'ELEPAIO

Journal of the Hawaii Audubon Society

VOLUME 46, NUMBER 16



For the Protection of Hawaii's Native Wildlife

OCTOBER 1986

White Terns Breeding on Oahu, Hawaii

by Dorothy H. Miles

A small but growing population of White Terns (*Gygis alba*) on Oahu is competing for nesting trees with several species of introduced land birds and escaped cage birds. Nevertheless, this delicate native seabird appears to be adapting well to an urban environment. White Terns generally breed on remote atolls and islands in the tropical and subtropical areas of the Pacific, Atlantic and Indian Oceans. Prior to 1961, when a pair with an egg was seen at Koko Head (Ord 1961), they were not known to nest on any of the main Hawaiian Islands (Munro 1960).

Precise censuses of nesting White Terns on Oahu have not been conducted (Berger 1981). Populations of this species are difficult to estimate due to a protracted breeding season and the location of eggs and chicks: no nests are built and a single egg is laid on a bare branch or on a small fork in a tree.

Harrison et al. (1984) estimated 50–100 pairs on the main Hawaiian Islands. The '*Elepaio* has published periodic reports indicating that during the past two decades the nesting range has extended along the South shore of Oahu into the civic center of Honolulu. The State of Hawaii lists the White Tern as an endangered species on Oahu but not on the Northwestern Hawaiian Islands (HWHI) where current population trends are probably stable (Harrison et al. 1984). It is not listed as endangered by the U.S. Fish and Wildlife Service.

STUDY AREA AND METHODS

From 1976 to 1984 I studied White Terns in Kapiolani Park, Oahu. Breeding was first reported there in October, 1970 (Berger 1981). This 68 ha urban park lies parallel with the shoreline for about 1.5 km between Diamond Head Crater and Waikiki. It has a variety of introduced trees from Asia, Africa and Australia. Breeding areas were either isolated trees where single pairs nested or groups of trees where two to eight pairs nested. Nest sites were from 60–730 m from the shoreline. Most were on or near heavily trafficked roads and human activity.

Observation periods ranged from weekly checks of all nesting pairs to daily observations of behavior for up to 8.5 consecutive hours. Periodic night counts were made of birds sleeping on their perches to help determine individual identities and the population of an area. A bird was usually identified by its individual perch, or by slight differences in appearance or behavior, whether banded or not. Photographs helped to confirm identification when needed. I recorded the dates and/or ages at pairing, courting, mating, egglaying and hatching and the ages of offspring at first flight, first fishing, and at independence and emigration from the natal area.

RESULTS

Of 14 species of trees used for breeding, the banyans were most commonly used. By 1983, 15 (46%) of 32 pairs were nesting in 11 banyans (*Ficus benghalensis*) including 6 huge old trees. The ironwood (*Casuarina equisetifolia*) was used by 6 (18%) pairs and the Kiawe (*Prosopis pallida*) by 3 (9%) pairs. In 1984 I monitored 28 pairs, 19 pairs in the same nesting trees from 2 to 7 years and 9 new pairs.

Nests were from 2.7 to 18 m above the ground. Diameter of nesting limb or fork was from 5.1 cm to 15.2 cm. Nest sites were a minimum of 15.2 m apart. On Midway, Howell (1978) found the usual minimum distance between nests was 1 m or as close as 0.5 m if a branch or other object screened the birds from one another. He noted that closer proximity leads to violent fights that make nesting success improbable.

The number of nests monitored per year increased from one in 1976 to 28 in 1984. Of 56 total nests monitored 14 (21%) were abandoned, some due to disturbance by pigeons or other birds. Three pairs lost their nesting limbs due to tree trimming and two to hurricane damage. Two pairs changed nest sites after losing an egg or a chick; another probably moved because of its unusually windy location; others moved for unknown reasons.



Both parents bring the chick small fish thoughout the daylight hours.

Photo by Dorothy H. Miles



Large trees, such as these banyans, provide nesting habitat for White Terns in urban Honolulu, especially Kapiolani Park. Photo by Dorothy H. Miles

Dorward (1963) and Ashmole (1968) found that pairs bred annually, reared one chick, then left the area. Dorward found that when most pairs returned the following year, they returned with the same partner and laid on the same nest site. Unlike the annual breeding pattern found in other areas, about 25% of the pairs of Oahu White Terns bred at less than annual intervals (4 to 7 months) and reared two or three offspring during a year. Due to parental duties, some of these pairs did not leave the breeding area.

Most eggs on Oahu hatched after 35 days incubation, as Howell (1978) found on Midway. Three eggs that I monitored failed to hatch but were incubated continuously for 126 days (1978), 115 days (1982) and 180 days (1984), then abandoned. This last egg, still in its cuplike nest in a Kukui tree when the pair returned in 1985, was removed with great difficulty and determination by the pair before they could lay again.

I documented eggs laid in every month of the year, but most were from February to June with a major peak in March. Reports from studies made in other areas appear to indicate that most eggs are laid from April to June in the NWHI (Fefer et al. 1984); from April to August on Christmas Island, Central Pacific (Schreiber and Ashmole 1968); and from December to March on Ascension Island (Dorward 1963).

Of 120 eggs that I monitored (1976–1984) 106 (88%) hatched. Comparable long-term hatching data in this species are not available. Short-term studies in other areas indicate the following hatching success: French Frigate Shoals, of 47 eggs laid on a variety of substrates 27 (57%) hatched (Rauzon and Kenyon 1984); on Ascension Island of 110 eggs laid 51 (46%) hatched (Dorward 1963).

Breeding success, from hatching to fledging, for one breeding period on Ascension Island was 67% (Dorward 1963). On Oahu (1984) 1 found that breeding success, from hatching to an independent bird, was 80%.

In 1976 I monitored one pair and their chick. By 1979 I was monitoring five pairs in four nesting areas. One of these pairs laid again after rearing a chick and successfully reared a second chick. The population continued to increase each year and by 1983, 12 of 32 pairs had produced more than one chick per year. In 1984 I monitored 28 pairs in 16 areas; eight pairs reared more than one chick in a single year. Two of the eight pairs reared three chicks each during the year. This was possible because both pairs hatched chicks in December 1983 which were reared to April 1984. Second chicks were hatched in May by both pairs. Third chicks were hatched in August by one pair and in October by the other pair. Both pairs laid again after rearing three chicks each: one in December 1984, the other in January 1985. This unusual breeding pattern has been observed in seven of the 12 pairs found to produce more than one offspring during a year.

From 1976–1984, 91 (85%) of 106 chicks survived to become potential breeders. The population increase in a nesting area may be attributed to offspring that remained to breed in their parents' tree or breeding territory, to offspring that began breeding at 16 months to two years of age, and to pairs that reared more than one chick during a year, rather than to an influx of new terns of other areas.

In 1983 there was a marked increase in pairs that lost eggs or chicks. Nine (39%) of 23 pairs lost eggs or chicks compared with two (12%) of 16 pairs in 1982. Between June 1976 and September 1984, of 120 eggs laid, 14 (11%) were lost and of 106 chicks that hatched, 15 (15%) were lost. Most of the losses occurred in nesting trees where introduced birds harassed or attacked White Terns, including an incubating tern and young chick. Some of these introduced land birds in the area are Common Mynas (*Acridotheres tristis*), Redvented bulbuls (*Pycnonotus cafer*), Rock Doves (*Columba livia*), and Red-lored Amazon Parrots (*Amazona autumnalis*). Cats have killed White Tern chicks that fell from their nest limbs. Introduced Common Mynas, cats, dogs, rats and mongooses (*Herpestes auropunctatus*) threaten successful seabird breeding elsewhere (Harrison et al. 1984). All of these species are found on Oahu.

Dorward (1963) noted that when White Terns fight it is generally with the bill. He said that Ashmole (1962:236) describes a White Tern seizing the bill of a Black Noddy (*Anous minutus*) and pulling it off the ledge, and that the bill may therefore have an attack-releasing stimulus. I have seen this behavior many times in White Tern adults that attack chicks or fledglings of their own species. I have also seen many attacks by adult White Terns on other adults that had intruded into their nesting area. During one attack I saw blood on the plummage of the intruding tern. I found no evidence of fatal injury until 1981.



Adapting to an urban environment.

Photo by Dorothy H. Miles



The Honolulu Fire Department assisted with banding of a fiveweek old chick in an Ironwood.

Photo by Dorothy H. Miles

On 15 July 1981 I found an adult White Tern carcass on the ground below the nest of a pair whose young chick sat alone most of the time. It had a small puncture wound in the breast. On 5 May 1982 I again found another adult White Tern carcass on the ground under the nest of a young chick. It also had a small puncture wound. The necropsy revealed this bird was male. The cause of the injuries of these two birds was not determined, but BB or pellet gun shots were suggested as possibilities. On 29 June 1982 I found an injured fledgling on the ground near its nest tree. It had a puncture wound and a broken wing. The pathologist said it appeared to have been hit by a missile of some kind. Despite medical treatment it died the next day. Pathology reports mentioned in this paper were prepared by veterinarians in consultation with the Departments of Agriculture and Land and Natural Resources.

During the following three years (1983 to 1985) I observed repeated attacks by a pair of White Tern intruders on three different chicks, on an incubating parent, and on other adult White Terns that had been nesting in the same area since 1978. The intruding pair was apparently attempting to usurp a coveted nesting area. I watched repeated episodes where an adult jabbed a chick with its long, pointed bill, which once resulted in a broken wing; or grasped its bill and twisted it until the struggling chick fell to the ground (Miles 1985). Such attacks were the first evidence I had that White Terns could cause injury and possibly death to members of their own species.

DISCUSSION

White Terns are low density breeders and on Oahu do not compete for nesting space with other seabirds. They breed among potential predators such as some land birds, cats, and possibly rats. According to Grant (1982a), dense rat populations on Eastern Island (NWHI) probably account for the rarity of nesting White Terns and the absence of Black Noddy nests. Common Mynas, introduced on Oahu in 1865 (Hawaii Audubon Society 1981) were recently introduced on Midway and attack White Tern chicks there (Grant 1982b). Red-vented Bulbuls were released on Oahu in 1965 (Hawaii Audubon Society 1981). I observed repeated attacks by both of these species on parents of young chicks that later vanished. The introduced Barn Owl (Tyto alba) may also be a potential predator (Berger 1981). It wice saw this species in White Tern nesting areas and found headless carcasses of two sparrows, a pigeon and barred dove. An introduced African owl is a serious predator of White Terns in the Seychelles Islands (C. Harrison pers. comm.). The burgeoning of pigeons should be controlled to help decrease losses of White Tern chicks.

Kapiolani Park is a good nesting area for White Terns because of the number and variety of trees, the arid climate and the diversity of seafood available in offshore waters (Harrison et al. 1983). An adverse note: the disappearance of available seafood in late 1985 caused three pairs to abandon an egg and two fledglings that were unable to fly due to starvation. One fell dead from its perch and the other I took to Honolulu Zoo where it was hand-fed along with two other White Terns.

The unusual breeding pattern of pairs that produced morthan one chick per year allowed observations of siblings behavior, inbreeding, and social behavior in extended family groups; in particular, this is true of one pair monitored for eight years on the same nest and their third generation offspring (Miles 1985). Their strong fixation on their nest site and their consistently vigorous defense of the nest against intruders was convincing evidence that I was observing the same individuals from year to year.

Perhaps the most significant results of this study are: 1) finding pairs that produced more than one offspring per year, and 2) observing hostile behavior that convinced me that the White Tern is capable of inflicting fatal injury on members of its own species.

Moynihan (1962) noted that the White Tern has fewer hostile behavior patterns than other larids, probably because they are less gregarious; and they do not usually attack their mates as often as do Brown Noddy males — a behavior I have never seen in White Terns on Oahu.



A pair incubated their infertile egg in this cup-like nest in a Kukui tree from February to August of 1984.

Photo by Dorothy H. Miles



Pigeons disturb many nests. This three day old chick fell, was handfed for a day, and then replaced. It survived to 12 weeks of age, but was killed by a Barn Owl between 27 August and 5 September 1986. Photo by Dorothy H. Miles



An older sibling attempting to brood a new chick is intensely alert before a parent returned and chased it away. Photo by Dorothy H. Miles

A four-week old chick (right) in defensive display (beak open) was attacked daily for two weeks and finally thrown to the ground by an adult intruder.

Photo by Dorothy H. Miles

The puzzle remains: what really killed the White Terns found with small puncture wounds? Was it pellet or BB guns or was it the White Tern's natural weapon — its long, sharply-pointed bill? My long-term observations convince me that two of these terns were intruders visiting young chicks and were attacked by the parents. The fledgling was probably attacked in flight while being chased by a male seeking a mate. The wounds on a female adult carcass I found on 12 March 1982 were entirely different from the others. They appeared to have been caused by a gun shot through the breast, as the necropsy report indicated.

ACKNOWLEDGMENTS

I am deeply grateful to the following agencies and individuals: Hawaii Division of Forestry and Wildlife, U.S. Fish and Wildlife, City and County of Honolulu Department of Parks and Recreation, Honolulu Zoo and Kapiolani Park Nursery Waikiki Fire Station Ladder 7, the University of Hawaii and B.P. Bishop Museum. For help in banding chicks, and replacement of fallen chicks, I thank Tim Burr, Margo Lengen, Peter Luscomb, Bob Miyashita, Marie Morin, Ralph Saito, Tim Sutterfield, Keo Tenjoma, and Ron Walker. For veterinary care Drs. Eric Ako and R.W. Steckelberg. For technical help and for advice on preparation of manuscripts, Lori Ackerman, Andrew J. Berger, Sheila Conant, Stewart Fefer, Carl Fieber, Barbara de Wolfe, Leonard Freed, Craig Harrison, C.J. Ralph, Marion Steinhauser, Ron Walker and G.C. Whittow. Volunteer helpers include Kay Ahearn, Vinona Honshell, Barbara Macaulay, Joan and Allen Morgan, Pat Purcell, Teruo and Kim Sasaki, Grace Seo and many others. Marie Morin deserves credit for the specimen of the White Tern on exhibit at Bishop Museum (adult male killed 5 May 1982).

LITERATURE CITED

- Ashmole, N.P. 1968. Breeding and molt in the White Tern (*Gygis alba*) on Christmas Island, Pacific Ocean. Condor 70: 35-55.
- Berger, A.J. 1981. Hawaiian Birdlife, 2nd ed. The University Press of Hawaii, Honolulu.
- Dorward, D.F. 1963. The Fairy Tern (*Gygis alba*) on Ascension Island. Ibis 103b: 365-378.
- Fefer, S.I., C.S. Harrison, M.B. Naughton and R.J. Shallenberger. 1984. Recent seabird research conducted in the Northwestern Hawaiian Islands. *In:* R.W. Grigg and K.Y. Tanoue (eds.). Proc. Symp. Resource Investigations in the NWHI, Univ. Hawaii Sea Grant Prog., Honolulu.
- Grant, G.S. 1982a. Wildlife on Midway Atoll during the winter and spring of 1980-1981. 'Elepaio 43:1-4.
- Grant, G.S. 1982b. Common Mynas attack Black Noddies and White Terns on Midway Atoll. 'Elepaio 42:97–98.
- Harrison, C.S., M.B. Naughton, and S.I. Fefer. 1984. The status and conservation of seabirds in the Hawaiian Archipelago and Johnson Atoll. *In:* J.P. Croxall, R.W. Schreiber and P. Evans (eds.). Status and Conservation of the World's Seabirds, ICBP Technical Publication No. 2.
- Harrison, C.S., T.S. Hida and M.P. Seki. 1983. Hawaiian seabird feeding ecology. Wildl. Monogr. 85.
- Hawaii Audubon Society. Hawaii's Birds. 1981. (R.J. Shallenberger ed.) Hawaii Audubon Society, Honolulu.

'Elepaio, Vol. 46(16)

- Howell, T. 1978. Ecology and reproductive biology in the White or Fairy Tern (*Gygis alba*). In: Ecology and reproductive behavior of the Gray Gull and of the Red-tailed Tropicbird and of the White Tern on Midway Island. Natl. Geogr. Soc. Res. Rep. Vol. 10:274–284.
- Miles, D.H. 1985. White Terns on Oahu produce siblings five months apart. Western Birds 16: 131-141.
- Moynihan, M.H. 1962. Hostile and sexual behavior patterns of South American and Pacific Laridae. Behaviour Suppl. 8.
- Munro, G.C. 1960. Birds of Hawaii. Charles E. Tuttle Co., Rutland Vermont and Tokyo, Japan.
- Ord, M.W. 1961. White Tern at Koko Head, Oahu. 'Elepaio 22:17-18.

Rauzon, M.J. and K.W. Kenyon. 1984. White Tern nest sites in altered habitat. 'Elepaio 44:79-80.

Schreiber, R.W. and N.P. Ashmole, 1970. Seabird breeding seasons on Christmas Island, Pacific Ocean. Ibis 112:363–394.

> 2957 Kalakaua Avenue Apt. 116 Honolulu, Hawaii 96815

WHO-O-O DUN IT?

Recently, the White Tern colony at Kapiolani Park has been visited by an unwelcome guest, a Barn Owl. This owl (we hope it is only one) is efficiently killing and consuming these terns, and from reports by Dorothy Miles, six adults have been preyed upon since 28 August 1986.

As you know, the White Terns nesting here in Honolulu are slowly increasing; however, the Barn Owl, if left alone, can make short work in reducing their numbers.

We are, therefore, interested in locating roosting sites of Barn Owls within the Diamond Head - Kaimuki area. If you know of such a site, please call Ralph Saito or Thane Pratt at the State Division of Forestry and Wildlife (548-2861) and provide the following information:

1. Your name and phone number.

2. Location of Barn Owl roosting site.

3. Date and time owl observed. Mahalo!

RECENT OBSERVATIONS JUNE - JULY 1986

This article is excerpted from Bob Pyle's record of bird observations for the Hawaiian Islands. Refer to future issues of <u>American</u> Birds for a full account.

ABBREVIATIONS - F.F.S.=French Frigate Shoals; H.=Hawaii Is.; K.=Kauai Is.; O.=Oahu Is.; E.S.F.P.=Endangered Species Facility at Pohakuloa, Hawaii I.; K.P.N.W.R.=Kilauea Pt. Nat. Wildlife Refuge, Kauai I.; H.R.B.P.F.= Hawaii Rare Bird Photograph File.

SEABIRDS - The 3 Laysan Albatross chicks from the nests at K.P.N.W.R. all fledged successfully in mid-July(DM). Hopefully, this will mark the beginning of a sustained successful breeding colony under Refuge protection. Nesting attempts in the Kilauea area over the past 10 years have been frustrated by dog depredations.

The 4 Laysan chicks moved from Pacific Missile Range at Barking Sands, K. to Sea Life Park, O. in April, and a fifth brought in May, all fledged successfully in mid-July(IK). This year, for the first time, about 15 adult Laysans were captured at locations around Oahu where they were not wanted and were brought to Sea Life Park. Two died; the others were pinioned for permanent exhibit in the Park's seabird sanctuary. The Animal Damage Control Section of U.S.Dept. of Agriculture is developing a plan for future years in which adult albatrosses captured on Oahu would be flown to the new colony at K.P.N.W.R. for release(TO).

A second sighting of a Dark-rumped (Hawaiian) Petrel was recorded again this year on Mauna Kea, H. when, on June 19, FD observed one flying at about 7000 ft. elevation above the E.S.F.P., the same location where a Hawaiian Petrel was seen April 20. This species formerly nested on Mauna Kea and may continue to do so.

Great Frigatebirds gathered in large flocks over E. Honolulu in the late afternoon of July 6(PF) and 7(SS) when 91 and 100+ were counted. They were headed northwest toward their evening roost at Moku Manu islet.

Early sightings of Least (or Little) Terns were recorded on June 4 at Pearl & Hermes Reef (TO fide KM) and another on June 5 on Oahu at Waiawa Unit, Pearl Harbor N.W.R. and also at Waipio(SB). The species usually arrives in Hawaii in mid-July or later. One seen at Laysan Is. for a week beginning July 10 (EB photo to H.R.B.P.F.) was on a more expected date. First recorded at Johnston Atoll in 1985, BLUE-GRAY NODDIES nested there this year: one pair of these terns fledged one young in July on North Is.(RS). Five hundred White Terns were banded on Johnston Atoll in July, from a total population estimated at 4-5000(RS).

SHOREBIRDS - RS collected a Black-bellied Plover at Johnston Atoll in July; the species is an unusual migrant to the central Pacific. A Red-necked Phalarope, a species rare in Hawaii, was observed at Laysan Is. from July 11 until Aug. 4 when the observer departed (EB - ph. to H.R.B.D.F.).

FRESHWATER BIRDS - For the past year a Cattle Egret with an injured wing has been marooned on Johnston Atoll, 1100 km. south of Hawaii, the nearest source for this straggler (fide RS).

GAMEBIRDS - Interesting gamebird sightings reported this season include 2 Erckel Francolins at Kolekole Pass, O. July 20(KF); a Japanese Quail heard calling adjacent to a cane field on Kawailoa Ridge, O. July 16(TP); and a Kalij Pheasant and a Ring-necked(Green) Pheasant seen at Kipuka Puaulu in Hawaii Volcanoes National Park, H. in mid-July(PB).

NIGHTJAR - The most astonishing of many unusual records reported from Tern Is., F.F.S. over the past year was of a CAPRIMULGID (species to be determined from close-up photos, RV). The bird most closely matches a Lesser Nighthawk, among N. American species, but a species of Eurasian nightjar has not yet been ruled out. First discovered on July 21, the bird was still there in mid-August.

NATIVE FOREST BIRDS - This year's breeding season for the captive Hawaiian Crows, or 'Alala, at E.S.F.P. benefited from the suspension of heavy ordnance firing by the U.S. Army at its training grounds adjoining the captive rearing facility. For the first time, all four pairs each built a nest, and the unmated female, Kuhio, also built one. Three nests were constructed on the ground, but these were destroyed by rain before eggs were laid. Ground nesting by 'Alala had not previously been known, within captivity or in the wild. In two other nests, clutches of two and one eggs were laid in May and June, but these did not develop beyond two days (FD).

A joint Army-Hawaii State project to move the captive rearing facility to new and better quarters at Olinda on Maui Is. was not completed before this year's breeding season as planned. If procedural questions are resolved, the move can be made before next year's breeding season. For the sake of the species, whose remaining numbers in the wild may be no more than the captive flock of nine, we certainly hope so.

An 'Elepaio, numerous 'Amakihi, and less common. 'Apapane were observed on Pauoa Ridge, O. July 19(TP). An 'Akiapola'au was heard singing June 16 near Puu Laau Cabin, H.(FD), where the species is only occasionally reported. No surveys of Hawaiian forest birds were undertaken on Kauai or Maui during late spring or summer this year (CKe) owing to cutbacks in U.S.F.& W.S. programs. ALIEN SONGBIRDS - Red-billed Leiothrix continue to turn up in the Koolau Mts., O. One was heard singing on Kawailoa Ridge in the northern Koolaus on July 16, and 3 on Pauoa Ridge behind Honolulu July 19(TP).

Common Waxbills may now have expanded throughout Oahu. Recent sightings from farflung localities include: 3 in CKi's yard between Waialua and Haleiwa on June 20; 34 at Campbell Industrial Park and from 1 to 10 at Waianae, Dillingham Airstrip and Haleiwa during July(KF). Two Warbling Silverbills were reported in Maili, O. July 15(KF). Two adult Chestnut Mannikins and 4 possible juveniles were seen along the trail through native forest on Kawailoa Ridge, O. July 16 (TP). This species also was found in good numbers at Makakilo and Campbell Industrial Park, O. during July (KF). At Mililani High School in central Oahu, 7-9 Red Avadavats were feeding with a flock of 100+ Nutmeg Mannikins June 2(KF), and a few others were seen at Waialua settling ponds July 29(TP). Two Java Sparrows were seen at Haleiwa Aug. 1(KF). A much better understanding of the distribution of estrildid finches will be forthcoming upon completion of a survey of this group by KF.

CONTRIBUTORS - Ed Bean, Steve Berendzen, Phil Bruner, Fern Duvall, Karen Falkenmayer, Stewart Fefer, Peg Fraser, Ingrid Kang, Cameron Kepler, Carla Kishinami, Ken McDermond, Dan Moriarity, Tim Ohashi, Thane Pratt, Ralph Schreiber, Sigrid Southworth, Tom Telfer, Rick Vetter.

NO NA LEO 'OLE

NEW WILDLIFE RULES

The Hawaii Division of Forestry and Wildlife has released a revised Chapter 124, rules to manage and protect indigenous wildlife, endangered and threatened wildlife and plants, and introduced wild birds, effective August 28, 1986. In comments on the draft rules ('*Elepaio*, June 1986, pp. 137-138), the Society strongly opposed a proposed amendment that would allow the destruction of certain pestiferous wild birds without a permit of any kind. For public safety and for protection of indigenous and endangered wildlife, the Society recommended the retention of the permit process for the control of all noxious wildlife.

The Society's arguments apparently were persuasive, because the new rules require the issuance of permits or authorization by the

176

'Elepaio, Vol. 46(16)

Board of Land and Natural Resources or its authorized representative before the destruction of any wild birds or other wildlife can be carried out. Eighteen pages of the regulation are composed of informative "exhibits" or lists of indigenous wildlife of Hawaii in categories of reptiles, mollusks, birds and mammals and lists of species of endangered and threatened wildlife and plants in Hawaii. Of the endangered wildlife, 34 species and subspecies of birds are listed; 5 mammal species (Hawaiian Bat, Hawaiian Seal and three whale species); 2 sea turtle subspecies; all (i.e., 41) Achatinella species of Oahu tree snails; and 19 species and subspecies of plants. Finally there is a list of 36 introduced wild bird species, other than game birds, which have become established in Hawaii.

MAUNA KEA SIGHTSEEING TOURS

The Society presented 12 recommendations for conditions to a Conservation District Use Permit for commercial sightseeing tours to the summit of Mauna Kea to be conducted by Waipio Ohana Corporation at a public hearing held in Hilo on August 21, 1986 before the Board of Land and Natural Resources. Testimony focused on the need for tour operators to have an understanding of the remarkable high-elevation ecosystems that have evolved on Mauna Kea over less than half a million years, isolated from the continents and isolated from the environmental impacts of modern man. The tours could be spectacular wilderness experiences if the guides convey to visitors an appreciation of the native plant and animal communities that live year-round on the upper slopes and summit in a highly stressed environment that has daily extremes in temperature from high heat to below freezing.

The operators need to protect the Mauna Kea Ice Age Natural Area Reserve, Lake Waiau and the ancient Hawaiian adze quarries and shrines from degradation. Driving or walking off the road must be avoided because of destructive impacts to the fragile ecosystem from compaction of the ground surface.

William Mull, a past president of the Society, presented information about the Wekiu bug and other recently discovered native invertebrates that are residents of the summit, an ecosystem supported by wind-borne debris. He emphasized the need for protection and more scientific study of the alpine habitats.

The tours will be limited to one roundtrip a day in appropriate weather for not more than seven passengers. The Board members and tour operators appeared receptive to the suggestions presented to them.

> Mae E. Mull (Island of Hawaii Rep.)

MAKIKI ENVIRONMENTAL CENTER EXPANDING, CHANGES NAME

Did you know that the Makiki Environmental Education Center has changed its' name to the Hawaii Nature Center?!! Our organization has grown to the point where we are now able to focus our emphasis on educating all of O'ahu about the environment, and there are plans for expansion to the neighbor islands. We want our name to more closely reflect our mission of fostering awareness, appreciation, and understanding of the environment, and encouraging wise stewardship of the islands in the future. We also want you and your children to remember our name more easily so that you can tell your friends about us. We currently reach about 10,000 kids a year at our Makiki-Tantalus site. In the next few years we look forward to expanding our program to other sites. Grow with us! Soon all of Hawai'i's youth will have the opportunity to learn about our unique environment.

Aloha and mahalo to Faith Roelofs for five years of dedicated service to the Hawaii Nature Center. She helped create and develop the Center from its conception and carried it through its many growing pains. She has given her heart and soul to the Center. We wish her all our aloha for her future endeavors and look forward to her involvement in our education program after she has had some rest and relaxation!

The Hawai'i Nature Center has a new Executive Director. Tamar Chotzen will be running the Center. She is highly qualified, and we are pleased to have her aboard. She welcomes your visits to the Center and looks forward to meeting you.

> Hawaii Nature Center 2131 Makiki Hts. Drive Honolulu, HI 96822 942-0990

'Elepaio, Vol. 46(16)

NATURAL HISTORY WORKSHOP TO BE HELD AT HAWAII VOLCANOES NATIONAL PARK

A Hawai'i natural history workshop is planned in conjunction with the 1986 Audubon Christmas Bird Count on the Big Island, January 2 through 4 1987. The tentative schedule is as follows:

- Friday, Jan. 2 (day) bird and plant identification training field trips. (evening) - speakers on Hawaiian natural history.
- Saturday, Jan 3 (day) Christmas bird count, bird count compilations. (evening) - Get-together dinner, speaker. Sunday, Jan. 4 (day) - Field trip to rainforest and mesic forest (optional).

The Magma House at Hawai'i Volcanoes National Park will be available for lodging. The facility has two dorms, a large meeting room with fireplace, and a community kitchen. Limited airport pick-up in Hilo is planned, but renting of cars is encouraged. There will be a nominal registration fee. Those wishing to stay at the Magma House will also be charged a modest daily fee. For further information and registration forms, please call Larry Katahira at 967-7416 (home), 967-8133 (work), or Julie Williams at 968-8156 (home), 967-7396 (work), or Paul Higashino at 967-7262 (home), or write to one of the above in care of Box 774, Volcano, HI 96785. We would appreciate all registration requests by November 15, 1986.

OCTOBER FIELD TRIP

Sunday, October 5th James Campbell National Wildlife Refuge Leaders: Bruce and Robin Eilerts (941-5974)

The Sunday, October 5th field trip will be a visit to the James Campbell National Wildlife Refuge in Kahuku. This will be a good opportunity to observe migratory shorebirds and waterfowl along with native waterbirds and possibly some seabirds. Some vagrant landbirds spotted recently in the Kahuku area include an Osprey, a Canada Goose, and a Curlew Sandpiper! Participants should pack a lunch and bring binoculars (if available), a hat and sunscreen. Meet at 7:30 a.m. in front of the State Library on Punchbowl Street.

VOLUNTEERS NEEDED

Mailing volunteers. Members willing to volunteer only one Sunday afternoon a year each, helping with monthly '*Elepaio* mailing (sticking on preprinted labels, as well as sorting, counting, and bundling by zip code). Please telephone Alan Ziegler at 247-5318 day or evening to sign up. Many thanks!!

OCTOBER PROGRAM

Due to a breakdown in the air conditioning at the library our September program has been rescheduled for October 20. Dr. Rob Fleischer, of the Hawaiian Evolutionary Biology Program, University of Hawaii, will discuss some of his research on brood parasitic birds. Avian brood parasites are birds which lay their eggs in the nests of other species of birds. These hosts often raise the young parasites as though they were their own. Rob will show examples of this interesting behavior and present the results of his work on host choice by Brown-headed Cowbirds (on the plains of Kansas and in the Sierra Nevada of California) and by Giant Cowbirds (in the lowland forests of Panama). The meeting will be held at the McCully-Moiliili Library at 7:30 p.m.



October 1986

179

HAWAII AUDUBON SOCIETY

BOARD OF DIRECTORS

President	Phillip Bruner	293-3820
lst. V. P.	Andrew Engilis	848-4155
2nd. V. P.	Peter Luscomb	261-3645
Treasurer	Mary Engilis	
Rec. Secy.	Tim Ohashi	396-8061
Cor. Secy.	Michael Hall	293-3800
Directors	Allen Allison	848-4145
	David Boynton	335-5008
	Wayne Gagne	848-4166
	Mae Mull	967-7352
	Tim Sutterfield	737-5874

COMMITTEES

Adopt-a-	Phillip Bruner 293-3820
Refuge	Sheila Conant, Jim Krakowski,
	Robert Pyle
Conservation	Wayne Gagne 848-4166
	David Boynton, Mae Mull
Education	David Boynton 335-5008
	Suzan Harada, Steve Montgomery
Field Activ-	Andrew Engilis 848-4155
ities	Peter Donaldson, Suzan Harada,
	Carl McIntosh, Robert Pyle
Finance	Audrey Newman 732-7572
	Marie Morin, Michael Ord,
	Thane Pratt, Robert Pyle
Grants and	
Scholarshp	John Engbring 546-7530
	Allen Allison, Phillip Bruner,
	Robert Kinzie, Thane Pratt
Mail Distr.	Leilani Pyle 262-4046
Membership	Robert Pyle 262-4046
	Susan Schenck, George Campbell
Programs	Allen Allison 848-4145
	Lee Bauer, Peter Luscomb
Publicity	Darwin Bohnet 293-5647
	M. Engilis, S. Harada, C. McIntosh
Publications	Andrew Engilis 848-4155
	P. Bruner, S. Conant, R. Pyle
Sales	Martha McDaniel 235-6636

ISLAND REPRESENTATIVES

Kaua'i	Dr. David and	
	Winona Sears	822-3045
Maui	(vacant)	572-1499
Hawai'i	Mae Mull	967-7352

FREE ICE CREAM

Will again be served to those volunteers who help with the typing, proof-reading, or paste-up of next month's '*Elepaio* at Thane Pratt's house, 954 Spencer St. on Saturday, 25 October, at 1:00 PM. Phone 524-8464 for more information. Authors of articles, notices, etc. are reminded that these must be received by 15 October to be included in the November issue.

Many thanks to Sheila Conant, Bob Pyle, and Rob Fleischer for helping with the production of the October issue.

'ELEPAIO

Editors	Thane Pratt 524-8464
	Sheila Conant 948-8241
Production	Robert Fleischer, Marie Morin,
	Robert Pyle
Mailing	George Campbell, Susan Schenk,
	Alan Ziegler

(MANUSCRIPTS of articles and newsletter items may be sent to the Managing Editor at 954 Spencer St., Honolulu, HI 96822. Articles not subject to peer review MUST be received by the 15th of each month to be considered for publication in the next month's issue.

IF NOT A MEMBER, PLEASE JOIN US

JOINT MEMBERSHIP

(National and Hawaii Audubon Soci	leties)
Individual\$	30.00
Family	38.00
Sustaining	50.00
Supporting	100.00
Contributing	250.00
Donor	500.00
Life (single payment)	1500.00
Dual Life (single payment)	2000.00

Special rates for full-time students and Senior Citizens (65 years of age or older) are available. Please write for application form.

LOCAL MEMBERSHIP

(Hawaii Audubon Society only)	
Regular\$	6.00
Junior (18 and under)	3.00
Subscriber (non-Hawaii residents)	6.00
Life (payable in three equal annual	
installments)	150.00

All Local Memberships and Subscriptions are for a calendar year January through December.

Oct.	5	(Sun.)	Fie	eld t	rip	to J	. Campbell
		NWR.	See	page	178	for	details.

180 Octobe
CALENDAR OF EVENTS
Oct. 5 (Sun.) Field trip to J. Campbell NWR. See page 178 for details.
Oct. 6 (Mon.) Board Meeting at Bishop Mu-seum at 7:00 PM. Call Phil Bruner at work, 293-3820.
Oct. 20 (Mon.) General Meeting at McCully-Moiliili Library at 7:30 PM. See page 178 for program notice.
Oct. 25 (Sat.) '*Elepaio* paste-up at Thane Pratt's house (524-8464) at 1:00 PM.

Reprinting of material from the 'Elepaio

is permitted if credited to " 'Elepaio, the journal of the Hawaii Audubon Society."

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

FORWARDING AND RETURN POSTAGE GUARANTEED ADDRESS CORRECTION REQUESTED

TABLE OF CONTENTS

White	Terns	bree	ding	on	Oahu	1,	Haw	a11		
	Doroth	y H.	Miles	s					•••	 .171
Recen	t Obse:	rvati	ons.							 .175
No Na	Leo '	ole.	Mae	MILL						 .176

Non-Profit Organization U.S. POSTAGE PAID Honolulu, Hawaii Permit No. 1156



180