

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.

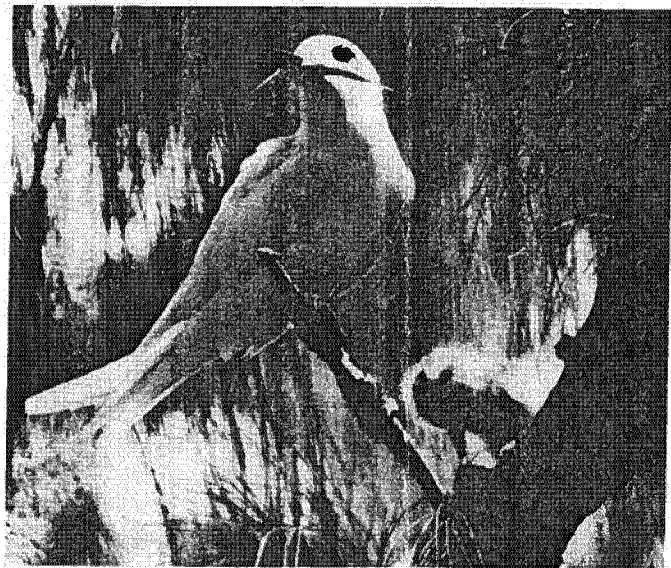
Observation periods ranged from weekly checks of all nesting pairs to daily observations of behavior for up to 8.5 consecutive hours. Periodic night counts were made of birds sleeping on their perches to help determine individual identities and the population of an area. A bird was usually identified 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, egg-laying 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.

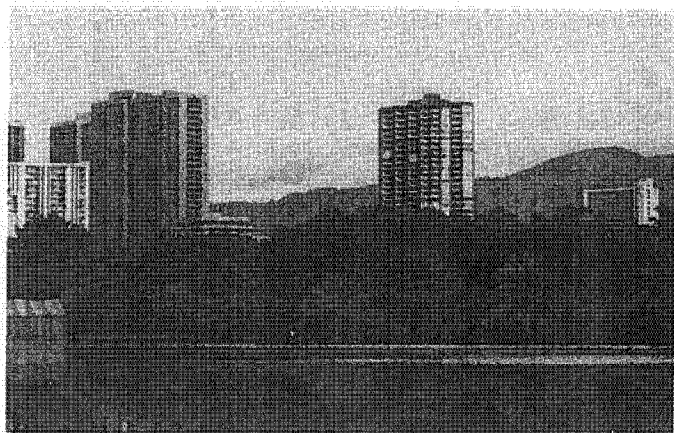
Nests were from 2.7 to 18 m above the ground. Diameter of nesting limb or fork was from 5.1 cm to 15.2 cm. Nest sites were a minimum of 15.2 m apart. On Midway, Howell (1978) found the usual minimum distance between nests was 1 m or as close as 0.5 m if a branch or other object screened the birds from 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 throughout 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) I found that breeding success, from hatching to an independent bird, was 80%.

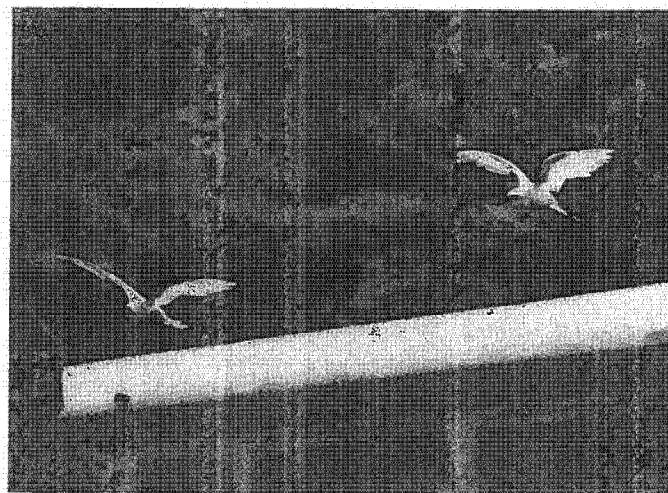
In 1976 I monitored one pair and their chick. By 1979 I was monitoring five pairs in four nesting areas. One of these pairs laid again after rearing a chick and successfully reared a second chick. The population continued to increase each year and by 1983, 12 of 32 pairs had produced more than one chick 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*), Red-vented bulbuls (*Pycnonotus cafer*), Rock Doves (*Columba livia*), and Red-ored 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 plumage 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 five-week 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 chicks 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 gunshots 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

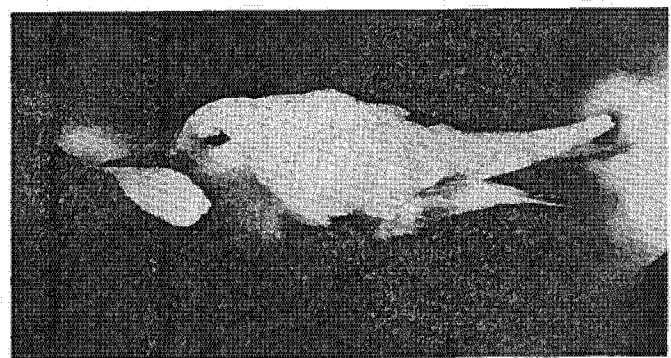
White Terns are low density breeders and on Oahu do not compete for nesting space with other seabirds. They breed among potential predators such as some land birds, cats, and possibly rats. According to Grant (1982a), dense rat populations on Eastern Island (NWHI) probably account for the rarity of nesting 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). I twice 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 more than 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 handled 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

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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 American 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 pinned 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 *vide* 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