

APPENDIX 1-1: ENVIRONMENTAL OUTREACH 2009**VOLUNTEER SERVICE TRIPS:**

Volunteers remove the incipient weed, *Juncus effusus*, from the summit of Kaala.



Scouts carry supplies to construct a water catchment, trail steps, and fence crossings.



Volunteers help clear invasive weeds around the site of a future field nursery for National Public Lands Day 2009.



Members of the Hawaii Youth Conservation Corps help remove invasive strawberry guava in the forest at Kahanahaiki.



Volunteers endure muddy conditions while removing the incipient weed, *Crocosmia x crocosmiifolia* at Kaala.

EDUCATIONAL MATERIALS:

'Ōhikilolo Cliff

Dry Cliff, Mesic Shrubland and Mesic Forest

Characteristics:
The 'Ōhikilolo cliffs range from open, dry cliff vegetation to pockets of mesic native shrubland and forest. A center of abundance for many rare plants, the 'Ōhikilolo cliffs are home to a high number of endemic species (species found nowhere else), which are protected from goats by a fence built along the ridge.

Cultural History:
'Ōhikilolo ridge's steep, fissured cliffs separate Mākua Valley from Kea'au and Mākaha Valleys. The name 'Ōhikilolo means "crazy crab." Stories describe its namesake as a type of crab found on the beaches of Mākua that moves about wildly. Movement of kāwelu, a native bunchgrass found along the cliffs, is inspirational for hula dancers as they mimic its graceful swaying in certain dances.

NATIVE PLANTS

- Mākua daisy, *Tetramolopium filiforme**
- Hinahina kuahiwi, *Artemisia australis*
- Na'ena'e, *Dubautia herbstobatae**
- Nehe, *Melanthera tenuifolia**
- Manono, *Hedyotis parvula**
- Kāwelu, *Eragrostis grandis*
- Loulu, *Pritchardia kaalae**

NATIVE ANIMALS

Nehe
Melanthera tenuifolia

Hawai'i's only native palm tree:
Loulu, a type of fan-palm, is Hawai'i's only true native palm. One endangered species of Loulu, *Pritchardia kaalae*, can be found growing on mountain tops and ridges in the Wai'ane mountains, like the cliffs of 'Ōhikilolo. The large leaves of Loulu have been used to make hats, fans, and even umbrellas.

Ponu 'ai lau
Rhyncogonus fordii

Kāhuli*
O'ahu Tree Snail
Achatinella mustelina

Mākua Daisy
Tetramolopium filiforme

Loulu
Pritchardia kaalae

Koa'e kea
White-tailed Tropicbird
Phaethon lepturus

*Endangered

Example of one of the interpretive signs designed for the OANRP's new baseyard interpretive garden.

Alien Snails Found in Greenhouses - Can We Keep Them Out of Our Native Forests?



The O'ahu Army Natural Resources Program (OANRP) maintains two endangered plant nurseries where propagules are raised for genetic storage and to be out-planted back into the wild. Within the last several months, it has been discovered that much of the nursery stock are harboring multiple species of alien snails. It has been shown that horticultural facilities act as critical vectors for many alien snail and slug species, highlighting the need for greater awareness about these species (Cowie et al., 2008). The purpose of this informational flyer is threefold: 1) to provide additional information for any agencies/organizations conducting out-plantings in the wild by highlighting the species found in OANRP nurseries; 2) to garner any information that the horticultural, botanical, and conservation community may have regarding quarantine and eradication methods; and 3) to garner any information the horticultural, botanical, and conservation community may have regarding known distribution of these alien snail species in the wild.

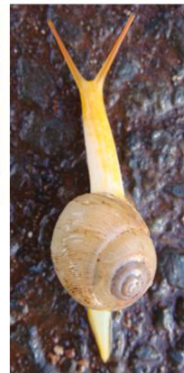
Five snails of concern:



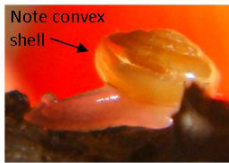
Zonitoides arboreus



Subulinid



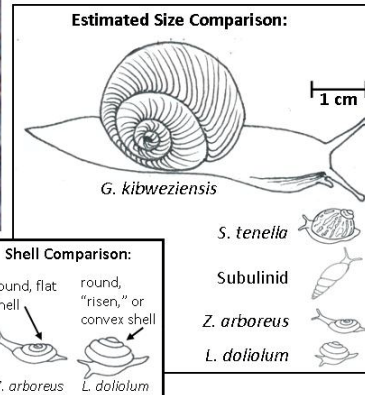
Gonaxis kibweziensis



Liardetia doliolum



Succinea tenella



RISKS associated with accidental forest introduction:

- Competition with native snails for food
- Increased prey for snail predators
- Potential to transmit diseases to native snails (currently little known)
- Possibly affecting plant health (currently little known)

OANRP's current QUARANTINE & ERADICATION methodology:

- Above-ground plant parts, soil, and below-ground plant parts visually examined for snails weekly on all stock to be planted.
- If, following 8 weeks of visual examination, snails are never found, then plants are cleared for out-planting.
- If snails are found, infected plants are treated with methocarb sprays and metaldehyde baits (Hollingsworth & Armstrong, 2003).
- Greenhouse facilities are sprayed with metaldehyde, all equipment is power-washed, all cleaned stock is kept on benches seated in salt water.

If you can provide additional information about these snail species, methods for control in the greenhouse, or have seen them in the wild, please contact: Matt Keir, OANRP Rare Plant Program Manager (matthew.keir@us.army.mil)

References:
Cowie, R.H., K.A. Hayes, C.T. Tran, and W.M. Meyer III, 2008. The horticultural industry as a vector of alien snails and slugs: widespread invasions in Hawaii. *Int. J. of Pest Mgmt.* 54(4): 267-276.
Hollingsworth, R.G. & J.W. Armstrong, 2003. Effectiveness of products containing metaldehyde, copper or extracts of yucca or neem for control of *Zonitoides arboreus* (Say), a snail pest of orchid roots in Hawaii. *Int. J. of Pest Mgmt.* 49(2): 115-122.

Flyer distributed at the Hawaii Conservation Conference and to other colleagues regarding invasive snails in the greenhouse.

OUTREACH EVENTS:



OANRP's booth at the Grow Hawaii Festival, April 2009.



Participants planted native Kookoolau seeds at the Bishop Museum's Family Sunday event, July 2009.

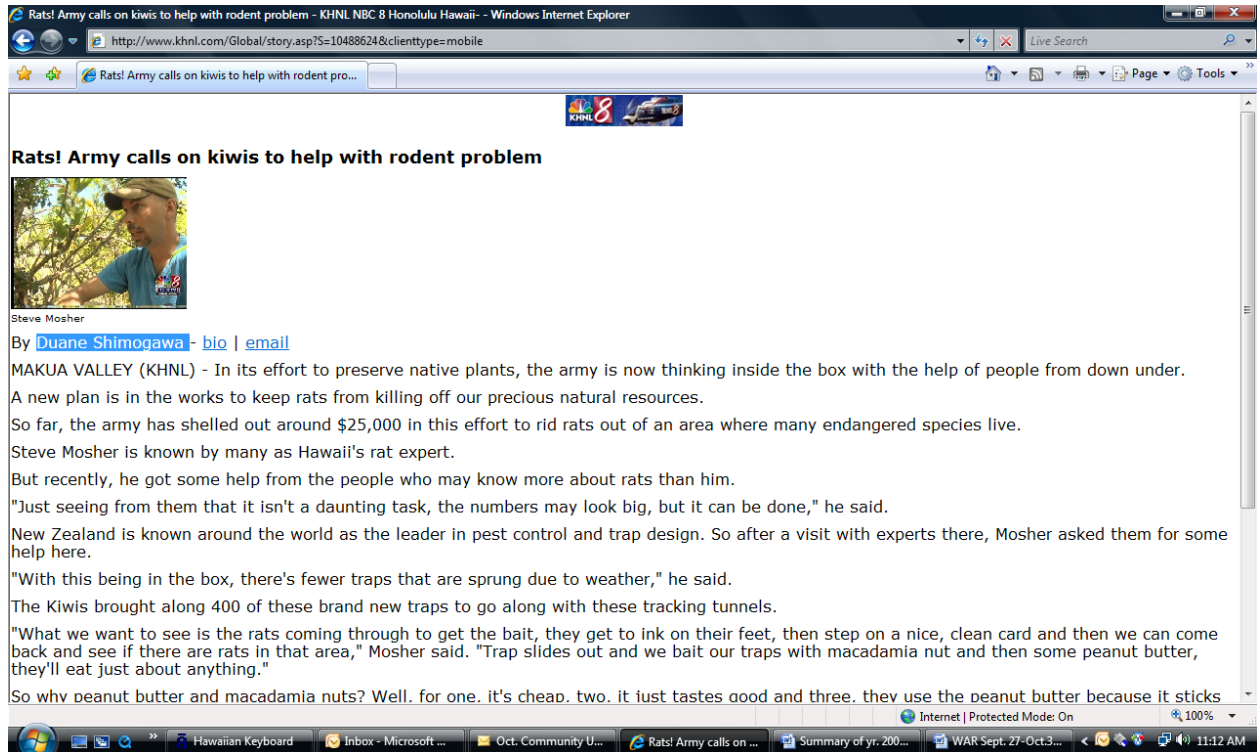


Guests tour the interpretive gardens at the new OANRP baseyard during the Earth Day Open House.



One of the OANRP's stellar volunteers, Jim Keenan, receives a volunteer appreciation award at the Earth Day Open House by Colonel Margotta; Army Natural Resources chief Michelle Mansker (center) announced the awards.

PUBLIC RELATIONS:



Screenshot of KHNL’s coverage of the rat-trap grid in Kahanahaiki.



Screenshot of KHON’s coverage of the story of *Cyanea superba*, “Rebuilding a Forest.”



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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

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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



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

and other waterbirds.

Front page from Summer 2009 EMP Bulletin.