

## Determining Age and Sex of 'Oma'o (*Myadestes obscurus*)

by Steven G. Fancy,<sup>1</sup> James D. Jacobi,<sup>1</sup>  
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**Abstract:** Methods to determine the age and sex of 'Oma'o (*Myadestes obscurus*) were developed on the basis of 66 museum specimens and 149 live 'Oma'o captured in mist nets on the island of Hawai'i. 'Oma'o in juvenal plumage are heavily spotted with scalloped greater coverts and tertials and are easily distinguished from adults. Birds in their first prebasic plumage usually retain one or more scalloped wing coverts or tertials. Wing lengths of adult and immature male 'Oma'o were significantly longer than those of females, but only 80% of adult specimens were accurately sexed by wing length.

Methods for determining the age and sex of live birds have been developed for only a few species of native Hawaiian forest birds (Fancy et al. 1993; Jeffrey et al. 1993; Pratt et al., in press). We report here on methods for aging and sexing the 'Oma'o (*Myadestes obscurus*), or Hawaii Thrush. The 'Oma'o is found in mesic and wet forests above 300 m elevation and in subalpine scrub on Mauna Loa on the island of Hawai'i (van Riper and Scott 1979, Scott et al. 1986) and is one of four extant thrush species endemic to the Hawaiian Islands (Pratt 1982).

### Methods

We recorded plumage characteristics and external measurements for 55 'Oma'o specimens at the Bernice P. Bishop Museum and 11 'Oma'o specimens loaned to us by the American Museum of Natural History. We assumed that birds were correctly sexed during specimen preparation.

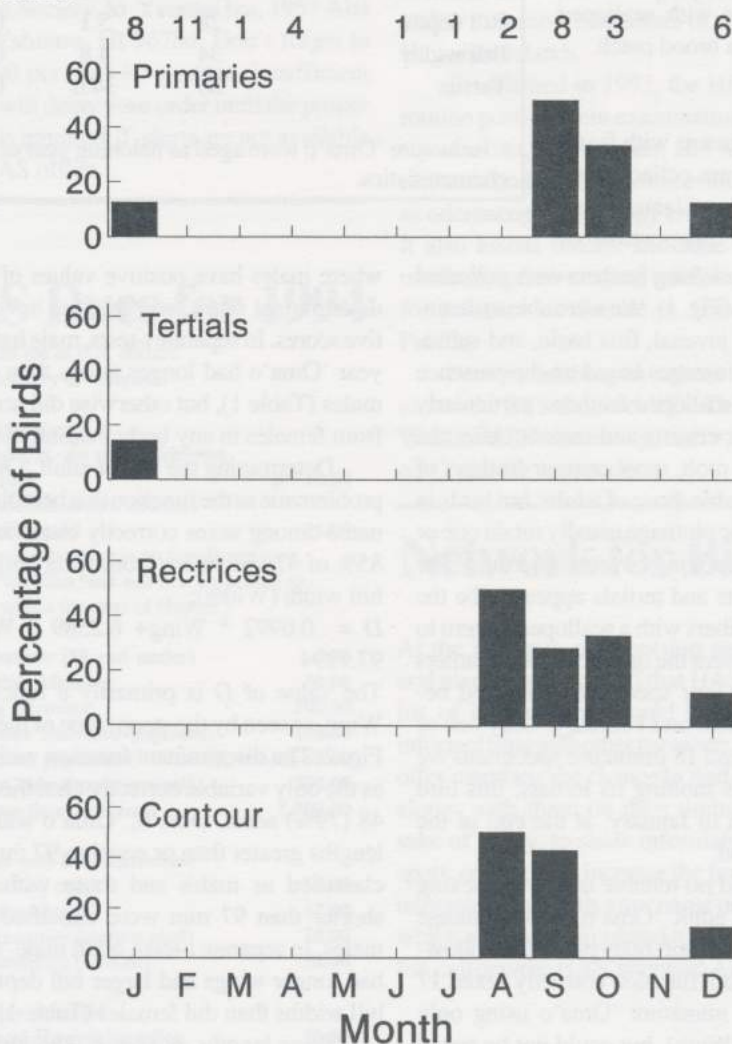
'Oma'o in juvenal plumage are dark and heavily spotted above and below and are easily distinguished from adults. The feathers of the breast, belly, and flanks are buffy white in the center but are broadly bordered with blackish brown, giving the feathers a scalloped pattern (Berger 1981, Pratt 1982). For each specimen, we recorded the percentage of contour feathers, greater coverts, and tertials

that showed this scalloped pattern, and noted any molting of primaries, secondaries, tertials, greater coverts, rectrices, or contour feathers. We measured the length of the wing chord and tail to the nearest millimeter with a metal rule, and measured the exposed culmen, culmen, bill width, bill depth, and tarsus length to the nearest 0.1 mm with dial calipers as described by Pyle et al. (1987) and Fancy

et al. (1993). In this study, we classified any bird with scalloped feathers as immature.

For each age class (immature and adult), we used stepwise discriminant analyses to determine the best set of measurements for sexing 'Oma'o and classified each specimen by sex using linear discriminant functions (SAS 1987). To produce unbiased error rates, we classified individuals by a jackknife pro-

Fig. 1. Monthly percentage of 'Oma'o museum specimens with molting feathers. Numbers above bars are sample sizes. No specimens were collected in May or November.



cedure (i.e., each discriminant function was computed from the other observations in the data set, excluding the observation being classified).

We tested the discriminant function for adults with an independent sample of 149 live 'Oma'o captured in mist nets by C. J. Ralph at Keauhou Ranch (19°30'N, 155°20'W; 1800 m elevation) and Kilauea Forest (19°31'N, 155°19'W; 1600-1650 m) during 1976-1982 (see Ralph and Fancy [1994] for description of study areas and capture methods). Live 'Oma'o were sexed as females if they had a brood patch and as males if they had a swollen cloacal protuberance (Ralph et al. 1993). We could not test the discriminant function for juvenile birds because none of the live birds with scalloped feathers had a brood patch.

## Results

All specimens with feathers in molt were collected between August and January, and the greatest proportion of

'Oma'o with molting feathers were collected in September (Fig. 1). We were able to distinguish among juvenal, first basic, and subsequent adult plumages based on the presence of spotted or scalloped feathers, particularly on the greater coverts and tertials. After the first prebasic molt, most contour feathers of 'Oma'o resemble those of adults, but birds in their first basic plumage usually retain one or more scalloped wing coverts or tertials. The greater coverts and tertials appear to be the last of the feathers with a scalloped pattern to molt as they were the only scalloped feathers remaining in four specimens collected between December and February. Only one of the 48 adult and 18 immature specimens we inspected was molting its tertials; this bird was collected in January, at the end of the molting period.

We found no reliable means for sexing immature or adult 'Oma'o from plumage characteristics or soft body parts. The following discriminant function correctly sexed 17 of 18 (94%) immature 'Oma'o using only wing length (Wing), but could not be tested independently with live birds:  
 $D = 1.3671 * \text{Wing} - 132.0000$

Table 1. Measurements (mm) of 'Oma'o museum specimens from the island of Hawai'i.

	Males			Females			<i>t</i> -test	
	n	Mean	SE	n	Mean	SE	<i>t</i>	P
<u>Hatching year<sup>a</sup></u>								
Wing	4	100.5	1.19	4	94.3	0.95	4.11	0.0063
Tail	4	65.0	1.00	4	64.5	0.29	0.48	0.6480
Exposed culmen	4	14.3	0.13	4	14.2	0.39	0.24	0.8164
Culmen	4	8.8	0.17	4	8.9	0.13	0.47	0.6540
Bill depth	4	5.1	0.15	4	4.8	0.15	1.55	0.1721
Bill width	4	4.8	0.13	4	4.6	0.06	0.89	0.4085
Tarsus	4	34.6	0.38	4	34.7	0.54	0.15	0.8857
<u>Second year<sup>a</sup></u>								
Wing	9	99.8	0.66	1	96.0	—	—	—
Tail	9	66.2	0.74	1	64.0	—	—	—
Exposed culmen	9	15.0	0.21	1	14.6	—	—	—
Culmen	9	9.0	0.13	1	9.1	—	—	—
Bill depth	7	5.0	0.05	0	—	—	—	—
Bill width	9	4.6	0.12	1	4.2	—	—	—
Tarsus	9	34.9	0.29	1	35.3	—	—	—
<u>Adults</u>								
Wing	35	101.5	0.55	13	96.4	0.94	4.81	0.0001
Tail	35	67.0	0.68	13	64.8	0.94	1.77	0.0833
Exposed culmen	34	14.8	0.15	13	14.7	0.24	0.29	0.7724
Culmen	34	9.2	0.08	10	9.2	0.24	0.22	0.8269
Bill depth	28	5.1	0.04	6	4.9	0.05	2.57	0.0151
Bill width	34	4.8	0.05	13	4.5	0.07	3.20	0.0025
Tarsus	35	34.6	0.16	13	34.2	0.39	1.32	0.1947

<sup>a</sup> Immature 'Oma'o were aged as hatching year or second year based on month of capture and plumage characteristics.

where males have positive values of *D*, the discriminant score, and females have negative scores. In separate *t*-tests, male hatching-year 'Oma'o had longer wings than did females (Table 1), but otherwise did not differ from females in any body measurement.

Determining the sex of adult 'Oma'o is problematic as the function that best discriminated among sexes correctly classified only 85% of 47 specimens from wing length and bill width (Width):

$$D = 0.6992 * \text{Wing} + 6.2389 * \text{Width} - 97.1294$$

The value of *D* is primarily a function of Wing, as seen by the steep slope of the line in Fig. 2. The discriminant function with Wing as the only variable correctly classified 38 of 48 (79%) adult 'Oma'o; 'Oma'o with wing lengths greater than or equal to 97 mm were classified as males and those with wings shorter than 97 mm were classified as females. In separate *t*-tests, adult male 'Oma'o had longer wings and larger bill depths and bill widths than did females (Table 1).

Wing lengths, but not bill widths, were available for 149 live adult 'Oma'o with either a brood patch or cloacal protuberance

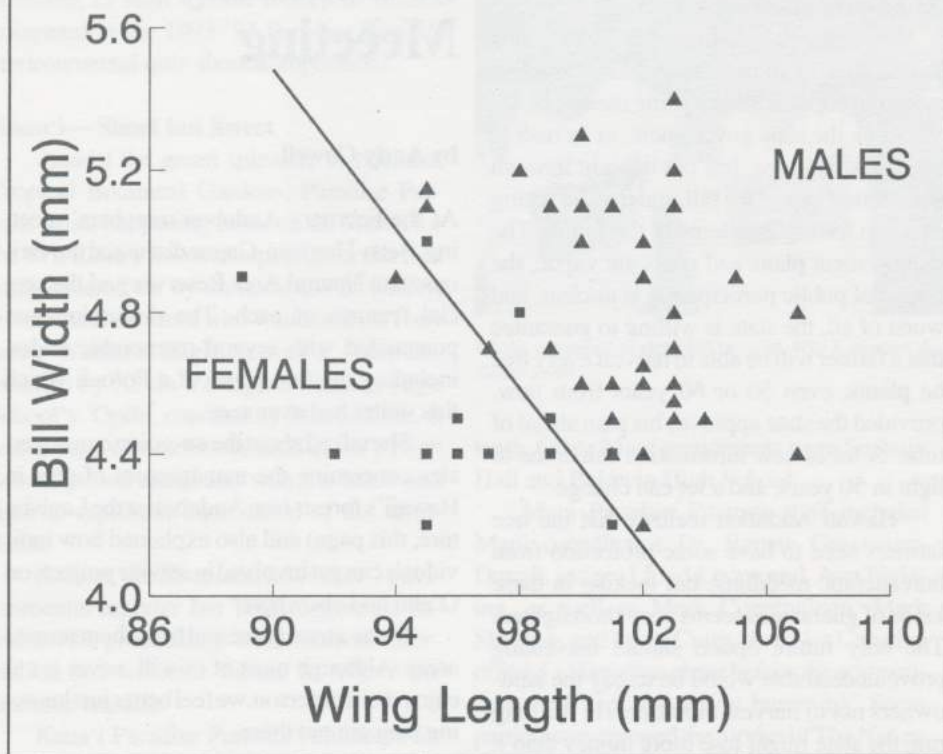
that were captured in mist nets at Keauhou Ranch and Kilauea Forest. Eighty-two percent (122 of 149) of birds from this independent sample were correctly sexed when we classified birds with wing lengths  $\geq 97$  mm as males. However, only 18 of 28 (64%) adult 'Oma'o with wing lengths  $< 97$  mm were females.

## Discussion

Our results indicate that 'Oma'o can be separated into three age classes (i.e., hatching year, second year, and adult, as used by the USFWS Bird Banding Laboratory) on the basis of plumage, but that adult 'Oma'o cannot be reliably sexed by plumage or body measurements. Wing length is the best field measurement for sexing 'Oma'o, but an accuracy level of approximately 80% for adults is unacceptable for most studies. We were able to accurately sex 94% of museum specimens with scalloped feathers by using wing length, but we were unable to test our results with an independent sample.

Several additional methods for sexing 'Oma'o are available to researchers. 'Oma'o are highly sedentary (C. J. Ralph, unpubl. data) and therefore tractable. The probability

Fig. 2. Wing chord and bill width measurements (mm) of adult male (triangles) and female (squares) 'Oma' o museum specimens. Line represents the linear discriminant function  $D = 0.6992 (\text{Wing}) + 6.2389 (\text{Width}) - 97.1294$ .



of sexing an individual marked bird on the basis of breeding condition (presence of a brood patch or swollen cloacal protuberance) or breeding behavior increases as an individual is monitored over time. 'Oma' o are large enough that field laparoscopy can be used safely to sex birds (Oring et al. 1988). Furthermore, blood samples or feather pulp can be analyzed to determine the sex of an individual (Dvorak et al. 1992).

#### Acknowledgments

We thank the staff of the Bernice P. Bishop Museum, and particularly Carla Kishinami, for providing access to museum specimens. Gerald Lindsey and Marie Morin assisted with study design and measurements of museum specimens. We thank Paul Banko, Sheila Conant, Jeff Hatfield, Gerald Lindsey, Doug Pratt, and Kathy Wakelee for helpful comments on earlier drafts of the manuscript.

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## HAS President Set to Join NAS Board

Hawaii Audubon Society President Reginald David is the only candidate from the chapters of the Alaska-Hawaii region for National Audubon Society's Board of Directors. The HAS Board will cast the chapter's vote for David. The position is a three-year term beginning in December.

Charles G. Evans, from Alaska, who held the position for six years, resigned from the board in March. NAS Board Chair Donal C. O'Brien, Jr., has indicated David will be invited to the board's June meeting and will be appointed to fill the vacancy at that time.

## Mahalo Frear Eleemosynary Trust

The Frear Eleemosynary Trust has generously given Hawaii Audubon Society a \$2,500 grant in support of Paradise Pursuits, the environmental quiz show for high school students. For a story about this year's competitions, see page 29.

## Conservation Conference

The 1994 Hawaii Conservation Conference will be at the Ala Moana Hotel in Honolulu on 14-15 July. It will feature a symposium on restoration and regeneration of Hawaiian ecosystems as well as papers and posters on a range of conservation topics. For more information call Colin Bassett, 956-9825.

# Audubon at the Legislature

by Andy Cowell

These are tough times in Hawaii, both for the economy and the environment. Those feeling the economic pinch are more and more inclined to look to our natural resources for short-term relief. As conservationists, we want to make sure that these resources are adequately protected, and not sacrificed for short-term profit at the cost of long-term harm. Yet we all need to make a living, and so we are faced with tough choices and the need for sound compromises. Hawaii Audubon has been involved in two such issues this year—pig hunting and tree farming.

Many Audubon birders have visited the forests of Hawaii and realize the damage to habitat caused by pigs. Many native birds virtually disappear from areas with heavy pig damage, especially the highly sensitive, endangered honeycreepers. But many Audubon members are also no doubt aware of the troubled Hawaii economy and the closing of sugar plantations. The result of these economic problems has been increasing reliance by local people on pig hunting as a source of food and rising pressure from hunters to ensure more pigs in the forests.

This has been a key issue at the legislature this year. A number of extremely unbalanced bills were introduced at the beginning of the session which would have led to great increases in pig numbers and the establishment of pig populations in new areas. These bills also would have placed severe limits on conservationists' abilities to control the pigs, and they would have led to the establishment of state laws and policies explicitly favoring the pig over other forest uses such as watershed protection and habitat for native plants and animals.

Hawaii Audubon, working with other conservation groups, was able to defeat these extreme measures, which would have caused devastation in many remaining native forests. Hunters and conservationists have now succeeded in writing a compromise bill. This bill recognizes the value of pigs and the need for subsistence hunting, but it also makes sure that pigs will only be maintained in appropriate areas where they will not cause excessive harm. The bill isn't perfect, but it is a compromise we can live with.

With the closing of the sugar mills, many want to convert the sugar lands to tree farms. This seems like a good idea, since it would

provide new local jobs, and also take the pressure off the remaining native forests. Audubon likes the idea too.

Unfortunately, Senate Bill 2956 which would encourage tree farming and establish rules and regulations has some serious flaws. We think the state government, in its rush to do something now, has not thought through the implications of the bill, and may be setting itself up for big problems in the future. The management plans and goals are vague, the nature of public participation is unclear, and worst of all, the state is willing to guarantee that a farmer will be able to harvest every tree he plants, even 50 or 60 years from now, provided the state approves his plan ahead of time. A lot of new information can come to light in 50 years, and a lot can change.

Hawaii Audubon realizes that the tree farmers need to have some protection from bureaucratic meddling, but locking in these kinds of guarantees seems very shortsighted. The only future option should harvesting prove undesirable would be to pay the landowners not to harvest their trees. In the long run, the state might lose more money than it gains. That is why we are opposing Senate Bill 2956.

# Natural Areas Discussed at February Meeting

by Andy Cowell

At the February Audubon members' meeting, Betsy Harrison-Gagne discussed the various state Natural Area Reserves and the special features of each. The discussion was punctuated with several memorable slides, including the first photo of a Po'ouli which this writer had ever seen.

She talked about the on-going controversies concerning the management of pigs in Hawaii's forests (see Audubon at the Legislature, this page) and also explained how individuals can get involved in service projects on O'ahu and elsewhere.

It was a treat to see and hear about remote areas. Although most of us will never get to enjoy them in person, we feel better just knowing they are out there.

# More Plants Declared Endangered

by Andy Cowell

On 28 March, the U.S. Fish and Wildlife Service declared 11 plants native to the Ko'olau Mountains of O'ahu as endangered. This follows a February declaration of 24 plants native to Kaua'i as endangered or threatened. On both islands, the main reasons for the plants' critical condition are habitat degradation caused by pigs and competition with introduced plant species.

Among the plants listed are several species of native lobeliads, including *Brighamia insignis*, *Cyanea asarifolia*, and *Delissea rhytidosperra* on Kaua'i, and *Cyanea truncata*, *Lobelia oahuensis* and *Rollandia crispa* on O'ahu. Several other plants listed are members of dry and mesic forest communities, including the *Tetraplasandra gymnocarpa* ('ohe'ohe), *Eugenia koolauensis* (nioi), and *Hesperomannia arborescens* on O'ahu, and the *Pteralyxia kauaiensis* (kaulu), *Nothoctrum peltatum* ('aiea), *Exocarpus luteolus* (heau), *Hibiscus clayi* (Clay's hibis-

cus), and *Munroidendron racemosum* on Kaua'i. Several species on both islands now have fewer than 10 individuals.

On a brighter note, scientists with the National Tropical Botanical Garden and the State Division of Forestry and Wildlife have rediscovered several plants that were thought to be extinct. They include four lobeliads, *Cyanea asarifolia*, *C. glabra*, *C. linearifolia*, and *Delissea rivularis*, and two members of the mint family, unique in Hawaii for their lack of mint odor, *Phyllostegia knudsenii* and *P. wawrana*. At least 13 species have been rediscovered. Another genus of plants, the *Cyrtandra* spp (ha'iwale) has figured prominently in both the rediscoveries and the endangered listings. Among these representatives of the African violet family, *C. olona* and *C. sessilis* have been relocated, while *C. limahuliensis* on Kaua'i has been listed as threatened and *C. crenata* and *C. polyantha* on O'ahu have been listed as endangered.

# It's Kamehameha, Kaua'i, Lahainaluna, and Parker in Finals

by Sheila A. Laffey and Jason P. Johnson

A record 25 high schools from four islands competed in the 1993-'94 Paradise Pursuits environmental quiz show competitions.

## Kaua'i—Short but Sweet

Amidst the green splendor of National Tropical Botanical Gardens, Paradise Pursuits was a happening event on 26 March for the two Kaua'i teams competing for the first time, cheered on by an audience of family, friends, and a rooster who wandered in. They were Waimea High School's 'Elepaio, coached by Kevin Young, and Kaua'i High School's 'Opihi, coached by Sharon Orth. It was a very close contest until Kaua'i High School pulled ahead and won the battle and right to represent their island at the semi-finals.

As host, the *Honolulu Advertiser's* environmental reporter Jan TenBruggencate enlivened the proceedings with tidbits of information and welcome humor to relieve the dramatic tension.

Kaua'i Paradise Pursuits volunteers included coordinators Randy Yokoyama and Coleen Lopez as well as Dave Boynton, Marty Power, Rick Hannah, and judge David Laurence. Contestants and coaches were treated to a field trip focusing on native plants at the gardens following the competitions.

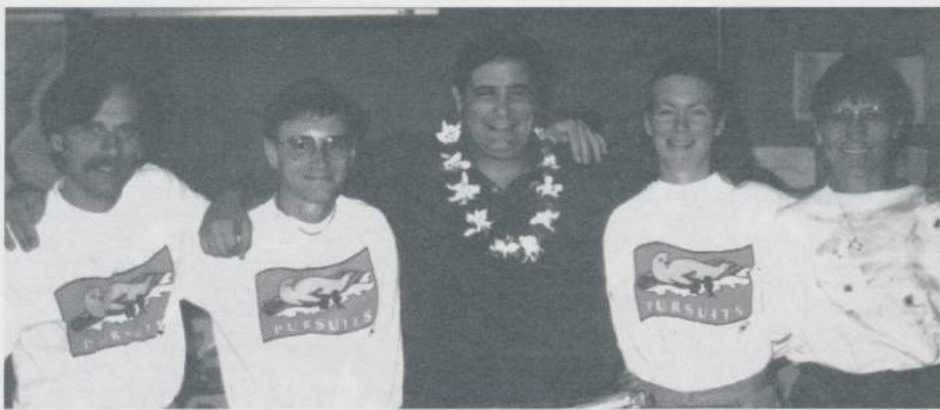
## Big Island Heated Up

On 12 March, teams from six Big Island high schools, some travelling across the island, braved stormy weather to compete at UH-Hilo. While cold rain was falling outside, host Professor Marlene Hapai provided some warm aloha inside. Parker School's 'Oma'om'o (Green Spirit Moth) team edged past Hilo High School's well prepared 'I'iwi team by a mere 10 points. Coaches Pat Wagner and Julie Williams could be seen sitting on the edges of their chairs.

Big Island Paradise Pursuits staff included judges Rick Warschauer and Jack Jeffrey, as well as Deborah Ward, Russell Bickler, and Wesley Field.

## Maui on the Go

A dogged Lahainaluna High School team unseated Maui's defending Paradise Pursuits champions, Maui High School, at Seabury Hall on 19 February. Running neck and neck for two rounds, Lahainaluna's Kokola team edged ahead of Maui High's 'Akohekohe



O'ahu competition staff, left to right, Will Freeman, Jason P. Johnson, host Randy Scoville, Alyssa Miller, and Susan Scott.

team. Other Maui participants were Seabury Hall and Baldwin High School.

Maui Paradise Pursuits staff included Maui coordinator Dr. Renate Gassmann-Duvall, judges Lloyd Loope and Ann Fielding, as well as Mark Cunningham, Mark Sheehan, and Toma Craig. Host Nan Cabatbat offered a Hawaiian chant before the competitions and kept the action humming. Some participants enjoyed the glories of The Nature Conservancy's Waikamoi Preserve amidst an avalanche of rain following the competitions.

## O'ahu Nailbiting

When the dust settled on the final round of the Honolulu District preliminaries Kamehameha Schools found itself on top. It was, however, no easy feat. Kamehameha encountered fierce competition from Kalani High School until the last segment.

During the first of the three rounds of play held on O'ahu, Kamehameha's Hui Lama team confidently eliminated their competitor with a smooth, self-assured style of play. Other schools competing during the 5 March competition were the host school, Hawaii School for Girls, Roosevelt, Farrington, Iolani, Kalani, and Mililani High Schools, and Sacred Hearts Academy.

The Central, Leeward and Windward rounds of play took place on 2 April at Kalaheo High School in Kailua. Kahuku High School dominated the early rounds, taking down three opponents one after the other to emerge the winner of their district, which included teams from Kalaheo, Waipahu, Moanalua, and Castle High Schools. As they moved into the final round, however, fate didn't smile on Kahuku's Man-O-War team. The defending champions, Kamehameha Schools, won.

Volunteers for the O'ahu rounds included hosts Randy Scoville and John Harrison, judges Susan Scott and Alyssa Miller, as well as Kersten Johnson, Will Freeman, and Jason P. Johnson.

## Mahalo!

Paradise Pursuits is funded primarily by Hawaiian Electric Company with additional funding from the Atherton Foundation and Frear Eleemosynary Trust. Air transportation is provided by Aloha Airlines.

And what would games be without prizes? Paradise Pursuits Coordinator Sheila Laffey says, "I feel like Santa Claus delivering wonderful prizes to all teams who participate." Prize donors have helped all the teams feel like winners. Nearly 40 organizations, businesses, and individuals donated prizes and bibliographic materials which included environmental books, notecards, posters, T-shirts, and passes.

Top prizes include an overnight camping trip to Pu'u Kukui from Maui Land and Pineapple Company, an overnight camping trip to Waikamoi Preserve from The Nature Conservancy, an overnight camping trip to Keahou Ranch courtesy of Kamehameha Schools-Bishop Estate, kayaking trips courtesy of O'ahu Adventure Kayak and Kaua'i Kayak, a whale watching cruise on the Navatek, and a semi-submersible trip on Nautilus in Kailua-Kona. Inter-island transportation for the competitions is provided by Aloha Airlines. Crazy Shirts provided transportation for a neighbor island trip for the winning team.

This year's prize donors are:

Aloha Airlines, Patrick Ching, Conservation Council of Hawaii, Crazy Shirts, Drs. Fern and Renate Gassmann-Duvall, Earth



*Enjoying Waikamoi Preserve after competitions, left to right, Dr. Renate Gassmann-Duvall, Mark Cunningham, Maui High School Coach Warren Liu, Rebecca Weeks, Sheila Laffey, Lea Voss, Robert Yoshioka, Aaron Kondo, and The Nature Conservancy guides Noah Stern and Pat Bily.*

Trust, *Environment Hawaii*, Ann Fielding, Greenpeace Hawaii, Hakalau Forest National Wildlife Refuge, Hawaii Audubon Society, Hawaii Botanical Society, Hawaii Earth Day, Hawaii Maritime Center, Hawaii Natural History Association, Hawaii Nature Center, Historic Hawaii Foundation, *Honolulu Advertiser*, and Honolulu Zoological Society.

Also, Kamehameha Schools Bishop Estate, Kayak Kaua'i, Kayak O'ahu Adventures, Koke'e Natural History Museum, Lyon Arboretum Association, Maui Land and Pineapple Co., Moanalua Gardens Foundation, Mountaineers Books, National Audubon Society, National Tropical Botanical Gardens, Native Hawaiian Plant Society, Natural Resources Defense Council, The Nature Conservancy, Nautilus, Navatek, Outdoor Circle, Peavian Logic, Planet Saviors, Recycling Association of Hawaii, Sea Life Park, Sierra Club, and UH Press.

## Kamehameha Wins Paradise Pursuits

As we went to press, we learned that Kamehameha Schools, the defending champions, had won the Paradise Pursuits competitions. The final and semi-final rounds were broadcast on KHON-TV2. Details in the June issue of the *'Elepaio*.

## Audubon Opposes ATOC Boombox

by Suzanne Marinelli

Several weeks ago, the Sierra Club Legal Defense Fund received an unexpected and very surprising fax transmission from a scientist in Nova Scotia, Canada, alerting them to a project about to begin in Hawaii. That project is ATOC—Acoustic Thermometry of Ocean Climate, designed to monitor the effects of global warming upon the earth's oceans. The project involves placing sound-generating devices in the Pacific Ocean—one in a marine sanctuary off Point Sur, California, and the other eight miles out from Hanalei Bay, Kaua'i.

According to the plan, 195 decibels of noise would be generated for 20 minutes at a time at four hour intervals for two years. At the end of this pilot project, the scientists involved hope to expand the program to 10 years, and include the Atlantic and Indian

Oceans as well. Because sound moves faster in warm water than cold, they hope to monitor temperature changes resulting from the global warming process.

An enormous outcry has erupted, resulting in a rift within the scientific and environmental communities. Some say that endangered marine mammals who live and breed in these waters (and numerous other life forms) are ultimately doomed if we don't deal with global warming now; they say the creatures will simply move away from the sound source. Others believe the sound levels, believed to be as much as 10 million times greater than what the deep diving whales can tolerate at close range, will simply lead to a quicker demise—"A deaf whale is a dead whale." Reports from Kaua'i indicate that the sound would be audible to the human ear on the beach at Hanalei Bay.

Because of the huge number of communications the National Marine Fisheries Service has received from Hawaii and California, they agreed to hold hearings in both states—one in California, one on O'ahu, and one in Lihu'e. Those hearings took place the week of 11 April.

Hawaii Audubon Society's Board of Directors unanimously voted to oppose the project on 11 April.

We will do our best to keep you informed as this issue unfolds. One specific area we will be investigating concerns the fact that the Defense Department is financing this huge undertaking. One wonders, is global warming the only agenda?

## Paradise Pursuits T-Shirts Available

A limited quantity of Paradise Pursuits T-shirts, in small and large sizes, is available at the office. The white shirts carry the Paradise Pursuits logo, a monk seal relaxing on a surf board, and HAS' 'Elepaio logo. To order, send \$12.00 plus \$2.00 for postage and handling to Hawaii Audubon Society, 1088 Bishop Street, Suite 808, Honolulu, HI, 96813.

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## 'ELEPAIO

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The 'Elepaio is printed on recycled paper.

# T-shirts for Sale

The Hawaii Audubon Society has a stock of T-shirts designed to spread the Audubon message. Not only are they attractive personal apparel, but they make excellent presents as well.

T-shirts bearing the Society's 'Elepaio logo are available in ash (gray) with a black design. We also have a few in aqua, navy, white, and beige. In addition, the "hot" Kolea (Pacific Golden Plover) T-shirts are also available. This T-shirt is white with a three-color design of the Kolea and native hibiscus. Proceeds from the Kolea T-shirt go to help HAS fund research on shorebirds in Hawai'i and elsewhere in the Pacific region.

T-shirts are \$12 each, plus \$2.00 per shirt for postage. They are available in medium, large, and extra large adult sizes only. When ordering T-shirts, be sure to list size and first, second, and third choice of color. To order T-shirts send your check, payable to the Hawaii Audubon Society, to Yvonne Izu, 1957 Alai Place, Wahiawa, HI 96786. Don't forget to add \$2.00 per shirt for postage. Insufficient postage will delay your order until the proper amount is remitted. T-shirts are not available at the HAS office.

# HAS Dues for 1994

All amounts are in U.S. dollars.  
Includes delivery of 'Elepaio.

## Regular Member

Delivery to U.S. zip code addresses

Via bulk mail \$ 10.00

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Introductory dues for

National and Hawaii Societies: 20.00

(Includes delivery of 'Elepaio and Audubon Magazine as bulk or 2nd class mail to U.S. zip codes. Renewal, \$30 annually.)

# Research Grants

The Hawaii Audubon Society makes grants for research in Hawaiian or Pacific natural history. Awards generally do not exceed \$500 and are oriented toward small-scale projects within Hawaii. Special consideration will be given to those applicants studying dryland forests and aeolian systems on Hawai'i. The deadlines for receipt of grant applications are 1 April and 1 October.

For an application form send a self-addressed stamped envelope to Grants, Hawaii Audubon Society, 1088 Bishop Street, Suite 808, Honolulu, HI 96813. For more information, call Phil Bruner, (808) 293-3820 (W).

# Did You Know?

The Honolulu Field Station (HFS), which investigates the role of disease mortality in native avifauna, is seeking reports of unusual and/or excessive mortalities of wildlife in the Hawaiian Islands.

Established in 1992, the HFS conducts routine post-mortem examinations on a variety of avian, mammalian, and reptilian species and conducts diagnostic evaluations, such as microscopic pathology and microbiology. It also assists federal and state agencies in monitoring free-ranging wildlife populations for presence of disease in Hawaii and the Pacific.

Persons wishing to submit a fresh carcass to the HFS should call Dr. Thierry Martin Work, wildlife disease specialist, at 541-3445 on O'ahu for instructions.

# Network for Birders

At the February membership meeting, several members suggested that HAS establish a list of birders who would be interested in informal trips with other members. This would offer members the chance to find others to go along with them on their outings—for the sake of safety, to share information on good spots, or simply to increase the fun. If you are interested in putting your name on such a list, which would be circulated to all those on the list, call or write HAS, attention Andy Cowell.

# Calendar of Events

## First Monday of Every Month

Monthly meeting of the Conservation Committee, 6:30 p.m., at the Coffee Line, 1820 University Avenue (in the YWCA). To join or for more information call David Hill, 988-7460 (H).

## Monday, May 9

Board meeting, 7:00 p. m., HAS office. Call Reggie David on Hawai'i, 329-9141 (W), for details.

## Saturday, May 7

Field trip to Red-footed Booby Colony at Ulupau Head, Kane'ohe Marine Corps Air Station, 9:00 a.m. to 11:00 a.m. Military security requires advance registration. Limited to 25 participants. To register call Lance Tanino at 247-5965 (H). Suggested donation: \$2.00.

## Monday, June 20

General Membership Meeting, Paki Conference Room, Bishop Museum, 7:30 p.m. Details to be announced in the June 'Elepaio. Refreshments will be served.

## Publications Available

The Hawaii Audubon Society publishes books, 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.

### Moving?

Please allow four weeks for processing address changes. Because our records are kept in order by zip code, we need both old and new addresses.

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