EMP

# Ecosystem Management Program Bulletin

Volume 46 Summer 2009

## Endangered Waterbirds Discovered Nesting on Army Land

By Phil Taylor

Staff with the Army Natural Resources Program made an exciting discovery during their winter waterbird survey last February when two fluffy-feathered Hawaiian Coot chicks emerged from the tall grass with their parents in a flooded field on Dillingham Military Reservation (DMR), near Ka`ena Point.

Juvenile and adult `alae`ke`oke`o, or Hawaiian Coot. (Photo by Eric VanderWerf)

The Hawaiian Coot, or `alae ke`oke`o, is a duck-like bird found only in the Hawaiian Islands and is federally listed as an endangered species due to habitat loss, avian diseases, invasive predators and invasive plants. Coots, which are sometimes called "black ducks," have only partially webbed feet with lobed toes. They are typically seen in the open water of marshes and ponds. Adults display uniformly grayish-black plumage with a white bill and a bulbous white or sometimes red frontal shield. The young downy chicks are all black, except for a reddish-orange head and bill.

This sighting of the family flock marks the first time an endangered waterbird has been observed breeding on Army land in the state of Hawai`i. The Hawaiian Moorhen and Hawaiian Stilt have also been observed this year at DMR, but neither species has been seen nesting in the area. Both are also native to Hawai`i and listed as endangered species.

Previous surveys at DMR have revealed the presence of few to no waterbird species due to low water levels in the fields just south of Dillingham Airfield. The heavy rains during December and January allowed water levels to rise, providing adequate nesting habitat for the coots and other waterbirds.

Wetlands at Dillingham Military Reservation. (Photo by Phil Taylor, OANRP)

### Inside this issue:

The O`ahu Army Natural Resources Program will continue to monitor the fields at DMR and help ensure that Hawai`i's endangered waterbirds are safe on Army land in the years to come.■

*~Phil Taylor is a natural resources field technician with the Research Corporation of the University of Hawai`i, Pacific Cooperative Studies Unit, working for the O`ahu Army Natural Resource Program.*

## Applications of Noninvasive Technologies in Cultural Resource Management

By Jaime Raduenzel

In recent years, archaeologists have increasingly utilized noninvasive, remote sensing technologies to help determine what may lie below the ground's surface without excavation. These nondestructive techniques, which include ground penetrating radar, light detection and ranging, and aerial photography, are advantageous in managing cultural resources because they avoid disturbing potentially sensitive archaeological sites or features, and they enable information to be gathered quickly.

The Army Cultural Resources Program (ACRP) has employed various remote sensing technologies to initially characterize subsurface features in the field. Such surveys are frequently conducted during initial planning stages of proposed projects, in advance of ground-disturbing activities related to construction or Soldier training. This modern technology allows archaeologists to make much more careful, efficient, and strategic decisions for the long-term preservation and protection of cultural resources under Army stewardship.

Multiple instruments and methods can be used to detect changes below the surface. Archaeologists can then analyze the resulting data. Variations in soil and local environmental conditions generally dictate which method is most effective.

Archaeologists recently completed a ground penetrating radar (GPR) survey on O`ahu's Wai`anae coast to locate possible culturally significant subsurface features. GPR is commonly used in archaeology to create profile maps which can provide an overall picture of the subsurface without excavation. The method emits low-power radio waves into the ground to detect changes in density and locate buried objects. GPR systems record the amount of energy that is reflected back and its travel time. It can detect objects, changes in materials, and voids and cracks.

Geophysical Survey Systems SIR-3000 system equipped with 400 MHz antenna used in GPR. (Photo by Garcia & Associates)

Previous archaeological investigations along the leeward coast uncovered buried cultural layers indicating human usage of the area. Cultural materials and artifacts recovered included volcanic glass, fishing implements, adze fragments and other stone, shell and bone objects. Coastal areas were heavily used by pre-contact Hawaiians for subsistence-related activities focused on the ocean, as well as for the interment of the dead.

The recent GPR survey allowed cultural resource managers to assess the presence or absence of culturally significant materials in the project area and determine a plan of action for avoiding and protecting such materials.

Light detection and ranging, commonly called "Li-DAR" is another remote sensing technology utilized by the Army in cultural resources management. Li-DAR measures the properties of scattered light to determine the distance to an object or surface.

Like GPR, the Li-DAR system measures the time-delay between transmission of a pulse and

detection of the reflection signal. Li-DAR can detect materials and very small objects that might not produce a significant enough reflection to be detected during a GPR study.

Another advantage of Li-DAR is the ability to map features beneath a forest canopy. Archaeologists can create high-resolution digital elevation models of sites that can reveal microtopography otherwise hidden by vegetation. This ability to penetrate a thick forest canopy has led to the discovery of features that were not distinguishable through other methods and inaccessible to a field survey.

The ACRP is currently processing Li-DAR data collected via flight operations to assist in the management of cultural resources, both historic and pre-historic, at Schofield Barracks. At Pōhakuloa Training Area on the Big Island, archaeologists used Li-DAR imagery to model a live-fire range and assess potential impacts on archaeological sites from training activities.

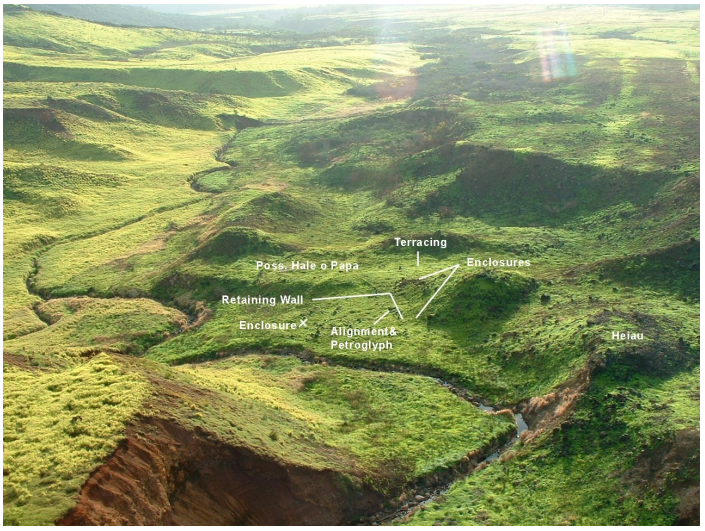
Finally, aerial photography continues to be a useful remote-sensing tool in cultural resources management. Requiring only a camera and a way to get it airborne above the potential archaeological site, aerial photography is the simplest of all the remote sensing techniques.

Site variations that are difficult to detect from the ground suddenly become obvious from a higher vantage point, and information can be collected about inaccessible areas or those deemed unsafe due to unexploded ordnance. Hot air balloons, airplanes, helicopters, and tethered blimps or kites are all ways of obtaining aerial images.

At Mākua Military Reservation, archaeologists have taken helicopter flights to view the landscape. One site they are seeking is a *hōlua* slide, which oral histories indicate exists in Mākua. Hawaiians modified steep hillsides by adding stones and earth to fill depressions in the natural slope and construct a smooth, even course for racing downhill on sleds. Such carefully prepared courses, or *hōlua* slides can sometimes be seen from above.

At Schofield Barracks, plans are currently underway to aerially photograph and map archaeological sites using a camera-mounted kite to gather the images.

Overall, there are great advantages to using noninvasive technologies in managing



Aerial photo of Schofield Barracks with cultural features identified. (Photo by ACRP staff)

cultural resources. Yet it is important to recognize that technology alone cannot reveal the past. The local community is often the best source of information about what may lie below the ground. Exceptional cultural resources management results from the combination of input from longtime residents or people connected with the land, and the science and technology available to cultural resources managers.■

*~Jaime Raduenzel is a cultural resources outreach specialist with the Research Corporation of the University of Hawai`i, Pacific Cooperative Studies Unit, working for the Army Cultural Resources Program.*

## PTA Offers Environmental Tours to Celebrate Earth Day

By Chicpaul Becerra

The U.S. Army Garrison - Pōhakuloa invited the public to two cultural tours and two natural resources tours at Pōhakuloa Training Area (PTA), April 23, in observance of the 34th anniversary of Earth Day.

The cultural resources tour highlighted a visit to a volcanic glass quarry site and a lithic workshop/habitation site, discussion of volcanology of the area, and how this relates to the types of sites found in the Saddle region. Participants walked through an ancient lava field to reach the site.

PTA senior cultural resources specialist Julie

Taomia and PTA cultural resources specialist James Head discussed the evidence of use at the volcanic glass quarry by native Hawaiians. At the habitation site, participants saw an area where a unique formation of rocks, indicating construction of an ancient shelter, and a couple of blisters (holes in the lava field) where native Hawaiians may have sought temporary shelter from the weather.

PTA cultural resources specialist James Head (left) talks about the significance of one of several blisters in the area (possibly used as temporary shelters by native Hawaiians) while Hilo visitor Alfred Tong kneels down to get a closer look. (Photo by Chicpaul Becerra, PTA)

The natural resources tour featured an interpretive hike inside the Kīpuka Kalawamauna East Fence Unit. The hike included an overview of endangered species threat management, scale of challenges confronting endangered species management, and invasive plant control.

PTA natural resources specialist Lena Schnell (far left) hands out leaves of the native Hawaiian plant ʻāweoweo for tour visitors to smell. (Photo by Chicpaul Becerra, PTA)

Led by PTA natural resources specialist Lena Schnell, the hike enabled participants to view various native plant species, such as the ʻaʻaliʻi, a red and green Native Hawaiian plant used for leis, the akokolau, a Native Hawaiian plant used for tea, and the fragrant ʻāweoweo. There was also an opportunity to see the endangered plant kioʻele, which was almost wiped out before being protected from hoofed animals by a wire fence.

For some, the tours allowed visitors a "close-encounter" with species they had never before seen; others were impressed with all they learned from PTA's environmental employees. Overall, the Earth Day tours helped connect visitors to PTA's vast landscape and provide a better understanding of the area's plants and natural habitats. ■

*~Chicpaul Becerra is a public affairs liaison officer for the U.S. Army Garrison - Pōhakuloa.*

## New Tree Snail Population Encourages Conservationists

By Vince Costello

Oʻahu Army Natural Resources Program (OANRP) staff currently manage seven species of endangered native Hawaiian tree snails, or *kāhuli*, on Oʻahu. One species, *Achatinella mustelina*, resides in the Waiʻanae Range, and the other six can be found in the highest elevation areas near the Koʻolau summit.

*Achatinella byronii,* a species of endangered Oʻahu tree snail, or *kāhuli.* (Photo by OANRP staff)

A total of 41 species of *Achatinella* tree snails are listed as endangered, although many are probably already extinct.

Generally, these snails have been decreasing in numbers for the past two hundred years. Shell collecting, warming trends, habitat factors (especially

host-plant decline and vegetation changes from native forest to alien forest), disease, and predators have all taken their toll.

Despite this grim trend towards decline, a snail monitoring trip to the Ko`olaus in early May proved to be surprisingly upbeat.

Four OANRP staff and two other conservationists were delighted to report a high number of *Achatinella byronii* in one area, and to discover a completely new population in another. To begin, staff surveyed an area that had been discovered as home to *A. byronii* back in 1997. During this survey, a noteworthy total of 436 *A. byronii* were counted.

Further into the May camping trip, OANRP staff explored some new environments not previously surveyed. One such area, further upstream from the known site, held what was a fortunate discovery of a new population of *A. byronii.*

Because this new site was found late in the day, there was only time to locate eight snails. However, even this small number is encouraging, since there are so few populations of this species currently recorded.

An *Achatinella byronii* found during the May OANRP trip to the Ko`olaus. (Photo by Kaleo Wong, OANRP)

The species *A. byronii* is named for Captain Byron, who voyaged with the H. *M. S. Blonde* in 1824 and returned to England carrying many *Achatinella* shell leis. This in turn set off a shell collecting craze here in the Islands from which the easy-targeted snails have never recovered.

It is sadly ironic that these "jewels of the forest" bare the name of a British explorer who lived 7,000 miles away and unwittingly contributed to their demise.

*A. byronii* show a great deal of variation in color and markings. They are mainly dextral (meaning their shells spiral to the right) but can also be sinistral (spiraling to the left). The shells are conical in shape, typically green, brown, and greenish-yellow, and have oblique (slanted – not perpendicular and not parallel) streaks on the last two whorls of their shell.

Young *A. byronii* can be as small as 4 mm long, and adults as large as 22 mm (a little less than an inch). Summing it up, these tiny critters are attractive, variable, and considering they are found nowhere else in the world except this little island – well worth saving.

*Achatinella byronii* living at a different site, illustrates the variation in shell color (when compared to the photo to the left). (Photo by OANRP staff)

The OANRP staff has been monitoring the larger population of these snails in the Ko`olaus for 12 years now. Early on, the staff decided that it was a special environment and would benefit best from as little visitation as possible. As a result, staff returns to the area only every other year, trying to best preserve the native vegetation including intact uluhe ferns growing in the understory.

The fact that OANRP staff have noticed little rat damage and no evidence of the predatory rosy wolf snail at this site is both a blessing and an anomaly, as the predatory snail seems to be

ubiquitous, in some places even outnumbering the native snails.

At many other rare snail sites OANRP staff bait for rats and kill predatory snails to attempt to shift the balance of power in favor of *Achatinella* and give the snails a fighting chance against more formidable foes.

Without intervention, the tree snails on O`ahu are destined for extinction. Their threats are serious and complicated. The OANRP staff hopes that their efforts prevent future snail species' extinctions on O`ahu Army training lands. Long live the snails! ■

*~Vince Costello is the rare snail conservation specialist with the Research Corporation of the University of Hawai`i, Pacific Cooperative Studies Unit, working for the O`ahu Army Natural Resource Program.*

## Wildfire Awareness - Help Spread the Word not the Flames!

By Jane Reppun Beachy

Summer brings heat, sunny days, beach park barbecues, south shore swells, and, unfortunately, increased risk of wildfires. Already in 2009, the O`ahu Army Natural Resources Program (OANRP) staff have counted 11 brushfires along the Wai`anae coast. Fortunately, these fires, and another above Hale`iwa, were extinguished quickly; but fires in previous summers took a heavy toll on O`ahu's dwindling native forests.

Over the past 10 years, OANRP management units have been threatened by approximately 25 fires, half of which were caused by arson. The list of endangered species burned in these fires is shockingly long: ma`o hao hele (*Hibiscus brackenridgii*), nehe (*Melanthera tenuifolia*, `ākoko (*Chamaesyce celastroides* var. *kaenana*), nā`ū (*Gardenia brighamii*), hāhā (*Cyanea longifolia*), nīoi (*Eugenia koolauensis*), *Euphorbia haeleeleana*, kulu`ī (*Nototrichium humile*), *Abutilon sandwicensis*, kauila (*Colubrina oppositifolia*), and *Bonamia menziesii*. It is heartbreaking to watch our native species literally turn to dust.

Wildfire rips through native forest above Waialua, O`ahu in August 2007. (Photo by OANRP staff)


*~Jane Reppun Beachy is the ecosystem restoration program manager with the Research Corporation of the University of Hawai`i, Pacific Cooperative Studies Unit, working for the O`ahu Army Natural Resource Program.*

SUMMER

# *Tis the Season…

**For COLOR! As the warm temperatures march on, familiar patches of green may morph from week to week. Flowers, fruit and even the wildlife add vivid hues to the landscape.**

**A crimson ‘Apapane seeking nectar from *‘Ōhi‘a mamo*. The gob-stopper violet *‘uki ‘uki* fruit looking like they belong in a glass jar at a candy store. The heart-stopping burst of orange from the thistle-like flower of the endangered *Hesperomannia*. These are just some of the many brilliant shades of summer in the Hawaiian native forest.**

**Some of these colorful shows are hard to ignore. The bright white flowers of the *koki‘o ke‘o ke‘o* flowers call out to all from the shady gulches.**

Images, from top left: ʻŌhiʻa mamo & ʻŌhiʻa lehua (*Metrosideros polymorpha*); ʻApapane (*Himatione sanguinea*); ʻuki ʻuki (*Dianella sandwicensis*); *Hesperomannia arb*orescens; Happy face spider (*Theridion grallator);* Kokiʻo keʻo keʻo (*Hibiscus arnottianus).* (All photos by OANRP staff except happy face spider, by Jim Johnston)

# OUTREACH OPPORTUNITIES

## Please join us for CONSERVATION WEEK!

### July 26 - August 1

U.S. Army Garrison - Hawai`i's Environmental Division is one of many partners that comprise the Hawai`i Conservation Alliance (HCA). Each year, Army programs participate in the Hawai`i Conservation Conference and public outreach events focusing on the stewardship of Hawai`i's unique natural resources. Please visit us at the following public events for information about our program, as well as other statewide conservation organizations.

**SUNDAY, July 26:**

Bishop Museum Family Sunday event
9 a.m. - 5 p.m., Bishop Museum

**WEDNESDAY, July 29:**

HCA Open House
12 p.m. - 9 p.m., Hawai`i Convention Center

**SATURDAY, August 1:**

Hawai`i Conservation Fair
10 a.m. - 4 p.m., ING Direct Café

For more information about these and other activities surrounding Conservation Week, please visit the Hawai`i Conservation Alliance Website: www.hawaiiconservation.org
(click the Conservation Conference logo, then click on "Conservation Week")

# EMP Bulletin

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*The success of this newsletter depends on article contributions from the staff of the O`ahu Army Natural Resources Program, O`ahu Army Cultural Resources Program, PTA Army Natural Resources Program, and PTA Army Cultural Resources Program. Mahalo to all staff who have contributed to this issue.*

*If you wish to contribute an article or have an idea for an article you'd like featured in the next EMP Bulletin, please feel free to contact us! The deadline to submit articles for the next issue is* ***August 25, 2009****.*

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