



2016 Report to the Hawai'i Invasive Species Council



The Ko'olau Range with Hawai'i's most well-known native trees, koa and 'ōhi'a, in the foreground.

The O'ahu Invasive Species Committee (OISC) protects O'ahu's watersheds, ecosystems and agriculture by preventing harm from invasive species. The OISC field crew conducts surveys and control for invasive species that have not yet become abundant enough to damage the island's agriculture and ecosystems, but likely would cause harm if not controlled. The OISC field crew is like the vitamin C that a person takes after feeling the first symptoms of a cold. By going after and removing invasive species before O'ahu residents begin to feel the effects, we can prevent expensive and costly remediation measures later.

OISC operations are guided by the OISC steering committee which is made up of representatives of conservation organizations and land managers. Many of the people who serve on OISC's steering committee today were giving up their weekends to control invasive species as volunteers when OISC was first formed back in 2001.

In 2016, HISC awarded OISC \$729,048 for survey and control of priority invasive species and outreach. OISC raised an additional \$511,517 from other sources. (Grants received from HISC for control of *Tibouchina herbacea* at Poamoho are discussed in a separate report). The deliverables and accomplishments described below include HISC-funded activities and leveraged funds.



OISC crewmember happy to have found a miconia before it set seed.



Terrain encountered during a typical survey for miconia.

In 2016, OISC continued steady progress towards stopping the spread of species like miconia (*Miconia calvenscens*), Himalayan blackberry (*Rubus discolor*), devil weed (*Chromolaena odorata*), glory bush (*Tibouchina urvilleana*) and Cape ivy (*Delairea odorata*). There were zero detections of fireweed (*Senecio madagascariensis*) at a previously infested site. We also began working with the Division of Forestry and Wildlife on early detection for Rapid 'Ōhi'a Death (ROD). OISC partnered with the Hawai'i Department of Agruculture to conduct treatments for little fire ant (*Wasmannia auropunctata*) and coqui frog (*Eleutherodactylus coqui*) and to continue early detection for naio thrips (*Klambothrips myopori*) and the coconut rhinoceros beetle (*Oryctes rhinoceros*) along the Windward coast. OISC also continued to present invasive species information to students, teachers, the landscape industry, recreational groups and others.

Miconia (*Miconia calvenscens*)

Miconia is a high-priority target for OISC because once established, it may severely degrade Oahu's watershed. Miconia's shallow root systems may be unable to hold soil in place during heavy rains and its unusually large leaves funnel rainwater to the ground with tremendous force. These characteristics indicate that a miconia-dominated forest will be more prone to erosion than a native-dominated one.

Unfortunately, miconia seeds remain viable in the soil for up to 21 years, making this a project that requires long-term financial commitment. OISC's strategy is to survey the entire estimated seed bank of miconia every two to three years to find and remove trees before they mature.



Monotypic stands of miconia in Tahiti, note the lack of understory and exposed roots, a sign of erosion.

Photos: Ryan Smith

In 2016, OISC conducted miconia surveys in 21 different watersheds across 4,970 acres by ground and 8,548 acres by air totalling 13,518 acres. The crew removed 1,152 immature and 12 mature miconia trees. Of the 1,152 immature trees, 70 were over 2 meters tall. Trees over 2 meters tall are tracked because if they are missed, they are likely to flower and set seed by the time the OISC crew finds them again. OISC's goal is to keep the number of mature trees to zero. The length of time the seeds can remain viable in the soil has made it difficult to achieve that goal. However, OISC is making progress. In 2002, the first year that OISC had a full 12 months of paid staff, OISC removed 40 mature and 3,347 immature trees across 2,041 acres. Ninety-four of those trees were over 2 meters tall. That averages out to .0196 mature trees per acre in 2002, compared to just .0008 mature trees per acre in 2016, a drop of 96%.

Although the island-wide numbers are good, there were some range extensions in 2016. During an aerial survey in December, the OISC field crew found an immature tree in Waiawa, close to the summit in native forest. This point is approximately 1,800 meters away from the nearest mature tree. OISC conducted an analysis of the distances between mature and immature trees in 2009 and found that while 99% of mature trees fell within 450 meters of a mature tree, 1% fell within 1600 meters. This tree goes even beyond that range and validates that OISC should continue to survey for outlier trees since it would only take one mature tree to begin a new population in a new watershed.

OISC conducted 3,164 acres of surveys around the immature miconia tree that was found in 'Aiea watershed last year approximately 7,000 meters away from the nearest mature tree and found no additional miconia. The ability of miconia seeds to remain dormant in the soil for many years was confirmed this year at Wahiawā Botanical Garden. The Garden removed their mature tree in 1995 but still finds seedlings and reports them to us when they find them. OISC has done numerous surveys around the Garden and never found any trees, so we assume that the seedlings are coming from dormant seeds in the soil produced by the tree removed in 1995. That puts the current seedbank longevity at 21 years.

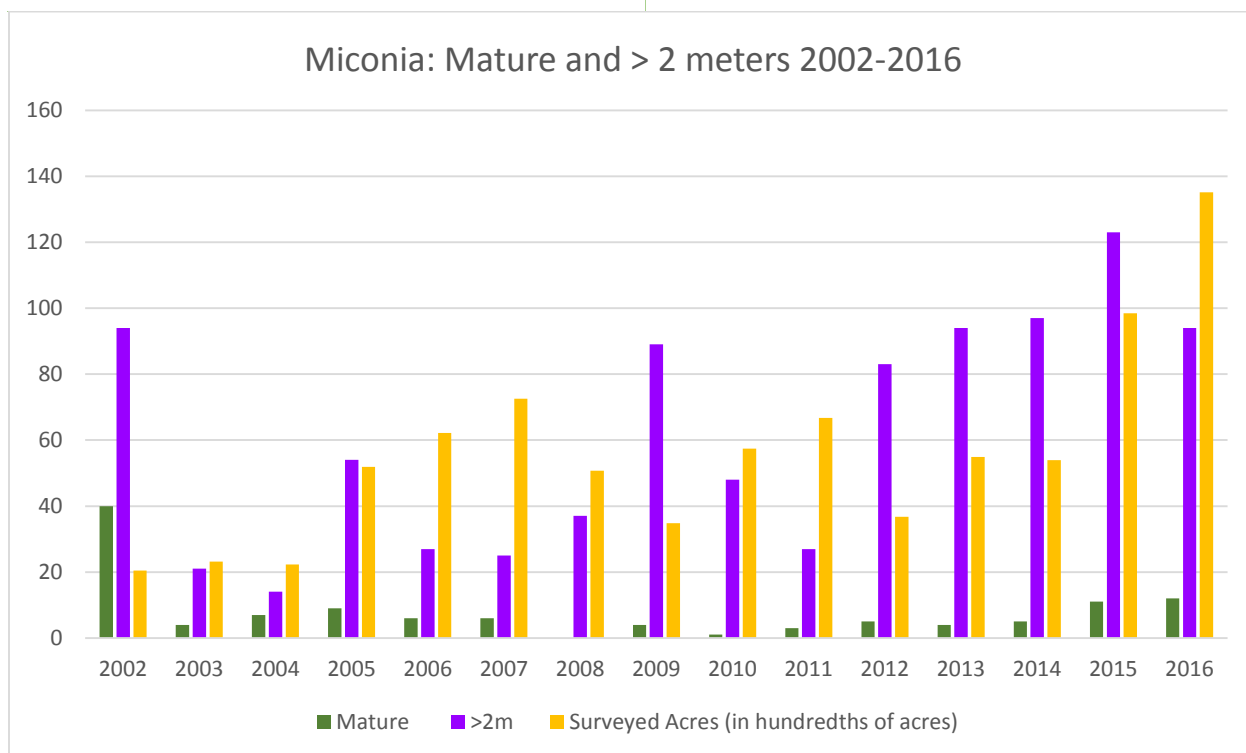
In 2016, OISC worked with Dr. James Leary of UH Mānoa CTAHR to use Herbicide Ballistic Technology (HBT) to control miconia by air in areas too steep to survey effectively and to cover more ground quickly in areas that are heavily infested. HBT allows a user to apply herbicide from a helicopter using a paintball gun apparatus. It is more efficient and safer in steep areas than other methods.



(Below) A minimal amount of herbicide is required to prevent larger miconia trees from re-sprouting. Smaller trees can be simply pulled from the ground and hung in the surrounding vegetation (above right!). Miconia is so tolerant of shade that it can grow in conditions too dark for most other species, such as this bamboo patch (above left).



Deliverable	Deliverable met?
Survey 2,400 acres by ground and 2,200 by air for <i>Miconia calvenscens</i> and control all plants found.	Yes: OISC surveyed 4,970 acres by ground and 8,548 acres by air for miconia. Of these surveys 3,164 were dual surveys for both miconia and devil weed (<i>Chromolaena odorata</i>). Although there was a range extension into a new watershed, islandwide the number of mature trees is still lower than when miconia surveys started in 2002.



Mature trees are a subset of >2 meters; Heights are estimates.

Devil weed (*Chromolaena odorata*)

The common name of *Chromolaena odorata* is “devil weed” and for good reason. It is toxic to livestock and humans and a weed of conservation and agricultural concern throughout Africa and the Pacific. Populations of this species are currently known to occur at the Kahuku Training Area, in ‘Ahupua’a ‘O Kahana State Park and in ‘Aiea. No new populations were found in 2016, although an individual immature plant was found growing out of a naupaka (*Scaevola sericea*) along a public beach access in Lanikai. OISC conducted road surveys in the surrounding area and found no plants. OISC surveyed both Joint Base Pearl Harbor and the Marine Corps Base Hawai‘i since a large part of the ‘Aiea infestation occurs at Camp Smith and with vehicle traffic and landscaping equipment possibly moving between the two sites, it seemed like a good to survey those areas. No plants were found.

OISC also responded to a public report of devil weed in Waiawa Valley, but no devil weed was found. A common plant that looks very similar devil weed was found in the location described in the report. Devil

weed likes disturbance and it can grow along roadsides, so road surveys are an efficient way to monitor for this species. OISC conducted 1,491 acres (10 acres for each mile of road) of road surveys in 2016 in neighborhoods adjacent to naturalized populations. OISC also continued survey and control work at KTA and in 'Aiea. In total OISC surveyed 5,690 acres for devil weed. OISC borrowed a customized spray rig from the O'ahu Army Natural Resources Program (OANRP) to spray the population in Kahana Valley. Treating the entire area by air took only a day and was much more efficient than had the sprays been done by personnel on the ground. We are grateful to the cooperation of the State of Hawai'i Division of State Parks for their cooperation.

Deliverable	Deliverable met?
Delimit in 'Aiea Valley	Yes: OISC surveyed 1,397 acres by air and 975 acres by ground. Some of these surveys were dual surveys with <i>Miconia calvescens</i> .
Verify and map reports from the public.	Yes: OISC surveyed Waiawa Valley in response to a public report and determined the person reporting had seen a common species that looks very similar to devil weed. OISC also verified the report from the beach access path in Lanikai from a photo (the person reporting pulled the plant) and conducted surveys to find additional plants.
Control where feasible	Yes: OISC conducted control work at Kahuku Training Area, in Kahana Valley and in 'Aiea. Treated areas have responded to the treatment with very little re-growth.
Investigate efficacy of biocontrol if needed.	Yes: Discussed biocontrol with Hawai'i Department of Agriculture and reviewed literature on use of previously developed biocontrols in other countries where devil weed is a problem. Assisted a partner agency to write a proposal that would have funded testing on native Hawaiian plants.

Rapid 'Ōhi'a Death: (*Ceratocystis spp.*)

Rapid 'Ōhi'a Death (ROD) is a forest disease caused by the fungal pathogen *Ceratocystis*. The pathogen has killed 'ōhi'a trees across at least 30,000 acres on Hawai'i Island. In 2016, OISC performed early detection aerial surveys over approximately 85,638 acres of O'ahu's 'ōhi'a forest. The surveys were flown higher and faster than what is standard when looking for individual plants such as miconia. Despite this, the crew was still able to see individual 'ōhi'a trees that had died. OISC used software called Digital Mobile Sketch Mapping developed by the US Forest Service to record point locations and attach those points to photos. The work on O'ahu is part of a statewide effort that is conducting early detection using the same methodology on all islands and is done in close cooperation with DLNR/DOFAW.



An ʻōhiʻa in full bloom in the Koʻolau Range, Oʻahu.

The crew did find trees that should be sampled for *Ceratocystis*, but getting to them has been problematic. They were either located in terrain that was too steep, or on private land. OISC is working on figuring out access points and acquiring permission for these points so they can be sampled.

As a result of the statewide outreach surrounding this disease, OISC received several reports of dead ornamental ʻōhiʻa. OISC responded to these reports and has submitted 8 samples from seven different watersheds. All the samples submitted tested negative for *Ceratocystis*.

Deliverable	Deliverable met?
Survey all ʻōhiʻa forest.	Partially: OISC was able to survey all ʻōhiʻa forest for signs of ROD except the windward side of the Koʻolau Range. This area will be the focus of surveys in 2017.

Cape Ivy (*Delairea odorata*)

Cape ivy invades dry forests on the Big Island and can smother native plants. The OISC crew has been monitoring and controlling a Cape ivy infestation in Pālehua. Through persistent treatment, the infestation has been drastically reduced from patches that were too numerous to count to just 1 mature and 1,365 individual immature plants. This has freed up time to begin further delimitation surveys an additional 100 meters from known infestation sites. During one of these surveys the crew did find one additional patch. It has since been controlled. In total, OISC has done repeated surveys for 400 acres around the location where this species was introduced so we are optimistic that our efforts we will be

able to keep the Waiʻanae Range free of this species. There is only one other location of this species on the island, in Makiki. Unfortunately the landowner at this location will not allow us to conduct control work.

Deliverable	Deliverable met?
Monitor efficacy of control over 15-acre infestation.	Yes: OISC was able to visit the area twice and conduct additional delimiting surveys for a total of 293 acres.

Fireweed (*Senecio madagascariensis*)

Fireweed is toxic to livestock and established on Maui and Hawaiʻi Island. It has made its way to Oʻahu several times now and OISC and its partners have been able to eradicate it each time. In 2016, OISC lowered its survey frequency since none had been found at the infestation site in 2015. No plants were found again in 2016 after 216 acres of ground surveys and 211 acres of road surveys.

Deliverable	Deliverable met?
Survey and control at Kawailoa	Yes: OISC conducted 227 acres of surveys and none was found.

Himalayan blackberry (*Rubus discolor*)

Himalayan blackberry is a thorny vine that is a serious problem in the Pacific Northwest. OISC staff have been told that it was planted on public land by a resident of Pālolo for fruits and to dissuade trespassers. It spread up the valley to the point where the forest becomes more dominated by native plants than invasives. This species is difficult to control since it is resistant to available herbicides and re-grows easily from cut stems and roots. Despite these challenges, OISC has drastically reduced Himalayan blackberry numbers. There are two subunits within the Palolo watershed that OISC surveys. In the Waiʻōmaʻo subunit, OISC has reduced Himalayan blackberry from 1,722 plants in 2008 to only 16 plants in 2016. Along Mauʻumae Ridge, OISC has reduced the number from 1,002 plants to 32. A mature plant has not been seen at either site since 2011.



Small Himalayan blackberry plant.

Deliverable	Deliverable met?
Survey 32 acres for Himalayan blackberry (<i>Rubus discolor</i>) infestation and control all plants found.	Yes: OISC surveyed 62 acres and treated 48 immature plants. A mature plant has not been seen since 2011.

Pampas grass (*Cortaderia spp.*)

OISC did not survey for pampas grass this year in order to make room to work on other species. The last plant seen in Kipapa valley was in 2008 and the area has been subsequently surveyed 5 times. In Haʻīku Valley, there was one plant treated in 2013, and the site was surveyed by air in 2015 with no plants found. OISC discussed seedbank longevity with an expert on *Cortaderia selloana*, Dr. Joseph DiTomaso

of the University of California at Davis. Dr. DiTomaso said that he had done seed bank trials of *Cortaderia selloana* and the seeds could germinate only up to six months. He had not conducted trials on *Cortaderia jubata*, but he suspected it was about the same. Therefore, OISC feels confident that the plant in Kīpapa valley is a successful localized eradication. OISC will check the Ha'iku plant point again in 2017 and if nothing is found we will categorize that as a local eradication.

Deliverable	Deliverable met?
Check on historical points in naturalized areas of Ha'iku and Kīpapa.	No: OISC decided to postpone monitoring surveys in order to make room for other surveys that were more urgent.
Verify new reports and remove with cooperation from landowner.	NA: None reported.

Fountain grass (*Cenchrus setaceum*)

Fountain grass is an OISC target because it is highly adaptable to fire and outcompetes native plants by altering the fire regimes of native forests. It is established at Diamond Head and Lanikai on O'ahu, but OISC's goal is to keep it from establishing in the Wai'anae Range. In 2016, OISC surveyed over 1,069 acres by air (356 acres) ground (69 acres) and road (640 acres). Unfortunately the landowner where this species occurs will not allow us to use herbicide and there is more of this species than can be effectively managed with handpulling at this time. An additional population has been seen and mapped by an OISC partner and the species does appear to be creeping up the ridge that separates Mākua Valley from Kea'au Valley.

Deliverable	Deliverable met?
Continue surveys and control over 10 acres in Ohikilolo Valley.	Yes: OISC surveyed over 1,069 acres by air (356 acres) ground (69 acres) and road (640 acres) .
Continue to monitor and treat isolated populations in Wai'anae Valley.	Yes, pulled 48 plants by hand.

Glory bush (*Tibouchina urvilleana*)

Glory bush is a striking ornamental plant that outcompetes natives in wet forest environments. In places on Hawai'i Island where it is naturalized, glory bush makes its way into 30-foot high 'ōhi'a canopy . O'ahu residents have cooperated when OISC has asked them to remove landscape plantings of glory bush, and one naturalized population was treated in the Tantalus area. The species grows well vegetatively but the population is near to eradication. In 2016, no plants were seen in the previously infested site.

Deliverable	Deliverable met?
Control all plants.	Yes: OISC monitored 7.6 acres of previously infested sites and found no plants.

Coqui frog (*Eleutherodactylus coqui*)

OISC provides systematic monitoring support to the Hawai'i Department of Agriculture (HDOA) for early detection of coqui frogs. Coqui frogs can be stowaways on plants and other items such as vehicles, boats and construction materials from areas on Hawai'i Island with large coqui frog populations. OISC assists with responding to reports from the public, treatments and monitoring areas to ensure treatments were effective. In 2016, OISC conducted 28 surveys over six separate sites. OISC staff captured 57 frogs and conducted three separate treatment operations to control frogs at sites with

larger populations. HDOA staff has conducted separate surveys and captures, so this number does not represent the total number of coqui frogs caught on O‘ahu in 2016.

Deliverable	Deliverable met?
Assist HDOA with responding to coqui reports from the public. Survey 6 high risk sites on a quarterly basis.	Yes: OISC conducted 28 surveys at three separate sites. Two sites were nurseries, one was a response to a public report at a private residence. 57 frogs were captured in total. OISC forwarded reports from the public to HDOA, but they only requested assistance with the one mentioned above. OISC assisted with three treatment operations at two different sites.

Little Fire Ant (LFA) (*Wasmannia auropunctata*)

LFA is a tiny stinging ant that is established on Hawai‘i Island and was accidentally introduced to O‘ahu in two separate locations. In 2016, OISC assisted HDOA and the Hawai‘i Ant Lab with surveys, treatment and outreach. OISC maintained trails in advance of treatment and monitoring surveys in Waimānalo and assisted with monitoring surveys in Mililani. OISC conducted early detection surveys at 78 separate sites that included retail nurseries, 8 community gardens, three responses to reports from the public and 7 high-risk sites at Joint Base Pearl Harbor Hickam. OISC also surveyed 2,722 meters of Waimānalo stream which runs through places where LFA has previously been found. In 2016, little fire ant was found at three nurseries where it was subsequently treated.

(Right) OISC and the Hawai‘i Ant Lab working to treat the last remaining little fire ants in a tree in Waimānalo.



Deliverable	Deliverable met?
Coordinate with the Little Fire Ant O'ahu Incident Command System to prioritize the survey of 170 high risk sites. Survey 150 of these site, treat as needed and assist with mapping.	Partially: OISC was only assigned 78 unique sites in addition to the stream survey. OISC conducted 96 surveys including a stream that spanned 52 seprate properties for a total of 148 sites (18 sites included repeat visits). OISC also responded to public reports and assisted with treatment and mapping.

Myoporum thrips (*Klambothrips myopori*)

Myoporum thrips have been damaging and killing Hawai'i's native naio trees (*Myoporum sandwicense*) on Hawai'i Island since they were discovered in 2009. Naio figures prominently in coastal restoration projects and is a popular ornamental for those wishing to landscape with native plants. OISC has been checking naio plants on O'ahu continuously since 2011 as an early detection strategy for the thrips. In 2016, OISC surveyed 72 locations with naio plants. No thrips were found.

Deliverable	Deliverable met?
Conduct 24 early detection surveys for Myoporum thrips at high risk sites.	Yes: OISC conducted 72 early detection surveys, all were negative.

Coconut Rhinoceros Beetle (*Oryctes rhinoceros*)

Coconut rhinoceros beetle (CRB) is currently limited to O'ahu and a separate CRB response team is taking the lead in the response. OISC assists where necessary. CRB damage can kill coconut and other palms.

Deliverable	Deliverable met?
Assist CRB Response Team with monitoring of traps across the island.	Yes: OISC checks and maintains 80 traps along O'ahu's windward coast and sends data to the CRB response team. No CRB was found in OISC maintained traps during 2016.

Identification and Risk Assessment:

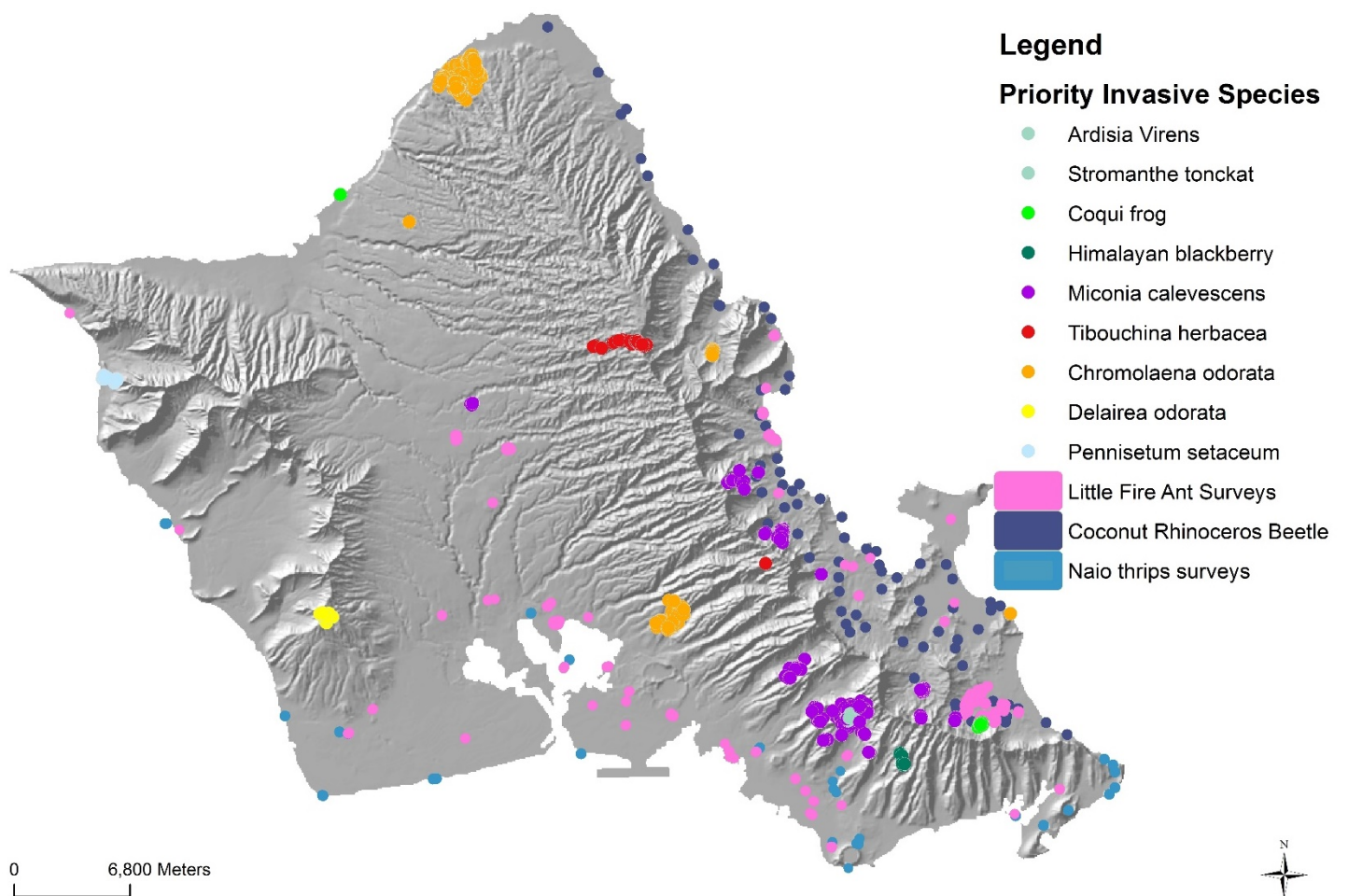
OISC had previously been able to identify plant species for the public, however the person that was doing this left for another position. OISC has the capacity to identify plants right now, but we have not received any inquiries. OISC has established a relationship with the University of Hawai'i Joseph F. Rock Herbarium to voucher specimens.

Deliverable	Deliverable met?
Identify 150 specimens submitted by the general public.	No: Only 15 specimens were submitted by the public. These were identified. Another 48 specimens were submitted by other natural resource professionals. These were also identified for a total of 63 specimens.

Other Activities and Deliverables:

Deliverable	Deliverable met?
Respond to new species as appropriate and in consultation with OISC Steering Committee.	Yes: OISC is working with the Rapid 'Ōhi'a Death response team to conduct early detection and be ready for action if a sample tests positive.
Store the data from daily field activities in a relational and geographic database and report as part of the annual HISC report to the legislature.	Yes: OISC submitted all required reports and worked with HISC on a new reporting format.
Participate in statewide policy coordination through CGAPS meetings and other forums.	Yes: OISC staff participated in statewide data meetings, the Rapid 'Ōhi'a Death Symposium and monthly conference calls, CGAPS meetings and submitted comments to the statewide biosecurity plan.

Species Treated in 2016



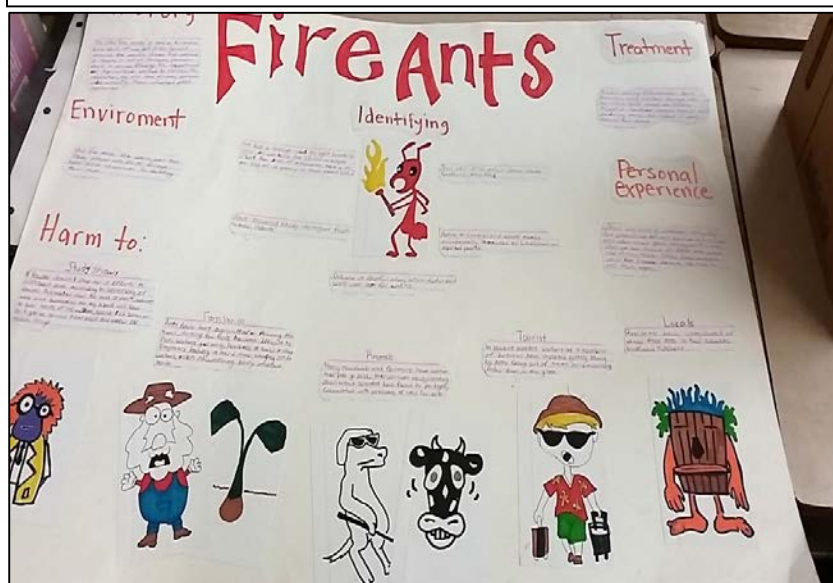
Outreach:

OISC recognizes that outreach is integral to invasive species management. OISC needs public support so that we can gain access to the private property we need to survey so that our eradication efforts are truly island-wide. For species like coqui frog and little fire ant, that can be transported anywhere on the island, we need the public to be our eyes and ears. We also want the public to know what they can do to help our efforts. For example, buying non-invasive plants and washing gear and equipment (especially boots) goes a long way towards preventing invasive species introductions.

The outreach program has conducted 21 presentations this year, reaching 470 people. These included the civil engineering firm AECOM's All-Hands meeting of 100 people, O'ahu Pig Hunters Association, Hawai'i Association for Environmental Professionals, the Kāne'ohe Rotary Club, the Afterschool Alliance Conference and the Hawai'i Environmental Education Alliance Symposium. OISC provided invasive species updates at eight Mānoa Neighborhood Board meetings, directly reaching 226 community members. Hawai'i Landscape magazine printed a little fire ant (LFA) authored by OISC in their fall issue and OISC met with eight legislators in March to provide updates and information about Rapid 'Ōhi'a Death. OISC presented and trained teachers on how to use LFA surveys as an activity for science classes. The remainder invasive species presentations were given to various community groups around the island. Presenting to community groups has proved to be a valuable way to reach audiences that can be innovators and early adopters of invasive species prevention. These are the sectors of the community with which new partnerships can be forged and key community stakeholders are often found.



(Above) OISC field crewmember receiving a "Water Heroes" cape during the Hawai'i Theatre for Youth Production "H₂O, the Story of Water and Hawai'i". (Below) A poster about little fire ants made by students after an OISC school visit



OISC participated in 34 events this year including the Hawaii State Farm Fair, Ocean Fest, The Hawai'i Pet Expo, Hawai'i Tattoo Expo, and CTAHR's O'ahu Ag and Environmental Awareness Day, which had the largest audience of 420 middle school children. OISC field crew members were honored as Water Heroes at the Honolulu Theater for Youth's musical, "H2O: The Story of Water and Hawai'i".

Little Fire Ant Classroom Activity (1,831) and School Visits (442)

The number of students taught the LFA classroom activity has increased 3.5 times over last year's total of 460. The LFA classroom activity uses current curriculum standards to teach students about invasive species and LFA and supplies testing kits so that students can test their yards and identify the ants they find. This year OISC visited 13 different schools and reached 1,600 students with the LFA activity, yielding 788 ant samples. OISC also presented the LFA activity to 231 teachers and students who then implemented the activity independently with their projects or in their classrooms. In addition to little fire ant specific messaging, OISC has visited a total of 12 schools reaching 442 students with messaging about invasive species impacts and conservation careers.

Materials (7,002,065) Website (9,624) and Social Media (6,431)

OISC distributed informational products about OISC target species to legislators, partners, businesses, and community associations. We also created an Adwall for LFA to be installed on every bus on O'ahu for the Spot the Ant, Stop the Ant Month in October. The Adwall averages 7 million views each month. We have also made and distributed over 2,265 LFA kits to students and the general public.

We have been keeping our website up-to-date with information, not only about OISC targets, but also with emerging threats from ROD. We have had 9,624 people visit our website and viewing our website 26,820 times. We also have been increasing our presence on social media with Facebook, Instagram and Twitter posts. OISC's Facebook, Instagram, twitter, YouTube, Vimeo, and volunteer blog messages were served to 100,940 people (meaning they received it in their feed) and 6,431 people engaged our messages (meaning they clicked, liked, or shared the post).

Volunteers (396 hours)

OISC leads monthly volunteer invasive species surveys in partnership with Lyon Arboretum. In 2016, volunteers dedicated 395.75 hours to survey 83 acres and remove 1,383 invasive plants. (328 *Ardisia virens* and 1047 *Stromanthe tonckat*). This year, there was a 69% drop in plants per acre from 2015, and in the past three years, there has been an 80% drop in plants.

There was a drop in volunteer hours this year by 41 hours, however there was a noticeable amount of "no-shows" in October and November. To compensate, the cut-off to close the RSVP form will be 16 people instead of the previous 12 people. Despite the drop in volunteer hours, the trips in 2016 yielded the highest amount of acres surveyed since the program began. Volunteers surveyed 83 acres this year, compared to 68 acres last year. This increase can be attributed to having so many repeat volunteers that are familiar with the plants and the terrain. Three volunteers have come to at least 70% of our trips.

One of the newly regular volunteers began volunteering after OISC's presentation to the Kāne'ohe Rotary Club meeting in July. This volunteer is also a librarian at UH Mānoa Life Sciences and put together an LFA display for the library. Another volunteer is working with the NARS invertebrate program to raise Kamehameha butterflys. Another is clearing the false 'awa (*Piper auritum*) from their property. False 'awa is an invasive species that is too widely distributed for OISC to take on. One of the best "extras" with volunteer trips are seeing new friendships formed between the volunteers and hearing the little things people implement into their lives to help with invasive species management on O'ahu.

The table below describes how OISC's outreach deliverables were met:

Deliverable	Deliverable met?
100 landowners engaged in invasive species control.	Yes: 198 properties were contacted for access. 167 property owners agreed to let OISC field crew survey their property for invasive species.
300 volunteer hours and eight volunteer trips.	Yes: Volunteers donated 396 hours to invasive species control in 2016.
40 presentations or participation in events at schools, community groups, neighborhood boards and other organizations.	Yes: OISC did a total of 55 presentations and events reaching a total of 4,352 people.
500 posts to OISC's social media sites.	Almost: OISC made 358 posts to its social media sites.
Assist with the development and implementation of a statewide public outreach event for Hawai'i Invasive Species Awareness Week 2016.	Yes: OISC outreach staff worked with HISC to sponsor a video contest for high-school students.
Update OISC's website with information regarding target pest and general invasive species information and assist in updating the HISC's website species page.	Yes: Facebook and Instagram were updated regularly with a reach of 100,940 and engagement of 6,431.
3 presentations or contacts to recreational groups regarding invasive species and the importance of decontaminating gear.	Yes: OISC presented to the O'ahu Pig Hunters Association, the Sierra Club Outings Leaders, and ClimbWorks.
Coordination and participation in events for "Spot the Ant, Stop the Ant" month.	Yes: Panels were installed on all buses and remained throughout the month of October as part of the "Spot the Ant, Stop the Ant" campaign.
Create invasive species packages developed for landscapers, construction companies, tree trimmers and shipping companies that contain decontamination protocols, species ID and other information tailored to the specific industry.	Yes: OISC developed packages for Department of Transportation workers (these were distributed in January of 2017). OISC provided information at the Landscape Industry of Hawai'i Meeting and developed packages for legislators about ROD.
Discuss getting decontamination protocols and basic invasive species training included in certification for ecotourism operators.	Yes: Began conversations about this topic with the Hawai'i Ecotourism Association.



OISC volunteers spelling our acronym