



# EMP

## Ecosystem Management Program Bulletin

Volume 55

Summer 2012

### Kahuku Huaka'i: A Glimpse into the Past

By Kim Welch and Jaime Raduenzel

AS TWO TRUCKLOADS of eager volunteers approached the Army's Kahuku Training Area (KTA), all eyes were drawn to the latest construction projects in the area. Spinning wind turbines and a large building occupied the upper portion of our viewscape atop a 200-foot-tall coralline bluff, which resided below sea level at one point in time—many millenia before the ideas of alternative energy and construction were conceived. Like many of the low-lying areas on O'ahu, the land at Kahuku has undergone numerous changes throughout its history, both natural and man-made.

On this special O'ahu Army Natural Resources Program (OANRP) volunteer service trip, many of Kahuku's less obvious manmade and natural changes were highlighted. Combining forces, outreach staff from both the OANRP and the O'ahu Army Cultural Resources Program (OACRP) provided volunteers with background on several historic sites within KTA.

Some of the more obvious land-use changes were visible during the drive into the training area. Horses grazed on surrounding ranch land, energy-generating windmills towered above the hills to the east, and heavy equipment lined a nearby road construction project on the training range. While checking in at Range Control, volunteers oriented themselves on posted maps of the training range, tracing the planned driving route on the maze of unpaved access roads and motocross tracks that criss-cross KTA.

As the group drove away from Range Control and began heading further into KTA, OACRP's Outreach Specialist, Jaime Raduenzel, soon motioned to stop next to a guardrail.

"We're here," she stated. "Here" was a nondescript roadside stop sandwiched between a steep hill

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covered with invasive Christmasberry trees (*Schinus terebinthifolius*) and a gulch filled with koa haole trees (*Leucaena leucocephala*)—the landscape of Kahuku has been changed radically in the last few hundred years with the introduction and spread of invasive weed species.

The group gathered around Raduenzel as she shared some history of Kahuku, including information about the early deforestation of the area between 1810-1840 due to the sandalwood trade, theories on agricultural use, and archaeological



Jaime Raduenzel, Cultural Resources Outreach Specialist, (left) shares a story about the "Waikane Stone," said to exist in the Kahuku area. Could this large pohaku (pictured left) be the one referenced in mo'olelo? (Photo by OANRP staff)

references—including one made in the 1930s by J. Gilbert McAllister (a noted archaeologist of the time) to the “Waikane Stone,” found in this general area.

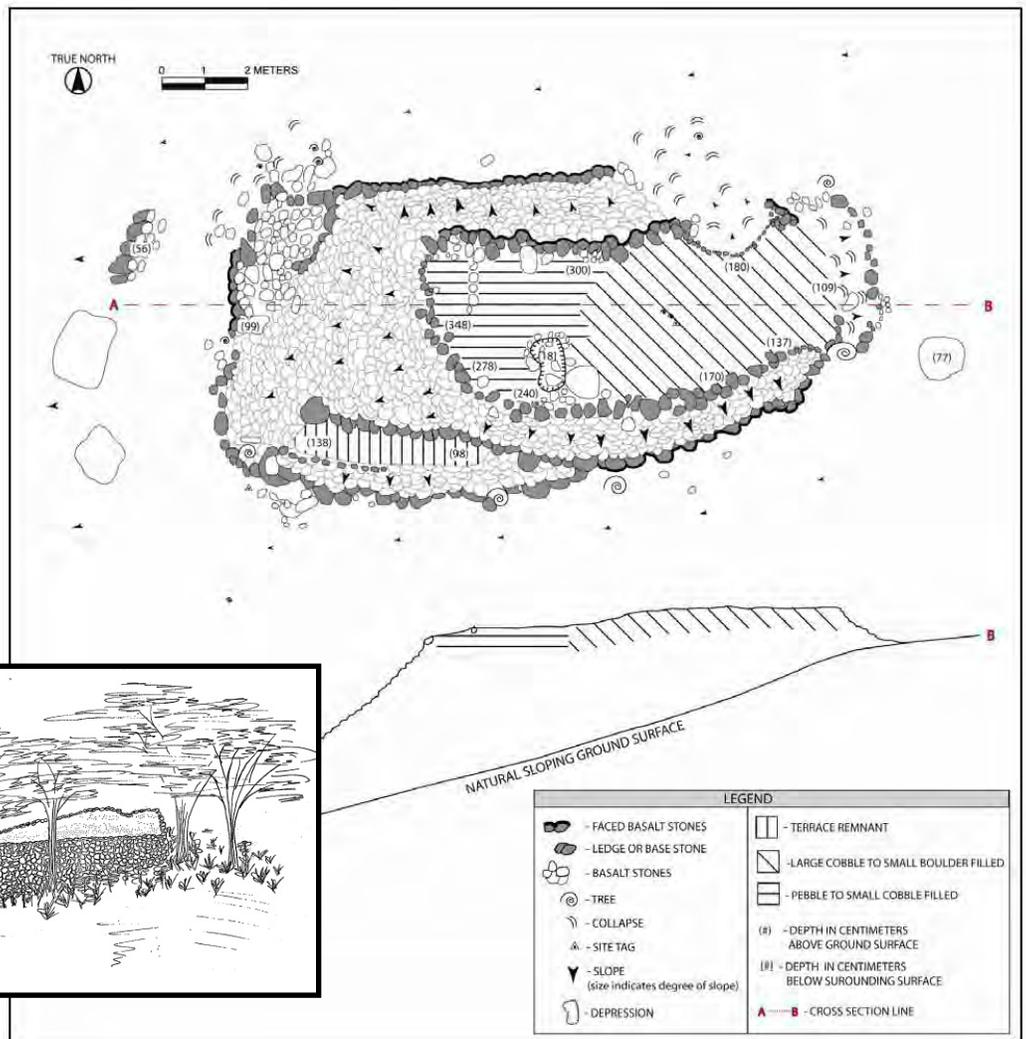
According to mo’olelo, or legend, long ago the residents of Kahuku had to go far up the valley in order to get fresh water. When the gods Kane and Kanaloa were traveling through the area, Kane struck the stone known as Waikane, and water immediately poured forth and continued to flow. Other legends of the many ahupua’a (traditional land divisions) within KTA focus on underground streams, abundant groves of hala trees (pandanus), and the importance of fish and fishing. Several legends describe Kahuku (“the projection”) as a floating land that was once a separate island.

As the volunteer group approached a large boulder, they talked about how archaeologists use mo’olelo to interpret cultural resources and imagine what the landscape may have looked like in the past.

The group then followed Raduenzel into the nearby vegetation, up an unmarked trail to an area that OACRP had recently mapped. The rough trail led to a cultural site that is believed to be a heiau, or pre-Christian religious site, that was first documented and nominated to the National Register of Historic Places in 1970. The large, stone platform is approximately 15 meters by 8 meters and is located on a slope in ‘Ō’io gulch. The platform consists of a relatively level upper surface on top of stacked, sloping, basalt cobbles; the base of the platform is larger than the upper surface. Hikers originally discovered this structure and reported it to the Bishop Mu-



Army weed clearing efforts highlight the impressive stone wall masonry at the platform in ‘Ō’io. (Photo by OACRP staff)



*INSET* Until recently, Bishop Museum archaeologist Peter Chapman’s 1970 drawing was the only known map produced of the archaeological site in Kahuku. *ABOVE* OACRP staff produce detailed maps of archaeological sites to better document the conditions of cultural resources. (Drawing and map courtesy of OACRP staff)

seum. The museum's archaeologist, Peter Chapman, produced a simple drawing of the stone platform in 1970. Until recently, that drawing was the only map produced of the site. Today, OACRP archaeologists are conducting further research into KTA's cultural sites and producing detailed maps to better document the resources' condition.

During the current recordation, Army archaeologists noted that the north face of the structure is situated precisely on a true east/west axis. While no invasive excavation is planned at this time, the archaeologists have concluded that additional investigation within this site, coupled with research within the several sites in the immediate vicinity, may provide insight into traditional Hawaiian political and social structure, as well as agricultural development within the hinterlands of northeast O'ahu.

Volunteers loaded back into the vehicles with a better sense of place and a greater appreciation for the cultural significance of natural land formations and traditional land use practices in Kahuku. Although the group would have liked to linger, it was time to move on to the work site and venture further back in history to a remnant native mesic forest that likely pre-dates human contact.

Thirty more minutes of four-wheel drive action up gravity-defying, gravel-covered roads brought everyone to the work site on the north-facing slope of Kaunala gulch. Here, volunteers joined up with OANRP's "Orange Team" of field technicians to support their efforts to manage the endangered nōi (*Eugenia koolauensis*).

Historically found on the islands of O'ahu and Moloka'i, approximately 274 mature nōi remain on O'ahu. The largest number of individuals occurs within KTA. While these populations contain mostly seedlings and saplings, the nōi in KTA represent more than 80% of the remaining plants in the world.

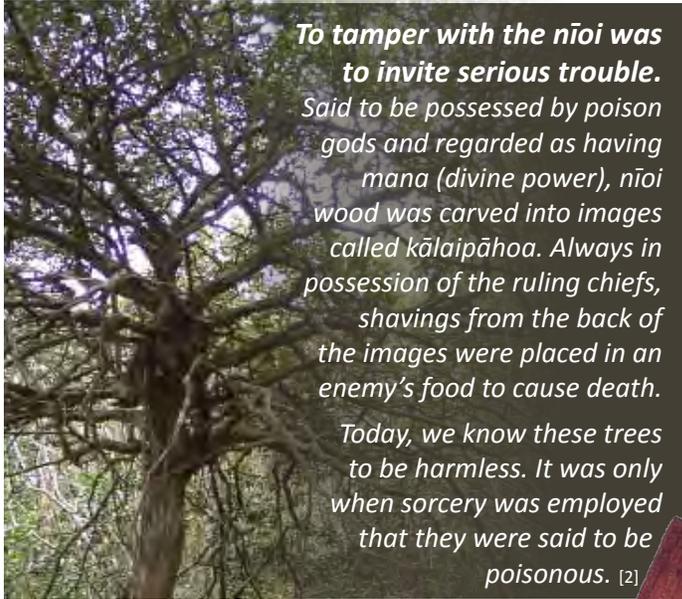
The volunteers trekked a short distance down a steep slope to the fenced management unit. At the site, Orange Team field technicians were working inside the fence, taking a census of the remaining nōi plants in the "pig-free zone," searching for even the tiniest seedlings in this three-acre area. OANRP constructed this fence, along with two others in KTA, in 2006 to keep non-native pigs from destroying the fragile nōi populations.

Non-native plants are another threat to nōi habitat, competing for moisture, light, nutrients

## Nōi (*Eugenia koolauensis*)



**The flower from the nōi was used in Hawaiian courtship practices.** *If a person wanted to win the affection of another, he would tuck the flower near his chest, pace back and forth in front of his desired's hale, or house, and chant a specific 'oli. This action was said to "awaken" and "capture" the love of the person within the hale.* [1]



**To tamper with the nōi was to invite serious trouble.**

*Said to be possessed by poison gods and regarded as having mana (divine power), nōi wood was carved into images called kōlaipāhoa. Always in possession of the ruling chiefs, shavings from the back of the images were placed in an enemy's food to cause death.*

*Today, we know these trees to be harmless. It was only when sorcery was employed that they were said to be poisonous.* [2]



**Nōi wood was used to make i'e kuku (kapa beaters).** *These tools were used to pound the inner bark of plants to produce kapa barkcloth.* [3]

[1] Rock, J. Revised List of Hawaiian Names of Plants, Native and Introduced, with Brief Descriptions and Notes as to Occurrence and Medicinal or Other Values. Transcribed and Annotated by Samuel M. 'Ohukani'ōhi'a Gon III.

[2] Mitchell, Donald D. Kilolani. Resource Units in Hawaiian Culture

[3] Krauss, B. Plants in Hawaiian Culture. 1993.

Kapa beater image courtesy of [www.kapahawaii.com](http://www.kapahawaii.com).

and growing space. The volunteer group hiked to an area where there was a fairly large patch of invasive weeds, surrounding several 10 to 15-foot-tall, mature nōi trees.

The goal was to clear low-lying weeds in the area to improve the habitat for future nōi seedlings. Once Army outreach staff helped to identify the

weeds vs. the native plants, volunteers quickly began targeting their weedy enemies.

“Cut...drip...cut...drip.” Volunteers moved methodically through the understory, cutting weeds down to stumps, then following up with a few drops of herbicide. The preferred weeding approach seemed to be a “walking squat”—rather duck-like—with heads down to ensure they got every weed in their path, including the carpet of weed seedlings.

Occasionally there would be reason to pause. The waddling gaits would come to a halt at the sight of the remnant natives of Kaunala: giant hapu‘u (Hawaiian tree ferns, *Cibotium spp.*), 30-foot-tall hao trees (*Rauvolfia sandwicensis*), and impressively large ‘iliahi, or sandalwood trees (*Santalum freycinetianum*). Each time the group discovered these native gems, they gained a better understanding of what the forests of Kahuku must have been like long before pigs, invasive weeds and humans arrived on the island.

The group of 11 managed to clear 400 square meters of densely packed invasive weeds, revealing some previously unknown nioi seedlings. Hopefully these efforts have given the nioi greater access to the nutrients, water and sunlight that they need to grow to maturity.

The Kahuku landscape has indeed been altered over time—from the impacts made by the earliest agricultural settlements, to military training, motocross recreation, introduced invasive pigs and weeds, and even innovations in sustainable energy. There is also the wave of change brought forth through volunteer effort—community members who care about the land where they live and who are willing to donate their time to restore O‘ahu’s native forests, one small patch at a time. The staff of OANRP and OACRP extend a heartfelt mahalo to all of the

**In the past 8 months, volunteers with OANRP have dedicated over 3,500 hours of service.**

**Mahalo nui loa to all volunteers who have so generously given their time and energy to protect and restore O‘ahu’s rare natural resources!**

volunteers who mālama i ka po‘e ‘ōiwi o nēia ‘āina (are protecting the natives of this land).•

Kimberly Welch is an Environmental Outreach Specialist with RCUH / PCSU, working for the O‘ahu Army Natural Resources Program.

Jaime Raduenzel is a Cultural Resources Outreach Specialist with RCUH / PCSU, working for the O‘ahu Army Cultural Resources Program.

## Kāhea—Call to Action

Rats are a major threat to many of the endangered plant and animal species that the O‘ahu Army Natural Resources Program (OANRP) protects, including kāhuli tree snails (*Achatinella spp.*), the O‘ahu ‘elepaio (*Chasiempis ibidis*), and the loulou palm (*Pritchardia kaalae*). The Conservation Council for Hawai‘i recently released a brochure that describes the threats that rats and other rodents present to Hawai‘i’s native birds, snails, plants, marine animals, and Native Hawaiian culture.



### DOWNLOAD THE BROCHURE

at [www.conservehi.org/documents/RatBrochure.pdf](http://www.conservehi.org/documents/RatBrochure.pdf) or visit [www.removeratsstorehawaii.org](http://www.removeratsstorehawaii.org) to find out how you can join the collaborative Federal and State effort to preserve and protect Hawai‘i’s native plants and animals from the devastating effects of non-native rodents.



# Staff Spotlight

...because it's always nice to put a face with a name!

# KRISTEN SAKSA

## AmeriCorps Intern



1



2



3

1) Flying to work gives her a birdseye view of the island; 2) Dressed in a homemade spiked tabi costume for Halloween; 3) Sifting through leaf litter to protect endangered kähuli tree snails (*Achatinella* spp.) from cannibal Rosy wolf snails (*Euglandina rosea*); 4) Suiting up with the Blue Team for a flight from Pahole; 5) Spotting a non-native predator of kähuli tree snails while on a night hunt; 6) Planting a loulu palm (*Pritchardia kaalae*) in its new home in the wild. (Photos by OANRP staff)



4



5

This female Jackson's chameleon (*Trioceros jacksonii*) couldn't hide from intern Kristen Saksa.



6

“Crooack...  
Crooack”  
“Crooack...  
Crooack”

When camping in Lower ‘Ōpae‘ula there is no forgetting that “Frog Pond” is just a few feet away from my tent. I am camping with the O‘ahu Army Natural Resources Program (OANRP) “Blue Team,” a group of six highly skilled field technicians and specialists. Our campsite is 2,000 feet in elevation in the Ko‘olau Mountains and is nestled between two ponds that are home to more than a few non-native amphibians.

# Field Work Spawns Excitement at Frog



The Lower ‘Ōpae‘ula management unit is one of the Blue Team’s newer management areas. Completed in 2011, the Lower ‘Ōpae‘ula fence protects rare plant species found only on O‘ahu, including a native nānū (*Gardenia manni*), alani (*Melicope lydgatei*) and ha‘iwale (*Cyrtandra dentata*).

One familiar threat to these native species is habitat degradation from feral pigs, and what pig can resist a muddy

pond in the Ko‘olau? Unfortunately, of exactly that on this trip. During a routine fence check, we found a tree that had fallen across one section of the fence-line, creating a possible opening for pigs. It is a vivid reminder of the importance of regular fence checks to protect the resources from pig pressure.



Kalā Asing, Natural Resource Management specialist with the Blue Team, OANRP takes a close look at alani (*Melicope lydgatei*).

The plans for the rest of our camping trip include fence repair, weeding, monitoring rare plants, and helping OANRP Rare Plant Program manager Matt Keir prepare air layers of nānū and alani.

Compared to other management units, Lower ‘Ōpae‘ula is relatively small, enclosing just 25 fenced acres. I can easily hike around the unit in less than an hour. However, while the unit may be tiny in terms of

# Pond

## Reports from the Field

By Kristen Saksa

acreage, it is great in terms of size and diversity of native plant life. I stand tall amongst the windswept trees on the Ko'olau summit, but here in Lower 'Ōpae'ula the trees seem to tower above me.

When I am working in Lower 'Ōpae'ula, I make sure to take a minute to look around—especially up! Atop the 'ōhi'a trees (*Metrosideros* spp.), I

can see blooms in an abundant array of colors, from red and yellow to orange and salmon—all in one valley! The familiar koa (*Acacia koa*) feels particularly magnificent here because there are several trees of impressive size.



LEFT Hawai'i is home to 3 native species of nānū (*Gardenia* spp.). The endangered *Gardenia manii* (pictured) is endemic to O'ahu.  
RIGHT Orange is one of the many colors of 'ōhi'a visible in Lower 'Ōpae'ula.

As is true for many areas along the Ko'olau mountains, weeds are starting to pop up in the forest understory. Nevertheless, all members of the Blue Team are excited to gear up for work in the area, whether it's weed control or



rare plant monitoring, knowing their efforts will go a long way to protect the unique plants and animals in this location. The team feels fortunate to be able to work in Lower 'Ōpae'ula, and I am excited as well, even if it means more sleepless nights with the frogs.

Kristen Saksa is a year-round AmeriCorps intern with RCUH/PCSU, working for the O'ahu Army Natural Resources Program (OANRP).

# 'Tis the Season... for 'ōpe'ape'a pupping!

# S U M M E R



The twilight skies of summer become a little more active with the addition of 'ōpe'ape'a pups (baby Hawaiian hoary bats, *Lasiurus cinereus semotus*) as they venture out on their first feeding flights.

Mother 'ōpe'ape'a give birth in June, usually to two pups, who are unable to fly until they are about four weeks old. During this time, the pups remain in their roosting tree and nurse when their mother returns from frequent foraging flights. At six weeks, the young 'ōpe'ape'a are ready to venture out on their own to feast on a variety of insect life including termites, mosquitoes, beetles and moths.

While more prevalent on the islands of Hawai'i and Kaua'i, 'ōpe'ape'a sightings on the main Hawaiian islands are now very rare, although they are known from Kawailoa and Kahuku Training Areas on O'ahu. The bat has been on the endangered species list since 1970.

A careful observer just might catch a glimpse of these tiny creatures, whose wingspan is just over one foot and whose body is approximately half that size. 'Ōpe'ape'a can be seen darting across open areas or over open bodies of water, such as ponds, streams, and the ocean.

# VOLUNTEER Opportunities AND UPCOMING EVENTS

## New Sign-Up Information

We have transitioned to a new online sign-up system for public volunteer trips.

To sign up for an OANRP volunteer trip, visit:

 [www.oanrp.ivolunteer.com](http://www.oanrp.ivolunteer.com)

## September

- ▶ **EVENT:** Ka'ala incipient moss control  
**DATE:** Wednesday, September 12  
**TERRAIN:** Flat terrain, dense vegetation
- ▶ **EVENT:** Ka'ala incipient moss control  
**DATE:** Saturday, September 29  
**TERRAIN:** Flat terrain, dense vegetation

## October

- ▶ **EVENT:** Kahanahāiki invasive weed control  
**DATE:** Saturday, October 13  
**TERRAIN:** Some steep slopes, moderate difficulty
- ▶ **EVENT:** Kahanahāiki invasive weed control  
**DATE:** Thursday, October 18  
**TERRAIN:** Some steep slopes, moderate difficulty
- ▶ **EVENT:** Palikea incipient weed control  
**DATE:** Tuesday, October 23  
**TERRAIN:** Steep slopes/cliffs, moderate difficulty
- ▶ **EVENT:** Ka'ala incipient moss control  
**DATE:** Tuesday, October 30  
**TERRAIN:** Flat terrain, dense vegetation

Sign up at [www.oanrp.ivolunteer.com](http://www.oanrp.ivolunteer.com)

Questions? Contact [outreach@oanrp.com](mailto:outreach@oanrp.com)

# EMP Bulletin

## Editors

**Kim Welch and Celeste Ventresca**  
**Environmental Outreach Specialists**  
**O‘ahu Army Natural Resources Program**  
**RCUH / PCSU**  
Directorate of Public Works  
U.S. Army Garrison - Hawai‘i  
Schofield Barracks, HI 96857-5013

**kmwelch@hawaii.edu**  
**celestev@hawaii.edu**

*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 Ecosystem Management Program Bulletin, please feel free to contact us! The deadline to submit articles for the next issue is **October 12, 2012**.*



<http://www.garrison.hawaii.army.mil/sustainability/NaturalResources.aspx>

Robert Eastwood  
Director of Public Works  
U.S. Army Garrison - Hawai‘i