

# Filling the Gaps in Invasive Species Management

The O'ahu Invasive Species Committee (OISC) works to prevent new invasive species infestations and to eradicate incipient, high-threat species before they become widespread. To perform this work effectively, OISC partners with private, government and non-profit organizations and individuals. OISC is concerned with all invasive species threatening the local economy, agriculture, natural resources, human health and the quality of life on O'ahu.



## Annual Report 2011

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## Why Incipients?

Widespread invasive plants such as strawberry guava form vast thickets that compete for resources with and suppress the growth of other plant species. Once a species has reached this stage of invasion in urban and forest areas, island-wide eradication is impossible.

OISC focuses on controlling *incipient* (just beginning to establish) invasive species. By directing efforts toward those incipient species that would be most harmful to O'ahu, OISC can protect the entire island at a relatively low cost.

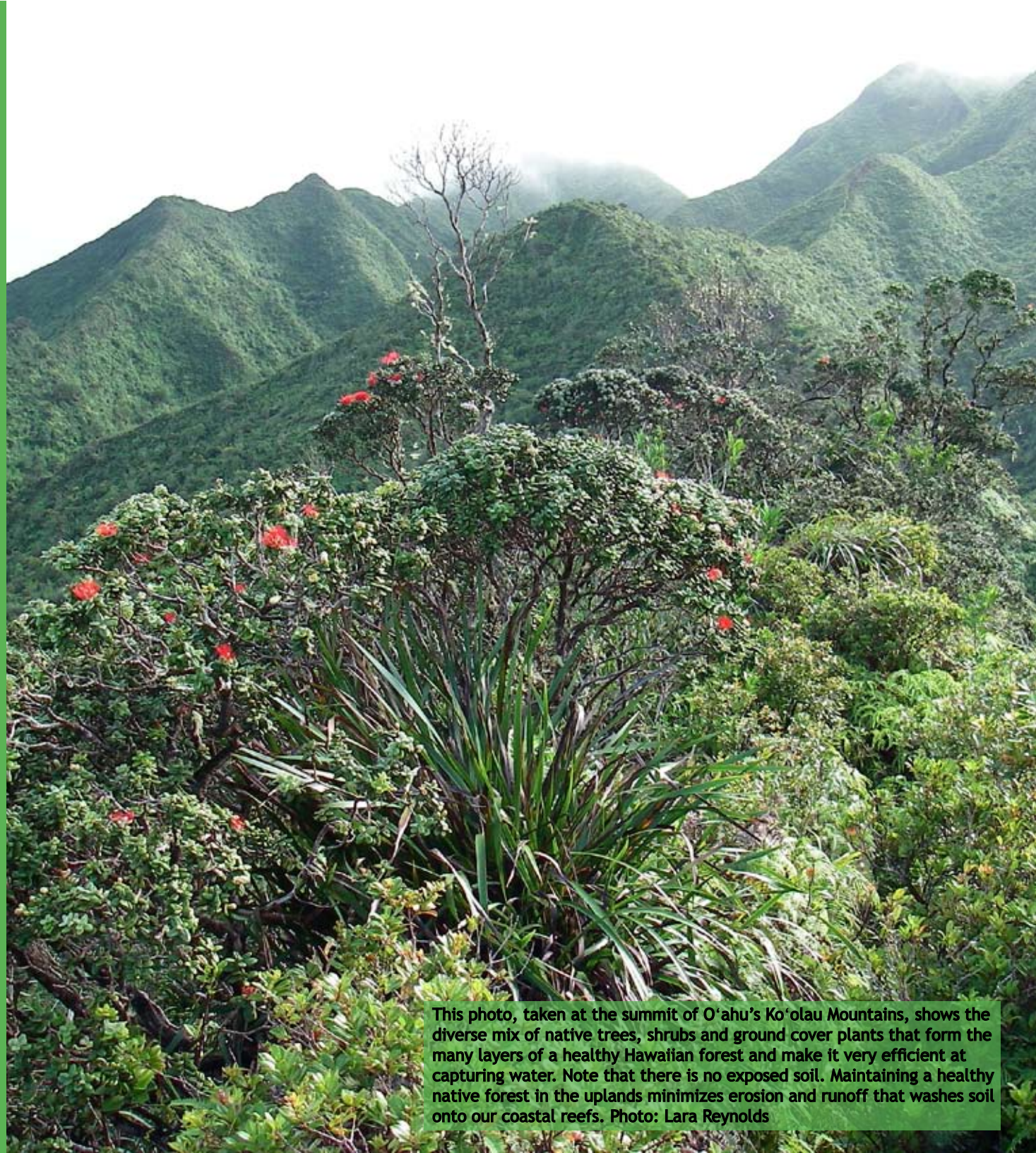
Giambelluca et al. 2007. *Impacts of alien tree invasion on evapotranspiration in tropical montane cloud forest in Hawai'i*. American Geophysical Union, Fall Meeting 2007, abstract #H211-02.



Strawberry guava is a fast-growing, non-native tree that has taken over large areas of native rainforest in Hawai'i. Water loss is nearly 30% higher from forests invaded by strawberry guava than from native forests (Giambelluca et al., 2007), reducing the amount of water that seeps into aquifers for use by residents, businesses and farmers.

A healthy forest is complex, with diverse native species and multiple layers of plants that collect water from mist and rain. O'ahu's naturally complex native forest is a "living sponge" that captures water and directs it into the island's aquifers. The native forest replenishes our water supply.

OISC protects this essential resource by surveying for and removing incipient, high-threat weeds before they become abundant and negatively affect forest health.



This photo, taken at the summit of O'ahu's Ko'olau Mountains, shows the diverse mix of native trees, shrubs and ground cover plants that form the many layers of a healthy Hawaiian forest and make it very efficient at capturing water. Note that there is no exposed soil. Maintaining a healthy native forest in the uplands minimizes erosion and runoff that washes soil onto our coastal reefs. Photo: Lara Reynolds

Lack of ground cover, large raindrop size and high velocity of raindrops are factors that contribute to soil erosion. Early research shows that miconia (*Miconia calvescens*) exacerbates all of these factors. Miconia forms thick canopies that kill the ground cover plants beneath. Miconia's large leaves channel rainwater into large drops that hit the ground at high speeds.

Miconia was introduced to O'ahu as an ornamental plant in 1961 and began to spread. In order to prevent miconia canopies from forming on O'ahu, OISC surveys almost 20,000 acres of residential and forested areas to remove miconia seedlings before they become seed-bearing trees.



Miconia's invasion of over 200,000 acres on the island of Tahiti has choked out the native forest understory, leaving bare ground and causing soil erosion. Photo: Ryan Smith

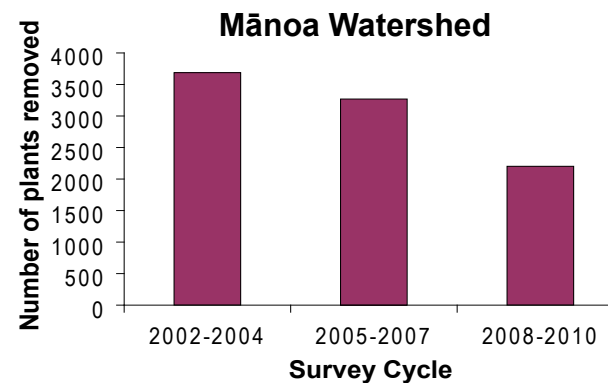


## Protecting O‘ahu’s Water Supply

The entire Ko‘olau Mountains watershed area is prime habitat for the miconia tree (*Miconia calvescens*), an aggressive, destructive forest invader. In 2011, OISC’s ground and air surveys led to the removal of 449 immature and 3 mature miconia trees from over 6,634 acres of difficult backcountry terrain in the Ko‘olau Mountains.

Measurable success: Miconia plant numbers are declining in watershed forests where OISC has been working the longest.

Miconia was removed from the watersheds of Kalihi, Nu‘uanu, Mānoa, Kawai Nui, ‘Āhuimanu and He‘eia. OISC spends more than 50% of its time and effort on the systematic control of miconia because its potential to disrupt watershed function is so great. OISC’s dedicated volunteers and partner agencies contributed 153 hours toward miconia surveys in 2011.





## Preventative Medicine: Early Detection & Rapid Response

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OISC conducts early detection and rapid response to find the species most likely to invade and harm O'ahu's natural ecosystems. This year, OISC's O'ahu Early Detection Program prioritized 16 invasive species of highest concern and lowest distribution on O'ahu using the Hawaii-Pacific Weed Risk Assessment and other sources. The list of species chosen for control includes some of the world's worst invasives: *Chromolaena odorata*, *Parkinsonia aculeata*, *Pennisetum villosum*, *Cryptostegia grandiflora*, *Piper aduncum*, *Nassella tenuissima*, *Rauwolfia vomitoria* and *Imperata cylindrica*. In 2011, OISC removed *Parkinsonia aculeata* and *Rauwolfia vomitoria* before they became established enough to do harm. *Delairea odorata* is now under systematic control in Wai'anae and eradication appears feasible.

OISC's O'ahu Early Detection Program works in cooperation with the Bishop Museum to identify new plant introductions to O'ahu, assess their threat to the environment or agriculture, map their distribution and remove high-threat species if possible. The OISC field crew conducts surveys, control and follow-up monitoring for early detection species.



*Parkinsonia aculeata*

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Conducting invasive plant control after a species has already spread into the forest is difficult and sometimes dangerous work because the terrain is often steep and heavily vegetated. Ideally, OISC could stop all invasive plants before they ever have a chance to get into the forest.

## Containing the spread of invasive species on public roads and beyond

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In 2011, the O'ahu Early Detection Program assisted the Hawai'i Department of Transportation (HDOT) to determine where HDOT can have the greatest impact in containing the spread of established invasive species on O'ahu such as java plum, albizia, African tulip tree and maile pilau. In addition, recommendations were made to HDOT to prevent the introduction of harmful species through hydromulch contamination and by way of roadside maintenance vehicles and equipment.

Through preventative measures and by catching species early before they spread, O'ahu Early Detection is preventing the establishment of invasive plants that have cost millions of dollars to combat in other parts of the world.





## Protecting O'ahu's agricultural lands

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The O'ahu Early Detection Program's work with collaborators has led to discoveries of invasive plant populations not found on O'ahu's public roads, such as Siam weed (*Chromolaena odorata*), giving a more complete picture of the status of invasive plants on the island. Siam weed was discovered in Kahuku in 2011 by the O'ahu Army Natural Resources Program and is now being targeted for eradication in collaboration with OISC. This pest grows quickly to form dense thickets, promotes wildfires, is an allergen and is toxic to both humans and livestock. The spread of this species threatens O'ahu's watershed forests and agricultural lands.

O'ahu Early Detection assists the public by identifying new species and documenting them with permanent herbarium records. Nurseries, landscapers, gardeners and natural resource managers from across the entire island chain, from the Big Island to the south and Kure Atoll Seabird Sanctuary to the north, have sent plants to the team for identification and threat assessment.





## Stopping the Spread of Little Fire Ant

OISC conducts early detection for the little fire ant (*Wasmannia auropunctata*) to complement Hawai'i Department of Agriculture surveys at ports and nurseries. Little fire ant was first detected on the Big Island in 1999 and has since become established there. None of the 50 species of ants that occur in Hawai'i are native. Of all the ant species now in Hawai'i, little fire ant seems to have the greatest impact on local residents and the economy. Its sting leaves welts that can last for days and its invasion of agricultural areas makes it difficult to export goods.

In 2011, OISC conducted surveys at community and botanical gardens. No little fire ants were detected. Although O'ahu is still free of little fire ant, this species has made its way to Kaua'i and Maui so there is a high risk that it could be transported here. Little fire ant can be eradicated if caught very early. Early detection is therefore essential to keeping O'ahu free of this pest.



Little fire ant is an extremely small (as long as a penny is thick), slow-moving ant that nests in trees and leaf litter and can infest yards, gardens, homes and agricultural and natural areas. Little fire ant is known to attack and kill the chicks of ground-nesting birds and its stings to pets and livestock can lead to blindness. Photo: Ellen Van Gelder, USGS

## Uniquely Hawaiian

Hawai'i's native forests, like its language and culture, are totally unique. Almost ninety percent of Hawai'i's native plants are endemic. These species and the communities they have formed are found nowhere else on earth.

OISC works to prevent incipient invasive species from harming O'ahu's native biodiversity and becoming a permanent part of the island's ecosystems.



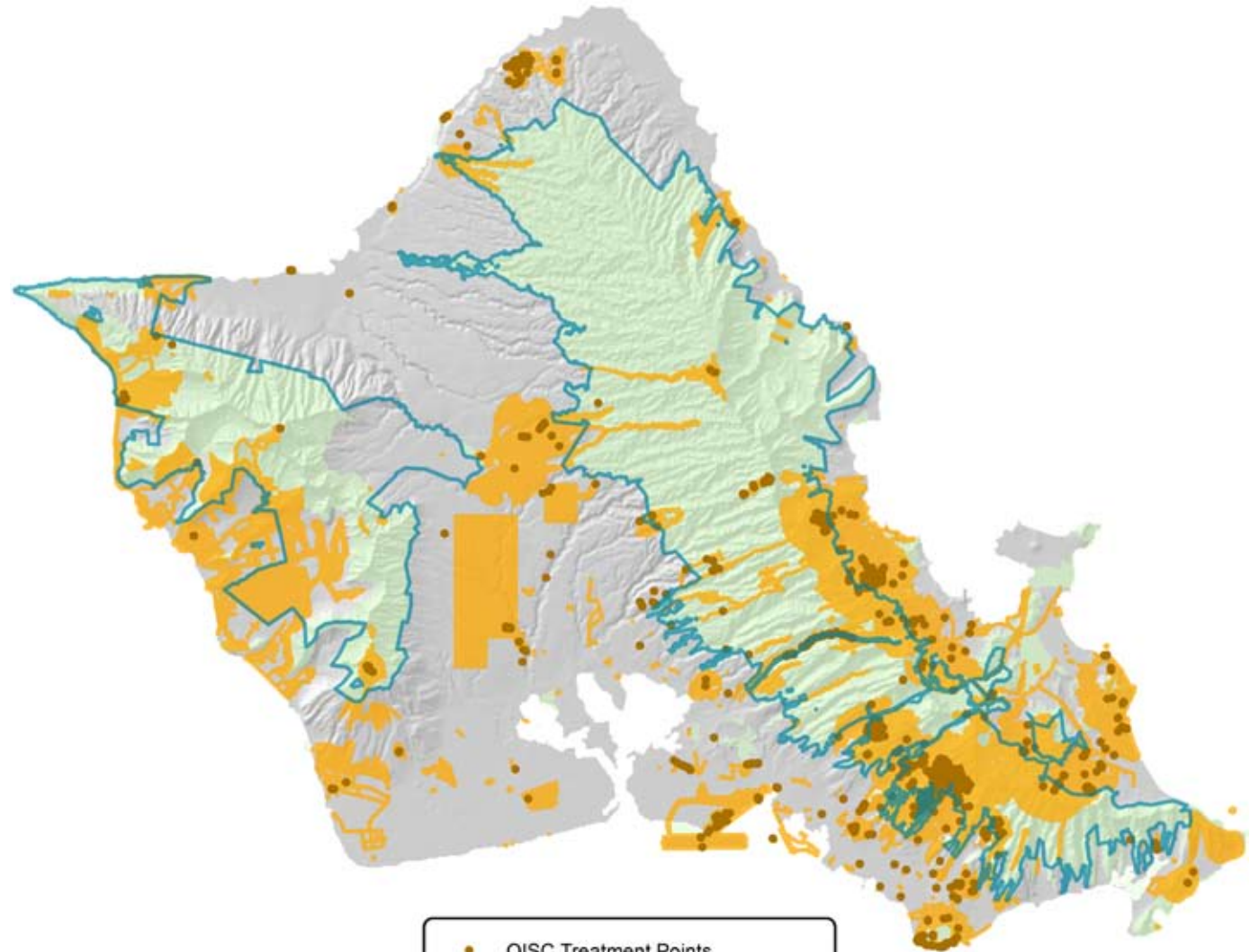
Clockwise from top left: 'ōhi'a lehua, hāhā, 'ōhai, 'ēkaha. Photos: Lara Reynolds

# OISC's Survey and Treatment Areas 2001 to 2011

## O'ahu, we've got your back

The entire island of O'ahu is OISC's management area. OISC works across all land-ownership types (public and private) to remove invasive plants wherever they are found before they can spread and cause damage.

OISC tracks the area surveyed and number of individuals removed for all the species we manage. We analyze this data to ensure that we are meeting the goals for each species, which are generally measured as declines in immature and mature plants over time.



- OISC Treatment Points
- OISC Surveys
- Watershed Partnership Boundaries
- Conservation-zoned lands

0 5 10 Miles



# Targeted Actions

In 2011, OISC conducted surveys for 14 invasive plant and two invasive animal species. The field crew treated or removed these species wherever they were found. *Wasmannia auropunctata* (little fire ant), a species not yet known to be on O'ahu, was not encountered on any of the early detection surveys that were carried out during the year.



*Tibouchina herbacea*



*Tibouchina urvilleana*



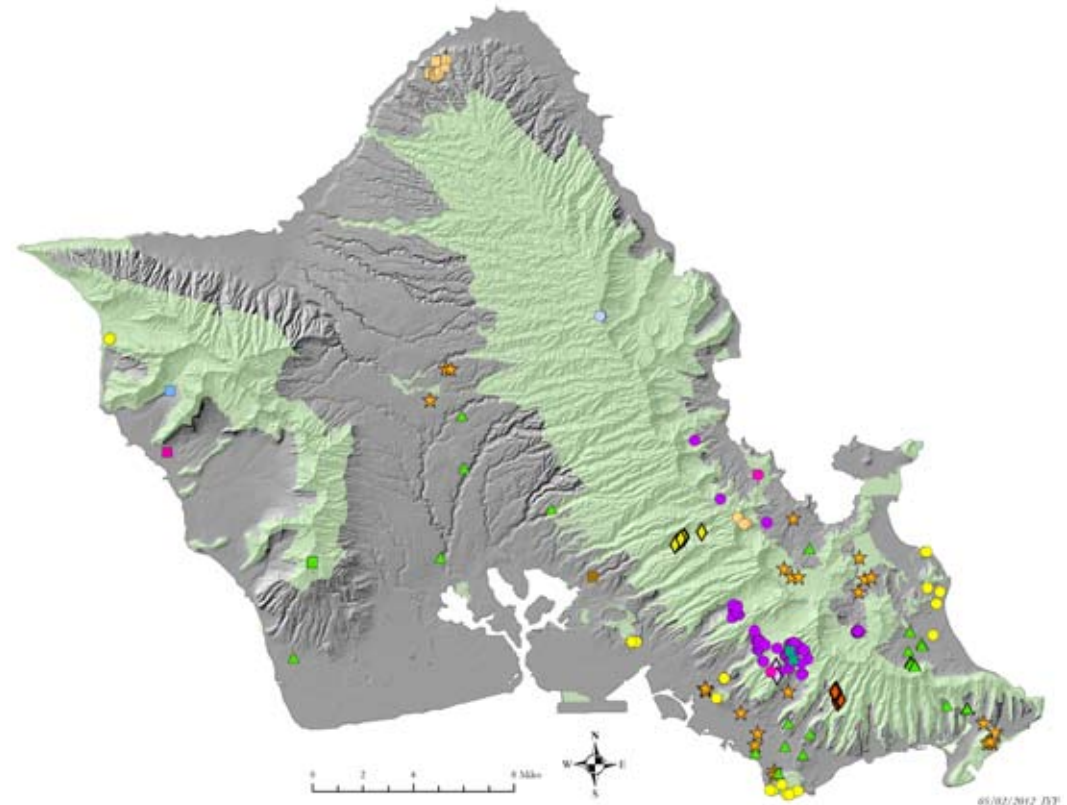
*Piper aduncum*



*Delairea odorata*



*Pennisetum villosum*



## Plants

- ◆ Andropogon glomeratus var. pumila
- Chromolaena odorata
- Cissus repens
- Cortaderia sp.
- Delairea odorata
- Miconia calvescens
- Parkinsonia aculeata
- Pennisetum setaceum
- Pennisetum villosum
- Piper aduncum

- Piper auritum
- ◆ Rubus discolor
- Tibouchina herbacea
- ◆ Tibouchina urvilleana

## Animals

- ▲ Eleutherodactylus coqui
- ★ *Wasmannia auropunctata* (surveys only)

■ Conservation-zoned lands

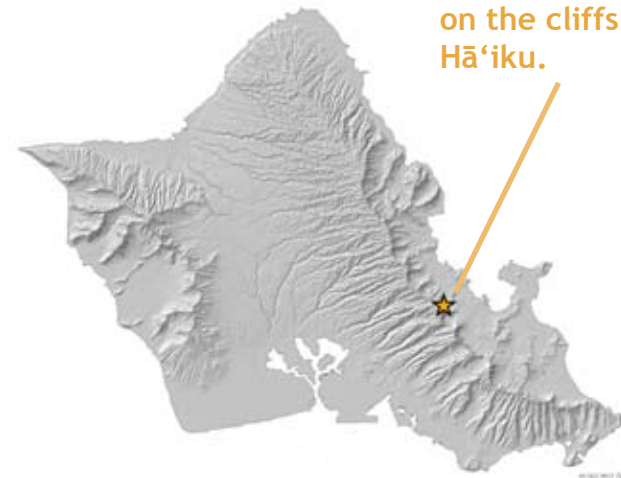


## Pampas grass curtailed

Pampas grass (*Cortaderia* sp.) is a giant, fire-prone ornamental bunchgrass that has escaped cultivation and invaded natural areas on Maui, in California, in New Zealand and elsewhere. OISC has been removing pampas grass from cultivation since 2008 to prevent the same thing from happening on O‘ahu. In 2011, a population was discovered on steep cliffs above Hā‘iku. A helicopter was used to reach and successfully treat all of the plants. OISC searched over 1,300 acres of the surrounding area without finding any more. OISC continues to remove urban plantings of pampas grass to prevent windborne seeds from beginning a silent invasion of the forests.

The large, dense growth and sharp-edged leaves of pampas grass could deter public access to natural areas in addition to increasing the chances of wildfires. This ecosystem-altering invader is still incipient on O‘ahu, but the cost of control could exceed \$400,000 per year if it were allowed to spread.

**Over a dozen pampas grass plants were found and controlled in a remote area high on the cliffs above Hā‘iku.**



## Containment

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OISC works to contain and prevent the spread of fire-promoting fountain grass (*Pennisetum setaceum*) from established populations in southeast O'ahu to the dry, leeward areas already vulnerable to wildfires.

OISC continued its quarterly searches and controlled a total of 301 plants in 2011. After the discovery of an incipient population of fountain grass in Mākua Valley by the O'ahu Army Natural Resources Program (OANRP), OISC immediately began survey and control work in partnership with OANRP. This effort will continue until eradication is complete.

Fountain grass is a State-listed noxious weed and a priority for both OISC and OANRP because it is fire-adapted and is known to invade dry native forest, changing the fire regime and suppressing the regeneration of native koa trees.





## Keeping O'ahu's natural areas free of Himalayan blackberry thickets

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Hikers and hunters don't want to fight their way through dense thickets of thorny Himalayan blackberry (*Rubus discolor*), nor does anyone want it to smother native plants in the understory. The Hawai'i Department of Land and Natural Resources has designated all non-native species of *Rubus* as some of Hawai'i's most invasive horticultural plants.

In 2011, OISC continued its control of Himalayan blackberry in Pālolo, treating 1,065 plants.





## Working with partners for better results

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Coqui frog infestations significantly threaten the State of Hawai‘i’s economy, quality of life and natural environment. The coqui’s loud calls are a nuisance for both residents and visitors, and their presence reduces property values. Lack of predators and competitors here in Hawai‘i allows coqui to reproduce without those limitations and to spread rapidly. Additionally, coqui have measurable impacts on the populations of insects and other invertebrates they feed upon. This can affect important ecological processes such as decomposition of leaf litter and releasing nutrients into the soil.

In 2011, OISC’s pest response technician responded to numerous coqui frog reports and worked in partnership with the Hawai‘i Department of Agriculture to remove a total of 89 frogs from residences and private businesses in Waikīkī, Ala Wai, Diamond Head, St. Louis Heights, Wilhelmina Rise, Hawai‘i Kai, Waimanālo, Kāne‘ohe, Mililani and ‘Ewa.

Invasive species don’t know boundaries; neither does OISC. OISC works with a number of different partners to protect O‘ahu from invasive species. We work closely with the Hawai‘i Department of Agriculture to detect and remove coqui frogs from O‘ahu before they can become established.



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Do you think  
you hear coqui?  
Call 643-PEST



## Inspiring the public

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In 2011, OISC staff gave presentations to students, landscape workers, community groups, neighborhood boards, sports groups and forestry professionals. OISC and the O'ahu Army Natural Resources Program is working with the Hawai'i Motorsports Association (HMA) as part of the strategy to control an early detection species, Siam weed (*Chromolaena odorata*). The main infestation area is at the only place on the island where motocross vehicles can be used legally. There is a high risk that Siam weed seeds could be spread by the vehicles, so OISC and OANRP are working with the association and its members to raise awareness and encourage the motocross participants to decontaminate gear and vehicles after using the site. The HMA has also volunteered to help remove some of the Siam weed found on the motocross trails. OISC also empowered nursery owners to keep their nurseries coqui-free by creating and distributing a handout that explains best management practices for detecting and controlling coqui that may arrive in shipments from Hawai'i Island.

Outreach and public education are an essential part of invasive species control. An informed public can help decrease the number of high-threat species in cultivation, spot invasives in natural areas, and detect newly introduced invasive species like little fire ant and coqui frog while their populations are still small enough to eradicate. OISC works with statewide partners to educate the public about how to identify and report invasive species.



## OISC's new home

OISC moved to a new, permanent location in Kailua in 2011 thanks to the help of one of its partners, the Hawai'i Department of Land and Natural Resources/Division of Forestry and Wildlife O'ahu Branch. OISC's office and field staff are now housed together instead of at two different baseyards.





Although OISC assists a number of government agencies through its work, it is not part of any agency's budget and does not have a dedicated funding source. OISC must seek funds to support its activities each year. OISC has historically received some State funding from the Natural Area Reserve Fund via the Hawai'i Invasive Species Council. In 2011, OISC was also supported by the Hawai'i Department of Land and Natural Resources/Division of Forestry and Wildlife, the U.S. Forest Service (both regular USFS funds and via the American Recovery and Reinvestment Act), the U.S. Fish and Wildlife Service, the Hawai'i Tourism Authority and the National Fish and Wildlife Foundation. OISC has also done contract work for SWCA Environmental Consultants.

Project administration and support is provided by the Pacific Cooperative Studies Unit of the University of Hawai'i: [www.manoa.hawaii.edu/hpicesu/pcsu](http://www.manoa.hawaii.edu/hpicesu/pcsu). The OISC website is maintained by the Hawai'i Ecosystems at Risk project: [www.oahuisc.org](http://www.oahuisc.org).

***Mahalo to our Partners:***

*Bishop Museum, Conservation Council for Hawai'i, Coordinating Group on Alien Pest Species, Hawai'i Department of Agriculture, Hawai'i Department of Health, Hawai'i Department of Land and Natural Resources/Division of Forestry and Wildlife O'ahu Branch, Hawai'i Department of Transportation Highways Division, Hawai'i Invasive Species Council, Honolulu Board of Water Supply, Hui Kū Maoli Ola, Ko'olau Mountains Watershed Partnership, Lyon Arboretum, Marine Corps Base Hawai'i, The Nature Conservancy of Hawai'i, O'ahu Army Natural Resources Program, Sierra Club Hawai'i Chapter, University of Hawai'i College of Tropical Agriculture and Human Resources, Pacific Cooperative Studies Unit, U.S. Department of Agriculture, U.S. Fish and Wildlife Service, Wai'anae Mountains Watershed Partnership*