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A BRIEF HISTORY OF EXOTIC GAME BIRD AND MAMMAL INTRODUCTIONS INTO HAWAII WITH A LOOK TO THE FUTURE*

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First Installment

Introduction

The history of game animal introductions to Hawaii parallels that of many other areas with one major difference. With the exception of the endemic waterfowl and marshbirds, and migratory waterfowl and shorebirds, there were no game animals native to the islands at the time of their settlement by man. Thus, introductions were made not to augment existing game populations as in other states, but rather to provide the initial game resource. Because at the present time the survival of most of the endemic species is threatened and migratory birds do not winter here in numbers great enough to support hunting, introduced game animals alone provide sport shooting for Hawaii's burgeoning population. The purpose of this paper will be to put into perspective the evolutionary process of these introductions from that of indiscriminate releases by private individuals to the present scientifically-based program of liberating animals compatible with the economy and ecosystems of the Hawaiian Islands.

Prior to 1919

The first potential game animals introduced to Hawaii were the junglefowl and pig, which the pioneering Polynesians brought with them for food, and which eventually went wild. The early explorers brought gifts of domestic goats, sheep and cattle for the Hawaiian kings, and these also reverted to a feral state eventually to become game animals. The first birds deliberately introduced as game were wild turkeys and pigeons of unknown species shipped by private means from China to Hawaii in 1788 (Locey, 1937). Sporadic introductions from all over the world continued and, by 1865, Chinese ring-necked pheasants and California valley quail were well established and provided considerable sport shooting. The first true game mammal introduced was the axis deer (Cervus axis), an Indian species, released by private interests on Molokai in 1868 and from there to Lanai in 1920. It adapted and thrived and is today a game mammal of major significance. Several brush-tailed rock wallabies (Petrogale penicillata) escaped from captivity in 1919 and established a small colony on Oahu which exists to this day. Although on the game mammal list, they are not open to hunting due to their limited numbers. Between the years 1788 and 1919, hundreds of exotic game birds were introduced by the Royal Agricultural Society and individuals with little thought as to their possible effect on the environment, natural or otherwise. Few records were kept, and species were listed merely as "quail" or "doves." Hunting was done indiscriminately with few government controls until the early 1900's, when hunters and conservationists became alarmed at the dearth of game, particularly the bird species.

*Presented at the Conference of the Western Association of State Game and Fish Commissioners - Honolulu, Hawaii, July 19, 1967.

Prior to 1945

In 1919, with the establishment of the Fish and Game Commission the management of the game bird and mammal resource was made the responsibility of the Territorial game warden who was directed to promote the introduction, release and protection of exotic game birds. An outgrowth of this mandate was the establishment of a game farm on Mokapu peninsula on Oahu in 1921. Stock was received directly from the country to which the bird was native, from game farms in the United States, or trapped from the wild on other islands of Hawaii. A wide variety of species were reared, often at the suggestion of sportsmen, and released on private as well as public lands. In 1928, in an effort to assess the extent of the game bird resource, questionnaires were sent out to hunters to determine the distribution and abundance of game birds in the islands. At first up to 800 game birds were being liberated each year, but with the installation of electric incubators in 1930, production leaped to 10,000 birds per annum. Releases were still being made on a hit-or-miss basis, but as the warden staff increased and techniques were improved, liberations were more opportune and made in more suitable areas. However, no study was made to determine the survival of game farmed birds or to find out how many reached the hunter's bag. In fact in 1936, it was decided to release birds after the hunting season to assure their survival. During the December 7, 1941 attack on Oahu, the game farm was virtually wiped out and the stock that survived or did not escape was sold as a supplementary food supply. Hunting was suspended during the war years, and no further deliberate releases were made by the government. In 1933 Edward L. Caum viewed the chaotic exotic bird introductions with alarm and wrote a paper entitled "The Exotic Birds of Hawaii" with the express purpose of recording previous introductions and their success in an attempt to prevent the importation of birds already tried and found to be unsuited to Hawaii (Caum, 1933).

Present Program - Beginning in 1945

With the passage of the Pittman-Robertson Act and the end of the War, a scientifically-based program of game bird and mammal management was initiated by the newly formed Game Bureau of the Territorial Division of Fish and Game. Pittman-Robertson funds were first used to hire Mr. and Mrs. Charles Schwartz to bring order out of chaos in the game bird area, and the result was a classic game bird survey embodied in their report, A Reconnaissance of the Game Birds in Hawaii," completed in 1947 (Schwartz and Schwartz, 1947). Based upon the Schwartzs' recommendations, a sound research and management plan for game birds was set up and implemented in 1949. Seventeen pairs of Indian chukar partridge (Alectoris graeca chukar) were released in that year on the Island of Hawaii and in 1955 biologists estimated a population of 30,000 birds on the island. This phenomenal success led to further searches for suitable exotic birds, and with the assistance of the U.S. Fish and Wildlife Service, through its Foreign Game Introduction Program, an accelerated plan for the introduction of exotic game birds began. Because of the extensive xeric habitat found in Hawaii, particularly on the leeward portions of the islands, the program was geared to filling those niches which appealed to birds of arid and semi-arid vegetative zones. Based upon recommendations of the USFWS biologists stationed in India and Africa, several species of Asian game birds were imported, including five species of francolin partridge (Francolinus sp.), the Barbary partridge (Alectoris barbara barbara), and Indian sandgrouse (Pterocles exustus hindustan). In addition, Gambel's quail (Lophortyx gambeli gambeli) and Rio Grande turkey (Meleagris gallopavo intermedia) were wild-trapped in Nevada and Texas, respectively, and shipped to Hawaii for release. Two techniques of liberation were employed. In most instances, birds of game farm origin were held in portable predator-proof "gentle" release pens in suitable locations for a period of weeks and then liberated. Food and water were provided continuously until the birds no longer frequented the site. Wild-trapped birds were given "violent" releases after appropriate dusting for ectoparasites. The location of the release was determined after consultation with the USFWS field team and usually made where

several vegetative zones converged to provide dispersal alternatives for the birds. In contrast to most States which liberate game birds in units of thousands, the number of each species released in Hawaii on any one island has seldom exceeded a few hundred. The establishment of grey francolin (Francolinus pondicerianus interpositus) on Lanai, for instance, was achieved through the release of only 467 birds. Of the 12 species of birds introduced since 1957 by the State under this program, four are now considered established and six have been opened to public hunting. (Two species not known to be established so closely resemble other game birds that they have been put on the open list because hunters are unable to distinguish between them in the field.) Twenty additional exotic game birds have been brought in and released by private ranchers since the late 1950's but have become established only in a limited way in areas where intensive management is practiced. (Near "sanctuaries" where food and water are provided in large quantities and intensive predator control is carried out.)

Concurrent with the exotic game bird introduction program, plans to fill vacant big game niches were initiated in 1954. Feral pigs were found abundantly in a variety of habitats from sea level to 10,000 feet elevation in pasture lands, semi-desert areas, sub-alpine regions, and particularly in the rain forests. Feral goats filled the precipitous gulch and cliff areas on all islands and the vast lava areas on Hawaii and Maui. Feral sheep adapted to high mountain slopes on the Island of Hawaii. Feral cattle were hunted from time to time where ranch lands blended into native forests. But because these prolific feral animals are difficult to control in inaccessible locations and are particularly damaging to their ranges due to their herding instincts, it was felt that truly wild species must be introduced to eventually replace them in problem areas. Also, there were a few habitats such as the grassy tablelands on Lanai which entirely lacked a big game mammal. The first game mammal introduced was the mouflon or European bighorn (Ovis musimon) which was selected for its trophy qualities, adaptability to even-climated areas and availability in zoos. It is now established on the Island of Lanai where limited hunting seasons are now held, and it will eventually supplant the goat there. On Hawaii, a unique experiment to hybridize this species with the feral sheep to produce a more desirable animal was commenced in 1957 (Walker, 1960). At first crossbreeding was done in captivity but hybridization is now occurring naturally on the island, and the hybrid rams provide handsome trophies for sportsmen. The pronghorn antelope (Antilocapra americana) was imported directly from Montana to Lanai in 1959 and was the first transplantation of pronghorn outside the continental U.S. (Nichols, 1960). Of the 40 animals which were shipped, only 18 survived on Lanai, and the present herd is estimated to number 150. This species adapted readily to the grassland plateau on the island, and the herd size is now limited only by the approximately 35 square miles of available habitat. A short hunting season on a drawing basis was held in 1966. Forty blacktailed deer were donated by the Oregon State Game Commission to the State of Hawaii between 1960 and 1966 and adjusted quickly to the brushy forest on the west side of the Island of Kauai (Swedberg, 1967). The herd is estimated now as 150 animals (Swedberg, 1967 pers. comm.), and a limited buck season may be in order soon. These big game releases were made on an experimental basis. That is, a relatively small number was released in an easily accessible area so that if they proved to be in conflict with the economy or the environment they could easily be removed through hunting or trapping. Although the original mouflon and pronghorn releases were made directly from the crate to the field, in subsequent mouflon and blacktailed deer releases, the gentle release technique was used to lessen the shock. Seven-foot stockproof pens were constructed at locations providing optimum food, water and cover and the animals held within them until they became acclimated. After their release, grain, hay and water were provided until the animals no longer frequented the release site. Initially, intensive follow-up observations were made on each flock to determine their movement, food habits and habitat preferences.

Safeguards to prevent the introduction of big game and game bird species which might have detrimental effects have been followed. Before any animal is approved for

importation, the importing agency must satisfy an exotic introduction committee that the species will not have harmful effects on agriculture or the native flora and fauna. The committee consists of scientists of the State Department of Agriculture, the Division of Fish and Game, the University of Hawaii, the Bishop Museum, the Honolulu Zoo, and representatives of the community. Once approved for importation, each species must go through strict quarantine procedures set forth by the State Veterinarian.

Future Plans

Two major vegetative zones in Hawaii still lack game birds of any kind. These are (1) the extensive transitional forests just above the dry mesquite (Prosopis chilensis) zone and below the wet native forest typified by vast growth of guava trees (Psidium guajava), and (2) the native rain forest itself. The latter region supports many species of endemic songbirds which would not suffer from the introduction of a ground dwelling species. In addition, certain types of South American birds, including tinamou, are currently slated for release in brushland and grassland areas. Because the mouflon has proven itself as an animal well adapted to Hawaii and one which is readily controlled by public hunting, future releases on Kauai and perhaps Maui are planned. Axis deer have already been transplanted to Maui, and it is hoped that in the future it can be established in the vast semi-arid parkland forests of the Island of Hawaii. If the results of the blacktailed deer experiment indicate that this species is adaptable to the Kauai environment and presents no problem from a nuisance standpoint, releases on other islands will be considered. Other species such as the black buck (Antelope cervicapra) of India and ibex (Capra ibex) of Eurasia have been suggested as potential game animals, and investigations into their suitability will be carried out in the future. In recent years, ranchers and private hunting clubs have recognized the dollar value of hunting and have consulted the government as to game animals which might be introduced to their lands. Future importations will be directed towards filling the demands of both private and public hunting programs. As each species of exotic bird and mammal becomes adapted and as open seasons are planned, life history studies will be initiated to better manage the resource.

To be continued

The following is an extract from the 1881 THURM'S ANNUAL, pp 39-40: GAME LAWS AND GAME OF THE HAWAIIAN ISLANDS.

(Margaret Titcomb's contribution)

As the game laws of this country are but little understood, even by many of our own residents, and as strangers, having a few days to spend in town, wishing to enjoy a little "sport," are liable by a transgression of the same to be placed in an awkward situation, it is deemed proper that a portion of our space should be devoted to an epitome of the laws as they now stand; and as intimately connected therewith, a few remarks upon the game which the country affords may be considered quite appropriate.

Persons wishing to shoot game within the Kona district, are required by law to pay a license of five dollars per annum; and such as are found violating the law, are liable to a fine of fifty dollars for each offense. The Kona district* includes Honolulu Town, and is bounded by Moanalua, Maunaloa, and the mountains between, which bisect the Island at this, its southeasterly portion. The law applies no farther, and no license is required to carry fire-arms for sporting purposes in any other part of the Kingdom. This license, however, gives no privilege to shoot game that is otherwise tabu, as has been erroneously supposed by some.

The birds which the law protects are: All insectivorous birds of foreign importation; the "kolea, or plover;" the "long-legged, or stilt plover" (kukulualo);

*The ancient Polynesian definition was that "kona" meant leeward, a place sheltered from the trade winds. Areas on the southwest or western areas of Oahu, Molokai and Kauai were called kona regions in early days, but the Kona Coast of the Big Island is the only designation that has persisted to modern times.--(HONOLULU STAR BULLETIN, Sept. 22, 1967, p. A-4)

and the "lesser pied plover, or akeke." Foreign-imported birds (insectivorous) are protected by a fine of ten dollars to any one "killing, snaring, or trapping" them, regardless of time or season; while with the plover and the other-mentioned birds, the law is applicable only during a stated portion of the year, extending from the 1st of August to the end of April, the fine for killing either of which is one dollar. This law, if enforced, would virtually amount to a total prohibition against the destruction of these birds, as during the time of prohibition there are scarcely any to be found, the entire period being occupied by their migrations; at least this is so of the golden plover and the akeke, or dunlin, the most numerous and most prized of the family. But the law has so long remained a dead letter, that there are few who are aware even of its existence; and it would be an injustice if, at this period, any prosecution should be held under it. The law was originally framed under the mistaken supposition that they were effective in checking the periodical inroads of the army worm, which are so destructive to vegetation in general, and pasture in particular.

Pigeon shooting, although illegal, owing to their rapid increase, and prodigious numbers in certain places, has long been allowed; and the same remarks as have been made in regard to the shooting of plovers apply equally here.

Of ducks, there are three or four varieties, including teal, which, however, are very rare, the common native wild duck being the most numerous; their habitat is ferny or boggy places, especially such as abound in aquatic plants. But the haunts of this much-prized game are daily being more and more circumscribed by the progressive absorption of our marshes and taro-lands for the purpose of rice-culture, a growing industry, with scarcely an exception, entirely in the hands of the Chinese. By the presence of laborers in the fields, and the incessant discharges of fire-arms for the purpose of scaring away granivorous birds from the rice, the wild duck is most effectually being driven away from his usual places of resort; especially is this so of Waikiki, Manoa, Kalihi, and Ewa, near town; and the sportsman may now look in vain for a brace, where a few years since he might have found them by the dozen.

During the month of August our shores are visited by vast numbers of what are commonly known here as the "nor'west ducks," being common to the waters of more northerly latitudes, and which, after spending their winter here, migrate again to the north, their migrations synchronizing with the migrations of the plovers. These birds are extensively gregarious, and are seldom seen excepting in large flocks often numbering hundreds or even thousands, their usual places of resort being the sea shore--either in the still bays or the large fishponds along the coast.

Curlew, although not plentiful, are yet to be found in certain places, and are perhaps more numerous on the Island of Molokai than elsewhere. Their most common feeding grounds on the Island are the flats between Kalihi and Moanalua, and at Ewa; they are also occasionally to be met with at Koko Head.

Coots, or mud-hens, are plentiful in all the marshes throughout the Islands; but owing to the absence of flavor in their flesh, and the toughness of their tegumentary covering, which requires removal in order to fit them for cooking, they are but little esteemed by the sportsman.

Hawaiian geese, birds indigenous and peculiar to this Archipelago, are to be found on the mountains of Hawaii, and are numerous in the vicinity of Mauna Loa. Imported quail have multiplied rapidly on most of the Islands; and on this Island may be found in considerable numbers in the mountains of Waianae, and at Halemanu and Wahiawa.

Among other imported birds esteemed as game may be mentioned pheasants and stock-doves, the latter of which make the town echo with their cooing at early morn. The former-mentioned birds are breeding fast on the ranch of H.R.H. Keelikolani, on Molokai; there are some also at Kahuku and Malaekahana (the property of Mr. James Campbell), on this Island, and were originally imported by Mr. Moffitt, the former owner of the Kahuku Estate. A.C.S.

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If you have similar articles, please share with other members. Your help is needed.

Field Trip to Manana Island, August 13, 1967, by Harry Whitten:

Brown and bare Manana Island was far greener than usual. This was the change most noted by Hawaii Audubon Society members on their annual visit to the tuff cone in the ocean seven-eighths of a mile off the main Oahu shore.

The grass was taller, it was more luxuriant, and the soil, strengthened by grass roots, was less apt to cave in on top of the shearwaters' nests. Wild tobacco plants were thriving. Heavy rains of the last few months can be thanked for the healthier vegetation on Manana.

The visit to Manana was, as always, a fascinating experience. It's a surprise to find the grass and coconut trees. It is a surprise to find that this island, which looks bare and lifeless from the shore, is almost pulsating with life, with thousands of wedge-tailed shearwaters, common noddies and sooty terns flying overhead.

Photography enthusiasts had a field day.

The sooty terns were through with their nesting, although there were some immature birds to be seen. But when we gingerly stepped our way along the ridge leading to the 361-foot top of the island, we had to be careful to avoid stepping on eggs and chicks of the common noddies. Very few of the young noddies had started yet to acquire their plumage.

The shearwaters were busy nesting in burrows among the grass; we saw one chick that was starting to peck its way out of its shell.

We saw two Bulwer's petrels in one nest in a hole in the cliff. Jack Throp saw a fairy tern. Bob Pyle saw four ruddy turnstones.

Two adult red-tailed tropicbirds were seen, one on a nest with a medium-sized downy chick. This is the first known record of the red-tailed tropicbird nesting in the main Hawaiian Islands east of Lehua, according to Bob Pyle.

As for the rabbits that have given Manana its popular name--we didn't see any, but we saw plenty of rabbit droppings.

The group of 25 members and guests spent about four hours on the island. Again, as in recent years, boat transportation from Koolau Beach near Sea Life Park was provided very capably by Harold Ahuna of Waimanalo.

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Editor's note:

The red-tailed tropicbird's nest is apparently the first known nesting of this species in the main Hawaiian Islands east of Lehua. It was in a well-worn crevice in the sheer cliff face about six to ten feet below the top, a little west of the high point at the north corner of the crater rim. The nest was found after two tropicbirds were observed in flight, one of which flew in to the nest. Although in a precarious position, the adult with magnificent red tail feathers was observed on the nest by many of the Audubon group, including Carl Frings, Robert Pyle and others. The nest contained a medium sized downy chick. The nest was photographed on the 20th and also on at least two other days during the following week.

Ten days later two red-tailed tropicbirds were observed circling low over Mokuili Island (Chinaman's Hat), but they did not land on the island. The numerous observations of red-tailed tropicbirds in recent years along the windward coast from Koko Head to Mokuili suggest that this species is now occurring here in greater frequency and numbers than it was a decade ago.

FOR JUNIOR MEMBERS:

Two years ago we talked about the whooping crane as one of the rare and endangered birds. (See THE ELEPAIO, Vol.26, No.5, pp 42-44) The following articles are additional information on this rare bird:

News items on whooping cranes - - - (Ethel Matheson's contribution, 11 June 1967)

TWO WHOOPING CRANES HATCHED IN CAPTIVITY

Two tiny whooping cranes shattered their eggs in an incubator yesterday at the Patuxent Wildlife Research Center and thereby may have changed the history of

their species. The artificial hatching of the eggs, swaddled in hot water bottles and flown in from the wilds of northern Canada, is part of a joint American-Canadian venture to keep whoopers from extinction. The two new arrivals bring the world's whooping crane flock to 45.

But it may be that the birds' problems are only beginning. Whooping cranes tend to become "fixated" on the first object they see, thinking it is their mother, explained Charles Most of the Bureau of Wildlife and Sports Fisheries. Since the mother of yesterday's newborns is in Canada, officials tried to simulate a mother at Patuxent: They dressed themselves all in white when going near the chicks, and had two whooping crane cutouts waiting in the nursery for the event. Six eggs in all were collected in northern Canada and flown to Patuxent. One hatched on the plane but the chick died in the lap of a researcher for lack of oxygen. The others arrived at Patuxent on Monday, were placed in a special incubator and kept under 24-hour watch. The big moment is expected at any time for the other three eggs. The cost of the plane ride alone was \$750.

TWO OTHERS DOING WELL, THREE NEW CRANES READY TO HATCH

While the world's two newest whooping cranes were resting comfortably in larger quarters late yesterday, egg watchers at the Patuxent Wild Research Center reported that a third of the rare chicks was busy picking at its shell. Peeping sounds were coming from the two remaining eggs of five flown in from northern Canada last week, observers said, and the chicks were expected to hatch today. A sixth egg hatched during the flight but the chick did not survive.

The two chicks that hatched Friday, both cinnamon colored and a gangly five inches tall, were moved to individual cages under a heat lamp yesterday. They will have to be kept apart until late fall, said Ray Erickson, the Center's assistant director, because cranes like to fight, even within families.

It will be a year before the sex of each new chick can be determined. The cranes will be kept flightless in wire enclosures, Erickson said, as breeding stock. They may live more than 20 years and, after they mature at five years, may produce as many as ten eggs a year, he said....

AUDUBON LEADER'S CONSERVATION GUIDE, Vol. 8, No. 12, June 15, 1967:

CRANE EGGS: SO FAR, SO GOOD

The current experiment to raise captive whooping cranes is, thus far, a success according to the U.S. Fish and Wildlife Service. Five whooping crane eggs were taken from the nesting grounds in Canada by U.S. biologists in cooperation with the Canadian Wildlife Service, with no apparent disruption to the adults brooding the remaining eggs. One egg hatched en route and the bird died; another hatched and is doing well; one more is pipping in the egg, and there are two to go.

National Audubon has approved the idea as a research project. The long range aim is reintroduction of captive cranes to the wild to enlarge the population which now stands at 43.

AUDUBON, May-June 1967, pages 4-5: THE AUDUBON VIEW, The Endangered Species Program Seen in Perspective.

It is an axiom of wildlife biology that before man can help a species, or before he can manage its populations up and down, he must know the life requirements of that species. What mortality factors weigh against it? What welfare factors best lend themselves to manipulation?

Most of this information must be sought in the field, sought in the complex environment that living things occupy and with which they interact. It is this kind of life history study which, since the 1930's has characterized the research program of the National Audubon Society.

Our major research publications on the whooping crane, roseate spoonbill, flamingo, California condor and ivory-billed woodpecker, and our reports on the golden eagle and other species, are basic documents of their special needs. But knowledge is always partial, and investigations must be continued on a broad front.

As a private organization with limited means, the National Audubon Society has

always considered its research efforts stopgap measures to meet or obviate crises. We have also hoped they would spur federal and state conservation agencies to give non-game species the attention they require and deserve if they are to survive the assault of a civilization in a hurry to revamp the face of the Earth.

Thus the endangered species program of the U.S. Fish and Wildlife Service, initiated with a \$350,000 appropriation, is a welcome addition to the society's pioneering research projects of the past thirty years, and it merits continued support in Congress.

Quite properly, early emphasis has been placed on ecological investigations of such birds as the California condor, Everglade kite, several endangered native Hawaiian species, and the masked bobwhite of Sonora, Mexico, and southeastern Arizona; and the elusive black-footed ferret. As a corollary of this field program, the Patuxent Wildlife Research Center at Laurel, Md., has established an avicultural center for the rearing of captive birds.

Studies of the sandhill crane are exploring techniques which may help build a captive population of whooping cranes from which future generations might be available for reintroduction into the wild. Biologists hope to reduce losses on the whooping cranes' Canadian breeding grounds, since usually two eggs are laid but only one young is successfully fledged. If weather conditions permit, the first wild whooping crane eggs will be taken this summer.

South American snail kites, of which our Everglade kite is a subspecies, and Andean condors from Argentina are also being studied at Patuxent.

The National Audubon Society, which opposed premature plans along these lines a few years ago, now agrees that such studies may help discover vulnerable points in the biological cycle of rare and threatened species. We have a high regard for the orientation and the conservatism of both the project leader, Ray C. Erickson, and the director of the Bureau of Sport Fisheries and Wildlife, John S. Gottschalk. Their Canadian Wildlife Service colleagues, under Dr. David A. Munro, likewise have our support.

It is nevertheless important to keep in mind that research programs based on artificial propagation may easily lose their sense of direction should less ecologically oriented administrators succeed to office. The production of captive birds could then become the end, rather than the means to an end.

No amount of success in captive rearing of a species will help maintain it in the wild if conservation efforts fail to preserve necessary living space in the face of human expansion and habitat alteration. What the California condor needs most is to be left alone and granted the lebensraum it must have for successful reproduction. Everglade kites need the reasonably stable water levels that produce their sole food, a snail of the genus POMACEA.

This problem is well illustrated in Hawaii, where federal and state forestry programs would convert native forests--which support a unique avifauna--to supposedly more economical stands of pine. Such a pine monotype would eliminate all the rare Hawaiian birds now dependent upon the original vegetation of these Pacific islands.

This is not an objection to forestry operations as such. There is adequate private land that could be--and probably will be--converted for commercial production. But Hawaii's state-held lands should be retained for higher, long-term use--the perpetuation of their unique biota.

Forestry, however, is the domain of the U.S. Department of Agriculture. Wildlife conservation is mostly the responsibility of the Department of the Interior. Unless efforts are coordinated, unless Agriculture joins in fostering a broadly ecological policy, our government agencies will work at cross purposes and Hawaii's unique birds will vanish. Then the endangered species program, despite nominal successes in aviculture, will have failed in its real purpose.

Such conflicts in land use endanger the fauna of many of the smaller islands of the world, where evolution is most strikingly illustrated and where species are most vulnerable--the Glapagos, Aldabra in the Indian Ocean, the Leeward Islands chain west of Hawaii, the Aleutians.

Effectively, of course, all remnants of wilderness, whether native prairie for

Attwater's greater prairie chicken or the black-footed ferret, or the Sespe National Condor Sanctuary, are now islands in a man-made terrestrial sea of destruction and development.

Perspective requires us to view the endangered species program as crash research into the ecology, physiology and reproductive behavior of the several species now threatened with extermination because mankind is still ecologically irresponsible. It is another stopgap measure, larger in scope but no more likely to succeed than National Audubon Society's research program unless its data is used to drive home to the American people that wildlife needs living space. That even man's numbers must be controlled before all the unique habitats that are home to a million or so other species which preceded Homo sapiens, are preempted for the production of food and fiber, or commandeered for disruptive activities like water-skiing and jeep riding on beaches during the nesting season of marine turtles or seabirds.

In short, the endangered species program must not be allowed to distract attention from basic habitat preservation programs. The danger is real, not so much from within the wildlife services but from political and economic pressure groups who tend to consider all species as mere individuals rather than as populations which are parts of a living and interacting ecosystem.

It is the ecosystem we must preserve; rare species are mere facets of the many-faceted ecosystem which we are still trying to define adequately.

Individual animals can live in a zoo and satisfy the elementary curiosity of unsophisticated, biologically illiterate Sunday strollers. But the biologist knows that a species has come to the end of the trail when we are down to a captive population.

What is your opinion? Please share it with other members by writing to Kojima, 725-A 8th Avenue, Honolulu, Hawaii 96816.

NATIONAL WILDLIFE, August-September 1967, page 20: THE ORPHAN BIRDS WITH 195,000,000 FOSTER PARENTS by Dick Kirkpatrick

...In the summer of 1965, the Department of the Interior and the Canadian Wildlife Service announced a daring plan to take eggs from whooping crane nests; hatch, raise, and breed the young in captivity; then build a captive flock from which hand-raised whoopers could be released to the wild. They might be orphans, but every American would be a foster parent to them.

At that time, there was some criticism of the plan....The logic and mathematics of the plan seemed irrefutable. There were 43 wild whoopers last year. Only ten pairs nested. They raise an average of five birds a year, but the mortality rate of the young birds is high, hence the low rate of gain. But now, there are five extra chicks at Patuxent. They will reach breeding age in five years. If they produce four eggs a year, and if additional "wild" eggs can be successfully taken every year, a fair-sized flock should be collected in just a few years--some for further breeding in captivity; others for release back to the wild.

A bonus was reported about the same time as the Patuxent hatching: Rosie and Crip, the mated captive whoopers in the San Antonio Zoo, had nested and laid two eggs. If they hatch successfully, the captive chick population will be increased to seven. In the meantime, the five little whoopers at Patuxent are doing fine. They are fed meal worms, cereal mash, and finely ground beef, and are growing normally. One was hatched with a weak leg joint, and would have died in the wild, but has been treated and cured....And another bonus: At the same time as the Patuxent hatching, a Canadian Wildlife Service helicopter survey reported a bumper natural hatch of wild whooping cranes. Eight new young birds were counted--proof that the "eggnapping" had not disturbed the nesting birds.

There is, then, every indication that the "great whooping crane gamble" is paying off. Already the world population of whoopers has been substantially increased, and Rosie and Crip seem to have proved that the cranes will breed and hatch eggs in captivity....So perhaps one day there will be several flocks for future generations to see...

Excerpts from the minutes of the Hawaii Audubon Society, General Meeting, July 17, 1967:

The meeting was called to order by Board Member Robert Pyle....He reported on the field trip of July 9th to Na Laau and Koko Head. The highlights of Koko Head were Fairy Terns, White-tailed Tropic Birds and one possible Red-tailed Tropic Bird. At Na Laau three exotic species were seen: Bishop Bird, Napoleon Weaver and Cordon Bleu.

A very enjoyable talk and slides were presented by Dr. S. Arthur Reed, visiting zoologist from Michigan State University, on Hawaiian marine invertebrates.

Margaret Titcomb of the Bishop Museum asked for contributions of habitat pictures for ecological studies.

Jack Throp commented that there was a movement to set aside Hanauma Bay as a wildlife preserve and to increase the fish life there.

Mr. & Mrs. Paul M. Scheffer, very active members for the last two years and well-known for their work on the recordings of the native Hawaiian birds' songs, were recently transferred to Vancouver, Washington. We hope they'll remain active by sending in articles for THE ELEPAIO. MAHALO NUI LOA and warmest ALOHA.

We'll miss Mr. Harold K.L. Castle, a long-time member of this Society, who died on August 19. He was a busy developer of Windward Oahu, but he found time to support our efforts to protect wildlife in Hawaii. Our deepest sympathy to his family.

ALOHA to our new members:

Junior: Donna Barati, 166 Poloke Place, Honolulu, Hawaii 96822.

Anne-Marie Gagne, Box 117, Hearst, Ontario, Canada.

Regular: Virginia Cone, 1673-B Paula Drive, Honolulu, Hawaii 96816.

Mrs. Helen Delaney, 3820 Salt Lake Blvd, Honolulu, Hawaii 96818.

Lt.Col. Charles G. Kaigler, 3363 Anoa Place, Honolulu, Hawaii 96822.

Manuel S. Pereira, 45-353 Kulauli St, Kaneohe, Oahu 96744.

Mrs. Margaret F. Roots, Apt 709, 445 Kaiolu St, Honolulu, Hawaii 96815.

Laurence J. Taylor, 4679 William St, Omaha, Nebraska 68106.

Nancy A. Conklin, 52 S. Kalaheo Ave, Kailua, Oahu 96734.

HELP WANTED:

Index: Is the index meeting the need? Is it worthwhile?

Articles for THE ELEPAIO: The quality of the publication depends upon you.

Please share your field notes and reading information with other members.

Please send in any suggestions to Kojima, 725-A 8th Ave, Honolulu, Hawaii 96816.

OCTOBER ACTIVITIES:

October 8 - Field trip to study shore birds. Bring lunch, water, and if possible, your car. Transportation cost (\$1.00) to be paid to the drivers.

Meet at the Library of Hawaii at 7:00 a.m. (Please note the time)

Leader: Mike Ord, telephone 968-771.

October 9 - Board meeting at the Waikiki Aquarium Auditorium at 7:30 p.m.

Members are always welcome.

October 16 - General meeting at the Waikiki Aquarium Auditorium at 7:30 p.m.

Program for the night: Mike Ord will show color slides of birds.

HAWAII AUDUBON SOCIETY EXECUTIVE BOARD:

President-W. Michael Ord, Vice Presidents-Dr. Andrew J. Berger & Jack L. Throp

Secretary-Mrs. Robert L. Pyle, Treasurer-Carl F. Frings

Board Members: Eugene Kridler & Dr. Robert L. Pyle

THE ELEPAIO: EDITORS: Miss Charlotta Hoskins & Miss Unoyo Kojima

MAILING ADDRESS: P.O. Box 5032, Honolulu, Hawaii 96814

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