



First Record of Nesting by Cattle Egrets on Maui from Observations Made During Birdstrike Control Operations

Tim J. Ohashi and Kevin K. Kimizuka

Cattle Egrets (*Bubulcus ibis*) were introduced to Hawaii in 1959 by the Hawaii State Board of Agriculture in an attempt to control the flies that pester cattle (Breese 1959). Since their introduction, they have become a very successful species in the islands, with greatly increased numbers and an expanded range (Paton *et al.* 1986). Their benefits to man and their effects on the Hawaiian environment are not entirely clear, but in particular situations, the Cattle Egret and man have come into direct conflict. The flocks of egrets that feed on airfields or roost next to our busy airports are a serious hazard to flying aircraft.

In 1959, 12 Cattle Egrets were released on Maui at the former Puunene Dairy site which is now the Kahului industrial area, across Hana Highway from Kanaha Pond (Breese 1959). This initial introduction apparently failed, and Cattle Egrets did not establish themselves on Maui until 1975, when about 40 egrets began to roost at Kanaha Pond (M. Ueoka pers. comm.). Over the years, the roosting population at Kanaha Pond increased. There were about 80 Cattle Egrets in 1980, 120 in 1982, and 407 in 1983. However, no nesting was observed during this period (M. Ueoka pers. comm.), and because of this, Paton *et al.* (1986) attributed the increase in the number of Cattle Egrets on Maui to interisland movements of birds.

EGRET ROOKERY DISCOVERED

During a population survey of Cattle Egrets at Kanaha Pond conducted on 30 June 1987, we discovered the egrets nesting. We believe this is the first such record for Maui.

We were making a count of departing Cattle Egrets from observation points east and west of roost trees located just outside the eastern boundary fence of the wildlife sanctuary. The count began with the first departing egret at 0511 hrs, and when the morning flight had ended at 0620 hrs, we had counted a total of 1,015 Cattle Egrets that had left the roost. There were more Cattle Egrets remaining in the trees, and in an attempt to count these birds, one of us went directly beneath the roost while the other remained outside to count egrets as they departed. In this effort we discovered an extensive Cattle Egret rookery. The egrets that had remained in the trees circled overhead and were estimated to be an additional 300 adults. We counted approximately 353 nests, without differentiating whether they were active or inactive. The active nests contained eggs and young in various stages from recently hatched to near fledging. We recognized a very small number of Black-crowned Night-Heron (*Nycticorax nycticorax*) nests by the heron nestlings that were present, but the large majority of the nests were those of the Cattle Egret. The rookery covered a horizontal area of about 60 m in length and 40 m in width and was located at the east central edge of Kanaha Pond (Fig. 1). Nests were between 15 to 20 m above the ground on kiawe (*Prosopis pallida*) trees of an average height of 20 m. Guinea grass (*Panicum maximum*), approximately 1 m in height, was the

dominant understory plant. The grass was covered with Cattle Egret droppings but still alive. The condition of the vegetation led us to believe that the rookery may have been recently established, since the accumulation of droppings under egret roosts and rookeries will usually kill the understory vegetation and often the roost trees (Dusi 1983). We suspect that the rookery was no more than two to three years old.

On 2 July 1987, one of us (Kimizuka), located 20 to 30 additional nests about 20 m east of the larger rookery in Kanaha Pond. There was almost no accumulation of droppings on the guinea grass under this group of nests, thus indicating very recent establishment.

EGRETS AND AVIATION SAFETY

The occurrence of Cattle Egrets nesting on Maui is important because egrets are a hazard at airports, including the Kahului Airport, which is about 0.8 km (1/2 mi) from Kanaha Pond (Paton *et al.* 1986, Fig. 1). Large egret flocks that feed on grassy areas along runways, or fly over the airfield on well-established diurnal migration routes, create the potential for bird-aircraft collisions. Such "birdstrikes," as they are called by airport officials, can result in thousands of dollars of damage to the aircraft and injury or death to passengers and crew (Michael 1986). Consequently, control of Cattle Egrets has become an essential part of airport operations in Hawaii, and monitoring egret populations around airports is necessary in planning control operations and assessing control efficacy.

If undisturbed, Cattle Egrets will regularly use an airfield to feed, especially after rains when insects are moving about, or while grassmowers are in operation (Fellows *et al.* 1987). Hazing with bird-scaring devices such as pyrotechnics has not been effective in keeping egrets off airfields, because the egrets quickly learned that there was no real threat associated with these devices. Hazing, therefore, was employed only when egrets were in close proximity to airport terminals or aircraft, or when experienced personnel were not available to shoot the birds. Aversive conditioning through a regular shooting program has been the most successful method employed to discouraging egrets from using airfields in Hawaii. In addition, shooting also serves to make the use of non-lethal pyrotechnics more effective.

KAHULUI BIRDSTRIKE CONTROL

Egrets stopped using the grassy areas along the runways as feeding habitat and staging areas after emergency shooting operations were implemented by Department of Transportation, Airport Division staff at Kahului Airport. There remained, however, the threat caused by the overflight of egrets as they crossed the airfield in their daily flights between their eastward feeding habitat in upcountry Maui and their rookery and roost at Kanaha Pond.

We planned to force the egrets to abandon Kanaha Pond, to move them from the proximity of the airport. Freshwater reservoirs at Puunene and Upper Wailuku provide potential nesting habitat that was used by a few Cattle Egrets as temporary roost sites. These reservoirs are far enough away from Kahului Airport and human habitation to make them desirable relocation sites for the Cattle Egret rookery on Maui.

Nestling and nest removal began in June 1987, followed by persistent harassment using a shotgun and pellet gun through August 1987. We were overly optimistic in allocating only three months for the operation; it ended before the egrets could be completely moved out of Kanaha Pond.

In November 1987, the project was resumed with renewed funding support. Within a 3-month period (November, 1987 to January, 1988), the egrets totally abandoned the rookery site at Kanaha Pond. They moved from the kiawe trees to roost in the great bullrush (*Scirpus lacustris*) patches within the pond itself. Again using various harassment techniques, (slingshot, pellet rifle, shotgun), the egrets were kept from settling in one location and thereby prevented from renesting. Surveys made between January and May 1988, showed no evidence of renesting at other suitable wetland sites on Maui.

Finally, in May 1988, three adult egrets were seen landing in an isolated stand of mangrove (*Rhizophora mangle*) trees near the water's edge at the southeast end of Kealia Pond. Kealia is a large intermittent saline pond, on the coast of central Maui, about 9.6 km (6 mi) south of Kanaha Pond (Fig. 1). Closer observations of the mangrove stand revealed a number of Cattle Egret nests among Black-crowned Night-Heron nests. Some of the egret nests contained hatchlings. The tangle of leaves, roots and branches made counting the number of nests difficult. On a subsequent visit to the heronry in July 1988, we estimated the number of nests to be roughly 100. No attempt was made to differentiate between egret and heron nests; however, once again the large majority, possibly 75%, of the nests were those of the Cattle Egret. The heronry occupied a horizontal area that was 50 m in length and 15 to 20 m in width. Trees were around 25 to 30 m high and nest heights varied from 10 to 20 m off the ground. The mangrove stand was surrounded by akulikuli-kai (*Batis maritima*), but there was no vegetation directly beneath the trees. The arching prop roots and branches of the mangrove trees were covered with a white wash of ardeid droppings. We assume that the egrets had joined a well-established heronry.

Harassment continued through May and June 1988 at Kanaha Pond, where only about 15 egrets remained. By July 1988, only 1 or 2 egrets could be observed at the pond during the evening. Observations were being made during the early morning and late evening to track the flight of egrets. They were seen flying mainly between Kealia Pond and their feeding sites in upcountry Maui, with virtually no flights in the vicinity of Kahului Airport.

Cattle Egrets numbered 283 on the most recent count at Kealia Pond on 27 September 1988. Shooting continues along egret flight paths, primarily at freshwater reservoirs where egrets stop to drink before heading to Kealia Pond to roost in the evenings. The objective of this additional control is to further reduce the population of egrets on Maui. As long as the population remains small, our ability to contain roosting and nesting at Kealia Pond is enhanced. Continual monitoring of Kanaha Pond and the airspace over Kahului Airport, however, remains a necessary part of the control operation in order to ensure that the egrets do not reestablish a roost or rookery next to the airport.

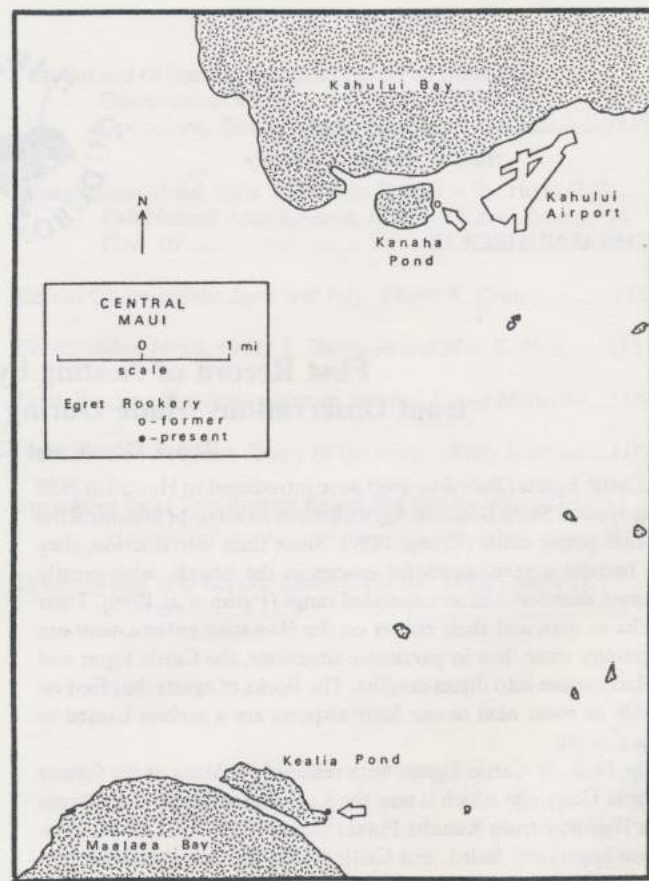


Fig. 1 Location of egret rookeries in central Maui.

LITERATURE CITED

- Breese, P.L. 1959. Information on cattle egret, a bird new to Hawaii. *Elepaio* 20:33-34.
- Dusi, J.L. 1983. Cattle egret management in Alabama. *Alabama Birdlife* 30:4-7.
- Fellows, D.P., P.W.C. Paton, L.F. Pank and P.Q. Tomich. 1983. Cattle egret ecology, behavior and control at General Lyman Field, Hilo, Hawaii. *Bird Damage Res. Rpt.* 391. Denver Wildlife Research Center. ADC/APHIS/USDA.
- Michael, R.A. 1986. Keep your eye on the birdie: aircraft engine bird ingestion. *J. Air Law and Commerce* 51:1007-1035.
- Paton, P.W.C., D.P. Fellows, and P.Q. Tomich. 1986. Distribution of cattle egret roosts in Hawaii with notes on the problems egrets pose to airports. *Elepaio* 46:143-147.

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Observations of the 'Ua'u (Hawaiian Petrel) in the Hono O Na Pali Natural Area Reserve, Island of Kauai

Samuel M. Gon III

From 16 to 20 May 1988, The Nature Conservancy of Hawaii and the Hawaii Department of Land and Natural Resources conducted an ecological survey of the upper plateau portion of the Hono O Na Pali Natural Area Reserve (NAR), Haena, Kauai. The purpose of the survey was to document the status of natural communities and rare species in the area and to obtain information for the development of a management plan for the reserve.

On the nights of 18 and 19 May, the survey team (S.M. Gon III and S.P. Perlman of The Nature Conservancy of Hawaii and M.G. Buck of the State Department of Land and Natural Resources) was camped in a remote bog on the edge of Wainiha Valley at 4,050 feet elevation. 'Ua'u or Hawaiian Dark-rumped Petrels (*Pterodroma phaeopygia sandwicensis*) were heard vocalizing in the darkness at about 2015 hrs. The calls were concentrated on the upper cliffs of Wainiha to the east of the bog and in adjacent steep slopes in the Hono O Na Pali NAR. Vegetation in the vicinity was a mosaic of montane wet 'ohio (*Metrosideros polymorpha*) forest and uluhe mat ferns (any of *Dicranopteris linearis*, *Diplopterygium pinnatum* and *Sticherus owhyensis*) on moderate to near-vertical slopes. We estimated that 5-10 birds were heard. Perhaps in response to our modest lights, several individuals circled the campsite, approaching to within 30 meters on occasion, when we could hear wingbeats. Their calls continued for approximately two hours each night, localizing in the cliffs below our campsite.

This is the first record of adult 'Ua'u in mountainous regions on Kauai since the 1890s (see review of historical accounts of 'Ua'u in Banko 1980). There have been observations of stranded 'Ua'u on Kauai in recent years. More than 30 such birds (nearly all fledglings) have been collected on beaches at locations near Kapaa, Hanalei and Waimea since 1982 (T. Telfer, pers. comm., 16 June 1988). The fledglings are probably the offspring of Kauai nesting populations. Their scattered locations suggest that there may be several nesting sites on the island.

The Wainiha birds probably had escaped detection until now because of the remoteness of the site, coupled with the nocturnal habits of 'Ua'u. While hikers often visit the Kilohana overlook into Wainiha Valley less than 3 miles away, no camping is allowed there. Only by camping overnight in the course of our survey were we fortunate enough to encounter the birds.

Although the major current breeding colonies of 'Ua'u on Maui are in barren volcanic landscapes at elevations above 7,000 feet, historical records of 'Ua'u nesting in wet forested slopes and cliffs on Molokai (e.g., Bryan 1908, 1914) suggest that the Wainiha site on Kauai represents a similar situation. Munro's (1944) account of the 'Ua'u suggested a nesting altitude of "1500 to 5000 feet," and that nesting once occurred "on all of the main islands except Niihau." In the 1970s, several records of 'Ua'u on Lanai and Hawaii islands (reviewed by Conant 1980) created cautious optimism that breeding colonies might be found on other islands besides Maui.

Constraints of our survey did not allow for extended explorations of the steep, densely vegetated cliffs of Wainiha where the birds were heard. An attempt to locate nest sites in the area is an important research need. The remote, nearly pristine setting of the Kauai site probably comes close to representing the nesting conditions that were typical of the 'Ua'u in pre-contact times. The area is an unexpected resource protected by the state in the Hono O Na Pali Reserve.

LITERATURE CITED

- Banko, W.E. 1980. Historical Synthesis of Recent Endemic Hawaiian Birds. CPSU/UH Avian History Report 5B. History of Endemic Hawaiian Birds. Part I Populations Histories—Species Accounts. Sea Birds: Hawaiian Dark-rumped Petrel('Ua'u). CPSU/UH Contribution Number 026/10.
- Bryan, W.A. 1908. Some birds of Molokai. B.P. Bishop Mus. Occ. Pap. 4(2):43-86.
- Bryan, W.A. 1914. Hunting the 'Ua'u on Molokai. Mid-Pacific Magazine 8(2):152-7.
- Conant, S. 1980. Recent records of the 'Ua'u (Dark-rumped petrel) and the 'A'o (Newell's shearwater) in Hawai'i. 'Elepaio 41:11-3.
- Munro, G.C. 1944. Birds of Hawaii. Tongg Publishing Company, Honolulu. 189 pp.

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RECENT OBSERVATIONS June and July 1988

(Editors' note: 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: H = Hawaii Island; K = Kauai Island; M=Maui Island; O = Oahu Island.

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WEATHER: This was another dry, hot summer, with the majority of weather stations reporting below average rainfall.

SEABIRDS: Hawaii is surrounded for thousands of miles by ocean; yet seldom do birders penetrate further than a day's trip into this pelagic realm. The vast expanse of water serves not only as a fishing ground for seabirds residing in our islands but is also home to numerous species that wander countless miles from their breeding places in other regions of the Pacific. As these birds rarely venture near shore, reports from ocean-going birders are always welcome and frequently turn up surprise sightings. Counting seabirds from a research vessel travelling between 100 and 200 km ESE of South Pt., H. during early morning of 3 June, LS saw over a 2.5 hr period: 4 Kermadec Petrels, 5 Black-winged Petrels, 1 Bulwer Petrel, 30 Wedge-tailed Shearwaters, 1 Newell Shearwater, 1 Great Frigatebird, 17 Sooty Terns, and 1 White Tern. Kermadec and Black-winged Petrels breed thousands of miles south of Hawaii.

Noteworthy observations of other seabirds in the islands included 5 Bulwer Petrel nest sites (one occupied by a downy chick, the rest by one or two adults) and 10-12 adult Red-tailed Tropicbirds, plus a chick, on Manana Is. on 20 July (RLP). A few Christmas Shearwaters and Dark-rumped Petrels were reported off of the N and W coasts of Molokai on 2-4 July (CC fide BE).

After carefully studying a tiny white tern at Aimakapa Pond, H., AE and RD (24 July) and BM (26 July) were able to report the first record for the main Hawaiian Is. of a Little Tern. The bird was distinguished from the Least Tern on the basis of very pale upper tail contrasting with gray rump and mantle.

Unfortunately the bird did not call or provide other clues to its identity. The first and probably only other prior record of a Little Tern in the AOU Checklist area is a specimen taken on French Frigate shoals in 1985. Only 200 adult Sooty Terns and no live juveniles remained on Manana Is. on 20 July (RLP). However, Brown Noddies, which nest later, were present in expected numbers (5-10,000); many were on eggs.

WATERBIRDS: The colony of Pied-billed Grebes at Aimakapa numbered 11 adults and 3 active nests on 29 July (RLP).

SHOREBIRDS: As in previous years, there was little to report during this slow season. Seven Lesser Golden-Plovers at Amoriet Aquafarm, O. on 10 July (AE) may have been among the first fall arrivals. A **Rufous-necked Stint** in splendid, nearly full breeding plumage, was observed and photographed at Aimakapa Pond on 29 July (RD, RLP). Two of only four other Hawaiian records of this stint were made at Aimakapa in August of 1983 and 1986.

RAPTORS, GAMEBIRDS AND PARROTS: An unusual summer sighting was a large falcon, probably a Peregrine, over Honolulu on 2 July (AE); such birds are normally winter vagrants.

Gray Francolins continue to hold out on Diamond Head, their only Oahu population; PD heard them cackling on Na Laau Trail on 6 June. I neglected to mention in the spring issue of this column (*'Elepaio* 48:77) that **Erckel Francolins** were seen at the head of Kamalo Gulch on Molokai during the May forest bird survey. This species was introduced to Molokai during the '60s but soon disappeared and was not discovered there until last year when TL flushed one at the Kamalo flats (3,000' +). In Hawaii, this species seems to prefer higher elevations, particularly on islands where Black and Gray francolins are abundant, as on Molokai.

Eight Rose-ringed Parakeets were seen at Na Laau Trail on Diamond Head on 6 June (PD). The species has lived in this neighborhood for the past 20 years without much expansion of numbers. Another rose-ring was reported flying over Captain Cook, H. in early June (BM). Parrots returning to their roost above Pearl City on 22 June included 26 Red-crowned Parrots, 1 Blue-fronted Parrot, and 1 Blue-crowned Conure (TP,AE); these numbers were similar to counts from last summer.

At least 2 and probably 3 Pueo were recorded within an hour in Lualualei Valley, O. on 12 July (BE), an encouraging sighting of an island population listed as endangered by the State of Hawaii.

NATIVE FOREST BIRDS -- The long-awaited event of this season was the successful hatching of a baby **'Alala** at the Olinda Endangered Species Propagation Facility, M. on 11 June (FD). Despite nest-building and egg-laying every year by the captive birds, this was the first successful hatching since 1981. This was one of 13 eggs laid in May and June, far more than in any prior year. Eight of the eggs from one female, including the hatchling, were fertile. Because much was learned this season about proper incubation temperature and procedures, hopes are high that next year a much larger percentage of the fertile eggs can be hatched successfully (FD). The transfer of the captive flock in November, 1986 from Pohakuloa, H. to much improved modern rearing facilities at Olinda, M. probably also contributed to the higher egg productivity this year. Only 8 adult **'Alala** remain in the captive flock and perhaps the same number or fewer survive in the wild.

In the native forest bird populations under intensive study at Hakalau NWR, H., this year's breeding success was apparently

rather poor for Hawai'i Creeper, **'Akepa**, and **'Amakihi**. Virtually no fledglings or juveniles were caught in mistnets, in comparison with prior years (LF). Other species (**'Elepaio**, **'Oma'o**, **'Iiwi**, and **'Apapane**) seemed to have done alright. Reasons for the differences are not evident.

A June survey of isolated Namolokama Peak, a potential Shangri-la for endangered forest birds on Kauai, turned up dismal results (TT). The plateau forest had been smashed by hurricane Iwa, and, to the astonishment of the survey crew, pigs had found their way to the top. Only a few common forest birds were encountered, not even a creeper or akepa.

FOREIGN BIRDS -- Reports of two common introduced species spreading to new islands were recorded this season. One **Red-vented Bulbul** was seen repeatedly in JJ's backyard in June (the second report for the Big Island). The bird was removed from the wild, as this species is a notorious garden pest, consuming an endless list of fruits and flowers, especially dendrobium orchids. The impact of this bird on the native insect fauna has not been documented, but when was the last time you saw a native damselfly along streams on Oahu, where the Red-vented Bulbul is abundant?

The Japanese Bush-Warbler, a shy forest dweller but aggressive expansionist, has now apparently established a population on Kauai. At least 15 were heard on 17-23 June along the forbidding pali of Namolokama Peak (TT), north of Mt. Waialeale. Bush-warblers have colonized higher mountain areas of Molokai, Lanai and West Maui, where they are now most abundant.

Several Hwamei and Red-billed Leiothrix, both scarce on Oahu, were heard along Waialeale-iki Trail on 19 June (TP,BE). Three or four leiothrix also were recorded along Woodlawn Trail on 6 June (PD).

A pair of Red-crested Cardinals, relatively local and rare on Maui, was seen and heard along the beach at Wawau Pt. near Spreckelsville, on 18 June (TP). A yellow-faced Grassquit heard twice on 19 June on the upper part of Waialeale-iki Trail Koolau (TP,BE,RLP) was south of the species' previously known range. Saffron Finches, thought to be virtually extirpated on Oahu, still persist in Blaisdell Park near Pearl Harbor. Up to 3 individuals were seen there several times in July (MM). The female Great-tailed Grackle frequenting Waipio Peninsula since 1980 was seen there again near Walker Bay on 6 June (PD).

Lavender Waxbills continue to be reported more frequently on Oahu. Four were found on 6 June along Na Laau Trail, their traditional locality on the slopes on Diamond Head (PD). One was seen nearby in Kapiolani Park on 28 June (MM), and one or more were reported coming to a feeder in Waialeale-iki, O. during July (CC). Common Waxbills, now locally common at numerous locations on Oahu, were reported at three interesting localities this season. Three were on the lawn at the Kalanimoku Building next to the State Capitol in downtown Honolulu on 23 June (TP); a flock of 63 was feeding in grass in Campbell Industrial Park at the SW corner of the island on 3 July (MM); and this waxbill was reported as numerous, with adults feeding juveniles, on Sacred Falls Trail on the NE coast, 17 July (BE,TP). Four Warbling Silverbills were seen at Kapiolani Park on 29 June (MM).

Thane K. Pratt

CONSERVATION NEWS

REAUTHORIZATION OF FEDERAL ENDANGERED SPECIES ACT -- Congress has voted to revitalize the Endangered Species Act of 1973 by providing a significantly increased budget and expanded powers for the program. This caps a four-year struggle to reauthorize a program that officially expired in 1985. The Act authorizes \$56 million next year (compared with a current budget of \$39 million) with yearly increases to \$66 million in 1992.

Two issues are extremely important to Hawaii, with 27% of the listed species. First, the Section 6 Program, in which the federal government picks up three quarters of the cost of helping state agencies such as the Department of Land and Natural Resources (DLNR) conduct research, management and recovery activities for endangered species, has finally been placed on a firm financial footing. The Act now provides that the Section 6 Program will be funded at five percent of the level of federal programs for game and sport fish conservation. These programs are currently funded at about \$300 million, so the Act provides \$15 million for next year and will increase in step with federal consumption-oriented programs. DLNR should be in a position to receive substantial funding under this program.

Second, the Act has vastly expanded its scope for endangered plants in Hawaii. It is now a violation of the federal Act if any person violates state law with respect to endangered plants. Accordingly, the relatively strong state laws for protection of endangered plants (which DLNR essentially does not enforce) can now be enforced by the federal government. Just as important, citizen groups and individuals may sue under the federal Act in federal court to enforce Hawaii law. Federal protection for the vast number of candidate endangered plants can now be achieved by simply listing them under state law rather than waiting four or more years for the federal listing process to run its course. State law provides that any three persons may petition DLNR to list a species, and even DLNR would be hard-pressed to fashion procedures for listing that could take as long as those developed by the Washington office of the U.S. Fish & Wildlife Service.

HAS should coordinate with the Hawaii law enforcement officials of the Fish & Wildlife Service to ensure that the amended Act is implemented in a timely fashion.

*Craig S. Harrison
Washington, DC*

ASTRONOMY DEVELOPMENT IMPACTS ON THE MAUNA KEA AEOLIAN ECOSYSTEM -- Since 1974, the Hawaii Audubon Society has expressed strong concerns about the impact of astronomy development on the terrestrial environment of the upper slopes and summit of Mauna Kea. As a result of the Society's appeal to Acting Governor George Ariyoshi in 1974 for sound environmental planning, the governor called for a master plan for Mauna Kea. A general Master Plan was adopted by the Board of Land and Natural Resources in 1977, but a specific environmental management plan has yet to be put into action.

Today there are eight telescopes operating within the summit region of the Mauna Kea Science Reserve. A ninth is under construction, and a tenth is currently in the process of environmental impact statement (EIS) review. In response to announcement this spring that an EIS was being prepared for a new radio telescope, called the Very Long Baseline Array (VLBA) Antenna Facility, the Society wrote to Dr. Donald N. B. Hall, Director, Institute for Astronomy (University of Hawaii, Honolulu, HI 96822), as follows:

"Audubon concerns involve the increased negative impacts on the highly fragile and vulnerable aeolian ecosystem in the summit region--already degraded or destroyed in part by construction, roads, and powerlines for the nine existing telescopes.

"Entomologists F. G. Howarth and F. D. Stone made a signal contribution to Hawaiian biology with their 1982 report, *An Assessment of the Arthropod Fauna and Aeolian Ecosystem Near the Summit of Mauna Kea, Hawaii*, 18 pp., published in the EIS for the Mauna Kea Science Reserve Complex Development Plan. They found 17 species of resident arthropods in this remarkable high elevation aeolian ecosystem. What is astonishing is that in this newly recognized ecosystem at least 11 of these invertebrate species turned out to be new to science!

"These newly discovered Hawaiian animals that adapted to a wind-swept environment of snow, tephra cinders and slopes, lava flows and talus slopes include such creatures as predatory 'seed' bugs, moths, several kinds of spiders, springtails, centipedes, and mites. These endemic animals evolved in Hawaii and occur nowhere else.

"Mauna Kea's oceanic aeolian ecosystem far above treeline has scarcely been studied by scientists, and most of those small animals without backbones have yet to be described. There may be more species awaiting discovery. It is essential that astronomers and construction crews know of the existence of this marvelous ecosystem where they work, and that they take precautions not to destroy or degrade this unusual habitat through ignorance or carelessness.

"In their report Drs. Howarth and Stone described the destructive impacts of off-road vehicle use and road construction on the fragile summit habitats. The heavy off-road traffic needlessly destroyed ideal habitat for some of these uncommon animals. Howarth and Stone made 11 carefully reasoned recommendations for environmental protection of summit habitats....

"We request that you adopt an environmental protection plan that encompasses these recommendations, so that Hawaii's rare aeolian ecosystem is properly recognized and maintained by all who visit or work in the Mauna Kea Science Reserve."

In June Dr. Hall sent this reply:

"...A management plan for the Mauna Kea Science Reserve was approved by the Board of Land and Natural Resources in 1985. This plan addresses your management concerns. At present, the University of Hawaii, Institute for Astronomy, is working with the Department of Land and Natural Resources to resolve some remaining jurisdictional issues, including enforcement, so that all aspects of the plan can be implemented."

Can you help speed up action on the environmental management plan? Yes, you can! Please write to Dr. Hall about your concerns for better protection now of native wildlife that live in aeolian habitats on Mauna Kea. *Mahalo nui loa!*

*Mae E. Mull
Island of Hawaii Representative*

BOOK REVIEW

Exploring Nature Safely, by Ed Arrigoni, Nature Safety Consultants, 1988, \$11.95.

Ed Arrigoni, author of *Exploring Nature Safely in Hawaii*, has written another book with a similar title, *Exploring Nature Safely*. The new book continues to emphasize safety in Hawaii while drawing upon important mainland situations requiring the attention of islanders.

Mr. Arrigoni leads us, step by step, on various types of outings, beginning with a section on starting out. We learn how to plan an expedition, where to go and when, what to bring, things to check prior to departure, what to do upon arrival, and taking precautions if a natural disaster occurs. Throughout this chapter we are reminded, over and over, that everyone in the group must know how to behave and what to expect on the trip.

Other chapters include the land environment--hiking, camping, and what to do when lost--the water environment, hazardous plants, hazardous animals, and first aid. While some of the parameters are common sense, their inclusion indicates that people do foolish things while exploring the natural world. A prime example can be found in the section under hazardous plants: "Do not try to build immunity to a poisonous plant by eating it....This practice has led to painful deaths."

A revised edition may have to devote more space to ticks, which carry Rocky Mountain spotted fever, Lyme disease, and other dangerous diseases. Lyme disease, a growing problem on the East Coast, has now been diagnosed in Hawaii. Scientists so far are puzzled as to how it is transmitted here, since the deer tick is not resident in the islands.

This excellent, well illustrated book should be read and kept as a reference by beginning and experienced nature explorers, including bird watchers, hikers, campers, swimmers, etc.

Lynne Matusow

OCTOBER PROGRAM Story of the Nene

The October program, "The Nene, Hawaii's State Bird," was given by Thane Pratt, Wildlife Biologist with the Hawaii Division of Forestry and Wildlife.

The Nene reached a crisis point 40 years ago when fewer than 30 birds were estimated to survive in the wild. Through the efforts of government and private agencies, releases of captive birds and management of habitat has "saved" the Nene, in the sense that a wild population of several hundred birds lives on the islands of Hawaii, Maui and Kauai and that the species is not in imminent danger of extinction. Still, there have been many frustrations with restoring the Nene, and much more needs to be done, particularly on the Big Island.

The Nene is unique to Hawaii and is related to mainland geese such as the Brant and Canada Goose. Nene differ from typical geese in several ways: webbing of the feet is reduced; the legs are longer; wings are shorter; the egg clutch is smaller; and Nene breed during the winter rainy season rather than during summer. Nene are also unwary; often to their own peril. These traits are adaptations to terrestrial living in an island environment.

Fossils of Nene have been found on nearly all main islands, frequently along the coasts far from their present montane habitat. Perhaps as many as 200 or more Nene live in and around Haleakala Crater. The Big Island population has not been censused recently. A new population of 30 or so birds has recently become established on Kauai. Hunting during the last

century and the introduction of mongooses, dogs and cats have led to the Nene's decline. Coastal habitats have largely been pre-empted by man. Presently restricted to marginal habitat, Nene have problems finding enough good forage for their young.

Captive breeding of Nene has been practiced at Pohakuloa on Hawaii Island since 1949. With the help of the Wildfowl Trust in Slimbridge, England, nearly 2000 Nene have been released into the wild. The state will be moving its Nene breeding program to Olinda, Maui next fall.

What happens to Nene after captive breeding? The State of Hawaii maintains four sanctuaries for Nene and cooperates with Haleakala and Hawaii Volcanoes National Parks in releasing Nene. Recent studies by Paul Banko have shed light on survival of Nene in the wild.

Betty Johnson

SEPTEMBER FIELD TRIP REPORT Kawai Nui Marsh

About 40 participants enjoyed the September Hawaii Audubon field trip to Kawai Nui Marsh, co-hosted by the Hawaii Audubon Society and the Kawai Nui Marsh Foundation. A bus circuit of the marsh began at the Kailua Drive-In and proceeded to the Pahukini Heiau atop the Kapaa Landfill. It continued with a stop at the estuary end of the marsh where it drains into Oneawa Canal, near the Coconut Grove area of Kailua where floodwaters overtopped the adjacent levee on New Year's Eve. The bus tour also stopped along the Ka'elepulu Stream along Hamakua Drive. It ended at Ulupo Heiau, adjacent to the marsh, by the Windward YMCA.

Several individuals from 3 out of 4 endangered Hawaiian waterbirds were spotted along the tour route, including Hawaiian Stilt, Hawaiian Gallinule, and Hawaiian Coot. However, this tour's focus was on a broader environmental theme on the management future of the marsh.

Tour participants were briefed on the City-sponsored Army Corps of Engineers' prepared plans for Coconut Grove flood relief in the form of a 200 ft. wide, 8,000-ft. long channel with a water control structure at the downstream end. Alternative approaches to flood relief were also discussed which many individuals and organizations feel have not been adequately evaluated and are more compatible with the goals of the State's Kawai Nui Marsh Resource Management Plan and the Kawai Nui Heritage Foundation's Directional Plan #5. Members of the Sierra Club Legal Defense Fund, the Hawaii Thousand Friends, Kawai Nui Heritage Foundation, the Conservation Council for Hawaii, Hawaii Audubon and other environmental organizations have



raised significant questions to the City and Army Corps of Engineers about the adequacy of the draft Environmental Assessment prepared for this project. Such concerns, expressed during the recent public review period, have successfully persuaded the City and Army Corps of Engineers on their need to prepare a full EIS for their proposed flood control project.

Meanwhile, concerned citizens are urged to monitor and participate in the City and Army Corps of Engineers' process of preparing this EIS, to assure that federal requirements are strictly followed, that a diligent effort is made to fully involve the public in this process, and that the energy expended to develop the EIS is not misspent to develop an elaborate defense for a hastily-conceived channel project without good data to back it up. Meanwhile, the City is implementing an immediate flood relief project by means of vegetation removal through aerial herbicide spraying in the marsh, along the same approximate route where their proposed channel would be.

All concerned citizens are urged to write to the City and Army Corps of Engineers and request to be a consulted party in the scoping of the flood channel EIS and in the implementation of the vegetation removal plan. On a national level, the Army Corps of Engineers' management of wetlands is currently undergoing Congressional and GAO scrutiny and information about Army Corps of Engineers' current performance on a controversial wetland management proposal in Hawaii is likely to receive very careful scrutiny at this particular time. Send your letters to: Dr. James Maragos, Chief, Environment Resources Section, U.S. Army Corps of Engineers, Ft. Shafter, HI 96858-5440 or Mr. Warren Yamamoto, Division of Engineering, Department of Public Works, 650 South King Street, 15th Floor, Honolulu, HI 96813.

Diane Drigot

FIELD TRIP REPORT James Campbell NWR 16 October 1988

The October 16th field trip to James Campbell National Wildlife Refuge, Kahuku, Oahu, was attended by 31 people. The outing began around 9:00 AM under cloudy skies, and although the weather was marginal, the birding wasn't bad. Almost everyone observed a total of 34 species of birds. Native species that were observed included: Hawaiian Ducks, Hawaiian Moorhens, Hawaiian Coots, Hawaiian Stilts, Black-crowned Night-Herons, Red-footed Boobies, Great Frigatebirds, Wedge-tailed Shearwaters, and Brown Noddies. Migratory species included: Lesser Golden-Plovers, Wandering Tattlers, Ruddy Turnstones, Sanderlings, Pectoral Sandpipers (15-20), Sharp-tailed Sandpipers (2), a Greater Yellowlegs, a Northern Pintail, Northern Shovelers, and a Canada Goose. Introduced species included: Cattle Egrets, Ring-necked Pheasants, Spotted Doves, Zebra Doves, Red-vented Bulbuls, Common Mynas, Japanese White-eyes, Northern Cardinals, Red-crested Cardinals, House Finches, House Sparrows, Common Waxbills, Red Avadavats, and Nutmeg Mannikins. The field trip ended around 12:30 PM.

Bruce D. Eilerts

AUDUBON NEWS

AUDUBON OFFICE OPENS; FURNITURE AND EQUIPMENT NEEDED -- The joint National Audubon Society and Hawaii Audubon Society office opens later this month.

Can you help furnish it? We need the following: xerox machine, bookcases, file cabinets, chairs, conference table, touch-tone telephone, answering machine, and computer work station.

We are also looking for someone with a pick-up truck to help us pick up donated goods and deliver them to the office.

A special "Mahalo!" to the Marilyn Bornhorst campaign for donating a refrigerator.

All donations are tax deductible to the extent permitted by law. Please call Lynne Matusow at 531-4260 if you have items to donate.

WATCH FOR SPECIAL MAILING; WE NEED YOUR SUPPORT -- In the next few days you will receive a special mailing comprising several components.

First is our fund appeal. The Hawaii Audubon Society is committed to protecting and enhancing Hawaii's native ecosystems and to supporting environmental education and research that will benefit the protection of Hawaii's natural wonders. This costs money. Your tax deductible contribution will enable us to expand our efforts.

Second is a ballot for officers and directors for 1989. Please take the time to cast your vote.

Third, for Hawaii chapter only members, is a dues renewal statement. We value your membership and participation and hope you will extend your membership.

Your dues renewal, contribution, and ballot may be combined and returned in the envelope enclosed with the mailing.

Mahalo for your continued support!

HELP NEEDED FOR PHONATHON -- Hawaii Audubon Society's fund raising campaign is underway, with proceeds earmarked for protecting and enhancing Hawaii's native ecosystems, environmental education and research which will benefit the protection of Hawaii's natural wonders. As part of the fund raising effort, we are running a phonathon. HMSA is assisting us by kindly making their phones available. We will be calling Oahu members from the HMSA offices on Tuesday, 10 January and Wednesday, 11 January, from 6-9 PM. Calls will also be made from the neighbor islands on those evenings. We need your help in seeking pledges from members. Please call Lynne Matusow at 531-4260 if you can make phone calls.

Also call Lynne if you would like to join the fund raising committee. Our next meeting is on Wednesday, 14 December at 7 PM.

OBSERVERS NEEDED FOR CHRISTMAS BIRD COUNTS -- Every December, the Society's field activities nationwide are concentrated on the annual Christmas Bird Counts. This year, eight counts are scheduled in the main Hawaiian Islands, as listed below. These counts are always exciting, with records to be broken and new birds to be seen. More observers, beginners as well as experienced, are needed to help with all of the counts, especially on the neighbor islands.

Call the appropriate compiler directly and offer to participate. Novices are encouraged to come along, as they can be paired with more experienced birders. There is a nominal participant's fee of \$4.00, which goes to National Audubon Society to help (only partially!) defray the costs of editing and publishing the 1500

counts across the country in a special issue of AMERICAN BIRDS Magazine.

1988 Counts:

OAHU:

Honolulu -- Sunday December 18, Bob Pyle, 262-4046
Waipio -- Monday December 26, David Bremer, 623-7613

KAUAI:

Kapaa -- Dan Moriarity, 828-1431
Lihue -- Winona Sears, 822-3045
Waimea -- Marsha Erickson, 335-9975, 335-3393

MAUI:

Puu O Kakae -- Fern Duvall, 572-1584

HAWAII:

Kona area (new count) -- Monday January 2, Reggie David, 329-1245
Volcano -- Saturday December 17, Larry Katahira, 967-8133, 967-7416. There will not be a 3-day workshop at Volcano this year, but participants are invited for birding on the day before the count. Phone Larry before December 8 to confirm your participation in the pre-count trip. Accommodations are available for \$8-10.

MAHALO TO REVIEWERS OF SCIENTIFIC ARTICLES

-- Every scientific article that appears in the *'Elepaio* represents the coordinated effort of authors, reviewers and editors. Each article is reviewed carefully by two or three authorities in the field, and scrutinized by both the Managing Editor and the Scientific Editor of *'Elepaio*. I would like to thank all those who have reviewed articles that have appeared during my tenure as Scientific Editor. I especially thank Managing Editor, Thane Pratt, who catches all the errors the authors, reviewers and I do not find in our readings of the manuscripts, and who orchestrates typesetting and paste-up of the articles. Reviewers for articles appearing in *'Elepaio* from January of 1986 to December 1988 were:

Peter Alden, Allen Allison, Philip Ashman, George Balazs, Paul Banko, Bob Beck, Steve Berendzen, Delwyn Berrett, Andy Berger, Julie Brock, Phil Bruner, Tim Burr, Vern Byrd, Roger Clapp, Richard Coleman, Robert Day, John Engbring, Andy Engilis, John Farrand, Stewart Fefer, Rob Fleischer, Leonard Freed, John Ford, Wayne Gagne, Craig Harrison, Tom Harvey, John Henderson, Jim Jacobi, Jim Juvik, Cam Kepler, Warren King, Carla Kishinami, Bob Kinzie, Tom Lemke, Pete Luscomb, Dick MacMillen, Ken McDermond, Sean McKeown, Mark Merlin, Dan Moriarity, Marie Morin, Steve Mountainspring, Mike Moulton, Peter Paton, Stuart Pimm, Doug Pratt, Thane Pratt, C.J. Ralph, Mike Scott, Rob Shallenberger, Chris Simon, Lani Stemmermann, Chuck Stone, Tim Sutterfield, Tom Telfer, Quentin Tomich, Charlie van Riper, and Alan Ziegler.

My apologies to anyone I missed and a big "MAHALO!" to all of you.

Sheila Conant
Scientific Editor

NOTICE TO AUTHORS

The *'ELEPAIO*, Journal of the Hawaii Audubon Society, invites authors to submit scientific articles on natural history of Hawaii and the Pacific. Scientific articles are subject to peer review. The *'ELEPAIO* also serves as a newsletter to inform members of conservation issues, Society events, and other subjects of interest to members. Manuscripts of articles and newsletter items may be sent to Thane Pratt at 1022 Prospect St., Apt. 1103, Honolulu, HI 96822. Articles not subject to peer review **MUST BE RECEIVED BY THE 15TH OF THE MONTH** to be considered for publication in the next month's issue.

SCIENTIFIC ARTICLES should be typewritten and double-spaced, and three copies should be submitted. Any photographs should be submitted as photographic prints, in color or black and white (they will appear in black and white). The prints should be 3.5 X 5 inches, or larger, and should be adequately cropped if cropping is required. Original copies of figures (e.g., maps, graphs) should be clear and clean, with lettering large enough to remain legible upon reduction to fit the newsletter format. Authors are advised to design their illustrations with the *'ELEPAIO*'s columnar format and size in mind (please look at a copy of the journal).

FREE ICE CREAM

Ice cream will be served for the last time to those volunteering for paste up of the *'Elepaio* at Thane Pratt's house on Saturday, 17 December, beginning at 1:00 PM. Thanks to Sheila Conant, Suzanne Harada, Lynne Matusow, Glynnis Miller, Bob Pyle, Leann Syrotuck, and Harry Whitten for helping with the paste up of the current issue! For more information, call me at 524-8464.

TKP

BEQUESTS

Do you know it's possible to leave money to Hawaii Audubon Society? George C. Munro, tireless and enthusiastic field ornithologist and naturalist and a major force in founding HAS, did more than 20 years ago. Today the George C. Munro Fund provides monies for research projects on the conservation of dryland forests.

A bequest to HAS is an excellent way to help us in our conservation efforts. Although an attorney should be consulted in the drafting of your will, a model clause for bequests is set forth below.

"I hereby give, devise and bequeath to the Hawaii Audubon Society, Honolulu, HI, the sum of _____ dollars (or set forth a description of the property) to be used for the general purposes of said organization."

For more information and assistance in the specifics of the manner and form of gifts and bequests contact HAS, P.O. Box 22832, Honolulu, HI 96822.

HAWAII AUDUBON SOCIETY

IF NOT A MEMBER, PLEASE JOIN US

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-----'ELEPAIO'-----

Managing Ed. Thane Pratt 548-8850 (wk), 524-8464 (hm)
 Scientific Ed. Sheila Conant 948-8241 (wk)
 Editorial Committee: Marie Morin, Bob Pyle, Leann Syrotuck
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JOINT MEMBERSHIP -- National and Hawaii Audubon Societies

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

Students and Senior Citizens may apply for discounted rate.

LOCAL MEMBERSHIP -- Hawaii Audubon Society only

Regular	\$6.00
Junior (19 years and under)	3.00
Subscriber (off-island residents)	6.00
Life (payable in three equal annual installments)	150.00

All local memberships and subscriptions are for the calendar year.

PUBLICATIONS OF THE SOCIETY

HAWAII'S BIRDS by H.A.S. (1984, revised 1987). An excellent, pocket-sized fieldguide to all native and well-established introduced birds. \$4.95 plus \$0.89 surface mail or \$1.07 air mail. Hawaii residents add \$0.20 State excise tax.

FIELD CHECKLIST OF BIRDS OF HAWAII by R. L. Pyle and A. Engilis, Jr. (1987). Pocket-sized card listing 125 species, with space for field notes. Post paid. \$0.25 or \$0.10 for 10 or more. (NEW!)

GUIDE TO HAWAIIAN BIRDING by H.A.S. and C. J. Ralph, ed. (1977). Where to go, what to see. All regularly visited islands. Post paid. \$1.50.

CHECKLIST TO THE BIRDS OF HAWAII by R. L. Pyle (1983). Our reference for avian nomenclature in Hawaii. All naturally occurring birds, plus introduced species well-established. Post paid. \$2.00.

CHECKLIST TO THE BIRDS OF MICRONESIA by P. Pyle and J. Engbring (1985). Similar to preceding but covers Micronesia. Post paid. \$2.00.

BACK ISSUES OF 'ELEPAIO and INDICES TO 'ELEPAIO:
 Vol. 1-40 -- \$1.00 per issue, \$10.00 per volume
 Vol. 41 to present -- \$0.50 per issue, \$5.00 per volume
 Complete set (Vols. 1-43) -- \$350
 INDEX Vols. 36-40 -- \$2.50
 INDEX Vols. 41-45 -- \$2.50

Overseas orders cost more. Contact the Society for added cost.

CALENDAR OF EVENTS

- Dec. 12 (Mon.) Board Meeting at Bishop Museum at 7:00 PM. Call Bruce Eilerts at 599-4795 for details.
- Dec. 14 (Wed.) Meeting of Fund Raising Committee at 7:00 PM. Call 531-4260.
- Dec. 17 (Sat.) 'Elepaio paste-up at Thane Pratt's house, 1:00 PM. Call 524-8464.
- Dec. 19 (Mon.) General Meeting at Atherton Halau, Bishop Museum, at 7:30 PM.

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