

The Natural History and Geographical Distribution of the Black-footed Albatross

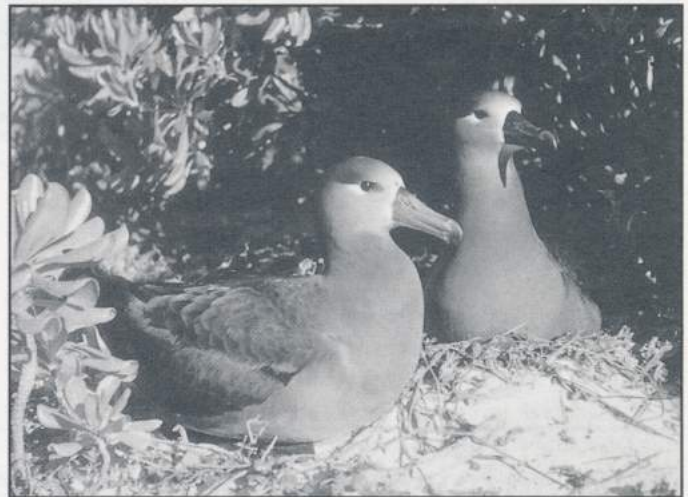
(An excerpt from "The Population Biology of the Black-footed Albatross in Relation to Mortality Caused by Longline Fishing — Report of a workshop held in Honolulu October 8-10, 1998 under the auspices of the Western Pacific Regional Fishery Management Council." Used with the permission of editors Katherine Cousins and John Cooper. Many thanks to Kim Ramos of Earthjustice for the use of their scanner!)

The life-history of the albatrosses is typical of "K-selected" species. By definition, this means that there is selection pressure for characteristics enabling individuals to maximize their fitness for contributing significant numbers of offspring to a population near its carrying capacity (Pianka 1970). The general characteristics of a "K-selected" species are long lives with a delayed reproductive maturity and low annual productivity. Black-footed Albatrosses are relatively long-lived, as many birds are known to have worn bird-bands for at least 43 years. And although some Black-footed Albatross may return to the breeding colonies at two or three years of age, the average age at first breeding is at least five years and probably averages at seven or eight years (Rice and Kenyon 1962a, Robbins 1966). Black-footed Albatrosses are also iteroparous, meaning that they have repeated reproduction, and lay a single egg during a breeding season.

Distinguishing Characteristics and Molting

The Black-footed Albatross is characterized by a dark bill, legs and feet at all stages of development. Comparatively, the Black-footed Albatross is slightly larger and heavier than the Laysan Albatross (Table 1), but for the same-sex birds there is no significant difference between the two species (Harrison et al. 1983, G.C. Whittow pers. comm.). Interestingly, the Japanese Black-footed Albatrosses are reported to be slightly smaller than their Hawaiian counterparts (H. Hasegawa pers. comm.). The plumage coloration for both the immature and adult Black-footed Albatross is extremely similar; brown with a white band at the base of their bill and a white sweep defining their eyes. One distinguishing feature between adult and juvenile (i.e., young-of-the-year) Black-footed Albatrosses is that the juveniles lack the white plumage at the base of their tail. In addition, the plumage of the immature birds may be slightly darker than that of adult birds. Generally, as the juvenile Black-footed Albatrosses mature, they tend to become more gray or dusty in appearance (Miller 1940).

This change in plumage coloration first occurs during prebasic I molt at between 16 and 21+ months (Whittow 1993). The definitive white plumage on the head, belly and upper tail coverts increases in size with each successive molt until first breeding at 5 or 6 years of age (Bourne 1982). Interestingly, the Black-footed Albatrosses, like Laysan Albatrosses, show an unusual bidirectional pattern of incomplete molt in their primaries (i.e., the most distal wing feathers). Patterns of molt in these



Black-footed Albatrosses. Photo by Dr. Hubert W. Frings

species often reflect trade-offs between current and future reproduction (Langston and Rohwer 1995). For instance, Black-footed Albatross, as do most seabirds, do not molt during the breeding season, so they have approximately four months to molt while at sea (Payne 1972). The birds may, however, trade the metabolic costs of replacing feathers with the cost of preparing for another breeding season.

Reproductive Biology

In late October, Black-footed Albatrosses begin to return to the nesting colonies in the northwestern Hawaiian Islands and on Torishima, Japan. The Laysan Albatrosses tend to return to the Hawaiian Islands a couple of weeks later than the Black-footed Albatrosses. Generally, the Black-footed Albatross males arrive first in the last week of October and await the arrival of the females (Bailey 1952). Both Black-footed and Laysan Albatrosses mate for life, and the same mated pair will return each year to breed (Bailey 1952). Often the males will wait for their mate near the same nest site the pair shared in previous years (Bailey 1952, Fisher 1971).

Interestingly, there is interbreeding between the Black-footed and Laysan Albatrosses that results in hybrid offspring, but there have been no confirmed reports of hybrids reproducing; however, hybrids have been observed incubating eggs (Fisher 1972, E. Flint pers. comm.). Fisher (1972) observed some "casual

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Bird of the Month — Rock Dove (*Columbia livia*)

The Rock Dove is a descendent of the European Rock Dove, which occurs in Britain and Europe, and nests on rocky cliffs. This gentle bird is present in virtually every city in the world. Considered a nuisance by some, in many cities they are truly treasured, seen by most residents as the only contact they have with wildlife. The Rock Dove was introduced to Hawai'i in 1796.

This bird is about 12.5 inches in length, and there are four main plumage types: Brown, checkered, dark, and natural. Pied (combinations of various colors) birds are also found. The natural wild plumage is a pale blue-grey, with dark head, primaries, and the tip of its fan-shaped tail. The rump is white, and there are two dark bands on the wings. The pure white type is the rarest, and there is an unusually high percentage of these birds here in Hawai'i.

The Rock Dove eats primarily seeds (and handouts of everything from bread to french fries). In cities it breeds mostly on ledges, with two eggs composing a clutch. The young are fed on "pigeon milk," a protein- and-fat-rich milky secretion from the parent bird's crop.

The Rock Dove's wings make a clapping sound on takeoff, and often whistle in flight. Their call is a deep cooing. Not found in forests, they prefer civilization, and are often found in large flocks. The Rock Dove sometimes reverts to a truly wild state, nesting on sea cliffs and other rocky places.



Columbia Livia. Photo by W. M. Ord

[information taken from *The Birds of Hawaii and the Tropical Pacific*, by Pratt, Bruner, and Berrett (1987), *Hawaiian Birdlife* by A.J. Berger (1972), *Hawaii's Birds*, by Hawaii Audubon Society (1996), and the *Sibley Guide to Birds*, by David Allen Sibley (2000).]

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social relations" between the two species, such as reciprocal preening and displaying, but he did not observe coition. He believed that hybrids are a result of a mobbing event, where early arriving males will over-zealously attempt coition with any newly arrived individual (Fisher 1971). Fisher (1971) theorized that the hybrids fail at their attempts to find a mate because their breast plumage is unrecognizable by both the Laysan and Black-footed Albatrosses. The breast plumage of the hybrid is a soft gray rather than the pure white of the Laysan Albatross or the grayish-brown of the Black-footed Albatross. Fisher (1971) believed that the breast plumage coloration was important for the birds to recognize a member of their own species.

Fisher (1972) also believed that, in the majority of cases, bonding between a mated pair was established at least two years previously during the late egg-laying time. Based on these observations, it is possible that if one of the mated pair did not return to breed, the other may wait at the nest site until it is too late to find another mate and lose a breeding season. Once all the other mated albatrosses are incubating and their chicks begin to hatch, the birds that have been "stood-up" join the "unemployed" (Richdale 1950) and the competition for a mate resumes. Clearly then, if a mate fails to return, the surviving mate could lose at least three breeding seasons.

In a successful reunion a female Black-footed Albatross will lay a single egg in mid-November to early December. Both the Black-footed Albatross and the Laysan Albatross lay only one egg in a single season. Although rare, two eggs are sometimes deposited into a single nest. This occurs when two pairs try to use the same nest or a second, and perhaps younger female, adds her egg (Warham 1990). If a second egg is deposited into a nest, usually the first egg is thrown out of the nest and the pair incubates the later egg (Richards 1909). The mean incubation period for Black-footed Albatross eggs is 65.6 days and both adults incubate the egg (Rice and Kenyon 1962b). The adults tend to forage close to the breeding colony during the chick brooding period, taking turns on the nest every two to four days.

After the chick hatches, between 15 January and 7 February (Rice and Kenyon 1962b), the brooding period lasts between one to two weeks where at least one adult stays with the chick protecting it from the elements and from neighboring adults or predators. Results from a recent satellite-tracking project, initiated by Dr. David Anderson of Wake University, show that during the brooding period the parents tend to forage close to the breeding colony taking short two to four day trips (Anderson and Fernandez 1998). At the end of the brooding period, however, the adults begin to take longer foraging trips and spend anywhere between 10 -28 days at sea (Anderson and Fernandez 1998). After two to three weeks foraging at sea, the adults return to the nesting colony to feed their chicks regurgitated food). The regurgitated food consists of, by volume, approximately 10% stomach oil, 50% fish, 32% squid and 5% crustaceans (Harrison et al. 1983). The adults stay with their chicks only as long as it takes to regurgitate all of their stomach contents. After the feeding session, the parents often tend to walk over to one or two neighboring chicks and attack them before promptly departing back to sea (Fisher 1904). There does not appear to be any coordination between the parents in terms of a feeding schedule and consequently, chicks must sometimes endure long periods alone between feedings.

After one last feeding in June, the adults depart for the open ocean leaving the young chicks to fledge on their own in late July. Many of the young fledglings never survive to enter the water as they slowly die of starvation or dehydration waiting for their parents to return. Others drown, or fall victim to waiting Tiger Sharks (*Galeocerdo cuvier*). Successful fledglings disperse over the open ocean of the North Pacific.

Breeding Distribution and Habitat

Historically, the breeding range of the Black-footed and Laysan Albatrosses was extensive, reaching as far east as the Japanese Islands of Torishima and as far south as Taongi Atoll in the Marshall Islands. Today, the Hawaiian Islands are the primary breeding colonies for the Black-footed and Laysan Albatross populations. Apparently, the feather and egg trade in the early 1900s, followed by World War II, destroyed nesting colonies on the Japanese, Wake, Bonin and Marcus Islands, as well as colonies on Johnston and Taongi Atolls (Spennemann 1998). However, a small population of approximately 1,100 - 1,200 Black-footed Albatrosses has recolonized the Japanese Islands of Torishima (Rice and Kenyon 1962a, Hasegawa 1984, Ogi et al. 1994) and there have been recent observations of Black-footed Albatrosses visiting Wake Island (M. Rauzon pers. comm.). There have been no reports of recent visits by Black-footed Albatrosses to Johnston Atoll or to Marcus Island (E. Flint pers. comm.); however, a Laysan Albatross was sighted on Johnston Atoll in 1999 (D. O'Daniel pers. comm.).

Although there is some overlap in nesting sites between the two species while they breed in the northwestern Hawaiian Islands, Black-footed Albatrosses prefer open wind-blown beaches whereas the Laysan Albatrosses prefer more sheltered inland sites (Bailey 1952, Fisher 1972, McDermond and Morgan 1993). On Torishima the Black-footed Albatross nesting sites are located on sparsely to richly vegetated wind-blown and exposed volcanic slopes (Ogi et al. 1994).

Feeding and Diet

Like other albatrosses, the Black-footed Albatross have well-developed visual and olfactory systems that assist them to locate food sources and these seabirds are predominantly crepuscular in their foraging activities (Warham 1990). The Black-footed Albatross feeds primarily by seizing prey off the ocean surface and by making shallow dives (Harrison 1990). The Black-footed Albatross diet is comprised of crustaceans, squid, fish, flying fish eggs and zooplankton (Harrison et al. 1983). Like the Laysan Albatross, the Black-footed Albatross eats squid; however, Black-footed Albatrosses eat 11 times as many flying fish eggs as do Laysan Albatrosses (Harrison et al. 1983, Harrison 1990). Black-footed Albatrosses are also highly opportunistic feeders and will scavenge from ship offal as well as from dead carcasses (Harrison et al. 1983).

Albatrosses, as well as other seabirds, will also accidentally ingest plastic while they are foraging at sea. Although adults can regurgitate plastic, the chicks do not regurgitate large items, including plastic, until they are ready to fledge. Plastic and oil float on the ocean surface, and the albatrosses being surface feeders are particularly vulnerable to these types of pollution. Older plastics may contain toxic chlorinated hydrocarbons such as PCBs (polychlorinated biphenyls). All plastics absorb

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compounds like PCBs onto their surfaces and these toxins may leach into a bird's circulation and tissues (Jones et al. 1994, Auman et al. 1997, 1998). Black-footed Albatrosses are especially vulnerable to the effects of plastic ingestion because flying fish eggs, a large component of their diet, closely resemble small plastic resin pellets. Often, flying fish eggs are deposited on floating items such as plastic, and seabirds mistakenly consume plastic along with the eggs.

Behavior

There is an older literature describing the behavior of Black-footed and Laysan Albatrosses frequenting ships or "racking-up" (i.e., loitering) near floating objects (Miller 1940, 1941, Yocom 1947). This behavior does not seem to have changed in over 50 years as the seabirds are still observed following ships and loitering near floating objects. Miller (1940) called Black-footed Albatrosses "feathered pigs" because they would eat whatever was thrown overboard, with a preference for bacon fat and cocoa butter.

When the birds do return to land, however, they often promenade about with one purpose, competitive courtship dancing which leads to reproduction. With this purpose in mind, the birds, for the most part, tend to ignore the presence of humans while they are present in albatross breeding colonies. Still, Black-footed Albatrosses are more aggressive in defense of their nest sites than are Laysan Albatrosses.

Courtship dancing is a critical component in forming a pair bond between a male and female Black-footed Albatross. The Black-footed Albatross dance has been described in detail by many naturalists and researchers (Bailey 1952, Rice and Kenyon 1962b, Harrison 1990) and is composed of various combinations of preening poses, posturing and vocalizations. Black-footed Albatrosses at sea also display some of the same postures observed by mated pairs at the breeding colonies (Miller 1940,

Yocom 1947). Comparatively, the dancing behaviors of the Black-footed Albatross are much more vigorous and synchronized than those of the Laysan Albatross (Fisher 1972).

Locomotion

Unlike Laysan Albatrosses, which stand more upright when they walk, Black-footed Albatrosses tend to lower and tuck their neck when walking. All three of the North Pacific albatross species tend to waddle when they walk and engage in elaborate and entertaining nuptial displays which involve several varieties of bobbing motions, wing lifts and rising on tiptoe.

Even though albatrosses are large birds, they seldom flap their wings in flight. Black-footed Albatrosses tend to flap their wings every 10 to 45 s while in flight and can reach air speeds of approximately 24 to 32 knots and greater in storms (Yocom 1947, Palmer 1962). The Black-footed Albatross, as well as other albatross species, use forms of flight called slope- and dynamic-soaring (Magnan 1925). This type of locomotion appears relatively effortless and is based on the gradation of wind velocity rate above the ocean surface, and the bird's ability to gain lift from the wind deflected upwards from the ocean surface. Because dynamic-soaring is dependent upon the ocean winds, the windless doldrums at the equator can hamper the flight of North Pacific albatrosses. There is an extensive literature on the slope- and dynamic-soaring of albatrosses (e.g. Cone 1964, Wood 1973, Wilson 1975, Pennycuick 1982, Warham 1977, and Pennycuick 1987).

Distribution of Black-footed Albatrosses at Sea

In their annual cycle, Black-footed Albatrosses range throughout the North Pacific between 20° and 58°N. Knowledge of their distribution comes primarily from reports of banded birds, from ocean scientific transects and casual observations. A few birds have been followed over long distances by satellites. Nearly all of the encounters of banded birds at sea have come from fishermen, but the reporting rates are unknown; undoubtedly, these varied over time and space.

Compared with the Laysan Albatross, which nests on most of the same islands, the Black-footed Albatross is more eastern in its at-sea distribution and occurs regularly in large numbers off the west coast of Canada and the United States where the Laysan Albatross is rare. Both species occur off the east coast of Japan. Whereas the great majority of pelagic encounters of Laysan Albatross have come from west of the 180° meridian (Sanger 1974), those of the Black-footed Albatross, although strongly clustered, are more uniformly distributed across the North Pacific Ocean.

During the egg-laying and incubation period, December through February, pelagic records

Table 1. Morphometric comparisons between Black-footed, Laysan and Short-tailed Albatrosses (Warham 1977, Hasegawa and DeGange 1982, Harrison et al. 1983, Whittow 1993).

	Black-footed Albatross	Laysan Albatross	Short-tailed Albatross
Length (cm)	64-74	79-81	94
Wing Span (cm)	193-216	195-203	213
Body Mass (kg)	2.0-3.8	1.9-3.1	7.0
Bill Length (cm)	9.4-11.3	10-11	12-14

Table 2. Monthly distribution of at sea encounters 1963 to mid-1969 (C.S. Robbins unpubl. data).

Month	N	Latitude		Longitude	
		Mean	S.D.*	Mean	S.D.*
January	24	30.4	4.3	178.2	23.8
February	24	29.6	5.6	167.5	24.2
March	58	32.4	6.1	167.6	31.3
April	35	39.1	10.2	153.2	33.9
May	69	42.0	9.1	149.9	30.9
June	95	43.2	7.3	148.1	32.8
July	120	44.3	6.5	144.0	30.0
August	72	45.9	6.3	158.4	34.9
September	35	45.5	9.2	152.3	27.7
October	34	43.7	9.1	165.7	32.7
November	11	31.4	9.7	165.9	24.8
December	13	30.9	5.5	170.5	25.3
Dec-Jan-Feb	61	30.1	5.1	172.3	24.3

* S.D. = Standard Deviation

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are concentrated near breeding islands. Records become more widely scattered in March. In April, May, and June the birds move northward to the major summering area just south of the Aleutian Islands and off the west coast of Canada, where they remain in July and August. Then, during September, October, and November they gradually return to the vicinity of the Hawaiian Chain.

Banding records of Black-footed Albatrosses caught at sea (1963 to mid-1969) show that young birds, ages zero through five years, tend to occur slightly farther north and east than do older birds, but the differences were not statistically significant (Table 2). The mean locations (weighting months equally) are 38.6°N, 157.1°W for Black-footed Albatrosses 0-5 years old and 37.8°N, 161.4°W for older birds. It was primarily from January through July that the average position of young birds was farther east than the position of the adults. A sample from 5,000 adults and 5,000 chicks banded at Midway from 1941 to 1967 shows nearly identical numbers of adults (54) and young (58) taken at sea in the first 14 years after banding (prior to any significant loss of bands through wear). Both birds banded as adults and those banded as chicks are most vulnerable to capture at sea in the first four years after banding. The great majority (77%) of albatrosses captured at sea was taken during the six-month period, March through August. The peak month, with 27% of all captures, was July. There is no significant difference between adults and young (ages 0-5) in the time of year when they were captured.

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Critical Habitat for Newcomb's Snail Proposed on Kaua'i

What is Newcomb's snail?

Newcomb's snail (*Erinna newcombi*) is one of four freshwater snail species native to Hawai'i in the family Lymnaeidae. The distribution of Newcomb's snail is restricted to small sites located along six streams in the interior of the island of Kaua'i.

Newcomb's snail is unique among the Hawaiian Lymnaeids in that the shell spire typically associated with lymnaeids has been completely lost. The result is a smooth, black shell formed by a single, oval whorl about a quarter of an inch long.

Newcomb's snail feeds on algae and other material growing on submerged rocks. Eggs are attached to underwater rocks or vegetation and there is no widely dispersing larval stage; the entire life cycle is tied to the stream system in which adults live.

Populations on Newcomb's snail are currently found within sections of the Kalalau, Lumaha'i, Hanalei, Waipahe'e, Makaleha, and North Wailua stream systems. Historically, Newcomb's snails were also found in Hanakoa, Hanakapi'ai, and Wainiha streams. The known populations of Newcomb's snails have a total of approximately 6,000 to 7,000 individuals.

Predation by alien species, habitat alteration, and natural disasters are threats that imperil the Newcomb's snail. Predators likely include the rosy glandina snail (*Euglandina rosea*) which is an introduced snail that preys mostly on other snails; two species of non-native marsh flies which prey upon eggs and adults of freshwater snails; and a variety of introduced fish, frogs, and toads. Habitat destruction through reduction or elimination of stream or spring flow could destroy an entire population of Newcomb's snail. Natural disasters such as hurricanes or catastrophic landslides could also destroy Newcomb's snail habitat.

Segments of nine streams and tributaries on the island of Kaua'i were proposed on January 28th by the U.S. Fish and Wildlife Service as critical habitat for the Newcomb's snail, a freshwater snail listed as a threatened species. The segments proposed for protection total 16.35 miles in length and are located at mid-elevation valleys in relatively remote areas. The proposed critical habitat areas are found largely on state land already managed for conservation purposes.

"These critical habitat units include specific stream segments as well as adjacent riparian areas," said Anne Badgley, regional director of the Fish and Wildlife Service's Pacific Region. "The Newcomb's snail needs cool, clean, moderate-to-fast flowing water in permanently flowing streams, springs, and seeps and the surrounding riparian area helps create these conditions. For that reason, it is included in the critical habitat units."

Badgley added that the Service believes the proposed critical habitat units would provide habitat the snail needs in order to survive and recover.

Critical habitat refers to geographic areas that are essential to the conservation of a threatened or endangered species and that may require special management considerations. A designation does not create a preserve or refuge and only applies to situations where federal funding, permits, or projects are involved. Designation of critical habitat has no regulatory impact on the state or private landowners taking actions on their land unless federal funding or permits are required.

The Fish and Wildlife Service proposes to designate critical habitat for the Newcomb's snail in the six streams where they currently exist and in three streams where they were once found but no longer exist. The units are purposely scattered across the northern streams of the island to improve the species' chance of survival.

The proposed critical habitat units where the Newcomb's snails are currently found are along the Kalalau Stream, Lumaha'i River, Hanalei River, Waipahe'e Stream, Makaleha Stream, and the north fork of the Wailua River. The three areas where the species historically existed but is no longer found are along the Hanakoa Stream, Hanakapi'ai Stream, and Wainiha River.

The proposed critical habitat units are made up of mostly state land, but some private lands also are included. The three Na Pali coast segments are within the Na Pali Coast State Park, while the Hanalei River segments are within the Halela Forest Reserve, the Makaleha segments are within Kealia Forest Reserve, and the north fork of the Wailua River segment is within the Lihu'e-Koloa Forest Reserve. All of these state lands are primarily managed to conserve natural resources.

Segments along the Wainiha River, Lumaha'i Stream, and Waipahe'e Stream are on private lands within state conservation districts. No economic activities currently occur on these state and private lands within proposed critical habitat areas, and future activities would not be affected unless a federal action is associated within the project. The Newcomb's snail lives only in fresh water and spends its entire life in the same stream. The larvae of most other freshwater Hawaiian Snails are found within ocean waters, where they disperse to other stream systems for the adult stage of their life cycle. Its shell is smooth, oval, and black and is approximately one-quarter inch long. The snail feeds upon algae and other material growing on submerged rocks.

Although biologists estimate that between 6,000 and 7,000 Newcomb's snails exist on Kaua'i, more than 90 percent of the snails are found in two populations in small areas along the Kalalau Stream and Lumaha'i River. "This makes these animals very susceptible to catastrophic events such as hurricanes, landslides, and invasions or nonnative predators," Badgley explained.

Currently, predation by alien species such as the rosy glandina snail, marsh flies, the green swordtail fish, the American bullfrog, and the wrinkled frog is a significant threat to the species. Natural disasters and habitat alteration also threatened the Newcomb's snail. Habitat loss and degradation through water diversion and well drilling are suspected to have caused the historical decline of the snail.

The Newcomb's snail was listed as a threatened species on January 26, 2000. Although designation of critical habitat was found to be prudent at the time, it was not proposed due to other workload priorities. On June 2, 2000, the U.S. District Court in Hawai'i ordered the Service to publish the critical habitat designation for the species by February 1, 2002. The plaintiffs and the Service recently asked the court to extend that deadline to August 10, 2002.

Source: USFWS News Release dated 1/28/02
Contact: Barbara Maxfield, 808-541-2749

Kilauea Point Natural History Association Announces Availability of the Dan Moriarity Memorial Scholarship for 2002-2003

The Kilauea Point Natural History Association annually awards a scholarship in the memory of Dan Moriarity, an outstanding environmental educator and conservationist. Dan played a major role in fostering a strong conservation ethic in the community, an ethic which continues to this day. The award, up to \$3,000, is applied directly to college or university tuition.

Students studying in the broadly defined fields of botany, zoology, history and related subjects concerning the Hawaiian environment are encouraged to apply. The fields of wildlife management, interpretation, conservation and environmental education are also included.

To be eligible, the student must have been a resident of Hawai'i within the last five years, be accepted or enrolled in a four-year college or university, and have maintained a grade point average of 3.0 or better.

Preference will be given to upper-level undergraduates (junior or senior), although both lower level and graduate student applications will be accepted. The preferred student would be from Kaua'i (not a requirement) and have demonstrated community service in environmental projects and/or participating membership in environmental clubs or organizations.

Application forms may be obtained from:

Dan Moriarity Memorial Scholarship Committee
Kilauea Point Natural History Association
P.O. Box 1130
Kilauea, Hawai'i 96754-1130
Attn: Janis Lyon

Application forms, transcripts, letters or recommendation, and FAFSA forms must be submitted by June 15, 2002.

Follow the Kolea to Alaska

Hawai'i based Annette's Adventures in conjunction with Explore Tours, Inc. in Anchorage, Alaska have created a natural and cultural history tour exploring some off the beaten path places in Alaska.

This is a chance to see the Kolea, or Pacific Golden Plover, in its summer breeding grounds in the treeless tundra along the northwestern coast of Alaska.

After a day of visiting museums in Anchorage, the tour goes to the Arctic Circle for a cultural tour of Kotzebue. The next few days will be spent searching for the Kolea near the famous gold rush town of Nome, on the Seward Peninsula. The remainder of the tour will be spent exploring the Kenai Peninsula near the fishing village of Homer, followed by a ferry ride across the Prince William Sound to Valdez.

The ecotour departs from Honolulu on June 13 and returns June 26. Limited to 20 participants. Contact Annette's Adventures at 808-235-5431, email annettesadventures@juno.com, or visit the website at www.annettesadventure.com

'Ohi'a Productions Presents Family Nature Productions

'Ohi'a Productions presents "From the Sea to the Sky" at Kamehameha School's Ke'elikolani Theater. Performances are Friday, May 24 at 7:30 PM, Saturday, May 25 at 4:00 PM and Sunday, May 26 at 4:00 PM. These entertaining, educational shows are from the creators of the popular "Once Upon One Time" local fairy tale trilogy. The performance will feature 'Ohi'a Productions' current touring shows "In the Clear Blue Sea" and "Wings of the Islands" written by Lisa Matsumoto, with music and lyrics by Roslyn and additional lyrics by Roslyn & Marco Catracchia.

"In the Clear Blue Sea" explores the amazing marine life of Hawai'i's waters. In these stories you'll meet an array of delightful characters, such as Palani, a young polyp who learns about the important role he plays in building coral reefs. Visit life in the crystal clear bay, to learn of the delicate balance of the ocean's food chain. Finally, join the adventures of Gary and Harry, two playful sea turtles who encounter some of the dangers which threaten our sea turtles, like the voracious Tiger Shark and the evil Ghostnet. "In the Clear Blue Sea" combines song, dance and humor to teach us how we can take better care of the ocean and the many creatures that live there.

Of particular interest to Audubon members is "Wings of the Islands" which features the incredible and diverse bird species who make their home in our islands. In the story "The Stilt Who Searched for a Perfect Home," Stuart, a young adventurous stilt leaves his wetland home, and journeys to the sea and to the forest. He meets the many unique birds who live there and learns of the challenges facing their habitats. In the end Stuart learns to appreciate his life in the pond and by returning to the wetlands, he finally finds his perfect home.

In the next story "The Quest For Guano," Mother Earth is sick and needs guano to get better so Bernie the Hawaiian Bat goes on a quest to find her some. The problem is, no one seems to know what it is. That is, until he meets the seabirds who are happy to come to the rescue and "Poop for Mother Earth."

These delightful productions are appropriate for children of all ages and are great for the whole family. Ticket prices are \$12 general admission; \$10 for Seniors (62+), Military and Students with valid ID and \$7 for Children under 12 years old. Tickets can be ordered by calling 'Ohi'a's box office at 484-8800 or on line at www.ohia.com.

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Small Mammal Predators Invade Hawai'i

The islands of the Pacific are some of the most isolated in the world and have produced distinct floras and faunas. Endemism, whereby plants and animals are restricted to a single geographic area, is frequent. Hawai'i exemplifies this process. Formed entirely by volcanic action about 4,000 km (2,400 miles) from the nearest continental land mass, Hawai'i is the most isolated group of islands in the Pacific. Except for the Hawaiian bat, no terrestrial mammal naturally colonized the islands. Isolated from the enemies of their ancestors, Hawai'i's native plants and animals gradually lost their natural defenses against mammalian predators.

With human settlement of Hawai'i, and the introduction of six small mammals, native animals and plants were exposed to predation by these alien species. Carried on early sailing ships, three rats, one mouse and the domestic cat escaped to the islands. The Polynesian rat arrived with the first Hawaiian settlers and is now common in forests, agricultural and adjacent grassy areas, and wooded gulches. In the late 1700s, the Norway rat arrived aboard European sailing ships. It is associated mainly with human activity. The house mouse, arriving about 1816, occupies dry grasslands, scrublands, and forests from sea level to about 3,700 m (12,000 feet). The black rat arrived about 1870 but rapidly became the dominant rat within the islands. The black rat's ability to live in trees makes it dangerous to native forest birds.

Domestic cats probably arrived in Hawai'i soon after Captain Cook. Cats developed wild populations and now live in forests from sea level to high elevation on all the main islands.

In 1883, the mongoose was introduced to Hawai'i in an unsuccessful attempt to control rats. Mongooses now occupy all habitats up to about 2,300 m (7,500 feet) on all main islands except Kaua'i and Lana'i.

These predators rapidly began to assault Hawai'i's native wildlife. Within the last 1,500 years, about 65% of Hawai'i's endemic bird life has gone extinct, and more than 30 of the remaining 48 species are endangered or threatened. Predation by

rats, cats, and mongooses is considered a leading cause in the decline and extirpation of endemic Hawaiian birds. Habitat destruction and avian diseases are other important causes.

Many extinct Hawaiian birds, known only from fossil remains, nested on the ground and were susceptible to predation. The eggs and young of the nene (Hawai'i's state bird) and the Pacific hawksbill sea turtle are eaten by feral cats and mongooses. Rats also prey on native Hawaiian tree snails and insect larvae and are suspected of competing for food with the 'alala (Hawaiian crow), oma'o (Hawaiian thrush), and some endemic insectivorous bird species. Bark stripping and seed predation by rats are known on many endemic Hawaiian plant species. Black rats eat the seeds, fruit, flowers, and bark of the endangered hau kuahiwi tree. Mice may compete with native species for plant and invertebrate food resources.

The alien mammals also brought diseases that are transmittable to humans. Black and Norway rats are carriers of fleas, which transmit plague. Plague was present in Hawai'i for 58 years (1899-1957). Rodents and mongooses carry leptospirosis, a bacterial disease transmittable to humans. Cats host a parasite that causes toxoplasmosis in humans and the 'alala.

Only two methods for controlling small mammals are available to land managers – trapping and 0.005% diphacinone bait placed in bait stations. Both methods, effective in small areas, are labor- and time-intensive and are impractical for large conservation areas. Scientists from Federal, State, and private organizations in Hawai'i are currently studying the ecology and biology of small mammal predators, and evaluating new control techniques, to develop management tools to lessen the impacts of these predators on native wildlife and plants.

From Volcano Watch, formerly a weekly feature provided by scientists at the Hawaiian Volcano Observatory. July 15, 1999

APRIL 15TH PROGRAM MEETING

“Impacts of Feral and Free-roaming Cats on Native Wildlife Species” featuring Linda Winter of American Bird Conservancy's Cats Indoors! Campaign

Six years ago, American Bird Conservancy launched Cats Indoors!, The Campaign for Safer Birds and Cats to encourage cat owners to keep their cats indoors and to support the humane, permanent removal of domestic cats from important wildlife areas. This slide show presentation will review recent studies of cat predation on wildlife, ways to get involved in the Cats Indoors! Campaign, and the controversial issue of “managed” cat colonies. Recommendations for resolving free-roaming cat overpopulation issues will be discussed. A portion of the award-winning National Geographic video, “The Secret Life of Cats” will also be shown.

Linda Winter, Director of Cats Indoors! for American Bird Conservancy, has led the campaign since its inception in 1997.

Ms. Winter's 16-year conservation career includes positions with Defenders of Wildlife, National Wildlife Federation, Izaak Walton League of America, and League of Conservation Voters. She has conducted lobbying and citizen education campaigns on issues such as wetlands protection, the Chesapeake Bay, Arctic National Wildlife Refuge, and Florida's endangered black bear. Ms. Winter has a Bachelor of Science degree in Wildlife Resources from West Virginia University and has owned cats for over 20 years. Her cat, Tiger, resides happily indoors.

Program meetings are held at Henry Hall Room 109 on the Chaminade University campus. Meetings are from 7:30 to 9:30pm. Refreshments are served, and HAS publications, T-shirts, and maps are available for purchase.

Products and Publications Available from the Society

Hawai'i's Birds by the Hawaii Audubon Society, 5th edition, 1997. Over 150 color photographs and illustrations. \$12.95 per copy (\$9.95 plus \$3.00 postage and handling).

Voices of Hawaii's Birds by Douglas Pratt and the Hawaii Audubon Society, 1995. Two 60 minute tapes of songs of more than 100 species of birds found in Hawai'i. Includes a booklet. \$15.50 (\$12.50 plus \$3.00 postage and handling).

Hawai'i's Rare & Endangered Birds Notecards with artwork by renowned Island artist Patrick Ching. Eight greeting cards with envelopes. \$9.50 per box (7.00 plus 2.50 postage and handling).

Treasures of O'ahu Map A fun and informative self-guided tour of O'ahu including hiking, birding, and ancient cultural sites. \$4.95 (\$3.95 plus \$1.00 postage and handling).

The Edge of Forever The Society's 60th Anniversary Commemorative Poster by Richard Pettit. \$20.00 (\$15.00 plus \$5.00 postage, mailing tube, and handling).

'Elepaio logo patch \$3.75 (\$3.00 plus \$.75 postage and handling).

Checklist of the Birds of Hawai'i—1997 by R.L. Pyle. Lists all taxa naturally occurring in Hawai'i and introduced species that have established viable populations. Also includes all changes from the 1992 checklist. \$3.00 (\$2.00 plus \$1.00 postage and handling).

Checklist of the Birds of the Mariana Islands by James D. Reichel and Philip O. Glass, 1991. Lists all taxa naturally occurring in the Marianas and introduced species that have established viable populations. \$3.00 (\$2.00 plus \$1.00 postage and handling).

Checklist of the Birds of Micronesia by P. Pyle and J. Engbring, 1985. Lists all taxa naturally occurring in Micronesia and introduced species that have established viable populations. \$3.00 (\$2.00 plus \$1.00 postage and handling).

Field Card of the Birds of Hawaii by R. L. Pyle and R. David, 1996. A pocket-sized field card listing bird taxa found in Hawai'i. \$.50 each. Call for postage price.

Also available are **Hawaii Audubon Society logo t-shirts** in white, spruce, and gray, in sizes from small to extra large. \$15.00 (\$12.00 plus \$3.00 postage and handling).

Send orders, with check payable to the Hawaii Audubon Society, to Hawaii Audubon Society, 850 Richards Street, Suite 505, Honolulu, HI 96813-4709. Products may also be purchased at the office to avoid mailing charges.

Field Trips for 2002

All trips with an * are still in the process of being planned. Details will be provided as the scheduled dates get closer. A donation of \$2 per participant on all field trips is appreciated.

April 13 (Saturday) Birding by bicycle! We will start at Blaisdell Park in Pearl City at 9:30am (meet in vicinity of restroom) to look for Saffron Finches and then follow the Pearl Harbor Bike Path along the coast of Pearl Harbor, stopping at an agricultural site to hopefully see Ruddy Turnstones, Sanderlings, and Chestnut and Nutmeg Mannikins, and continuing along the path to Pouhala Marsh in Waipahu to see Hawaiian Black-necked Stilts and whatever else might be there. We may decide to continue to 'Ewa Beach Estates where one can catch a glimpse of birds in a wildlife refuge. Round trip is about 10 miles. The pace will be easy. Bring a bicycle in good working order, tire patch kit, helmet, binoculars, water, sunscreen, and snack. Call the HAS office to register - 528-1432 or register by email, hiaudsoc@pixi.com.

April 20 and 21 (Saturday and Sunday) Paiko Lagoon to see aquatic creatures such as eels, crabs, snails, mantis shrimp, squid, puffer fish, ghost crabs, and whatever else becomes visible. This is also a chance to bid our shorebirds goodbye, as they will be leaving for Alaska any day. Wear old tennis shoes or reefwalkers, and bring sunscreen, water, and lunch. We will meet at Paiko Lagoon at 7:30am. Call Alice to register, 538-3255

May 13 (Monday) Starwatch at Hanauma Bay with Dr. Samuel Rhoads, author of "The Sky Tonight - A Guided Tour of the Stars Over Hawai'i." We will meet at 7:00pm at the gate to Hanauma Bay. Please call Alice Roberts to register 538-3255.

May 19 (Sunday) Honolulu Zoo Although the Native Hawaiian Forest Bird Captive Propagation Unit is temporarily closed, Linda Santos will give us a tour of the South American aviary and the walk-through aviary (your editor was there several weeks ago - a fantastic close-up look at some very beautiful and unusual birds!) at the back of the zoo. This trip is limited to 15 participants. Call the HAS office to register, 528-1432 or register by email, hiaudsoc@pixi.com.

June 22 and 23 (Saturday and Sunday) Paiko Lagoon Another visit to check for shorebirds and sea critters. Wear old tennis shoes or reefwalkers, and bring sunscreen, water, and lunch. We will meet at Paiko Lagoon at 7:30am. Call Alice to register, 538-3255

KOLEA WATCH

Help study Kolea, the Pacific Golden Plover!

K-12 students, scientists, and the public are teaming up to study the spring Kolea migration. Kolea leave O'ahu for Alaska around April 25 each year. When do they leave other islands? Do they mix? How long does the flight take? Your data helps answer these questions and more!

- Count Kolea in the same place each day, and write down your data
- Start before they leave (Hawaii: start April 14). Stop after count is zero for 4 days
- Share your data on the web or mail it in!

For more information, see <http://www.hawaii.edu/bird> or email koleabird@hotmail.com

A project of the UH Manoa GK-12 Program, US Fish and Wildlife Service, Hawai'i Nature Center, Bishop Museum, Hawai'i Audubon Society, and others.



APRIL 2002

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Calendar of Events

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Mondays May 13 and July 8

HAS Board meeting open to all members, 6:30 to 8:30 p.m. at the HAS office. Education and Conservation Committees meet at 5:45 p.m. before Board meetings.

Monday, April 15

Program Meeting "Impacts of Feral and Free-roaming Cats on Native Wildlife Species" featuring Linda Winter of American Bird Conservancy's Cats Indoors! Campaign. *See page 114.*

Saturday, April 13

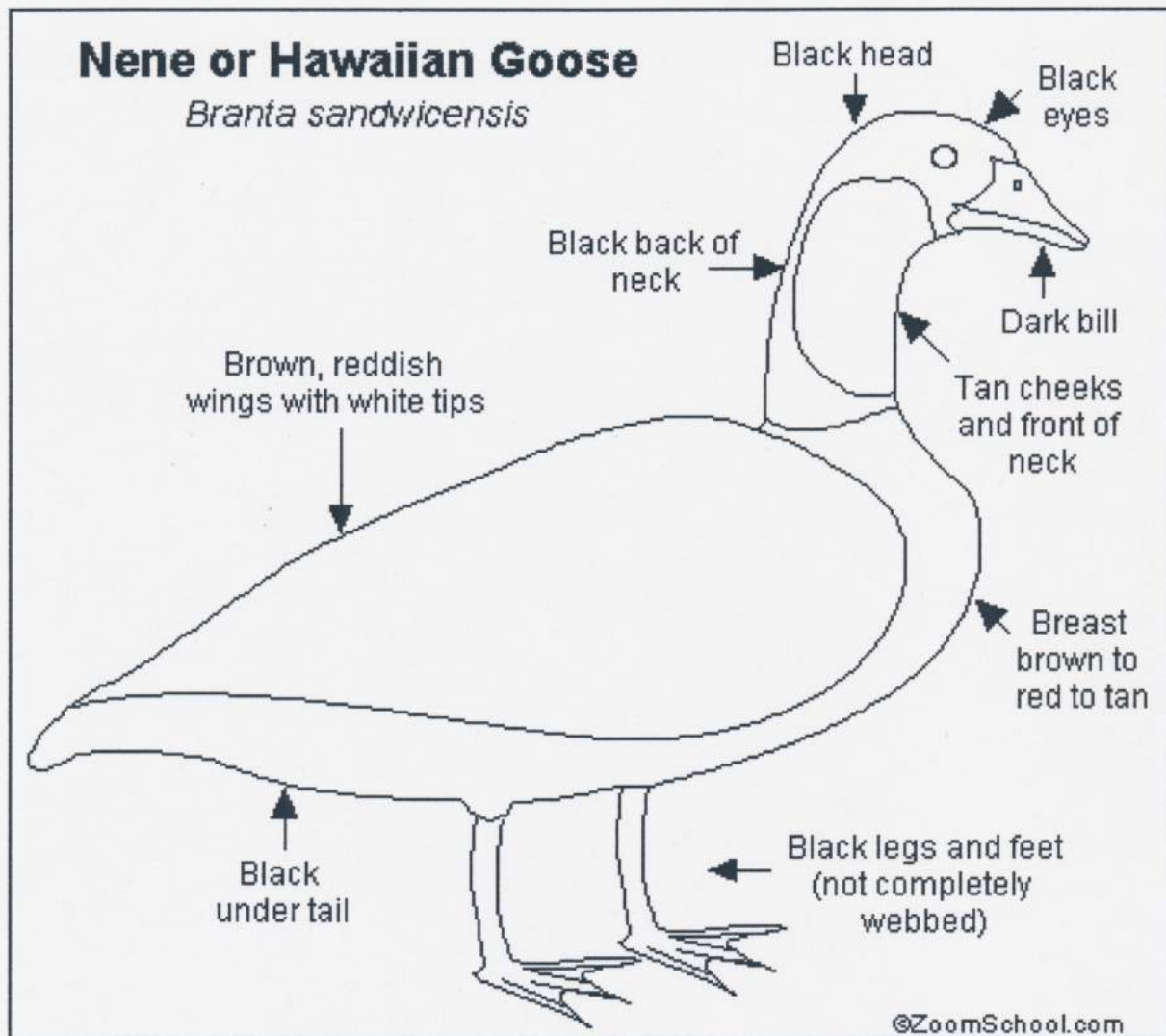
Field Trip Birding by Bicycle.
See page 115.

Saturday and Sunday, April 20 and 21

Field Trip to Paiko Lagoon.
See page 115.

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Nene - Hawaiian Goose (*Branta sandwicensis*)



Distribution: The Nene or Hawaiian Goose (*Branta sandwicensis*) is the official state bird of Hawaii. It lives on scrublands and volcanic slopes of the islands of Maui, Kauai, and Hawaii. It does not migrate and spends little time in water.

Anatomy: The Nene has partially webbed feet. It is about 24 inches long and weighs 4 to 5 pounds; the males are slightly bigger. Males and females are similar in plumage or color.

Eggs and Nests: The Nene's nest is bowl-shaped and made from volcanic rock on the ground. The nest is lined with grass and down feathers. Females lay 5 to 8 eggs in each clutch (the group of eggs laid at one time). The female incubates the eggs for 30 days, until the eggs hatch. Meanwhile the male feeds the female during the incubation period.

Voice: The Nene makes a soft honking sound or call.

Diet: The Nene is an herbivore (plant-eater), eating grass and other low-lying plant material.

Conservation: By implementing a captive breeding program in 1951, the Nene was saved from extinction. However, the Nene is an endangered species that depends upon healthy, undisturbed habitat and resources.