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Pacific Island Ecosystems Research Center: Annotated Bibliography 1994 – 2004

Compiled by David A. Helweg

Report Series OF 2005-1290

U.S. Department of the Interior
U.S. Geological Survey

U.S. Department of the Interior
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U.S. Geological Survey
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U.S. Geological Survey, Reston, Virginia 2005
Revised and reprinted: 2005

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Suggested citation:
Helweg, David A., 2005, Pacific Island Ecosystems Research Center: Annotated Bibliography 1994-2004. USGS Report Series OF 2005-1290. For additional copies please contact the author at USGS-PIERC Kilauea Field Station, POB 44, Hawaii National Park, HI 96718.

Foreword.

In 1994, the Pacific Islands Science Center (PISC) was established with the creation of the National Biological Survey (NBS). On October 1, 1996, NBS was transferred by Congress to the U.S. Geological Survey (USGS) as the Biological Resources Division. As part of the reorganization, PISC was renamed the Pacific Island Ecosystems Research Center (PIERC) to reflect the Center's increasing emphasis on ecosystem science.

The primary responsibility of PIERC is to assist resource managers in the Pacific region by providing them with sound biological information and with assistance in applying the information to their needs. The mandated field of operations for PIERC includes the Hawaiian archipelago plus current U.S. holdings and former Trust Territories in Polynesia and Micronesia. This is an area spanning six time zones, from 30 degrees North to 15 degrees South of the equator, and from 155 degrees East to 130 degrees West across the International Date Line.

The mission of PIERC is to work with others to provide scientific understanding and technologies needed to support and implement sound management and conservation of our Nation's biological resources occurring within cultural, sociological and political contexts of the State of Hawai'i and other locations in the Pacific Basin affiliated with the United States. PIERC fulfills this mission by 1) investigating biological resource issues faced by Federal and State land managers and providing meaningful information important for management purposes; 2) providing scientific information necessary to effectively intercede in the decline of native biodiversity in this region; and 3) providing the best possible information concerning the nature, structure, condition, evolution, and importance of the biodiversity of the Pacific region.

We offer this Annotated Bibliography as an introduction to our research for all those who share our quest for understanding and interest in preserving and restoring native ecosystems in Hawaii and other Pacific islands. Within each section, works are sorted by year and then author. Hawaiian words have been spelled as they were in the original work, and variants provided in square brackets to enhance searchability. A brief summary of each peer-reviewed work has been provided wherever possible. We invite you also to explore the USGS, our Center, and partners through the following websites:

- *www.usgs.gov/pierc.html*
- *www.hear.org*
- *www.pbin.gov*

with aloha,

William W.M. Steiner, Ph.D.
Director, USGS Pacific Island Ecosystems Research Center

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Peer-Reviewed Journal Articles

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> Methods to determine the age and sex of ‘Oma‘o were developed on the basis of 66 museum specimens and 149 live ‘Oma‘o captured in mist nets on the island of Hawai‘i. Our results indicate that ‘Oma‘o can be separated into three age classes (i.e., hatching year , second year, and adult) on the basis of plumage, but that adult ‘Oma‘o cannot be reliably sexed by plumage or body measurements.

Pratt, T.K., S.G. Fancy, C.K. Harada, G.D. Lindsey, & J.D. Jacobi (1994). Identifying sex and age of Akiapolaau. *Wilson Bulletin,* **106**: 421- 430. [‘Akiapōlā‘au]

> Methods for identifying the sex and age of the Akiapolaau (*Hemignathus munroi*), an endangered honeycreeper found only on the island of Hawaii, were developed by examination and measurement of 73 museum specimens and 24 live birds captured in mist nets. Little geographic differentiation was observed among four sites that spanned 2100 m in elevation and included extremely wet lowland rainforest, montane mesic forest, and subalpine xeric woodland.

Ralph, C.J. & S.G. Fancy (1994). Demography and movements of the endangered Akepa and Hawaii Creeper. *Wilson Bulletin,* **106**: 615-628. [‘Akepa]

> We studied populations of the endangered Akepa (Loxops coccineus coccineus) and Hawaii Creeper (Oreomystis mana) at four sites on the island of Hawaii. Both species appears to defend Type-B territories typical of cardueline finches, retained mates for more than one year, and showed strong philopatry. Home ranges for Hawaii Creepers were larger than those for Akepa; no difference was found between home rang sizes of male and females for either species.

Ralph, C.J. & S.G. Fancy (1994). Demography and movements of the Omao *(Myadestes obscurus). The Condor*, **96**: 503-51 1. [‘Oma‘o; ‘Ōma‘o]

> Density, age-specific survival, timing of breeding and molting, and movements of the Omao or Hawaiian Thrush were studied at four sites on the island of Hawaii. Omao showed strong site fidelity and were highly sedentary. Mean home range size did not differ between sexes or study sites.

Ralph, C.J. & S.G. Fancy (1994). Timing of breeding and molting in six species of Hawaiian honeycreeper. *The Condor*, **96**: 151-161.

> The timing of breeding and molting was studied in six species of Hawaiian honeycreepers with differing food habits on the Island of Hawaii. All six species of honeycreeper had extended breeding and molting periods with peak breeding between April and July and peak molting in August. Although overlap of breeding and molting was rare, some individuals may have been able to allocate energy resources to both activities because of low clutch size, extended brooding of young, and a low rate of molting.

Lindsey, G.D., K.A. Wilson, & C.M. Herrmann (1995). Color change in Hughes's celluloid leg bands. *Journal of Field Ornithology*, **66**: 289-295.

Color change was recorded in 10 colors for 237 Hughes celluloid bands attached to the tarsi of 84 birds for up to 5 yr and for 45 celluloid bands exposed to natural sunlight on Mauna Kea, Hawaii. For long-term studies, biologists should select only those colors that can be recognized for the duration of the study or use another type of color and that is more resistant to fading or discoloration.

Lindsey, G.D., S.G. Fancy, M.H. Reynolds, T.K. Pratt, K.A. Wilson, P.C. Banko, & J.D. Jacobi (1995). Population structure and survival of Palila. *The Condor*, **97**: 528-535.

The Palila (*Loxioides bailleui*) is an endangered Hawaiian finch belonging to the family Fringillidae, subfamily Drepanidinae. Presently, the palila occupies <5% of its historic range and is confined to mamane (*Sophora chrysophylla*) and mixed mamane and naio (*Myoporum sandwicense*) forests above 1950 m elevation on Mauna Kea, Hawaii. In 1987, we began a study of palila demography, and here report on the age and sex structure, and annual survival of the only remaining palila population.

Ralph, C.J. & S.G. Fancy (1995). Demography and movements of Apapane and Iiwi in Hawaii. *The Condor*, **97**: 729-742. ['Apapane; 'I'iwi; I'iwi]

Density, annual survival, philopatry, and movements of two species of Hawaiian honeycreepers, the Apapane (*Himatione sanguinea*) and the Iiwi (*Vestiaria coccinea*) were studied at four sites on the island of Hawaii. Highest densities of both species occurred during the breeding season and were highly correlated with flowering by *Metrosideros*. Widespread movements of Apapane and Iiwi in response to the seasonal and patchy availability of *Metrosideros* nectar have important implications for disease transmission since Apapane are the primary carrier of avian malaria in Hawaii, and Iiwi appear to be highly susceptible to mortality from malaria.

Engilis, A., Jr., T.K. Pratt, C.B. Kepler, A.M. Ecton, & K.M. Fluetsch (1996). Description of adults, eggshells, nestling, fledgling, and nest of the Poo-uli. *Wilson Bulletin*, **108**: 607-619. [Poouli; Po'o-uli; Po'ouli]

The Poo-uli (*Melamprosops phaeosoma*), a Hawaiian honeycreeper discovered on the island of Maui in 1973 and now nearing extinction, is represented in museums by only two specimens. Based on the first observations of a nesting p[air and re-examination of the two specimens, we describe the adult male and female, eggshells, nestling, and fledgling Poo-uli.

Fancy, S.G., S.A. Sandin, M.H. Reynolds, & J.D. Jacobi (1996). Distribution and population status of the endangered 'Akiapōlā'au. *Pacific Science*, **50**: 355-362. [Akiapolaau; 'Akiapola'au]

The 'Akiapōlā'au (*Hemignathus munroi*) is an endangered Hawaiian honeycreeper that is found only in high-elevation native forests on the island of Hawaii. We used a newly developed analysis approach to estimate the population size for 'Akiapōlā'au based on surveys conducted during 1990-1995. We estimate that there are 1163 ± 54 (90% CI) 'Akiapōlā'au in the world. The distribution has been greatly reduced in the Ka'ū District, where the estimated population has declined from 533 (ca. 1980) to 44 birds, and relic populations in māmane forest and South Kona are likely to become extinct within the next five years.

Jacobi, J.D., S.G. Fancy, J.G. Giffin, & J.M. Scott (1996). Long-term population variability in the Palila, an endangered Hawaiian honeycreeper. *Pacific Science*, **50**: 363-370.

Annual surveys of the entire range of the endangered Palila (*Loxioides bailleui*) on Mauna Kea, Hawai'i, were conducted during 1980-1995. Population size outside of the population center near Pu'u Lā'au has decreased significantly since 1980.

Kepler, C.B., T.K. Pratt, A.M. Ecton, A. Engilis, Jr., & K.M. Fluetsch (1996). Nesting behavior of the Poo-uli. *Wilson Bulletin,* **108**: 620-638. [Poouli; Po'o-uli; Po'ouli]

We describe two sequential nesting of a pair of Poo-uli (*Melamprosops phaeosoma*), a Hawaiian honeycreeper nearing extinction. Weather is usually poor throughout the year in the relictual range of the Poo-uli and is likely to impact nesting success. We suspect that factors such as decreasing food availability, habitat disturbance by feral pigs, and

predation by non-native mammals may be more important to the Poo-uli's decline than vulnerability arising from the species' nesting behavior.

Meyers, J.M., W.J. Arendt, & G.D. Lindsey (1996). Survival of radio-collared nestling Puerto Rican Parrots. *Wilson Bulletin,* **108**: 159-163.

A remnant population of the critically endangered Puerto Rican Parrot (*Amazona vittata*) survives in the Luquillo Mountains of northeastern Puerto Rico. Verifying that at least two of the radio-collared parrots were alive demonstrates that this type of radio attachment may have little influence on juvenile survival. Another study of 15 parrots of four *Amazona* species in Puerto Rico resulted in no mortalities as a consequence of similarly design radio-collars that remained attached for up to 1.8 years.

Pratt, T.K., C.B. Kepler, & T.L.C. Casey (1996). Po'ouli (*Melamprosops phaeosoma*). *The Birds of North America*, No. 272 (A. Poole & F. Gill, eds.). The Birds of North America, Inc., Philadelphia, PA. [Poouli; Po'o-uli; Poo-uli]

A husky Hawaiian honeycreeper drably colored in shades of brown, the Po'ouli (pronounced poh-oh-U-lee and translated "black-faced) was named for its most striking feature by M. Kawena Pukui, noted authority on Hawaiian language and culture. The Po'ouli is listed as an Endangered Species by both federal and state governments. The state of Hawaii manages the Hanawi Natural Area Reserve to protect the bird's habitat, and a recovery program is attempting to improve the future of the fewer than 10 surviving Po'ouli.

Slotterback, J.W. (2002). Band-rumped Storm-Petrel (*Oceanodroma castro*) and Tristram's Storm-Petrel (*Oceanodroma tristrami*). *The Birds of North America*, No. 673 (A. Poole and F. Gill, eds.). The Birds of North America, Inc. Philadelphia, PA.

The Band-rumped Storm-Petrel ranges throughout the Pacific and Atlantic Oceans, breeding away form continental areas on remote islands including the Hawaiian Archipelago where it is a candidate for listing because of its small local population size. With twice the body mass of the Band-rumped Storm-Petrel, Tristram's Storm-Petrel is one of the largest of all the storm-petrels, sedentary, breeding only in the remote northwestern Hawaiian Islands and small islands off Japan. Because of the secretive habits of these species, and remoteness and/or inaccessibility of their breeding sites, estimates of populations are out of date and inaccurate, making their protection difficult.

Ralph, C.J. & S.G. Fancy (1996). Aspects of the life history and foraging ecology of the endangered Akiapolaau. *The Condor*, **98**: 312-321. ['Akiapōlā'au; 'Akiapola'au]

Relative abundance, breeding ecology, annual survival, home range, and foraging ecology of the Akiapolaau (*Hemignathus munroi*), an endangered Hawaiian honeycreeper, were studied on the island of Hawaii. Akiapolaau used koa (*Acacia koa*) for foraging much more than expected based on koa availability, and most Akiapolaau occurred in old-growth koa and ohia (*Metrosiderous polymorpha*) forests. Protection of remaining old-growth koa and ohia forests above the mosquito zone are critical to the survival of the species.

Ainley, D.G., T.C. Telfer, & M.H. Reynolds (1997). Townsend's and Newell's Shearwater *(Puffinus auricularis townsendi* and *P. a. newelli). The Birds of North America*, No. 297 (A. Poole & F. Gill, eds.). The Birds of North America, Inc., Philadelphia, PA.

The Townsend's Shearwater is confined to the Revillagigedo Islands off the western coast of Mexico, where its small population is jeopardized. Also threatened, the related Newell's Shearwater, once widespread in the main Hawaiian Islands, has been reduced to a few remnant breeding colonies. Habitat loss due for agriculture and development, urbanization, and predation from introduced mammals are significant factors responsible for decreasing populations in these birds.

Fancy, S.G. & C.J. Ralph (1997). 'Apapane *(Himatione sanguinea). The Birds of North America*, No. 296 (A. Poole & F. Gill, eds.). The Birds of North America, Inc., Philadelphia, PA. [Apapane]

The 'Apapane is the most abundant species of Hawaiian honeycreeper and is perhaps best known for its wideranging flights in search of localized blooms of ō'hi'a (*Metrosideros polymorpha*) flowers, its primary food source. 'Apapane are common in mesic and wet forests above 1000 m elevation on the islands of Hawai'i, Maui, and Kaua'i, locally common at higher elevations on O'ahu; and rare or absent on Lāna'i and Moloka'i. Despite their seasonal high

densities and widespread distribution in higher-elevation forests, no aspect of ‘Apapane life history or biology has been well-studied.

Fancy, S.G. & C.J. Ralph (1997). ‘I‘iwi *(Vestiaria coccinea). The Birds of North America*, No. 327 (A. Poole & F. Gill, eds.). The Birds of North America, Inc., Philadelphia, PA. [Iiwi; I‘iwi]

The ‘I‘iwi is one of the most spectacular of extant Hawaiian birds, with vermillion plumage, black wings and tail, and long, decurved bill. ‘I‘iwi are common in mesic and wet forests above 1500 m elevation on the islands of Hawai‘i, Maui, and Kaua‘i, but their populations consist of less than 50 birds on the lower-elevation islands of O‘ahu and Moloka‘i, and they are now extinct on Lāna‘i. Habitat loss and modification because of development and agriculture, and introduction of disease vectors, avian disease, mammalian predators, and alien plants all continue to threaten ‘I‘iwi populations, as well as those of other native Hawaiian birds.

Fancy, S.G. (1997). A new approach for analyzing bird densities from variable circular-plot counts. *Pacific Science*, **51**: 107-114.

An approach for calculating bird densities from variable circular-plot counts is described. The approach differs from previous methods in that data from several surveys are pooled and detection distances are adjusted as if all distances were recorded by a single observer under a given set of field conditions. Computer software for entering and analyzing data by this method is described.

Fancy, S.G., T.J. Snetsinger, & J.D. Jacobi (1997). Translocation of the endangered Palila. *Pacific Conservation Biology*, **4**: 39-46.

The Palila *Loxioides bailleui* is an endangered Hawaiian honeycreeper that is restricted to high-elevation dry woodlands on Mauna Kea volcano, Hawaii. The Palila’s habitat is regenerating as a result of feral ungulate control, but the species is likely to be slow in recolonizing former ranges because of strong site tenacity. Translocations of adult birds and release of captive-reared juvenile Palila, in combination with additional habitat restoration, may be an effective management tool for speeding the recovery of this species.

Lindsey, G.D., T.K. Pratt, M.H. Reynolds, & J.D. Jacobi (1997). Response of six species of Hawaiian forest birds to a 1991-1992 El Niño drought. *Wilson Bulletin*, **109**: 340-343.

El Nino-Southern Oscillation vents (ENSO) are known to affect reproduction and survival of various bird species and other animals. Here, we report a short-term effect of the 1992-1992 ENSO drought on capture rates, fat scores, and active nests of six resident Hawaiian forest bird species.

Reynolds, M.H. & G.L. Ritchotte (1997). Evidence of Newell’s Shearwater breeding in Puna District, Hawaii. *Journal of Field Ornithology*, **68**: 26-32.

Nocturnal surveys using auditory cues and night-vision equipment were conducted during the seabird breeding season in 1993 to determine use of inland areas in the Puna District, Hawaii, by Newell’s Shearwater (*Puffinus auricularis newelli*). Two hundred sixty auditory or visual detections were made during 275 survey hours from 23 July to 20 September 1993. Although night-vision equipment was used on most of the surveys, only 4% of the birds were detected visually.

Reynolds, M.H., T.J. Snetsinger, & C.M. Herrmann (1997). Kauai’s Solitaires: Update on population status and distribution 1996. *Transactions of the Western Section of the Wildlife Society*, **33**: 49-55.

Hawaiian solitaires (Muscicapidae: Turdinae) as a group have been negativelyimpacted by human-induced changes to Hawaii’s forest ecosystems. Five Hawaiian species are known historically, 1 extinct, and 2 likely to be extinct: the amaui (*Myadestes oahensis*) from Oahu, olomao (*M. lanaiensis*) formerly of Molokai and Lanai, and the kamao of Kauai (*M. myadestinus*), respectively. The puaohi or small Kauai thrush (*M. palmeri*) and the kamao or large Kauai thrush are endangered solitaires endemic to the island of Kauai. Only the omao from the island of Hawaii has a large population.

Simon, J.C., P.E. Baker, & H. Baker (1997). Maui Parrotbill (*Pseudonestor xanthophrys*). *The Birds of North America*, No. 311 (A. Poole & F. Gill, eds.). The Birds of North America, Inc., Philadelphia, PA.

> The Maui Parrotbill is an endangered Hawaiian honeycreeper that was first collected in 1892. No Hawaiian name for the species survives. The Maui Parrotbill was thought to be extinct until rediscovery in 1950. Currently restricted to the remote high-elevation rain forests of eastern Maui, fossil evidence indicates that this species may have occurred in all forest types, from arid woodland at sea level to wet montane rain forest at high elevation.

Woodworth, B.L. (1997). Brood parasitism, nest predation, and season-long reproductive success of a tropical island endemic. *The Condor,* **99**: 605-621.

> To determine the impact of the exotic Shiny Cowbird (*Molothrus bonariensis*) on endemic Puerto Rican Vireo (*Vireo latimeri*) reproductive success, I studied the demography of marked vireos in Guánica Forest, PR, in 1990-1993. The combination of restricted breeding season, high predation and parasitism rates, large impact of parasitism on reproductive output, and low seasonal fecundity of females suggests that, despite high survival rates, the Puerto Rican Vireo is in danger of extirpation from portions of its range.

Baker, P.E. (1998). A description of the first live Poouli captured. *Wilson Bulletin,* **110**: 307-310. [Po‘o-uli; Po‘ouli; Poo-uli]

> The Poouli (*Melamprosops phaeosoma*) is an endangered Hawaiian honeycreeper found only on Maui, Hawaii. In 1997, I captured an adult male Poouli which is described here for the first time.

Lindsey, G.D., E.A. VanderWerf, H. Baker, & P.E. Baker (1998). Hawai‘i ‘Amakihi (*Hemignathus virens*), Kaua‘i ‘Amakihi (*Hemignathus kauaiensis)*, O‘ahu ‘Amakihi (*Hemignathus chloris*), and Greater ‘Amakihi (*Hemignathus sagittirostris*). *The Birds of North America*, No. 360 (A. Poole & F. Gill, eds.). The Birds of North America, Inc., Philadelphia, PA. [Amakihi]

> The ‘amakihi are a group of closely related, small, endemic olive green birds with block lores and short, decurved bills. Found from sea level to the subalpine zone primarily in native forests, they are presently common on the islands of Hawai‘i, Maui, and Kaua‘i, locally common on O‘ahu, uncommon on Moloka‘i, and extirpated on Lāna‘i. Highest densities are found above 1500 m in drier woodland and forest on Hawai‘i Island.

Male, T.D., S.G. Fancy, & C.J. Ralph (1998). Red-billed Leiothrix *(Leiothrix lutea). The Birds of North America*, No. 359 (A. Poole & F. Gill, eds.). The Birds of North America, Inc., Philadelphia, PA.

> Known in the cage bird trade as the Japanese Hill-Robin, Peking Robin, or Peking Nightingale, the Red-billed Leiothrix was first imported into the Hawaiian Islands in 1911, with intentional releases to the wild occurring after 1918. The Red-billed Leiothrix is found in a wide variety of habitats in the Hawaiian Islands, including both native and exotic forests from sea level to near mountain summits exceeding 4000 m in elevation. Leiothrix populations have fluctuated widely on different islands.

Nelson, J.T. & A. Vitz (1998). First reported sighting of Japanese Bush-warbler (*Cettia diphone*) on the island of Hawaii. ‘*Elepaio*, **58**(1): 1-2.

> The Japanese Bush-warbler is common on O‘ahu, Lanai, Moloka‘i, and Maui, and has been recently recorded on Kaua‘i and Kaho‘olawe, but has never been reported for the island of Hawai‘i. On 9 June 1997, we heard a loud song that we recognized a that of the Japanese Bush-warbler at Pu‘u Wa‘awa‘a Wildlife Santuary on the north slope of Hualalai Volcano, island of Hawai‘i. The acoustic identification was confirmed visually.

Simon, J.C. (1998). Nest relocation using PVC spotters. *Journal of Field Ornithology*, **69**: 644-646.

> A simple device to aid in the rapid relocation of nests, composed of PVC pipe and tie wire, is described. Used like a lensless spotting scope, the “spotter” allows other observers to quickly and reliably relocate the nest with minimal written or verbal description.

Simon, J.C., T.K. Pratt, K.E. Berlin, & J.R. Kowalsky (1998). Age and sex identification of Akohekohe. *Journal of Field Ornithology*, **69**: 654-660. [ʻĀkohekohe]

> We present methods to determine the age and sex of Akohekohe (*Palmeria dolei*), an endangered Hawaiian honeycreeper, developed on the basis of 45 museum specimens and 91 live birds captured on the island of Maui.

Snetsinger, T.J., M.H. Reynolds, & C.M. Herrmann (1998). ʻŌʻū and Lanaʻi Hookbill. *In* A. Poole and F. Gills (eds.), *The Birds of North America*, No. 335-336 (A. Poole & F. Gill, eds.). The Birds of North America, Inc., Philadelphia, PA. [Ou]

> The ʻŌʻū and the Lanaʻi Hookbill are plump, predominantly olive green, thick-billed Hawaiian honeycreepers. They are closely related species, belonging to a specialized tribe, Psittirostrini, consisting of nine historically known Hawaiian species with heavy, finchlike to parrotlike bills. The Lanaʻi Hookbill is extinct, and the critically endangered ʻŌʻū, once one of the most common and widespread of Hawaiian birds, is now so scarce that its continued existence is in question.

Woodworth, B.L., J. Faaborg, & W.J. Arendt (1998). Breeding and natal dispersal in the Puerto Rican Vireo. *Journal of Field Ornithology,* **69**: 1-7.

> Information on dispersal is critical for understanding the population dynamics of birds. We estimated breeding and natal dispersal in two studies of a population of the Puerto Rican Vireo that is in danger of local extirpation due to low reproductive success.

Banko, P.C., J.M. Black, & W.E. Banko (1999). Hawaiian goose (*Branta sandvicensis*). *The Birds of North America*, No. 434 (A. Poole & F. Gill, eds.). The Birds of North America, Inc., Philadelphia, PA. [Nēnē; Nene]

> Evolving in the remote Hawaiian Archipelago and having he smallest range of any living goose, the Hawaiian Goose, or better known by its Hawaiian name – Nēnē, is among the most isolated, sedentary, and threatened of waterfowl. Substantial additional efforts to reduce threats from predators and to enhance foraging opportunities by improving habitat conditions are needed if the Nēnē is to recover fully.

Berlin, K.E. & E.M. VanGelder (1999). ʻĀkohekohe *(Palmeria dolei*). *The Birds of North America*, No. 400 (A. Poole & F. Gill, eds.). The Birds of North America Inc., Philadelphia, PA. [Akohekohe]

> The ʻĀkohekohe is a brightly colored Hawaiian honeycreeper with a unique appearance and boisterous, aggressive behavior. The ʻĀkohekohe inhabits perpetually misty, high-elevation rain forest on the island of Maui in the Hawaiian Archipelago. The greatest threats to the ʻĀkohekohe are a result of human activity, primarily deforestation and introductions of exotic species, which led to degradation of remaining native forests by feral ungulates, and introduced avian blood-borne disease and predation risks previously unknown to Hawaiian forest birds.

Fancy, S.G., M.R. Lusk, & D.J. Grout (1999). Status of the Mariana Crow population on Rota, Mariana Islands. *Micronesica*, **32**: 3-10.

> We conducted a survey of the endangered Marian Crow (*Corvus kubaryi*) population on Rota, CNMI, in October-November 1995 to provide current information on numbers and distribution of this species. The apparent 56% decrease in population size may be a result of habitat loss from development and typhoons, as well as persecution, but other factors contributing to the decline cannot be identified until more is known about the ecology and demography of the Mariana Crow population.

Nelson, J.T. & S.G. Fancy (1999). A test of the variable circular-plot method when exact density of a bird population was known. *Pacific Conservation Biology*, **5**: 139-143.

> Variable circular-plot (VCP) counts are statistically more sound than point counts because they are adjusted for the probability of detecting birds at different distances and under different conditions. We conducted the first field test of the VCP method where the exact density of a forest bird was known as part of re-establishing the ʻOmaʻo *Myadestes obscurus* in former range. Excluding the first census, when three of the four detections were of the same individual, differences in VCP density estimates ranges from –34% to +24% even though ≤ 18 ʻOmaʻo were detected per survey.

Woodworth, B.L. (1999). Modeling population dynamics of a songbird exposed to parasitism and predation and evaluating alternative management options. *Conservation Biology,* **13***:* 67-76.

> I demonstrate the use of a two-step modeling approach to determine the implications of parasitism and nest predation for the population dynamics of songbird populations and to quantitatively evaluate alternative options for their management. This modeling approach can be used to determine the reproductive health of a population over a range of parasitism and predation values, to test alternative hypotheses for the cause of an observed population decline, and to make a priori predictions about the outcomes of specific management actions.

Woodworth, B.L., J. Faaborg, & W.J. Arendt (1999). Survival and longevity of the Puerto Rican Vireo. *Wilson Bulletin,* **111**: 376-380.

> The Puerto Rican Vireo, a Puerto Rican endemic, is declining in at least one forest reserve a the result of pressures from introduced nest predators and an introduced brood parasite. Puerto Rican Vireos have relatively high survival rates despite the presence of numerous introduced predators in their habitat, a highly seasonal environment, and the stress of renesting as many as 6 times in a season.

Work, T.M., J.G. Massey, L. Johnson, S. Dougill, & P.C. Banko (1999). Survival and physiologic response of Common Amakihi and Japanese White-eyes during simulated translocation. *The Condor*, **101**: 21-27. ['Amakihi]

> We evaluated the effects of three translocation trials on Common Amakihi (*Hemignathus virens*) and Japanese White-eyes (*Zosterops japonicus*). We recommend that if small passerines are to be held for > 12 hr, they be monitored individually for weight loss, food consumption, and fecal production.

Foster, J.T., J.M. Scott, & P.W. Sykes, Jr. (2000). 'Akikiki (*Oreomystis bairdi*). *The Birds of North America*, No. 552 (A. Poole & F. Gill, eds.). The Birds of North America, Inc., Philadelphia, PA. [Akikiki]

> The 'Akikiki is an energetic, bicolored Hawaiian honeycreeper endemic to the island of Kaua'i in the Hawaiian Archipelago. Also called the Kaua'i Creeper, the 'Akikiki is known for its characteristic creeping behavior when foraging, reminiscent of nuthatches (Sittidae). Despite the decline of the species, the 'Akikiki has never been the focus of a research study, and it remains one of the least understood of the extant birds in the Hawaiian Islands.

Lusk, M., S. Hess, M.H. Reynolds, & S. Johnston (2000). Population status of the Tinian Monarch (*Monarcha takatsukasae*) on Tinian, Commonwealth of the Northern Mariana Islands. *Micronesica*, **32**(2): 181-190.

> We conducted surveys to evaluate the current population status of the Tinian Monarch, an insectivorous forest bird restricted to the island of Tinian, CNMI. Our data suggest that the Tinian Monarch population has increased possibly due to increased habitat availability, but remains at risk both from an accidental introduction of brown tree snakes (*Boiga irregularis*) to the island and stochastic processes.

Pratt, T.K. (2000). Evidence for a previously unrecognized species of owlet-nightjar. *Auk*, **117**: 1-11.

> I studied the systematic relationships of the three large owlet-nightjars (Aegothelidae) to determine the taxonomic status of a fawn-colored lowland form currently classified as *Aegotheles insignis tatei*. I propose that *tatei* be elevated to species status and that the name Starry Owlet-Nightjar be adopted based on the bird's markings.

Reynolds, M.H. & K. Kozar (2000). History and current status of the Laysan Duck (*Anas laysanensis*) in captivity. *'Elepaio*, **60**(7): 59-65.

> The Laysan Duck, also called the Laysan Teal, has the most restricted range of any duck species and is among the most highly threatened of birds. Here, we provide a review of the Laysan Duck's status in captivity, and summarize new and historical information.

Simon, J.C., T.K. Pratt, K.E. Berlin, & J.R. Kowalsky (2000). Reproductive ecology of the Maui Parrotbill. *Wilson Bulletin,* **112**: 482-490.

> The endangered Maui Parrotbill (*Pseudonestor xanthophrys*) is an excavating, insectivorous Hawaiian honeycreeper endemic to the high elevation rain forests of east Maui, Hawai'i. As with another insectivorous honeycreeper the 'Akiapōlā'au, the threat of extinction is persistent and results from both the constraints of inherent life history traits and artificial ecological changes. We advocate the protection and expansion of habitable forest areas and an ongoing program to monitor and mitigate the effects of invasive species.

Berlin, K.E., J.C. Simon, T.K. Pratt, J.R. Kowalsky, & J.S. Hatfield (2001). 'Ākohekohe response to flower availability: foraging, movements, breeding, and molt. *In* Evolution, ecology, conservation and management of Hawaiian birds: a vanishing avifauna (J.M. Scott, S. Conant, & C. van Riper, III, eds.). *Studies in Avian Biology*, **22**: 202-212. [Akohekohe]

> We studied the relationship of flower availability to the seasonality of life history events of the 'Ākohekohe (*Palmeria dolei*), a primarily nectivorous and endangered Hawaiian honeycreeper from montane rain forests on Maui, Hawai'i. For comparison, we also investigated temporal bird density and foraging behavior of three other competing Hawaiian honeycreepers: 'Apapane, 'I'iwi, and Hawai'i 'Amakihi. 'Ākohekohe remain on their territories partly by switching their foraging to subcanopy trees and shrubs, most of which require protection from feral pigs (*Sus scrofa*).

Berlin, K.E., J.C. Simon, T.K. Pratt, P.E. Baker, & J.R. Kowalsky (2001). Age and sex determination of the Maui Parrotbill, *Pseudonestor xanthophrys*. *Journal of Field Ornithology*, 72:12-21.

> We determined the best plumage and morphometric variables for ageing and sexing the Maui Parrotbill, an endangered Hawaiian honeycreeper found only on east Maui, Hawaii, by examining and measuring 30 museum specimens and 71 live birds captured in mist nets.

Fancy, S.G. & T.J. Snetsinger (2001). What caused the population decline of the Bridled White-eye on Rota, Mariana Islands. *In* J.M. Scott, S. Conant, & C. van Riper, III (eds.), "Evolution, ecology, conservation and management of Hawaiian birds: a vanishing avifauna." *Studies in Avian Biology*, **22**: 274-280.

> The Bridled White-eye (*Zosterops conspicillatus rotensis*) was once thought to be common and widespread on Rota, Commonwealth of the Northern Mariana Islands, but is now restricted to several patches of native limestone forest in and adjacent to the Sabana region. Surveys conducted in 1990 indicated that the population had declined by 87% between 1982 and 1990. We believe that the population decline and current localized distribution is primarily a result of habitat changes due to agricultural development and typhoons, but the absence of white-eyes from several stands of native forest above 200 m remains unexplained.

Fancy, S.G., J.T. Nelson, P. Harrity, J. Kuhn, M. Kuhn, C. Kuehler, & J.G. Giffin (2001). Reintroduction and translocation of 'Ōma'o: a comparison of methods. *In* J.M. Scott, S. Conant, & C. van Riper, III (eds.), "Evolution, ecology, conservation and management of Hawaiian birds: a vanishing avifauna." *Studies in Avian Biology*, **22**: 347-353. [Ōma'o; 'Oma'o; Omao]

> We reintroduced 25 captive-reared 'Ōma'o (*Myadestes obscurus*)and translocated 16 wild-caught 'Ōma'o to former range in the Pu'u Wa'awa'a Wildlife Sanctuary on the island of Hawai'i to develop and refine methods that might be used in the recovery of the closely related and critically endangered Puaiohi (*Myadestes palmeri*). Fidelity to the release site was higher for captive-reared birds, and this approach is less expensive for 'Ōma'o and more likely to result in successful establishment of a new population in continuous habitat.

Hess, S.C., P.C. Banko, M.H. Reynolds, G.J. Brenner, L.P. Laniawe, & J.D. Jacobi (2001). Drepanidine movements in relation to food availability in subalpine woodland on Mauna Kea, Hawai'i. *In* Evolution, ecology, conservation and management of Hawaiian birds: a vanishing avifauna (J.M. Scott, S. Conant, & C. van Riper, III, eds.). *Studies in Avian Biology*, **22**: 154-163.

> The objectives of this study were to determine the patterns and relative scales of movements of the drepanidine community in relationship to food availability and tree density on leeward Mauna Kea, Hawai'i. Palila and Hawai'i 'Amakihi do not make movements on the same scale as 'I'iwi and 'Apapane, whose densities changed by more than an

order of magnitude. Ungulate eradication, grass reduction, fire management, and restored corridors of māmane woodland would benefit all drepanidines on Mauna Kea, particularly the Palila.

Pratt, H.D. & T.K. Pratt (2001). The interplay of species concepts, taxonomy, and conservation: lessons from the Hawaiian avifauna. *In* Evolution, ecology, conservation and management of Hawaiian birds: a vanishing avifauna (J.M. Scott, S. Conant, & C. van Riper, III, eds.). *Studies in Avian Biology*, **22**: 68-80.

The Hawaiian Islands, with their unique geological history and geographic position, provide an excellent natural laboratory in which to evaluate currently competing biological (BSC) and phylogenetic (PSC) concepts of the species. A review of the taxonomic history and species limits in Hawaiian birds under both concepts reveals that BSC yields a species total remarkably close to that produced under the PSC. We contend the BSC is arguably a more rational concept that better supports the activities of both scientific and nonprofessional observers.

Pratt, T.K., J.C. Simon, B.P. Farm, K.E. Berlin, & J.R. Kowalsky (2001). Home range and territoriality of two Hawaiian honeycreepers, the ʻĀkohekohe and Maui Parrotbill. *The Condor*, **103**: 746-755. [Akohekohe]

We investigated space-use in two Hawaiian honeycreeper species, the ʻĀkohekohe (*Palmeria dolei*), and endangered nectarivore, and Maui Parrotbill (*Pseudonestor xanthophrys*), and endangered wood excavator, by mapping the home ranges and dispersion of color-banded individuals at a study site in relatively undisturbed montane cloud forest on Maui, Hawaii. By defending all-purpose territories, these two species depart from the more common honeycreeper pattern of sharing large, undefended home ranges.

Pratt, T.K., S.G. Fancy, & C.J. Ralph (2001). ʻAkiapōlāʻau (*Hemignathus munroi*) and Nukupuʻu (*H. lucidus*). *The Birds of North America*, No. 600 (A. Poole & F. Gill, eds.). The Birds of North America, Inc., Philadelphia, PA. [Akiapolaau; ʻAkiapolaʻau ; Nukupuu]

Evolving in the absence of woodpeckers, the Hawaiian honeycreepers ʻAkiapōlāʻau and Nukupuʻu capture invertebrates living in bark or wood, but their tools and methods are entirely different. The ʻAkiapōlāʻau survives as an endangered species on its home island of Hawaiʻi. A review of all records from the 20th century revealed that the Nukupuʻu is probably extinct. With expanded management as a metapopulation, the ʻAkiapōlāʻau can be spared the fate of its less fortunate sister species.

Reynolds, M.H. & T.J. Snetsinger (2001). The Hawaii rare bird search 1994-1996. *In* Evolution, ecology, conservation and management of Hawaiian birds: a vanishing avifauna (J.M. Scott, S. Conant, & C. van Riper, III, eds.). *Studies in Avian Biology,* **22**: 133-143.

We compiled the recent history of sightings and searched for 13 rare and missing Hawaiian forest birds to update status and distribution information. We made 23 expeditions between August 1994 and April 1996 on the islands of Hawaiʻi, Maui, Molokaʻi, and Kauaʻi, totaling 1685 search hours over 146 field days. During our surveys we found four critically endangered birds: the Poʻouli, Mauʻi Nukupuʻu, Molokaʻi ʻIʻiwi, and the Puaiohi.

Simon, J.C., T.K. Pratt, K.E. Berlin, & J.R. Kowalsky (2001). Reproductive ecology and demography of the ʻĀkohekohe. *The Condor*, **103**: 736-745. [Akohekohe]

The ʻĀkohekohe (*Palmeria dolei*) is an endangered Hawaiian honeycreeper endemic to the montane rain forests of east Maui in the Hawaiian Islands. We investigated ʻĀkohekohe nesting ecology using color-banded birds for the first time as a background to understanding the species' conservation. With the presence of avian predators such as rats, feral cats, and mongooses, and introduced vectors of avian disease (mosquitoes *Culex quinquefasciatus*) at play, the ʻĀkohekohe will remain at risk within its rainforest refuge for the forseeable future.

Woodworth, B.L., J.T. Nelson, E.J. Tweed, S.G. Fancy, M.P. Moore, E.B. Cohen, & M.S. Collins (2001). Breeding productivity and survival of the endangered Hawai'i Creeper in a wet forest refuge on Mauna Kea, Hawai'i. *In* Evolution, ecology, conservation and management of Hawaiian birds: a vanishing avifauna (J.M. Scott, S. Conant, & C. van Riper, III, eds.). *Studies in Avian Biology,* **22**: 164-172.

> We studied the demography of the endangered Hawai'i Creeper (*Oreomystis mana*) from 1994-1999 at three sites in Hakalau Forest National Wildlife Refuge. The primary factors limiting productivity of Hawai'i Creeper in Hakalau appear to be low reproductive potential in combination with high rates of nesting failure. Further research into the causes of nest failure, the length of the breeding season, and renesting behavior of females is needed, and protection of the forest form the degrading impacts of introduced mammals is paramount.

Banko, P.C., D.L. Ball, & W.E. Banko (2002). Hawaiian Crow (*Corvus hawaiiensis*). *The Birds of North America*, No. 648 (A. Poole & F. Gill, eds.). The Birds of North America, Inc., Philadelphia, PA. [Alala; 'Alalā]

> The Hawaiian Crow (hereon called the 'Alalā) may once have occurred on more than one Hawaiian island, but it was found only on Hawaii Island when naturalists first collected it. Among corvids worldwide, the 'Alalā is notable for its precipitous decline in range and numbers, strong association with forest habitat, largely frugivorous diet, and remarkable vocal repertoire. The 'Alalā is believed to be extinct in the wild and cannot be recovered without dramatically improving habitat conditions and captive propagation.

Banko, P.C., L. Johnson, G.D. Lindsey, S.G. Fancy, T.K. Pratt, J.D. Jacobi, & W.E. Banko (2002). Palila (*Loxioides bailleui*). *The Birds of North America*, No. 679 (A. Poole & F. Gill, eds.). The Birds of North America, Inc., Philadelphia, PA.

> One of the last surviving of the extraordinary "finch-billed" Hawaiian honeycreepers (Drepanidinae), the Palila epitomizes specialization for seed-eating as it relies almost entirely on immature (soft) seeds, flowers, and other resources produced or supported by māmane (*Sophora chrysophylla*), an endemic dry-forest tree. The Palila's present confinement to Mauna Kea Volcano – and then almost entirely to the western slope – represents only a tiny fraction of its range when Polynesians first encountered the species some 1500 years ago. Despite research and conservation efforts, recovery of the Palila is not assured.

Chace, J.F., B.L. Woodworth, & A. Cruz (2002). Black-whiskered Vireo (*Vireo altiloquus*). *The Birds of North America*, No. 607 (A. Poole & F. Gill, eds.). The Birds of North America, Inc., Philadelphia, PA.

> This vocal yet sometimes elusive vireo, which breed throughout the Caribbean Basin, is limited in the United States to coastal mangroves and hardwood forests of southern Florida. Clearly, more study is needed in areas of life-history characteristics, partially migratory subspecies, and the impacts of range expansion of Shiny and Brown-headed cowbirds into Florida.

Lepson, J.K. & B.L. Woodworth (2002). Hawai'i Creeper (*Oreomystis mana*). *The Birds of North America*, No. 680 (A. Poole & F. Gill, eds.). The Birds of North America, Inc., Philadelphia, PA.

> A denizen of lofty, fog-shrouded mountain rain forests, the Hawai'i Creeper, formerly called Olive-green Creeper, is a small green bark-picker typically seen creeping along trunks and large branches, peering back and forth, and probing under bark as it searches out its insect prey. Now endangered, the Hawai'i Creeper was historically widespread and relatively common, but despite its former abundance, no Hawaiian name was ever recorded for this species. The Hawai'i Creeper can be quite conspicuous in its limited range when it forms large mixed-species postbreeding flocks with other Hawaiian honeycreepers.

Aruch, S.N., T.K. Pratt, & J.P. Vetter (2003). Methods for capturing and banding Kalij Pheasants. *North American Bird Bander*, **28**: 111-116.

> We developed methods to capture and band Kalij pheasants (*Lophura leucomelanos*) in their introduced range at Hawaii Volcanoes National Park, where they are not hunted and are relatively tame. Kalij readily took cracked corn bait and entered baited traps, provided they were introduced to them gradually. The majority of Kalij on the study site were captured using three trap designs: open-door trap, large box trap with hinged door, and drop trap.

Klein, A. , P.J. Hart, K. Stumpf, E.J. Tweed, C. Henneman, C. Spiegel, J. LeBrun, K. McClure, & B. Woodworth (2003). Nests of ‘Amakihi near sea-level on Hawai‘i Island. *‘Elepaio,* **63**: 1-2. [Hawaii; Amakihi]

> The Hawaiian ‘Amakihi is a generalist Hawaiian honeycreeper that, like all other Honeycreeper species, has undergone large historic declines in distribution and abundance. Here, we provide the first description of the nesting biology and nests of Hawai‘i ‘Amakihi in coastal habitat on the island of Hawai‘i.

Laut, M.E., P.C. Banko, & E.M. Gray (2003). Nesting behavior of palila, as assessed from video recordings. *Pacific Science*, **57**: 385-392.

> We quantified nesting behavior of Palila (*Loxioides bailleui*), and endangered Hawaiian honeycreeper, by recording at nests during three breeding seasons. A total of seven nests were observed. Characterization of parental behavior by video had similarities to but also key differences from findings taken from blind observations.

Reynolds, M.H., R.J. Camp, B.M.B. Nielsen, & J.D. Jacobi (2003). Evidence of change in a low-elevation forest bird community of Hawai‘i since 1979. *Bird Conservation International* **13**: 175-187.

Tweed, E.J., J.T. Foster, B.L. Woodworth, C. Kuehler, A. Lieberman, P. Oesterle, A.T. Powers, & K. Whitaker (2003). Survival, dispersal, and home-range establishment of reintroduced captive-bred Puaiohi, *Myadestes palmeri*. *Biological Conservation*, **111**: 1-9.

> We monitored the survival, dispersal, and home-range establishment of captive-bred, reintroduced puaiohi *Myadestes palmeri*, a critically endangered thrush endemic to the island of Kauai. Fourteen juvenile birds were released from hacktowers in January-February 1999 and monitored for 8-10 weeks using radiotelemetry. All 14 birds survived to 56 days post-release. The high survival rate bodes well for establishing additional populations through captive breeding and release.

Foster, J.T., E.J. Tweed, R. Camp, B.L. Woodworth, C. Adler, & T. Telfer (2004). Long-term population changes of native and introduced birds in the Alaka‘i Swamp, Kaua‘i. *Conservation Biology*, 716-725. [Kauai]

> Within the last 30 years, five endemic bird species of the Alaka‘i Swamp, Kaua‘i, Hawai‘i, have likely gone extinct. We documented population trends of the remaining avifaana in this time period to identify a common pattern in the Hawaiian Islands: decline of native species and expansion of introduced species. Overall, native bird populations on Kaua‘i have exhibited species-specific responses to limiting factors. Although most native populations appear stable, the extant native avifauna is vulnerable as a result of limited distributions and the potential for widespread habitat degradation.

Reynolds, M.H. (2004). Habitat use and home range of the Laysan teal on Laysan Island, Hawaii. *Waterbirds: International Journal of Waterbird Biology* **27**(2): 183-192.

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Smith, T.B. & S.G. Fancy (1997). Challenges and approaches for conserving Hawaii’s endangered forest birds. Pp. 306-316 *in* P.L. Fiedler & P. Karevia (eds.), *Conservation biology for the coming decade* (Chapman and Hall, New York).

Scott, J.M. & P.C. Banko (2000). Hawaiian Goose. Pp. 142-146 *in* R.P. Reading & B. Miller (eds.), *Endangered animals: a reference guide to conflicting issues* (Greenwood Press, Westport, CT).

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Morin, M.P. (1996). "Bird inventory of Pu'ukohola Heiau National Historic Site, South Kohala, Hawai'i Island." *University of Hawai'i Cooperative National Park Resources Studies Unit Technical Report 102* (University of Hawai'i, Honolulu, HI). 13 pp.

Morin, M.P. (1996). "Birds of Kaloko-Honokahau National Historical Park." *University of Hawai'i Cooperative National Park Resources Studies Unit Technical Report 104* (University of Hawai'i, Honolulu, HI). 28 pp.

Morin, M.P. (1996). "Birds of Pu'uhonua o Honaunau National Historical Park." *University of Hawai'i Cooperative National Park Resources Studies Unit Technical Report 106* (University of Hawai'i, Honolulu, HI). 19 pp.

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Camp, R.J., M. Gorresen, B.L. Woodworth, & T.K. Pratt (2003). "Forest birds of Hakalau Forest National Wildlife Refuge, Hawaii: Distribution, abundance, trends, and habitat associations, July 2003." Hawaii Forest Bird Interagency Database Project, USGS-BRD-PIERC internal working papers, 139 pp.

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Grout, D.J., M.R. Lusk, & S.G. Fancy (1996). "Results of the 1995 Mariana Crow survey on Rota." *Unpublished technical report to U.S. Fish and Wildlife Service, Pacific Ecoregion 1* (U.S. Geological Survey, Biological Resources Division, Pacific Island Ecosystems Research Center, Honolulu, HI).

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Bioacoustics / Sensory Systems

Peer-Reviewed Journal Articles

Helweg, D.A., H.L. Roitblat, P.E. Nachtigall, & M.J. Hautus (1996). Recognition of three-dimensional aspect-dependent objects by an echolocating bottlenosed dolphin. *Journal of Experimental Psychology: Animal Behavior Processes*, **22:** 19-31.

> We examined the ability of a bottlenose dolphin to recognize aspect-dependent objects using echolocation and compared the dolphin's recognition performance with echo identification using statistical and neural network classifiers. The results show that dolphins can uses varying acoustic properties to recognize constant objects and suggest that aspect-independent representations may be formed by combining information gleaned form multiple echoes.

Helweg, D.A., W.W.L. Au, H.L. Roitblat, & P.E. Nachtigall (1996). Acoustic basis of recognition of aspect-dependent objects by an echolocating bottlenosed dolphin. *Journal of the Acoustical Society of America*, **99**(4): 2409-2420.

> The relationships between acoustic features of object echoes and the cognitive representations of the object formed by an echolocating dolphin will influence the ease with which the dolphin can recognize the object. A blindfolded bottlenose dolphin learned to match aspect-dependent 3-D objects at haphazard orientations. The results suggest that the dolphin recognized the objects using a multidimensional representation and that dolphins can form stable representations of objects regardless of orientation.

Helweg, D.A., D.H. Cato, P.F. Jenkins, C. Garrigue, & R. Macauley (1998). Geographic variation in South Pacific humpback whale songs. *Behaviour,* **135:** 1-27.

> Every winter, (male) humpback whales produce long, complex songs. We compared songs recorded in winter migratory termini in Tonga, New Caledonia, Eastern Australia, and on migration paths off Eastern Australia and New Zealand, in the winter of 1994. The results suggest some migratory exchange among widely separate wintering regions of Area V, consistent with tag recovery data, but the time and location at which song sharing occurs remains speculative.

Houser, D.S., D.A. Helweg, & P.W. Moore (1999). Classification of dolphin echolocation clicks by energy and frequency distributions. *Journal of the Acoustical Society of America*, **106**(3): 1579-1585.

> Dolphins demonstrate an adaptive control over echolocation click production, but little is known of the manner or degree with which control is exercise. Seven click types were identified from a sample of echolocation clicks (N ~ 30,000) collected from a bottlenose dolphin performing object discrimination tasks. Differences in animal and task performance may influence click type and click train length.

Au, W.W.L., A.S. Frankel, D.A. Helweg, & D.H. Cato (2001). Against the humpback whale sonar hypothesis. *IEEE Journal of Ocean Engineering*, **26**(2): 295-300.

> A rebuttal to an article of Frazer and Mercado, who presented a sonar model for humpback whale song, is presented. This rebuttal considers the noise-limited form of the sonar equation, current understanding of humpback whale behavior, and the characteristics of humpback whale songs, along with arguments from an evolutionary perspective. Arguments from all of these different aspects do not support the model of Frazer and Mercado.

Findrarakoto, Y., H.C. Rosenbaum, & D.A. Helweg (2001). First description of humpback whale song from Antongil Bay, Madagascar. *Marine Mammal Science*, **17**(1): 180-185.

> Recordings of whale song on humpback whale wintering grounds have been used to characterize geographical differences among populations. To our knowledge, this study represents the first song ever recorded and described from Antongil Bay, located in northeastern Madagascar, with the first analysis of song structure form the tropical wintering grounds of the southwestern Indian Ocean.

Houser, D.S., D.A. Helweg, & P.W.B. Moore (2001). A bandpass filter-bank model of auditory sensitivity in the humpback whale. *Aquatic Mammals*, **27**(2): 82-91.

> Concerns that water-borne, anthropogenic sound could negatively impact whale species continue to escalate. Unfortunately, the auditory sensitivity of mysticete whales is unknown, impeding assessment of underwater sound exposure on these animals. In this study, through an approach integrating biology, engineering, and computer modeling, the first predicted humpback whale audiogram was made and used to develop the first bandpass model of the humpback ear.

Houser, D.S., D.A. Helweg, K. Chellapilla, & P.W.B. Moore (2001). Optimizing models of dolphin auditory sensitivity using evolutionary computation. *Bioacoustics,* **12:** 57-78.

> Object classifiers that attempt to mimic dolphin echolocation require an auditory weighting function representative of dolphin peripheral auditory processing. An evolutionary program was used to fit the frequency dependent output of a bank of bandpass filters to the auditory sensitivity of the bottlenose dolphin. This model will be applied to further investigate how dolphins use echolocation to discriminate among objects.

Campbell, G.S., R.C. Gisiner, D.A. Helweg, & L.L. Milette (2002). Acoustic identification of female Steller sea lions (*Eumetopias jubatus*). *Journal of the Acoustical Society of America,* **111**(6): 2920-2928.

> Steller sea lion mothers and pups establish and maintain contact with individually distinctive vocalizations. Our objective was to develop a robust neural network to classify females based on their mother-pup contact calls. Acoustical identification of distinctive female acoustic signatures has several potentially important conservation applications for this endangered species, such as rapid survey of females present on a rookery.

Dankiewicz, L.A., D.A. Helweg, P.W. Moore, & J.M. Zafran (2002). Discrimination of amplitude-modulated synthetic echo trains by an echolocating bottlenose dolphin. *Journal of the Acoustical Society of America,* **112**(4), 1702-1708.

> Bottlenose dolphins have an acute ability to use object echoes to judge attributes such as size, shape, and material composition. The current study examined whether dolphins could discriminate synthetic echo trains with different AM envelopes. The results support multiple-echo processing in bottlenose dolphin echolocation, and provide additional theoretical justification for exploring synthetic aperture sonar concepts in models of animal echolocation.

Helweg, D.A., J.L. Rodgers, & W.L. Teeter (2002). Historical and contemporary covariation of ambient noise and baleen whale calls in Southern California waters. *U.S. Navy Journal of Underwater Acoustics,* **52**(3), 595-607.

> Many species of baleen whales reside or migrate annually through California waters. During these times some species of vocalizing whales can be detected by hydrophone and identified by stereotypical species-specific calls. The current study compares historical and contemporary narrowband ambient noise measurements with respect to mysticete residency and movement through Southern California waters.

Altes, R.A., P.W. Moore, L.A. Dankiewicz, & D.A Helweg (2003). Multi-Echo processing by an echolocating dolphin. *Journal of the Acoustical Society of America*, **114**(2): 1155-1166.

> Bottlenose dolphins (*Tursiops truncatus*) use short, wideband pulses for echolocation. The dolphin, however, often uses many pulses to interrogate a target, and could use multipulse processing to combine the resulting echoes. An experiment to test multiecho processing in a dolphin measured detection of a stationary target when the number *N* of available target echoes was increased, using synthetic echoes. A receiver that sums binary-quantized data samples from multiple echoes closely models the *N* dependence of the SNR required by the dolphin.

Helweg, D.A., P.W. Moore, L. Dankiewicz, J.M. Zafran, & R.L. Brill (2003). Discrimination of complex synthetic echoes by an echolocating bottlenose dolphin. *Journal of the Acoustical Society of America*, **113**(2): 1138-1144.

> Bottlenose dolphins detect and discriminate underwater objects by interrogating the environment with their native echolocation capabilities. This study used synthetic echoes with complex highlight structures to test whether high-amplitude initial highlights would interfere with discrimination of low-amplitude trailing highlights. The results suggest that the animal processed multiple echo highlights as separable analyzable features in the discrimination task, perhaps perceived through differences in spectral rippling across the duration of the echoes.

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Helweg, D.A., H.L. Roitblat, P.E. Nachtigall, W.W.L. Au, & R.J. Irwin (1995). Discrimination of Echoes from Aspect-Dependent targets by a Bottlenosed Dolphin and Human Listeners. Pp 129-136 *in* R.A. Kastelein, J.A. Thomas, & P.E. Nachtigall (eds.), *Sensory Systems of Aquatic Mammals* (De Spil Publishers, Woerden, Netherlands).

Jenkins, P.F., D.A. Helweg, & D. Cato (1995). Humpback Whale Song in Tonga: Preliminary results. Pp 335-348 *in* R.A. Kastelein, J.A. Thomas, & P.E. Nachtigall (eds.), *Sensory Systems of Aquatic Mammals* (De Spil Publishers, Woerden, Netherlands).

Roitblat, H.L., D.A. Helweg, & H.E. Harley (1995). Echolocation and imagery. Pp 171-182 *in* R.A. Kastelein, J.A. Thomas, & P.E. Nachtigall (eds.), *Sensory systems of aquatic mammals* (De Spil Publishing, Woerden, Netherlands).

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Helweg, D.A. & Sigurdson, J.E. (2001). "SURTASS T-9 TwinLine Test: Marine mammal risk assessment." *Unpublished PMW-182 Overseas Environmental Assessment* (Space and Naval Warfare Systems Command, San Diego, CA). 23 pp. + appendix.

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Helweg, D.A. (1996). "Geographic and temporal variation in songs of humpback whales." The 3rd Joint Meeting of the Acoustical Society of America and Acoustical Society of Japan, Honolulu, HI, December 1996 (Invited Presentation). *Journal of the Acoustical Society of America*, **100**(4.2): 2609. (Abstract)

Helweg, D.A. (1996). "Geographic variation in humpback whale song." University of Hawaii Marine Mammal Research Program, Hawaii Institute of Marine Biology. Kailua, HI, April 1996. (Invited Presentation)

Helweg, D.A., D.H. Cato, P.F. Jenkins, & C. Garrigue (1996). Dialects in South Pacific humpback whale song. 131st Meeting of the Acoustical Society of America, Indianapolis, IN, May 1996 (Presentation). *Journal of the Acoustical Society of America*, **99**(4.2): 2556. (Abstract)

Helweg, D.A. & P.W.B. Moore (1997). "Aspect independent classification of "dolphin" ensonified mines using Choi-Williams representations." 134th Meeting of the Acoustical Society of America, San Diego, CA, December 1997 (Invited Presentation). *Journal of the Acoustical Society of America*, **102**(5.2): 3123. (Abstract)

Helweg, D.A., D.A. Carder, & S.H. Ridgway (1997). "A portable virtual instrument for collection of cetacean auditory evoked potentials." 134th Meeting of the Acoustical Society of America, San Diego, CA, December 1997 (Presentation). *Journal of the Acoustical Society of America*, **102**(5.2): 3196. (Abstract)

Houser, D.S., D.A. Helweg, & P.W. Moore (1997). "Classification of dolphin clicks by means of energy and frequency distributions." 134th Meeting of the Acoustical Society of America, San Diego, CA, December 1997 (Presentation). *Journal of the Acoustical Society of America*, **102**(5.2): 3124. (Abstract)

Helweg, D.A. & P.W. Moore (1998). "Adaptive classification of ensonified underwater targets." The Conference on Biological Sonar, Carvoeiro, Portugal, May 1998. (Invited Presentation)

Helweg, D.A. (1999). "A Computational Model of Humpback Whale Hearing." *Proceedings of the International Bioacoustical Council.* Chartres, France, April 1999. (Presentation and Proceedings)

Helweg, D.A. (1999). "Automatic Detection and Species Identification of Blue and Fin Whale Calls." *Proceedings of the International Bioacoustical Council.* Chartres, France, April 1999. (Presentation and Proceedings)

Helweg, D.A. (1999). "Detection and species identification of baleen whale calls." 138th Meeting of the Acoustical Society of America, Columbus, OH, November 1999 (Invited Presentation). *Journal of the Acoustical Society of America*, **106**(4.2): 2162 (Abstract).

Houser, D.S., D.A. Helweg, K. Chellapilla, & P.W.B. Moore (1999). "Creation of a biomimetic model of dolphin hearing through the use of evolutionary computation." 1999 Congress on Evolutionary

Computation, Washington, D.C., July 1999 (Invited Presentation). *Proceedings of the 1999 Evolutionary Computation Congress* (pp. 496-502). IEEE Press. (Proceedings)

Houser, D.S., D.A. Helweg, P.W.B. Moore, & K. Chellapilla (1999). "Modeling cetacean ear filters by means of evolutionary computation." 138th Meeting of the Acoustical Society of America, Columbus, OH, November 1999 (Presentation). *Journal of the Acoustical Society of America*, **106**(4.2): 2281. (Abstract)

Brill, R.L., P.W. Moore, D.A. Helweg, & L. Dankiewicz (2000). "Mapping acoustic sensitivity about the dolphin's head: A look at the peripheral hearing system." 139th Meeting of the Acoustical Society of America, Chicago, IL, May 2000 (Presentation). *Journal of the Acoustical Society of America*, **107**(5.2): 2786 (Abstract).

Campbell, G.S., R. Gisiner, & D.A. Helweg (2000). "Acoustic identification of female Steller sea lions." 140th Meeting of the Acoustical Society of America, Newport Beach, CA, December 2000 (Presentation). *Journal of the Acoustical Society of America*, 108(5.2): 2541 (Abstract).

Helweg, D.A. (2000). "Seasonal contribution of mysticete vocalization to ambient noise in southern California waters." 140th Meeting of the Acoustical Society of America, Newport Beach, CA, December 2000 (Invited Presentation). *Journal of the Acoustical Society of America*, **108**(5.2): 2613 (Abstract).

Houser, D.S., D.A. Helweg, & P.W.B. Moore (2000). "Optimization of a dolphin hearing model to relative sensitivity and frequency discrimination through simple aggregate selection." 2000 Congress on Evolutionary Computation, San Diego, CA, July 2000 (Invited Presentation). *Proceedings of the 2000 Congress on Evolutionary Computation*, Vol. 2, 844-850 (IEEE Press). (Proceedings)

Campbell, G.S., R. Gisiner, & D.A. Helweg (2001). "Neural network classification of individual female Steller sea lion (*Eumetopias jubatus*) calls." 14th Biennial Conference on the Biology of Marine Mammals, Vancouver B.C., Canada. (Presentation and Abstracts p. 38)

Helweg, D.A. (2001). "Geographic variation in 1996 humback whale songs around the southern hemisphere." *Proceedings of the International Bioacoustical Council.* Cogne, Italy, September 2001. (Presentation and Proceedings)

Ecosystem Restoration / Endangered Species Recovery / Best Management Practices

Peer-Reviewed Journal Articles

Loope, L., M. Duever, A. Herndon, J. Snyder, & D. Jansen (1994). Hurricane impact on uplands and freshwater swamp forest. *BioScience,* **44**(4):238-246.

> The path of Hurricane Andrew by chance touched on the core of a complex mosaic of terrestrial vegetation comprised of an assemblage of plant species markedly different from that found anywhere else in the continental United States. It is difficult to predict how the opening of the canopy will affect animals and understory plants. Humans have increased the potential for chance extinctions of rare taxa.

Snetsinger, T.J., S.G. Fancy, J.C. Simon, & J.D. Jacobi (1994). Diets of owls and feral cats in Hawaii. '*Elepaio*, **54**: 47-50.

> Cat (*Felis catus*) scats and pellets from Pueo (*Asio flammeus sandwichensis*) and Barn Owls (*Tyto alba*) from Hawaiian islands were examined to determine the incidence of rodent, bird, and insect remains in the diets of these predators. Rodents were the main prey, but the incidence of bird remains in diets of all three predators was high relative to studies conducted elsewhere in the world.

Stone, C.P. (1995). Toward ethical treatment of animals in ecosystems in Hawaii. *Pacific Science*, **49**: 98-108.

Human alienation from nature is evidenced by minimal understanding of interrelationships in the wild and an emphasis on individual wild animals. Decisions about nature should consider a complex of human values including the economic, aesthetic, spiritual, ecological, and humane, along with a preservation ethic for the future. We need to "outgrow" narrow views of nature by better understanding human relationships to it through meaningful participation (hunting, management, scientific study, observation, etc.).

Stone, C.P., M. Dusek, & M. Aeder (1995). Use of an anticoagulant to control mongooses in Nene breeding habitat. *'Elepaio*, **54**: 73-78.

Small Indian mongooses (*Herpestes auropunctatus*) were brought to Hawaii in 1883 to in a failed attempt to control rats in sugar cane fields. In 1992, we began tests in Hawai'i Volcanoes National Park to determine the practicality of using diphacinone toxicant to reduce mongoose numbers near Kipuka Nene, an important nesting and brooding area for Nene in the park.

Pratt, T.K., P.C. Banko, S.G. Fancy, J.D. Jacobi, & G.D. Lindsey (1997). Status and management of the palila, an endangered Hawaiian honeycreeper, 1987-1996. *Pacific Conservation Biology*, 3: 330-340.

A single, relictual population of Palila *Loxioides bailleui*, an endangered Hawaiian honeycreeper, survives on the slops of Mauna Kea volcano on the island of Hawai'i, where it feeds principally on flowers and green seeds of the mamane tree *Sophora chrysophylla.* Availability of food and habitat remain the principal factors limiting increase in the Palila population. Recovery efforts now focus on reducing numbers of feral ungulates, fire management, removing mammalian predators, and developing techniques for captive propagation and introduction to currently unoccupied sites with in the bird's former range.

Hess, S.C., P.C. Banko, G.J. Brenner, & J.D. Jacobi (1999). Factors related to the recovery of subalpine woodland on Mauna Kea, Hawaii. *Biotropica*, **31**: 212-219.

Dry forests of the Hawaiian Islands, like dry forests in other tropical regions, have been extensively altered by human activity, and as in other tropical areas, Hawaiian dry forest avifaunas have fared worse then those of humid forests. We measured mature tree and sapling density, tree associations, crown size, age structure, recovery from ungulate browsing, and grass cover at four study sites in two types of subalpine woodland on Mauna Kea volcano, island of Hawaii.

Dougill, S.J., L. Johnson, P.C. Banko, D.M. Goltz, M.R. Wiley, & J.D. Semones (2000). Consequences of antenna design in telemetry studies of small passerines. *Journal of Field Ornithology*, **71**: 385-388.

Entanglement and mortality of Palila (*Loxioides bailleui*), an endangered Hawaiian honeycreeper, occurred when birds were radio-tagged with transmitters equipped with a long, limp, solder-tipped antenna. For radio telemetry studies of small passerine species we recommend avoiding transmitters equipped with an antenna that is bulbous at the tip, > 16 cm in length, limp, and shiny.

Erdman, S., A. Medeiros, A. Durso, & L. Loope (2000). Ranchers and biologists in Hawaii – keeping a business strong and protecting native forests at Ulupalakua Ranch, Maui. *Rangelands*, October 2000: 33-35.

The loss of ranchland to critical habitat has been a major concern to ranchers and other large landowners in recent years. On the island of Maui, a novel approach is in the works which seems to have merit both for conservation of endangered species and for helping a landowner ethically manage an ecologically sensitive area.

Kuehler, C., A. Lieberman, P. Oesterle, T. Powers, M. Kuhn, J. Kuhn, J. Nelson, T. Snetsinger, C. Herrmann, P. Harrity, E. Tweed, S. Fancy, B. Woodworth, & T. Telfer (2000). Development of restoration techniques for Hawaiian thrushes: Collection of wild eggs, artificial incubation, hand-rearing, captive-breeding, and reintroduction to the wild. *Zoo Biology,* **19**: 263-277.

From 1995 to 1999, two species of endemic Hawaiian thrushes, 'Oma'o (*Myadestes obscurus*) and Puaiohi (*M. palmeri*), were captive-reared and reintroduced into their historic range in Hawaii. This paper describes the

management techniques that were developed with the non-endangered surrogate species, the ‘Oma‘o; techniques that are now being used for recovery of the endangered Puaiohi.

Banko, P.C., R.E. David, J.D. Jacobi, & W.E. Banko (2001). Conservation status and recovery strategies for endemic Hawaiian birds. *In* J.M. Scott, S. Conant, & C. van Riper, III (eds.), “Evolution, ecology, conservation and management of Hawaiian birds: a vanishing avifauna.” *Studies in Avian Biology*, **22**: 359-376.

Populations of endemic Hawaiian birds declined catastrophically following the colonization of the islands by Polynesians and later cultures. Extinction is still occurring, and recovery programs are urgently needed to prevent the disappearance of many other species. Multitudinous sociopolitical and biological factors make recovery decisions complex and effectiveness probabilistic.

Banko, P.C., P.T. Oboyski, J.W. Slotterback, S.J. Dougill, D.M. Goltz, L. Johnson, M.E. Laut, & T.C. Murray (2002). Availability of food resources, distribution of invasive species, and conservation of a Hawaiian bird along a gradient of elevation. *Journal of Biogeography*, **29**: 789-808.

We evaluated how an elevation gradient affects: (1) the availability of food required by a specialist seed-eater, Loxioides bailleui (Drepanidinae), or palila, and hence the distribution of this endangered Hawaiian bird, and (2) the distribution of alien threats to Loxioides populations, their primary foods, and their dry-forest habitat, and hence strategies for their conservation.

Nelson, J.T., B.L. Woodworth, S.G. Fancy, G.D. Lindsey, & E.J. Tweed (2002). Effectiveness of rodent control and monitoring techniques for a montane rainforest. *Wildlife Society Bulletin* 30:82-92.

Introduced rats (*Rattus spp.*) are damaging to native birds, insects, and plants in island ecosystems. We controlled rodent populations in a montane rainforest on the island of Hawaii to determine feasibility, cost, and effectiveness of ground-based rodent control in a rugged remote rainforest habitat. Rodent control applied continuously for 4 months each year during the [avian] breeding season may be effective in protecting nesting forest birds, but will not provide protection to plants and invertebrate vulnerable to predation throughout the year, and it is not likely to protect avian food resources.

Books, Chapters, and Edited Volumes

Loope, L.L. & A.C. Medeiros (1994). Impacts of biological invasions on the management and recovery of rare plants in Haleakala National Park, Maui, Hawaiian Islands. Pp. 143-158 *in* M. Bowles & C.J. Whelan (eds.), *Restoration of Endangered Species* (Cambridge University Press, Cambridge, U.K.).

Medeiros, A.C., L.L. Loope, & R.W. Hobdy (1995). Conservation of cloud forests in Maui County (Maui, Molokai, and Lanai), Hawaiian Islands. Pp. 223-233 *in* L.S. Hamilton, J.O. Juvik, & F.N. Scatena (eds.), *Tropical Montane Cloud Forests* (Springer-Verlag, New York).

Loope, L.L. & S.P. Juvik (1998). Protected areas. Pp. 154-157 *in* S.P. Juvik & J.O. Juvik (eds.), *Atlas of Hawai`i*, Third Edition (University of Hawai`i Press, Honolulu, HI).

Banko, P.C. (2000). Recovering palila: Hawaiian bird recovery requires ecosystem and population restoration. Pp. 158-162 *in* L. Beletsky (ed.), *Hawaii: the ecotravellers’ wildlife guide* (Academic Press, San Diego, CA).

Peer-Reviewed Technical Reports

Fancy, S.G. (1996). “Analyzing densities of rare birds by using variable circular-plot counts.” *NBS Information Bulletin No. 7*.

Medeiros, A.C., C. Chimera, & L.L. Loope (1996). “Ka‘uhako Crater Botanical Resource and Threat Monitoring, Kalaupapa National Historical Park, Island of Moloka‘i, Hawaii.” *University of Hawai‘i*

Cooperative National Park Resources Studies Unit Technical Report 110 (University of Hawai‘i, Honolulu, HI). 71 pp.

Pratt, L.W. (1998). “Vegetation management strategies for three national historical parks on Hawai‘i Island.” *University of Hawai‘i Cooperative National Park Resources Studies Unit Technical Report 121* (University of Hawai‘i, Honolulu, HI). 133 pp. + appendices.

Nonreviewed Technical Reports

Loope, L.L., A.C. Medeiros, & C. Chimera (1995). “Natural Resources Management Plan, Kanaio National Guard Training Area, Island of Maui, Hawaii.” *Unpublished technical to the Hawaii National Guard* (U.S. Geological Survey, Biological Resources Division, Pacific Island Ecosystems Research Center, Honolulu, HI). 74 p. + maps. .

Banko, P.C., F.R. Warshauer, & J.D. Jacobi (1996). “Saddle Road realignment mitigation plan for palila.” *Unpublished technical report to U.S. Fish and Wildlife Service, Pacific Islands Ecoregion, Honolulu, Hawaii, 4 April 1996* (National Biological Service, Hawaii Field Station, Hawaii National Park, Hawaii). 8 pp.

Lindsey, G.D., C.T. Atkinson, P.C. Banko, G.J. Brenner, E.W. Campbell, III, R.E. David, D. Foote, C.M. Forbes, M.P. Morin, T.K. Pratt, M.H. Reynolds, W.W.M. Steiner, R.T. Sugihara, & F.R. Warshauer (1997). “Technical options and recommendations for faunal restoration of Kaho‘olawe.” *Unpublished technical report to Kaho‘olawe Island Reserve Commision, State of Hawai‘i* (U.S. Geological Survey, Biological Resources Division, Pacific Island Ecosystems Research Center, Honolulu, HI). 168 pp.

Tweed, E.J., J. Foster, & B.L. Woodworth (1999). “Initiating Recovery of the Critically Endangered Hawaiian Solitaire, the Puaiohi.” *Annual Report to U.S. Fish and Wildlife Service and Hawaii Division of Forestry and Wildlife* (U.S.Geological Survey, Biological Resources Division, Pacific Island Ecosystems Research Center, Honolulu, HI). 17 pp.

Tweed, E.J., J. Foster, & B.L. Woodworth (2000). “Initiating Recovery of the Critically Endangered Hawaiian Solitaire, the Puaiohi.” *Annual Report to U.S. Fish and Wildlife Service and Hawaii Division of Forestry and Wildlife* (U.S.Geological Survey, Biological Resources Division, Pacific Island Ecosystems Research Center, Honolulu, HI). 6 pp.

Woodworth, B.L. (2000). “Applied research and adaptive management for Puaiohi, *Myadestes palmeri*.” *Unpublished technical report to Hawaii Forest Bird Recovery Team* (U.S. Geological Survey, Biological Resources Division, Pacific Island Ecosystems Research Center, Honolulu, HI). 38 pp.

Monahan, W.B., J.L. Kellermann, & B.L. Woodworth (2001). “Initiating Recovery of the Critically Endangered Hawaiian Solitaire, the Puaiohi, in the Alakai Wilderness Preserve of Northwestern Kauai.” *Annual report to U.S. Fish and Wildlife Service and Hawaii Division of Forestry and Wildlife* (U.S. Geological Survey, Biological Resources Division, Pacific Island Ecosystems Research Center, Honolulu, HI). 18 pp.

Pratt, T.K. (2001). “Suggestions for recovery planning regarding the Pale-headed Brush-Finch.” *Unpublished technical report to Jocotoco Foundation, Quito, Ecuador* (U.S. Geological Survey, Biological Resources Division, Pacific Island Ecosystems Research Center, Honolulu, HI). 9 pp.

Nonreviewed Technical Reports

Medeiros, A.C., L.L. Loope, & P. Thomas (1994). “Recovery plan for twenty-one endangered plant species of Maui, Hawaii.” *Final report to U.S. Fish and Wildlife Service, Honolulu, Hawaii* (Published with minor changes by USFWS, Washington, D.C.).

Nonreviewed Articles

Lindsey, G.D. & S.M. Mosher (1994). Tests indicate minimal hazard to ‘Io from diphacinone baiting. *Hawaii’s Forest and Wildlife*, **9**: 1-3.

Loope, L.L. & A.C. Medeiros (1995). Strategies for long-term protection of biological diversity in native rainforests of Haleakala National Park and East Maui, Hawaii. *Endangered Species Update,* **12**(6):1-5.

Banko, P. (2002). Restoring palila on the Big Island. *Environmental Review*, **9**(6): 1-8.

Conference Presentations, Posters, and Abstracts

Loope, L.L. (1994). “Ecosystem management: an example from Maui, Hawaii.” The Wildlife Society, Western Section, Maui, HI, January 1994. (Invited Presentation)

Loope, L.L. (1994). “Effect of catastrophic events on ecological restoration.” Hawaii Conservation Conference, Honolulu, HI, July 1994. (Invited Presentation)

Loope, L.L. (1994). “Management of rainforest ecosystems of East Maui, Hawaii.” Annual Conference of the Natural Areas Association, West Palm Beach, FL, October 1994. (Invited Presentation)

Loope, L.L. (1995). “Evolution of ecosystem management in national parks of Hawaii.” Conference of The George Wright Society on Science in National Parks and Other Protected Areas, Portland OR, April 1995. (Invited Presentation)

Banko, P.C., L. Johnson, S. Dougill, C. Kuehler, A. Lieberman, M. Kuhn, J. Kuhn, P. Conry, J. Giffin, A. Char, B. Miura, & K. Rosa (1996). Palila restoration and habitat management on Mauna Kea. Pp. 235-245 *in Proceedings of the Seventy-sixth Western Association of Fish and Wildlife Agencies Conference, 22-26 July 1996, Honolulu, Hawaii* (Western Association of Fish and Wildlife Agencies). (Proceedings and Presentation)

Hess, S.C., P.C. Banko, G.J. Brenner, & J.D. Jacobi (1996). “Tree densities in subalpine woodland on Mauna Kea, Hawai‘i.” Pp. 225-234 *in Proceedings of the Seventy-sixth Western Association of Fish and Wildlife Agencies Conference, Honolulu, Hawaii, July 1996* (Western Association of Fish and Wildlife Agencies). (Proceedings and Presentation)

Pratt, T.K. (1996). “Status and management of the Palila.” Southern Hemisphere Ornithological Congress, Royal Australian Ornithologists’ Union. Albany, Australia, October 1996. (Presentation)

Banko, P.C. (1997). “Progress of terrestrial Hawaiian bird recovery programs.” Symposium: Conservation and management of Pacific landbirds and endangered ecosystems. Cooper Ornithological Society, Hilo, HI, May 1997. (Presentation)

Loope, L.L. (1997). “An overview of research at the Haleakala Field Station and of conservation biology on the island of Maui, Hawaii.” Workshop on Restoration of Highly Degraded and Threatened Native Forests in Mauritius, University of Mauritius, Reduit, Mauritius, September 1997. (Invited Presentation)

Medeiros, A.C. & L.L. Loope (1997). “*E ho ‘ala ka nahele Auwahi* – Restoration efforts at Auwahi dryland forest, East Maui.” Hawaii Conservation Conference, Maui, HI, July 1997. (Presentation)

Loope, L.L., S. Anderson, R. Hobdy, M. White, & R. Bartlett (1999). “The island of Maui, Hawaiian Islands, as a prospective PABITRA site.” Pacific Science Congress, Sydney, Australia, July 1999. (Presentation)

Tweed, E.J., J. Foster, & B.L. Woodworth (1999). “Behavior of a reintroduced population of the critically-endangered Puaiohi.” Hawaii Conservation Conference, Honolulu, HI, July 1999. (Presentation)

Tweed, E.J., J.T. Foster, & B.L. Woodworth (1999). "Behavior of a reintroduced population of the critically-endangered Puaiohi." American Ornithologists' Union, Cornell University, Ithaca, NY, August 1999. (Poster)

Banko, P., A. Agness, D. Cerasale, S. Dougill, L. Gold, D. Goltz, L. Johnson, T.C. Murray, P. Oboyski, & J. Slotterback (2001). "Restoration of an endangered Hawaiian bird through removal of alien species." Big Island Science Conference, 17th Annual Meeting, Sigma Xi Chapter of the University of Hawai'i, Hilo, HI, December 2001. (Poster)

Banko, P.C., P. Oboyski, J. Slotterback, L. Johnson, S. Dougill, & L. Gold (2001). "The importance of environmental gradients in maintaining a Hawaiian bird species in dry forest habitat." Conference on the Ecology of Insular Biotas, Victoria University of Wellington, Wellington, New Zealand February 2001. (Presentation)

Banko, P.C., S. Dougill, & L. Gold, D. Goltz, L. Johnson, P. Oboyski, J. Slotterback (2001). "Removing a diverse suite of invasive threats to recover an endangered Hawaiian bird species and its dry forest habitat." Conference on the Eradication of Island Invasives: Practical Actions and Results Achieved. University of Auckland and Invasive Species Specialist Group of the International Union for the Conservation of Nature (IUCN) Species Survival Commission, Auckland New Zealand February 2001. (Poster)

Banko, P.C., S. Dougill, D. Goltz, L. Johnson, & P. Oboyski (2001). "Hawaiian bird recovery: removing invasive threats, restoring habitat, and reestablishing populations." Society for Conservation Biology, Hilo, HI, 29 July - 1 August 2001. (Presentation)

Loope, L.L. & D. Duffy (2001). "Conclusion: Can we sustain Hawaiian ecosystems?" Symposium: Sustaining Island Ecosystems: Can it be achieved in Hawaii? Society for Conservation Biology, Hilo, HI, July 2001. (Presentation)

Pratt, T.K., B. Woodworth, & R. Camp (2001). "Is the Hawaiian avifauna sustainable?" Society for Conservation Biology, Hilo, Hawaii. July 2001. (Presentation)

Tweed, E.J., J. Foster, & B.L. Woodworth (2001). "Behavior of a Reintroduced Population of the Critically Endangered Puaiohi." Society for Conservation Biology, Hilo, HI, July 2001. (Poster)

Banko, P. (2002). "Avian food and threats along a gradient of elevation." 2002 Stanford University Hawaii Ecosystems Meeting, Volcano, Hawai'i, June 2002. (Presentation)

Starr, K., F. Starr, & L.L. Loope (2002). "Coastal restoration of Kanaha Beach, Mauiu: Efforts of the Emergency Environmental Workforce (EEW)." Hawaii Conservation Conference, Honolulu, HI, July 2002. (Abstract)

General Biology / Behavioral Biology

Peer-Reviewed Journal Articles

Helweg, D.A. & L.M. Herman (1995). Diurnal patterns of behavior and group structure of humpback whales (*Megaptera novaeangliae*) in Hawaiian waters. *Ethology*, **98**(3-4): 298-311.

> We examined the behavior of humpback whales in Hawaiian waters in relation to time of day using visual observations from shore platforms and acoustic observations using hydrophones. As humpbacks are not observed to feed in Hawaiian waters, we assumed that the data were free from the influence of diel cycles of prey availability. The results suggest that the whales were resting in the dawn hours, behavior related to mating begins shortly after sunrise, and that male-male competition peaked in the afternoon.

Ballard, W.B., L.A. Ayres, P.R. Krausman, D.J. Reed, & S.G. Fancy (1997). Ecology of wolves in relation to a migratory caribou herd in northwestern Alaska. *Wildlife Monographs*, **135**: 1-47.

> There is a paucity of data concerning wolf (*Canis lupus*) demography, movement patterns, and predation characteristics in relation to migratory caribou (*Rangifer tarandus granti*). Wolf densities were limited by hunting and trapping, and wolf predation at levels found in 1987-1991 did not strongly limit caribou population growth.

Caro, T.M., N. Pelkey, M. Borner, E.L.M. Severre, K.L.I. Campbell, S.A. Huish, J. ole Kuwai, B.P. Farm & B.L. Woodworth (1998). The impact of tourist hunting on large mammals in Tanzania: an initial assessment. *African Journal of Ecology,* **36**: 321-346.

> In Tanzania, where tourist hunting is employed as a conservation tool for habitat protection, information on population sizes and hunting offtake was used to assess the impact of tourist hunting on mammal densities. In general, tourist hunting pressure was unrelated to local population sizes, but for most species, animals were removed at a level of less than 10% of local population size, suggesting that over-exploitation was unlikely.

Caro, T.M., N. Pelkey, M. Borner, K.L.I. Campbell, B.L. Woodworth, B.P. Farm, J. ole Kuwai, S.A. Huish & E.L.M. Severre (1998). Consequences of different forms of conservation for large mammals in Tanzania: preliminary analyses. *African Journal of Ecology,* **36**: 303-320.

> We examined the effects of protection from human activities and effects of tourist hunting on densities of 21 large mammal species in Tanzania. Our analyses suggest that prohibition of human activity, back up by on-site enforcement, maintains ungulate populations at relatively high densities, and challenge the idea that5 enforcement is only effective when spending is high.

Nonreviewed Technical Reports

Helweg, D.A. (1994). National Progress Report submitted to the International Whaling Commission Scientific Committee: New Zealand. 3 pp.

Helweg, D.A. (1995). National Progress Report submitted to the International Whaling Commission Scientific Committee: New Zealand. 4 pp. {General Biology / Behavioral Biology}

Helweg, D.A. (1996). National Progress Report submitted to the International Whaling Commission Scientific Committee: New Zealand. 3 pp. {General Biology / Behavioral Biology}

Conference Presentations, Posters, and Abstracts

Bauer, G.B., J.R. Mobley, Jr., A.S. Frankel, D.A. Helweg, & L.M. Herman (1995). "Behavior characteristics of humpback whales in Hawaii." Eleventh Biennial Conference on the Biology of Marine Mammals, Orlando, FL, December 1995. (Presentation and Abstract)

Gorresen, P.M., F.J. Bonaccorso, & T.K. Pratt (2004). "Distribution and habitat selection of Hawaiian hoary bat (*Lasiurus cinereus semotus*)." 34th Annual North American Symposium on Bat Research, Salt Lake City, UT, October 2004 (Poster).

General Botany / Vegetation Ecology

Peer-Reviewed Journal Articles

Purvis, O.W., C.W. Smith, & P.W. James (1994). Studies of the lichens of the Azores. Part 2. Lichens of the upper slopes of O'Pico. A comparison between the lichen floras of the Azores, Madeira and the Canary Islands at high altitudes. *Archipelago*, **12A**: 35-50.

Smith, C.W. (1995). Notes on Long-Distance Dispersal in Hawaiian Lichens: Ascospore characters. *Cryptogamic Botany*, **5**: 209-213.

Smith, C.W., G. Thor, & P. Wolseley (1996). Lichen Specialist Group. *Species*, **25**: 77-78.

Smith, C.W., B. Czeczuga, & H. Harada (1997). Carotenoids in some lichens from Hawaiian, Ogasawara (Bonin) and Mariana Islands (Pacific). *Journal of the Hattori Botanical Laboratory*, **81**: 263-271.

Smith, C.W., D.E. Gardner, & W.J. Hoe (1997). Foliicolous Hawaiian cryptogams. *Abstracta Botanica*, **21**: 163-167.

Banko, P.C., M.L. Cipollini, G.W. Breton, E. Paulk, M. Wink, I. Izhaki (2002). Seed chemistry of *Sophora chrysophylla* (Mamane) in relation to diet of specialist avian seed predator *Loxioides bailleui* (Palila) in Hawaii. *Journal of Chemical Ecology*, **78**: 1393-1410.

> This study describes the chemical ecology of a tritrophic interaction among species endemic to the island of Hawaii, USA: a tree (mamane), and endangered bird (palila), and moth larvae (*Cydia* spp.). Results suggest that palila have evolved tolerance to high levels of alkaloids and that they forage upon embryos primarily because of their availability in the habitat and high nutritional reward.

Books, Chapters, and Edited Volumes

Loope, L.L. (1999). Vegetation of the Hawaiian Islands. Pp. 661-688 *in* M.G. Barbour & W.D. Billings (eds.), *North American Terrestrial Vegetation*, 2nd edition (Cambridge University Press, Cambridge, UK.).

Conference Presentations, Posters, and Abstracts

Smith, C.W., O.W. Purvis, & P.W. James (1995). "Studies on the Lichens of the Azores. Part e. Macrolichens of Relict Cloud Forests." Proceedings of the 1st Symposium on Fauna and Flora of the Atlantic Islands." *Boletim do Museu Municipal do Funchal*, Sup. No. 4: 599-619. (Proceedings)

Smith, C.W., W.J. Hoe, & D.E. Gardner (1997). "Foliicolous Hawaiian Cryptogams." Proceedings of the International Conference on Foliicolous Lichens and Bryophytes, Eger, Hungary, September 1995. *Abstracta Botanica*, **21**(l): 163-167. (Proceedings)

Loope, L.L. (2001). A primer on the Hawaiian Islands for conservation biologists in Mauritius. Pages 110-130 *in* Y. Mungroo, J.R. Mauremootoo, & V. Bachraz (eds.). *Proceedings of the Workshop on Restoration of Highly Degraded and Threatened Native Forests in Mauritius: a UNDP/GEF Project* (National Parks and Conservation Service, Port Louis, Mauritius). (Proceedings)

Banko, P., S. Hess, K. Brinck, S. Dougill, P. Oboyski, J. Slotterback, D. Pollock, L. Johnson, C. Murray, D. Goltz, R. Danner, & A. Agness (2003). "Subalpine forest structure, dynamics, and conservation on Mauna Kea." Hawaii Conservation Conference, Honolulu, HI, July 2003. (Presentation).

Böhmer, H.J., G.C. Gerrish, J.D. Jacobi, & D. Mueller-Dombois (2004). "Regeneration of *Metrosideros polymorpha* (Myrtaceae) in dieback stands of a montane tropical rain forest." 17th Annual Conference of the Society for Tropical Ecology, University of Bayreuth, Germany, February 2004. (Poster).

Haines, W.P., F.P. Duvall, H.L. Oppenheimer, T. Erwin, & L.L. Loope (2003). "Preliminary investigations of Makawao Forest Reserve and recommendations for future inventory and management." Hawaii Conservation Conference, Honolulu, HI, July 2003 (Poster).

Mueller-Dombois, D., N. Wirawan, & J.D. Jacobi (2003). "The Kahana Valley Ahupuaa, a PABITRA study site on Oahu, Hawaiian Islands." Hawaii Conservation Conference, Honolulu, HI, July 2003. (Presentation).

Rubenstein, T., N. Agorastos, L. Hadway, J. Jacobi, L. Katahira, P. MacDonald, J. Denslow, C. Rowland, & P. Simmons (2003). "Protecting native Hawaiian forest through a unique partnership." Hawaii Conservation Conference, Honolulu, HI, July 2003. (Poster).

General Ecology / Climate Change

Peer-Reviewed Journal Articles

Pimm, S.L., G.E. Davis, L. Loope, C.T. Roman, T.J. Smith, III, & J.T. Tilmant (1994). Hurricane Andrew. *BioScience,* **44**(4):224-229.

> Hurricane Andrew was intense. The 1992 hurricane allowed scientists to assess damage and consider long-term consequences to well-studied ecosystems. Researchers are guardedly optimistic that the ecosystems will recover.

Loope, L.L. & T.W. Giambelluca (1998). Vulnerability of island tropical montane cloud forests to climate change, with special reference to East Maui, Hawaii. *Climatic Change,* **39**: 503-517.

> Island tropical montane cloud forests may be among the most sensitive of the world's ecosystems to global climate change. Measurements in and above a montane cloud forest on East Maui, Hawaii, document steep microclimatic gradients. Because of the exceptional sensitivity of these microclimates and forests to change, they may provide valuable "listening posts" for detecting the onset of human-induced global climate change.

Berlin, K.E., T.K. Pratt, J.C. Simon, J.R. Kowalsky, & J. Hatfield (2000). Plant phenology from a cloud forest on the island of Maui, Hawaii. *Biotropica*, **32**: 90-99.

> We recorded the times of flowering, fruiting, and leafing for ten native canopy and subcanopy trees and shrubs in a montane cloud forest with relatively aseassonal rainfall on the island of Maui, Hawaii. Flowers and fruits were available in the community year-round; however, all species exhibited annual patterns of flowering, and four species showed annual patterns of fruiting while the rest fruited in supra-annual patterns.

Books, Chapters, and Edited Volumes

Loope, L.L. & A.C. Medeiros (1994). Biotic interactions in Hawaiian high-elevation ecosystems. Pp. 337-354 *in* P.W. Rundel, A.P. Smith, & F.C. Meinzer (eds.), *Tropical Alpine Environments: Plant Form and Function* (Cambridge University Press, Cambridge, U.K.).

Medeiros, A.C. & L.L. Loope (1994). *Rare Animals and Plants of Haleakala National Park* (Illustrated by Nanci Sidaras; Hawaii Natural History Association, Hawaii National Park, HI). 56 pp.

Foote, D. (1995). Patterns of diversity in island soil fauna: Detecting functional redundancy. Pp. 57-71 *in* P. Vitousek, L. Loope, & H. Adsersen (eds.), *Biological diversity and ecosystem function on islands* (Springer-Verlag. New York).

Smith, C.W. (1995). Lichens as indicators of Cloud Forest in Hawai'i. Pp. 309-314 *in* L.S. Hamilton, J.O. Juvik, & F.N. Scatena (eds.), *Tropical Montane Cloud Forests* (Springer-Verlag, New York).

Vitousek, P.M., H. Adsersen, & L.L. Loope (1995). Introduction – Why focus on islands? Pp. 1-4 *in* P. Vitousek, L. Loope, & H. Adsersen (eds.), *Biological Diversity and Ecosystem Function on Islands* (Springer-Verlag, New York).

Vitousek, P.M., L.L. Loope, H. Adsersen, & C.M. D'Antonio (1996). Island ecosystems: Do they represent "natural experiments" in biological diversity? Pp. 245-259 *in* H.A. Mooney, J.H. Cushman, E. Medina, O.E. Sala, & E.-D. Schultze (eds.), *Functional Roles of Biodiversity: A Global Perspective* (John Wiley and Sons, New York).

Loope, L.L. (1998). Hawaii and Pacific islands. Pp. 747-774 *in* M.J. Mac, P.A. Opler, C.E. Puckett Haecker, & P.D. Doran (eds.), *Status and trends of the nation's biological resources*, Vol. 2. (U.S. Department of the Interior, U.S. Geological Survey, Reston, VA).

Carter, L.M., E. Shea, M. Hamnett, C. Anderson, G. Dolcemascolo, C. Guard, M. Taylor, T. Barnston, Y. He, M. Larsen, L. Loope, L. Malone, & G. Meehl (2001). Potential consequences of climate variability

and change for the US-affiliated islands of the Pacific and Caribbean. Pp. 315-349 *in* National Synthesis Assessment Team (eds.), *Climate Change Impacts on the United States: the Potential Consequences of Climatic Variability and Change.* Report for the U.S. Global Change Research Program (Cambridge University Press, Cambridge, UK).

Loope, L.L. (1995). Climate change and island biological diversity. Pp. 123-134 *in* P. Vitousek, L. Loope, & H. Adsersen (eds.), *Biological Diversity and Ecosystem Function on Islands* (Springer-Verlag, New York).

Peer-Reviewed Technical Reports

Tunison, J.T., J.A.K. Leialoha, R. Loh, L.W. Pratt, & P.K. Higashino (1994). "Fire effects in the coastal lowlands, Hawai'i Volcanoes National Park." *University of Hawai'i Cooperative National Park Resources Studies Unit Technical Report 88* (University of Hawai'i, Honolulu, HI). 43 pp.

Conference Presentations, Posters, and Abstracts

Loope, L.L. & T.W. Giambelluca (1995). "Vulnerability of island tropical cloud forests to climate change, with special reference to East Maui, Hawaii." World Wildlife Fund Workshop on Potential Impacts of Climate Change on Tropical Forest Ecosystems, San Juan, Puerto Rico, April 1995. (Invited Presentation)

Genetics / Molecular Biology

Peer-Reviewed Journal Articles

Fleischer, R.C., C.L. Tarr, & T.K. Pratt (1994). Genetic structure and mating system in the palila, an endangered Hawaiian honeycreeper, as assessed by DNA fingerprinting. *Molecular Ecology*, **3**: 383-392.

> We conducted DNA fingerprinting analyses to ascertain the mating system and population genetic structure of the palila, an endangered Hawaiian honeycreeper, which occupies a fragmented range on the Mauna Kea volcano of the island of Hawai'i. DNA fingerprinting of twelve complete families from the Pu'u La'au population revealed no evidence of extrapair fertilization or intraspecific brood parasitism. We conclude that present levels of inbreeding are low within both populations, and that proposed translocation of individuals from Pu'u La'au to Kanakaleonui appear appropriate from a genetic standpoint.

Hamm, J.J., E.L. Styer, & W.W.M. Steiner (1994). Reovirus-like particle in the parasitoid *Microplitis crociepes* (Hymenoptera: Braconidae). *Journal of Invertebrate Pathology*, **63**: 304-306.

> The present report describes the finding of a reovrius-like particle (RVLP) in 9 of 11 colonies of *Microplitis croceipes* at the BCIRL, USDA/ARS, Columbia, MO. The RVLP of *M. croceipes* differs from CPV, the most common type of insect pathogenic virus in the Reoviridae.

Jarvi, S.I., G.F. Gee, M.M. Miller, & W.E. Briles (1995). A complex alloantigen system in Florida sandhill cranes *Grus canadensis pratensis*: evidence for the major histocompatibility (B) system. *Journal of Heredity*, **86**: 348-53.

Li, Y. & W.W.M. Steiner (1995). A wing color mutant (*cw*) in the parasitic wasp, *Microplitis croceipes* (Hymenoptera: Braconidae). *Journal of Heredity*, **86**: 158-163.

> The haplodiploid parasitoid *Microplitis croceipes* normally occurs with a dark-pigmented, patterned wing. Here, we describe a clear wing color mutant defined by the allele *cw*, which ahs an abnormal wing pigmentation.

Jarvi, S.I. & P.C. Banko (2000). Application of a PCR-based approach to identify sex in Hawaiian honeycreepers (Drepanidinae). *Pacific Conservation Biology*, **6**: 14-17.

> The application of molecular techniques to conservation genetics issues can provide important guidance criteria for management of endangered species. The results from this study establish that PCR-based approaches for sex determination can be applied with a high degree of confidence to at least four species of Hawaiian honeycreepers. This provides a rapid, reliable method with which population managers can optimize sex rations within populations of endangered species that are subject to artificial manipulation.

Dumbacher, J.P., T.K. Pratt, & R.C. Fleischer (2003). Phylogeny of the owlet-nightjars (*Aegothelidae*) based on mitochondrial DNA. *Molecular Phylogenetics and Evolution* **29**: 540-549.

> The avian family Aegothelidae (Owlet-nightjars) are secretive nocturnal birds of the South Pacific. They are relatively poorly studied and their confusing morphological variation has made it difficult to cluster into hierarchical taxonomic units. We used DNA to obtain mitochondrial gene sequences and construct a molecular phylogeny.

Jarvi, S.I., C.L. Tarr, C.E. McIntosh, C.T. Atkinson, & R.C. Fleischer (2004). Natural selection of the major histocompatibility complex (Mhc) in Hawaiian honeycreepers (Drepanidinae). *Molecular Ecology*, **13**: 2157-2168.

> Although multiple factors have likely influenced the fate of Hawaiian birds, the relatively recent introduction of avian malaria is thought to be a major factor limiting honeycreeper distribution and abundance.We have initiated genetic analyses of class II β chain Mhc genes in four species of honeycreepers using methods that eliminate the possib lity of sequencing mosaic variants. Phylogenetic analyses group the honeycreeper Mhc sequences into two distinct clusters. Variation within one cluster is high, the second cluster is nearly invariant.

Books, Chapters, and Edited Volumes

Steiner, W.W.M. (1994). Genetics and insect biotypes: Evolutionary and practical implications. Pp. 1-17 in K.S. Narang, R.M. Faust and A.C. Bartlett (eds.), *Applications of Genetics to Arthropods of Biological Control Significance,*(CRC Press, Boca Raton, FL).

Miller, M.M., R. Goto, P.S. Wakenell, S. Jarvi, A. Bernot, C. Auffray, R. Zoorob, N. Bumstead, & W.E. Briles (1995). The Rfp-Y system- A second cluster of histocompatibility genes in the chicken. Pp. 95-108 *in* T.F. Davison, N. Bumstead, & P. Kaiser (eds.), *Advances in Avian Immunology Research* (Carfax Publishing Co.).

Conference Presentations, Posters, and Abstracts

Dumbacher, J.P., T.K. Pratt, & R.C. Fleischer (2000). "Phylogenetic relationships of Owlet-nightjars from museum skin DNA." Southern Hemisphere Ornithological Congress, Brisbane, Australia, June 2000. (Presentation)

Fleischer, R.C., J.P. Dumbacher, & T.K. Pratt (2000). "Phylogenetic relationships of Owlet-nightjars from museum skin DNA." American Ornithologists' Union, St. Johns, Newfoundland. August 2000. (Poster)

Dumbacher, J.P., T.K. Pratt, & R.C. Fleischer (2001). "Phylogenetic relationships of Owlet-nightjars from museum skin DNA." Society for the Study of Evolution, Knoxville, Tennessee. June 2001. (Poster)

Invasive Fauna

Peer-Reviewed Journal Articles

Anderson, S.J. & C.P. Stone (1994). Indexing sizes of feral pig populations in a variety of Hawaiian natural areas. *Transactions of the Western Section of the Wildlife Society*, **30**: 26-39.

> Twelve linear models for estimating feral pig population density were generated from data on feral pig sign and densities collected in 5 habitat types in Hawaii. The model for all fresh sign encompassed variability in all habitats sampled and gave the most precise predictions across habitats. None of the models was useful at population densities of < 1 pig/km^2.

Cole, F.R., L.L. Loope, A.C. Medeiros, J.A. Raikes, & C.S. Wood (1995). Conservation implications of introduced game birds (*Phasianus colchicus* and *Alectoris chukar*) in high-elevation Hawaiian shrubland. *Conservation Biology,* **9**(2): 306-313.

> The Ring-necked Pheasant and the Chukar Quail are the dominant avifauna in high-elevation shrubland of Haleakala National Park, Maui, Hawaii. We studied the food habits, ecological niche, and effects of these alien game birds on the native biota in this Hawaiian ecosystem. The role of these alien birds in facilitating seed dispersal and germination of native plant species is beneficial in restoring degraded ecosystems.

Wetterer, J.K (1997). Ants on *Cecropia* in Hawaii. *Biotropica*, **29**: 128-132.

> One of the best-known ant-plant relationships of the Neotropics is the association between *Cecropia* trees and "Cecropia ants" that live inside the *Cecropia's* hollow trunks. Although neither *Cecropia* trees nor ants are native to the Hawaiian Islands, one *Cecropia* species (*C. obtusifolia*) and about forty ant species (none in the genus *Azteca*) have been introduced through human activity. This study was conducted to determine which ants, if any, associate with *C. obtusifolia* trees in Hawaii, and to evaluate the nature of these an-plant associations.

Krushelnycky, P.D. & N.J. Reimer (1998). Bait preferences by the Argentine Ant (Hymenoptera: Formicidae) in Haleakala National Park, Hawaii. *Environmental Entomology,* **27**(6): 1482-1487.

> The Argentine ant, *Linepithema humile*, has proven to be a threat to native arthropod species in Haleakala National Park, Maui, HI, and is also a potential threat to the park's native flora. Maxforce was concluded to be the best bait carrier for toxicant-based control at Haleakala National park because of its attractiveness and its ease for large-scale broadcast dispersal.

Krushelnycky, P.D. & N.J. Reimer (1998). Efficacy of Maxforce bait for control of the Argentine Ant (Hymenoptera: Formicidae) in Haleakala National Park, Maui, Hawaii. *Environmental Entomology,* **27**(6): 1472-1481.

> In an effort to develop a chemical control strategy for the invasive Argentine ant, *Linepithema humile*, in Haleakala National Park, Maxforce, which is formulated with 0.9% hydramethylnon, was used in test plots to determine the efficacy of the ant bait in the field. Bait molding, quick mortality, and toxicant breakdown from UV radiation created a short exposure time to the bait and toxicant, which may have been the main obstacle to achieving eradication.

Wetterer, J.K., P.C. Banko, L.P. Laniawe, J.W. Slotterback, & G.J. Brenner (1998). Nonindigenous ants at high elevations on Mauna Kea, Hawai'i. *Pacific Science*, **52**: 228-236.

> Although the Hawaiian Islands have no indigenous ants, more than 40 species of ants have become established there, where they have been implicated in the extermination of much of the native fauna. Ant surveys were conducted at high elevations (1680 – 3140 m) on the western slop of Mauna Kea Volcano on the island of Hawaii to determine the extent of ant infestation in those highland communities and particularly to evaluate the potential threat of ants in the highlands to native Hawaiian species. Five species were collected. Ants were common up to 2000 m elevation, but densities quickly dropped off above that.

Kraus, F., E.W. Campbell, A. Allison, & T.K. Pratt (1999). *Eleutherodactylus* frog introductions to Hawaii. *Herpetological Review*, **30**: 21-25. {Herpetofauna}

> As an oceanic archipelago isolated from continental source areas, Hawaii lacks native terrestrial reptiles and amphibians. We report the recent establishment in Hawaii of three new species of frogs native to the Caribbean: *Eleutherodactylus coqui, E. martinicensis,* and *E. planirostris*. Control and eradication efforts will be pointless until such time as relevant State officials actively pursue a program to ensure nursery material imported into Hawaii or offered for sale in-state is free of frogs or their eggs.

Lindsey, G.D., S.M. Mosher, S.G. Fancy, & T.D. Smucker (1999). Population structure and movement of introduced rats in an Hawaiian rainforest. *Pacific Conservation Biology*, **5**: 94-102.

> We studied populations of introduced rats in three areas in Hawaiian rainforests as part of a larger study to determine the factors limiting endangered bird populations. Species composition among 1264 rats live trapped was Black Rats *Rattus rattus* 60.8%, Polynesian Rats *R. exulans* 38.1%, and Norway Rats *R. norvegicus* 1.0%. Of 44 rats captured in trees, 43 were Black Rats and one was a Polynesian rat.

Cole, F.R., L.L. Loope, A.C. Medeiros, C.E. Howe, & L.J. Anderson (2000). Food habits and impacts of introduced rodents in high-elevation shrubland of Haleakala National Park, Maui, Hawaii. *Pacific Science,* **54**(4): 313-329.

> *Mus musculus* and *Rattus rattus* are ubiquitous consumers in the high-elevation shrubland of Haleakalā National Park. These rodents, particularly *Mus musculus*, exert strong predation pressure on populations of arthropod species, including locally endemic species on upper Haleakalā Volcano.

Smucker, T.D., G.D. Lindsey, & S.M. Mosher (2000). Abundance, home range, and diet of feral cats in Hawaii. *Pacific Conservation Biology*, **6**(3): 229-237.

> Feral cat *Felis catus* home range in a Hawaiian montane wet forest and their diet in three habitats – montane wet forest, subalpine dry forest, and lowland dry forest – were determined to provide baseline ecological data and to assess potential impacts to native terrestrial fauna. If large-scale rat control is implemented in Hawaii, predator population structure and diet, and prey abundance should be assessed before, during and after rodent control, with particular attention given to the abilities of predators to exert subsequently higher predation upon native fauna, especially birds.

Krushelnycky, P., C.S.N. Hodges, A.C. Medeiros, & L.L. Loope (2001). Interaction between the Hawaiian Dark-rumped Petrel and the Argentine ant in Haleakalā National Park, Maui, Hawai‘i. *In* Evolution, ecology, conservation and management of Hawaiian birds: a vanishing avifauna (J.M. Scott, S. Conant, & C. van Riper, III, eds.). *Studies in Avian Biology,* **22**: 243-246.

> The invasive immigrant Argentine ant has spread to occupy roughly 120 ha., or 15%, of the nesting habitat of the endangered Hawaiian Dark-rumped Petrel in Haleakalā National Park on the island of Maui, Hawai‘i. The colony at Haleakalā is responsible for most of the known reproduction of the endemic seabird. At current levels, the Argentine ant is not believed to significantly influence the nesting success rate of the Hawaiian Dark-rumped Petrel.

Brenner, G.J., P.T. Oboyski, & P.C. Banko (2002). Parasitism of *Cydia* spp. (Lepidoptera:Tortricidae) on *Sophora chrysophylla* (Fabaceae) along an elevation gradient of dry subalpine forest on Mauna Kea, Hawaii. *Pan-Pacific Entomology*, **78**(2): 101-109.

> The biology and ecological importance of Hawaiian endemic *Cydia* spp. are poorly known. *Cydia* larvae are an important food to palila, an endangered Hawaiian bird that inhabits *Sophora* woodlands on Mauna Kea, Hawaii. We quantified *Cydia* larval abundance in seeds of *Sophora chrysophylla* and larval mortality caused by three species of alien wasps and one endemic wasp species.

Kowalsky, J.R., T.K. Pratt, & J.C. Simon (2002). Prey taken by Feral Cats (*Felis catus*) and Barn Owls (*Tyto alba*) in the Hanawi Natural Area Reserve, Maui, Hawai‘i. *‘Elepaio*, **62**: 127,129-131.

> Native Hawaiian birds experienced an extraordinary period of extinction after immigration of people from around the world. This rapid decline was caused by factors including habitat destruction and introduced avian disease and predators such as feral cats and the introduced Barn Owl. It would be important to monitor cat and owl populations

when rodent populations are controlled for conservation purposes, to see if these predators decrease through emigration and mortality, or if instead they resort to preying more heavily on birds.

Krushelnycky, P.D., L.L. Loope, & S.M. Joe (2004). Limiting spread of a unicolonial invasive insect and characterization of seasonal patterns of range expansion. *Biological Invasions*, **6**: 47-57.

Limiting dispersal is a fundamental strategy in the control of invasive species, and in certain situations containment of incipient populations may be an important management technique. To test the feasibility of slowing the rapid spread of two Argentine ant supercolonies in Haleakala National Park, Hawaii, we applied ant bait and toxicant within an experimental plot situated along a supercolony boundary. Foraging ant numbers at baited monitoring stations decreased sharply within two weeks after treatment, and ant spread was completely halted within the plot for at least one year.

Peer-Reviewed Technical Reports

Tunison, J.T., R. Loh, L.W. Pratt, & D.W. Kageler (1994). "Early succession in pig-disturbed mountain parkland Hawai'i Volcanoes National Park." *University of Hawai'i Cooperative National Park Resources Studies Unit Technical Report 89* (University of Hawai'i, Honolulu, HI). 25 pp.

Cole, F.R., L.L. Loope, A.C. Medeiros, J.A. Raikes, C.S. Wood, & L.J. Anderson (1995). "Ecology of introduced game birds in high-elevation shrubland of Haleakala National Park." *University of Hawai'i Cooperative National Park Resources Studies Unit, Technical Report 96* (University of Hawai'i, Honolulu, HI). 26 pp.

Nonreviewed Technical Reports

Tweed, E.J., J. Foster, & B.L. Woodworth (2000). "Recommendations for controlling introduced rodent populations in the Alakai Wilderness Preserve." *Special report to Hawaii Division of Forestry and Wildlife* (U.S.Geological Survey, Biological Resources Division, Pacific Island Ecosystems Research Center, Honolulu, HI). 6 pp.

Goltz, D.M., A.M. Agness, & P.C. Banko (2001). "Axis deer home range, movements, and survival at Kalaupapa, Molokai." *Unpublished technical report to National Park Service, Kalaupapa National Historic Monument, Kalaupapa, Hawaii, 15 November 2001* (U.S. Geological Survey, Biological Resources Division, Pacific Island Ecosystems Research Center, Kilauea Field Station, Hawaii National Park, HI). 21 pp.

Nonreviewed Articles

Loope, L.L. (1998). Ball pythons on Maui? *In* 1997 Natural Resource Year in Review. National Park Service, Washington, D.C. {Herpetofauna}

Loope, L.L. (2000). Book Review. "Problem Snake Management: The Habu and the Brown Treesnake," by G.H. Rodda *et al. Journal of Wildlife Management*, **64**: 1093. {Herpetofauna}

Conference Presentations, Posters, and Abstracts

Loope, L.L., A.C. Medeiros, & F.R. Cole (1994). "Range expansion of the Argentine ant (*Iridomyrmex humilis*) in high-elevation shrubland of Haleakala National Park, Maui, Hawaii (1967-1994)." ESA Annual Meeting, Knoxville, TN, August 1994. (Presentation) *Bulletin of the Ecological Society of America*, **75** (Abstract).

Krushelnycky, P.D., N.J. Reimer, S.M. Joe, P.A. Thomas, A.C. Medeiros, & L. Loope (1996). "Efforts at control of the Argentine ant (*Linepithema humile*) in Haleakala National Park, Maui, Hawaii." Hawaii Conservation Conference, Honolulu, HI, July 1996. (Poster)

Lease, J.K., R.J. Dusek, & C.T. Atkinson (1996). "Feral pig control is effective in reducing mosquito populations." Hawaii Conservation Conference, Honolulu, HI, July 1996. (Presentation)

O'Connor, P. , A.M. Brasher, & L.L. Loope (1996). "Leeches in paradise: distribution and abundance of an introduced North American ectoparasite on native Hawaiian stream fishes." Hawaii Conservation Conference, Honolulu, HI, July 1996. (Poster)

Brenner, G., P. Oboyski, & P. Banko (1998). "Parasitism of endemic *Cydia* species found in mamane pods in a Hawaiian montane forest." The Wildlife Society, Western Section, Sacramento, CA, February 1998. (Presentation)

Oboyski, P.T., G.J. Brenner, & P.C. Banko (1998). "Parasitism of endemic *Cydia* caterpillars (Lepidoptera: Tortricidae) found in mamane seedpods (*Sophora chrysophylla*) on Mauna Kea, Hawai'i." Hawaii Conservation Conference, Honolulu, HI, July 1998. (Poster)

Cole, F.R., L.L. Loope, A.C. Medeiros, L.L. Hush, E.L. Adams, & L.G. Berry (1999). "Recovery of native arthropod species after the decline of Argentine ant populations in Hawaiian high-elevation shrubland." Pacific Science Congress, Sydney, Australia, July 1999. (Poster)

Loope, L.L., P. Krushelnycky, E. VanGelder, & F.R. Cole (1999). "Efforts to prevent further range expansion of the Argentine ant in Haleakala National Park, Maui, Hawaiian Islands." Pacific Science Congress, Sydney, Australia, July 1999. (Poster)

Oboyski, P.T. & P.C. Banko (1999). "Entomology projects associated with palila restoration." Hawaii Entomological Society, Honolulu, HI, February 1999. (Presentation)

Belfield, T.R. & L.W. Pratt (2000). "Changes in population structure of Hawaiian Catchfly (*Silene hawaiiensis*) after mouflon (*Ovis musimon*) sheep browsing in Hawai'i Volcanoes National Park." Hawaii Conservation Conference, Honolulu, HI, August 2000. (Poster)

Orr, K., T. Belfield, L. Pratt, & D. Foote (2000). "Seed and seedling predation by rats (*Rattus* spp.) in Hawai'i Volcanoes National Park." Hawai'i Conservation Conference, Honolulu HI, August 2000. (Poster)

VanGelder, E. & L.L. Loope (2000). "A prevention plan for the imported fire ant (*Solenopsis invicta*), a severe and imminent threat to Hawaii." USGS-BRD National Program Review (Status and Trends Program), Annapolis, MD, October 2000. (Poster)

Agness, A., D. Goltz, P.C. Banko, & J. Trainer (2001). "Movement patterns and population trends of axis deer (*Axis axis axis*) on the Kalaupapa Peninsula, Moloka'i." Society for Conservation Biology, Hilo, HI, 29 July - 1 August 2001. (Poster)

Goltz, D., C. Murray, A. Agness, & P.C. Banko (2001). "Feral cat home range, habitat utilization, and movements on Mauna Kea, Hawaii." Society for Conservation Biology, Hilo, HI, 29 July - 1 August 2001. (Poster)

Gregor, A.J., L.B. Passerello, J.W. Slotterback, J.P. Weber, P.T. Oboyski, & P.C. Banko (2001). "Invasions of alien insect predators in mid- and upper-elevation dry forest habitats on Hawai'i Island Hawai'i." Society for Conservation Biology, Hilo, HI, 29 July - 1 August 2001. (Poster)

Hess, S.C., P.C. Banko, & J.G. Giffin (2001). "Effectiveness of sheep reduction operations in the Mauna Kea Forest Reserve, Hawai'i." Society for Conservation Biology, Hilo, HI, 29 July - 1 August 2001. (Poster)

Krushelnycky, P.D., E. VanGelder, L.L. Loope, & R. Gillespie (2001). "The status of invasive ant control in the conservation of island systems." Eradication of Island Invasives: Practical Actions and Results Achieved. Invasive Species Specialist Group of IUCN, University of Auckland, Auckland, New Zealand February 2001. (Poster)

Oboyski, P.T., J.W. Slotterback, & P.C. Banko (2001). "Insect-parasitism and the conservation of an endangered bird species on Mauna Kea, Hawai'i." *S*ymposium: Sustaining island ecosystems: can it be achieved in Hawai'i? Society for Conservation Biology, Hilo, HI, 29 July - 1 August 2001. (Presentation)

Reeser, D.W. & L.L. Loope (2001). "Crosssing boundaries at Haleakala: the struggle to get improved quarantine protection prior to expansion of Maui's airport." George Wright Society Biennial Conference, Denver, CO, April 2001. (Presentation)

Slotterback, J.W., P.T. Oboyski, & P.C. Banko (2001). "Ant invasions of native forest at high elevations on Mauna Kea." Big Island Science Conference, 17th Annual Meeting, Sigma Xi Chapter of the University of Hawai'i, Hilo, HI, December 2001. (Poster)

VanGelder, E. & L. Loope (2001). "A prevention plan for the red imported fire ant *(Solenopsis invicta*): a severe and imminent threat to Hawaii." Society for Conservation Biology, Hilo, HI, July 2001. (Poster)

Gutrich, J., E. VanGelder, & L. Loope (2002). "Potential economic impact of the Red Imported Fire Ant in Hawaii." Hawaii Conservation Conference, Honolulu, HI, July 2002. (Poster)

Haines, W., L.L. Loope, E. VanGelder, P. Krushelnycky, & S. Joe (2002). "Evaluation of a containment strategy for the Argentine ant (*Linepithema humile*) at Haleakala National Park." Hawaii Conservation Conference, Honolulu, HI, July 2002. (Poster)

Loope, L. & E. VanGelder (2002). "How do we address the threat of Red Imported Fire Ant invasions: the need for a strategy." Global Biodiversity Forum for the Pacific Region, Rarotonga, Cook Islands, July 2002. (Presentation)

Loope, L.L. & F.G. Howarth (2002). "Globalization and pest invasion: Where will we be in five years?" First International Symposium on Biological Control of Arthropods, Honolulu, HI, January 2002. (Invited Presentation)

VanGelder, E. & L. Loope (2002). "Invasion of Pacific islands by the Red Imported Fire Ant (*Solenopsis invicta*): How can it be prevented?" Symposium: Island Biogeography with a Pacific Flavor. American Association for the Advancement of Science, Western Region Annual Meeting, Waimea, HI, June 2002. (Poster)

Hess, S.C. (2004). "Development of new trap technology." Hawaii Conservation Conference, Honolulu, HI, June 2004 (Presentation).

Hess, S.C., P.C. Banko, D.M. Goltz, R.M. Danner, & K.W. Brinck (2004). "Strategies for reducing feral cat threats to endangered Hawaiian birds." 21st Vertebrate Pest Conference, Visalia, CA, March 2004 (Presentation).

Postelli, K. , J. McBroom, D. Hu, & T.K. Pratt (2004). "Kalij pheasant (*Lophura leucomelanos*) seed dispersal and predation in a mesic forest." Hawaii Conservation Conference, Honolulu, HI, June 2004. (Presentation).

Invasive Plants / Biocontrol

Peer-Reviewed Journal Articles

Duffy, B.K. & D.E. Gardner (1994). Locally established *Botrytis* fruit rot of *Myrica faya*, a noxious weed in Hawaii. *Plant Disease*, **78**: 919-923.

> Faya (*Myrica faya*) is an introduced weedy tree threatening native ecosystems in Hawaii. Attention was recently given to identify locally established insect pests and pathogens. *Botrytis cinerea* causes widespread fruit rot and is the first

pathogen reported from faya in its nonnative habitat. Selection of more aggressive or ecologically fit strains or introduction of large numbers of *Botrytis*-infested insect vectors early in the fruiting season may enhance faya biocontrol.

Gardner, D.E., C.S. Hodges, Jr., E. Killgore, & R.C. Anderson (1997). An evaluation of the rust fungus *Gymnoconia nitens* as a potential biological control agent for alien *Rubus* species in Hawaii. *Biological Control,* **10**: 151-157.

The rust fungus *Gymnoconia nitens* infects blackberry (*Rubus argutus*) systemically in regions of the continental United States, producing bright yellow-orange masses of spores on newly developing floricanes during springtime. In tests to determine the suitability of this rust as a biological control agent for *R. penetrans* in Hawaii, a species now thought to be conspecific with *R. argutus*, rooted cuttings of the Hawaiian plants were grown at NCSU, inoculated, and observed. Ability to attack the endemic species *R. hawaiensis* and *R. macraei*, suggests that *G. nitens* would not be suitable for release in Hawaii as a biological control agent, at least on the islands with populations of the native species.

Howarth, D.G., D.E. Gardner, & C.W. Morden (1997). Phylogeny of *Rubus* subgenus *Idaeobatus* (Rosaceae) and its implications toward colonization of the Hawaiian Islands. *Systematic Botany*, **22**: 433-441.

Two species of *Rubus* occur naturally in the Hawaiian islands, *R. hawaiensis* and *R. macraei.* Our results suggest that *R. macraei* and *R. hawaiensis* may have arisen from two separate colonizations in the Hawaiian Islands rather than one as previously assumed. The ancestry of *R. macraei* may trace to other Pacific Rime islands.

Medeiros, A.C., L.L. Loope, P. Conant, & S. McElvaney (1997). Status, ecology, and management of the invasive tree *Miconia calvescens* DC (Melastomataceae) in the Hawaiian Islands. *In* N.L. Evenhuis & S.E. Miller (eds.), Records of the Hawaii Biological Survey for 1996. *B.P. Bishop Museum Occasional Papers*, **48**: 23-36.

Miconia calvescens, native to montane forests of the neotropics, has now invaded wet forests of both the Society and Hawaiian Islands. This tree, which grows up to 15 m tall, is potentially the most invasive and damaging weed of rainforests of Pacific islands. Although biological control is being purused, conventional control techniques to contain and eradicate it locally are underway.

Anderson, R.C. & D.E. Gardner (1999). An evaluation of the wilt-causing bacterium *Ralstonia solanacearum* as a potential biological control agent for the alien kahili ginger (*Hedychium gardnerianum*) in Hawaiian forests. *Biological Control*, **15**: 89–96.

Kahili ginger (*Hedychium gardnerianum*) is an invasive weed in tropical forests in Hawaii and elsewhere. The suitability of *Ralstonia* (= *Pseudomonas*) *solanacearum* as a biological control agent for kahili ginger was investigated by inoculating seedlings and rooted cuttings of native forest plants, ornamental ginger, and solanaceous species to confirm host specificity. The ability of this bacterium to cause severe disease in *H. gardnerianum* in the field, together with its lack of virulence in other ginger species, contributes to its potential as a biological control agent.

Duffy, B.K. & D.E. Gardner (1999). Nematodes associated with the invasive weed *Myrica faya* in Hawaii. *Nematrópica*, **29**: 95-97.

Invasion by faya (syn. firetree, *Myrica faya*) is a major threat to natural ecosystems in Hawaii where this actinorrhizal tree aggressively colonizes nitrogen-limited habitats and displaces native vegetation. Biological, chemical, and physical control efforts have failed to check the rapid spread of this noxious weed. In 1987, we first observed dead and declining trees in a remote area of Hawaii Volcanoes National Park. We are attempting to elucidate the etiology of decline with the aim of possibly increasing and distributing the damage throughout faya's range in Hawaii.

Ewel, J.J., D.J. O'Dowd, J. Bergelson, C.C. Daehler, C.M. D'Antonio, L.D. Gomez, D.R. Gordon, R.J. Hobbs., A. Holt, K.R. Hopper, C.E. Hughes, M. LaHart, R.R.B. Leakey, W.G. Lee, L.L. Loope, D.H. Lorence, S.M. Louda, A.E. Lugo, P.B. McEvoy, D.M. Richardson, & P.M. Vitousek (1999). Deliberate introductions of species: research needs. *BioScience,* **49**(8): 619-630.

> The silent invasion of Hawaii by insects, disease organisms, snakes, weeds, and other pests is the single greatest threat to Hawaii's economy and natural environment. Greatly increased public awareness of environmental change and degradation, well-publicized concerns of the international scientific community about the effects of invasive species, interest on the part of the news media in environmental issues, and widespread concern for the development of sustainable system of land use have combined to create a propitious environment in which to foster, promote, and fund research on species introductions.

Gardner, D.E. (1999). Biocontrol of yellow Himalayan raspberry: Exploration in China. *Newsletter of the Hawaiian Botanical Society*, **38**(3/4): 53-58.

Gardner, D.E. (1999). *Septoria hodgesii* sp. nov.: A potential biocontrol agent for *Myrica faya* in Hawai'i. *Mycotaxon*, **70**: 247-253.

> *Septoria hodgesii* sp. nov. is described. This fugus is a common leaf pathogen of *Myrica cerifera* in the southeastern U.S., where it usually has been identified as *S. myricae*. Comparison of *S. hodgesii* with the types of *S. myricae*, from *M. certifera* and *S. myricata*, from *M. gale*, shows it tobe distinct from both species.

Killgore, E.M., L.S. Sugiyama, R.W. Barreto, & D.E. Gardner (1999). Evaluation of *Colletotrichum gloeosporioides* for biological control of *Miconia calvescens* in Hawaii. *Plant Disease*, **83**: 964.

> *Miconia calvescens* (Melastomataceae), from the Neotropics, is a noxious forest weed in Hawaii. We evaluated an isolate of *Colletotrichum gloeosporioides* that causes leaf spots on *Miconia* spp. in Brazil for its potential in biological control. The results demonstrate that our pathogen (VIC 19306) is distinct from *C. gloeosporioilks f. sp. clildemiae* (l), which did not infect *M. calvescens*. We designate our pathogen *C. gloeosporioides f. sp. miconiae*. Voucher specimens (VIC 19306, Sana, RJ, 24.11.1998, and R. W. Barreto) and cultures are maintained at the Departamento de Fitopatologia, Universidade Federal de Vicosa MG, Brazil.

Starr, F., K. Martz, & L.L Loope (1999). New plant records from East Maui for 1998. *B.P. Bishop Museum Occasional Papers,* **59**: 11-15.

> The following contributions include new island records, new naturalized records, a range extension, and name change of plants located on East Maui, Hawai'i. Voucher specimens are housed in the Bishop Museum, Honolulu.

O'Connor, Paul J. , A.P. Covich, F.N. Scatena, & L.L. Loope (2000). Non-indigenous bamboo along headwater streams of the Luquillo Mountains, Puerto Rico: Leaf fall, aquatic leaf decay and patterns of invasion. *Journal of Tropical Ecology*, **16**: 499-516.

> The introduction of bamboo to montane rain forests of the Luquillo Mountains, Puerto Rico has lead to present-day bamboo monocultures in numerous riparian areas. As non-indigenous bamboos spread along Puerto Rico streams, they are likely to alter aquatic communities dependent on leaf input.

Loope, L., F. Starr, & K. Starr (2004). Protecting endangered plant species from displacement by invasive plants on Maui, Hawaii. *Weed Technology*, **18**: 1472-1474.

> The Hawaiian island of Maui, with highly diverse habitats and 80 federally listed endangered plant species, provides a microcosm for addressing the threats of plant invasions to endemic biologigcal diversity through partnerships for research and management. An evolving vision of what is needed involves an accelerated, balanced program involving exclusion of potential new invaders, early detection and rapid response, control, and public education.

Books, Chapters, and Edited Volumes

Conant, P., A.C. Medeiros, & L.L. Loope (1997). A multiagency containment program for miconia (*Miconia calvescens*), an invasive tree in Hawaiian rain forests. Pp. 249-254 *in* J. Luken & J. Thieret (eds.), *Assessment and Management of Invasive Plants* (Springer-Verlag, New York).

Loope, L.L. (1997). The Hawaiian islands as a laboratory for addressing alien species problems. Pp. 259-260 *in* G. Meffe & R. Carroll (eds.), *Principles of Conservation Biology*, 2nd edition (Sinauer Associates, Inc., Sunderland MA).

Peer-Reviewed Technical Reports

Pratt, L.W., G.L. Santos, & C.P. Stone (1994). "A test of four herbicides for use on strawberry guava (*Psidium cattleianum* Sabine) in Kipahulu Valley, Haleakala Nationla Park." *University of Hawai'i Cooperative National Park Resources Studies Unit Technical Report 90* (University of Hawai'i, Honolulu, HI). 21 pp.

Ellshoff, Z.E., D.E. Gardner, C. Wikler, & C.W. Smith (1995). "Annotated bibliography of the genus *Psidium,* with emphasis on *P. cattleianum* (strawberry guava) and *P. guajava* (common guava), forest weeds in Hawai'i." *University of Hawai'i Cooperative National Park Resources Studies Unit Technical Report 95* (University of Hawai'i, Honolulu, HI). 105 pp.

Lutzow-Felling, C.J., D.E. Gardner, G.P. Markin, & C.W. Smith (1995). "*Myrica faya*: Review of the biology, ecology, distribution, and control, including an annotated bibliography." *University of Hawai'i Cooperative National Park Resources Studies Unit Technical Report 94* (University of Hawai'i, Honolulu, HI). 120 pp.

Chimera, C.G., A.C. Medeiros, L.L. Loope, & R.W. Hobdy (2000). "Status of management and control efforts for the invasive alien tree *Miconia calvescens* DC. (Melastomataceae) in Hana, East Maui." *University of Hawai'i Cooperative National Park Resources Studies Unit, Technical Report 128* (University of Hawai'i, Honolulu, HI). 53 pp.

Nonreviewed Technical Reports

Dougill, S.J. & P.C. Banko (2002). A new genus of alien grass discovered in Hawaii: *Oryzopsis* (Poaceae). *Newsletter of the Hawaiian Botanical Society*, **(1,2)**: 8.

Nonreviewed Articles

Gardner, D.E. (1994). Biocontrol of ivy gourd (*Coccinia grandis*) on Windward O'ahu. *Newsletter of the Hawaiian Botanical Society*, **33**: 13,15–16.

Duffy, B.K. & D.E. Gardner (1995). Decline of invasive faya in Hawai'i. *Newsletter of the Hawaiian Botanical Society*, **34**: 1, 3-5.

Anderson, R.C. & D.E. Gardner (1996). Preliminary evaluation of *Pseudomonas solanacearum* as a potential biological control agent for the alien weed kahili ginger (*Hedychium gardnerianum*) in Hawaiian forests. *Newsletter of the Hawaiian Botanical Society*, **35**: 1, 3–6.

Gardner, D.E. (1999). Biocontrol of yellow Himalayan raspberry: Exploration in China. *Newsletter of the Hawaiian Botanical Society*, **38**: 53-58.

Gardner, D.E., R.C. Anderson, E.M. Killgore, & L.S. Sugiyama (1999). Host range evaluation of *Septoria hodgesii* as a biocontrol agent for fayatree. *Newsletter of the Hawaiian Botanical Society*, **38**: 1, 3-4.

Killgore, E.M., M. Ramadan, & D.E. Gardner (2000). Evaluation of *Puccinia lagenophorae* as a biocontrol agent for *Senecio madagascariensis* in Hawaii. *Newsletter of the Hawaiian Botanical Society*, **39**: 37–39.

Loope, L.L. (2000). A passive approach to biological invasions. Review of "Plant Invasions: Ecological Mechanisms and Human Responses," by U. Starfinger *et al*. *Diversity & Distributions,* **6**(1): 61-62.

Loope, L.L. (2002). Book Review. "Plant Invasions, Special Ecology and Ecosystem Management," edited by G. Brundu et al. *Journal of Vegetation Science,* **13**: 292.

Conference Presentations, Posters, and Abstracts

Medeiros, A.C. & L.L. Loope (1994). "Management strategies for the invasive tree *Miconia calvescens* on Maui, Hawaii." ESA Annual Meeting, Knoxville, TN, August 1994. (Presentation) *Bulletin of the Ecological Society of America*, **75** (Abstract).

Duffy, B.K. & D.E. Gardner (1995). Spontaneous decline of weedy *Myrica faya* in Hawai'i. *Phytopathology*, **85**: 1196 (Abstract).

Gardner, D.E. & C.S. Hodges, Jr (1995). "Pathogens from the Azores, Madeira, and Canary Islands as biocontrol agents of *Myricafaya* (Myricaceae) in Hawaii." *In* Proceedings of the 1st Symposium on Fauna and Flora of the Atlantic Islands, Funchal, Madeira, Portugal, October 1993. *Boletim do Museu Municipal do Funchal*, Sup. no. 4: 319-323.

Gardner, D.E. & C.W. Smith (1995). "Applicability of biological control to the weed problem in Hawaii's native habitats." Hawaii Conservation Conference, Honolulu, HI, July 1995. (Abstract)

Gardner, D.E., C.W. Smith, & G.P. Markin (1995). "Biological control of alien plants in natural areas of Hawaii." Pp. 35–40 *in* E.S. Delfosse and R.R. Scott (eds.), *Proceedings of the Eighth International Symposium on Biological Control of Weeds, Lincoln University, Canterbury, New Zeal*and *February 1992* (DSIR/CSIRO, Melbourne, Australia). (Proceedings)

Smith, C.W., C. Lutzow-Felling, & D.E. Gardner (1995). "*Myrica faya*: One man's meat is another man's poison." Proceedings of the 1st Symposium on Fauna and Flora of the Atlantic Islands. *Boletim do Museu Municipal do Funchal*, Sup. No. 4: 699-706. (Proceedings)

Gardner, D.E., E.M. Killgore, L.S. Sugiyama, & R.C. Anderson (1996). "Current biocontrol research in the Hawaii Department of Agriculture plant pathogen containment facility." P. 229 *in* V.C. Moran and J.H. Hoffmann (eds.), *Proceedings of the IX International Symposium on Biological Control of Weeds, Stellenbosch, South Africa, January, 1996* (University of Capetown, South Africa). (Proceedings)

Smith, C.W. & D.E. Gardner (1996). "Biological control of forest weeds in Hawaii." P. 339 *in* V.C. Moran and J.H. Hoffmann (eds.), *Proceedings of the IX International Symposium on Biological Control of Weeds* (Stellenbosch, South Africa). (Proceedings)

Anderson, R.C. & D.E. Gardner (1997). "Biological control of the alien weed kahili ginger (*Hedychium gardnerianum*) in Hawai'i Volcanoes National Park." Hawaii Conservation Conference, Maui, HI, July 1997. (Abstract).

Gardner, D.E. (1997). "Consideration of the rust fungi *Phragmidium violaceum* and *gymnoconia nitens* for biocontrol of *Rubus* in Hawaii." Conference on the Biological Control of Weeds with Plant Pathogens, Auburn University, Auburn, AL, March 1997. (Abstract).

Loope, L.L. (1997). "Alien plant management considerations for Kahoolawe." Hawaii Conservation Conference, Maui, HI, July 1997. (Invited Presentation)

Medeiros, A.C., L.L. Loope, & R.W. Hobdy (1997). "Interagency efforts to combat *Miconia calvescens* on the island of Maui, Hawai'i." First Regional Conference on Miconia Control, Papeete, Tahiti, August 1997. (Invited Presentation)

Gardner, D.E., C.S. Hodges, Jr., R.C. Anderson, & E.M. Killgore (1998). "Consideration of *Gymnoconia nitens* as a potential biocontrol agent for blackberry in Hawaii." 7th International Congress of Plant Pathology, Edinburgh, Scotland August 1998. (Abstract)

Medeiros, A.C., L.L. Loope, & R. Hobdy (1998). "Interagency efforts to combat *Miconia calvescens* on the island of Maui, Hawai'i." *Proceedings, 1st Regional Conference on Miconia Control* (Gouvernment de Polynesie francaise/University of Hawai'i at Mānoa/Centre ORSTOM de Tahiti). (Proceedings)

Randell, R.A., D.E. Gardner, & C.W. Morden (1999). "Hybridization among endemic and naturalized species of raspberry (*Rubus*) in the Hawaiian Islands." Hawaii Conservation Conference, Honolulu, HI, July, 1999. (Abstract).

Randell, R.A., D.E. Gardner, & C.W. Morden (1999). "Hybridization between endemic and naturalized species of *Rubus* in the Hawaiian Islands." XVI International Botanical Congress, St. Louis, MO, August, 1999. (Abstract).

Anderson, R.C. & D.E. Gardner (2000). "Efficacy and plant response to *Ralstonia solanacearum*, a potential bioherbicide for control of kahili ginger (*Hedychium gardnerianum*)." Proceedings of the X International Symposium on Biological Control of Weeds, Montana State University, Bozeman, MT, July 1999. (Abstract)

Anderson, R.C. & D.E. Gardner (2001). "Recent developments in the biological control of kahili ginger with *Ralstonia solanacearum* in Hawaii." Proceedings of the Western International Forest Disease Work Conference, Waikoloa, HI, August 2000. (Abstract)

Gardner, D.E. (2001). "Efforts toward biocontrol of invasive *Rubus* spp. in Hawaiian forests." Proceedings of the Western International Forest Disease Work Conference, Waikoloa, HI, August, 2000. (Abstract)

Killgore, E.M., M. Ramadan, & D.E. Gardner (2001). "Evaluation of *Puccinia lagenophorae* as a biocontrol agent for *Senecio madagascariensis* in Hawaii." Joint Meeting of APS, MSA, and SON, Salt Lake City, UT, August 2001. *Phytopathology*, 91(6): S48. (Abstract)

Loope, L.L. (2001). "Invasive plant impact on Hawaiian ecosystems." From Urban Landscapes to Native Forests: Invasive Species in Hawaii, Kilauea Military Camp, HI, December 2001. (Invited Presentation)

Martz, K., F. Starr, & L. Loope (2001). "Status of invasive non-native plants in the northwestern Hawaiian Islands." Society for Conservation Biology, Hilo, HI, July 2001. (Poster)

Starr, F., K. Martz, & L. Loope (2001). "Invasion of Maui, Hawaii, by three species of *Ficus* (Moraceae): Biotic interactions and consequences." Society for Conservation Biology, Hilo, HI, July 2001. (Poster)

Bio, K. & J.D. Jacobi (2003). "Modeling the current and potential distribution of invasive alien plant species on the island of Hawaii." Hawaii Conservation Conference, Honolulu, HI, July 2003. (Poster).

Starr, F., K. Starr, & L. Loope (2003). "Information gathering and development of methodology to address newly emergent alien plant species on Maui." Hawaii Conservation Conference, Honolulu, HI, July 2003. (Presentation).

Anderson, R.C. (2004). "Sharing biocontrol success across the Pacific: Aotearoa and Hawai'i." Hawaii Conservation Conference, Honolulu, HI, July 2004. (Presentation).

Invasive Species, General

Peer-Reviewed Journal Articles

Vitousek, P.M., C.M. D'Antonio, L.L. Loope, & R. Westbrooks (1996). Biological invasions as global environmental change. *American Scientist*, **84**: 468-478.

> The human species is noteworthy for its ability to forge into new environments and drastically alter them. Our mobile society is redistributing the species on the earth at a pace that challenges ecosytems, threatens human health and strains economies.

Vitousek, P.M., C.M. D'Antonio, L.L. Loope, M. Rejmanek, & R. Westbrooks (1997). Introduced species: a significant component of human-caused global change. *New Zealand Journal of Ecology,* **21**: 1-16.

> Biological invasions are a widespread and significant component of human-caused breakdown of the regional distinctiveness of Earth's flora and fauna – a substantial global change in and of itself. People and institutions working to understand, prevent, and control invasions are carry out some of the most important – and potentially most effective – work on global environmental change.

Ricciardi, A., W.W.M. Steiner, R.N. Mack, & D. Simberloff (2000). Towards a global information system for invasive species. *Bioscience*, **50**(3): 239-244.

> Retrieving critical information about the spread, impact, and control of invasive species has always been difficult because much of this information is buried in disciplinary journals from many different fields or in obscure government documents and technical reports that are not widely accessible. In October 1998 a workshop was convened to discuss the creation of an Internet-based global information system that would provide comprehensive and readily accessible information to aid monitoring, risk assessment, and control of invasive species.

Loope, L.L., F.G. Howarth, F. Kraus, & T.K. Pratt (2001). Newly emergent and future threats of alien species to Pacific birds and ecosystems. *In* Evolution, ecology, conservation and management of Hawaiian birds: a vanishing avifauna (J.M. Scott, S. Conant, & C. van Riper, III, eds.). *Studies in Avian Biology*, **22**: 291-304.

> Although the devastating effects of established alien species to Pacific birds and ecosystems are generally well recognized by the avian conservation community, we raise the under appreciated issue of effects of incipient and future invasives. We touch upon a sampling of obviously severe potential future threats, with the hope of raising awareness and resolve to fix the current woefully inadequate system for prevention of and rapid response to new invasions.

Fornwall, M. & L. Loope (2004). Toward a comprehensive information system to assist invasive species management in Hawaii and Pacific islands. *Weed Science*, **52**: 854-856.

> The need for coordinated regional and global electronic databases to assit prevention, early detection, rapid response, and control of biological invasions is well accepted. The Pacific Basin Information Node, a node of the National Biological Information Infrastructure, has been increasingly engaged in the invasive species enterprise since its establishment in 2001. Although initial emphasis has been on Hawaii, cooperative work with other Pacific islands and countries of the Pacific Rim is already underway and planned.

Loope, L.L. (2004). The challenge of effectively addressing the threat of invasive species to the National Park System. *Park Science*, **22**(2): 14-20.

> Ever-increasing transport of species of all kinds is breaking down biogeographical boundaries with profound consequences for biodiversity loss worldwide. Given the seeds of catastrophic loss already planted and those yet to come, invasive species pose a highly significant threat to the biodiversity of the U.S. National Park System in the early decades of the 21st century. My attempt here is at a personal review and synthesis of implications of trends in biological invasions for national parks, based on personal experience and analyses by others.

Loope, L.L., & D.A. Helweg (2004). Invasive species prevention for oceanic islands. *Insula: International Journal of Island Affairs* (February 2004)*:* 67-72.

> Humans have been moving species of animals and plants beyond their native ranges, both deliberately and inadvertently, and many of these species have become established and spread. Invasive species pose the primary threat to biodiversity on most oceanic islands. New terrestrial and aquatic/marine invasive plant and animal species threaten to overwhelm Galapagos, Hawaii, New Zealand and all Pacific islands with ecological and economic damage and social costs. Key prerequisites for progress include obtaining broad public support and the cooperation of agriculture and biodiversity interests.

Books, Chapters, and Edited Volumes

Loope, L.L. & C.P. Stone (1996). Strategies to reduce erosion of biodiversity by exotic terrestrial species. Pp. 261-279 *in* R.C. Szaro and D.W. Johnston (eds.), *Biodiversity in Managed Landscapes: Theory and Practice* (Oxford University Press, New York).

Stone, C.P. & L.L. Loope (1996). Alien species in Hawaiian national parks. Pp. 133-158 *in* W.L. Halvorson & G.E. Davis (eds.), *Science and Ecosystem Management in the National Parks* (The University of Arizona Press, Tucson, AZ).

Loope, L.L. (1998). Biological invasions. Pg. 86 *in* P. Calow (ed.), *The Encyclopedia of ecology & environmental management* (Blackwell Science, Ltd. Oxford, U.K.).

Loope, L.L. (1998). Exotic and invasive species. Pp. 257-258 *in* P. Calow (ed.), *The Encyclopedia of ecology & environmental management* (Blackwell Science, Ltd. Oxford, U.K.).

Nonreviewed Technical Reports

Vitousek, P.M., C. D'Antonio, & L.L. Loope (1995). "Final Report – Biological Invasions as Global Change." *Unpublished technical report to Aspen Global Change Institute, Aspen, Colorado* (U.S.Geological Survey, Biological Resources Division, Pacific Island Ecosystems Research Center, Honolulu, HI).

Nonreviewed Articles

Loope, L. & R. Bartlett (1999). Maui Invasive Species Committee. *Endangered Species Bulletin*, **23**(6): 8-9.

Loope, L.L. (2001). Review of book, *Invasive species in a Changing World*, edited by Harold Mooney and Richard J. Hobbs. *Plant Systematics and Evolution*

Conference Presentations, Posters, and Abstracts

Loope, L.L. & F.G. Howarth (1997). "Present and future threats of alien species to Pacific landbirds and endangered ecosystems." Cooper Ornithological Society, Hilo, HI, April 30 - May 4, 1997. (Invited Presentation)

Thomas, P.A., L.L. Loope, & C.W. Smith (1999). "The Hawaii Ecosystems at Risk Project." Hawaii Conservation Conference, Honolulu, HI, July 1999. (Poster)

Thomas, P.A., L.L. Loope, & C.W. Smith (1999). "The Hawaii Ecosystems at Risk Project: Tracking status and trends of alien species at multiple scales to assist prevention, eradication, and containment" USGS-BRD National Program Review (Status and Trends Program), Tucson, AZ, May 1999. (Poster)

Thomas, P. & L. Loope (2000). "An invasive species information system for Hawaii." USGS-BRD National Program Review (Status and Trends Program), Annapolis, MD, October 2000. (Poster)

Loope, L.L. & D.W. Reeser (2001). "Crossing boundaries at Haleakala: Addressing invasive species through partnerships." George Wright Society Biennial Conference, Denver, CO, April 2001. (Presentation)

Thomas, P. & L. Loope (2001). "An invasive species information system for Hawaii and Pacific Islands." Sixth Meeting of the Subsidiary Body on Scientific, Technical and Technological Advice, Secretariat of the Convention on Biodiversity, Montréal, Canada, March 2001. (Poster)

Thomas, P. & L. Loope (2001). "An invasive species information system for Hawaii and Pacific Islands." Society for Conservation Biology, Hilo, HI, July 2001. (Poster)

Loope, L.L. & D.W. Reeser (2002). "Crossing boundaries at Haleakala: Addressing invasive species through partnerships." Pp. 29-34 *in* D. Harmon (ed.), *Crossing Boundaries in Park Management, Proceedings of the 11th Conference on Research and Resource Management in Parks and on Public Lands* (George Wright Society, Denver, CO). (Proceedings)

Loope, L.L. (2002). "Invasive species in Hawaii: impacts, problems, and opportunities for collaboration." Austral-Pacific Meeting of Global Invasive Species Programme. Bishop Museum, Honolulu, HI, October 2002. (Invited Presentation)

Loope, L.L. (2002). "Role of monitoring in a fully integrated invasive plant management program (including prevention and early detection)." National Park Service Workshop on Invasive Plant Monitoring Guidelines, Ft. Collins, CO, June 2002. (Invited Presentation)

Loope, L.L. & F.G. Howarth (2003). "Globalization and pest invasion: Where will we be in five years?" Pages 34-39 *in* R.G. Van Driesche (ed.), *Proceedings, First International Symposium on Biological Control of Arthropods, Honolulu, Hawaii, 14-18 January 2002* (U.S. Department of Agriculture, Forest Service, Morgantown, West Virginia, FHTET-2003-05). {Invertebrates}

Inventory & Monitoring

Peer-Reviewed Journal Articles

Faaborg, J., K. Dugger, W.J. Arendt, B.L. Woodworth, & M.E. Baltz (1997). Population declines of the Puerto Rican Vireo (*Vireo latimeri*) in Guánica Forest. *Wilson Bulletin,* **109**: 195-202.

> Abundance of the Puerto Rican Vireo in Guánica Forest, PR, has declined gradually over the period 1973-1996 as determined by constant-effort mist netting. As a single-island endemic, it is important the cause of this decline be determined so that recovery efforts can begin while the species is still moderately abundant.

Reynolds, M.H., B.A. Cooper, & R.H. Day (1997). Radar study of seabirds and bats on windward Hawaii. *Pacific Science*, **51**: 97-106.

> Modified marine surveillance radar was used to study the presnce/absence, abundance, and flight activity of four nocturnal species: Hawaiian dark-rumped petrel (*Pterodroma phaeopygia sanwichensis*), Newell's shearwater (*Puffinus auricularis newelli*), Band-rumped storm petrel (*Oceanodroma castro*), and Hawaiian hoary bat (*Lasiurus cinereus semotus*).

Woodworth, B.L., B.P. Farm, C. Mufungo, M. Borner, & J. ole Kuwai (1997). A photographic census of flamingos in the Rift Valley Lakes of Tanzania. *African Journal of Ecology,* **35**: 326-334.

> An aerial photographic census of flamingos (*Phoenicopterus minor* and *P. ruber*) was conducted on 20 July 1994 on nine lakes in Tanzania. Trends in flamingo populations, survey methodology, and future monitoring needs are discussed.

Banko, P.C., S.C. Hess, L. Johnson, & S.J. Dougill (1998). Palila population estimate for 1997. *'Elepaio*, **58**: 11-15.

With counts beginning in 1980, the Palila, an endangered Hawaiian honeycreeper, has the longest history of annual monitoring of any forest bird in Hawaii. We used variable circular plot counts during 28-31 January 1997 to estimate Palila population at 310 stations on 17 transects on Mauna Kea that were used in 1996. The 1997 estimate of 4,395 ± 625 SE Palila is higher than the mean estimate for the period 1980-1995 and similar to the 1996 estimate.

Fancy, S.G., R.J. Craig, & C.W. Kessler (1998). Forest bird and fruit bat populations on Sarigan, Mariana Islands. *Micronesica*, **31**: 247-255.

We conducted the first quantitative surveys of forest bird and bat populations on the uninhabited island of Sarigan, Commonwealth of the Northern Mariana Islands. We recorded five species of forest birds on Sarigan: Micronesian Honeyeater (*Myzomela rubratra*), Micronesian Megapode (*Megapodius laperouse laperouse*), Micronesian Starling (*Aplonis opaca*), Collared Kingfisher (*Halcyon chloris*), and White-throated Ground Dove (*Gallicolumba xanthonura*).

Reynolds, M.H., B.M.B. Nielsen, & J.D. Jacobi (1998). Surveys of the Hawaiian Hoary Bat in the District of Puna, Hawaii Island. *ʻElepaio*, **57**(9): 153-157.

We studied the distribution, abundance, and activity patterns of the Hawaiian hoary bat (*Lasiurus cinereus semotus*) in the District of Puna, Hawaii Island, August – December 1993. The number of bats detected was independent of vegetation types (native, mixed, or introduced). Peaks in bat activity occurred at sunset and 30 minutes before sunrise.

Gray, E.M., P.C. Banko, S.J. Dougill, D. Goltz, L. Johnson, M.E. Laut, J.D. Semones, & M.R. Wiley (1999). Breeding and nonbreeding censuses of the 1998 Palila population on Mauna Kea, Hawaiʻi. *ʻElepaio,* **59**: 33-39.

Censuses of Palila population numbers on Mauna Kea have fluctuated tremendously over the past 18 years. Our goal in this study was to continue censusing Palila population numbers throughout their entire range, using the same methodology that has been used in previous censuses to facilitate comparison between years. We found no significant difference in mean population sized per area when we compared population estimates from the nonbreeding season with estimates from the breeding season.

Morin, M.P., C.T. Atkinson, P.C. Banko, R.E. David, & M.H. Reynolds (1999). Sightings of Kaho‘olawe birds. *ʻElepaio*, **58**: 55-65

We visited Ka-hoʻolawe birds in December 1996 and February 1997 on contract to survey avifauna. Constraints imposed by the contract deadlines, survey dates, limited time on island, and safety and logistical issues resulted in a survey of limited scope and this report should not be construed as a complete list of avian species occurring on Kaho‘olawe birds.

Pratt, T.K. & R.L. Pyle (2000). Nukupuʻu in the twentieth century: endangered species or phantom presence? *ʻElepaio*, **60**: 35-41. [Nukupuu]

In May 1899, while on a bird collecting trip to Makaweli, Kauaʻi, George C. Munro shot the last two Nukupuʻu specimens ever taken. Accounts by naturalists Wilson, Palmer, Perkins, and Munro depict a bird that closely resembled the ʻAkiapōlāʻau and shared that species' warbled house-finch-like song, energetic bark-excavating behavior, insectivorous diet, and sociality involving solitary pairs.

Baker, P.E. (2001). Status and distribution of the Poʻouli in the Hanawī Natural Area Reserve between December 1995 and June 1997. *In* Evolution, ecology, conservation and management of Hawaiian birds: a vanishing avifauna (J.M. Scott, S. Conant, & C. van Riper, III, eds.). *Studies in Avian Biology*, **22**: 144-150. [Poouli; Poʻo-uli; Poo-uli]

The Poʻouli (*Melamprosops phaeosoma*), a critically endangered Hawaiian honeycreeper first discovered in 1973 on east Maui, Hawaiʻi, is on the brink of extinction. In the first six months of 1997, only three Poʻouli could be found (two males, one possible female), one bird in each of three home ranges. These birds are believed to be the last of their species.

Simon, J.C., T.K. Pratt, K.E. Berlin, J.R. Kowalsky, S.G. Fancy, & J.S. Hatfield (2002). Temporal variation in bird counts within a Hawaiian rainforest. *The Condor*, **104**: 469-481.

We studied monthly and annual variation in density estimates of nine forest bird species along an elevational gradient in an east Maui rainforest. All species showed significant differences in density estimates among months and years. Temporal variations in density estimates documented in our study site emphasize the need for consistent, well-researched survey regimens and for caution when drawing conclusions from, or basing management decisions on, survey data.

Starr, F., K. Martz, & L.L Loope (2002). New plant records from the Hawaiian Archipelago. *B.P. Bishop Museum Occasional Papers,* **69**: 16-27

The following contributions include new island records, new state records, and range extensions of plants located on Midway Atoll, Pearl and Hermes Reef, O‘ahu, Maui, and Hawai‘i, State of Hawai‘i. Voucher specimens are housed in the Bishop Musuem, Honolulu.

Starr, F., K. Starr, & L.L. Loope (2003). New plant records from the Hawaiian Archipelago. *Bishop Museum Occasional Papers,* **74**: 23-34.

Contributions include new island records, new state records, and range extensions of plants located on Kure Atoll, Midway Atoll, Maui, and Hawai‘i. Voucher speciments are housed in the Bishop Museum’s *Herbarium Pacificum*, Honolulu (BISH).

Starr, F., K. Starr, & L.L. Loope (2004). New plant records for the Hawaiian Archipelago. *B.P. Bishop Museum Occasional Papers,* **79**: 20-30

Contributions include new island records, new naturalized records, new state records, and range extensions of plants located on Midway Atoll, Kaua‘i, Maui, and Hawai‘i. Voucher speciments are housed in the Bishop Museum’s *Herbarium Pacificum*, Honolulu (BISH).

Starr, F., K. Starr, & L. Loope (2004). New arthropod records from Kaho‘olawe. *B.P. Bishop Museum Occasional Papers*, **79**: 50-54.

Contributions include new island records of arthropods located on the island of Kaho‘olawe. Voucher speciments were collected and determined by the authors. All vouchers are housed in Bishop Museum, Honolulu.

Books, Chapters, and Edited Volumes

Stone, C.P. & L.W. Pratt (1994). *Hawai‘i’s plants and animals, biological sketches of the plants and animals of Hawai‘i Volcanoes National Park* (Hawai‘i Natural History Association, University of Hawai‘i Press, Honolulu, HI). 399 pp.

Stone, C.P. & L.W. Pratt (2002). *Hawai‘i’s plants and animals, biological sketches of the plants and animals of Hawai‘i Volcanoes National Park.* Second Edition with Addendum (Hawai‘i Natural History Association, University of Hawai‘i Press, Honolulu, HI). 408 pp.

Peer-Reviewed Technical Reports

Pratt, L.W. & L.L. Abbott (1996). “Distribution and abundance of alien and native plant species in Kaloko-Honokohau National Historical Park Site.” *University of Hawai‘i Cooperative National Park Resources Studies Unit Technical Report 103* (University of Hawai‘i, Honolulu, HI). 88 pp.

Pratt, L.W. & L.L. Abbott (1996). “Vascular plants of Pu‘uhonua o Honaunau National Historical Park.” *University of Hawai‘i Cooperative National Park Resources Studies Unit Technical Report 105* (University of Hawai‘i, Honolulu, HI). 74 pp.

Pratt, L.W. & L.L. Abbott (1996). “Vascular plants of Pu‘ukohola Heiau National Historic Site, Hawai‘i Island.” *University of Hawai‘i Cooperative National Park Resources Studies Unit Technical Report 101* (University of Hawai‘i, Honolulu, HI). 33 pp.

Medeiros, A.C., L.L. Loope, & C.G. Chimera (1998). "Flowering Plants and Gymnosperms of Haleakala National Park, Hawaii." *University of Hawai'i Cooperative National Park Resources Studies Unit Technical Report 120* (University of Hawai'i, Honolulu, HI). 181 pp.

Pratt, L.W., L.L. Abbott, & D.K. Palumbo (1999). "Vegetation above a feral pig barrier fence in rain forests of Kilauea's East Rift, Hawai'i Volcanoes National Park." *University of Hawai'i Cooperative National Park Resources Studies Unit Technical Report 124* (University of Hawai'i, Honolulu, HI). 88 pp.

Hess, S.C. & L.W. Pratt (2004). "Integrated Trip Report: Site visits to Area 50, Andersen Air Force Base, Guam National Wildlife Refuge, and War in the Pacific National Park, Guam, May 8-18, 2004." USGS-BRD-PIERC Internal Report series.

Pratt, L., I. Stout, & T. Tunison (2004). "National Park Service Pacific Island Network Monitoring Plan: Appendix A: Vegetation & Flora Report." National Park Service Inventory & Monitoring Program (*http://science.nature.nps.gov/im/units/pacn/monitoring/2004/*).

Nonreviewed Technical Reports

Farm, B.P. & B.L. Woodworth (1994). "A total count of buffalo and elephant in Serengeti National Park, May 1994." *Technical report* (Tanzania Wildlife Conservation Monitoring, Frankfurt Zoological Society).

Farm, B.P. & B.L. Woodworth (1994). "Status and trends of wildebeest in the Serengeti Ecosystem." *Technical report* (Tanzania Wildlife Conservation Monitoring, Frankfurt Zoological Society). 13 pp.

Reynolds, M.H., G.L. Ritchotte, B.M.B. Nielsen, A. Viggiano, J.K. Dwyer, & J.D. Jacobi (1994). "Surveys on the distribution and abundance of seabirds in the vicinity of proposed Geothermal Project subzones in the District of Puna, Hawaii." *USFWS Final report prepared for Hawaii Geothermal Project, Environmental Impact Statement* (U.S. Dept. of Energy, Oakridge, TN). 30 pp.

Reynolds, M.H., G.L. Ritchotte, A. Viggiano, J.K. Dwyer, B.M.B. Nielsen, & J.D. Jacobi (1994). "Surveys on the distribution and abundance of the Hawaiian hoary bat *(Lasiurus cinereus semotus)* in the vicinity of proposed Geothermal Project subzones in the District of Puna, Hawaii." *USFWS Final report prepared for Hawaii Geothermal Project, Environmental Impact Statement* (U.S. Dept. of Energy, Oakridge, TN). 33 pp.

Woodworth, B.L., K.L.I. Campbell, B.P. Farm, & S. Huish (1994). "Wildlife Census of the Greater Ruaha Area, wet and dry seasons 1993." *Technical report* (Tanzania Wildlife Conservation Monitoring, Frankfurt Zoological Society).

Woodworth, B.L., S. Frazee, & M. Gavin (1994). "Ecological monitoring of bird populations in Serengeti National Park: pilot study." *Technical report* (Tanzania Wildlife Conservation Monitoring, Frankfurt Zoological Society). 26 pp.

Farm, B.P. & B.L. Woodworth (1995). "Aerial survey of the Selous Game Reserve, Mikumi National Park, and surrounding areas, dry season 1994." *Technical report* (Tanzania Wildlife Conservation Monitoring, Frankfurt Zoological Society). 54 pp.

Woodworth, B.L. & B.P. Farm (1995). "A census of flamingos in the Rift Valley Lakes of Tanzania: Developing methods for long-term monitoring." *Technical report* (Tanzania Wildlife Conservation Monitoring, Frankfurt Zoological Society). 19 pp.

Woodworth, B.L. & B.P. Farm (1995). "Wildlife populations and human activities in Moyowosi and Kigosi Game Reserves: Aerial survey wet season 1994." *Technical report* (Tanzania Wildlife Conservation Monitoring, Frankfurt Zoological Society). 30 pp.

Woodworth, B.L., G. Gerletti, B.C. Mwasaga, B. Farm, & R. Facoetti (1995). "Total count of buffalo and elephant in the Tarangire ecosystem, September 1995." *Technical report* (Tanzania Wildlife Conservation Monitoring / Tarangire Conservation Project, Frankfurt Zoological Society / European Commission). 17 pp.

Woodworth, B.L. & B.P. Farm (1996). "Tanzania Wildlife Conservation Monitoring Operations Manual." *Technical report* (Tanzania Wildlife Conservation Monitoring, Frankfurt Zoological Society). 111 pp.

Woodworth, B.L. (1996). "Dry season wildlife censuses in Mkomazi and Ugalla Game Reserves and Katavi National Park." *Technical report* (Tanzania Wildlife Conservation Monitoring, Frankfurt Zoological Society).

Murray, T.C., P. Banko, L. Johnson, K. Radasky, R. Rounds, J.D. Semones, & M. Wiley (1999). "Keauhou forest bird monitoring project report." *Unpublished technical report to Kamehameha Schools, Hilo, Hawaii* (U.S. Geological Survey, Biological Resources Division, Pacific Island Ecosystems Research Center, Kilauea Field Station, Hawaii National Park, HI). 7 pp.

Steiner, W.W.M. (1999). "Establishing Permanent Reference Grids for Inventory and Monitoring on Navy Properties on Guam: Phase 1 of Floral and Faunal Surveys on Guam Navy Lands." *COMNAVMARIANAS Natural Resources Management Project* (U.S. Geological Survey, Biological Resources Division, Pacific Island Ecosystems Research Center, Honolulu, HI). 15 pp.

Steiner, W.W.M., B.P. Farm, & M. Reynolds (2000). "Establishing Permanent Reference Grids for Inventory and Monitoring on Navy Properties on Guam: Phase 2 of Floral and Faunal Surveys on Guam Navy Lands." *COMNAVMARIANAS Natural Resources Management Project* (U.S. Geological Survey, Biological Resources Division, Pacific Island Ecosystems Research Center, Honolulu, HI). 12 pp.

Camp, R.J., M. Gorresen, B.L. Woodworth, & T.K. Pratt (2002). "Hawaii Forest Bird Species Modeling." *Unpublished technical report to Hakalau Forest National Wildlife Refuge, September 2002* (Hawaii Forest Bird Interagency Database Project, U.S. Geological Survey, Biological Resources Division, Pacific Island Ecosystems Research Center, Kilauea Field Station, Hawaii National Park, HI). 145 pp.

Camp, R.J., M. Gorresen, B.L. Woodworth, & T.K. Pratt (2002). "Hawaii Forest Bird Species Modeling." *Unpublished technical report to Hawaii Gap Analysis Program, May 2002* (Hawaii Forest Bird Interagency Database Project, U.S. Geological Survey, Biological Resources Division, Pacific Island Ecosystems Research Center, Kilauea Field Station, Hawaii National Park, HI). 50 pp.

Camp, R.J., P.M. Gorresen, B.L. Woodworth, & T.K. Pratt (2002). "Preliminary analysis of forest bird survey data 1976-2002 for National Parks in Hawaii: Hawaii Volcanoes National Park." *Unpublished technical report* (prepared by the U.S. Geological Survey, Biological Resources Division, Pacific Island Ecosystems Research Center, Kilauea Field Station, Hawaii National Park, HI). 100 pp.

Oboyski, P.T., A.J. Gregor, L.B. Passerello, J.P. Weber, J.E. Hines, & P.C. Banko (2002). "Kipuka Alala terrestrial arthropod survey, Pohakuloa Training Area, Hawaii." *Unpublished technical report to U.S. Army Garrison, Hawaii, Hawaii, April 2002* ((U.S. Geological Survey, Biological Resources Division, Pacific Island Ecosystems Research Center, Kilauea Field Station, Hawaii National Park, HI). 133 pp.

Pratt, R., E. Rose, & B.L. Woodworth (2002). "Puaiohi Recovery Project Report 2002. Part I. Survival and dispersal of captive-bred Puaiohi released in the eastern Alakai Wilderness Preserve, Kauai. Part II. Intensive surveys of Puaiohi population in five drainages in the Alakai Wilderness Preserve." *Annual report to U.S. Fish and Wildlife Service and Hawaii Division of Forestry and Wildlife* (U.S. Geological Survey, Biological Resources Division, Pacific Island Ecosystems Research Center, Honolulu, HI). 27 pp.

Nonreviewed Articles

Pratt, T.K. (2001). "Hawaii/Pacific Islands." Pp. 652-654 *in* The 101Christmas Bird Count. American Birds. National Audubon Society (Ivyland, Pennsylvania).

Pratt, T.K. (2002). "Hawaii/Pacific Islands." Pp. 88-90 *in* The 102 Christmas Bird Count. American Birds. National Audubon Society (Ivyland, Pennsylvania).

Conference Presentations, Posters, and Abstracts

Camp, R., B.L. Woodworth, T. Pratt, C. Collins, & H. Howitt (2000). "The Hawaii Forest Bird Interagency Database Project." Hawaii Conservation Conference, Honolulu, HI, July 2000. (Poster)

Foster, J., E.J. Tweed, B.L. Woodworth, & C. Adler (2000). "Population status and distribution of the Akikiki, a Kauai bird species of special concern." Hawaii Conservation Conference, Honolulu, HI, July 2000. (Poster)

Dougill, S.J., L.S. Gold, & P.C. Banko (2001). "Monitoring the distribution and impacts of alien weeds to facilitate recovery of a dry, subalpine Hawaiian forest." Society for Conservation Biology, Hilo, HI, 29 July - 1 August 2001. (Poster)

Foster, J., E.J. Tweed, B.L. Woodworth, R. Camp, & C. Adler (2001). "Avian Population Trends in the Alakai Swamp, Kauai: Native Declines and Exotic Expansions?" Society for Conservation Biology, Hilo, HI, July 2001. (Presentation)

Foster, J., E.J. Tweed, B.L. Woodworth, R. Camp, C.A. Adler, & T. Telfer (2001). "Avian population trends in the Alakai Swamp, Kauai: Native Declines and Exotic Expansions?" American Ornithologists' Union, Seattle, WA, August 2001. (Poster)

Johnson, L., P.C. Banko, & R.J. Camp (2001). "Annual population estimates of a tropical bird species: lessons in confounding variables." Society for Conservation Biology, Hilo, HI, 29 July - 1 August 2001. (Poster)

Camp, R., M. Gorresen, B.L. Woodworth, & T. Pratt (2002). "Population estimates, distribution and habitat associations for Hawaiian forest birds." 3rd North American Ornithological Congress, New Orleans, LA, September 2002. (Poster)

Gorresen, M., R. Camp, B.L. Woodworth, & T. Pratt (2002). "Spatial modeling of Hawaiian forest bird densities." 3rd North American Ornithological Congress, New Orleans, LA, September 2002. (Poster)

Jacobi, J.D. (2002). "Biological resource mapping and analysis using GIS." Pacific Biodiversity Transect Analysis (PABITRA) Field Biology Training and Joint Analysis Workshop, University of the South Pacific, Suva, Fiji, November 2002. (Invited Presentation)

Invertebrate Biology / Native Fauna

Peer-Reviewed Journal Articles

Martz, K., F. Starr, & A.C. Medeiros (1999). New island record of *Carposina nigronotata* Walsingham on Maui. *In* N.L. Evenhuis & L.G. Eldredge (eds.), Records of the the Hawaii Biological Survey for 1998. *B.P. Bishop Museum Occasional Papers*, **59**: 26.

> The following represented a new island record of this moth species from Maui. Parasitic wasps, identified as *Pristomerus hawaiiensis*, emerged from some moth pupal cases. Voucher specimens are housed in the Bishop Museum (BPBM), Honolulu.

LaPointe, D.A. (2002). First report of a water mite in the Family Pionidae (Acari: Parasitengona: Hygrobatoidea) in the Hawaiian Islands. *B.P. Bishop Museum Occasional Papers*, **69**: 41-42.

> Species of water mites can be found in over 100 families and subfamilies and are known to occur in great abundance and diversity throughout the world. An as yet undescribed species from the aquatic mite family Pionidae is reported for the first time in the Hawaiian Islands from material collected on O'ahu and the Island of Hawaii.

Haines, W.P., J. Giffin, & D. Foote (2003). Rediscovery of five species of *Omiodes* Guenée (Lepidoptera: Crambidae) on Hawai'i Island. *Records of the Hawaii Biological Survey for 2003 – Part 2: Notes* (pp 45-49).

> Beginning in 1980, conservation status of 22 species of endemic leafrollers in the genus *Hedylepta* (= *Omiodes*: Crambidae) was analyzed; 9 species were "presumed recently extinct." Since then, 14 of the 23 known Hawaiian species of *Omiodes* leafroller moths have been cited as extinct or possibly extinct. An examination of the insect collections of Hawaii Volcanoes National Park and the collection of Jon Giffin revealed recently collected specimens for 5 of these 14 species.

Books, Chapters, and Edited Volumes

Foote, D. & H.L. Carson (1995). Drosophila as monitors of change in Hawaiian ecosystems. Pp. 368-372 *in* E.T. LaRoe, G.S. Farris, C.E. Puckett, P.D. Doran, & M.J. Mac (eds.), *Our living resources: a report to the nation on the distribution, abundance, and health of U.S. plants, animals, and ecosystems* (U.S. Department of the Interior, National Biological Service, Washington, D.C.).

Nonreviewed Technical Reports

LaPointe, D.A. (2000). "New Pionid Fresh-Water Mite Found in Hawaii Volcanoes National Park." *Unpublished technical report to Hawai'i Volcanoes National Park* (Volcano, Hawaii)). 2 pp.

Conference Presentations, Posters, and Abstracts

Brenner, G.J., P.C. Banko, S.C. Hess, P.T. Oboyski, L. Laniawe, & J.D. Jacobi (1996). "Life history and ecology of endemic *Cydia* moths (Lepidoptera:Tortricidae)." Hawaii Conservation Conference, Honolulu, HI, July 1996. (Poster)

Steiner, W.W.M. (1996). "The role of insect diversity: Ecological, evolutionary and practical considerations." XX International Congress on Entomology Section 2, Firenze, Italy, August 1996. (Proceedings)

Steiner, W.W.M. (1997). "The role of gene diversity in Arthropod biodiversity." XX International Congress on Entomology Section 2, Firenze, Italy, August 1996. (Proceedings)

Native Plants / Plant Pathology

Peer-Reviewed Journal Articles

Gardner, D.E. (1994). Teliospore germination and nuclear behavior of *Puccinia rutainsulara*, a microcyclic Hawaiian rust. *Mycologia*, **86**: 486-493.

> *Puccinia rutainsulara* recently was described as a microcyclic rust on *Melicope* (= *Pelea*) spp. endemic to Hawaii. The observed nuclear behavior and production of a single basidiospore are not typical of rust fungi elsewhere, but similar unusual teliospore germination and nuclear behavior have been observed in other Hawaiian rusts.

Gardner, D.E. (1994). The native rust fungi of Hawaii. *Canadian Journal of Botany*, **72**: 976-989.

In 1925, F.L. Stevens published the first comprehensive list of fungi in Hawaii, recognizing 7 species of endemic rusts and 10 species probably indigenous. Currently, of the more than 74 rusts in Hawaii, 22 are considered native, of which 13 are endemic and 9 indigenous.

Killgore, E., R. Heu, & D.E. Gardner (1994). First report of soybean rust in Hawaii. *Plant Disease*, **78**: 1216 (Dis. Note).

Melcher, P.J., G. Goldstein, F.C. Meinzer, B. Minyard, T.W. Giambelluca, & L.L. Loope (1994). Determinants of thermal balance in the Hawaiian giant rosette plant*, Argyroxiphium sandwicense. Oecologia,* **98**: 412-418.

The effects of leaf pubescence and rosette geometry on thermal balance were studied in a subspecies of a Hawaiian giant rosette plant, *Argyroxiphium sandwicense*. This species, a member of the silversword alliance, grows above 2000 m elevation in the alpine zone of two Hawaiian volcanoes. Model simulations of bud temperatures at different elevations and laboratory estimates of the temperature threshold for permanent heat injury predicted that the lower altitude limit should be approximately 1900 m, which is reasonably close the lower limit of distribution of *A. sandwicense* on Haleakala volcano.

Borth, W.B., J.S. Hu, B.C. Kirkpatrick, D.E. Gardner, & T.L. German (1995). Occurrence of phytoplasmas in Hawaii. *Plant Disease*, **79**: 1094-1097.

Using nucleic acid hybridization, polymerase chain reaction (PCR), and transmission electron microscopy (TEM), phytoplasmas were detected in *Dodonaea viscosa* afflicted with Dodonaea yellow disease in Hawaii. These results, and the witches-broom symptoms of disease *D. viscosa*, suggest that phytoplasmas might be involved in the etiology of this disease in Hawaii. This is the first report demonstrating the presence of plant-pathogenic phytoplasmas in the Hawaiian Islands.

Chen, W.-Q., D.E. Gardner, & D.T. Webb (1996). Biology and life cycle of *Atelocauda koae*, an unusual demicyclic rust. *Mycoscience*, **37**: 91-98.

Atelocauda koae, a rust of the native Hawaiian *Acacia koa*, is considered as a demicyclic species, having spermogonial, aecial, and telial states, but is unusual in production of aeciospores simultaneously with teliospores rather than consecutively. Unusual nuclear behavior associated with teliospore germination, in which meiosis occurs in more than one diploid nucleus was observed, in confirmation of an earlier study.

Gardner, D.E. (1996). *Puccinia rugispora:* An unusual microcyclic rust endemic to Hawaii. *Mycologia*, **88**: 671-676.

Puccinia rugispora, a recently-described microcyclic rust on the endemic forest tree *Zanthoxylum dipetalum* in Hawaii, forms telia deep within the leathery leaf tissue of its host. One of the nuclei migrated into the developing basidiospore and underwnt meiosis, producing four small nuclei in the basidiospore. Whereas this behavior is atypical of the rusts in general, it agrees with unusual teliospore germination and nuclear behaviors observed in other Hawaiian rusts which have evolved with their hosts in isolation from continental forms.

Medeiros, A.C., W.H. Wagner, Jr., & R.W. Hobdy (1996). A new Hawaiian hanging firmoss (Lycopodiaceae: *Phlegmariurus)* from the eastern Hawaiian Islands. *American Fern Journal*, **86**(3): 89-97.

A new species in the Lycopodiaceae, a firmoss, is described and illustrated from East Maui and the island of Hawaii.

Gardner, D.E. (1997). Additions to the rust fungi of Hawai‘i. *Pacific Science*, **51**: 174-182.

In a 1989 publication, the 74 species of rust fungi (order Uredinales) known to occur in Hawaii were listed. Since the time of the 1989 publication, 16 additional rusts have been recognized in Hawaii. New host and location records and other important updating information on this well-defined group of fungi in Hawaii are also included.

Gardner, D.E. (1997). *Botryosphaeria mamane* sp. nov. associated with witches'-brooms on the endemic forest tree *Sophora chrysophylla* in Hawaii. *Mycologia*, **89**: 298-303.

> *Botryosphaeria mamane* sp. nov. occurs on the leguminous forest species *Sophora chrysophylla* in Hawaii. Inoculation did not demonstrate a causal relationship, but the fungus is consistently associate with branch contortions, swellings, witches'-brooms, and eventual death of tissue.

Gardner, D.E. (1997). *Septoria vulcani* sp. nov. on endemic *Rumex* in Hawai'i. *Mycotaxon*, **62**: 461-464.

> *Septoria vulcani* sp. nov. is described. The fungus produces leaf spots on *Rumex skottsbergii* and *R. giganteus*, closely related constitutents of Hawaii's endemic flora. This appears to be the first report of a *Septoria* on members of the Polygonaceae in Hawai'i.

Gardner, D.E. (1997). The genus *Septoria* (Fungi: Deuteromycetes) in Hawai'i. *B.P. Bishop Museum Occasional Papers*, **49**: 3-9.

> Among the pathogenic fungi under consideration as potential biocontrol agents of invasive alien plants in Hawaii, species of the genus *Septoria* have received perhaps a disproportionate amount of attention. Most species of *Septoria* currently known to occur in Hawaii are pathogens of introduced crops or ornamentals and, it can be reasonably assumed, were introduced with their hosts. Although some cases are known of attack of an endemic host by a fungal pathogen known to occur elsewhere, in most cases it is thought that fungi occurring on endemic hosts are also endemic.

Carr, G. & A.C. Medeiros (1998). A remnant greensword population from Pu'u 'Alaea, Maui, with characteristics of *Argyroxiphium virescens* (Asteraceae). *Pacific Science,* **52**: 61-68.

> Two unusual greenswords occurring on Pu'u 'Alaea in 1989 reportedly possessed vegetative features characteristic of the presumed extirpated species *Argyroxiphium virescens*. Recovery of a few embryos from fruits and the possibility of tissue culture of the remaining living plant at Pu'u 'Alaea apparently represent the last opportunities to conserve any vestige of *A. virescens*.

Gardner, D.E. & T.W. Flynn (1998). *Uredo maua*, sp. nov. and *Uromyces tairae*: Additions to the rust flora of Hawai'i. *Mycoscience*, 39: 343-346.

> The family *Flacourtiaceae* is represented in Hawai'i by *Xylosma*, a genus of about 100 species that occur in all the topical regions of the world except Africa. In recent observation of trees in the South Kona District of the Island of Hawai'i, we found a few leaves of *X. hawaiiense* to be infected with the uredinial state of a rust fungus. No rust has been previously reported on *Xylosma* in Hawai'i.

Wagner, W.L., S.G. Weller, A.K. Sakai, & A.C. Medeiros (1999). An autogamous rainforest species of *Schiedea* from East Maui, Hawaiian Islands. *Novon,* **9**: 284-287.

> A new autogamous species of *Schiedea*, *Schiedea jacobii*, is described and illustrated. It is known only from cliff habitat in rainforest on a single ridge in the Natural Area Reserve, Hanawi, East Maui. The new species appears to be most closely related to *S. nuttallii*, a species of mesic habitats on O'ahu, Moloka'i, and Maui.

Medeiros, A.C., C.G. Chimera, L.L. Loope, P. Krushelnycky, & S. Joe (2000). Status and ecology of the endangered Hawaiian annual 'Āwiwi, *Centaurium sebaeoides* (Gentianaceae). *Pacific Science,* **54**(4): 417-422.

> The annual, endemic, coastal herb *Centaurium sebaeoides* is the only native Hawaiian species in the gentian family. The U.S. Fish and Wildlife Service listed it as Endangered on 29 October 1991. Threats that further contributed to the rarity of the species include (1) displacement and overtopping by salt-tolerant nonnative woody species, especially *Casuarina* spp., (2) trampling and erosion of habitat by ungulates, and (3) damage caused by off-road vehicles.

Anderson, R.C., D.E. Gardner, C.C. Daehler, & F.C. Meinzer (2002). Dieback of *Acacia koa* in Hawai'i: Ecological and pathological characteristics of affected stands. *Forest Ecology and Management*, **162**: 273-286.

In the Mauna Loa Strip area of Hawaii Volcanoes National Park, mature koa (*Acacia koa*) stands are suffering from an unexplained dieback that has increased in severity since it was first noticed approximately 25 years ago. Results from the greenhouse inoculations demonstrated that *Fusarium oxysporum* f. sp. *Koae* is pathogenic to koa, but the pathogen's activity in the field may be influenced by predisposing factors such as temperature fluctuations, water availability, soil type, and interactions with other soil organisms.

Drake, D.R. & L.W. Pratt (2001). Seedling mortality in Hawaiian rain forest: the role of small-scale physical disturbance. *Biotropica,* **33**(2): 319-323.

Most montane rain forests of the island of Hawaii consist of a closed canopy formed by *Cibotium* beneath an open canopy of emergent *Metrosideros* trees. We used artificial seedlings to assess the extent to which physical disturbance caused by the senescing fronds of tree ferns and the activities of feral pigs might limit tree regeneration.

Books, Chapters, and Edited Volumes

Loope, L.L. & A.C. Medeiros (1995). Haleakala silversword (*Argyroxiphium sandwicense* subsp. *macrocephalum*). Pp. 363-364 *in* T.E. LaRoe, G.S. Farris, C.E. Puckett, P.D. Doran, & M.J. Mac (eds.), *Our Living Resources: A Report to the Nation on the Distribution, Abundance, and Health of U.S. Plants, Animals, and Ecosystems* (U.S. Department of the Interior, Washington, D.C.).

Pratt, L.W. & S.M. Gon, III (1998). Terrestrial Ecosystems. Pp. 121-129 *in* S.P. Juvik & J.O. Juvik (eds.), *Atlas of Hawai'i,* Third edition (University of Hawai'i Press, Honolulu, HI).

Gagne, W.C. & L.W. Cuddihy (1999). Vegetation. Pp. 45-114 *in* W.L. Wagner, D.R. Herbst & S.H. Sohmer (eds.), *Manual of the flowering plants of Hawai'i,* Revised edition. *Bishop Museum Special Publication 97* (B.P. Bishop Museum Press and University of Hawai'i Press, Honolulu, HI).

Peer-Reviewed Technical Reports

Abbott, L.L. & L.W. Pratt (1996). "Rare plants of Naulu Forest and Poliokeawe Pali, Hawai'i Volcanoes National Park." *University of Hawai'i Cooperative National Park Resources Studies Unit Hawaii Technical Report 108* (University of Hawai'i at Manoa, Honolulu, HI). 65 pp. + appendices.

Gardner, D.E. (1996). "Rust and smut fungi of Hawai'i: An annotated host index on angiosperms and ferns." *University of Hawai'i Cooperative National Park Resources Studies Unit Technical Report 100* (University of Hawai'i, Honolulu, HI). 50 pp.

Pratt, L.W. & L.L. Abbott (1997). "Rare plants within managed units of *'Ola'a* Forest, Hawaii Volcanoes National Park." *University of Hawai'i Cooperative National Park Resources Studies Unit Technical Report 115* (University of Hawai'i, Honolulu, HI). 66 pp . + appendices.

Medeiros, A.C., C. Davenport, & C.G. Chimera (1999). "Auwahi: Ethnobotany of a Dryland Forest." *University of Hawai'i Cooperative National Park Resources Studies Unit Technical Report 117* (University of Hawai'i, Honolulu, HI). 43 pp.

Belfield, T.R. & L.W. Pratt (2002). "Rare plants of the Mauna Loa Special Ecological Area, Hawai'i Volcanoes National Park." *University of Hawai'i Cooperative National Park Resources Studies Unit Hawaii Technical Report 130* (University of Hawai'i at Manoa, Honolulu, HI). 61 pp. + appendices.

Nonreviewed Articles

Gardner, D.E. (1994). Witches' broom disease of mamane *(Sophora chrysophylla). Newsletter of the Hawaiian Botanical Society*, **33**: 97-100.

Gardner, D.E. & T. Flynn (1996). The fern rusts of Hawai'i. *Newsletter of the Hawaiian Botanical Society*, **35**: 41,43-44,120.

Gardner, D.E. (1996). Notes on the decline problem of koa. *Newsletter of the Hawaiian Botanical Society*, **35**: 27–31.

Gardner, D.E. (1997). Tetranucleate basidiospores are characteristic of Hawaiian rust fungi. *Inoculum: Newsletter of the Mycological Society of America*, **48**(3): 11 (Abstract)

Gardner, D.E. & C.C. Daehler (1998). Smut disease of pili grass in Hawai‘i. *Newsletter of the Hawaiian Botanical Society*, **37**: 4-5.

Gardner, D.E. (1998). Eriophyid mite galls on lama and other Hawaiian plants. *Newsletter of the Hawaiian Botanical Society*, **37**: 1-3.

Gardner, D.E. & E.E. Trujillo (2001). Association of *Armillaria mellea* with mamane decline at Pu‘u La‘au. *Newsletter of the Hawaiian Botanical Society*, **40**: 33-34.

Conference Presentations, Posters, and Abstracts

Gardner, D.E. (1994). “Hawai‘i’s plant pathogenic microfungi: Native residents or alien invaders?” Hawaii Conservation Conference, Honolulu, HI, July 1994. (Abstract)

Gardner, D.E. (1994). “Unusual cytology of some species of rusts from Hawaii.” International Mycological Congress, Vancouver, British Columbia, August 1994. (Abstract)

Gardner, D.E. (1997). “*Acacia koa:* A review of its diseases and associated fungi.” Pp. 56-63 *in* L. Ferentinos and D.O. Evans (eds.), *Proceedings of Koa: A Decade of Growth. Symposium of The Hawai‘i Forest Industry Association, Honolulu, Hawai‘i, 1996* (Hawai‘i Forest Industry Association, Honolulu, HI). (Proceedings)

Anderson, R.C. & D.E. Gardner (1998). “Investigations of koa (*Acacia koa*) decline in Hawaiian forests.” Hawaii Conservation Conference, Maui, HI, July 1998. (Abstract)

Gardner, D.E. (1999). “Unique aspects of Hawaiian rusts.” IXth International Congress of Mycology, International Union of Microbiological Societies, Sydney, Australia, August 1999. (Abstract)

Gardner, D.E. (1999). “Unusual life cycles of some rusts of Hawaii.” 3rd Latin American Mycological Congress, Caracas, Venezuela, 31 August - 3 September 1999. (Abstract)

Anderson, R.C. & D.E. Gardner (2001). “Koa dieback in Hawaii.” Joint Meeting of APS, MSA, and SON, Salt Lake City, UT, August 2001. *Phytopathology*, **91**(6): S3. (Abstract)

Forsyth, S., L. Loope, & R. Robichaux (2002). “Demography of the Haleakala silversword, a threatened Hawaiian plant species.” Ecological Society of America, Tucson, AZ, August 2002. (Presentation)

Forsyth, S., L. Loope, & R. Robichaux (2002). “Demography of the threatened Haleakala silversword (*Argyroxiphium sandwicense* ssp. *macrocephalum*): Implications for conservation and restoration.” Hawaii Conservation Conference, Honolulu, HI, July 2002. (Presentation)

Resource Valuation / Cultural Resources

Peer-Reviewed Journal Articles

Steiner, W.W.M. (2001). “Evaluating the cost of saving Native Hawaiian birds.” *In* Evolution, ecology, conservation and management of Hawaiian birds: a vanishing avifauna (J.M. Scott, S. Conant, & C. van Riper, III, eds.). *Studies in Avian Biology,* **22**: 377-383.

> Approximately $94 million has been spent on avian research and management in Hawai‘i over the past decade. Yet only one firm success story exists, the Nene (*Branta sanvicensis*), which has been brought back from the edge of

extinction to more than 300 birds on two islands today. This paper examines the accomplishments gained by this level of funding, and the problems that still remain to be examined.

Books, Chapters, and Edited Volumes

Steiner, W.W.M. (2001). Implications of the loss of cultural diversity for marine resource sustainability: the impact in Hawai`i. Pp. 417-421 *in* P. Chambers (ed.), *Cultural and Spiritual Values of Biodiversity* (UNEP Global Biodiversity Assessment,Vol. 2, Intermediate Technology Publications, London, U.K.).

Conference Presentations, Posters, and Abstracts

Gruner, D., P. Conant, L. Loope, K. Kaneshiro, N. Reimer, E. VanGelder, & D.P. Young (2002). "Mania for *Wasmannia*: Involving K-12 educators and students in conservation research." Hawaii Conservation Conference, Honolulu, HI, July 2002. (Presentation)

Wildlife & Human Health

Peer-Reviewed Journal Articles

Spalding, M.G., C.T. Atkinson, & R.E. Carleton (1994). *Sarcocystis* sp. in wading birds (Ciconiiformes) from Florida. *Journal of Wildlife Diseases*, **30**: 29-35.

Sarcocysts were found in striated muscle of 21 adult wading birds among 145 examined grossly and 70 examined histologically, and in none of 332 immature wading birds examined from Florida. We concluded from ultrastructural examination of cysts that the same species of Sarcocystis may occur in all species of wading birds in Florida.

Atkinson, C.T., K.L. Woods, R.J. Dusek, L. Sileo, & W.M. Iko (1995). Wildlife disease and conservation in Hawaii: Pathogenicity of avian malaria *(Plasmodium relictum)* in experimentally infected 'I'iwi *(Vestiaria coccinea*). *Parasitology*, **111**: S59-S69.

Native Hawaiian forest birds are facing a major extinction crisis with more than 75% of species recorded in historical times either extinct or endangered. We are reexamining the importance of avian pox and malaria as limiting factors in Hawaiian forest bird populations through detailed investigation of the epizootiology and pathogenicity of these introduced diseases. Our findings support previous studies documenting high susceptibility of native Hawaiian forest birds to avian malaria, which continues to threaten remaining high elevation populations of endangered native birds.

Atkinson, C.T., K.L. Woods, R.J. Dusek, L.S. Sileo, & W.M. Iko (1995). Wildlife disease and conservation in Hawaii: pathogenicity of avian malaria (*Plasmodium relictum*) in experimentally infected Iiwi (*Vestiaria coccinea*). *Parasitology*, **111**: S59-S69.

Native Hawaiian forest birds are facing a major extinction crisis with more than 75% of species recorded in historical times either extinct or endangered. We tested susceptibility of Iiwi, a declining native species, and Nutmeg Mannikins, a common non-native species, to an isolate of *Plasmodium relictum* from the island of Hawaii. Iiwi were highly susceptible, whereas Nutmeg Mannikins were refractory to infection, consistent with previous studies documenting high vulnerability of native Hawaiian forest birds to avian malaria.

Moelans, I.I.M.D., J. Cohen, M. Marchand, C. Molitor, P. de Wilde, J.F. van Pelt, M.R. Hollingdale, W.F.G. Roeffen, W.M.C. Eling, C.T. Atkinson, M. Aikawa, J.G.G. Schoenmakers, & R.N.H. Konings (1995). Induction of *Plasmodium falciparum* sporozoite-neutralizing antibodies upon vaccination with recombinant Pfs16 vaccinia virus and/or recombinant Pfs16 protein produced in yeast. *Molecular and Biochemical Parasitology*, **72**: 179-192.

Pfs16 is a sexual stage/sporozoite-specific antigen of *Plasmodium falciparum* and is a potential candidate for a sporozoite-neutralizing vaccine. Animals vaccinated with the yeast hybrid particles and/or recombinant vaccinia virus both produced Pfs16-specific antibodies. These antibodies showed no transmission-blocking activity, but they

efficiently diminished or abolished *in vitro* invasion of sporozoites into human hepatoma cells and primary human hepatocytes.

Sina, B.J., C. Wright, C.T. Atkinson, R. Ballou, M. Aikawa, & M. Hollingdale (1995). Characterization of a sporozoite antigen common to *Plasmodium falciparum* and *Plasmodium berghei*. *Molecular and Biochemical Parasitology*, **69**: 239-246.

Previous studies demonstrated that immunization with *Plasmodium falciparum* sporozoites protected mice against *Plasmodium berghei* sporozoite infection and that this cross-protection was mediated, at least in part, by anti-sporozoite antibody. Passive transfer of anti-CSP-2 monoclonal antibody7 protected mice from *P. berghei* sporozoite infection. Therefore, CSP-2 appears to play a role in the cross-protective immune response observed.

Jarvi, S.I., R.M. Goto, W.E. Briles, & M.M. Miller (1996). Characterization of *Mhc* genes in a multigenerational family of ring-necked pheasants. *Immunogenetics*, **43**(3): 125-135.

Little is known about the major histocompatibility (*Mhc*) genes of birds in different taxonomic groups or about how *Mhc* genes may be organized in avian species divergent by evolution or habitat. In this study a close relative of the chicken, the ring-necked pheasant, was examined for the presence and organization of the *Mhc B-G* genes. The high polymorphism exhibited by the pheasant *B-G* gene family allowed genetic differences among individuals within the small experimental population in this study to be detected easily by restriction fragment patterns.

Herrmann, C.M. & T.J. Snetsinger (1997). Pox-like lesions on endangered Puaiohi *(Myadestes palmeri)* and occurence of mosquito *(Culex quinquefasciatus)* populations near Koaie Stream. '*Elepaio,* **57**: 73-75.

In August 1995 we began a cooperative project on the island of Kauai to study the life history of the puaiohi (*Myadestes palmeri*), a critically endangered solitaire, and to recommend management strategies to assist in its recovery. On 29 January 1996 we captured an adult puaiohi with multiple lesions typical of those produced by the avian pox virus. This is the first report of pox-like lesions for this species.

Fonseca, D.M., C.T. Atkinson, & R.C. Fleischer (1998). Microsatellite primers for *Culex pipiens quinquefasciatus*, the vector of avian malaria in Hawaii. *Molecular Ecology*, **7**: 1617-1618.

The southern house mosquito, *Culex pipiens quinquefasciatus*, was introduced accidentally to Hawaii in 1826. There it eventually became the vector of avian malaria, *Plasmodium relictum*, a disease that severely limits the size and distribution of endemic forest bird populations in Hawaii. We are examining the population structure of *Cx. quinquefasciatus* and association with malaria parasites using microsatellites as one of the genetic markers. Here, we describe the isolation, and characterization, of eight polymorphic microsatellite loci in *Cx. quinquefasciatus*.

Jarvi, S.I., R. Goto, W.E. Briles, G.F. Gee, & M.M. Miller (1999). Identification, inheritance and linkage of B-G-like genes and MHC class I genes in cranes. *Journal of Heredity*, **90**: 152-159.

We identified *B-G*-like genes in the whopping and Florida sandhill cranes and linked them to the major histocompatibility complex (MHC). This study supports the concept of a long-term association of polymorphic *B-G*-like genes with the MHC. It also establishes SSCP as a means for evaluating MHC genetic variability in cranes.

Atkinson, C.T., R.J. Dusek, K.L. Woods, & W.M. Iko (2000). Pathogenicity of avian malaria in experimentally-infected Hawaii Amakihi. *Journal of Wildlife Diseases*, **36**(2): 197-204.

The introduction of avian malaria (*Plasmodium relictum*) and mosquitoes (*Culex quinquefasciatus*) to the Hawaiian Islands is believed to have played a major role in the decline and extinction of native Hawaiian honeycreepers (Drepanidinae). Mortality in experimentally-infected Amakihi (*Hemignathus virens*) was similar to that observed in Apapane (*Himatione sanguinea*) and lower than that observed in Iiwi (*Vestiaria coccinea*) infected under similar condition s with the same parasite isolate. We conclude that the current elevational and geographic distribution of Hawaiian honeycreepers is determined by relative susceptibility to avian malaria.

Fonseca, D.M., D.A. LaPointe, & R.C. Fleischer (2000). Bottlenecks and multiple introductions: population genetics of the vector of avian malaria in Hawaii. *Molecular Ecology*, **9**: 1803-1814.

Avian malaria has had a profound impact on the demographics and behaviour of Hawaiian forest birds since its vector, *Culex quinquefasciatus* the southern house mosquito, was first introduced to Hawaii around 1830. In order to understand the dynamics of the disease in Hawaii and gain insights into the evolution of vector-mediated parasite-host interactions in general we studied the population genetics of *Cx. quinquefasciatus* in the Hawaiian Islands. The current distribution of mitochondrial haplotypes combined with the microsatellite information lead us to conclude that there have been several introductions and to speculate on some processes that may be responsible for the current population genetics of vectors of avian malaria in Hawaii.

Tripathy, D.N., W.M. Schnitzlein, P.J. Morris, D.L. Janssen, J.K. Zuba, G. Massey, & C.T. Atkinson (2000). Characterization of poxviruses from Hawaiian forest birds. *Journal of Wildlife Diseases*, **36**(2): 225-230.

Two strains of avian pox viruses were isolated from cutaneous lesions in Hawaiian crows (*Corvus hawaiiensis*) examined in 1994 and a third from a biopsy obtained in 1992 from an infected bird of the Apapane species (*Himatione sanguinea*) by inoculation of the chorioallantoic membranes of developing chicken embryos. Based on the genetic distinctness of the two Hawaiian bird viruses, they appear to represent different strains of avipoxvirus.

Yorinks, N. & C.T. Atkinson (2000). Effects of malaria (*Plasmodium relictum*) on activity budgets of experimentally-infected juvenile Apapane (*Himatione sanguinea*). *Auk*, **117**: 731-738.

We used behavioral, physiological, and parasitological measures to document effects of acute malarial infections on activity budgets of experimentally infected juvenile Apapane. Regardless of survival in the course of this study, infected birds experienced acute illness that would have left them unable to forage or to escape from predators in the wild.

Atkinson, C.T., J.K. Lease, B.M. Drake, & N.P. Shema (2001). Pathogenicity, serological responses and diagnosis of experimental and natural malarial infections in native Hawaiian thrushes. *The Condor*, **103**: 209-218.

Omao (*Myadestes obscurus*) from the Hawaiian Islands typically have very low prevalences of infection with avian malaria (*Plasmodium relictum*) and it is not clear whether they share the same high susceptibility to this parasite that has been documented in native Hawaiian honeycreepers. We exposed four captive Omao to single infective mosquito bites and measured parasitemia, serological responses, and mortality over time. Hawaiian thrushes appear to have a high tolerance for malaria, with most individuals developing chronic, low-level infections after exposure that cannot be diagnosed accurately by blood smears.

Atkinson, C.T., R.J. Dusek, & J.K. Lease (2001). Serological responses and immunity to superinfection with avian malaria in experimentally-infected Hawaii Amakihi. *Journal of Wildlife Diseases*, **37**(1): 20-27.

Six of seven Hawaii Amakihi (*Hemignathus virens*) with chronic malarial infections had no increases in peripheral parasitemia, declines in food consumptions, or loss of body weight when rechallenged with the homologous isolate of *Plasmodium relictum* 61 to 62 days after initial infection. Five uninfected control amakihi exposed at the same time to infective mosquito bites developed acute infections with high parasitemias. Hawaiian honeycreepers that are capable of recovering from acute infections develop concomitant immunity to superinfection, making them functionally immune in areas where malaria transmission has become endemic.

Jarvi, S.I., C.T. Atkinson, & R.C. Fleischer (2001). Immunogenetics and resistance to avian malaria in Hawaiian honeycreepers (Drepanidinae). *In* "Evolution, ecology, conservation and management of Hawaiian birds: a vanishing avifauna (J.M. Scott, S. Conant, & C. van Riper, III, eds.). *Studies in Avian Biology*, **22**: 254-263.

Although a number of factors have contributed to the decline and extinction of Hawaii's endemic terrestrial avifauna, introduced avian malaria (*Plasmodium relictum*) is probably the single most important factor preventing recovery of these birds in low-elevation habitats. We are investigating the natural evolution of disease resistance in some low-elevation native bird populations, to perfect genetic methods for identifying individuals with a greater immunological capacity to survive malarial infection.

Benning, T.L., D.A. LaPointe, C.T. Atkinson, & P.M. Vitousek (2002). Interactions of climate change with biological invasions and land use in the Hawaiian Islands: Modeling the fate of endemic birds using a geographic information system. *Proceedings of the National Academy of Sciences*, **99**(22): 14246-14249.

The Hawaiian honeycreepers represent a superb illustration of evolutionary radiation, with a single colonization event giving rise to 19 extant and at least 10 extinct species. They also represent a dramatic example of anthropogenic extinction. Landscape analyses of three high-elevation forest refuges show that anthropogenic climate change is likely to combine with past land-use changes, biological invasions, and avian disease introductions to drive several of the remaining species to extinction, especially on the islands of Kauai and Hawaii.

Jarvi, S.I., J.J. Schultz, & C.T. Atkinson (2002). PCR diagnostics underestimate the prevalence of avian malaria (*Plasmodium relictum*) in experimentally-infected passerines. *Journal of Parasitology*, **88**: 153-158.

This study compares the sensitivity of several polymerase chain reaction (PCR)-based methods for diagnosing avian malaria (*Plasmodium relictum*) in captive Hawaiian honeycreepers using microscopy and a recently developed immunoblotting technique. Individually, none of the diagnostic methods was 100% accurate in detecting subpatent infections, although serological methods were significantly more sensitive (97%) than either nested PCR (61-84%) or microscopy (27%). The use of PCR as a sole means of detection of circulating parasites may significantly underestimate true prevalence.

Jarvi, S.I., M.E.M. Farias, H. Baker, H.B. Freifeld, P.E. Baker, E. VanGelder, J.G. Massey, & C.T. Atkinson (2003). Detection of avian malaria (*Plasmodium* spp.) in native land birds of American Samoa. *Conservation Genetics*, **4**: 629-637.

This study documents the presence of *Plasmodium* spp in landbirds of central Polynesia. Blood samples collected from eight native and introduced species from the island of Tutuila, American Samoa were evaluated for the presence of Plasmodium spp by nested rDNA PCR, serology and/or microscopy. High prevalence of apparently chronic infections, the relative stability of the native land bird communities, and the presence of mosquito vectors which are considered endemic and capable of transmitting avian *Plasmodia*, suggest that these parasites are indigenous to Samoa and have a long coevolutionary history with their hosts.

Adamczyk, K.J., T.E. McQuistion, & D.A. LaPointe (2004). A new coccidian parasite, *Isospora samoaensis*, from the Wattled Honeyeater (*Foulehaio carunculata*) from American Samoa. *Acta Protozoologica*, **43**: 1-3.

A new species of *Isopora* is described from the feces of the wattled honeyeater, *Foulehaio carunculata* from American Samoa. Numerous oocysts of similar morphology were found in a single adult wattled honeyeater.

Ahumada, J.A., D.A. LaPointe, & M.D. Samuel (2004). Modeling the population dynamics of *Culex quinquefasciatus* (Diptera: Culicidae) along an elevational gradient in Hawaii. *Journal of Medical Entomology*, **41**(6): 1157-1170.

We present a population model to understand the effects of temperature and rainfall on the population dynamics of the southern house mosquito, *Culex quinquefasciatus* Say, along an elevational gradient in Hawaii. We use a novel approach to model the effects of temperature on population growth by dynamically incorporating developmental rate into the transition matrix, by using physiolgical ages of immatures instead of chronological age or stages. The predictions of our model indicate the importance of abiotic conditions on mosquito dynamics and have important implications for the managemet of disease transmitted by *Cx. quinquefasciatus* in Hawaii and elsewhere.

Beadell, J.S., E. Gering, J. Austin, J.P. Dumbacher, M.A. Peirce, T.K. Pratt, C.T. Atkinson, & R.C. Fleischer (2004). Prevalence and differential host specificity of two avian blood parasite genera in the Australo-Papuan region. *Molecular Ecology*, **13**: 3829-3844.

The degree to which widespread avian blood parasites in the genera *Plasmodium* and *Haemoproteus* pose a threat to novel hosts depends in part on the degree to which they are constrainted to a particular host or host family. We examined the host distribution and host-specificity of these parasites in birds from two relatively understudied and isolated locations: Australia and Papua New Guinea. Results support previous evidence of strong host-family

specificity in *Haemoproteus* and suggest that lineages of *Plasmodium* are more likely to form evolutionarily-stable associations with novel hosts.

Gering, E. & C.T. Atkinson (2004). A Rapid Method for Counting Nucleated Erythrocytes on Stained Blood Smears by Digital Image Analysis. *Journal of Parasitology*, **90**: 879-881.

Measures of parasitemia by intraerythrocytic hematozoan parasites are normally expressed as the number of infected erythrocytes per n erythrocytes and are notoriously tedious and time consuming to measure. We describe a protocol for generating rapid counts of nucleated erythrocytes from digital micrographs of thin blood smears that can be used to estimate intensity of hematozoan infections in nonmammalian vertebrate hosts.

Books, Chapters, and Edited Volumes

van Riper, C. III, C.T. Atkinson, & T. Seed (1994). Plasmodia of Birds. Pp. 73-140 *in* J.P. Kreier (ed.), *Parasitic Protozoa*, Vol. 7 (Academic Press, New York).

Atkinson, C.T. (1999). Hemosporidiosis. Pp. 193-199 *in* M. Friend and J.C. Franson (eds.), *Field Manual of Wildlife Diseases: General Field Procedures and Diseases of Birds* (U.S. Geological Survey, Washington DC).

Atkinson, C.T. (2001). Avian Malaria. Pp. 306-314 *in* M.W. Service (ed.), *Encyclopedia of Arthropod-transmitted Infections* (CABI Publishing, New York).

Atkinson, C.T. (2001). Haemoproteosis. Pp. 200-206 *in* M.W. Service (ed.), *Encyclopedia of Arthropod-transmitted Infections* (CABI Publishing, New York).

Nonreviewed Technical Reports

LaPointe, D.A. & M.L. Goff (1996). "Distribution and Disease Vector Potential of Mosquitoes in Hawaiian Forest Bird Habitat." *Unpublished technical report to U.S. Geological Survey Cooperative Fisheries Unit, University of Hawai'i at Mānoa* (U.S. Geological Survey, Biological Resources Division, Pacific Island Ecosystems Research Center, Kilauea Field Station, Hawaii National Park, HI). National Biological Survey. 62 pp.

LaPointe, D.A. (1999). "Breeding Ecology, Bionomics and Control of *Culex* Mosquitoes in Hawaiian Forest Bird Habitat." *Unpublished technical report to U.S. Fish and Wildlife Service* (Honolulu, Hawaii). 33 pp.

Atkinson, C.T., P.C. Banko, D.A. LaPointe, & B.L. Woodworth (2004). "Biocomplexity Project: 2003 Annual Report." USGS-BRD-PIERC Internal Report series.

Nonreviewed Articles

Atkinson, C.T. (1998). Book Review. "Diseases of Poultry, 10th Edition." *Journal of Wildlife Diseases*, **34**: 839.

Conference Presentations, Posters, and Abstracts

Atkinson, C.T. & D.A. LaPointe (1994). "Significance of introduced diseases in the decline and extinction of native Hawaiian forest birds." International Symposium on Ecosystem Health and Medicine, Guelph, Canada, June 1994. (Presentation)

Atkinson, C.T., L. Sileo, J. Price, D.A. LaPointe, R.J. Dusek, & W.M Iko (1994). "Epizootic pox and malaria in Hawaiian forest birds." Joint meeting of the American Ornithologists' Union, Cooper Ornithological Society, and Wilson Ornithological Society, Missoula, MT, June 1994. (Presentation)

Dusek, R.J., W.M. Iko, & C.T. Atkinson (1994). "Does avian malaria threaten recovery of the Hawaiian Crow (*Corvus hawaiiensis*)?" Raptor Research Foundation, Flagstaff, AZ, November 1994. (Presentation)

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Appendix I. Thesis & Dissertations

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1. "01-Year First Progress Report." Anonymous. June 1974.
2. "Proposal for the Study of Rare and Endangered Birds in Hawaii's National Parks." A.J. Berger. June 1974.
3. "The Ohia Dieback Problem in Hawaii." D. Mueller-Dombois. July 1974.
4. "Vegetation Map, Hawaii Volcanoes National Park." D. Mueller-Dombois & F.R. Fosberg. October 1974.
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10. "Halape Marine Survey." F.W. Ball. April 1976.
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24. “Haleakala National Crater District Resources Basic Inventory: 1976-77.” L. Stemmermann, C.W. Smith & W.J. Hoe. April 1979.

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28. “Proposed Native Ecosystem Restoration Program for Halape, Keauhou, and Apua Point - Hawaii Volcanoes National Park.” C.W. Smith. February 1980.

29. “Mites (Chelicerata: Acari) Parasitic on Birds in Hawaii Volcanoes National Park.” M.L. Goff. February 1980.

30. “Distribution of Mosquitos (Diptera : Culicidae) on the East Flank of Mauna Loa, Hawaii.” M.L. Goff. February 1980.

31. “Haleakala National Park Crater District Resources Basic Inventory: Insects.” J. Beardsley. July 1980.

32. “Summer Census of the Reef Fish Communities of Waters adjacent to Pu‘uhonua O Honaunau National Historical Park, Summers 1974 -78.” G.M. Ludwig, L.R. Taylor, Jr., & D.M. Imose. August 1980.

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37. “A Portable Metal Box Trap - Feral Pigs.” C.H. Diong. May 1981.

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43. “A Survey Showing the Effect of Environment and Behavior upon Parasite Levels in the Hawai‘i ‘Amakihi (*Loxops Virens*) (Aves: Drepanididae).” C. Van Riper, III. September 1981.

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46. “A Morphometric Analysis and Taxonomic Appraisal of the Hawaiian Silversword *Argyroxiphium sandwicense* DC. (Asteraceae).” A.K. Meyrat. October 1982.

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8 A. `Amakihi.
8 B/C. `Amakihi, Creeper, `Akepa, &Po`ouli.
9. `Akialoa, Nukupu`u & `Akiapola`au
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