HAWAII AUDUBON SOCIETY

‘ELEPAIO

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For the Protection of Hawai‘i’s Native Wildlife

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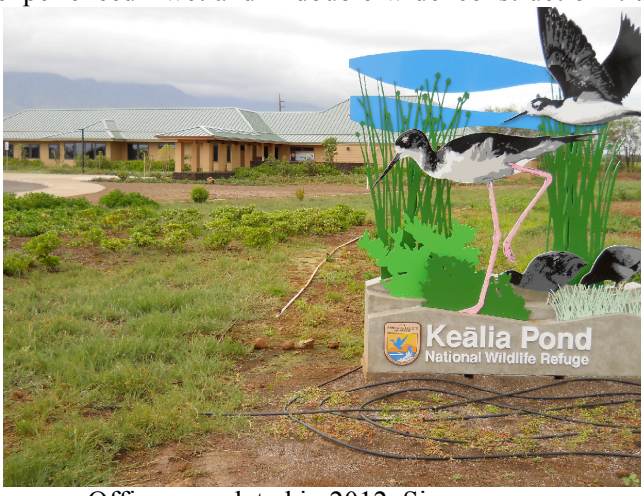
Institutional Memory and Keālia Pond

By Mike Nishimoto
Maui Nui Wildlife Co-op
Kahului, HI

A few years after Keālia Pond Refuge was established at south Maui, it faced a range of challenges. We were still learning about the biology and getting to know the nearby communities at that time. The Refuge needed help. Fortunately we received the generous sharing of knowledge by a number of experienced wetland biologists and managers from Hawaii, Alaska, the continental United States, Australia and New Zealand. When I was offered a buyout in 2014, I felt I had to pass on what they taught us, as well as our management experiences. The Refuge had already lost its manager of 15 years in 2013 and there was no intent to fill a Refuge manager’s position on Maui due to the sequestration budget. I had worked as the Refuge’s first and only biologist. A buyout generally means that the Refuge could not hire a biologist and as a result there was no one to pass on the Refuge’s institutional knowledge. Perhaps the ’Elepaio could retain some of this information.



Office completed in 2012. Sign was designed with the new office.

I have observed other refuge biologists leave their positions, yet their former refuges continued to move on so I expected the same here, but some events made me reconsider. I wondered if the budget was so tight that even the infrastructure had to be compromised when the Refuge office/visitors center closed in May 2014. The agency attributed the closure to mechanical problems with the air conditioning unit. There were several complaints about poor air quality at the visitors center/office of Keālia Pond Refuge since the winter rains (2013/14). If there are difficulties with the infrastructure, what about the wildlife? Thus far we can be grateful that waterbirds appear to be unaffected. The Refuge had overcome difficult times before, but is it different this time?

Our congressional delegation, state and local officials, conservation organizations and various others contributed toward the establishment of this refuge and protection of its wildlife. The original staff managed the Refuge through hard times out of their homes, then a ~200 sq ft office and later a double-wide construction trailer. After an office fire, the staff worked out of a travel trailer and later a single trailer. The office environment may not have been adequate, but it was working through controversies with nearby communities and with limited resources that made work tough. There has been a large investment in this refuge. Maybe we can contribute in some way to continue to protect and perhaps enhance a unique Hawaiian wetland.

Before I left the Refuge, several people had expressed concern that the biological knowledge of the Refuge would be lost. There is no substitute for a biologist or manager, but perhaps I could share several basic management strategies and pitfalls.

Background

Let me start with a brief background on Keālia Pond. In 1953, the Board of Commissioners of Agriculture and Forestry set aside 300 acres of Keālia Pond as a wildlife Refuge. Later, as part of an endangered species recovery plan, it was proposed for inclusion into the National Wildlife Refuge System. A perpetual conservation easement from Alexander & Baldwin, Inc., in December 1992 provided habitat to establish Keālia Pond Refuge.

The Refuge is one of the largest lowland wetlands left in the State. Keālia is valued for its endangered Hawaiian stilts and Hawaiian coots providing nesting, feeding and resting habitat. I counted as many as 1,079 stilts and 1,126 coots here at one time. Keālia is also a Hawaii birding hotspot that attracts a greater diversity of migratory birds than most Hawaiian wetlands.

Wildlife Management

Avian botulism: An outbreak of avian botulism is one of the more obvious threats to waterbirds. The bacteria *Clostridium botulinum* may produce its toxin at Keālia when vegetation is flooded and water is stagnant, shallow and hot. However, it can occur in any season. It is difficult to accurately predict an outbreak, but incidents of avian botulism need to be caught early. Healthy birds feeding on maggot-infested carcasses perpetuate this disease. In 2000, we had a large botulism event. Through the years we learned to minimize botulism incidents through monitoring and adjusting water coverage except in very wet years. The Refuge does not have discharge pumps to lower water level when the main pond is continuously flooded.

February 2014

We find a few victims of avian botulism at Keālia in most years. I used to monitor wetlands weekly to detect the early onset of an outbreak, remove carcasses and modify the environment. With experience you develop a search image, so searches for weak or dead birds are part of your daily fieldwork. The National Wildlife Health Center office in Honolulu had been a valuable resource on suspected disease incidents. We also studied the numerous papers on this subject. Details on Keālia avian botulism events are presented in the Refuge's waterbird reports (available through the Hawaii Wetland Information Network website and a sharepoint site accessible to agency employees).

The Big Three: In the late 1990s, the Refuge was frequently in the news for the smell of dead fish, large midge emergences and dust inundating nearby condominiums. The regional biologist labeled these issues the "Big Three." It takes a good understanding of pond ecology to avoid unintended consequences. The Refuge can reduce dust by pumping water. However, this often creates more habitat for tilapia. As tilapia numbers increase, the pond's carrying capacity with a large biomass of this species will eventually be reached. On hot windless days, massive die-offs will occur in spite of pumping. Once a die-off begins there are no easy fixes. To control tilapia, the Refuge learned to adjust the water level to reduce the pond's carrying capacity and manage for small tilapia die-offs.

June 2012

Low water level in the summer/fall often results in large midge emergences after winter storms fill the pond. To protect waterbirds and yet reduce midges below nuisance level, a range of factors need to be considered. We used to simultaneously monitor water level/coverage, water quality, adult midges, larval midges, fish abundance, waterbird numbers and coot/stilt reproduction. Often water management is insufficient to control large midge emergences so the Refuge would treat a portion of the pond with an insect growth regulator. The Refuge's internal requirements for pesticide applications mandate monitoring a variety of parameters. Several Refuge midge reports explain factors we considered before treating Keālia Pond.

Vegetation Control: The encroachment of two stands of red mangrove was recognized during acquisition of the Refuge. It became the Refuge's first large vegetation control project. Since the management of Keālia Pond was under the Oahu National Wildlife Refuge Complex, they could not provide much funding to another Refuge. Oahu already managed two Pearl Harbor Refuges, James Campbell and Kakahai'a (Molokai). So the Keālia Refuge tried to control mangroves with an E-Z-Ject Lance using glyphosate cartridges. It failed. At that time, we thought it required more glyphosate. I remember Ron Walker helping us drill holes in the mangrove to accommodate more glyphosate. It killed mangroves, but was inefficient. Meanwhile, the Division of Forestry and Wildlife had experimented with basal bark treatment on mangroves using Garlon 4. When water dropped in the summer, we successfully treated a portion of a mangrove stand. Cutting by chainsaw was also attempted, but it took time and involves some risks.

In 1998, Keālia became a separate Refuge and received funds for mangrove removal in 2003. A contractor removed a stand of mangrove by excavator. A second stand further east was removed a few years later. Eradication efforts require follow-up treatment so small stands of mangrove still remain.

Bulrush was removed through several contracts. Where the substrate was relatively dry, bulrush removal was more effective than a moist site to the east. Still, bulrush at the former site requires periodic maintenance. Its removal at the wetter easternmost site was unsuccessful. There were two attempts and both times bulrush returned to pre-treatment coverage. The project inadvertently resulted in the encroachment of fan palm (*Washingtonia sp*). Where the excavator piled material to drive within the wetland, it created habitat for the palms. You can see

this encroachment on aerial photographs. Besides the bulrush, there were various efforts to control Indian fleabane, California grass, pickleweed and a few other species. Most projects had uneven results when the Refuge was unable to conduct follow-up treatments. Visitors may observe the encroachment of alien vegetation along the eight transects (marked with PVC pipes) that had extended to the vegetation line of the pond in 1998.

Keālia Pond, June 1996

There may be other options to control vegetation more efficiently. The Refuge controlled vegetation with basic mechanical and chemical techniques, but there may be a mix of tools that embraces integrated pest management, conserves funds and produces results. For example, farmers use other weed control techniques like planting living mulches, calibrating sprayers, using selective herbicides, rotating herbicides, using solarization treatments, monitoring weed growth and numerous other techniques. A weed scientist warned: "A year of seeds means decades of weeds."

Predator Control: Hawaiian stilt eggs and chicks are the most vulnerable to predators at Keālia Pond. However, predator control requires intensive effort particularly in a Refuge that has limited vehicular access. We decided to focus on easily accessible, high-density nesting sites after analyzing trapping and nest success data. Details on predator control are presented in the Refuge's waterbird reports.

Water quality/quantity: The continued productivity of a wetland ultimately depends on the availability of water. Since about 2006, Keālia has been generally drier than in previous years. Refuges have received guidance to plan for climate change, but we had limited monitoring in dry years. Keālia has probably the best set of water quality data among Hawaii wetland Refuges. From 2000–2007 the Refuge had a water quality/quantity monitoring program in response to the "Big Three." Through the years we refined monitoring efforts to collect information efficiently. Changes are often subtle from year to year. Without monitoring and data analyses, changes or trends might not be recognized in time. Initially I thought planning for climate change was futile. While we cannot solve the problem, we may slow down some of the effects.

In planning for vegetation control projects in 2013, we planned to clear alien plants that had encroached prime coot nesting habitat after several dry winters. A wet 2013/14 winter was predicted. Normally it would take several wet winters to drown undesirable species and restore sedge habitat. A small area was cleared in 2013 and in the wet winter of 2013/14 sedges returned.

We monitor salinity to assist in assessing the health of the Refuge. Although 2013/14 was a wet year, the salinity was higher than in the past at the same water level. Eventually high salinities will modify the pond ecology. Periodically the pond needs to be flushed to remove salt. This is practiced at a refuge adjacent to the Great Salt Lake in Utah. We manage wetlands by pushing back succession. Now wetland management strategies need to be developed that delay the impacts of climate change.

Conclusion

In 1993 the Refuge had one part time employee and two full time permanent employees the next year. By 2012 Keālia had five full time permanent employees. In 2014, the Maui staff was reduced to two, but no onsite Refuge manager or wildlife biologist. Through the years we experienced several crises. We believed we could overcome the problems and improve the Refuge in spite of small budgets and a limited staff. Slowly the Refuge improved. In its short history, Keālia Pond Refuge had overcome hard times, but with loss of key positions its management will be a challenge. I have experienced several low budget cycles, but nothing this severe. In the Refuge's Comprehensive Conservation Plan, there is a caveat stating that actions will be implemented subject to funding availability. However, our selected alternative was not based on funding as austere as a sequestration budget. The plan does not describe where cuts would be made when the Refuge is underfunded/under staffed. The Comprehensive Conservation Plan mentions that it will be revised every 15 years or earlier if monitoring and evaluation determine that changes are needed to achieve the Refuge purposes.

Boardwalk had to be redone due to defects in the recycled plastic boards. It was replaced with a trex composite. This also has defects and needs to be rebuilt.

AMAZING CREATURES MOVE FROM OCEAN TO STREAM ONE TINY STEP AT A TIME

Aquatic Researcher's 20 Years of Tracking Movements
Sippy Hau – DAR Biologist
News Release from the Department of Land and Natural Resources
July 14, 2015

KAHULUI, MAUI – Skippy Hau, an aquatics biologist with the DLNR Division of Aquatic Resources (DAR) has dedicated much of his career to studying the life cycles and movements of fresh water fishes, shrimp, and snails. Carefully navigating the slippery stream beds and rocks of east and central Maui, Hau has collected reams of data on the movements of five fishes (ʻoʻopu), shrimp (ʻopae), and snails (hihiwai). "Often we think of taking from the ocean only, but historically people have depended on harvests from freshwater streams for sustenance as well," Hau explains.

It's easy to see his fascination with these tiny creatures. Consider the hihiwai. They hatch from eggs in the stream and then as larvae they flow out to the ocean where they develop further. Then they begin their long migration back to land; crawling one tiny step at a time up streams and waterfalls to where they grow into adults. They leave a mucus trail and basically play follow-the-leader by following one another upstream. Four species of ʻoʻopu or gobies move upstream in a different way. They have fused pelvic fins which they use like suction cups, grabbing onto rocks and the streambed to travel upward; sometimes many, many miles to the headwaters of a stream. A fifth species (ʻoʻopu akupa) does not have a fused pelvic fin, but nature has provided for it, by making it a carnivore. It survives in the lower stream and survives by feeding on other fish.

Many Maui streams have been diverted and channelized, sometimes resulting in little to no water flow at the point the stream flows into the ocean. However Hau's research has shown that even in streams with little to no surface flow, because of diversions, groundwater often continues to provide an estuary with enough fresh flow to ensure continued recruitment of fish, shrimp and snails. He says it's important to know what's happening with stream life as it can indicate larger problems in the ecosystem. It's even more important since so many freshwater ways in Hawaiʻi have been diverted since territorial times.

Once each quarter, Hau travels to each of his research sites and replaces temperature loggers that are typically fixed to exposed roots a foot or so beneath the surface of the water. His collected data on temperature differences provides information about the impacts on freshwater creatures from diversions and channelization. "This is more than looking at just a few animals. We also look at other aquatic species and plants, both native and introduced, to give us a better idea of what is happening with the overall health of our watersheds," Hau said.

Upcoming Field Trips, Volunteer Opportunities & Events

Please RSVP with name and contact information to
Hawai'i Audubon Society at 808-528-1432 or hiaudsoc@pixi.com unless otherwise specified

Foodland's *Give Aloha* Campaign, Code #77189
September 1st – 30th
Make a donation to HAS at the cash register using your Maika'i Card and our code #77189. See page 38 for full details.

Global Shorebird Counting
Saturday, September 5th 7am – noon
Meet at Honokohau Harbor, Kaloko-Honokohau National Historical Park entrance. We will visit shorebird areas along Kona coast, ends at 12 PM. Please RSVP to Lance Tanino: lance.tanino@gmail.com

Kawainui Marsh Restoration
Saturday, September 5st, October 3rd from 9am – noon
Volunteer at the monthly Kawainui Volunteer Day led by DLNR/DOFAW. HAS has adopted ponds #10 and 11. Support some of Hawaii's most endangered waterbirds and contribute to the success of the new restoration ponds behind Castle Medical Center in Kailua (at the end of Ulukahiki St.)

Bishop Museum Vertebrate Collections Tour
Monday, September 14th at 3:30 pm
Take a tour of the Bishop Museum's Vertebrate Zoology Collection, including the Hawaiʻi bird collection of approximately 7,200 specimens of extinct native species, native breeding species, non-breeding visitors, and introduced species. Please RSVP to Alice by leaving a message with your name, number attending, and phone number at (808) 864-8122. Space is limited to 10 participants.

Maui Forest Bird Recovery Project in need of Restoration Volunteers
October 22nd – 27th
Trips are typically five days in length and require a helicopter ride in and out of the reserve. For more information and additional trips please see the Maui Forest Birds Recovery Project site and follow the link for Restoration Volunteers. www.mauiforestbirds.org

Awards Dinner and Silent Auction
October 15th 5:30 – 8:30pm
Join us for an educational lecture as well as our silent auction. Tickets are $30 per person. More details on page 38.

Remembering Mary Stewart Gaber:

an active and beloved member of Hawaii Audubon Society and former member of the Society's Board of Directors

By Claudia Gaber

Mary Stewart Gaber, age 89, died at Whittier California on March 4, 2015.

Mary Gaber was born in 1926 in Rockford, Illinois to parents Lewis N. and Martha Stewart. Her father was a mechanical engineer; her mother a registered nurse. She met and married Lee Gaber, a salesman, of Chicago in 1945. They lived in Arkansas for five years, moved to Arlington Heights, Illinois until 1959 before moving to Kaneohe, Hawaii, which remained her hometown for many years. In her retirement she made her home in Crystal River, Florida from 2002-2009. She spent time again in Kaneohe, living at Pohai Nani retirement home. Finally, she resided for the past year with family in Whittier California. She passed away on March 4, in hospice care, from respiratory problems.

Mary is survived by her sister, Elizabeth Buckley of Leesburg Florida, and her three children and seven grandchildren: Steven L. Gaber of Hutto, Texas and son Steven Jr.; Michael M. Gaber of Whittier, California and his children Richard, Christopher, Reina and Joey; and Claudia Gaber of Queensland Australia and her children Oliver and Sheri. Mary was preceded in death by husband, Lee Gaber.

Mary Gaber raised her family, then in her 50's, made a new start as a mature student, earning an Associates Degree, a Bachelors Degree, and eventually earning a Masters in Library and Information Science. She later became a Peace Corps Volunteer, working in Ghana, West Africa for two years. Afterwards she worked for the State Department as a secretary and served in American Embassies in Berlin West, Germany, Managua, Nicaragua and Panama City, Panama. Leaving the civil service in her mid-sixties, she returned to the States and worked as a Librarian for the Hawaii State Libraries for nine years, retiring in 2002.

Mary loved to travel, and in the course of her life she lived in or visited over 30 countries in North, South and Central America, Europe, Asia, Oceania and Africa. She travelled on every continent but Antarctica, which sadly remained on her bucket list in the end.

Mary was a member of the Unitarian Universalist Church, with First Unitarian Church of Honolulu, then with the Nature Coast Unitarian Universalist church in Florida, and most recently attending Unitarian Universalist Congregation in Fullerton California.

Volunteering was a big part of her life. Mary Gaber was a Cub Scout leader when her boys were young, then a Girl Scout leader and volunteer, with over 50 years as a member of GSUSA. She loved bowling, joining many leagues over the years and was still averaging 175 in her 70's. Most importantly she was the founder of the "Gals in Green" bowling league, which for over four decades has donated funds to the Hawaii Girl Scout Council. Even before she became a librarian, she volunteered with "Friends of the Kaneohe Library."

She was an avid bird-watcher and very active member of the Audubon Society. She was a tireless hiker, belonging to the Hawaii Trail and Mountain Club. In 2001, at the age of 75, she walked for 3 days over the 20 mile Routeburn Track in the Southern Alps of New Zealand. When she lived in Kaneohe, she was a Docent at Ho'omaluhia Botanic Garden, giving nature-walks and talks to students.

Mary's nickname was "The Bat" because she loved bats. She was a long-standing supporter of Bat Conservation International. Friends who would like to make a tribute donation can contribute to Bat Conservation International in memory of Mary "The Bat" Gaber by going online at www.batcon.org.

Private services were held earlier in Whittier and again in Kaneohe in early July.

HAWAI'I AUDUBON SOCIETY'S 2015 AWARDS BANQUET AND SILENT AUCTION

Thursday, October 15th 2015
5:30pm - 8:30pm
Treetops Restaurant
In Paradise Park, Manoa

Join us for a wonderful evening of delicious food, good company, an interesting talk and of course our annual silent auction.
Proceeds benefit the Hawaii Audubon Society and the Freeman Seabird Preserve
We are pleased to present our featured speaker:

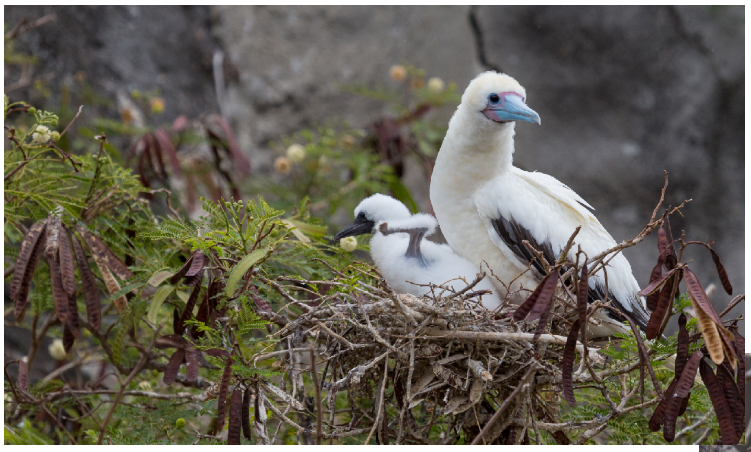
Philip Bruner,

Professor of Biology at Brigham Young University of Hawaii,
Director of the BYUH Museum of Natural History

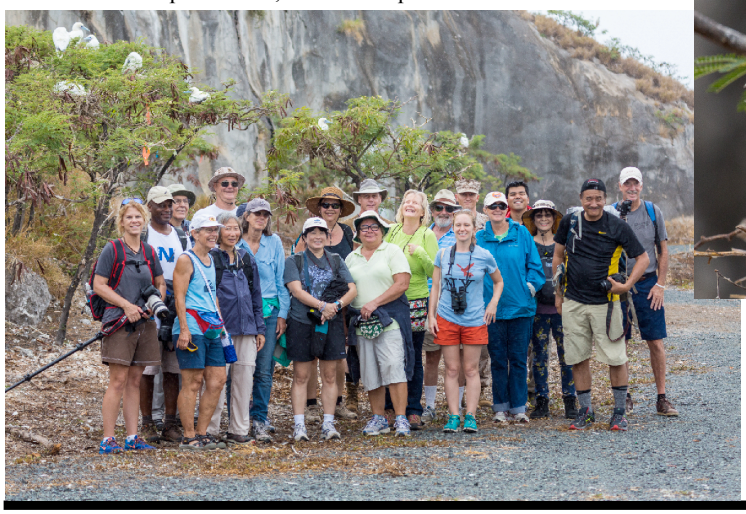
"Behavioral Ecology of Shorebirds"

Tickets are $30 per person and can be purchased in advance by contacting
Hawaii Audubon Society
by phone: (808) 528-1432; e-mail: hiausoc@pixi.com
or website: www.hawaiiaudubon.org

We look forward to seeing you there!



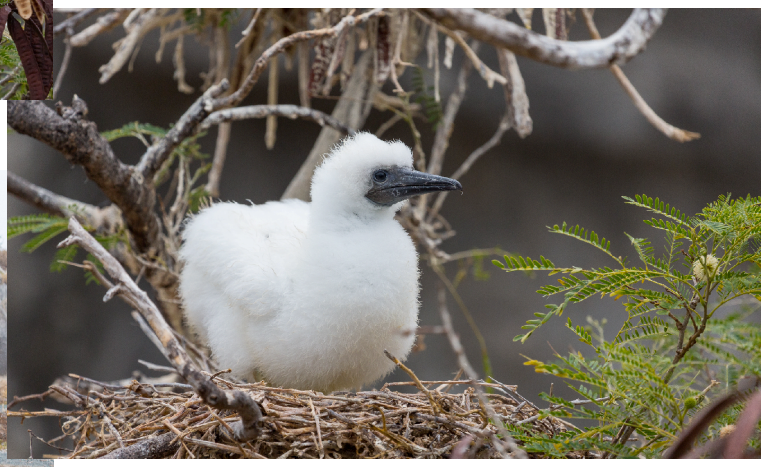
Red-footed booby chick, sitting in its nest in kiawe at Ulupa'u Crater, Marine Corps Base Hawaii Kaneohe.



Tour of the Marine Corps Base Hawaii Kaneohe

July 10, 2015
Photos and caption courtesy of Anthony Leiggi

Red-footed booby chick and parent, nesting in kiawe at Ulupa'u Crater, Marine Corps Base Hawaii Kaneohe. The chick is stretching its wings in this picture.



We had a great turn out for the Red-footed booby colony tour. The tour is limited to a small number of participants and fills up quickly. If we are fortunate enough to be invited back next year, get your RSVP in ASAP, because the tour fills up fast. You will not likely get an opportunity to see these wonderful birds this close anywhere else.

Hawai‘i Audubon Society Membership/Donation Form

☐ $25 Regular Member
☐ $15 Student Member
☐ $40 Family Membership
☐ $100 Supporting Member

International Membership:
☐ $28 Canada & Mexico
☐ $33 Other

☐ $____ Donation
Donations are tax-deductible and greatly appreciated.

Name: _____

Address: _____

Phone: _____ Email: _____

☐ E-mail me the ‘Elepaio ☐ Mail me the ‘Elepaio ☐ E-mail me volunteer opportunities, updates, & field trips.

Thank you for your concern and commitment to protecting Hawaii's native wildlife and ecosystems.
Pay by credit/debit card at www.hawaiiaudubon.org.
Please make checks payable to **Hawai‘i Audubon Society**
Mail form and payment to 850 Richards St., Suite 505, Honolulu, HI 96813

DONATE

September 1st to 30th
CODE: 77189

September is *the* time to make a contribution to the Hawai’i Audubon Society through the annual *Give Aloha* campaign! Head on down to any Foodland, Sack N Save, and Foodland Farm locations throughout the state to make a donation to HAS at the cash register using your Maika‘i Card. Designate your donation to the Hawai’i Audubon Society with our code# 77189 and up to $249 per individual will be matched. Mahalo nui loa for your continued support!

HAS Seeking Nominations for 2016 Board of Directors

The 2016 HAS Board elections Nominating Committee is seeking Society members who are willing to serve on the Board of Directors for an initial one year term. A handful of seats will become vacant and open for nomination.

All members of the Board are expected to attend five two-hour meetings per year and a weekend Leaders’ Retreat in January. If you are a Society member and interested in becoming a candidate, please submit a letter of interest and brief resume of your background and activities to the attention of the Nominating Committee at the Hawai’i Audubon Society’s address by Friday, October 2nd, 2015.

HAS RESEARCH GRANTS

OCTOBER 1ST APPLICATION DEADLINE

The Hawai’i Audubon Society offers grants for research in Hawaiian or Pacific natural history. Awards are oriented toward small-scale projects and generally do not exceed $500.00. Proposals are reviewed semi-annually, with the next deadline falling on **OCTOBER 1ST**. Email hiaudsoc@pixi.com for an application or visit the “Programs & Projects” section of our website at www.hawaiiaudubon.org.

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Calendar of Events

Foodland's *Give Aloha* Campaign, Code #77189
September 1st – 30th

Global Shorebird Counting
Saturday, September 5th 7am – noon

Kawainui Marsh Restoration
Saturday, September 5th, October 3rd from 9 am – noon

Bishop Museum Vertebrate Collections Tour
Monday, September 14th at 3:30 pm

HAS Research Grant Application Deadline
Tuesday, October 1st

HAS Board of Directors Nominations Deadline
Friday October 3rd

Restoration Volunteers for Maui Forest Bird Recovery Project
October 22nd – 27th

Awards Dinner and Silent Auction
Thursday, October 15th 5:30 – 8:30pm

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