Friends of Hakalau



INSIDE:

I From our new President

2 Meet the current Board of Directors

Review Membership and 2012 accomplishments

3 Awards and Donations

4 Origins of Hakalau Forest NWR

5 2012 JJ Award Winner

6 Hawaii's Iconic Goose

Newsletter editor: Emily Needham

Welcome as new FOHF President RICK CAMP From the President's Perch

The New Year brought many new challenges for the Friends of Hakalau Forest (Friends) and the Hakalau Forest NWR (Refuge). First, there was a shuffling of the Board. Mililani Browning stepped down and Sheila Conant was elected. Mili served as the Treasurer last year and was integral in the Friends Youth Education program. Thank you Mili for your outstanding help; you and your cheerful smile will be missed. Sheila returns to the Board as our past, first President and founding member of the Friends. We welcome Sheila back and look forward to her spunky energy and can-do attitude. Thank you to the other Board Members-Creighton Litton, Emily Needham, Mike Scott, Rob Shallenberger, Layne Yoshida, J.B Friday, Secretary – and Dick Wass, Treasurer-for another year service.

A second challenge facing the Refuge and Friends this year arrived in the form of the sequester—mandatory budget cuts. The Refuge, along with all government agencies, is trying to make the best of things and keep managing endangered birds and plants. However, this provides several opportunities for the Friends to help. One example is we are helping the Refuge by covering the cost to repair two field vehicles, including the truck Baron Horiuchi uses to transport seedlings for volunteer outplantings. Another example of how the Friends are helping the Refuge is by painting the outside of the Volunteer Cabin.



Previously the Friends painted the interior of the Volunteer Cabin and last year we re-roofed it. Layne Yoshida is setting up and leading Service Trips to the Refuge later this year to complete our work on the Volunteer Cabin. If you would like to help please contact Layne through the Friends website and click on the "Contact Us" tab.

In addition to the above challenges, we have a wonderful opportunity through the Friends Youth Conservation Education program to continue youth education and outreach. We received a windfall

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President's Perch cont.

this last year through the diligence of Creighton Litton and Scott Laursen that provides monthly trips to the Refuge for groups of school aged children. The children get hands on experience planting trees that will support future populations of native birds, and partnering with USGS they participate in research to better understand conservation and our environment. A portion of those funds will be used for field trips to teach teachers about environmental conservation and provide educational materials so they can continue connecting keiki to our environment.

Hakalau Forest NWR is a unique and special place. Mike Scott provides a brief history about how the Refuge came to be and the incredible plant and animal diversity the Refuge conserves. This year the Friends looks forward to helping the Refuge conserve Hawaiian rain forest by strengthening the connection of children to our environment and filling in where the Refuge staff sees shortfalls. In addition, we are planning service trips, Members only field trips, continuing the FOHF Lecture Series in conjunction with Mokupapapa Discovery Center, and many other activities. Please check the Friends website at <u>www.friendsofhakalauforest.org/</u> often for updates on events.

Rick Camp, President FOHF



Standing L-R: Creighton Litton, Dick Wass, J.B. Friday, Emily Needham, Geoff Nelson, Rick Camp.

Kneeling: Rob Shallenberger, Layne Yoshida, Mike Scott. Insert: Sheila Conant

Membership Renewal and Lectures

by Layne Yoshida

As we start a new year, The FOHF Board would like to let you know about our 2012 projects and what we plan to do in 2013. One of the 2012 projects that FOHF sponsored was a lecture series dealing with the environment in Hawaii. The lectures dealt with 1) studies on the native Hawaiian Bat, 2) Koa Reforestation, and the 3) study of several native birds. The three lectures were held at the auditorium of the Mokupapapa Discovery Center and, since they were well attended, we are planning more.

Our Friends group also sponsored an overnight trip to the refuge to help with invasive weed control. This weekend trip was a success and reported on in a previous newsletter.

In 2013 we are coordinating a day visit to the refuge and two overnight trips. Details concerning these outings will be provided to members in the coming months and since these trips will be able to accommodate only a limited number of members, get your name on the list early by contacting me.

Each year our organization attempts to fund at least one large project at the refuge. In 2012 that project was the re-roofing of the volunteer cabin at the refuge (see newsletter #13). This year we will be helping repaint the volunteer cabin. Again contact me to get your name on the list.

Our organization is also proud of the fact that we are helping to fund several programs that benefit students in Hawaii by introducing them to environmental concerns and possibilities. More information is available on our website.

Everything that we do depends upon a sustained and increasing membership. When you receive your membership renewal notice please remember that your membership is helping to do a lot, not only for the refuge but also in protecting the environment and in educating our future leaders. If you know others who are interested in the refuge or in environmental issues facing our island let them know that by joining our organization they are protecting our environment.

If you are interested in helping with any of these projects, please contact Layne Yoshida at (808) 640-0435

The Rachel Carson Award for Scientific Excellence (Individual) goes to

BARON HORIUCHI

"in recognition of his outstanding and unique contribution toward native plant restoration at Hakalau Forest National Wildlife Refuge on Hawai'i Island. Baron's contributions, as the only horticulturalist in the Fish and Wildlife Service, have been critical to adaptive management efforts and recovery of rare native plants. Baron propagates plant species never before propagated, and actively experiments with new ways to germinate, propagate, and out-plant endangered and common native plant species."

http://www.fws.gov/science/awards.html



Baron with University of Idaho students.

"Please join me in congratulating our 2012 Science Award Winners...As we all face increasingly complex challenges in wildlife management and conservation, innovation and excellence in science are crucial to improving the Service's knowledge and management of fish and wildlife resources." Jim Kraus, Refuge Manager



Don't forget your donation to the "JJ Conservation Education Grant" so it can be doubled !

Matching Donation Offered for JJ Conservation Education Grant

Kirk Dawson has generously offered to match up to \$500 of new contributions to the Jack Jeffrey Conservation Education Grant program. The Friends of Hakalau Forest awards this grant each year for a project which directly contributes to the conservation education of Big Island students, teachers, residents and visitors, and which focuses on native terrestrial species/ecosystems at Hakalau Forest National Wildlife Refuge. The program was established upon Jack's December 2008 retirement as Hakalau's wildlife biologist to honor his 20 years of dedicated service and his desire to "give back to the Refuge". Four annual grants of \$1,000 each have been awarded beginning with the 2010 grant to UH Hilo graduate student Colin Phifer to train students to assist with data collection for his study of relationships between plant pollinator communities and seed production and the development of Hawaii-specific pollination lessons to share with local K-8 teachers. The 2011, 2012 and 2013 grants were all awarded to 'Imi Pono no ka 'Aina, the environmental education program of the Three Mountain Alliance, to bring students to the refuge for conservation biology education and field experience. The \$500 we raise here, combined with Mr. Dawson's \$500 will suffice for the 2014 award. If this call generates enough funds, the grant could even be increased for 2014. Let's get out our checkbooks and take advantage of Kirk Dawson's exciting offer to double your money! Checks can be mailed and payable to Friends of Hakalau Forest, P.O. Box 6065, Hilo, HI 96720 with a notation the money is designated for the JJ Conservation Education Grant.

Jack Jeffrey in action



Origins of Hakalau Forest National Wildlife Refuge

J. Michael Scott and Sharon L. Scott



In 1975, shortly after I moved to Hawaii to work for the Forest Wildlife Service (FWS), it became obvious to me that there was insufficient knowledge about most of the native Hawaiian birds or their habitats to make informed decisions about how to preserve them or what lands were needed for additional habitat. So, with encouragement and support from Eugene Kridler, US

Fish and Wildlife Service regional biologist in Honolulu, we planned and acquired funding for the Hawaiian Forest Bird Survey, which was officially launched in the spring and summer of 1976, beginning in the Ka'u district on the southern slopes of Mauna Loa on the island of Hawaii and ending on the island of Kauai in 1981.

John Sincock, USFWS research biologist on Kauai, and I led the first survey in the forest of Ka'u. The Hamakua coast slope of Mauna Kea on the Big Island, future location of the Hakalau Forest National Wildlife Refuge, was surveyed in the summer of 1977, and the Kona coast of that island, including the area of the Kona addition to Hakalau Refuge, was surveyed in 1978. Between 1976 and 1981 we surveyed along 1401 km of transects, during 20,789 eightminute count periods The area surveyed was all native forest bird habitat on the main islands from tree line down to the cane fields, highway or coast whichever came first. Funding for this huge undertaking came from the US Fish and Wildlife Service along with in-kind support from Hawaii Division of Forestry and Wildlife, US National Park Service and the US Forest Service.

During the survey we recorded thirty native bird species, thirty three nonnative species, counted hundreds of thousands of birds, characterized, assessed and mapped vegetation (Jacobi 1989), documented occurrence of nonnative species (Warshauer et al. 1983), damage from feral animals and recorded the presence of rare plants. Oahu was surveyed separately by Rob Shallenberger (Shallenberger and Vaughn 1978).

The primary objective of the survey was to assess the population status of the endangered forest birds of Hawaii and determine: how many species there were remaining, where they were found, how they are distributed and their density in various areas, who owned or managed the land on which they were found, and the conservation status of that land. This objective was formed and clarified during a period of months with conversations between managers and researchers including Gene Kridler and John Sincock of the US Fish and Wildlife Service and state wildlife biologists including Ernie Kosaka, David Woodside, Ronald Walker and John Giffin who were all key participants in this planning stage. Because of this diverse input, we had also included vegetation mapping in our survey process and documented occurrence of non-native species and damage from feral animals as well.

Finally, using the results from this survey, we used a simple geographical information process, "Gap Analysis", to overlay maps of the bird and plant distribution over maps of areas designated as reserves or protected areas. We found that there was an almost total lack of overlap between the reserve areas and the location of the endangered species. The lack of overlap identified the gaps in management protection for the endangered forest birds of Hawaii. A photo of these non-overlapping maps became one of the most powerful tools we had when it came to sharing information from the Hawaiian Forest Bird Survey with the public and especially with the governmental and private organizations that could put the information to use to establish more and better reserves. Henry Little and Kelvin Taketa used it to develop The Nature Conservancy's Endangered Hawaiian Forest Bird Project and later the Endangered Hawaiian Ecosystem Project (TNC 1982). Because the area on the high slopes of Hamakua was particularly rich in species diversity, with high densities of Akiapola'au, Hawaii creeper, and Akepa and with records of the Hawaii O'u on adjacent lands, it was designated and established as Hakalau Forest National Wildlife Refuge on October 28, 1985.

Information from the Forest Bird Survey and other sources was also used by TNC, US Fish and Wildlife Service and the Natural Areas Reserve System to establish and design natural area reserves other than Hakalau e.g. Kamakou, Waikamoi and others, that would fill gaps in conservation coverage for endangered plants and animals on Hawaii. Maui, Molokai, Kauai and Lanai.

The results of the Forest Bird Survey also laid a foundation for a generation of research on the effectiveness of management activities. Additionally a number of the people who were members of the HFBS continue to work toward conserving Hawaii's unique biota. These folks include Jack Jeffrey, who became Hakalau's first wildlife biologist, Carter Atkinson and Jim Jacobi who are both now research biologists for the US Geological Survey in Hawaii, Tonnie Casey who went to work as a biologist with Bishop Estate and Frederick Warshauer who worked for several organizations as a botanist.

Additional reading .. on next page

Origins .. continued

Additional Reading on the history of Hakalau Forest Wildlife Refuge:

Jacobi, J.D. 1989. Vegetation maps of the upland plant communities on the islands of Hawai'i, Maui, and Molokai and Lanai. Technical report 68. Cooperative National Park Resources Studies Unit. Department of Botany, University of Hawaii, Honolulu.

Scott, J.M., C.B. Kepler, P. Stine, H. Little, and K. Taketa 1987. Protecting endangered forest birds in Hawaii: The development of a conservation strategy. Transactions 52nd N.A. Wildlife and Natural Resource Conference 348-363.

Scott, J.M., .S. Mountain spring, F.L. Ramsey, and C.B. Kepler. 1986. Forest bird communities of the Hawaiian Islands: their dynamics, ecology and conservation. Studies in Avian Biology, Number 9. Shallenberger, R and G.K. Vaughn. 1978. Avifaunal survey in the central Koolau range, Oahu. Ahuimana Productions

The Nature Conservancy 1982. Endangered Hawaiian Forest Bird Project TNC Honolulu Hawaii

Warshauer, F.R. Jacobi, J.D., A.M. La Rosa, J.M. Scott, and C.W. Smith. 1983 The distribution, impact and potential management of the introduced vine *Passiflora mollissima* in Hawaii. Technical Report 48: Cooperative National Park Research Studies Unit, University of Hawaii, Honolulu.



2012 Jack Jeffrey Conservation

Education Award winner

Imi Pono no ka'Aina (Imi Pono), the environmental education program for The Three Mountain Alliance (TMA) watershed partnership, is very greatful to receive the 2012 Jack Jeffrey Conservation Education Award. The award will be used to support two, threeday trips to Hakalau Forest National Wildlife Refuge. Each trip will be a part of a ten-day summer student enrichment program, which is available to students in grades 6-12. A total of 24 students, 12 per session, will be included in the program. The Hakalau portion of the program includes a day working in the Laulima greenhouse, learning about the endangered 'oha'wai and mintless mints and carefully transplanting tiny keiki plants. Day two is a day full of out-planting. Students work together to plant hundreds of understory species that will one day provide habitat for native birds and support a healthy watershed. All our hard work, if you can even call it that, is all worth it when on the last day we head to Pua'akala and are able to get a closer look at the jewels of the forest, the birds! While at Pua'akala the students also learn about and collect data on the phases of Koa and Ïhi a as part of a phenology and climate change project through the Nature of Learning Program. Hakalau is truly a special place. The JJ Award will ensure that island youth are able to see the mist settle on the Koa leaves while trying to find a rare bird or work along side a friend to restore a mountain experiences that enrich and cultivate stewardship of the land.

Mahalo Nui, Lahela Camara

For more information about 'Imi Pono please contact: Lahela Camara, Program Coordinator Phone: 808-333-8241 Email: lahelacamara@gmail.com

"The following article 'The Nene: Hawaii's Iconic Goose' is reprinted with permission of The Wildlife Society. <u>The article originally appeared in the The Wildlife Professional, Fall 2011 issue."</u>.

The Nēnē: Hawaii's Iconic Goose

A MIXED BAG OF SUCCESSES, SETBACKS, AND UNCERTAINTY

By Steven C. Hess



Courtesy of Steven C. Hess

Steven C. Hess, Ph.D., is a Research Wildlife Biologist with the U.S. Geological Survey's Pacific Island Ecosystems Research Center at Hawaii Volcanoes National Park. w research with satellite telemetry shows that the endangered Hawaiian goose, or nēnē (*Branta sandvicensis*), appears to be making a comeback—and a puzzling one at that.

In 2009, two nēnē ganders with satellite transmitters were found making regular visits to a rugged site high on the Mauna Loa volcano, where the birds had last been reported 60 years earlier. Ancient Hawaiians had named the site Kipuka Nēnē, indicating that it had been a common location for the birds. An early record of the site described it as "dotted with small, shallow, permanent pools and covered with an open ohia forest with a ground cover of lush grass and sedges" (Smith 1952). By 2009, those pools and sedges were long gone, altered by one of the largest lava flows on Earth. The habitat had changed, but the nēnē had returned. Nearly extinct by the mid-20th century, how did nēnē recover and learn to find such isolated destinations once used by their ancestors?



In March 2009, this nēnē became the first to receive a satellite transmitter, carefully attached with a teflon ribbon at Hawaii Volcanoes National Park. Tracked by biologists, this bird set an elevation record at the Kahuku unit of the park, flying up to 8,789 feet.

Biologists have been understandably astonished by the comeback of the nēnē, Hawaii's state bird. By 1950, there were only 20 or 30 birds known to exist in the wild, all of them on the Big Island of Hawaii. Today, there are roughly 900 on Hawaii Island and perhaps as many as 2,000 scattered across the four islands of Hawaii, Maui, Kauai, and Molokai. In addition, nēnē have appeared in ancestral places of which they could not possibly have any knowledge. For example, the birds discovered at Kipuka Nēnē came from the Hakalau Forest National Wildlife Refuge some 50 miles away, yet the Hakalau population did not exist prior to 1996. Researchers are hoping that telemetry data can shed some light on the mystery.

A Bird's Rapid Fall

Scientists believe that nēnē evolved from Canada geese (*Branta canadensis*) that made landfall in the Hawaiian Islands some 890,000 years ago (Paxinos *et al.* 2002). There they evolved in isolation from all predatory mammals. But beginning about 1,000 years ago, nēnē began a precipitous decline, sparked by the introduction of several predators such as Polynesian rats (*Rattus exulans*) and dogs (*Canis familiaris*). Norway rats (*Rattus norvegicus*) and domestic cats (*Felis catus*) appeared soon after Captain James Cook reached the Hawaiian Islands in 1778 (Tomich 1986, Steadman 1995). The small Indian mongoose (*Herpestes auropunctatus*) was then intentionally introduced in 1883 to control rodents in agricultural lands (Tomich 1986).

Perhaps the worst invader, the black rat (*Rattus rattus*) arrived on ships in the late-1800s (Atkinson 1977). Nēnē eggs, nestlings, goslings, and even adults (along with other ground-nesting birds) became subject to predation by each new species of introduced mammal, yet black rats irrupted repeatedly and uncontrollably without any predators that could effectively control them. In addition to burgeoning predator populations, unregulated hunting and lowland habitat destruction also contributed to the decline of the nēnē.



The bird's plight had become so grave by 1949 that territorial fish and game biologist J. Donald Smith promoted a captive propagation program high in the saddle of Hawaii Island at Pohakuloa. He began with two pair of nēnē contributed by Herbert Shipman, a prominent businessman who had kept a flock since 1918 (Kear and Berger 1980). The founding pool of captive breeders—not more than a handful of closely related geese-experienced several setbacks from mortality, low fertility, and poor hatching success in the cool, arid climate of Pohakuloa. The addition of three wild nene from Mauna Loa in 1960 enabled the program to build a flock that contributed to the restoration of nēnē throughout Hawaii's state lands and national parks. Unfortunately, many of the captive-raised nēnē were less likely to make long-distance movements than their wild counterparts, and more likely to die of starvation or dehydration during extended drought (Black et al. 1997). Decades of captive breeding, releases into the wild, habitat management, and predator control have restored the nēnē to four of Hawaii's largest islands.

Pattern of Puzzling Flights

Although unimpressive fliers by the standards of migratory goose species worldwide, nēnē on Hawaii Island in the late 1990s started to make regular movements between the windward side, leeward Kona, and a large natural area on Mauna Loa called Kahuku, which was acquired by Hawaii Volcanoes National Park in 2003. Yet these appearances raised more questions than they answered: Were nēnē making direct flights between these sites or stopping at places along the way? If they were stopping, what threats did they face? What kind of habitats and foods were they using? Given that geese are social animals, had a small number of survivors passed this knowledge on to contemporary descendants?

Under normal circumstances, questions like these would be well-suited for conventional radiotelemetry. However, the interior of Hawaii Island is extraordinarily rugged with lava flows, dense rainforests, and high volcanoes. A great deal of helicopter flight time was therefore required to track nēnē along their journeys. Researchers determined that satellite telemetry would provide an effective, less-costly alternative to tracking nēnē, but would require a fine-scale application of the technology, which had typically been applied to track migratory birds across much vaster distances.



Credit: Christina Cornett

During three years of a collaborative study conducted from 2009 to 2011 by the U.S. Geological Survey and the National Park Service, 11 nēnē ganders were fitted with backpack harnesses and 40-gram solar-powered platform transmitter terminals (PTTs) provided by the U.S. Army's Pohakuloa Training Area. These PTT devices have provided reliable GPS data on a daily basis, acquiring more than 8,500 locations to date. One of the most frequently used travel routes is along the windward slopes of Mauna Kea and Mauna Loa volcanoes, with nēnē stopping to roost once again at their historic haunt of Kipuka Nēnē. In addition, data show that east-west and north-south island crossings from leeward Kona and the high volcanoes intersect at the meeting grounds of Kipuka Ainahou in the island's high saddle, where some of the last wild nēnē were observed.

Despite the fact that nēnē are among the most terrestrial of all geese, study subjects often locate small ponds or water catchments, which are unusual features to use, given the lack of natural sources of standing water on young volcanic islands. Telemetry subjects have been located at anywhere from 199 meters (653 feet) to 2,679 meters (8,789 feet) in elevation, and from dry lowland Kona grasslands to native subalpine shrublands, exhibiting a pattern of seasonal movement—from lowland breeding grounds to high-elevation non-breeding areas—not seen since the beginning of the 20th century. With leg band and transmitter in place, a nēnē prepares to swim in a water hazard at a local golf course. Federally listed as endangeredand the only remaining goose endemic to Hawaii-nēnē often make use of humanaltered landscapes such as golf courses and agricultural fields, where they face threats from predation and are sometimes considered pests.



Two Steps Forward, One Back?

Although managers are encouraged by the re-establishment of these traditional movement patterns, the challenges $n\bar{e}n\bar{e}$ face in the future are almost overwhelming, as they must transcend their lack of genetic diversity in a changing climate and survive in an ever-shrinking natural environment with many non-native enemies.

Hawaii is on the cusp of controlling some of its most damaging invasive predators. Rodenticides that have been used in bait stations since 1997 are now registered for aerial distribution, and mongooses are particularly susceptible to low dosages of the newly approved anticoagulant diphacinone (Hess *et al.* 2009). Hawaii Volcanoes National Park has also adapted a predator-proof fence design from New Zealand to keep feral cats, feral pigs, and mongooses out of a two-acre pen, a protected area where nēnē return each year to breed.

The island of Kauai has different challenges. Due to an absence of mongooses there, nēnē have become superabundant, reaching more than 1,000 individuals on the small island. This is posing a serious airstrike hazard at the local airport, and forcing the state to devise a plan to move the endangered birds, suspending state laws as necessary to expedite the move to other suitable locations. Some of the Kauai nēnē will likely soon be relocated to reduce airstrike hazards and bolster other island populations, but reintroduction to other islands poses its own risks. The Kauai nēnē may carry chronic avian malaria infections that must be treated prior to release. In addition, their genetic pedigree is far from optimal (Rave et al. 1995). Because the Kauai population was founded by a small number of individuals, it has suffered multiple bottlenecks, and like any bird species that has plummeted to fewer than 50 individuals, nēnē already experience significantly lower hatching success than more robust species (Rave et al. 1999, Heber and Briskie 2010).

On Hawaii Island, satellite telemetry has shown that nēnē move among multiple breeding populations. If Kauai nēnē are introduced to Hawaii Island, they would undoubtedly interbreed and thereby contribute substantially reduced genetic diversity to the entire Hawaii Island metapopulation, which is more genetically diverse than Kauai's but still not self-sustaining. This interbreeding could potentially reduce hatching success in the Hawaii Island population.

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Some extent of low genetic diversity is to be expected among island populations, but a comprehensive study of population genetics would help determine the potential consequences of mixing Kauai nēnē with those of other islands.

Managers have other cause for concern. Nēnē eat valuable agricultural crops like lettuce and vegetables, but because the birds are protected, farmers have become increasingly frustrated by an inability to repel the birds from croplands. In addition, although nēnē have adapted to use human-altered landscapes such as golf courses, they face mortality from attacks by dogs and other hazards. For instance, nēnē are frequently attracted by food handouts to dangerous situations near roads where they are struck by vehicles (Banko *et al.* 1999). Toxoplasmosis, transmitted through cat feces, has also been identified as a cause of nēnē mortality (Work *et al.* 2002).

The U.S. Fish and Wildlife Service Recovery Plan for nēnē (2004) calls for restoring the birds to some of their former low-elevation locations, such as Kona and Maui. Yet this may prove difficult because there are few remaining undeveloped lowland areas without potential human-wildlife conflicts. Wildlife managers would therefore benefit from knowing if there are ways to favor wild behaviors in nēnē, providing protection in natural areas away from anthropogenic hazards.

Climate change threatens further consequences for Hawaii's nēnē and other at-risk species. The prospect of more frequent El Niño events in the Pacific may mean less precipitation for islands like Hawaii, which has areas that normally receive four to six meters or more of rainfall annually (Trenberth and Hoar 1996, Loope and Giambelluca 1998, Chu and Chen 2005). Nēnē experience substantially higher mortality from starvation in drought years (Black *et al.* 1997), and 2010 was one of the most extreme droughts on record in Hawaii. If drought is the wave of the future, the 21st century may be as perilous as the 20th century was for Hawaii's nēnē.



For a full bibliography and additional resources about the Hawaiian nēnē, go to *www.wildlife.org.*

