

New Zealand – Hawaii Conservation Exchange Program 2002

Secretariat for Conservation Biology and Landcare Research New Zealand Ltd.

Travel Report

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1) Introduction

With support from Landcare Research, New Zealand, and the Secretariat for Conservation Biology, Hawai'i, under the New Zealand – Hawai'i Conservation Exchange Program, I visited New Zealand for 22 days in November, 2002. Through cooperative study and instruction among land managers, scientists, and educators Landcare Research New Zealand and the Secretariat for Conservation Biology promote conservation of New Zealand and Hawai'i's native ecosystems. My goal while visiting New Zealand was to meet with biologists and aviculturists to learn as much as possible about the New Zealander's avian captive rearing and release techniques, and to better understand the limiting factors imposed on New Zealand species as they relate to Hawai'i's.

Many avian species are threatened or endangered with extinction. Several of the rarest species are considered to be virtually "on the brink" of extinction. For these rarest of the rare, extreme conservation measures are required to not only prevent imminent extinction, but to actually recover the species. One of the conservation strategies that has proven to be effective is captive management, which includes propagation and release, translocation and cross-fostering. These captive management techniques have proven invaluable for the restoration of several endangered avian species including the Peregrine Falcon (*Falco peregrinus*), the Chatham Island Black Robin (*Petroica traversi*), and the Mauritius Kestrel (*Falco punctatus*). Several more endangered species are being re-established applying these techniques including the Aplomado Falcon (*Falco femoralis*), California Condor (*Gymnogyps californianus*), Andean Condor (*Vultur gryphus*), Puaiohi or Small Kauai Thrush (*Myadestes palmeri*), Harpy Eagle (*Harpia harpyja*), and Nene or Hawaiian Goose (*Branta sandvicensis*), to name a few. Although captive management techniques are proving to be an effective tool for species recovery, such strategies will only be effective if the limiting factors that created the species endangerment are managed or perhaps even eliminated.

By virtue of their geographic isolation, the islands of New Zealand and the Hawaiian archipelagos share many of the same conservation issues. This geographic isolation has created unique biota found nowhere else in the world. Of greatest conservation concern shared by New Zealand and Hawaii are the limiting factors which have greatly impacted the endemic avifauna. One such limiting factor is the introduction of terrestrial predators to an island ecosystem that has evolved without predatory mammals. This has had a devastating effect on the endemic bird populations. In addition, several other limiting factors such as loss of habitat, avian disease, and the introduction of ungulates have created a rapidly shrinking environment for the conservation and recovery of endangered insular species.

Although in many cases, the respective avifauna of New Zealand and Hawaii are taxonomically unique, their respective avian biota share many of the ecological equivalents including “crows” (e.g. the Kokako and `Alala, resp.), “thrushes” (eg. the Black Robin and Puaiohi, resp.), waterfowl (ducks and geese), and nectivores (eg. the Stitchbird and the Hawaiian Honeyeater and Honeycreeper families, resp). Understanding these environmental constraints and the taxonomic features common to both the New Zealand and Hawaiian biota will help Hawaii and New Zealand create a conservation synergy that will aid in the recovery of their respective endangered species of birds. Our goal is to utilize all the expertise now available in the discipline of captive management to maximize the potential of species recovery. This has proven to be effective for the Chatham Island Black Robin, once considered the rarest bird in the world, and will hopefully prove to be equally effective for the `Alala or Hawaiian Crow (*Corvus hawaiiensis*) which now numbers only 37 birds (two wild, 35 in captivity) and the Poouli (*Melamprosops phaeosoma*) who is now considered the rarest bird in the world with only three individuals remaining (all in the wild).

The Hawaii Endangered Bird Conservation Program, a conservation program of the San Diego Zoo, focuses on avian restoration using captive propagation and release methods. Our program has formed a unique partnership with several organizations including the State of Hawaii Division of Forestry and Wildlife, the U. S. Fish and Service, the U. S. Geological Survey Biological Resources Division, and private land-owners to recover endangered species and their habitat statewide. Of the estimated 140 endemic bird species prior to human colonization, 71 remain. Thirty species of those remaining are federally listed as endangered and half of these are critically endangered. The Hawaii Endangered Bird Conservation Program works to re-establish many endangered native Hawaiian forest birds including `Alala (Kuehler, et al 1994, 1995), Nene, Puaiohi (Kuehler, et al, 2000 a), Elepaio (*Chasiempis spp.*), and several Hawai'i Honeycreeper species including the Maui Parrotbill (*Pseudonester xanthophrys*), Hawai'i creeper (*Oreomystis mana*), Hawai'i Akepa (*Loxops coccineus*), `Akohekohe (*Palmeria dolei*), and Palila (*Loxioides bailleui*) (Kuehler, et al, 1996). Since 1993, the techniques required to hatch and rear such small and difficult passerine species have been developed and refined using historical models from zoos and private aviculture (Kuehler, et al 1993; 1995). The program in Hawai'i has hatched and reared over 300 chicks of 13 Hawaiian forest species with greater than 80% success in both hatching and rearing (Kuehler, et al, 2000 b). This is an excellent record.

2) First Impressions

The “Kiwis” are known for being very friendly and that was my first impression of New Zealand. The New Zealanders were very eager to learn as much as they could about our project, as I was about their projects. During my travels I noted the many similarities between Hawaii and New Zealand i.e. limiting factors including predator issues, related plants, and related birds.

3) Ecological Degredation of New Zealand

Many areas of New Zealand have lost their original ecology or have fragments of the original ecology. A population of about 4 million people and 50 million sheep (a ratio of 1:12.5 people to sheep) in an area smaller than the state of California can expect its share of encroachment. However, the New Zealanders have worked hard to recover smaller islands and even “islands” of land on the bigger islands. Several islands are now predator free and host their native flora and fauna. Definitely a feat to be proud of! Eliminating predators on islands is something Hawaii hasn’t yet been able to attain but, hopefully, we can follow in the Kiwi footsteps. X-cluder fences have been used in New Zealand to keep out introduced ungulates, and predatory mammals including even the smallest rodents. Our first X-cluder fence will be installed on the Big Island soon. Hand broadcast bait and traps (snap, have-a-heart, and fenn) are the main means of predatory mammal control in Hawaii, which is very time and labor consuming. Different predator baits are used in New Zealand than in Hawaii. The New Zealanders have used 1080 and brodifacoum to eliminate their pests. They rely on secondary poisoning to eliminate pests higher on the food chain (stoats, ferrets, possums, etc), something that may or may not be good to use in Hawaii. In Hawaii we mainly use diphacinone bait, an anticoagulant, for rodent and mongoose control. Studies have shown that diphacinone does not reside in the food chain and this may be good considering endangered bird species (i.e. the Io) might eat the poisoned rodents/weasels lower on the food chain. The New Zealanders have also implemented aerial bait drops to disperse their bait, something we are trying to approve with our legislation in Hawaii. Aerial bait drops have greatly sped up the predator elimination process in New Zealand, and would probably do the same in Hawaii.

4) Auckland Zoo

The Auckland Zoo is involved with several conservation projects using captive propagation and release methods including “Operation Nest Egg” dedicated to saving the Kiwi (*Apteryx spp.*) from extinction. Other avian species included in the Auckland Zoo’s native bird breeding program include the North Island Kaka (*Nestor meridionalis*), New Zealand Wood Pigeon or Kereru (*Hemiphaga novaeseelandia*), the Brown Teal (*Anas auklandica*), and the Blue Duck (*Hymenolaimus malacorhynchus*). The Auckland Zoo is also working to preserve reptiles including the Tuatara, and Chevron Skink. I spent five days at the Auckland Zoo (November 4-9) with Andrew Nelson, Team Leader Native Fauna, and his staff observing their techniques. Andrew has also worked on several recovery projects throughout New Zealand including the Chatham Island Black Robin. Learning about the Black Robin was of particular interest for me because we will be

receiving the Poouli, a species with a similarly very low population, in captivity to attempt to breed. It gives us much hope to know that a passerine species was brought back from only five individuals to about 250-300. I was able to read recovery plans on the North Island Kokako, Blue Duck or Whio, Kiwi, and was given handraising protocols from the Stone Curlew, Kiwi, and Dotterel. On November 6th I visited a Gannet colony. On November 7th I visited Tiri Tiri Matangi, a predator free island off the coast of Auckland where the native habitat and birds are being restored. Native bird species restored to Tiri include the Saddleback, Kokako, Takahe, Hihi, North Island Robin, Tui, Bellbird, Kereru, Fernbird, Brown Teal, and Little Spotted Kiwi. On Tiri staff provide nectar feeding stations for their birds until the habitat is restored to adequately carry the bird populations, something we might want to consider in Hawaii. On November 8th I gave a seminar on our project in Hawaii. On November 9th I met with Glen Holland, Manager Life Sciences. Glen is writing a book on handraising bird species of the world and was interested in using some of our protocols.

Kiwi are the smallest member of the ratites which includes Rheas of South America, Cassowaries of Australia and New Guinea, and Ostriches of Africa. Moas might also be a Kiwi ancestor. Kiwi are highly evolved and have several mammal, not bird, type features including lowered body temperature, paired functional ovaries, flightlessness, feathers that more closely resemble fur, and they are nocturnal. There are 4 species of Kiwi in New Zealand: the Brown, Tokoeka, Great Spotted, and Little Spotted. Kiwi have a 95% mortality before 3 weeks of age due to predators. Operation Nest Egg is designed to pull Kiwi eggs from the wild, hatch them at the zoo, and then release the Kiwi chicks back to the wild at 21-30 days. A grim example of the damage introduced mammals cause to Kiwi involves one dog that was lost from its owners in Kiwi territory over a six week period. During these six weeks this dog killed over 500 Kiwi. The Maori believe the Kiwi is the oldest of all Tanemahuta's bird family. The Kiwi are our older siblings and protective of us, in Maori belief. During my stay at the Auckland Zoo I was able to observe a Kiwi egg hatching, the care of several young chicks, and the care of an adult breeding pair with an egg.

The decline of the North Island Kokako or Wattled Crow has mainly been due to recruitment failure caused by depredation of eggs, chicks, and adults by ship rats and brushtail possums. The population of Kokako is estimated to be 400 pairs. The recovery plan for Kokako includes translocation to predator free islands, and captive propagation and release. The Auckland Zoo hosts one, newly acquired, pair of Kokako which haven't yet bred in captivity.

The Blue Duck is the only member its genus. It is a river species with a population of about 1200 pairs. There are 11-18 pairs in captivity (not just at the Auckland Zoo) that provides a range of 0-9 ducks/year for release. Limiting factors for the Blue Duck include habitat loss, disturbance, direct human impact, predation, and population fragmentation. At the Auckland Zoo I was able to observe a female on eggs and her management.

5) Mount Bruce National Wildlife Centre

Mount Bruce, Department of Conservation, is probably best known for their work with the Campbell Island Teal (*Anas aucklandica nesiotis*), the Hihi or Stitchbird (*Notiomystis cincta*), the Shore Plover (*Charadrius novaeseelandiae*), the Kokako or Wattled Crow (*Callaeas cinerea*), the Kaka, the Takahe (*Porphyrio mantelli*), and the Kiwi. From November 11-13 I followed Karen Barlow, Programme Manager, and her staff through their routines. On November 13th I gave a slide show on our Hawaii program.

The Campbell Island Teal is a very unique duck because it is flightless and nocturnal. Their decline is mainly due to introduced predators. Currently, the population of the Campbell Island Teal is precariously low with only about 20 birds on the predator free island of Dent and there are about 80 ducks in captivity. Releases to Codfish Island, another predator free island, are in the works. Captive management and predator elimination is slowly increasing the population. Most teals at Mt. Bruce are parent reared and I was able to see nesting teals during my stay and learn their management.

Hihi are extremely aggressive nectivores and are the only species of bird in the world (of ~9,000 total species) that mates front to front. Due to their aggression Hihi are very difficult to keep in captivity. Hihi have also been very troublesome to handraise. The youngest age a Hihi chick was successfully hand raised is from over 9 days. Several attempts were made to handraise chicks from hatch but failed. There were several Hihi eggs at the time of my visit and I was able to observe their management techniques for allowing the birds to breed without injury or mortality due to aggression. Not an easy task.

The North Island Kaka is an endemic parrot with populations declining due to predation (mainly at nests) by introduced mammals, and loss of habitat. The Mount Bruce facility is surrounded by 1,000 hectares of mostly native forest. Thirty five Kaka were released from Mt. Bruce to the surrounding forest. Predator proof artificial cavity nests have been hung in the Mt. Bruce forest for the released Kaka. Two thirds of the released Kaka at Mt. Bruce use the artificial nests. During my visit to Mount Bruce I helped hang new artificial nests and monitor chicks hatched in the nests. I also went along with staff radio tracking the Kaka.

Mount Bruce is also raising Grey Faced Petrels (*Pterodroma macroptera*) as a surrogate for the Chatham Island Taiko (*Pterodroma magentae*). I was able to observe their handraising techniques with 4 Grey Faced Petrel chicks.

6) Manaaki Whenua Landcare Research New Zealand, Ltd.

On November 14th I gave a seminar at the Manaaki Whenua Landcare Research New Zealand, Ltd. in Lincoln through Dr. Andrea Byrom. Their staff mainly focuses on predators and were very interested in Hawaii's predator control techniques, as I was about theirs.

7) Department of Conservation Twizel Area Office

The DOC's Twizel Area Office handrears and releases the very rare Kaki or Black Stilt (*Himantopus novaeselandiae*). From November 15-17 I followed Kaki aviculturist, Emily Sancha, through the egg and chick routines. During my stay in Twizel I was able to see many Kaki eggs and chicks – a perfect time to be there. I watched candling, incubation procedures, chick rearing procedures, and adult care. Veterinarian David Schultz of the Adelaide Zoo in Australia was visiting the Kaki project during my stay and I was able to observe some of his vet procedures (taking blood and analyzing blood on stilts) and his management suggestions. Emily and I broke out some stilt eggs to check for fertility. On November 15th I gave a seminar at the DOC office on our program in Hawaii. On November 16th I watched a seminar by Mark Saunders of Department of Conservation on the braided river ecology and management of the South Island. Their work focuses on river and wetland recovery.

The Kaki population is estimated at 84 wild adults, 61 subadults in the wild, and 25 captive adults. Loss of habitat and depredation by stoats, ferrets, possums, hedgehogs, and cats have been the main cause of decline for the stilt. Through captive management (rear and release), changes in diet providing iodine, predator control, and land management the stilt population has made a significant come back in just the last 3 years. A trend that will hopefully continue.

8) Alexandra Landcare Research New Zealand, Ltd.

Grant Norbury of Landcare arranged for a “lizard wrangling adventure” in the Macraes Flat area to visit some of New Zealand's megafauna. Macraes Flat hosts several species of reptiles including the endangered Grande Skink and endangered Otago Skink. A field operation run by DOC monitors the reptiles. I stayed at Macraes flat field station for two days (November 19-20). Causes of decline for the Grande and Otago skink includes depredation and habitat loss. Declines in the populations continue to be a mystery as predator control has been implemented in skink habitat but there persists to be a steady rate of decline. Scientists are looking more closely at the predator/prey relationship and are using small X-cluder fences in three skink habitats to try to pin down the exact predatory limiting factors. Macraes flat was also unique for its remains of the extinct giant Moa. I was shown Moa gizzard stones and bones.

9) Burwood Bush Takahe Rearing Unit

The Burwood Bush Reserve, Department of Conservation, handrears and releases the rare and flightless Takahe (*Porphyrio mantelli*), the largest living member of the rail family. Takahe were thought to be extinct until they were rediscovered in the late 1940s. The population low was around 120 individuals and now has risen to about 300 individuals. Mammalian predation and loss of habitat have been the main limiting factors for the Takahe. For two days (November 22-23) I followed team leader Max Smart and his staff. On November 22nd I was extremely lucky and observed 4 chicks hatch! I also observed the management routine for artificial incubation, hand-rearing, and adult care.

10) Overview

The information exchange between New Zealand and Hawaii is invaluable. I came away with a much better knowledge of captive release programs and management in the wild. The exchange also sparked ideas for modifications we could make within the Hawaii program. In turn, my hosts were especially eager to learn about our passerine handraising protocols because we have had much success in raising very small and delicate species. In regard to predator control, I believe we have much to model from the New Zealand techniques including X-cluder fences and aerial bait broadcasts. Overall, this was an immense learning experience provided by Landcare Research New Zealand and the Secretariat for Conservation in Hawaii. Hopefully, the opportunity for the exchanges will continue.