



Hawaii's Seabird Islands, No. 1: Moke'ehia

by Cameron B. Kepler¹, Angela K. Kepler¹, and Theodore R. Simons²

Most of the 30 major offshore islands around Maui, Molokai, Lanai, and Kahoolawe have rarely been investigated, and some have never been surveyed by a biologist. Much of what little is known about them dates from the 1950s (Richardson 1957). Some of the islands harbor significant but undescribed seabird colonies, and most have been declared part of the Hawaii State Seabird Sanctuary. In addition to our intrinsic interest in each island, it is essential to know what seabird species breed on each island, and the stresses to which they are subjected, if we are to protect them. Furthermore, some islands could serve as translocation sites to establish new colonies of the endangered Dark-rumped Petrel (*Pterodroma phaeopygia*).

In 1977 we began surveying the offshore islands of Maui County (Kepler & Kepler 1980). With this paper we introduce a standardized format, widely used in Australia (Warham 1979), to present our findings. We hope that this plan will be used by others undertaking island surveys in the Hawaiian islands, and that ultimately information about all of Hawaii's offshore islands will be made available to biologists and land managers interested in their important resources.

LOCATION: Moke'ehia lies in the Pacific Ocean at 20° 59' N. latitude, 150° 31' W. longitude, just 2 meters north of Hakuhe'e Point, and 2.4 km southeast of Kahakuloa Head, Maui (Figure 1). Map location: Kahakuloa Quadrangle, Hawaii.

STATUS: Hawaii State Seabird Sanctuary, protected by the Hawaii Department of Land and Natural Resources.

PHYSICAL DESCRIPTION: Moke'ehia (Hawaiian="trodden island") is "L"-shaped, with an approximate area of 3.43 ha (Figure 2). Its long axis, extending northeast about 260 m from its landward base, has an average width of about 110 m and a maximum elevation of 50 m. The landward (southwest) end, and the southern and northern sides, are vertical cliffs dropping into water up to 30 m deep. From the cliffy heights of 45 m at the landward end, the island slopes steeply in a northeasterly direction to under 5 m at the foot of the "L" (Figure 1). The northern peninsula is less than 10 m high, soilless, wave-washed in storms, and of irregular contour, extending about 100 m from the remainder of the island.

Moke'ehia is rocky throughout, with a base of dark Wailuku Volcanic Series basalt overlain by more recently deposited grayish-white Honolua Series lavas (Kyselka and Lanterman 1980). Weathering smoothly over time, the Honolua lavas have produced most of the island's powdery, crumbly soils. Several large sections of formerly soil-covered slopes have

eroded to the underlying lava, perhaps as a result of undermining by seabird burrows. The black basalts are heavily pitted with fretwork weathering.

The island is a sea stack formerly connected to Maui, and is only slightly detached from Hakuhe'e Point by a crooked channel less than 2 m wide and 1 m deep. Because Moke'ehia forms a narrow "V" with the mainland that faces the prevailing northeast tradewinds, this channel is normally wave-swept and treacherous to cross, and this fortunate geography forms an effective barrier to introduced mammals common on Maui. There are no sandy beaches on the island, and soil is entirely restricted to slopes above about 10 m, resulting in only about one-fifth the island having vegetation.

ACCESS: There is no safe anchorage or boat access. The island is best approached by swimming, either from a boat offshore, or along the northwest coast from the leeward (west) side of Hakuhe'e Point. The best landing site is near the junction of the northern peninsula. The coast here forms an open bay that is usually leeward and protected from the tradewinds. Swimmers could land on the southeast coast with caution, but surge, surf, and windchop are greater, and transporting gear is difficult. However, since Moke'ehia is a State Seabird Sanctuary, camping and many other activities are prohibited except by permit.

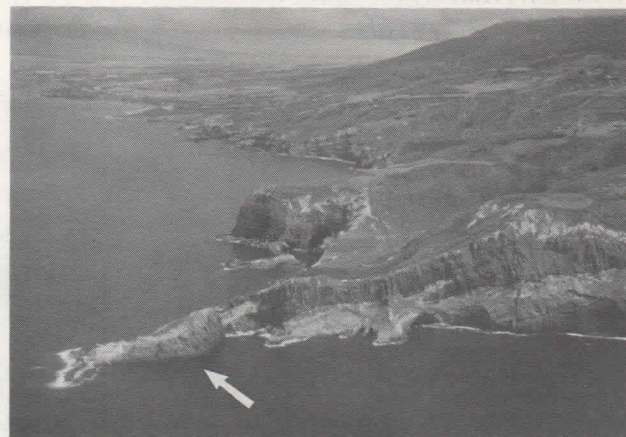


Figure 1. An aerial view of Moke'ehia (arrow), looking southeast along West Maui's northeastern shore.

Photo by C. B. Kepler

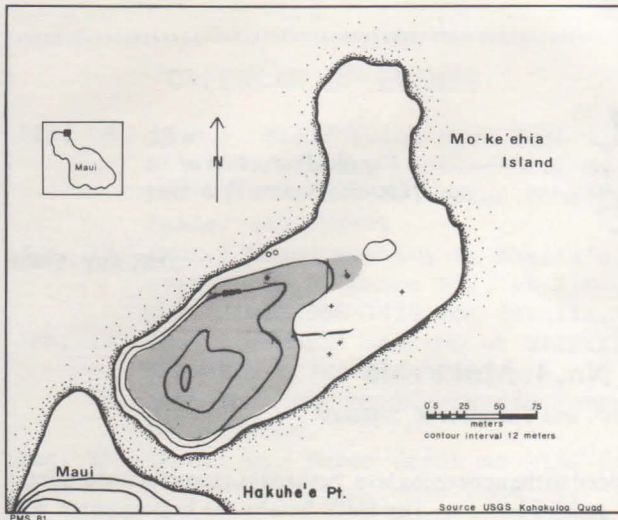


Figure 2. Moke'ehia, Maui. The main Wedge-tailed Shearwater colony lies within the stippled area. Active Bulwer's Petrel nests are represented by crosses, and the Black Noddy roosting area is shown by open circles,

VEGETATION: We found 16 species of plants on the island; 9 (56%) were native (Table 1). Vegetation is established primarily above 30 m elevation, where *Chenopodium oahuense*, *Lantana camara*, and *Leucaena glauca* dominate on the more compacted soils less exposed to salt spray. Halophytes such as *Scaevola* spp., *Sesuvium portulacastrum*, and the introduced *Atriplex semibaccata* are found at lower elevations.

Of particular interest was the occurrence of the very rare *Scaevola coriacea*, once a widespread coastal plant currently thought to be restricted to several lithified sand dunes in the Waihee-Waiehu region of Maui. On Moke'ehia we found 15 plants on sandy, powdery, or rocky substrates. These plants covered about 12 m². They appear undisturbed by nesting seabirds; in fact, several intertwining plants lay right above and around two Wedge-tailed Shearwater burrows.

ORNITHOLOGICAL HISTORY: There is no previous published information on the island.

PRESENT SURVEY: A dawn seawatch from Ho'okipa Park, 18 km to the east of Moke'ehia, on 12 June 1981, revealed several hundred Wedge-tailed Shearwaters flying in an easterly direction about 1 km offshore, leading us to suspect the presence of a substantial colony to the west. A preliminary investigation of Moke'ehia, a potential breeding site, from Hakuhe'e Point (see Figure 3) on 19 June indicated the presence of a shearwater colony, and we surveyed the island from 13:00 on 18 July to 08:00 on 19 July, 1981. We briefly stopped on the island from 11:00 to 11:30 on 25 March 1982.

BREEDING SEABIRDS AND THEIR STATUS:

Wedge-tailed Shearwater (*Puffinus pacificus*). This bird nests abundantly in all areas with soil (Figures 2 & 4). Although most pairs nested within deep burrows, some were found in rock crevices, collapsed burrows, depressions under cliff overhangs, or beneath vegetation. Independent counts by each observer on 18 July produced estimates of 1529, 1475, and 1360 burrows (\bar{x} = 1454). We examined 101 randomly selected earthen burrows; 28 were empty and 73 were occupied, for a total estimated population of 1060 breeding pairs. All occupied nests contained eggs, suggesting breeding in synchrony with other Hawaiian colonies (Richardson 1957).

Available habitat on Moke'ehia is saturated with burrows (Figure 4). Potential breeding birds unable to nest on Moke'ehia or nearby islands attempt to nest on Hakuhe'e Point. In July we found three nests in this headland that had been raided by predators; two were under boulders on the grassy slopes, and one was in a natural crevice on the cliff top. We also found the carcasses or wings of six shearwaters. Predators include cats, dogs and mongooses (*Herpestes auropunctatus*). Katino Te'ebaki saw a mongoose at the water's edge, and the authors found cat scats containing feathers on the headland. Byrd and Boynton (1979) found that dogs were the most serious threat to shearwater nests on Kauai. It is unlikely that shearwaters nest successfully on any area of mainland Maui accessible to predators.

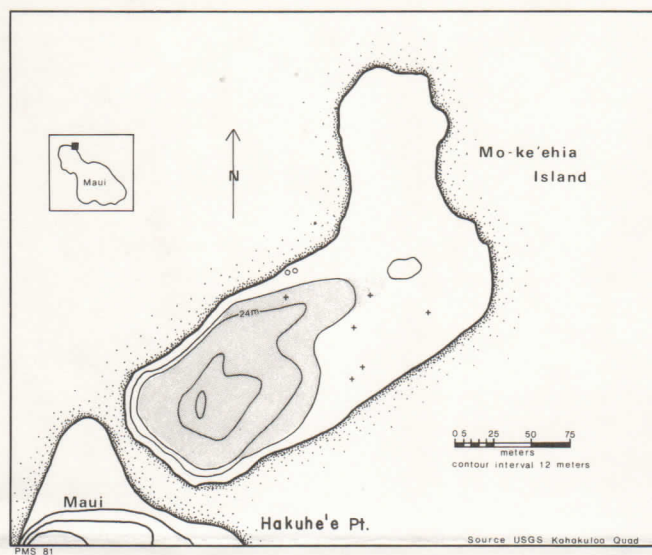
TABLE 1. Plants of Moke'ehia Island, Maui.

SPECIES	COMMON NAME	RELATIVE ABUNDANCE*	STATUS†
<i>Digitaria adscendens</i>	Henry's crabgrass	U	X
<i>Eleusine indica</i>	goosegrass	U	X
<i>Atriplex semibaccata</i>	Australian salt bush	A	X
<i>Chenopodium oahuense</i>	'aweoweo	A	E
<i>Sesuvium portulacastrum</i>	'akulikuli	A	I
<i>Portulaca oleracea</i>	common purslane	C	X
<i>Osteomeles anthyllidifolia</i>	'ulei	O	E
<i>Leucaena glauca</i>	haole koa	C	X
<i>Euphorbia celastroides</i>	'akoko	U	E
<i>Sida fallax</i>	'ilima	U	I
<i>Lantana camara</i>	lantana	C	X
<i>Lycium sandwicense</i>	'ohelo kai	C	I
<i>Scaevola coriacea</i>	naupaka, false jadetree	O	E
<i>Scaevola taccada</i>	beach naupaka	O	I
<i>Heliotropium curassavicum</i>	seaside heliotrope, nena	U	I
<i>Sonchus oleraceus</i>	sow thistle	R	X

* A=abundant, C=common, U=uncommon, O=occasional, R=rare

† E=endemic, I=indigenous, X=introduced, in Hawaii.

ERRATUM



The map, marked Fig. 2 on page 72 of the January 1984 issue (Vol. 44, No. 7), should have appeared without the extra line and bracket in the center of the island. This map could be cut out and glued over the incorrect map, if desired.



Figure 3. Moke'ehia and adjacent Hakuhe'e Pt., s seen from 195 m elevation on cliffs to the southwest. Hakuhe'e Pt. reaches an elevation of 82 m, affording an excellent view of the island. Photo by A. K. Kepler.

Bulwer's Petrel (*Bulweria bulwerii*). This bird nests in suitable crevices and rock piles, probably throughout the island. We found 13 nests or nest sites with calling adults. Birds were easily located after dark by listening for their response to imitations of their calls or by searching with a flashlight in scree or cracks with small openings. All nests were in unmodified natural cavities. At least four were located in soilless areas exposed to stormsurf and below 10 m elevation. This small petrel is excluded from any cavity large enough to admit the Wedge-tailed Shearwaters. We were able to examine five nests: four contained downy chicks estimated at less than one week old and one contained an egg.

Our estimate of the breeding population ranges from 50 to 150 pairs. This is, at best, a guess, given the large number of inaccessible cliff faces that could contain suitable cavities. We heard several adults calling in flight after dusk, and an observer on shore (Katino Te'ebaki) saw several additional birds circling the high southern cliffs.

OTHER SEABIRDS RECORDED:

White-tailed Tropicbird (*Phaethon lepturus*). At least one bird flew by the island each day in July, but none landed or circled the cliffs. Local residents suggest that they may breed on the island.

Great Frigatebird (*Fregata minor*). One or two juveniles and adult females flew overhead daily in July, generally well above Hakuhe'e Point. None approached the island, and we saw no evidence of roost or nest sites.

Black Noddy (*Anous minutus*). This species probably breeds on the island. Noddies congregated on the northwest cliffs within 10 to 15 m of the sea. The cliffs were 20 to 25 m high at this point. We counted a maximum of 26 birds at 07:00 on 19 July. We found no nests, although the flock contained one flying juvenile. Innumerable potential nest sites occur on the island's steep cliffs.

OTHER BIRDS:

Lesser Golden-Plover (*Pluvialis dominica*). This species is a regular winter visitor. We found one mummified carcass on 18 July 1981. On 25 March 1982 we found two wing sets that suggested Barn Owl (*Tyto alba*) predation (see Byrd & Telfer 1980).

Ruddy Turnstone (*Arenaria interpres*). One flew over the northern peninsula on 18 July. They undoubtedly use the island regularly in winter.

Wandering Tattler (*Heteroscelus incanus*). One called from the northwest shoreline on 19 July; birds may use the low coastal areas throughout the year.

Barred Dove (*Geopelia striata*). One was seen feeding on barren ground in the main shearwater colony near the summit of the island on 19 July.

Common Myna (*Acridotheres tristis*). Two foraged in the colony on 19 July, and again on 25 March 1982. On 19 June we saw several mynas flying between the island and Hakuhe'e Point. We found two shearwater eggs that had been pecked open in front of burrows, suggesting that mynas may prey on shearwater eggs on Moke'ehia as they do on Kilauea Point, Kauai (Byrd 1979).

OTHER VERTEBRATES: We saw one skink, but could not collect it for identification. It appeared to be a snake-eyed skink (*Cryptoblepharus boutoni*), which is found on other offshore islands in Maui County (Kepler and Kepler 1980).

We found no sign of mammals. Food left out at camp was untouched, and we caught nothing in one rat trap set overnight. The island appears to be free of mammals.



Figure 4. An aerial view of the main Wedge-tailed Shearwater colony on Moke'ehia's southeast slopes. Photo by C. B. Kepler.

FACTORS AFFECTING THE ISLAND: Moke'ehia is relatively undisturbed. Fishermen visit it infrequently. We noted very little evidence of human activity (only one caved-in burrow, no dead adults, and occupied burrows in areas accessible to the landing site). Mammals that prey on shearwaters on Maui have apparently been unable to reach the island. Even if they crossed the narrow channel in calm weather, they would find smooth cliffs 45 m high and would probably be unable to climb onto the island.

ACKNOWLEDGEMENTS

We thank Bill Han for his help on the island, Katino Te'ebaki and Jitsumi Kunioki for their logistic support, Derrall Herbst for confirming our plant identifications, Pam Simons for providing the map of the island, and Tom Hauptman of Sunair Copter, Inc., for providing an aerial view of West Maui's offshore islands. Buddy Nobriga provided access to the island across his land, for which we are most grateful. We thank V. Byrd, R. Shallenberger, J. M. Scott, and R. Walker for helpful comments on the manuscript.

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¹Cameron B. and Angela K. Kepler
Patuxent Wildlife Research Center
Maui Field Station
248 Kaweo Place
Kula, Hawaii 96790

²Theodore R. Simons
Wildlife Science Group
College of Forest Resources
University of Washington
Seattle, Washington 98195

OBSERVATIONS OF THE COMMON MYNA

by Jean Bancroft

During my mid-winter vacations in Hawaii in recent years, I have found the Common Myna (*Acridotheres tristis*) and its habits very interesting.

The Common Myna is native to Ceylon, India, West Pakistan, and Nepal, and was "...introduced to Hawaii in 1865 to help keep down various insect pests" (Munro, 1944).

This bird has been called "...comical, clownish, charming, impertinent and intelligent" (Berger, 1972). I noticed that it is gregarious, and it has been labelled aggressive (Hawaii Audubon Society, 1975), but I did not find it to be so. For example, on numerous occasions I sat on a bench in the Honolulu Zoo park area and scattered seeds and pieces of bread for the large numbers of birds which hovered around, namely Zebra Doves (*Geopelia striata*), white Rock Doves (*Columba livia*), Spotted Doves (*Streptopelia chinensis*), and House Sparrows (*Passer domesticus*). Several mynas came running (they do not hop), but, when they made an attempt to come closer, they were chased away quite readily by the aforementioned birds. It was very comical to watch the birds' antics; one morning I noticed a myna jumping round and round and chasing after a large piece of green plastic which was being blown about by the wind.

On many occasions I have watched Common Mynas carry nesting material to Queen Palms (*Arecastrum romanzoffianum*) and Royal Palms (*Roystonea regia*). However, the most interesting nest I have observed was in a cavity caused by a deformity in a twinned African Tulip Tree (*Spathodea campanulata*) in the park area of the Honolulu Zoo.

I first discovered it in February, 1980, and upon returning to this particular spot on 7 February, 1981, I found a nest in the same cavity, approximately 10 feet from the ground. Grassy fibers and pieces of wood shavings hung down from the nest. Two white feathers stood upright in the nest and, at the opening, there was a piece of clear plastic.

Three days later I noticed a bird fly into this nest. Only a little of the clear plastic was visible, but the bird commenced to move and became enveloped in the plastic. When it emerged it had a piece of white paper in its bill which covered its face. It went down into the nesting cavity and, a little later, I noticed a small piece of red plastic showing, as well as two large brown feathers at the back of the hollow. During the next few days I observed a thin piece of bright

yellow plastic in the nest, and two pieces of thin organic fiber, about a yard long, hung down from the untidy bundle of grassy fibers in the cavity.

The Common Myna is reported to lay two to five eggs which are incubated by both parents for 13 days (Berger, 1972). On 18 February a bird was sitting, and only part of its head and beak were visible. My observations continued in the mornings during the entire nesting period. Since the sexes are similar, I could not confirm that both parents helped incubate the eggs.

On 5 March, I noticed that both parents took turns feeding the young. They made numerous trips to an adjoining Benjamin Banyan tree (*Ficus Benjamina*) to obtain orange berries to feed the nestlings (this banyan tree was "alive" with birds feasting on its fruit). I noticed that one adult put its beak into the open mouth of one of the nestlings three times and then flew off again. It wasn't until 12 March that I ascertained there were three nestlings.

On 14 March, an adult came to feed bread to three hungry growing nestlings; it also carried away droppings. Two days later, however, when both parents fed the young, I noticed there were only two; apparently, one had died.

I continued my observations every other day, and on 21 March two nearly-fledged young were sitting on the edge of the nesting cavity, flapping their wings. Two days later, the parents were continuing to bring food.

On 25 March, the nest was empty - the young had apparently fledged. I was unable to determine the exact length of the nestling period, but it reportedly "...varied from 29 to 35 days, which is a very long nestling period for passerine birds" (Berger, 1972).

As the upper branches of the large spreading Benjamin Banyan tree almost touched those of the African Tulip tree, I presumed that the newly-fledged young and their parents had joined numerous other Mynas to feast on the fruit of this banyan.

What a joy it was to hear the cacophony produced by the many varied calls coming from the Benjamin Banyan, which gave shelter and food to so many of Nature's feathered friends!

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306-200 Tuxedo Ave.
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OCTOBER FIELD TRIP REPORT:

JAMES CAMPBELL NWR

At 9:30 in the morning on 9 October, about 28 people gathered at the parking lot of the Polynesian Cultural Center where we met Phil Bruner and adjourned to the Museum of Natural History at B.Y.U. There, for approximately an hour, Phil shared with us the museum's excellent collection of avian study skins. Among other things, we saw a hybrid albatross and a dollarbird.

From there we drove to the Kii Unit of the James Campbell National Wildlife Refuge. The refuge has recently negotiated with James Campbell Estate to expand the refuge approximately 10 acres, by enlarging pond D, and adding another pond. A new entrance and parking area will also be added. The refuge has also begun plans to start educational tours for schools as well as other groups that would enjoy the experience. In order to help with these plans, this refuge is targeted by the Hawaii Audubon Society as part of the "Adopt a Refuge" program.

After parking next to the nearby sewage treatment plant, we started walking along the dike behind pond C. Almost immediately we saw adult and immature Hawaiian Stilts. Rob Shallenberger, Refuge Manager, who graciously led the group, stated that there were several four-chick nests this year, and that 40% of the stilts seen during the fall count had been young, making this a very good breeding year. In pond C there were also Hawaiian Coots, Lesser Golden-Plovers, and several types of ducks, including Koloa, Pintail, and, after flushing up several small flocks, Northern Shoveler and American Wigeon. Farther along the dike a Hawaiian Gallinule (Common Moorhen) was spotted. After this dike we turned and walked down the one separating ponds A and B. In pond A we saw Hawaiian Stilts, Hawaiian Coots, Black-crowned Night-Herons, Cattle Egrets, and ducks, including one Mallard, as well as the before-mentioned Koloa and Pintails. In pond B, more ducks and Night-Herons were seen, as well as a few stilts and shorebirds. After this path, we turned down the

dike running between pond A and the refuge boundary. Along this, we saw Lesser Golden-Plovers, Wandering Tattlers, a Lesser Yellow-legs, Sanderlings, Ruddy Turnstones, a Pectoral Sandpiper, coots, stilts, and ducks. There were cattle across the fence; also, across the fence we saw the scars of sand mining on one of the dunes. After traveling this path, we left the refuge and went out to the beach to watch for seabirds. Across a small stream, some members of the Sierra Club were taking a hike. No birds were seen and we soon returned, this time hiking down the strip of land between ponds C and D. In pond D we saw Sanderlings, Ruddy Turnstones, a Semipalmated Plover, a Semipalmated Sandpiper, and a Wilson Phalarope. Also seen were the usual urban birds and a lone frigatebird flying closely overhead. From there, we returned to our cars and the group disbanded.

Paul and Janice Sweet

ENDANGERED SPECIES BULLETIN

The *Endangered Species Technical Bulletin* is now available by paid subscription to persons not eligible to receive this publication regularly without charge. In partnership with the World Wildlife Fund-U.S., the Wildland Management Center at the University of Michigan's School of Natural Resources will be reprinting and distributing the BULLETIN (at cost) each month, along with a clearly distinguishable insert summarizing their activities. For each subscription of 12 monthly issues, send \$12.00 by check or money order (payable to the University of Michigan) to Endangered Species Technical Bulletin, Wildland Management Center, School of Natural Resources, University of Michigan, Ann Arbor, Michigan 48109.

Due to budgetary constraints, the Fish and Wildlife Service has to limit its free distribution of the BULLETIN to Federal employees and official contacts of the Endangered Species Program. Those who have already been receiving the BULLETIN will continue to do so at no charge.

Reprinted from the Endangered Species Technical Bulletin

JANUARY PROGRAM: MICRONESIAN FOREST BIRDS

The guest speaker for the Monday 16 January general meeting will be John Engbring. John works as an ornithologist for the U.S. Fish and Wildlife Service, based in Honolulu. He has done forest bird surveys throughout Micronesia. Appropriately, John's program is entitled *The 1983 Micronesia Forest Bird Survey*, which will feature the unusual species of Ponape and Kosrae in the E. Caroline Islands.

The meeting will begin at 7:30 pm at the Waikiki-Kapahulu Library at 400 Kapahulu Ave. next to the Ala Wai Canal. The public is welcome to attend!

PLEASE NOTE THAT THE JANUARY GENERAL MEETING PLACE (THE WAIKIKI-KAPAHULU LIBRARY) IS NOT THE USUAL MEETING PLACE, SO DON'T FORGET!

JANUARY FIELD TRIP: NORTH HALAWA VALLEY

The Sunday, 8 January field trip will explore North Halawa Valley on Oahu. The walk will mainly feature non-native birds, but there is the possibility of glimpsing a few native birds or unusual introduced species such as the Gray Swiftlet. Take advantage of this chance to see Halawa, since it is the site of the proposed H-3 freeway.

The hike crosses Halawa Stream several times, so wear appropriate footwear. It is also recommended that participants carry some water, lunch, raingear, and a hat. Of course, don't forget your binoculars! The gathering place for this field trip is, as usual, on Punchbowl St., Honolulu, next to the Hawaii State Library. Be there by 7:30 a.m.! Call the leader, Peter Donaldson at 456-5662 for more information.

LEARN ABOUT GALAPAGOS WILDLIFE

At 7:30 p.m. on 30 January (Monday) the Hawaii Audubon Society and the Botanical Society will jointly host a talk by the well-known finch man, Dr. Peter Grant, of the Univ. of Michigan. His talk is entitled *Wildlife of the Galapagos*. The presentation will take place in Rm. 11 of St. John Hall at the Univ. of Hawaii, Manoa, in Honolulu. For more information, call Sheila Conant at 948-8241.

PAY YOUR 1984 DUES

1984 dues for those who are only local Hawaii Audubon Society members should be paid this month, since all local memberships expired on 31 December, 1983.

Dues for 1984 are \$6.00 for the regular memberships (see below on this page for other categories). Dues may be mailed to Hawaii Audubon Society, P.O. Box 22832, Honolulu, Hawaii 96822. Make the check payable to "Hawaii Audubon Society".

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The February issue of the 'Elepaio will be pasted-up 21 January (Sat.) at 1415 Victoria St., beginning at 12 noon. The entry phone is #198. Call Marie at 533-7530 after 5 pm or call Peter at 847-3511 ex. 156 during the day for more information. Everyone welcome to help!

CALENDAR OF EVENTS

- Jan. 8 (Sun.) Field trip. Meet 7:30 a.m. at State Library on Punchbowl St. for hike to Halawa. Peter Donaldson leader (456-5662)
- Jan. 9 (Mon.) Board meeting at Sheila's home, 3419 E. Manoa Rd., at 7:00 p.m. Call 988-7439 for details.
- Jan. 16 (Mon.) General meeting at WAIKIKI-KAPAHULU LIBRARY at 7:30 p.m. John Engbring on *Micronesia Forest Bird Survey*.
- Jan. 30 (Mon.) Dr. Peter Grant on *Wildlife of the Galapagos*. See page 76.

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HAWAII AUDUBON SOCIETY
P. O. Box 22832
HONOLULU, HAWAII 96822

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