



Prey taken by Feral Cats (*Felis catus*) and Barn Owls (*Tyto alba*) in Hanawi Natural Area Reserve, Maui, Hawai'i

by James R. Kowalsky¹, Thane K. Pratt², and John C. Simon

Native Hawaiian birds experienced an extraordinary period of extinction after Polynesian arrival and subsequent immigration of people from around the world (Olson and James 1982). This rapid decline was caused by habitat destruction and introduced avian diseases and predators, among other factors. Predation by feral cats (*Felis catus*) is one of the leading causes of decline and extinction of native island fauna (Fitzgerald and Veitch 1985, Kirkpatrick and Raunon 1986), and cats have been documented as predators on native Hawaiian forest birds (Pletschet and Kelly 1990, Snetsinger et. al. 1994, Mostello 1996). Native forest birds are also preyed upon by the introduced Barn Owl (*Tyto alba*) (Snetsinger et. al. 1994, Mostello 1996).

As part of a project studying factors limiting the populations of two endangered Hawaiian honeycreepers, the 'Akohekohe (*Palmeria dolei*) and Maui Parrotbill (*Pseudonestor xanthophrys*), we studied the diets of feral cats and Barn Owls by quantifying remains of prey in cat scats and owl pellets collected from a montane wet forest in the Hanawi Natural Area Reserve, Maui (see map).

Methods

The Hanawi Natural Area Reserve is managed by the State of Hawai'i and located on the northeast slope of Haleakala Volcano, East Maui, at 20(44°N and 156(8°W (Wagner et. al. 1990, Berlin et. al. 2000). Our study area ("Hanawi") of approximately 35 ha is within the reserve and extended from treeline above Frisbee Meadow (2100 m elevation) down to 1560 m and was bordered by the east and west branches of Hanawi Stream (Fig. 1). The montane wet forest was dominated by 'ohi'a-lehua trees (*Metrosideros polymorpha*) and a moderate understory with a thick growth of epiphytes (Yoshinaga 1977, Berlin et. al. 2000). Above treeline, subalpine mesic grassland was composed mainly of bunchgrass (*Deschampsia nubigena*) and extended to the rim of Haleakala Crater (Wagner et. al. 1990).

Much of upper Hanawi Natural Area Reserve, including our study area, had been fenced, and the feral pigs removed. While rat control had begun 2 km to the east, we have no reason to believe that the impact of these measures reached as far as our study area.

We collected cat scats from 1994 to 1997 along ridge top trails throughout the forest and occasionally from subalpine areas near Frisbee Meadow. Scats were placed individually in plastic bags, labeled, and later removed to the project's office for analysis. We also noted all cat sightings.

In February 1996, a ledge with two Barn Owl roosts was discovered in the west Hanawi Stream gulch at about 2,300 m elevation. The first roost (Site 1) was sheltered by a rock outcrop

and contained scattered bones of prey and weathered pellets. The second roost (Site 2), a small cave 4 m away on the same ledge, contained scattered bones and owl feathers, with an accumulation of pellets outside the cave entrance. All intact pellets were collected from both sites. Scattered bones were not collected and are not reported here. Subsequent collections were made every two months to minimize disturbance. We recorded sightings of Barn Owls and Pueo (or Short-eared Owl, *Asio flammeus*) in the study area and in the grasslands above Frisbee Meadow.

Pellets and scats were dried and later pulled apart using tweezers and probes. Bones, feathers, invertebrates, and seeds were sorted to identify the number of individual animals represented in each sample. See Table 1 for scientific names of prey items. A field guide (Pratt et. al. 1987) and banding measurements (Pacific Island Ecosystems Research Center [PIERC], unpubl. data) were used to identify bird remains. Rodent remains were identified mostly by teeth size and skull shape from a key developed by Conant (1972). We assumed that most or all prey were captured rather than scavenged. Some potential remains, such as soft-bodied invertebrates, may have been completely digested and therefore were not represented in scats.

Results

Rodents were the most common prey taken by both feral cats and Barn Owls at Hanawi (Table 2). Prey species were represented by more than one individual in 20% of cat scats and more than 90% of owl pellets. One owl pellet contained the remains of eleven House Mice (*Mus musculus*); another held bones of three individual rats. Although many rats could not be identified, Black Rats (*Rattus rattus*) were the most common rat species taken by Barn Owls (Table 1). The remains of House Mice were also common in Barn Owl pellets, especially from pellets taken at Site 1 (Tables 1, 3). Only one Norway rat (*Rattus norvegicus*) was identified, in an owl pellet, confirming the rarity of this rat in montane forests (Snetsinger et. al. 1994, Sugihara 1997).

Two species of native forest birds and three introduced bird species were identified from cat scats (Table 1). 'Alauahio (*Paroreomyza montana*) and Ring-necked Pheasant (*Phasianus colchicus*) were the most abundant bird prey identified. Whereas cat scats frequently contained bird remains, only one Barn Owl pellet did so, and these were of a single 'Akohekohe (Table 1).

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Bird of the Month — Erckel's Francolin (*Francolinus erckelli*)

by Linda Shapin

The Erckel's Francolin is a game bird that was introduced to Hawai'i in 1957 from Africa, specifically Ethiopia and Sudan. It is found on all islands except Maui. Described as "chicken like," it is 16 inches tall and has a black forehead with a chestnut crown, a white throat, and longitudinal chestnut streaks on its gray breast. The rest of the bird is grayish brown with dark chestnut. It has a black bill and its legs and feet are dark yellow. Males have two sets of spurs on their legs, females just one set. The sexes are similar, although the male is larger.

A ground dweller, it prefers grasslands and open forests at higher elevations, especially rainy areas. It gives laughing cackles and crows, ending with chuck-chuck-chuck calls. It can become quite tame.

The Erckel's Francolin is monogamous. The hen lays 7-12 spotted eggs and incubates them for 21 to 23 days. The bird can be seen at Pu'u La'au and the Saddle Road Kipuka on the Big Island, Waimea Canyon (try the lookout) and the Koke'e Region on Kaua'i, and in appropriate habitats on the Wai'anae Coast (although I saw one while hiking the Maunawili Trail along the Ko'olau Range last year!).



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'ELEPAIO

ISSN 0013-6069

Managing Editor: Linda Shapin

Scientific Editor:

Ronald Walker, 235-1681 (H)

Distribution: Susan Miller

The 'Elepaio is printed on recycled paper
and published nine times per year:
February, March, April, May, June/July,
August/September, October, November,
and December/January

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Cat scats rarely contained the remains of insect larvae (*Lepidoptera*) (Table 2), and most (66%) contained the barbed seeds of a native sedge (*Uncinia sp.*), probably groomed off the animals' fur. No insect or plant material was found in owl pellets. Only two cat sightings, less than 30 m apart, were noted during the entire study period. One pair of Barn Owls from the two roosting sites was thought to frequent the study area. Barn Owls were occasionally flushed from perches within the forest and observed making low passes over the forest canopy. Pueo were also observed flying over the forest and grasslands, but no roost or nest was ever found. Pueo were mainly associated with adjacent subalpine grass and shrubland upslope of the study site.

Discussion

Feral cats have been identified as one of the most destructive predators of island birds (Kirkpatrick and Rauzon 1986, Ebenhard 1988, Robertson et al. 1995). Ground feeding and nesting birds are particularly vulnerable (Fitzgerald and Veitch 1985). However, feral cats at Hanawi consumed more rodents than birds, as has been found in most studies of cats where rodents are available, including those in Hawai'i (Amarasekare 1994, Snetsinger et al. 1994, Mostello 1996). By comparison, at Hakalau on Hawai'i Island, in a forest comparable to ours, 75% of cat scats contained rats and 52% contained mice (Smucker et al. 2000). At our study site, rodent populations were high during both winter and summer months (Sugihara 1997).

Cats are opportunistic hunters that take whatever prey species are most available and accessible (Fitzgerald 1990). In studies on small islands where birds were more common than rodents, cats preyed mainly on birds (Fitzgerald and Veitch 1985, Kirkpatrick and Rauzon 1986). Compared with the frequency of bird remains in cat scats from Hakalau (68%), we found at Hanawi that 39% of cat scats contained bird remains. It is difficult with our small sample to speculate on what appears to be different occurrence of bird remains in cat scats at Hakalau vs.

Hanawi. However, the point remains that feral cats are frequently eating birds in native bird habitat.

In our study of 'Akohekohe, we documented high survivorship of adults and high rates of nesting success, which suggests that rates of depredation on this species may be relatively low (Simon et al. in press). The only evidence of predation of any kind was that of an 'Akohekohe killed on the nest at night (presumably by a rat) and the remains of an 'Akohekohe on a trail. We were unable to estimate survivorship of Maui Parrotbill (Simon et al. 2000). However, the demography of this species is relatively sensitive to mortality owing to intrinsically low reproduction, because each parrotbill pair can annually produce only one young (two in rare cases, Simon et al. 2000). While we detected no evidence of depredation by feral cats on either 'Akohekohe or Maui Parrotbill, our sampling was inadequate to measure the amount of mortality caused by cats. We did learn that cats inhabit forest at Hanawi, where they prey on a range of native and introduced birds and subsist mainly on rodents. The impacts of cats are perhaps best investigated by removing this predator and measuring bird survivorship. Also, cat stomach contents could then be examined and compared with data from cat scats.

Judging from the few cat scats found, cat density at our study site may be low. In an earlier study, Mountainspring (1987) noted that feral cats were relatively uncommon at Hanawi. We discovered a dead cat in October of 1996, and afterward fewer cat scats were found on our study plot. The low population of feral cats at Hanawi may be due to the cold, wet climate and dense vegetation at ground level. Nevertheless, cats did roam everywhere in the study area, even the forest depths, as could be seen by their scats along trails, and their densities could be higher than the rare sightings suggest, based on studies on Mauna Kea (D. Goltz, pers. comm.). Feral cats appear to be breeding at Hanawi, as a kitten was found in dense rainforest 2

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Program Meeting, June 17:

Ahupua'a of Pu'uwa'awa'a: Public Opportunities for Kona Drylands Restoration

Two Perspectives by Lyman Perry, District Botanist, DLNR/DOFAW and Steven Lee Montgomery, Ph. D., Biologist and a Director of the National Wildlife Federation affiliate, Conservation Council for Hawai'i.

Lyman Perry and Steve Montgomery will show options for our State's largest public tract, now emerging from a century of grazing regimes. Learn of rich discoveries like bird bones in lava tubes under its upper Koa forest, a Wildlife Sanctuary since 1988, which was finally fenced from cattle in response to logging violations in the last North Kona Alala nesting site. Hear of its diverse flora and fauna: Vicia, Delissea, Kokia, and 'Aiea, host tree of our largest native insect, the endangered Blackburn's Hawk Moth, and many invertebrate novelties.

The State Division of Forestry and Wildlife (DOFAW) and Parks Division are drafting a Management Plan for the Board of Land and Natural Resources (DLNR). The scale and intensity of land uses has remained a sticking point. Major areas to be addressed include: fire, public access, ecotourism, native ecosystem and endangered species management, game manage-

ment, stewardship and funding. Fencing and animal removal, coupled with fire fuels management, remains an effective way to protect and restore native flora, especially within landscapes where grazing cattle and game mammals are needed or desired.

It is expected that large portions of these lands will be proposed and designated as Federal critical habitat for endangered plant species. Finding the balance between the continued survival of native plants and animals while providing public hunting opportunities is a complex endeavor. Program meetings are held at Henry Hall Room 109 on the Chaminade University campus at Wai'alae Avenue. Meetings are from 7:30 to 9:30pm. Refreshments are served, and HAS publications, T-shirts, and maps are available for purchase.

km east of the study site (T. Casey pers. com.). The nearest domestic source of cats was 10 km down slope on the coast. The significance of the feral cat's impact at Hanawi remains unclear, but is potentially severe at times, because a few individual cats can exterminate local bird populations (Fitzgerald and Veitch 1985).

Native Hawaiian birds coexisted with predatory owls long before the arrival of people and introduced predators like cats (Olson and James 1982). Between 1958 and 1963, several shipments of Barn Owls were released in Hawai'i to help control rodents (Tomich 1962). Research on the effectiveness of this control has been minimal, and the diet of Barn Owls in natural Hawaiian ecosystems is just now being documented. Snetsinger et. al. (1994) found that 100% of Barn Owl pellets and 89% of Pueo pellets contained rodent remains, whereas 36% of all Barn Owl pellets and 15% of Pueo pellets held the remains of birds. Mostello (1996) studied Barn Owl pellets collected at Hakalau and found that 63% contained rats, 72% contained mice, and 19% held birds. We found that Barn Owls at the two roosts in Hanawi took a far greater proportion of rodents (98.3%) than birds (1.7%). Significantly, the one bird taken was an endangered 'Akohekohe.

It would be important to monitor cat and owl populations when rodent numbers decline (either with natural population cycles or with control of rodents for conservation purposes) to see if these predators decrease through emigration and mortality, or if instead they resort to preying more heavily on birds. Additional research would be valuable to determine if reproductive success and survivorship of native birds can be increased through the removal of feral cats and Barn Owls. However, if rodent populations were not simultaneously controlled, there would be a risk that rat populations may increase and lead to more depredation on bird nests. A further important question is how do cats respond when dense understory vegetation returns after fencing and pig removal? Perhaps a restored understory restricts their movements and reduces predation on birds.

Acknowledgments

We thank fellow staff member K. E. Berlin and all of the project's field assistants for their help in collecting cat scats and owl pellets. Special thanks go to D. Holmes and A. French, who sorted most of scat and pellet contents. U. S. Fish and Wildlife Service, U. S. Geological Survey, Hawai'i Department of Land and Natural Resources, and The Nature Conservancy of Hawai'i provided funding. The Hawai'i Natural Area Reserve Commission permitted access to the study site. We are indebted to F. Duvall, II, for help with identifying plants at Hanawi and to the staff of Haleakala National Park and Pacific Helicopters for logistical support. Finally, our thanks to Fern Duvall, II, Renate Gassmann-Duvall, D. Goltz, G. Lindsey, and P. Banko who reviewed drafts of this paper.

¹ P. O. Box 171, Winchester, NH 03470

² Send all correspondence to:

Thane Pratt
U.S.G.S. Pacific Island Ecosystems Research Center
P. O. Box 44
Hawai'i National Park, HI 96718
email: thane_pratt@usgs.gov

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Table 1.

Numbers of prey identified by species in feral cat scats and Barn Owl pellets.

Species	Scientific Name	Cat	Owl
Black Rat	<i>Rattus rattus</i>		23
Polynesian Rat	<i>Rattus exulans</i>		8
Norway Rat	<i>Rattus norvegicus</i>		1
Unknown Rat	<i>Rattus sp.</i>	27	23
House Mouse	<i>Mus musculus</i>	5	27
	Total Rodent	32	82
'Amakihi	<i>Hemignathus virens</i>	1	
'Akohekohe	<i>Palmeria dolei</i>		1
'Alauahio	<i>Paroreomyza montana</i>	3	
House Finch	<i>Carpodacus mexicanus</i>	1	
Red-billed Leiothrix	<i>Leiothrix lutea</i>	1	
Ring-necked Pheasant	<i>Phasianus colchicus</i>	2	
Unknown Bird		6	
	Total Bird	14	1

Table 2.

Number (and %) of feral cat scats and Barn Owl pellets containing remains of rodents, birds, and insects.

Species	n	Rodent	Bird	Insects
Feral Cat	33	28 (84.9)	13 (39.4)	3 (9.1)
Barn Owl	61	60 (98.3)	1 (1.7)	0 (0.0)

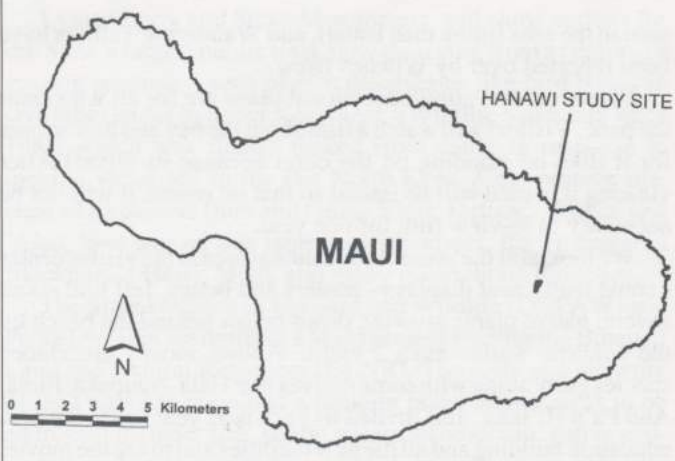
Table 3.

Comparison of rodent prey captured at the two Barn Owl roosts (Site 1 older than two years, Site 2 was more recent)

	Site 1	Site 2
Pellets Collected	27	34
Total Rat	22	33
Total House Mouse	26	1

Figure 1.

Map of Maui Island showing location of Hanawi study site.



The Natural and Cultural History of the Kailua Ahupua'a and Kawai Nui Marsh 2002

Sponsored by the Kawai Nui Heritage Foundation, 'Ahaui Malama I ka Lokahi and The Kailua Hawaiian Civic Club

These educational tours of the Kailua Ahupua'e and Kawai Nui Marsh are designed to inform residents, visitors, educators and members of the various Kailua community organizations about the Hawaiian archaeological, historic and ecological sites of the marsh. There are also special requested field study trips for elementary through college age student groups or other Hawaiian cultural groups visiting the sacred sites.

The tour groups meet at Ulupo Heiau next to the Windward Kailua YMCA at 8:30 am and walk as well as car pool to the various sites. Return trip is usually back at the Windward YMCA by 1:00 pm. A donation fee of \$5.00 for non-members and \$3.00 for members will be accepted for the tour. Monies are used to support the cultural and ecological restoration work of Kawai Nui Marsh. Groups will be limited to 20 persons.

DATES OF 2002 TOURS

1. Sat. May 4 Chants and Traditional Stories of Kawai Nui Marsh
2. Sat. July 6 Archaeological and Historic Sites of Maunawili Valley.
3. Sat. Sept. 7 Cultural and Natural History Tour of Kawai Nui Marsh.
4. Sat. Oct. 5 Geology of the Kailua Ahupua'a
5. Sat. Nov. 2 Archaeological & Historic sites of Kawai Nui Marsh
6. Sat. Dec. 7 Birds of the Marsh.

WHAT TO BRING: Backpack or Fanny-pack, walking shoes, water bottle, mosquito repellent, sunscreen, rainwear, hat or cap, sunglasses. Optional camera and binoculars. Snack?

CALL: Chuck "Doc" Burrows for more information and to register for these educational tours at: 595-3922 or email: cburrows@aloha.net

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.

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

July 20 (Saturday)

Ho'omaluhia Botanical Garden Potluck Birding Picnic! Bring a dish to share with others and we'll eat lunch, talk birds and then go look for some. Picnic will be in the Pa Launa area of Ho'omaluhia Botanical Garden, Kane'ohe. Call the HAS office to sign up and let us know what you'll bring —528-1432

Service Projects at Kawai Nui Marsh

The Kawai Nui Heritage Foundation And 'Ahahui Malama I Ka Lokahi, in cooperation with Kailua Hawaiian Civic Club, Ka Pa Ku 'i A Holo, Ke Kula o Samuel Kamakau, DLNR Division of Hawai 'i State Parks, and Windward YMCA invite you to Kokua and Malama Kawai Nui Marsh.

Na Pohaku O Hauwahine (The rock formation of the Hawaiian Mo'ō goddess and guardian of Kawai Nui Marsh) is located on the right-hand side of Kapa'a Quarry Road at the Y-intersection before entering the Kapa'a Landfill Transfer Station. It offers a panoramic view into the "piko" of Kawai Nui Marsh where one can observe in tranquillity the wetland birds and marsh vegetation. Brush removal and trail construction has revealed ancient Hawaiian terraces that align the massive rock outcrops. We are planting the 12 acre area with native plants to recreate a dryland forest ecosystem. We are also working in the marsh to form a wetland bird habitat.

Holomakani Heiau (The running wind) was presumed to be destroyed according to McAllister's account in 1933 but was rediscovered in 1987. Archaeological surveys suggest that this site may be a "possible prehistoric heiau or large platform terrace structure of some significance." This site is located on a 319 acre privately owned property on the mauka side of Kapa'a Quarry Road about 0.7 miles from the intersection of Kalaniana'ole Hwy. A short hike of 15 minutes from the Quarry Road along roadways created by off road vehicles will lead to the site. Off road trucks have damaged the rock wall of the heiau in recent years and have caused erosional runoff in the watershed. We have cleared vegetative overgrowth, and maintained the heiau terraces to make visitors aware and respectful of this sacred site.

Ulupo Heiau (Night of Inspiration) one of the first sacred temples to have been built as a "māpele" (agriculture) heiau by the first people or menehune and dedicated to Kaneulupo. Later in the reign of high chief Ku'ali'i, the temple may have been reconstructed as a luakini or human sacrificial heiau. The Kailua Hawaiian Civic Club and Ka Pa Ku 'i A Holo are the co-curators for this heiau and conduct service projects every second Satur-

day of the month. Ahahui Malama I Ka Lokahi has taken the lead to restore the ancient spring-fed lo'i kalo (taro terraces) located behind the heiau.

Kawai Nui Estuary Wetland Bird Islet Restoration - As part of the Ahahui Malama I Ka Lokahi research program in Kawai Nui Marsh, an islet located at the Kaha Park side of the Kawai Nui estuary has been cleared of alien vegetation and will be landscaped as a wetland bird habitat. Service project dates to this site will be announced.

REMAINING SERVICE PROJECT DATES ñ 2002:
(All Saturdays from 8:30 am to 2 pm)

Ulupo Heiau: June 8, July 13, August 10, September 14,
October 12, November 9, and December 14

Holomakani
Heiau: June 15 and October 19

Na Pohaku o
Hauwahine: July 20, August 17, September 21,
November 16, and December 21

What to Bring: Backpack, lunch, 1 qt. water, rain gear,
mosquito repellent, gloves.

Tools to bring if
you have them: Sickles, pruners, handsaws, machete,
weeders, cultivators.

Call: Chuck "Doc" Burrows for more information
and to sign up for these service projects at:
595-3922 or email: cburrows@aloha.net

Field Trip Report

Hanauma Bay Nature Preserve Marine Life Conservation District, Saturday, March 16, 2002, 9:00 AM

by Alice Roberts, Field Trip Coordinator

We gathered at a picnic table near the entrance & sighted several feathered creatures - a favorite Pacific Golden Plover Kolea, Red-Vented Bulbuls, Barred and Spotted Doves, Mynas, Sparrows, and Java sparrows in the grass. Jeff Kuwabara, Sea Grant Marine Park Program Specialist — Hanauma Bay Education Program, checked us in.

First we went to the overlook where Jeff told us about the geology of the bay — perhaps six 30-40,000 year old craters — two making up the bay, the two on the town-side forming Koko Head, and perhaps two at the Witches Brew end. The water entered only about 7,000 years ago. He spoke of the reef bits (coral and shells) in the lava since these volcanics happened long after the Ko'olau volcano formed about 2 million years ago.

He mentioned humpback whales had been observed cavorting that week and that several Red-Tailed Tropicbirds had been

seen in the area (more than usual), and Wandering Tattlers have been reported over by Witches Brew.

Future conservation/educational plans are for all who enter the park. Visitors will watch a film about the bay and how to care for it (like no standing on the coral because its alive!) After viewing it, a card will be issued so that on return, it will not be necessary to re-view film for one year.

We looked at the present educational area at the visitor center - some really neat displays - posters and bones. Jeff told about several native plants growing down below behind the beach by the volcanic walls - even 2 loulu. Above, mostly introduced species grow along with some natives like Hala, Naupaka, Ilima, And Pa'u Hi'iaka. Jeff invited us back next year to see the new education building and all the new facilities and to see the movie.

Bold Attempt to Save Rarest of Hawaiian Forest Birds Yields New Information But No Matchmaking

Hawaii Audubon Society Hawaii Audubon Society 42 days of hanging mist nets (special fine-mesh nets that are almost invisible) and trudging through miles of rugged rainforest terrain to finally capture one of the females. The scientists were forced to give up on catching the male, who eluded their month-long attempt to land him in a mist net. Once they landed the female on April 4, the scientists kept her for a few hours in a holding box developed for the project by Peter Luscomb, general curator of the Honolulu Zoo.

The soft enclosure was designed to protect the Po'ouli from hurting herself if she became nervous and flew wildly against the sides. An avian veterinarian accompanied the scientists just in case the small bird was injured. To the joy of the researchers, the Po'ouli remained calm and settled down to a meal of wax worms and snails, proving that the very rare bird will eat in captivity. That knowledge is a boon to the efforts to save the Po'ouli from extinction. "It shows that the bird can handle this level of management," said Dr. Eric VanderWerf, a Fish and Wildlife Service biologist. "This gives us more knowledge and confidence to choose an option that people were a little afraid of before. Our thinking now is that if the best option for the Po'ouli is captive breeding, that's what we'll do."

While the Po'ouli was in the padded box, Groombridge fitted her with a tiny transmitter so her movements could be tracked. The specially designed transmitter weighs just 0.7 grams so it wouldn't impair her flying. It had enough battery power for a month. The researchers then hiked the female Po'ouli into a site in the male's home range and set her free just before dark, in the hope that in the morning, she and the male would meet. The researchers were up before dawn with radio telemetry equipment to track the female's every move. For the first few hours, she flew around in the male's range but by midday, she was headed home. As far as the scientists know, the two birds didn't meet. "We're disappointed, of course, but we now have more options to consider next year," Groombridge said. "This shows a lot of promise for the future."

The research team tracked the female Po'ouli's movements for another 10 days until the radio fell off. During that time, scientists were able to unravel some of the mysteries surrounding the Po'ouli's behavior for the first time since the species was discovered. Since mating season has now passed, the scientists don't plan to try to capture the other female Po'ouli this year. Over the next year, they will consider whether to try another capture and translocation next spring or whether to try to gather the birds up and place them into a field aviary or bring them into captivity, where they might breed. "This was an extremely difficult task we set out to do but it was successful in that it provided us with an enormous amount of new information," Buck said. "This information will help us find the best way to protect this rare species of bird."

The Po'ouli was first discovered in 1973 in the rainforest of East Maui at 6,494 feet elevation by college students on a University of Hawai'i expedition. It was the first new native Hawaiian bird species discovered since 1923. Named by Hawaiian cultural authority Mary Kawena Puku'i, Po'ouli means "black-faced" in Hawaiian. Never an abundant species, its population was initially estimated at fewer than 200 birds. The last known Po'ouli breeding was in 1996. Fossil evidence indicates Po'ouli once inhabited other areas of Maui, including drier habitat between 1,500 and 4,500 feet in elevation on the southwestern slope of Haleakala. The bird is unique in that it is the only Hawaiian forest bird known to eat tree snails. Po'ouli also eat insects, spiders and occasionally fruit.

The Maui Forest Bird Project was created in 1995 to investigate and respond to the decline of Maui's forest birds. The project's staff is currently studying food resources, avian disease, predation and competition from introduced species in DLNR's Hanawi Natural Area Reserve.

Source: U.S. Fish & Wildlife Service News Release dated May 8, 2002
Contacts: Deborah Ward, Hawai'i Department of Land and Natural Resources, 808/587-0320

Joan Jewett, U.S. Fish and Wildlife Service, 808/541-2749

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Calendar of Events

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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, June 17

Program Meeting on Pu'uwa'awa'a. See page 129.

Saturday and Sunday, June 22 & 23

Field Trip, Paiko Lagoon. See page 131

Saturday, July 20

Field Trip, Ho'omaluhia Botanical Garden Potluck Birding Picnic. See page 131

Prey taken by Feral Cats (*Felis catus*) and

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