



'ELEPAIO

Journal of the
Hawaii Audubon Society

For the Protection of
Hawaii's Native Wildlife

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OCTOBER 1996

Pursuing Paradise for Sixth Season

by Sylvianne Yee

Paradise Pursuits, Hawaii Audubon Society's successful environmental quiz program, is recruiting teams for the sixth consecutive year. This past year a record number of schools took the "Paradise Pursuits Challenge." Hopefully, even more schools will join us in learning about Hawaii's environment through a fun, challenging game show format. Competitions will be held in the spring of 1997, culminating in the televising of the semifinal and final games.

Registration forms, posters, and guidelines have been sent to all public and private high schools statewide. Each team has a teacher who serves as a coach and four students members (three regular and one alternate). Once a team's application is received, the new bibliography list and some resource materials are sent to the coach for team preparation during the fall and winter. Each participant receives an Audubon

T-shirt and a Certificate of Participation as well as other prizes. Last year over sixty donors gave generous gifts.

Hawaiian Electric Industries Charitable Foundation has once again showed its strong support for, and dedication to, preserving our island environment by renewing a grant to fund Paradise Pursuits. With Hawaiian Electric as our major sponsor and with additional support from Aloha Airlines, Outrigger Hotels, Crazy Shirts, the Department of Land and Natural Resources, and the Department of Education's Environmental Education Branch, Paradise Pursuits can continue to grow and prosper. To all of the above companies who believe in us and our program, thank you.

Call Sylvianne Yee at 373-3062 for an application or if you have any questions. The registration deadline is October 15. Don't miss out on what could be the highlight of the year!

Three Nihoa Plants Listed as Endangered

Barbara Maxfield

The native plants of Hawaii continue their struggle against introduced species - both plants and animals - and on Nihoa three plant species (*Amaranthus brownii*, *Pritchardia remota*, *Schiedea verticillata*) now will receive the added protection of the Endangered Species Act. With two of the plants represented by only two populations, the U.S. Fish and Wildlife Service has published a final rule placing all three species on the endangered list.

Competition with alien plants is the primary threat to these native species. Introduced species often out-compete native species for space, light, water, and nutrients, according to Fish and Wildlife Service botanists. Six alien plants species have been reported on the island of Nihoa, and one, pigweed, has spread over the entire island and is displacing native vegetation in the habitat where two of the endangered species grow.

Erosion, landslides, rock slides, and flooding due to natural causes are other primary threats to the endangered species, resulting in the death of individuals as well as habitat destruction. One species grows in valley floors subject to flash floods. The other two species are found on rocky outcrops and cliff faces subject to landslides and rock slides. Trampling by humans could increase the frequency of such events.

The Nihoa plants were proposed as endangered species in March 1993. The final rule was published in the *Federal Register* on August 21, 1996. Copies are available from the U.S. Fish and Wildlife Services's Honolulu office by calling 541-2749, or by writing them at 300 Ala Moana Boulevard, Room 3108, Honolulu, Hawaii 96850.

Source: U.S. Fish and Wildlife Service

U.S. EPA Cites Eleven Facilities in Hawaii for Fuel Storage Violations

by Ivy White

The U.S. Environmental Protection Agency (U.S. EPA) recently announced it conducted fourteen inspections and cited eleven facilities on O'ahu for violating underground fuel storage tank regulations under the federal Resource Conservation and Recovery Act, which governs management of hazardous waste. The facilities were fined \$3,450.

"Compliance with underground storage tank regulations is crucial to preventing groundwater and soil contamination from leaking underground tanks," said Julie Anderson, director of U.S. EPA's Office of Waste Programs.

The eleven facilities had a total of twenty violations. These included a variety of leak detection violations such as: failing to conduct proper inventory control, tank and

pipings tests, and line leak detector tests.

The citations were issued immediately after joint inspections by U.S. EPA and the Hawaii Department of Health.

The U.S. EPA's underground storage tank (UST) field citation program is designed to quickly bring owners and operators of underground fuel tanks into compliance with federal UST regulations. Facilities that receive a citation are required to comply with the regulations and pay any penalty within thirty days. If they do not, they will be subject to a more formal enforcement action, which carries much stiffer penalties. The citations impose penalties which generally range from \$50 to \$300 per violation.

Source: U.S. EPA, San Francisco Office

Slate for 1996 Election

Members encouraged to submit additional nominations

The Nominating Committee announces the following nominees for the 1996 HAS ballot for two-year terms beginning January 1997: President, Linda Paul (incumbent); Second Vice President, Wendy Johnson;

Recording Secretary, Kim Welch (incumbent); Director, Mary Gaber (incumbent); and Director, Eric Vanderwerf. Also nominated to fill out a Director term for next year is Andrew Tomlinson.

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Continuing officers and directors are John Harrison, First Vice President and Dan Sailer, Director, whose terms finish December 1997.

The Society bylaws provide that members may nominate additional candidates by submitting their names in writing, along with their written consent to be nominated, to the Elections Committee at the HAS office address by **November 10, 1996**. The nominations may be for one of the positions in the first paragraph or for any of the following vacant positions: (with terms expiring December 1997) Treasurer, Corresponding Secretary, and three Directors; (with terms expiring December 1998) three Directors.

Office Corner

by Susan Elliott Miller

A moving time will be had by all—some time soon...

The lease is up on HAS' present office space at the end of October, so negotiations are presently underway to obtain better and more space for less money. Hope to let you know in the November 'Elepaio where our new nest is...

A big **mahalo** to Linda Paul and John Harrison (shoppers extraordinaire) and to Wendy Johnson, Lynnea Overholt, Dan Sailer, Sylvianne Yee, and Kim Welch for helping prepare for the third Annual Awards Dinner on September 12, 1996. Full details and pictures in next issue! Another **mahalo** to David Boynton for taking everyone at the Dinner on a great tour of Kaua'i!

'ELEPAIO

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Scientific Articles Sought

We encourage readers to submit their own articles or encourage others to submit articles about research results in fields related to Hawaiian natural science. Reports of observations of Hawaiian birds or bird life are also welcomed. One of the purposes of the 'Elepaio is to include original scientific articles which are peer reviewed on matters of interest to its members.

Honolulu Zoo Excursion

Members visit Native Forest Bird Propagation Project

by Lance La Pierre

After receiving a warm welcome from James Mejeur, the curator of birds, Linda Santos, keeper (II) of birds, led us through the zoo towards the bird house. She mentioned that the facilities were still under construction, and that the zoo was also planning to build new, walk-through aviaries with such themes as wetland birds and birds of prey. They hope to have birds such as 'io, pueo, 'elepaio, and 'ae'o and are redoing the nene exhibit. Linda also reported that there are plans to build a structure for the O'ahu 'Elepaio Project near the avian exhibits.

The birds that were visible to the public, a pair of 'apapane, were best acclimated to the glass and the public – within their air-conditioned, sky-lighted homes. The bird house is also on automatic timer for lights and sprinklers. Linda explained that the birds' diet consists of nectar (fed through a tube), crushed papaya seeds, and fruit flies. At the facility, keepers hand-rear many species in twelve-hour shifts, study call and songs, and videotape bird behavior such as nest building.

Behind the scenes, we were given the opportunity to view the operation close up. We saw 'oma'o, i'iwi, Laysan finches, and 'amakihi. The birds that seemed to steal the show were a pair of 'apapane and their two chicks. The 'apapane are the only Hawaiian birds that the zoo has propagated so far. 'Apapane nest in the same site each year, usually in the winter as is the case with most native birds. The male 'apapane has been observed teaching songs to the male chick, which the young one learns to imitate. The 'apapane 'ohana seems to be doing well.

The group enjoyed the excursion. Participant Vaughn Sherwood said, "The successful captive propagation of Hawaiian native forest birds is a step in the direction of preserving species which are near extinction in the wild."

Field Trip to Mo'omomi Preserve on Moloka'i

by Mary Gaber

The July 21 field trip was a hike through part of the Mo'omomi Preserve on the north-west shore of Moloka'i. This 921 acre preserve protects more than twenty-two native Hawaiian plant species, four of which are rare and endangered. The preserve is managed by The Nature Conservancy (TNC). Joan Aidem, a TNC docent, was our guide.

Ms. Aidem met us at the airport at 8:30 and drove us to the start of a footpath near the coast. Strong, steady winds have shaped the sand dunes; some of which have lithified to rocklike consistency. Green sea turtles regularly lay eggs in the sands here. Deposits of fossilized bird bones found here indicate that at least thirty bird species once lived in the area. Many were flightless birds which are now extinct. We saw some of these bones, and Ms. Aidem showed us a cast made from the fossilized remains of an egg from a large extinct goose-like bird.

Petrified roots and small branchlets were scattered along the beach, and in one place, an ancient mud slide contained three species of land snails believed to be about 27,000 years old.

We sampled some tasty sea purslane (*Sesuvium portulacastrum*). Among the rare plants we encountered were the tomato relative, *Solanum nelsonii*, and *Tetromolopium rockii*, from the daisy family of plants.

Publications Available

The Hawaii Audubon Society publishes books, bird song tapes, checklists, and field cards relating to birds of Hawaii and the Pacific. For a complete price list, send a self-addressed, stamped envelope to Publications List, Hawaii Audubon Society, 1088 Bishop Street, Suite 808, Honolulu, HI 96813.

Cooper Ornithological Society to Meet in Hilo

HAS shares in hosting the sixty-seventh annual meeting

Mark your calendars at 30 April — 4 May 1997, when the Hawaii Audubon Society; the Biological Resources Division, Pacific Islands Science Center; and the University of Hawai'i will host the 67th annual meeting of the Cooper Ornithological Society at the Hawai'i Nanihoa Hotel Hilo, Hawai'i. There will be symposia on the unique avifauna, biology and urgent conservation issues of the Pacific and Hawaiian Islands, as well as other ornithological topics. Queries about lodging, transportation, field trips or other matters should be directed to Jim Jacobi, Pacific Islands Science Center, P.O. Box 44, Hawai'i National Park, HI 96718 or jimjacobi@nbs.gov. Queries concerning the scientific program should be directed to Steven C. Hess, Pacific Islands Science Center, P.O. Box 44, Hawai'i National Park, HI 96718 or shess@aloha.net.

Hawaii Map Highlighted in New Map Series

by David A. Emery

A hypsometric map of Hawaii is being featured in a new product line called Map of the Month. Measuring thirty inches by twenty-six inches and printed in five colors at a scale of 1:1,000,000, it is based on the out-of-print International Map of the World. This map shows the rugged terrain of the islands by adding color to the areas between the topographic contours. This technique makes the high peaks really stand out, especially on the big island. Bathymetry is also shown in shades of blue. A legend explains all man-made features and boundaries. The map is folded for easy storage.

For further information write: Arrowood Publishing, attention EL, PO Box 802, Chantilly VA 22022.

The Hawaiian Islands, 20 Years Later

by Barbara Maxfield¹

Twenty years, virtually a lifetime in the eyes of a child, is but a blink of the eye in terms of biological history. Only once in every 100,000 years did a new species become established on the remote specks of land we call the Hawaiian Islands. And it even took humans about 1,500 years to destroy much of Hawaii's native wildlife.

So when the Fish and Wildlife Service's (FWS) Pacific Islands staff was asked to review our progress in saving Hawaiian endangered species over the past twenty years, our first thought was, "Have we made any progress?" Admittedly, we have taken a few steps backward, but we're also pleased to report that progress is being made, not just by the FWS but by our many public and private partners throughout the Hawaiian islands.

A Step or Two Backward

A feature article in the November 1976 *Endangered Species Bulletin* focused primarily on Hawaii's unique bird species and referred to twenty-three species and subspecies as being extinct. Sadly, we now believe twenty-six bird species, up to 900 tree snails, more than 100 arthropods, and 100 plant species have disappeared — more than ten percent of Hawaii's native plants and animals.

Others cling precariously to life, including nine bird species with estimated wild populations of fewer than twenty birds, 101 plant taxa with fewer than twenty remaining individuals in the wild, twelve arthropods with fewer than three remaining populations, and thirteen tree snails with only one or two populations.

Alien species — recognized as a major problem in 1976 — continue to wreak havoc in Hawaiian ecosystems. The Office of Technology Assessment estimated that approximately five new plant and eighteen new arthropod species are introduced to Hawaii annually, many of which become serious pests.

Some alien species were introduced deliberately, but with good intentions. Banana poka (*Passiflora mollissima*) and fountain grass (*Pennisetum setaceum*) are ex-

-amples of ornamentals that were brought to Hawaii to decorate gardens but which have escaped into native ecosystems with disastrous results. The rosy snail (*Euglandina rosea*) was imported from Florida to control burgeoning populations of another introduced species, the African giant snail (*Achatina fulica*). Unfortunately, its diet also includes Hawaii's endemic and beautiful tree snails. Tilapia (*Sarotherodon mossambicus*), an African fish introduced to control the growth of algae and weeds in reservoirs and irrigation ditches, may be impeding the recovery of native Hawaiian waterbirds by feeding on the same plants as the endangered Hawaiian coot (*Fulica alai*) and the same insects as the endangered Hawaiian stilt (*Himantopus mexicanus knudseni*). Today, new introductions generally occur accidentally — perhaps a weed seed on hiking boots or a hitchhiking insect — or are illegally smuggled species. Given Hawaii's tropical climate, it does not take long for these unwanted guests to become established pests in the wild.

Habitat loss continues to be a very serious problem for Hawaii's native plants and animals. More than ninety percent of Hawaii's dryland ecosystems, sixty-one percent of its mesic or moist forests, and forty-two percent of its tropical rainforests already have disappeared. Only its less hospitable subalpine ecosystems are relatively intact, showing about a three percent loss.

Many Steps Forward

Despite these problems, cooperative efforts are making a difference in saving Hawaii's unique ecosystems:

Habitat Protection. Increased public awareness of the plight of Hawaiian ecosystems has led to significant support for protecting the most pristine of these environments. The State of Hawaii has placed 109,186 acres (44,188 hectares) in its Natural Area Reserve System, almost all within the last twenty years. Another 38,878 acres (15,734 hectares) are managed by the state as wildlife, sanctuaries, and another approximately 1,500 acres (607 hectares) are within designated Marine Life Conservation Districts. Additional lands are protected to some degree as state parks or forest reserves.

The Nature Conservancy of Hawaii manages 29,193 acres (11,814 hectares) in ten preserves within the main Hawaiian islands, all acquired during the last twenty years. This private organization seeks to protect Hawaii's rarest natural communi-

ties, thereby protecting many native species at the same time.

The FWS also has been adding acreage in Hawaii to the National Wildlife Refuge System (NWR). Hawaii's ten NWRs are managed to protect a diversity of native ecosystems, including high elevation tropical rainforests, coastal wetlands, and coral atolls. All provide habitat for threatened and endangered species as well as other native plants and animals. Since 1976, Pearl Harbor and James Campbell National Wildlife Refuges (NWR) have protected an additional 227 acres (92 hectares) on O'ahu; forty-five acres (18 hectares) on Moloka'i were protected in Kakahaia NWR, 203 acres (82 hectares) on Kaua'i became Kilauea Point NWR, 700 acres (203 hectares) on Maui were designated as Kealia Pond NWR, and Hakalau Forest NWR on the Big Island set aside 32,233 acres (13,045 hectares) as a forest bird refuge. Beyond the state boundaries but within the Hawaiian Islands archipelago, 90,097 acres (36,482 hectares) of emergent and submerged lands were added to the refuge system as Midway Atoll NWR.

Recovery Plans. In 1976, none of Hawaii's threatened and endangered species were covered in approved recovery plans. The first plans — those for the palila (*Loxioides bailleui*) and Hawaii's four endangered waterbirds — were completed in 1978. Since that time, seventeen recovery plans outlining activities needed to restore 143 Hawaiian taxa have been approved, and twenty-seven other plans are in development.

Plant Protection. Although most of the listed Hawaiian species in 1976 were birds, 184 of the 211 species on today's list of threatened and endangered species in Hawaii are plants. Another seventy-nine plant taxa have been proposed for listing.

Emergency actions such as spot fencing, seed collection and storage, and plant propagation are receiving significantly more attention — and funding — to save the most critically endangered plant species. The FWS also is cooperating with the state to fence fragile bog ecosystems on Kaua'i to protect four plant species, including two candidate species that may, as a result, not need to be listed. Several botanical gardens are working with the state and federal governments in efforts to build mid-elevation plant propagation facilities, collect and propagate plant materials, and put the resulting seedlings in protected habitat.

Help for the Birds. Hawaii's unique forest and water birds aren't being ignored. Perhaps one of the most exciting recent developments is the opening this year of the Keauhou Bird Conservation Center on the Big Island. The Peregrine Fund, a private organization based in Boise, Idaho, manages the facility in cooperation with the State of Hawaii and the FWS. Actively involved in captive propagation activities in Hawaii for several years, The Peregrine Fund has played a major role in developing propagation, rearing, and release techniques for Hawaiian forest birds, including the critically endangered 'alala or Hawaiian crow (*Corvus hawaiiensis*). So far in 1996, the facility's staff has successfully hatched twenty-three 'oma'o (*Myadestes obscurus*), thirteen palila, five puaiohi (*Myadestes palmeri*), and one 'alala.

Hawaii's state bird, the nene or Hawaiian goose (*Branta sandvicensis*) is increasing in numbers, though its road to recovery is still a long one. Twenty years ago, scientists assumed these birds preferred an upland habitat since remaining populations were found there. Nene have been managed at both Haleakala and Hawaii Volcanoes National Parks for many years in assumed "preferred" habitat. Recently, biologists found that nene really prefer lowland habitats and wetland areas, and will thrive in those areas once predators have been removed.

The National Biological Service also is assisting in forest bird recovery activities. It is focusing its efforts on finding remnant populations of such rarely sighted birds as the nuku pu'u (*Hemignathus lucidus affinus*) and po'ouli (*Melamprosops phaeosoma*) on Maui and the puaiohi on Kaua'i, and on research into avian pox and avian malaria, which are two diseases thought to have played a major role in the loss of Hawaii's forest birds. Populations of Hawaii's four endangered waterbirds — the Hawaiian stilt, Hawaiian coot, koloa or Hawaiian duck (*Anas wyvilliana*) and common moorhen (*Gallinula chloropus sandvicensis*) — are on the rise as their wetland habitats are restored, and introduced predators, such as rats, feral cats, and mongooses are controlled. The FWS and State of Hawaii manage several wetlands set aside for waterbirds, and more private landowners are attracting these birds as they develop ponds or other wetland areas on their property.

Rekindling Interest in Hawaiian Culture

Although the native Hawaiian culture was never lost, it was somewhat dormant until fairly recently. Since 1976, however, an expanded interest in maintaining a native Hawaiian cultural identity has surfaced, accompanied by a renewed sense of natural resource stewardship.

The ecosystem approach to conservation is reflected in the Hawaiian concept of 'ahupua'a, in which lands were managed "from the mountains into the seas." The early residents of Hawaii knew how important it was to protect the rainforests at higher elevations in order to protect their marine resources and the watershed, habitat, and species at all the intervening levels. They also established open and closed seasons on some species, as well as catch limits to ensure that essential resources would not be depleted.

This renewed interest in the early peoples of Hawaii has led to an awareness of her natural blessings by many of Hawaii's residents, including both old and new "immigrants." Although many of the plants and animals associated with Hawaii in the minds of its visitors are actually introduced species, many of the state's residents are increasingly interested in protecting native species, in restoring native habitats, in landscaping their yards with native species, in seeking out the colorful forest birds, and in ensuring a place for Hawaii's native plants and animals in the future.

'Ohana Spirit Renewed

It's said that in times of crisis, family members will pull together to overcome adversity. With the increasing awareness of Hawaii's extinction crisis, the Hawaiian family — the 'ohana — of public and private entities is pulling together to protect Hawaii's unique natural ecosystems and the species that depend upon them.

As an example, the 'alala population in the wild consists of only fourteen birds and would be lower if not for the efforts of landowners, the State of Hawaii, Peregrine Fund, the National and Hawaii Audubon Societies, The Nature Conservancy of Hawaii, Kamehameha Schools Bishop Estate, the National Biological Service, and the FWS working together to save the species.

Such cooperative efforts are not only heartwarming, but also absolutely crucial if we are to succeed in our goal of securing lasting protection for Pacific island ecosystems. Through the efforts of our 'ohana, the

next twenty years may move many of our native ecosystems much further along the road to recovery.

Barbara Maxfield is the public information specialist with the FWS Pacific Islands Ecoregion Office in Honolulu, Hawaii.

Source: Endangered Species Bulletin
July/August 1996

In Memoriam: Charles M. Dunn

In January, 1939, a letter appeared in a local paper proposing the founding of an Audubon Club and asking all bird lovers to meet at the Library of Hawaii. In March the meeting took place, the name of the branch was decided upon and goals were discussed. The following month the writer of the letter, Charles M. Dunn, was elected the first secretary-treasurer of the group — the Hawaii Audubon Society.

Mr. Dunn held this office until April, 1941 when he became vice president, a position he held until 1944. For the next several decades, he continued his active interest, planning and leading field trips, and on several occasions speaking at HAS programs. Although an active birder, he was a man of varied interests and energies. He died on July 5, in Phoenix, Arizona at the age of 88, a loss to his family and many friends.

Born in Honolulu, Dunn was employed for forty-five years as a typesetter. He was an enthusiastic contributor to the community. In addition to his HAS activities he was a Boy Scout and 4-H counselor, a member of the Bonsai and Hibiscus clubs, and a volunteer providing physical therapy to asthmatic youngsters.

Survivors include his wife Mary; daughters Cheryl Rita and Natalie Costa, six grandchildren and seven great-grandchildren.

To the Dunn family, the Hawaii Audubon Society extends its condolences and its appreciation for the important role Charles played in founding the Society.

Waiau Oil Spill Response

by Linda S. Elliott¹

On 14 May 1996 at 07:00 HST, International Bird Rescue Research Center (IBRRC) was put on alert by The Chevron Companies (TCC) for a possible wildlife response associated with the early morning Waiau pipeline fuel oil spill. The Waiau spill area was located at the Hawaiian Electric Power Plant on the shoreline of the East Loch of Pearl Harbor on the island of O'ahu, Hawaii. Approximately 32,000 gallons of #6 fuel oil were believed spilled. TCC has an active retainer agreement with IBRRC to respond expeditiously when needed to Chevron spills anywhere in the US and its territories.

The pipeline, belonging to TCC, leaked into a freshwater pond and marsh area with two channel outlets leading to the harbor. The oil impacted a small fresh water marsh at the spill site and a large portion of the Pearl Harbor's East Loch and Ford Island shorelines. No impact was reported in the Middle and West Lochs of Pearl Harbor, where the Pearl Harbor National Wildlife Refuge, (Waiawa and Honolulu Units), and the Pouhala Marsh are located.

IBRRC Response

I was requested to immediately assess the population of wildlife at the spill site and surrounding areas. Literature reviews and previous site visits by IBRRC to the Waiau area and the adjacent areas of Pearl Harbor indicated that a number of waterbird species have been sighted in this region. The resident bird species were known to include, but are not limited to, the following endangered species: Hawaiian coot (*Fulica alai*), Hawaiian stilt (*Himantopus mexicanus knudseni*), Hawaiian moorhen (*Gallinula chloropus sandvicensis*) and the Hawaiian duck (*Anas wyvilliana*). In addition several species of migratory shorebirds and waterfowl are also known to use this area. There was potential for these birds to be directly affected by this spill. IBRRC's immediate role was to assess the possible wildlife impacts, prepare for a quick and effective response to any affected wildlife, and to work with the TCC's Environmental Unit and the Natural Resource Trustees (e.g. the state and federal agencies) on wildlife issues. IBRRC's goal is to provide the best available expertise to

protect and restore affected wildlife to their original condition. Although there were no wildlife impacts observed initially, IBRRC began preparations for a response, focusing on the endangered and migratory species in the area.

Wildlife Impact Assessment

After arriving at noon on May 14, I immediately began an initial wildlife assessment of the spill and adjacent areas. This assessment was accomplished, with the assistance of Stan Sato of the Chevron Environmental Unit, by automobile and foot. The assessment began at the Arizona Memorial Visitor Center shoreline and continued to the Pearl City Kai shoreline, the spill site at Waiau, and then on to the Pearl City Peninsula. This was followed by a boat assessment in which I was accompanied by Gordon Olayvar, a technician with the State of Hawaii Department of Land and Natural Resources, Division of Forestry and Wildlife (DLNR/DOFAW). During the water assessment, the Middle Loch, East Loch and Ford Island shores were checked. This initial assessment yielded observations of nonnative birds flying over the areas and utilizing the trees in affected areas. These introduced species included: cattle egrets (*Bubulcus ibis*), northern cardinals (*Cardinalis cardinalis*), common mynahs (*Acridotheres tristis*), and zebra doves (*Geopelia striata*). No oil affected wildlife was observed during this day's search.

I continued these daily boat and foot surveys for five consecutive days, from 14 to 18 May 1996. These surveys were done with the assistance of the Environmental Unit and DLNR/DOFAW personnel. In addition, the Natural Resource Trustees provided foot surveys of the nearby Pearl Harbor National Wildlife Refuge and other known wildlife areas. The other recognized important wildlife areas included the tidal mud flats along the Waipio Peninsula, the Fort Kamehameha tidal mud flats, the Chevron refinery, the Pouhala Marsh and Walker Bay. These observations were recorded daily on typed wildlife assessment log sheets. After this initial survey period, the foot and boat surveys by IBRRC were less frequent. Over the next nine days, I followed up on reports received from the work crews and trustees on wildlife observed in the area. I was on call for five of those days (May 19, 23, 25, 26, 27, and 28) and remained in daily contact with the Environmental Unit.

On May 29, after further evaluation of the impacted areas, it was decided coopera-

tively by the Environmental Unit and the Natural Resource Trustees to continue the monitoring program. A written monitoring plan which was requested was completed by the IBRRC that same day. This plan was edited and approved by the Natural Resource Trustees. The purpose of the continued monitoring was to survey the wildlife in and around the spill site for the possible oiling of birds until the spill response actions were completed. This five day assessment began on May 30 and ended June 3. The primary area identified for monitoring was the Waiau mud flats and wetland. The other areas identified included the mud flats of the Waipio Peninsula, Ford Island's north shore, and the above listed areas of wildlife usage and refuges.

In summary of this assessment, it was shown that five species of waterbirds actively used the mud flats of Waiau on a daily basis during this survey. The bird species represented were: The endangered Hawaiian stilt, ruddy turnstone (*Arenaria interpres*), wandering tattler (*Heteroscelus incanus*), Pacific golden plover (*Pluvialis fulva*), and the black-crowned night-heron (*Nycticorax nycticorax*). All fed actively on the low tide exposed flats. This monitoring was done from a small boat anchored at the edge of this area during the low tide periods. The marsh was checked by foot in the late afternoon and early evenings during the same time period. Ford Island and the Waipio Peninsula, along with buoy thirty-six (a roost for two brown boobies) were checked by boat every other day during the monitoring period. The US Fish and Wildlife Service (USFWS) personnel continued regularly scheduled checks of the refuges and refinery sites. No reports of oiled birds were made during this survey period. As the amount of oil product decreased in the area and as the observations were showing the low probability of birds directly encountering the oil, the monitoring program was discontinued. The emphasis then changed from active monitoring for oil exposure to not disturbing an endangered species' use of a known feeding area.

Oiled Wildlife Response Preparations and Procedures

On May 14, Susan Colborn, Chevron Environmental Unit Leader, and myself as the IBRRC representative began developing the written Wildlife Response Plan and Impacted Wildlife Notification Procedures for this spill. The plan was completed on 17 May after review by the Natural Resource

Trustees. This plan gave details on procedures for notification of sightings of oil affected wildlife and the procedures to be followed from capture to the final release of rehabilitated birds.

In addition, on May 15, IBRRC procured and staged some basic stabilization supplies for a response to a small number of affected birds. These supplies included: towels, a digital oral/rectal thermometer, petiodolyte, ensure, eye saline, cotton swabs, cardboard boxes and IBRRC supplies of feeding tubes, syringes, and eye lubricant drops. A list was also prepared for additional items that would be needed upon the report of an oiled bird. This list was developed during the last few years by IBRRC for the Area Planning Committee's Oiled Wildlife Work Group and acquisition of these supplies had been on going by the State before this spill. The supplies on this list include capture nets, medical and long term rehabilitation supplies, some of which are pre-staged at the Navy SUP/SAL warehouse, with the remainder needing to be purchased.

I was initially provided an air-conditioned van for transport of affected birds. Later this was down graded to a 4 door compact vehicle as the low probability and numbers of birds that might be affected were assessed. The stabilization and long term care facility identification were complicated due to the lack of adequate predetermined facilities. A decision was made to utilize an acceptable building, the Hui Aikane, at the Chevron refinery until another location could be found.

On May 15, I called six pre-trained volunteers and alerted them to the possible need for their assistance. These volunteers were from a pool of twenty-five Hawaii volunteers that had completed a two day IBRRC oiled wildlife response training class in October 1995. Additionally, IBRRC trained nearly four hundred general volunteers in Hawaii in 1992 and 1993. The listing of these volunteers is currently maintained at the Clean Islands Council office and is scheduled to be added to the area plan.

The procedures for collection and disposition of dead invertebrates and fish were being developed by DLNR/DOFAW as the response progressed. The Wildlife Response Plan detailed that dead animals were to be stored in plastic bags on ice or in a refrigerator with a chain-of-custody form until they were picked up by a Natural Resource

Trustee. Three calls were received for non-oil affected, nonnative birds. Two were young pigeons (one died, and the other was released) that had fallen into the harbor. The third call was for a very thin barn owl that was taken at DLNR/DOFAW's request to a veterinary clinic. A couple of dead crawfish and four puffer fish were also collected and turned over with the dead pigeon to a DLNR/DOFAW representative.

Summary

Although the endangered Hawaiian stilt, coot and moorhen are known to use both the freshwater wetland and tidal mud flats of the Waiau Bank, none were observed with oil on them. The Hawaiian duck has been sited during last year's DLNR waterbird surveys of the Pearl Harbor area in very low numbers, but with no recent listing for the Waiau area. The Hawaiian duck, coot and moorhen were never observed in this habitat for the duration of this monitoring effort. The Black-crowned night-herons that frequented both of these areas throughout the spill response were also showing no signs of oiling. This also held true with the migratory shorebirds that fed daily on these mud flats. There are three factors that probably contributed to the lack of noticeably impacted native birds in the affected area: (1) The spill happened at the time of year when most of the migrant bird populations were gone. (2) The spill happened at night when birds were not feeding in the area. (3) The human disturbance during the spill cleanup process essentially hazed the birds from the area.

The quick notification of wildlife response personnel and initiation of searches and assessments for wildlife impacts is a significant achievement at this spill response. The coordinated efforts and active communication with the Natural Resource Trustees were also of great importance. The development of a wildlife response plan for this spill is an important step for a quick and effective response and can be used as a guide for future spill responses.

The lessons learned include the need for pre-developed procedures for most areas of a wildlife response, such as; understanding each group's role in a wildlife response, and how dead animal collection and disposition will be done. Additionally, it is important to: identify adequate wildlife response facilities, procure and stage the pre-identified list of supplies and equipment, and packaging equipment for an expedi-

tious initial response. For example, capture equipment and stabilization equipment should be in packaged units. In conclusion, this spill and the lack of known oiled wildlife casualties provide a fortunate opportunity for the improvement of Hawaii's oiled wildlife response capabilities. A spill occurring at the height of the migratory season or directly in the wildlife refuge areas would have presented very different results. There remains the potential for additional spills happening in this area because of the expansive stretch of pipelines surrounding the Pearl Harbor area. The potential for spills is not only from corrosive leaks but also from other accidents or natural disasters such as hurricanes, tsunamis, and earthquakes.

Acknowledgments

I thank the reviewers for this article, Jay Holcomb and Marie Morin, for their comments and suggestions. I thank all those who have or continue to participate in efforts to improve this state's ability to adequately meet the needs of wildlife affected by oil spills. These participants include the members of the Oiled Wildlife Subcommittee of the Area Planning Committee, the Federal and State Natural Resource Trustees, the State House of Representatives Committee on Energy and Environmental Protection, the volunteers that completed oiled wildlife response training and the Hawaii petroleum industry.

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¹Hawaii / Pacific Representative, First Response Team, International Bird Rescue Research Center (IBRRC), PO Box 506, Hawi, HI 96719.

Calendar of Events

Thursday, October 3

Monthly meeting of the **Education Committee**, 7:00 p.m. at BaLe Sandwich Shop in Manoa Marketplace (near Safeway). All are welcome. For more information, call chairperson Wendy Johnson, 261-5957.

Monday, October 7

Regular first Monday of the month meeting of the **Conservation Committee**, 6:00 p.m., at the U.H. Environmental Center (Crawford Hall, Room 317, 2550 Campus Road). All are welcome. For more information, call chairperson Dan Sailer, 455-2311 (evenings).

Monday, October 14

HAS Board meeting, (always open to all members) 6:30 p.m. at the office.

Monday, October 21

Ever wanted to go to Paraguay? Come to the next **bimonthly program meeting** and let your imagination take you there with videotapes taken by Ron Walker, biologist and Scientific Editor for *'Elepaio*. He visited this fascinating South American country last April and has agreed to share the trip with us.

Bring your friends and join fellow HAS members at Paki Hall Conference Room, Bishop Museum, 7:30 p.m. Refreshments provided; HAS books, tapes, and T-shirts available for purchase.

Saturday, November 9, 16, & 23

Mark your calendar for early Christmas shopping opportunities! The HAS office will be open from 10 a.m. to 2 p.m. — come pick up *Hawaii's Birds, Voices of Hawaii's Birds* (tapes), and HAS t-shirts for family and friends.

Sunday, November 17

It's time once again to send out the HAS ballot and annual appeal. Your help is needed in stuffing envelopes—many hands will make it light work! from 10 a.m. to 3 p.m. at the HAS office. Please volunteer to Susan Miller (528-1432) for any part of the time you can help.

April 30 — May 4, 1997

The 67th Annual Meeting of the Cooper Ornithological Society at the Hawai'i Naniloa Hotel Hilo, Hawai'i. (See page 51 for details)

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