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PLANT COMMUNITIES AND BIRD DISTRIBUTION ON EAST MOLOKAI

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This report concludes a two week survey of the vegetation and bird life in the vicinity of Puu Kolekole on Molokai in preparation for the possible inclusion of the summit area of East Molokai within the State of Hawaii's Natural Area Reserve System. Puu Kolekole Cabin, where I stayed from January 3 to 14, 1972, is situated at 3,800 ft. in Kawela, a strip of land owned by Molokai Ranch.

A quick glance at the map of East Molokai...will reveal several important features of this mountain. The volcano's slope is very steep and incised by so many deep ravines as to give a terrain composed almost solely of gullies and ridges, resulting in a very irregular vegetation and difficult ground to traverse. Further, three great valleys draining to the north--Waikolu, Pelekunu and Wailau--have carved out all but impassable cliffs which have isolated the canyon floors as well as several plateau areas. ...The rainfall at the summit exceeds 300 inches a year while two miles leeward precipitation probably is less than 50 inches annually. This rough terrain and unpleasant climate, together with the dense vegetation, have succeeded in segregating from human activities the small remaining tract of Molokai's native forest. This forest is composed almost entirely of Hawaiian endemics and contains many species peculiar to Molokai. As a whole it is amazingly well preserved and what damage has been done can be corrected.

PLANT COMMUNITIES

Dry land scrub and forest:

West, south and east of the summit rain forest, rainfall diminishes rapidly with the decrease in altitude. At Kawela the transition between mesophytic and xerophytic plant communities lies approximately between 3,000 ft. and 3,500 ft. altitude. In places the rain forest follows the gullies into lower elevations. Native dry land vegetation drops off at about 2,250 ft. to 2,000 ft. From this altitude down to sea level the climate becomes more arid, over-grazing more evident and introduced plants more common. In the xerophytic regions there occurs a striking difference between the vegetation of the ridge tops and that of ravine bottoms. Vegetation in the gullies changes from rain forest, with trees averaging 25 ft. tall, to a dry forest of the same height while on the ridges the trees become shorter and degenerate to scrub stature. The composition of plant species change in both cases.

On the lower drier ridges pukiawe (Styphelia tameiameiae) and to a lesser extent 'akoko (Euphorbia celastroides), 'a'ali'i (Dodonaea viscosa), ko'oko'olau (Bidens menziessii), and grasses form the dominant vegetation in undisturbed regions, as along Forestry Road #17c at the elevation of 2,500 ft. Most ridges of this sort have been badly damaged by goats and only pukiawe, the silvery Gnaphalium sandwicensium and an occasional 'a'ali'i are left on the bare crumbling rock. The shrubs of this vegetation type are scattered and seldom more than several feet high, but Bidens a handsome plant with large clusters of yellow flowers and finely divided leaves, often

grown to a height of five feet.

Further up the ridges before the rain forest is reached the scrub attains its best development, for instance at 3,500-3,250 ft. along the jeep trail leading to Puu Kolekole Cabin. Pukiawe, 'a'ali'i, 'ohi'a (Metrosideros polymorpha), 'ulei (Osteomeles anthyllidifolia), 'akia (Wikstroemia sp.), Dubautia molokaiensis, pilo (Coprosma sp.), and 'ohelo (Vaccinium sp.) form a dense thicket. Other rarer trees can be found--a small Gouldia, mamane (Sophora chrysophylla), sandalwood (Santalum ellipticum), Pittosporum forbesii, and Exocarpus sandwicensis. P. forbesii is endemic to the ridges below Puu Kolekole. While Exocarpus, an odd relative of the sandalwood, is quite rare elsewhere in the Hawaiian Islands, according to one source (Degener, 1932. FLORA HAWAIIENSIS), it is most abundant in the dry sections of Kawela where a few individuals can be found on most ridges. The trees and shrubs of this community range from 4-8 feet or more in height.

The vegetation of the gullies varies considerably, some ravines having the same plants as the ridges, others with a very different flora. 'A'ali'i, pukiawe, pilo, 'akia, hala-pepe (Dracaena aurea), olopua (Osmanthus sandwicensis), lama (Diospyros ferrea), two varieties of kolea (Myrsine lessertiana), aulu (Planconella sandwicensis), and, at higher elevations, 'ohi'a are the most often found, the first four being especially common. A variety of maile (Alyxia olivaeformis) with small leaves, 'ulei, huehue (Cocculus ferrandianus), Lysimachia remyi (in wetter areas), ferns, grasses (especially Mollasses Grass), and occasionally Phyllanthus sandwicensis constitute the sparse undergrowth of these woods. Hala-pepe grows from 15-30 ft. tall, while the other shrubs and trees range from 6-20 ft.

Hunting for rare plants in these ravines became an exciting undertaking for me and on January 13 my searching was rewarded with the discovery of a relatively large and well preserved dry land forest in a small gully below Puu Kolekole. ...This grove and the enclosing valley walls and ridge tops contained 34 genera of native plants (exclusive of grasses and ferns)...

Of all native communities on Molokai the dry land vegetation is suffering the most from the overgrazing of game and feral animals. Cattle and goats are the worst offenders, the former preferring more level ground than the gully walls inhabited by the latter. Cattle were seen most often on the flats around the foot of Puu Kolekole where they have cleared away the original scrub and forest. The area is now pasture with a few remaining trees. ...

Goats are extremely abundant in the deep gulches on the leeward side of the mountain where they have done terrible damage. At the head of Kamalo Gulch the goats have eaten the forest back almost a quarter mile in places and have reduced the forest on Kaapahu Cinder Cone to a few wind-stunted trees. The ridges especially at Mooloa are bare and badly eroded. In Kamalo Gulch itself few plants survive except close cropped grasses. Surely Molokai must lose more forest every year to these two animals than is reclaimed by reforestation with Eucalyptus and pines.

Secondary damage results from overgrazing when aggressive and often poisonous introduced plants colonize bald spots of ground stripped of their original cover. Apple of Sodom (Solanum sodomeum), pa-makani (Eupatorium glandulosum), lantana (Lantana camara), guava (Psidium guajava), and foreign grasses are among the most noxious, although near Puu Kolekole these weeds have not become serious pests. ...

Rain forest:

The rain forest, perhaps more properly termed "cloud forest" because of the extremely wet, cold climate and stunted trees burdened with epiphytes, covers the summit of East Molokai above an elevation of 3,500 ft. At this boundary a mixture of the hardier wet and dry land plants, broken by glades of uluhe or false staghorn fern (Dicranopteris linearis) and grass, marks the transition between the two zones. Thus, on the ridge between the two Kawela Gulches at 3,500 ft., small 'ohi'a dominate the forest along with less common 'olapa (Cheirodendron trigynum), kawa'u (Ilex anomala), and Gouldia sp. Shrubs include naupaka (Scaevola chamissoniana), pukiawe, pilo, kanawau (Broussaisia arguta), 'akia, and 'ohelo. Open areas are choked with uluhe (Dicranopteris; in some places Hicriopteris as well) accompanied by wawae-'iole (Lycopodium cernuum) and Cladium sp. Tree ferns or hapu'u (Cibotium sp.) and 'ama'uma'u (Sadleria cyatheoides) also make their appearance here. ...

The rain forest behind this transition zone varies from 20 to 30 ft. in height and reaches its best development in areas such as the northern region of the plateau between Waikolu and Pelekunu and behind Puu Kolekole cabin. Here large spreading 'ohi'a with the less common 'olapa form a canopy over smaller trees and tree ferns. These short trees and shrubs include young 'olapa, Clermontia arborescens, kolea (Myrsine lessertiana), pilo, and ho'awa (Pittosporum sp.)...

In places the trees do not reach 20 ft. and are densely crowded together allowing little light to pass for the sparse undergrowth. ...

Pigs seem to be the only feral animals with wide-spread distribution in the rain forest but their rooting and grazing appears to be serious only in areas transitional between wet and dry forest. ...

...Blackberry (Rubus), the only weed pest for real concern, has taken hold near the old tree nursery and must be eradicated immediately before Molokai's forests--both native and artificial--become choked with its impenetrable briers.

The bogs:

Molokai boasts three tiny open bogs of the kind for which Waialeale, Kauai and Puu Kukui, Maui are famous. These bogs, accessible by the Hanalilolilo Trail, are situated on the plateau between Waikolu and Pelekunu.

The bog vegetation consists of a compact matrix of dwarfed 'ohi'a, one to three feet in height, interrupted by tussocks of sedge (Oreobolus furcatus) and grass (Panicum isachnoides), Cladium, and clumps of gray moss.

BIRDS

Prior to the last decade our knowledge of Molokai's native birds was restricted to work done by collectors at the turn of the century especially by R.C.L. Perkins and W.A. Bryan. Perkins published first hand accounts of all the forest birds ever reported from Molokai, describing nine species: the Molokai Thrush (Phaeornis obscura), Molokai 'O'o (Moho bishopi), 'Apapane (Himatione sanguinea), Crested Honeycreeper (Palmeria dolei), 'I'iwi (Vestiaria coccinea), Black Mamo (Drepanis funerea), 'Amakihi (Loxops virens wilsoni), Kakawahie (Loxops maculata flammea) /Molokai creeper/, and 'O'u (Psittirosta psittacea). But Bryan, some ten years later in 1906, found the 'O'o already extinct and the Crested Honeycreeper and Black Mamo nearly so. By then the general decline of the native avifauna on all islands had become apparent and Munro, in his famous BIRDS OF HAWAII published in 1944, states that the only bird he had seen on Molokai recently was the 'Apapane, but that other species probably still lived. By the 1960s ornithologists assumed the 'Apapane and 'Amakihi to be common but feared all the other Molokai forest birds to be extinct. In 1964 Noah Pekelo reported two exciting discoveries--the Kakawahie and Molokai Thrush--both endemic to the island. This January a fifth bird, the 'I'iwi, was sighted during the survey. Below is outlined the distribution of bird species in the vicinity of Puu Kolekole and the observations made on field trips to adjacent areas during the first two weeks of January.

The abundant 'Apapane, a bird found on each of the Hawaiian Islands, inhabits all areas forested by 'ohi'a, from the summit cliffs down into the scrub on the dry ridges. However, the sightings of other native forest species have mostly been confined to the cloud forests lee of the Papaala Pali.

The 'Amakihi on Molokai belongs to a subspecies also shared by Maui and Lanai. It is not uncommon behind the cliffs north of Kolekole and north and east of the bogs. Along the trail following the cliffs from Pepeopae north to Ohialele the 'Amakihi became more common as one proceeds seaward. In the northern section of this plateau the forest is taller (30-40 ft., tall by Molokai's standards), the vegetation more open and the ground not as boggy as the dwarf forests near the summit. Here large spreading 'ohi'a form a canopy over other smaller trees and tree ferns...The 'Amakihi was more abundant here than elsewhere on Molokai although they were still not as common as their cousins the 'Apapane. This is where Noah Pekelo rediscovered the Kakawahie. Along the cliffs behind the cabin, from Kaunuohua east to Kuana Ridge the 'Amakihi was scarce. Further east, lee of the cliffs at Kumueli, Mr. Pekelo saw the Molokai Thrush. The only other sightings of 'Amakihi included a lone female or immature in Kuapia Gulch halfway along Forestry Road #19 and a pair near the cabin. That the 'Amakihi has abandoned the dry 'ohi'a scrub and even certain seemingly

suitable rain forest habitat (such as that along the Puu Kolekole Trail which I traversed nearly every day) is quite surprising, since on West Maui its brethen occupy a range comparable to that of the 'Apapane.

While returning from the Papaala Pali in the early afternoon on January 9th I heard an 'I'iwi in the tall, well-developed 'ohi'a forest one mile north of the cabin. The bird was singing softly and infrequently quite a distance off the trail, so that at first I supposed it to be one of the many 'Apapane busily feeding and singing in the flowering 'ohi'a. However, the loud clear whistles that occasionally rose above the 'Apapane chorus were suspiciously 'I'iwi-like, but attempting to locate the bird only succeeded in alarming it and "squeaking" failed to attract its attention. After a ten minute wait, however, the singer called from a nearby 'ohi'a and then approached more closely. When its curiosity was satisfied, it settled down to preen and sing a quiet song of fluty whistles and creaking notes. Three minutes later the bird wandered off up the nearby ravine. This was the only 'I'iwi seen during the two weeks on Molokai.

Other native birds observed were the Koa'e or White-tailed Tropicbird (Phaeton lepturus), Ae'o or Hawaiian Stilt (Himantopus himantopus knudseni), and migratory Kolea or Golden Plover (Pluvialis dominica). The Koa'e, a cliff nester, was found circling about the Papaala Pali; a pair of stilt were seen feeding on mud flats within walking distance of the Pau Hana Inn and, lastly, the plover foraged in the pastures around Puu Kolekole and, of course, along the shore.

It should be mentioned here that both the 'Ua'u or Dark-rumped Petrel (Pterodroma phaeopygia) and Newell Shearwater (Puffinus puffinus newelli) once nested on the cliffs of the great valleys and that the Noio or Hawaiian Noddy (Anous minutus melanogenys) used a cave on the coast between Pelekunu and Waikolu to nest and roost. In Bryan's time, the Hawaiians living in Pelekunu and Wailau would scale the pali to capture 'Ua'u, the young birds being considered a great delicacy. Specially trained dogs located occupied burrows for the men who then extracted the young birds with a forked stick that was wound into the chicks thick down. Bryan found the remains of several adult birds killed by mongooses which have since probably exterminated both petrels on this island although their status is unknown.

Introduced birds in the mountains include Black and Gray Francolins, Ringnecked Pheasant (Phasianus colchicus), Spotted Dove (Streptopelia chinensis), White-eye (Zosterops palpebrosus), Mockingbird (Mimus polyglottus), Ricebird (Lonchura punctulata), and House Finch (Carpodacus mexicanus). The first three mentioned are game birds inhabiting grass lands opened up in the forest by cattle and pigs. The dove, Ricebird and House Finch also visit these areas especially near gulches. The Mockingbird, however, prefers the dry forest and scrub. This leaves the White-eye as the only exotic that has successfully colonized the rain forest and in fact it appeared in all areas studied.

Molokai originally was inhabited by four other species of passerine birds: the 'O'u, Crested Honeycreeper, Molokai 'O'o, and Black Mamo. These occurred or had related species on other islands which are either extinct or not far from it suggesting that Molokai's four species on the extinction list stand a poor chance for rediscovery. However, we may find that the rarer species enjoy a wider distribution and larger populations than the scattered sightings of the past few years suggest since most of the good forests are so inaccessible and unexplored for birds. The areas with most potential appear to be the plateau between Waikolu and Pelekunu and the forests lee of the Papaala Pali. Mt. Olokui, which remains the unexplored citadel of Molokai's flora and fauna, may also harbor some interesting finds.

PROBLEMS AND PROSPECTS

Regardless of man's activities west of Waikolu and the deterioration, through overgrazing, of dry land areas to the south, and summit of East Molokai is still in amazingly good shape and steps should be taken to preserve it from any further destruction. This would call for:

1. The control of animal and plant pests. The cattle must be immediately removed, since their presence is a menace as well as illegal. Also, the goat population should be reduced substantially to stop them from denuding the hillsides and causing serious erosion on many ridges. Lastly, the blackberry must be extermi-

nated now before it spreads out of control.

2. A new legal status to insure the land's protection. ...The boundaries of an area well worthy of inclusion within the Natural Area Reserve System...would span the three great valleys, from the west wall of Waikolu to the east wall of Wailau and would be bordered on the north by the precipice along the windward coast and to the south by the forestry reserve boundary. (It might be a good idea, if a reserve does materialize, to protect the west wall of Waikolu and the east wall of Wailau with a small strip of land, say 200 yards wide, from dumping of garbage over the sides.) It would contain nearly all of Molokai's native forest birds and set aside some of the most magnificent scenery in the state. From Papaali Pali neither the view of Mt. Olokui rising 4,000 ft. from the floor of Pelekunu Valley nor, on a cloudy day, the spectre-of-the-bracken illuminated on the mist below are sights soon forgotten.

Thane Pratt's Molokai report was summarized by Steven Montgomery. It contained twenty pages, including excellent photographs and a map showing his proposal for a Natural Area, which he estimated by a planimeter method to cover 23,000 acres.

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AUDUBON VIEWPOINTS ON WILDLIFE CONSERVATION PROBLEMS IN HAWAII
Presented by William P. Mull at the Third Hawaii Wildlife Symposium
Wailua, Kauai, 4 October 1972

"Better protection of wildlife in Hawaii" has been the stated goal of the Hawaii Audubon Society for thirty years. Under the stimulus of the "age of ecology," current leadership in the Society has been taking a long, hard look at our <u>total environment</u> to see how we, as "birdwatchers," can better fulfill our wildlife conservation goal. Over the past couple years, we've increased our involvement in public issues that concern wildlife--and we've found that an environmentally concerned public is not only more <u>receptive</u> to the views of wildlife conservationists but more <u>perceptive</u> when it comes to equating wildlife conservation values to considerations of long-range human survival and well-being.

Despite this unprecedented opportunity for the wildlife conservationist to state his case to a receptive public, we've found that people won't buy a pig in a poke--and we've concluded that our opportunity will be missed, unless we can demonstrate that wildlife conservation goals are in the interest of the general public, not just for the benefit of a few birdwatchers, hunters or scientists. Clearly, we need a <u>broad</u>, <u>rational</u> basis for our wildlife conservation proposals--and it must be capable of <u>consistent</u>, <u>long-range</u> application.

The birdwatcher must be able to explain why protection of birds is important to people. The hunter must explain the full ecological implications of a sustained yield of game animals. The scientist must explain the worth to humans of species and ecosystems he wishes to perpetuate for further study. Furthermore, the agriculturalist and the forester must explain their programs in terms of long-range ecological impact--as well as short-range economics. In the end, all of us who have a conservation cause must be able to explain to an inquiring public the apparent conflicts between "ecology" and "economics." As it stands now, the public is confused and divided on conservation issues--largely because we, as conservationists, are divided among ourselves.

Here in Hawaii, the conservationist has <u>twice</u> the problem of his cohorts on the Mainland--simply because he has to contend with <u>double</u> the human pressure on the land. Furthermore, the wildlife conservationist in Hawaii is faced with an endemic-exotic conflict that is virtually unparalleled on the Mainland. He not only has to make basic choices between native and introduced wildlife, but having done so he must work out his own conservation models and rationale to suit a biological and ecological situation that is largely unique and to which Mainland conservation experience and philosophy have only limited application.

These are general conclusions within which officers in the Hawaii Audubon Society are now pursuing the Society's goals. Our prevailing viewpoint is that, among Hawaii's biota, endemic taxa and ecosystems are Hawaii's most unique and most well-adapted life forms--and that the odds are that they will prove to be Hawaii's most valuable long-range natural resource among the plants and animals that now exist here in the wild.

As a logical extension of this perspective, we view with skepticism any further introductions of new exotic species into the wild, and we see a necessity to discourage further encroachment of existing exotics into remaining native habitats.

These are not easy policies to pursue, either on the public stage or among ourselves. They bring us into apparent conflict with prevailing human values at every turn. They are, however, the only rational, long-range course we can perceive in terms of emerging knowledge and insights concerning the status of our biosphere in general and these islands in particular. If overpopulation of man as a species is a problem requiring programs to limit human population growth and human impact on the natural environment on the Mainland, then the problem has twice the urgency here. If accelerated reduction of species diversity is a major ecological problem worldwide, then we in Hawaii must face the compelling need to reassess the status of our indigenous natural environment and reverse our world-record trend toward extinction and endangerment of endemic species faster than nature can evolve new ones.

Our geographic isolation doesn't insulate us from the long-range implications of these worldwide truths. Rather, it emphasizes the need to get our wildlife house in order--and to do it in accordance with the unusual dictates of our real situation. It seems especially important that we overcome parochial interests among the conservation community in our own small house. We must all, it seems, pay more attention to what each of us is doing and why we are doing it. We would be well advised to be more discerning in equating our individual interests and proposals to the total conservation picture in Hawaii and to the total implications in what appears to be our deteriorating natural environment.

In the Society, we have found that we can't logically plunk for all-out protection of all birds in Hawaii--and that we can't view birds in a vacuum. If we are to present a credible, rational basis for our individual positions on specific wildlife issues, we have to evaluate, for example, how each bird we watch fits into the overall wildlife scene. To do this, we have to know something about native ecosystems--we have to know how birds relate to plants and snails and insects. Not only that, we must distinguish between endemics and exotics--not only among these other life forms, but even among the birds themselves. Inevitably, we must make distinctions between "good" and "bad" birds, trees, caterpillars and mammals--in terms of their particular roles in Hawaii's natural environment. Having made such value judgments, we have to explain them to the public in the context of specific wildlife issues and their relevance to human survival and well-being on these islands.

In the process, we end up supporting the elimination of ricebirds and linnets in the sorghum fields around Kilauea on Kauai--which bothers some birdwatchers and confuses the press. At the same time, we recommend more hunting on public and private land--which further confuses our image in various circles. Our opposition to the Koke'e Dam proposal on Kauai or to hapu'u (tree fern) harvesting in the Kilauea Forest Reserve on Hawaii is closer to our conventional image, but people still ask us to explain why we take such strong positions against these projects when, as they see it, birds in those places can easily move to nearby forested areas in the Alaka'i Wilderness Preserve or Hawaii Volcanoes National Park, as the case may be. Our explanations about habitat requirements, biological niches and complex ecological relationships are not entirely convincing to a public that is not yet fully appreciative of insular biological phenomena and that is hesitant to make personal sacrifices and change life styles for the perpetuation of species few of them have ever even seen.

No less provocative and controversial have been our questioning of game management and forestry practices that are undertaken in the name of "conservation." In the case of game management, it appears to some that, contrary to our stated goal, we are actually opposed to "wildlife conservation." We're asked: "What's wrong with a sustained yield of wild game...or tree plantations...or multiple use of native forests?" Our answer to these questions is: "Nothing is wrong with the basic concepts of recreation, meat and lumber for the people--but we must question game and forestry management practices that may not take fully into account the long-range viability of the total biotic environment upon which future generations of people on these islands will depend." We must question the long-range impact of sustaining yields of exotic game mammals that are destructive to native ecosystems, or of replacing diversified

native forest ecosystems with monoculture exotic tree plantations of uncertain economic value.

Here we run into conventional wisdom and short-range pragmatism of continental origin. Here we confront values whose long-range applicability not only seems increasingly questionable in our limited insular environment in Hawaii, but whose validity is even being seriously challenged on their vast home ground in the continents. How can we convince an inquiring but skeptical public that the future well-being of Hawaii's human population does not necessarily lie wholly in a sustained yield of white-eyes and doves, deer and goats, eucalyptus and plumeria blossoms, or highways and golf courses? How can we explain to the public--and to ourselves--the insights and implications we arrive at when we set out to protect a native honeycreeper and trace its connections with ecosystems and biomes and human ecology in these islands? How can we overcome reactions that our ideas are "too progressive" or "against progress," as the case may be--by the various conventional standards?

Clearly, man must change some of his attitudes and actions in order to lessen his adverse impact on Hawaii's natural environment. Clearly also, the wildlife conservationist must explain what he thinks is wrong and suggest how to correct it. And if he wants a constructive response, he must be careful to recognize not only what has been dreadfully wrong but also what is increasingly right. Certainly the public is concerned now that something is wrong--or they wouldn't listen to us at all. Certainly also there is official recognition of a need for better wildlife conservation practices, as indicated by Hawaii's three new and progressive public laws enacted within the past three years on (1) the establishment of natural areas, (2) closer control of exotic animal species and (3) protection of rare and endangered native land vertebrates. Thus, the process of change has already started--what it needs is intensified encouragement.

With these considerations in mind, along with our current perspective on wildlife conservation problems in Hawaii, we offer the following specific thoughts:

(1) We encourage the Division of Fish and Game to continue its field study of the black-tailed deer on Kauai as an ultimate replacement for the more destructive feral goat as a game animal--but with strict confinement of the herd to the original range projection. We further encourage and support the Division in its mouflon hybridization and feral-sheep-herd reduction efforts on Mauna Kea, Hawaii, to facilitate the perpetuation and enhancement of the singular mamane forest ecosystem there. Overall, we urge the Division to intensify and expand its efforts to monitor feral goat and pig damage to native ecosystems throughout the islands--and to increase seasons, bag limits and hunter pressure in all areas where damage to native ecosystems is apparent or in prospect. We strongly support Division efforts to get State-leased lands open to public hunting and to act as a friendly catalyst in getting agreements between private landowners and hunter groups, whereby the hunters agree to harvest specified numbers of feral goats and pigs to take their pressure off the land. We also support current Division work on the "Green Book" in cooperation with the U.S. Bureau of Sport Fisheries and Wildlife, concerning the status of native forest birds. Some time ago, we were glad to hear of the Division's proposal to undertake a much-needed study of the feeding biology of the Hawaiian stilt. We anticipate hearing that Pittman-Robertson funds will be used for such basic research on the requirements or endangered native waterbirds and forest birds. Such projects are necessary groundwork toward active implementation of Act 49, which can have a significantly beneficial effect on native birds and ecosystems--once it gets underway.

(2) Forestry plans and programs are of keen interest to the Hawaii Audubon Society. Efforts by the Division of Forestry to have State-owned marginal pasture lands returned to forest when leases expire is, to our mind, constructive long-range planning--especially with native tree species. In this connection, there is great potential value in research efforts with koa and mamane germination, and we look forward to research efforts by the Division on other native trees and forest plants--some of which may well have important but now-unrecognized future economic value. We commend Division willingness to suspend its plan to replant the Kea'a Forest on the Big Island with exotic hardwoods in favor of that remnant forest's existing natural values. We are encouraged by indications that the Division is de-emphasizing exotics

and increasing efforts on natives in its tree nursery operations. Along this line, we would support a Division review of its current Five-Year Forest Plan for the purpose of re-evaluating the advisability of replacing plots of native 'ohi'a-treefern forest with exotic hardwood plantings in such places as the Ola'a Forest Reserve on Hawaii. We applaud the Division's initiative on natural area reserves and urge a strong push to get such areas finally established. At the same time, we strongly support Division efforts to control and inhibit infestations of noxious exotic plants in native forest areas--such as recent control efforts against blackberry in the Kawaikoi Stream area on Kauai. In this connection, we encourage maximum Division cooperation with the Department of Agriculture in a concerted effort to discover and introduce--yes, "introduce"--host-specific biological control agents against noxious exotic plants, such as have been applied with marked success against panini (cactus), lantana and Maui pa-makani in some places. It was encouraging to read the resolution by the Society of American Foresters against the release of Axis deer on the Big Island. Could the same scientific rationale be applied to insure that the black-tailed deer on Kauai be contained in their originally-projected range?

(3) The programs of several federal agencies are of vital interest. Programs to control, fence out and, hopefully, get rid of feral ungulates in the National Parks at Haleakala, Maui, andVolcano, Hawaii, are essential to basic park values. The experience and knowledge gained from those programs and their associated field research could have effective application elsewhere in the State. The extended, intensive study of endemic Hawaiian bird species by the federal biologists from Patuxent promises much-needed data--when the results of their research finally are published. Acquisition by the U.S. Bureau of Sport Fisheries and Wildlife of the large Hanalei wetland acreage on Kauai as a permanent refuge for Hawaiian waterbirds is a major step toward effective protection of these endangered species on Kauai. When will there be news of permanently protected sanctuaries on Maui, Oahu and the Big Island?

The above efforts signal progress toward better protection of Hawaii's native wildlife and ecosystems--but much more needs to be done, and greatly increased public understanding and support is essential to that end. Part of that job falls to the Hawaii Audubon Society. We rely heavily on the findings of basic field research on native species and ecosystems by the scientific community, but support for such ecological fact-finding is, to our minds, grossly inadequate. Without more facts, we can neither present effectively our wildlife conservation goals to the public nor, indeed, can we be certain that our current viewpoints are entirely correct.

The agenda items and speakers for this meeting of the Wildlife Society promise to shed more light than heat on some of Hawaii's most pressing specific wildlife conservation problems. We are grateful for this opportunity to participate--and to learn.

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AMERICAN BIRDS, Vol. 25, No. 6, Dec. 1971, pp 948-949: Announcing--The Blue List: an "early warning system" for birds

With this issue AMERICAN BIRDS inaugurates the maintenance of a list of North American bird species which are of especial concern, and of which observers are asked to take particular note. The species named to this list are ones which have recently or are currently giving indications of non-cyclical population declines or range contractions, either locally or widespread. ...

When a species is added to the Blue List, that is a signal to observers everywhere to be aware that observations (or the lack of them) of that species are especially wanted, and valuable. ...

The Blue List is essentially an "early warning system." In itself it cannot prevent the decline of any species in trouble. But by focusing the attention of our thousands of observers on problem species, it cannot help but improve our understanding of their changing status, and alert the scientific community, governmental agencies, and the general public to situations that need action. If successful, Blue List data can help prevent these species from silently slipping onto the endangered list. ...

The Blue List, January 1, 1972 (Preliminary-Tentative): Brown Pelican, White Pelican, Double-crested Cormorant (inland populations only), Great White Heron, Reddish

Egret, Black-crowned Night Heron, White-faced Ibis, Wood Ibis, White Ibis, Fulvous Tree Duck, Mexican Duck, Turkey Vulture, Black Vulture, Swallow-tailed Kite, Sharp-shinned Hawk, Cooper Hawk, Red-shouldered Hawk, Ferruginous Hawk, Harris Hawk, Marsh Hawk, Osprey, Caracara, Prairie Falcon, Pigeon Hawk, Sparrow Hawk (Florida), Sharp-tailed Grouse, Sage Grouse, Limpkin, Snowy Plover, Am. Oystercatcher, Least Tern, Barn Owl, Burrowing Owl, Red-cockaded Woodpecker, Gila Woodpecker, Red-headed Woodpecker, Bewick Wren, E. Bluebird, W. Bluebird, Mountain Bluebird, Loggerhead Shrike, Gray Vireo, and Bachman Sparrow.

The following birds have been reported declining in numbers in certain parts of their range and are being considered as possible additions to The Blue List: Great Blue Heron (Midwest), Swainson Hawk (S.Calif.), Clapper Rail (Calif.), Roseate Tern (Gulf Coast), Yellow-billed Cuckoo (Calif.), Short-eared Owl (Central Rockies), Red-shafted Flicker (S.Calif., Central Rockies), Red-headed Woodpecker (Florida), Scissor-tailed Flycatcher (S. Plains), House Wren (S. Atlantic, Midwest, N. Rockies), Bell Vireo (S.Calif.), Yellow Warbler (Colo.), Le Conte Sparrow (Gulf Coast), Fox Sparrow (N. Rockies).

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Since the Blue List is meant to complement the official US List of Endangered Species, which includes twenty-nine Hawaiian bird species or subspecies, and since the preliminary Blue List did not consider the native Hawaiian birds, Mae E. Mull has submitted 16 candidates for the Blue List.

AMERICAN BIRDS, Vol. 26, No. 4, Sept. 1972, page 703: The Hawaiian Candidates for the Blue List

The State of Hawaii leads all the others, and all other areas of the world of comparable size in the numbers of recently extinct species of birds, and in the length of the list of presently endangered species. Enactment of the first legislation in Hawaii's history to protect Hawaii's unique avifauna, Act 49, the Endangered Species Conservation Act, has recently signed into law by Governor John A. Burns.

While enactment of this legislation will not immediately and automatically reverse historical trends in Hawaii, it will help, if implemented by education, observation, research, and enforcement to slow the swift decline of the threatened endemic species.

Principle reasons for the desperate situation of some species, and the "to-be-watched-closely" situation for others, are: Native forest habitats on the main islands continue to be modified rapidly by (1) reforestation with exotic timber, (2) spread of escaped exotic flora, (3) maintenance of hunting populations of feral goats, feral sheep and feral pigs, (4) maintenance of hunting populations of introduced axis deer, black-tailed deer, pronghorn and mouflon, (5) populations of mongooses, rats and mice, (6) populations of exotic bird species, and (7) "development" projects.

There are sixty-eight bird species thought to be endemic to Hawaii. Of these, twenty-three species are extinct, twenty-nine are on the U.S. List of Endangered Species (including one "Rare"), and the remaining sixteen species are recommended candidates for all or part of their range for "The Blue List."

As well as undergoing rapid modification, the native forest areas of the separate islands provide a limited range for these endemic forest birds, which makes these 16 species more vulnerable to changes in their habitat.

1. Hawaiian Owl(Pueo) Asio flammeus sandwichensis In modest numbers, but uncommon on Oahu
2. Hawaii Thrush('Oma'o) Phaeornis obscurus obscurus Limited range on Hawaii only
3. Oahu 'Elepaio Chasiempis sandwichensis gayi Limited range on Oahu only
4. Kauai 'Elepaio Chasiempis sandwichensis sclateri Limited range on Kauai only
5. Hawaii 'Elepaio Chasiempis sandwichensis sandwichensis Limited to Hawaii
6. Kauai 'Amakihi Loxops virens stejnegeri Limited to Kauai
7. Oahu 'Amakihi Loxops virens chloris Limited to Oahu
8. Maui 'Amakihi Loxops virens wilsoni Limited to Maui, Molokai, and Lanai
9. 'Anianiau Loxops parva Limited to Kauai
10. Hawaii 'Amakihi Loxops virens virens Limited to Hawaii
11. Kauai Creeper Loxops maculata bairdi Limited to Kauai
12. Maui Creeper Loxops maculata newtoni Limited to Maui
13. Hawaii Creeper Loxops maculata mana Limited to Hawaii
14. 'Apapane Himatione sanguinea sanguinea Blue List candidate for Oahu, Molokai,

and Lanai. Remains abundant in local native forests on Kauai, Maui and Hawaii.

15. 'I'iwi Vestaria coccinea Blue List candidate for Oahu (no reliable report for 4-5 years), Molokai /seen 9 January 1972 by Thane Pratt/and Lanai (may be extinct). Remains moderately abundant in local native forests on Kauai, Maui, and Hawaii.

16. Kauai 'Akepa Loxops coccinea caeruleirostris Limited to Kauai

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Since the publication of "The Blue List"...observers in different parts of the continent have reported their field studies to be in variance with the list. ...It is to be emphasized that the original list was intended to be...a preliminary, tentative list, subject to constant survey and revision. ...Meanwhile, we have been informed that the US Fish and Wildlife Service is about to adopt the Blue List. ...

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RAPTOR RESEARCH, Vol. 6, No. 1, Spring 1972, page 48: Bird Treaties Signed with Japan and Mexico

The US Government recently signed a bilateral agreement in Tokyo to protect 189 species of birds that fly between Japan and the U.S., mainly from Alaska. The treaty, which provides preservation of migratory habitats and sets a ban on the import and export of birds that are considered endangered, is hoped to curtail some of the alarming decline in Japanese migratory birds. ...

Among the species that fly between the two countries and are endangered are the Short-tailed Albatross, Peregrine Falcon, and Aleutian Canada Goose.

In ceremonies held in Mexico City on March 10, the U.S. and Mexico formally ratified amendments to the 1936 Migratory Bird Convention which extends extra protection especially from wanton shooting, to 32 new families of birds.

Included are the six families that contain all the birds of prey. Also, the amendments now give the U.S. Government authority to arrest persons caught taking any of the following endangered species: American and Arctic Peregrine Falcon, Brown Pelican, California Least Tern, California Condor, Hawaiian Crow, Hawaiian Dark-rumped Petrel, and Florida Everglade Kite.

The amendments increase from 31 to 63 the families of birds protected under the treaty with Mexico. Among the new families added, 11 were already protected in the U.S. under the 1916 Migratory Bird Treaty with England, acting for Canada. Also, some of the species were protected already under individual state laws. ...(From CONSERVATION NEWS 37(9):13, 1972)

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J. d'Arcy Northwood
By Grenville Hatch

We are saddened to learn of the death of our old friend d'Arcy Northwood in Cape May Point, New Jersey, last spring.

d'Arcy became the first president of the Hawaii Audubon Society when it was formed in 1939, and we have much for which to thank him. It was he who established the general lines of our endeavors: to work for conservation, to augment the body of information on Hawaiian birds, to recognize the importance of keeping records of our sightings, but at the same time never to lose the fun and joy of birding. It was a privilege to go birding with him. His delight in birds and out-of-doors was almost palpable, but he was always ready to help a beginner, to instruct in the best techniques of birding.

One of his great contributions was his book FAMILIAR HAWAIIAN BIRDS, published in 1940, now, unhappily, out of print, and almost impossible to find.

d'Arcy was so much the heart and soul of our little society that we felt devastated when he left Hawaii in the fall of 1944. He was our president, presided over our meeting with dignity, edited and largely wrote THE ELEPAIO, led us along the trails, and taught us to recognize the birds and their calls. Our regrets over his departure were only lessened because he changed his occupation to full-time work with the out-of-doors. As Executive Secretary of the New Jersey Audubon Society, as Warden for the

National Audubon Society at Lake Okeechobee in Florida, as Manager for the Mill Grove Sanctuary in Audubon, Pa., his great talents benefited many people, and he was freed from "pushing a pen", as he used to say of his previous employment, ruefully.

d'Arcy's death leaves a gap in our lives, although we had not seen him for some years, but we are richer and happier for having known him. This writer, for one, has him to thank for developing the most absorbing interest of her life -- birding.

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ALOHA to new members:

Junior: Jean Jacobi, 2884 Komaia Place, Honolulu, Hawaii 96822
Arnold Ikawa, 47-470 Hoopala St., Kaneohe, Oahu 96744

Regular: Lorin T. Gill, 4110 Round Top Drive, Honolulu, Hawaii 96822
Sandra J. Guest, 2715 Kolo Place, #25, Honolulu, Hawaii 96814
Randolph Harker, PO Box 396, Koloa, Kauai 96756
Alan D. Hart, Dept of Entomology, Bishop Museum, Honolulu, Hawaii 96818
H. Eddie Smith, Dept of Zoology, University of Hawaii, Honolulu, HI 96822
Mrs. J. Patricia Swenson, 2053 Alihilani Place, Honolulu, Hawaii 96822
Karen Swenson, 2053 Alihilani Place, Honolulu, Hawaii 96822

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To the outgoing and incoming officers: MAHALO NUI LOA

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HAWAII'S BIRDS, a field guide, is available for $2.00. Send in your orders to: Book Order Committee, Hawaii Audubon Society, PO Box 5032, Honolulu, Hawaii 96814.

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JANUARY ACTIVITIES:

8 January - Board meeting at McCully Moiliili Library, 6:45 p.m. Members welcome.

14 January - Field trip to study shore and waterbirds. Bring lunch, water, and if possible your car. Transportation cost ($1.00) to be paid to the drivers. Meet at the State Library on Punchbowl Street at 8:00 a.m. Leader: Dr. William Wingfield, telephone 732-5884.

15 January - General meeting at the Waikiki Aquarium Auditorium at 7:30 p.m.
Program: 1. Wildlife and the Human Environment by Maurice Taylor, Division of River Basin Studies, US Bureau of Sport Fisheries and Wildlife, Kailua, Oahu
2. Nihoa and Laysan Finches on color film by Eugene Kridler of US Bureau of Sport Fisheries and Wildlife, Kailua, Oahu

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HAWAII AUDUBON SOCIETY EXECUTIVE BOARD:

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Treasurer: (Election deferred until January meeting)
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