

Hawaii's Forests and Wildlife



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The Quarterly Newsletter of the Hawaii State Division of Forestry & Wildlife
Department of Land and Natural Resources

Expert Recommends Increasing Genetic Diversity of Alala Captive Flock

Paul J. Conry, Wildlife Biologist
DOFAW, Honolulu

Fern P. Duvall, III, Aviculturist
Olinda Endangered Species Facility, Maui

As part of the ongoing efforts of the Division to assess progress and keep current with developments in the field of aviculture, Cynthia Kuehler, Reproduction Specialist with the San Diego Zoo, was asked to do an assessment of incubation and hatching failures for the 'alala at the State's captive propagation project at Olinda, Maui.

Kuehler visited the Olinda Endangered Species Propagation Facility (OESPF) during September 30 - October 4, 1990 and inspected the facilities and equipment, evaluated management procedures, reviewed the available data on reproductive success and discussed low hatchability problems with the Olinda and Honolulu endangered species staff. After additional evaluation of the data, Kuehler prepared and submitted a report assessing incubation and hatching problems with the captive 'alala population and provided recommendations for the captive propagation program. Most of her recommendations are excellent and the Division will implement them where ever appropriate and feasible. A number of them, however, propose major changes in husbandry practices and egg handling that involve an increased risk to the captive population, and therefore warrant consideration and endorsement by the 'alala technical advisory group prior to implementation.

Kuehler's primary recommendation for the Hawaiian Crow Project is to bring in new genetic stock from the wild. This would increase the genetic diversity of the flock, decrease inbreeding, and help insure the continued survival of this species. She considered it unlikely, given the low hatchability in the captive population, that there is sufficient founder stock at Olinda to establish a self-sustaining population. Her assessment of the captive husbandry for the Hawaiian crows at OESPF is, in general, that it is very good; but added that even the best captive propagation techniques available cannot improve hatchability success in eggs from inbred birds that do not have a good "hatchability potential."

The Division recognizes the urgent need to increase the number and genetic diversity of 'alala in captivity and is attempting to work with private land owners and the federal government to achieve this goal.

Kuehler considers her other recommendations to be secondary to increasing genetic diversity. Many of them constitute minor tinkering with the incubation and hatching procedures and equipment, but may add a small measure of improvement in hatching success and are being given serious consideration. Many have already been implemented.

Kuehler recommended the following changes in incubation procedures:

- Allowing females to incubate for five to seven days before the eggs are removed for artificial incubation will provide a natural still-air gradient which typically increases hatchability. Egg breakage by males has been a problem in the past when natural incubation was tried. Removal of males during this period would be necessary to reduce egg breakage. However, this may disrupt female incubation behavior, resulting in lower hatchability. Because of the uncertain results, implementation of this recommendation will be contingent on endorsement by the 'alala technical advisory group.

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Avian Disease Research Program Initiated for Hawaii



James D. Jacobi, Hawaii Research Group
USFWS, Hawaii

The U.S. Fish and Wildlife Service's National Wildlife Health Research Center has received funding from Congress to initiate a new avian disease research program in Hawaii during 1991. This work will be conducted in cooperation with several other agencies, including the Patuxent Wildlife Research Center's Hawaii Research Group, the State of Hawaii Department of Land and Natural Resources, and the National Park Service.

Avian diseases, particularly avian pox and malaria, are among the major factors that have been suggested as being responsible for the decline and extinction of the native Hawaiian forest birds. Previous studies by Warner (1968), Nakamura and Hansen (1985), and van Riper et al. (1986) have confirmed the presence of these pathogens in Hawaii, and suggested that many of the native birds may be highly susceptible to such diseases.

This new disease research program initially will focus on determining spatial and temporal variations in the distribution of avian pox and avian malaria throughout native forest bird habitats on several of the islands. It will also attempt to identify additional pathogens that may be impacting the native bird populations. Although funding for this project has only been secured for this first year, it is anticipated that the Fish and Wildlife Service will support the disease research program for at least the next three to five years.

Robert Smith Joins USFWS Pacific Islands Office

Ernest Kosaka, Field Office Supervisor
U.S. Fish and Wildlife Service, Honolulu

Effective January 27, 1991, Mr. Robert P. Smith will be the Fish and Wildlife Service's senior representative in the Pacific Islands Office, Honolulu, Hawaii. Mr. Smith brings to this position an extensive background in endangered species and habitat conservation issues. He served for the past two years in the Service's Portland Regional Office as the Assistant Regional Director - Fish and Wildlife Enhancement. In this capacity he gained in-depth knowledge of natural resource issues and concerns in the Pacific Basin. He also served the agency well in several previous positions in Washington, D.C. Mr. Smith will complement the current Hawaii Fish and Wildlife Service staff in utilizing innovative approaches to address issues of significance to Hawaii, Guam, American Samoa, the Commonwealth of the Northern Mariana Islands, the Republic of the Marshall Islands, the Republic of Palau, and the Federated States of Micronesia.

USFWS to Conduct Work- shop on Wildlife Diseases

James D. Jacobi
Hawaii Research Group
USFWS, Hawaii

The Fish and Wildlife Service's National Wildlife Health Research Center will be conducting a workshop in Hilo during February 12-14 on wildlife diseases. The main purpose of this workshop is to provide field biologists and managers with (1) a better understanding of wildlife diseases in general and what diseases may be found in Hawaii, (2) information on how to recognize disease situations in the field, and (3) some hands-on experience on how to collect specimens and take samples for further diagnosis.

Tentatively, the first day will consist of lectures or video presentations covering diseases in general, then focus more particularly on avian diseases. Day 2 will first include more discussions of avian diseases, then conclude with necropsies of birds in the lab. The third day will focus on mammalian disease, again with both lecture and necropsy sessions.

Anyone involved with wildlife research or management is invited to participate in this free workshop. There is no limit on how many people may attend the lecture presentations. Although we are a bit limited on both space and specimens for the necropsy sessions, we will try to make space for as many people as possible in the lab.

Please contact Jim Jacobi (967-7396, Big Island) or Paul Conry (548-8850, Oahu) for more information on attending this workshop.

Suggestions for 'Alala Captive Flock *continued*



- Slightly increase the incubation temperature, which may decrease the incidence of mal-positioned chicks and late-term deaths. This recommendation and increased turning frequency will be implemented in 1991.

- Radiograph eggs at the end of incubation to determine if the chick is mal-positioned within the egg. An X-ray machine is available at the facility, but implementation of this recommendation will require substantial veterinary assistance, staff training, and experimentation with surrogate eggs. We will try to implement this procedure as far as is feasible within staffing and resource availability.

- Use behavioral stimulation techniques during pip-to-hatch interval. Audio stimulation is currently being provided with Olinda's forced-air incubators. Tactile stimulation will be provided when still-air hatchers are employed in the future (see below).

- Hatch chicks under still-air conditions in order to simulate natural incubation conditions more closely, and to help alleviate in-shell chick rotation problems. This will require rewiring of a still-air hatcher presently at OESPF. We will try to implement this for the 1991 season.

- Break out chicks as soon as possible during the pip-to-hatch interval. We currently break out chicks as soon as we deem the action is feasible and prudent. We will incorporate new techniques such as radiographing eggs, as they become available.

Kuehler recommended the following changes in 'alala husbandry:

- Offer a more frugivorous diet with low iron and acid content. This recommendation arises out of a general concern for iron storage problems in captive populations of birds of paradise, which are closely related to crows. This is a general preventative measure that has been implemented.

- Conduct liver biopsies on the captive 'alala at Olinda to determine iron levels. This is an invasive technique that, although probably safe, has risks. Additionally, it identifies a problem for which there is no known treatment other than a change in diet which has already been implemented. However, OESPF has a collection of surrogate myna birds being maintained on the 'alala diet from which liver biopsies can be obtained to investigate possible iron storage problems.

- Determine the sex of juveniles and adult non-breeding birds using laparoscopy, in order to determine accurately the sex of non-breeding birds. Laparoscopy has been done safely in the past. We will request the assistance of the San Diego Zoo veterinarians to implement this recommendation on non-proven breeders and juveniles.

- Conduct chromosome analysis of the breeding stock at Olinda to look for abnormalities. We will implement this recommendation once a laboratory which can perform these analyses has been decided upon.

- Develop artificial insemination techniques with Kolohe, the mis-imprinted 'alala female, in order to gain production from this otherwise healthy bird. We will request the assistance of San Diego Zoo for this procedure and will attempt to implement this recommendation, contin-

gent upon the availability of adequate staff at Olinda.

- Develop chick rearing protocols which minimize inappropriate imprinting and maximize independence. Such protocols are partially in use and will continue to be developed and utilized.

- Set up a surrogate propagation program at Olinda to conduct research and develop protocols on a similar species in order to gain information which can be applied to the 'alala, such as artificial incubation, chick rearing, artificial insemination, diet analysis, breeding/behavioral problems, foster parenting, and reintroduction into the wild. This is currently under consideration, but will require additional facilities and staffing. This is viewed as an inescapable part of the future of Olinda if the program is to succeed on a large scale. The surrogate work developed for the California condor at the San Diego Zoo is an example of the value of this kind of program.

- Develop an avicultural training program for current staff at OESPF. This is currently in the development stages with ongoing discussion between DOFAW and Honolulu Zoo personnel. Other facilities such as the San Diego Zoo will be contacted as needed.

Kuehler offered the assistance of the San Diego Zoo in implementing many of these management and propagation procedures involving expertise not available within the Division. We thank her for her efforts and look forward to continuing the productive relationship between the San Diego Zoo and the Division's captive propagation program.

Copies of her report and the Division's comments are available upon request from the Division of Forestry and Wildlife, 1151 Punchbowl St. Honolulu, HI, 96813.

April 1991(cont)

23 Hawaii, Hilo High School 5:30pm-9:30pm
 24 " " - Multi-Purpose Rm " "
 25 " " " " "

May 1991

10 Maui, Kahului Library 5:45pm-10:00pm
 11 " " " 8:00am-3:00pm

14 Molokai, Nat Guard Armory 6:00pm-9:30pm
 15 " " " " "
 16 " " " " "

15 Hawaii, Waimea Civic Ctr 6:15pm-9:00pm
 16 " " " - Conf Rm " "
 22 " " " " "
 23 " " " " "

21 Lanai, Lanai Rec Ctr 6:00pm-9:30pm
 23 " " " " "
 24 " " " " "

21 Hawaii, Hilo High School 5:30pm-9:30pm
 22 " " " " "
 23 " " " " "

22 Hawaii, Kealahaha Int Sch 6:00pm-9:30pm
 23 " " " - Rm F 7 " "
 24 " " " " "

24 Kauai, Lihue State Bldg 5:45pm-10:00pm
 25 " " " 8:00am-3:00pm

24 Oahu, Nimitz Bus Ctr, B-223 5:45pm-10:00pm
 25 " " " 8:00am-3:00pm

26 Kauai (Class is tentative. Call the Hunter Education
 27 Office or DOCARE for updated information.)

June 1991

1 Oahu, Nimitz Bus Ctr 8:00am-2:00pm
 8 " " " " "

12 Hawaii, Waimea Civic Ctr 6:15pm-9:00pm
 13 " " " - Conf Rm " "
 19 " " " " "
 20 " " " " "

21 Oahu, Nimitz Bus Ctr, B-223 5:45pm-9:30pm
 22 " " " 8:00am-3:00pm

25 Hawaii, Hilo High School 5:30pm-9:30pm
 26 " " " " "
 27 " " " " "

28 Kauai, Lihue State Bldg 5:45pm-10:00pm
 29 " " " 8:00am-3:00pm

28 Maui, Kahului Library 5:45pm-10:00pm
 29 " " " 8:00am-3:00pm

This schedule is tentative.

Call the Hunter Education Office to confirm time and place. On Oahu call 543-2710. Outer islands dial "Operator" and ask for Enterprise 5212.

To report hunting violations, call your local Department of Conservation and Resources Enforcement office:

Hawaii 933-4291	Mauai 243-5414
Kauai 241-3444	Molokai 567-6618
Oahu 548-5919	Lanai 565-6688

Hunter Education Course Produces Better Hunters

Larry Hirai, Volunteer Hunter Education Instructor and Environmental Specialist, U.S. Army

In many parts of the continental United States, this is the time of year for hunters to be afield for upland game birds. Here in Hawaii, it is no different. The annual game bird hunting season is now through January 20, 1991 on weekends and State holidays, and Axis deer season on Lanai starts in February.

All hunters are required to have a 1990-91 State of Hawaii hunting license, which costs \$10.00 for residents, active military, and military dependents. First time hunters must also complete a hunter education course before they can obtain a hunting license.

The State of Hawaii made hunter education a requirement on July 1,

1990, becoming one of 44 states with the requirement. All hunters under 18 and any hunters over 18 who have not previously obtained a hunting license must take the eleven hour course. Those who are over 18 and have a license or have successfully completed a hunter education or safety course in another State may be exempted.

The hunting education course is free and aimed at reducing hunting accidents, improving hunters skills, and increasing environmental awareness and

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Better Hunters *continued*

knowledge of Hawaii's wildlife resources. The course stresses respect and responsibility for all wildlife and is intended for both sports-persons and non-hunters of all ages.

What can you do to be an ethical and responsible hunter or outdoors-person in Hawaii? The course will teach you to:

- *Consider yourself an invited guest on the land, obtaining the landowner's permission before using his land.
- *Respect the land, leaving gates and signs as you find them and carrying out your litter.
- *Support conservation efforts to ensure continued hunting and outdoor recreational activities in future years.
- *Appreciate Hawaii's unique and rare native plants and animals and how you can provide for their continued survival.
- *Obey rules on safe firearm handling, always treating your firearm as if it were loaded.
- *Never go afield alone and always tell others of your plans.
- *Educate others to become true sportspersons.

Being a responsible individual is one of our greatest duties when we go afield. The hunter education program is one step in this direction. Your participation in the course is another important step.

Interested individuals may obtain information on the program or enroll in a class by calling the Hunter Education Program of the Division of Conservation and Resources Enforcement at 543-2710.

Molokai's 1991 Axis Deer Season Cancelled

The annual DOFAW census of Axis deer in Game Management Areas on Molokai indicated that the numbers of deer there were well below normal. Therefore, in order not to reduce the population further, the 1991 Axis deer hunting season on Molokai has been canceled.

Hunter Ed Instructor Phelps Nominated for National Award

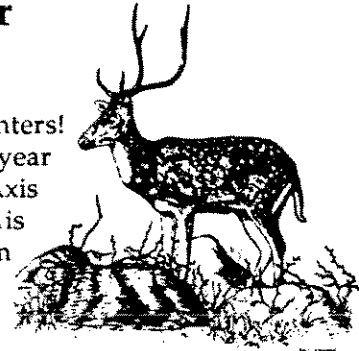
Charles Phelps, West Oahu Master Instructor, has been nominated for the Winchester Hunter Education Instructor of the Year. This is a national award which recognizes outstanding instructorship in Hunter Education. Charlie has been an instructor for the past 10 years and has helped certify over 2,000 of our fellow residents. In addition to teaching Hunter Education he gives enthusiastic presentations at schools, youth organizations, community groups and sporting organizations.

Good Luck Charlie!

Game News

Axis Deer Season Planned for Lanai

Attention Hunters! It's that time of year again. The Lanai Axis deer hunting season is scheduled to run on consecutive Sundays from February 17 to May 5.



The first two Sundays (Feb. 17 and 24) will be open only to archery hunting while the third Sunday (March 3) will be open only to black powder muzzleloaders. Permits are not required for archers and muzzleloaders. However, these hunters must pick up a deer tag prior to hunting. Tags will be given out between 3:00 pm and 7:00 pm on the Saturday before the hunt or between 7:00 am and 9:00 am on the Sunday of the hunt. There is no limit on the number of participants for either the archery or muzzleloading seasons.

NOTE: A special muzzleloading seminar will be held at the Lanai Community Center from 6:00pm to 8:00pm on Saturday March 2nd.

The general rifle season will be held for nine consecutive Sundays beginning with March 10. A permit is required for the general rifle season. Permit applications should have been in by January 18, 1991. The public drawing for the assignment of hunting dates will be held at noon on January 25 in Wailuku, Maui and at 4:00 pm on Lanai in the DOFAW office.

The bag limit for all hunters is one Axis deer of either sex. Once archers or muzzleloaders fill their limit, they will not be eligible to participate in the remainder of the Axis deer season. Should you have any questions, please call the DOFAW office in Honolulu at 548-8850 or the Maui district office at 243-5352.



Only You Can Prevent Forest Fires

Kauai's 1990 Black-Tail Harvest Lower Than Expected

Tom Telfer, Wildlife Biologist
DOFAW, Kauai

The 1990 black-tailed deer hunt on Kauai produced disappointing results - only 17 bucks were taken. This was just half of last year's total harvest. There were 1,496 deer tags issued in this year's lottery, but hunter participation was only 62 %.

The reason for the poor harvest this year was unexplainable because reported deer sightings and observations of deer sign in the hunting area were higher than usual. Bad weather during one weekend of the season contributed to the poor harvest, but was not only reason for the poor showing.

The heaviest buck was harvested by Charles Cobb-Adams, at 152 lbs. dressed weight, (the estimated whole weight was 190 lbs.). It sported perfect 4:4 point antlers. The condition of the bucks examined at the hunter checking station indicated that the health and apparent productivity of the herd was excellent.

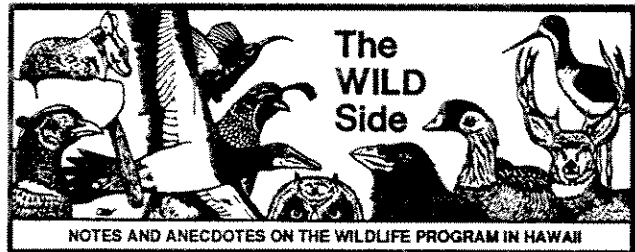
New Game Bird Hunting Areas Opened on Kauai

Tom Telfer, Wildlife Biologist
DOFAW, Kauai

In mid-December, Waimea Canyon and Mokihana Ridge Game Management Area were opened to bird hunters. These areas were formerly open only to game mammal hunting, but the opportunity for taking Erckel's francolins, pheasants, chukars, and doves, was considered significant enough to also open it to bird hunting. The only drawback, certain intrepid hunters will consider it an advantage, is that access is limited only to foot or horseback travel. The ambitious hunter however, can be assured of flushing up scores of francolins in the rough broken canyon bottom.

Although it is recognized that few hunters would be tempted to try bird hunting with a bow and arrow, a few archers have proven themselves to be masters at "calling in" Erckel's francolins using artificial calling devices. Therefore, hunting unit "F" on the western lower rim of Waimea Canyon would be the place to try, as these aggressive birds are abundant there and it is too narrow and close to a public highway to permit the use of shotguns. Perhaps the use of a decoy bird would entice a cock into the range of a bow.

Maps depicting the boundaries of these hunting areas can be obtained at the Lihue Forestry and Wildlife Office.



Ronald L. Walker, Wildlife Program Manager
DOFAW, Honolulu

Hunters as Conservationists

Fortunately, Hawaii does not have a serious anti-hunting movement as is the case in many mainland States. There are, of course, those here who think of hunting as barbaric and hardly a "sport" because wild animals cannot defend themselves. Realists understand that, because introduced species often have adverse impacts on native flora and fauna, hunting is a necessity. The sport is a mechanism of control and balance in native ecosystems which are overlaid with non-native biota. Practically speaking, a vigorous public hunting program is the most cost-efficient method of reducing overabundant game populations with the added benefit of recreation and meat for the pot.

A little known fact about hunting is that hunters pay for native species restoration in Hawaii in a big way and have done so since 1945. In that year, the State first took advantage of the Pittman-Robertson Federal Aid to Wildlife Restoration Act (known fondly now as "P.R."). Admittedly, in the early years, the major use of the Fed bucks was to improve game populations by habitat improvement and to introduce many exotic game animals which now cause problems. But since then, hundreds of thousands of dollars of hunter-generated funds have been used to directly benefit native Hawaiian endangered wildlife.

Each time a hunter purchases a hunting arm or ammunition for it, he or she pays a tax which accrues to the Federal government for eventual doling back to the States. The amount each State receives is based on a formula involving land area and the number of licensed hunters, but because of Hawaii's small size and low percentage of hunters, we get more than this formula would allow. This funding pays up to 75% of the total cost of approved P.R. projects, so the State must provide the other 25%. Therefore, hunters also contribute to the program directly through their State tax payments.

Well, what are we talking about here? In 1952, Statewide hunter-funded migratory waterfowl surveys were instituted. Field studies of the endangered Hawaiian goose (our State bird, the nene) began in 1954

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The Wild Side *continued*

and continue to this day, paid for with P.R. funds. These monies paid for a study of the Pacific golden plover (1963-1968), and currently pay for studies of endangered seabirds, waterbirds and forest birds, including the palila and 'alala. Thirty-five percent (\$242,500) of Hawaii's Pittman-Robertson 1990-1991 fiscal year budget (\$667,500) is dedicated to native non-game wildlife species. This includes research, inventories, habitat improvement, management, technical advice, and administration.

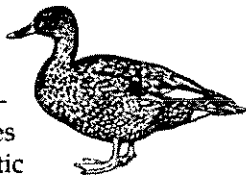
Next time you are on a bird-watching trip through a native forest, and you come upon a hunter walking down the trail with a feral pig on his or her back, you might want to express your thanks for his or her contribution to conservation in Hawaii.

Patients Pending

Being a summary of lesser known wildlife projects awaiting action by others . . . BACK BURNER BITS:

1. **DIPHACINONE:** we are awaiting action on an application to approve its use as a pesticide on mongooses in Hawaii, particularly for the benefit of endangered ground-nesting birds, but also for game birds. This is a complicated procedure involving the State and Federal Departments of Agriculture, Bell Laboratories, and the Environmental Protection Agency. Paul Conry is coordinating this initiative and may be contacted for more information.

2. **KOLOA KAPER:** the Wildfowl and Wetlands Trust in England has agreed to take "surplus" Hawaiian ducks off our hands. The birds currently being held at Olinda on Maui will be shipped to The Trust as soon as logistics and permits permit. Although koloa have been reestablished on Oahu and Hawaii by releasing captive stock, recent studies indicating questionable genetic purity among local birds make further releases unwise, until the koloa-domestic duck hybridization problem can be resolved. Meanwhile, wild populations on Kauai are thriving and offer a ready source if captive propagation needs to be fired up again.

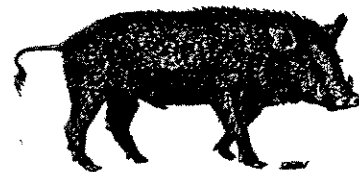


3. **TURKEY TALK:** believe it or not there is a "Wild Turkey Super Fund" for the restoration, management and conservation of the wild turkey. The National Wild Turkey Federation Inc. (NWTF) has established the program to involve State fish and game agencies and the Federation in joint projects for our largest game bird. In Hawaii, turkey hunters would need to organize, become affiliated with the national organization, and engage in fund raising. Our agency would have to

enter into a memorandum of understanding with the NWTF and work closely with the local affiliate.

4. **LANAI HUNTING PROGRAM:** Castle and Cooke Inc. has indicated to us their concurrence in re-instituting a formal cooperation agreement for game management and public hunting on the Island of Lanai. In recent years, hunting seasons have been subject to the owners' approval on a season by season basis, even though the terms and conditions of the former agreement have been followed. We are presently negotiating with Castle and Cooke on the exact terminology, liability clauses, and provisions of a new cooperative agreement. Meanwhile, the annual hunting season for Axis deer has been finalized and hunters may contact any Division of Forestry and Wildlife office for details.

Kauai Feral Pig Tracking Study Begun



Tom Telfer, Wildlife Biologist
DOFAW, Kauai

A portion of the Kauai District's game mammal research program got under way in December with the capture and radio collaring of two feral pigs in the Kokee region of the island. The study is intended to determine the seasonal movement patterns of feral pigs in the upland forested parts of the island. The results of this study will help us improve our management of the species as a game mammal and help protect those areas where pigs are considered to be undesirable.

The radio collars we are using can identify individual pigs by means of unique radio frequencies. Their location will be monitored throughout the course of the year using triangulation procedures. The radio collars have a range of up to 5 miles direct line of sight, somewhat less in rough or heavily forested habitat.

If hunters capture pigs with radio collars on them, the Division would appreciate receiving them back, as they are expensive and can be re-used. Hunters finding collars should contact the Lihue DOFAW office.

Camping Permits Now Required for Waimanu Valley

As of March 1, 1991, people on overnight camping trips into Waimanu Valley (Waimanu National Estuarine Research Reserve) must first obtain a camping permit. For more information contact the Division of Forestry and Wildlife, P.O. Box 4849, Hilo, HI 96720.

Management Continues After Hunting Season Ends

David Smith, Wildlife Biologist
DOFAW, Oahu



The game bird season in the Kuaokala Game Management Area will be over after the third weekend in January, but habitat management efforts designed to improve hunting in the GMA will continue all year. Kirk McCarthy has been maintaining water units, clearing trails and trapping mongooses in the GMA, and will soon be tallying the season's bird take, establishing a game bird monitoring system, and experimenting with various game bird feeding units in an effort to make the 1991-92 season the best ever. Hunters interested in volunteering to work in the Reserve in the off season can contact David Smith or Kirk McCarthy at the Forestry and Wildlife Office in Honolulu.

Mokuauia Nesting Season Uneventful

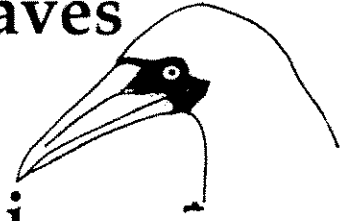
Maile Sakamoto
Volunteer Coordinator
DOFAW, Oahu

The wedge-tailed shearwaters at Mokuauia Island (an Oahu wildlife sanctuary) had a very uneventful nesting season. What makes this so exciting and newsworthy for the rest of us is that this area has been fraught with problems over the past few years. During the 1988 and 1989 nesting seasons, there were large bird kills due to dogs and shootings. The island had been closed twice to the general public to prevent further harm to the birds, most recently in April 1990 after 37 birds were killed by dogs during the breeding season.

In June, working in conjunction with Malaekahana State Park, a group of volunteers formed an "island watch." Thanks to this group of concerned citizens, there have been few problems since the island was reopened in July. Not only do they patrol activities on the island, but they also assist in informing and educating the public about the shearwaters and their habitat.

We would like to express our thanks to these individuals and hope that the 1991 season will be even more successful and uneventful than 1990!

Seabird Salvage Effort Saves 1,548 Birds on Kauai



Tom Telfer, Wildlife Biologist
DOFAW, Kauai

The annual cooperative seabird salvage project, conducted by the Division of Forestry and Wildlife and the U.S. Fish and Wildlife Service on Kauai, resulted in the successful release of 1,548 downed seabirds. Aid stations, set up at each county fire station, and at a few other locations around the island, were the collection points for most of the birds turned in by the public. The project resulted in the successful return of 91% of the birds known to have fallen on the highways and urban areas of Kauai. Birds salvaged included Newell's shearwaters, dark-rumped petrels, band-rumped storm petrels, wedge-tailed shearwaters, white-tailed tropicbirds, and a red-footed booby.

Of particular interest this year was the greatly increased numbers of dark-rumped petrels in the annual fallout. A total of 29 dark-rumps were included in this year's salvage, constituting almost two percent of the total. In previous years, the greatest number of petrels recovered was nine. Only one band-rumped storm petrel was recovered this year.

A substantial number of wedge-tailed shearwaters also were recovered late in the season - a total of 54. Such a large number is interesting, because most wedge-tails nest along the coastline and therefore do not have to fly across urban areas. But these evidently were drawn back inland after fledging to the ocean.

The heaviest areas of fallout were: Lihue (22%), followed by Hanalei-Princeville (15%), Kapaa-Wailua (15%), and Poipu (7%). Fallout followed the normal heavy pattern during the new moon with lighter fallout during the full moon. The many unknown volunteers that faithfully picked up the downed birds: county fire station personnel and cooperating private businesses, deserve much credit for the success of the annual program; as does Greg Vajda, who worked as an emergency hire and performed much of the pick-up and banding during the peak period of the season.

The Incident Command System: Teamwork In Emergency Management

Patrick G. Costales, Protection Forester
DOFAW, Honolulu

Media accounts of wildland fires during 1990 have clearly documented the impact of such conflagrations on the environment and their threat to life and property. When too many brushfires occur, efforts to suppress wildfires are expensive and stretch firefighting resources to the limit. Last summer, for instance, a single six hour battle at the Naval Ammunition Depot Road in Waianae cost the fire department \$12,788 in man-hours and equipment, and used thousands of gallons of valuable water.

According to fire officials, the increased number of wildland fires and their larger acreage have given reason for multi-agency cooperation in addressing the issue. As part of their mutual aid pacts, some fire agencies have identified the need for a safe and efficient management system for emergency situations.

As a consequence, the Division of Forestry and Wildlife (DOFAW) sponsored introductory and advance courses in the Incident Command System (ICS) during the latter part of November and early December. Classes were held on the Big Island and Oahu for federal, state, and local fire protection services and natural resource management agencies. At the request of the DOFAW, a cadre of instructors from USDA—Forest Service were assembled to teach key agency personnel in the major functions of the system. The introductory session was attended by approximately eighty fire officers, firefighters, and resource managers Statewide. Advance courses involved a total of twenty-three fire managers.

ICS was developed in Southern California in 1970 as a result of fires that consumed large portions of the State. The management system was developed so that different agencies could work together toward a common (fire suppression) goal in an effective and efficient manner. The Incident Command System basically establishes procedures for controlling personnel, facilities, equipment, and communications.

The command and control system can be used for any type and sized emergency which may range from a very small incident involving only a single engine crew to a very major incident requiring a multi-agency response. The structure of ICS can be expanded to match ever-changing incident scenarios. It allows for a coordinated and timely assignment of emergency resources and improves responder communications via use of common terminology.

In this era of budget constraints, the use of a uniform management system, such as ICS, will enable



managers to utilize the combined suppression resources of cooperating fire protection agencies more effectively. Common standards in organization, procedures, and communications provide the basis for flexibility in meeting public expectations for fire protection and other emergency situations.

Palila Sighted on Saddle Road

Rebecca L. Cann, Dept. of
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On 28 December 1990, around 11:00, two palila were sighted within 20 feet of the Mauna Kea side of Saddle Road between mileposts 34 and 35, in the Hilo direction from Mauna Kea State Park. The birds were perched about 6 feet above the ground in a mature mamane tree with flowers and seed pods of all stages. One palila was an adult male, as indicated by its bright yellow plumage and song. The bird that accompanied it was duller and approximately the same size. We assumed it to be a female. The birds foraged in this tree for approximately 2 minutes before flying away from the road to a nato tree about 60 feet away, before being lost from sight.

We were also informed by Dr. Evangeline Funk that she saw a palila fly across Saddle Road from the Mauna Loa to the Mauna Kea side on 15 December 1990, between the same two mileposts. To the best of our knowledge, these are the first sighting of palila in this area since Dr. Fern Duvall's sighting in the nearby Critical Palila Habitat in 1983.

These sightings underscore the wisdom of designating this entire habitat for the recovery of palila, even though the birds may have been absent from much of it when it was initially set aside.

Management Plans Continue for Olokui and Puu Alii Natural Area Reserves

Cyndi White, Natural Area Biologist
DOFAW, Honolulu

Of the 19 Natural Area Reserves established throughout the State, 10 have completed management plans and an additional 6 have been inventoried for their resources, but lack management plans. Efforts are being made to complete the management plans for the remaining Reserves beginning with the Olokui and Puu Alii Reserves.

Both the Olokui and Puu Alii Reserves encompass remote plateaus on windward east Molokai. The Olokui Reserve contains some of the most pristine examples of montane wet forest communities in the State, largely due to the absence of feral ungulates. Preventing ungulate movement into the Reserve is the highest management priority for this Reserve. Aerial hunting to reduce ungulate populations along the pali areas surrounding the Reserve has been ongoing for the past year and will continue since the rugged terrain makes fencing unfeasible.

The Puu Alii Reserve also contains intact montane wet forest communities, although in recent years the lower portions of the Reserve have been invaded by feral ungulates and nonnative plants. Feral ungulate control is the highest priority management action in this area. Aerial hunting to reduce ungulate populations along the pali areas has been ongoing for the past year. Also, fences recently have been completed which enclose the most intact native communities in the upper portion of the Reserve and pig snaring is being initiated throughout the Reserve.

Population of Endangered Hawaiian Mint Protected By Enclosure

Steve Bergfeld, Assistant Protection Forester
DOFAW, Island of Hawaii

A healthy population of an endangered Hawaiian mint, *Haplostachys haplostachya* var. *angustifolia* was recently fenced off in the Pohakuloa Training Area on the Big Island. The fencing will protect this population of about 300 plants from grazing and trampling by feral ungulates. Construction of the fence began on December 3 and was completed on December 14. A joint effort by the Wildlife, NARS, and Forestry crews made it possible for the 1.5 miles of fence surrounding Puu Ka Pele to be completed in just two weeks.

Members of the crews included: Wildlife - Joey Mello, Bruce Silva, Arthur Mahoe, Matthew Majamay, Russel Medieros, and Bob Covington. NARS - John Mauga Sr., John Mauga Jr., Glenn Nihipali, and Robert Miguel. Forestry - Gene Burke (Project Crew Leader), Bill Downs, Solomon Kaluhikaua, Oren Kitayama, and Curtis Tampos.



NARS NOTES



David Smith, NARS Biologist
DOFAW, Oahu

Kaena Point Natural Area Reserve

This fall saw an exciting new development in the Kaena Point Natural Area Reserve - two Laysan Albatross nests. Mongoose trapping began in the Reserve in late September in anticipation of the upcoming nesting season which begins in early November, and the decrease in predators has produced the first eggs at Kaena in quite a few years.

The wet winter has produced good native plant growth, including the beautiful 'ohai, which has a number of new seedlings.

Pahole Natural Area Reserve

Native vegetation monitoring efforts are underway, with transects and plots being established by the Oahu natural areas manager and University of Hawaii researchers.

Non-native vegetation is being controlled in the Reserve thanks to the hard work and perseverance of Forestry and Wildlife employees Bryon Stevens and Bill Haus.

The old hunter's cabin near the Makua Valley rim has been dismantled and is in the process of being replaced by a new trail shelter for use by hunters, hikers and Forestry and Wildlife crews.

Special permits can be obtained for pig hunting in the Reserve from January through April. Contact David Smith at the Oahu Forestry and Wildlife office.

The Oahu Forest Bird Survey is underway and biologists are roaming the hills listening for the birds that inhabit our forests. Some, such as the native Hawaiian Oahu Creeper are rare and have not been seen in a number of years, but others are abundant and thriving. The survey will be completed this spring.

Clidemia Battlefront: Leafminer Beetle Added to Arsenal



Glenn Shishido, Protection Forester
DOFAW, Maui



On August 29, 1990, Patrick Conant, an entomologist with the State Department of Agriculture, released a species of beetles known as a leafminer (*Lius poseidon*) to aid in the control of clidemia (*Clidemia hirta*), a noxious plant. The release was done at Makapipi in the Koolau Forest Reserve. Additional beetles were also released in the Kahakuloa section of the West Maui Forest Reserve. These beetles are the third biocontrol agent released in an effort to curb the infestation of clidemia. Inspection trips will be made to determine the effectiveness of the beetles.

In 1981 a thrips (*Liothrips urichi*) was released in the Makapipi area. Inspections since then have determined that the thrips has been very effective in killing clidemia, particularly those in full sunlight. In 1989, a fungus (*Collectotrichum gloeosporioides*) was found to cause defoliation of clidemia. This particular fungus had been used previously on Molokai. The fungus was also released in the Kahakuloa area. The success of the fungus was limited to the exposed ridge top. However, various degrees of regrowth have occurred since its release.

Two public informational meetings were held in Hana and Keanae in May, 1981 to familiarize the local communities on the pestiferous nature of clidemia. Within a few months of the meeting, hunters alerted the Division to the presence of a patch of clidemia in the Koolau Forest Reserve. Subsequent infestations were also found in the Haleakala National Park and the Maui Land and Pineapple Company's Puu Kukui Watershed area.

Over the years, the Sierra Club and The Nature Conservancy have released both the beetle and the fungus in the Wailau area of Molokai with varying degrees of success.

Foresters Help Recycle Christmas Trees

Wayne F. Ching, Resource Management Forester
DOFAW, Honolulu

On December 29, 1990 and January 5, 1991, the Recycling Association of Hawaii along with numerous cooperating agencies, including the Division of Forestry and Wildlife, participated in a Christmas tree recycling program. This idea was conceived by people concerned with the recycling concept. They felt that instead of throwing away Christmas trees after they are used, we should collect these trees and "recycle" them: grind them into mulch and use it in home gardens, public parks, or wherever mulch is needed. The idea of the program was to turn in your used Christmas tree at a central drop-off point and in return you would receive a certificate entitling you to a free wiliwili seedling (*E. sandwichensis*) courtesy of McDonald's of Hawaii. The seedlings will be given out in April.

On Oahu, DOFAW employees Nelson Ayers, Verna Nakamoto, and I, participated in the program by volunteering our time and strong backs at the Castle High School drop-off point. Over 1,200 trees were dropped off at Castle High School, although it seemed like it was about ten times that amount! Statewide, over 30,000 trees were recycled. A real success for a first-time program! Hopefully, next year we will recycle even more.

Zen and the Art of Everyday Work

Wayne F. Ching
Resource Management Forester
DOFAW, Honolulu

How many times a day do we come in conflict with fellow workers, subordinates, the general public and others and we come away feeling angry or stressed? How often do we see our supervisor and argue and feel like nothing gets accomplished? One of the problems we encounter everyday is how to redirect this stress and anger. Instead of arguing with a supervisor or subordinate, it would be better to see things in a different light.

The martial arts concept of being in harmony with your opponent can and should be used in everyday life. When encountering an opponent, one does not attack against his opponent's force. Instead, one uses his opponent's energy and redirects this energy back to his opponent. In everyday work, you should not meet conflict head-on. You should redirect your energy into something more positive.

Our field of work is filled with conflict, frustration, and anger. Yet we continue to do our work the way we were conditioned to do it — meet it head-on. Our energy can be put to better use if we realize that continued fighting and arguing does not belong in the work place. What is needed is better harmony with those around us. Morihei Ueshiba, the founder of the martial art - Aikido, once said that in order to achieve harmony or oneness with your opponent, you need to use his positive energy and use it to your benefit. As in work, we need to use the positive energy of everyone we come in contact with. If we can achieve that, then we are better for it. True harmony comes when we realize how much easier our work is because of positive energies coming together as one.

Maui County Celebrates Arbor Week



Glenn Shishido
Protection Forester
DOFAW, Maui

"Ka Makahiki O Na Makuahine O Hawai'i Nei - The year of Hawai'i's Women" was the theme of the County of Maui sponsored Arbor Week. It was held November 2-10.

This eight day celebration honored Gladys Raven who is described in the Arbor Week program guide as: "... the manifestation of the Outdoor Circle on Maui. A resident of Kihei for over twenty-five years. Ms. Raven has worked diligently with beautification projects on the island, first with the Beautification Commission and then as a member of the Arborist Committee. For many years, Gladys has judged school beautification contests and through the Outdoor Circle, financed projects for Community Work Day Program. Gladys has always been tightly connected to the Community Work Day Program performing as the Bookkeeper as a backbone for the organization. With her tenure up as a member of the Arborist Committee, there is no more appropriate selection for Honorary Chairperson in this "Year of Hawai'i's Women."

The celebration consisted of numerous tree planting ceremonies at public and private schools, a neighborhood street planting event, and the Division of Forestry and Wildlife's free tree seedling distribution.

To coincide with the celebration's theme, flowering tree and shrub species were selected and planted by Nurseryman Rich-

ard Nakagawa. 3,400 seedlings were distributed this year with 500 seedlings made available on Molokai and 400 seedlings in Hana.

The Division of Forestry and Wildlife has participated in the County of Maui's celebration since its inception here in 1972. District Manager Wesley Wong, Jr. and Forester Robert Hobby continue to be ex-officio members of the Maui County Arborist Committee - the

steering committee for Arbor Week.

In 1977, Maui County was recognized by the National Arbor Foundation as a member of Tree City USA, a program that recognizes the government's commitment for urban beautification. Since then, the County has consistently qualified as a "Tree City USA."

The Division of Forestry and Wildlife is the State liaison for the National Arbor Foundation.

A Forester's Art: Estimating Acreage



Professional foresters are often asked to estimate the number of acres burned in a fire. Acres, fortunately, turn out to be very flexible units of measure, and therefore wide open to observer bias and highly individualized interpretation.

The following is intended to point out a truer interpretation of fire size and the interconversion of various versions of "the acre." Thanks to Don Studebaker from the Cleveland National Forest in California for providing the following thought-provoking information.

As a starting point, recall that a "standard acre" is defined as 43,560 square feet, regardless of shape. Alternatively, a standard acre equals 10 square chains, 0.4047 hectares, 6,272,640 square inches, or 4.521×10^{-29} square light years. Keep in mind that the following conversions are not entirely fixed and depend upon whether the estimator is from the Hawaii, Maui, Oahu, Kauai District, or an Administration refuge.

- *10 flaming acres = 3 extinguished acres (having no doubt shrunk when water was applied).
- *4 night acres = 1 daylight standard acre.
- *40 flaming acres = 3 extinguished daylight standard acres.
- *0-10,000 mapped acres = 0-10,000 guessed acres = unknown standard acres. (depending on who made the map, and which drainage they decided to put the fire in).
- *20 seen-from-a-far acres = 1 to 7 standards acres (depending on the impressiveness of the smoke column).
- *6 steep acres = 2.5 flat acres.
- *5 seen-from-a-chopper acres = 2 map acres = 1 standard acre.

Just remember that when asked to make an acre estimate, be confident of your answer. Whether it's right or wrong is not the point. The point is to earn respect from your superior and instill in you the much-needed confidence in the art of acre estimation.

The Nature Conservancy's Oahu Preserves

Barrie Fox Morgan, Stewardship Planner
The Nature Conservancy of Hawaii, Honolulu

The Nature Conservancy of Hawaii's recent agreement with Campbell Estate to manage 3,700 acres in the Honouliuli Forest Reserve has lent new steam to Preserve management on Oahu. TNCH is in the process of hiring a preserve manager for the two Oahu preserves: Honouliuli and Ihihilauakea, the 30-acre vernal pool preserve at Koko Head. (This preserve manager will also be responsible for Kanepuu Preserve on Lanai.) These Oahu Preserves have higher visitation demands than other more remote preserves, and provide a good place to further conservation education. Working out a balance to accommodate users while protecting the native plants and animals of the Preserves has been the challenge of the past few months.

Within Honouliuli Preserve, travel is naturally restricted to ridge top trails, but these trails also route hikers very close to some of the rarest plants and animals in the Preserve. A study of the federally listed tree snail, *Achatinella mustelina*, by University of Hawaii researchers is alongside a popular trail, and is being affected by hikers who travel through the area. In an effort to control the impacts of hikers on the study site and on this declining population of the snails, hiking group size and the frequency of hikes has been limited. All individuals wishing to visit the Preserve must obtain a permit. These limitations on access will be assessed over the first eighteen months of management in the Preserve, and will be revised as appropriate. We would appreciate any information on past or current public or agency use of the Preserve area.



Ihihilauakea Preserve is managed under an agreement with the land

owner, the City and County of Honolulu. Established to protect a rare aquatic fern, *Marsilea villosa*, management focuses on weed control and prevention of trespass by off-road vehicles. Weeding work parties are organized during the wet winter months when the fern comes out of its dormant phase and can grow into areas opened by weed removal. A system of monitoring *Marsilea's* response to weed control has been established and is maintained by a volunteer from the Hawaiian Botanical Society. For this reason, and because the fern has such a short growing period during the rainy season, it is critical that people do not trample the area where the fern grows. Any groups or individuals visiting the area must request a permit from the Conservancy so that these visits can be coordinated with other Preserve activities.

Contact the Oahu/Lanai Preserve Manager at The Nature Conservancy of Hawaii, 537-4508, for information or permits.



NA ALA HELE
Hawaii Trail & Access System

Deborah Chang
Program Coordinator
DOFAW, Honolulu

The Na Ala Hele Program would appreciate hearing from anyone who can provide historic references (i.e. pre-1900's) for the popular term, "King's Trail." So far we have found no evidence that our ancient or historic Hawaiian trails can be correctly called "King's Trails." Na kamaaina ("old timers"), who are recognized as authorities on trails of the past, do not remember their parents or grandparents using that term. It appears to be a widely used, untraditional, modern label.

Why might historic Hawaiian

"King's Trail" - Is There Such a Thing?

trails be called "King's Trails?" The chiefs and kings preferred to travel by canoe in early times. Many historic trails were built at the behest of chiefs or kings. Messengers and spies of ancient chiefs are legendary in their running prowess while using Hawaii's trails. There are connections between the building and use of trails and the chiefs and kings of old Hawaii. However, Hawaiian trail terms that appear in early historical accounts and chants are as follows:

* Alaloa or "Long Trail" was used by the earliest Hawaiian historians to refer to major prehistoric and early historic routes that were used by the general population. These trails were important in transportation,

religious rites, and political control in old Hawaii. Na alaloa are often located along shorelines and at times are mid-elevation or cross-island trails. Such trails are frequently associated with nearby historic sites such as habitation complexes, shrines, and petroglyph fields.

* Alanui or "Large Trail" is a major thoroughfare or street. The term is used in certain pre-1892 maps and legal documents relating to land title. An alaloa can also be referred to as an alanui.

* Alanui Aupuni or "Government Road" is used in certain pre-1892 maps and legal documents relating to land title. Certain na alaloa are also alanui aupuni.

The Buck Stops Here

Michael G. Buck, Administrator
DOFAW



Forest Management on Private Lands

Much of the forest land in Hawaii is in private ownership and the capacity to protect important watersheds, native Hawaiian plants and animals, and produce renewable forest resources is significantly dependent on these private forest lands. Private land ownership in Hawaii is highly concentrated, as 30 entities own 94 percent of the land. At one time, a major portion of the private forest land was under "surrender agreement" whereby private land owners assigned their lands to the State Forest Reserve System in exchange for reduced property taxes. Under expiration of these agreements, the majority of landowners have opted not to keep their lands in Forest Reserve status.

Stewardship of private forest lands requires a long-term commitment by the owners of these lands. Such a commitment can be fostered through governmental actions and an understanding of the motivation and needs of private landowners. The results of interviews with Tree Farm Award winners on the mainland suggest that ethnic, family, and personal identity are the primary management motivators. While these "internal motivations" may be primary, "external incentives" such as income production opportunities, property tax incentives, cost-sharing, and technical assistance also influence the management decisions of private forest managers.

Forest management and protection redistributes income between generations. When trees are planted, managed, or simply protected, the bulk of the benefits probably will be captured by future generations. Also benefitting are possibly many of the general public, who have not contributed at all to the initial investment. This is especially true with many forest resources which are hard to quantify and do not show up in normal economic analysis, such as watershed enhancement, native species protection, and clean air. The government receives funds to protect those resources on public lands as it does in the state-owned natural areas and forest reserves. In most cases, private landowners' decisions will always be more market driven, unless public subsidies are provided.

The roles that public and private sectors play in forest management in Hawaii need to be recognized. Both have different clienteles, time perspectives, and accountability concerns. At times, benefits for the public good will outweigh short term economic concerns. Yet, availability of carrots (e.g. tax incentives, cost sharing programs) will have a longer lasting effect than the judicious use or threat of the stick (e.g. condemnation, law suits). Coercing people to do things through laws with penalties for non-compliance is a poor motivator of action. People do better when pulled by incentives rather than pushed by regulations or penalties.

The following recommendations, if pursued concurrently, would encourage wise forest management on private land and promote reforestation in Hawaii:

* Establish reasonable property tax assessment categories for forest land using categories based on site productivity.

* Establish cost sharing programs, such as the proposed Forest Stewardship and Natural Area Partnership Programs to encourage wise forest management in Hawaii. This program would provide cost sharing and technical assistance. Applicants would have a management plan approved by the State Division of Forestry and Wildlife, which would monitor individual plans to assure they conform to agreed management goals.

* Establish an aggressive information and education program to inform private land owners of forest management potentials and options, once they are available.

* Increase production and availability of tree seedlings adapted for Hawaii conditions. Accelerate the propagation of common native plants.

New Publication on Sandalwood Available

Larry S. Hamilton, Res. Asst.
East-West Center
University of Hawaii, Manoa

In April 1990, a "Symposium on Sandalwood in the Pacific" was held at the East-West Center of the University of Hawaii, Manoa. This symposium was cosponsored by the East-West Center, the National Tropical Botanical Garden, and the Hawaii Society of American Foresters; and resulted in an updated synthesis of our present knowledge about sandalwood. The U.S. Forest Service supported this effort by publishing the papers presented. The technical coordinators for the publication were Larry Hamilton and Gene Conrad. It is now available as General Technical Report PSW-122 of the Pacific Southwest Research Station. Copies are available from the Institute of Pacific Island Forestry, USFS, in Honolulu or at the East-West Center.

Tips on Conserving Energy and Saving Money

Wayne F. Ching, Resource Management Forester
DOFAW, Honolulu

In these times of gasoline price increases and the Gulf crisis, we need to take a hard look at conserving energy and making the most out of a difficult situation. The following tips are something we can all follow to conserve energy and save money:

- *Consolidate your errands.** If you are out doing errands, try to work in two or more errands so that you won't need to use the car again that day.
- *Use the air conditioner sparingly.** Using the air conditioner on your car ten minutes less per day would save more than a gallon of gas every two weeks. Use the "manual air conditioner," you know, one of those handles that sits on the inside of your car door. Those of you who use office air conditioners, turn up your thermostats a notch. That saves energy.
- *Leave your assigned company vehicle at the office.** Leaving your assigned vehicle at the office once a week or more would cut back on auto expenses and give you more money to spend on other projects!

***Take the bus to work.** Taking the bus to work alleviates the need to find parking, eliminates unnecessary vehicles on the road, saves you money on gas, and someone else does the driving.

***Ride a bicycle to work.** Riding a bicycle to and from work is a great way to get exercise. Parking is plentiful and you get to work refreshed and ready to go! Don't forget that helmet.

***Keep your vehicle in good running condition.** Keeping your vehicle in top shape saves on gasoline and repair bills. Properly inflated tires can give you more miles per gallon of gasoline.

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