



Survey and Control of *Chromolaena odorata* in the Kahuku Training Area, O'ahu, Hawai'i

Annual Progress Report
October 1, 2015—September 30, 2016



Devil weed (Chromolaena odorata) "hotspot" flagged off for later treatment

Summary of Project Objectives:

Chromolaena odorata, commonly known as devil weed, is a state-listed noxious weed that is toxic to livestock, people and other plants. It possesses the ability to root vegetatively, produces up to 800,000 wind-dispersed seeds a year and is a fire promoting species that forms dense, monotypic stands of vegetation. The O'ahu Army Natural Resources Project (OANRP) discovered *C. odorata* at the Kahuku Training Area (KTA) on the north shore of O'ahu in January 2011 as part of its early detection program. The Biological Opinion for military activities on O'ahu requires the Army to respond immediately to incipient weeds brought in via training operations. What is currently known about *C. odorata* supports the assumptions that the center of the population is the Kahuku Training Area (KTA) and that *C. odorata* was introduced to KTA because of military activities.

Between 2006 and 2009, botanical surveys of all publicly accessible roads on O'ahu were conducted by OISC's O'ahu Early Detection program. *C. odorata* was not found during these

surveys. This means that it is unlikely *C. odorata* was introduced somewhere else and dispersed onto KTA. *C. odorata* is a widely dispersed pest on the island of Guam, and units from Hawai'i sometimes train in Guam. The seeds are wind dispersed and readily attach to clothing. One plant can produce approximately 800,000 seeds a year. Given these factors, it is highly likely the pathway of introduction was military activities.



All crew decontaminate at the end of each day and wear dedicated gear for devil weed operations to avoid spreading seeds to other worksites.

The aim of this project is to contain or eradicate

Chromolaena odorata,

commonly called devil weed, from the Kahuku Training Area (KTA). Eradication at KTA will reduce the threat of this species spreading to natural areas that may contain protected species. At KTA, OISC conducts sweeps of designated subunits and flags devil weed infestations for later treatment by OANRP. This method allows consistent monitoring of devil weed treatments to ensure that areas that may need re-treatment are noted and any new infestations mapped. OISC's responsibilities are:

- Surveying and monitoring treatment of subunits 3,4,7,8 and 10 within the Alpha 1 Range of Kahuku Training Area (KTA). This includes state land leased by the military and used by the public as a motorcross recreational area on the weekends.
- Flagging areas as "hotspots" for follow-up treatment by OANRP. Hotspots are defined as areas with more than five plants or areas that would be inefficient to treat without a power sprayer or an aerial spray.
- Monitoring hotspot treatment and recording amount of re-growth after treatment.
- Removing outlier *C. odorata* outside of hotspots.
- Treating re-growth inside previously treated hotspots if this can be accomplished without delaying surveying (otherwise area is flagged for follow-up treatment by OANRP).
- Communicating results of all monitoring through a Google Docs spreadsheet.
- Assisting with treatment and acquiring access to private land that makes treating OISC hotspots OISC 022, 024 and 080 more efficient.

Project Accomplishments: October 1, 2015—September 30, 2016.

Fieldwork:

During the reporting period, OISC conducted eight multi-day trips and also assisted in treating hotspots OISC 022, 024 and 080 during day-trips. In total the OISC fieldcrew:

- OISC spent 1871 hours and conducted survey sweeps over 1,567 acres in the Kahuku Training Area.

- Treated a total of 706 mature and 5627 immature plants. It should be noted that these numbers are not a reflection on the total amount of plants detected or that actually exist within the subunits OISC and OANRP manage, just the total that were treated by OISC staff.
- Mapped monotypic fields of guinea grass for possible alternate survey techniques since these areas have a lower confidence level.
- Took points that appeared to be good areas to use gigapan technology—a technique OANRP has begun to use for other species.
- Assisted OANRP staff by acquiring access to adjacent private land and providing labor to power spray hotspots OISC 022, 024 and 080.

One camp trip had to be cut short due to an intern that would not follow the instructions of OISC field leaders and had to be delivered back to OISC's baseyard. OANRP staff were informed of the incident by phone as soon as it happened. Other camp trips were postponed due to training exercises. Despite this, the crew was still able to sweep all the subunits they were assigned twice. OISC finished early and added the extra activity of treating hotspots OISC 022, 024 and 080.



OISC crewmember climbing one of the rock walls frequently encountered at KTA

Observations and Results:

OISC data alone cannot be analyzed for results since the field crew is responsible for surveys and OANRP is responsible for much of the treatment. However, the crew's observations indicate that the treated hotspots show little or no recruitment and that the partnership between OANRP and OISC is working to eradicate *C. odorata* from the Kahuku Training Area. The crew saw some recruitment in areas that had been treated, but they have described other hotspots as "crispy" and saw no plants in these locations. At some hotspots the herbicide appeared to have not penetrated the canopy and in some hotspots just a few plants survived on the outskirts of the treatment area. In these cases, the field crew pulled these plants. Unfortunately, some new hotspots were found this year in Kaunala Gulch.

An ongoing project of the OISC field crew has been to map guinea grass. These areas are difficult to survey because visibility is extremely low when moving through grass that is taller than the average person. OISC is also noting cliff areas that may be difficult to survey on foot but might be good candidates for gigapan imagery.

Data Management and Project Coordination:

During the reporting period, OISC staff entered observations for each hotspot into the Google Docs Hotspot Spreadsheet and quality controlled data from the field entered into the database. In addition staff did the following:

- Obtained permission from a private landowner adjacent to KTA that facilitated OANRP's access into hotspots OISC 022, 024 and 080.
- Organized meeting with environmental staff of Marine Corps Base Hawai'i, OANRP and OISC to coordinate treatment efforts and begin discussions to coordinate biocontrol research.
- OISC and OANRP met to ensure the Google Docs Hotspot Spreadsheet was communicating the information necessary to both organizations. Staff decided to keep OISC's monitoring notes for the past 4 visits so the history of 2 years (each hotspot is surveyed twice in one year). This ensures the information needed to evaluate whether a hotspot should be deactivated or not will be displayed. OISC will strive to merge adjacent hotspots together. OANRP may combine further if it makes treatment easier.
- OISC and OANRP met with the Hawaiian Electric Company (HECO) to discuss the transmission lines that run through the *C. odorata* survey area. HECO said that we did not need to seek permission from them to survey or treat along transmission lines. We provided brochures for their staff and discussed the necessity of washing boots, gear and trucks after working in areas infested with *C. odorata*.
- OISC is working with the state trails program, Na Ala Hele, to ensure that the contractors building a fence around the area used for motorcross will clean all their equipment once the project is finished to avoid spreading *C. odorata* to a new area.

Challenges:

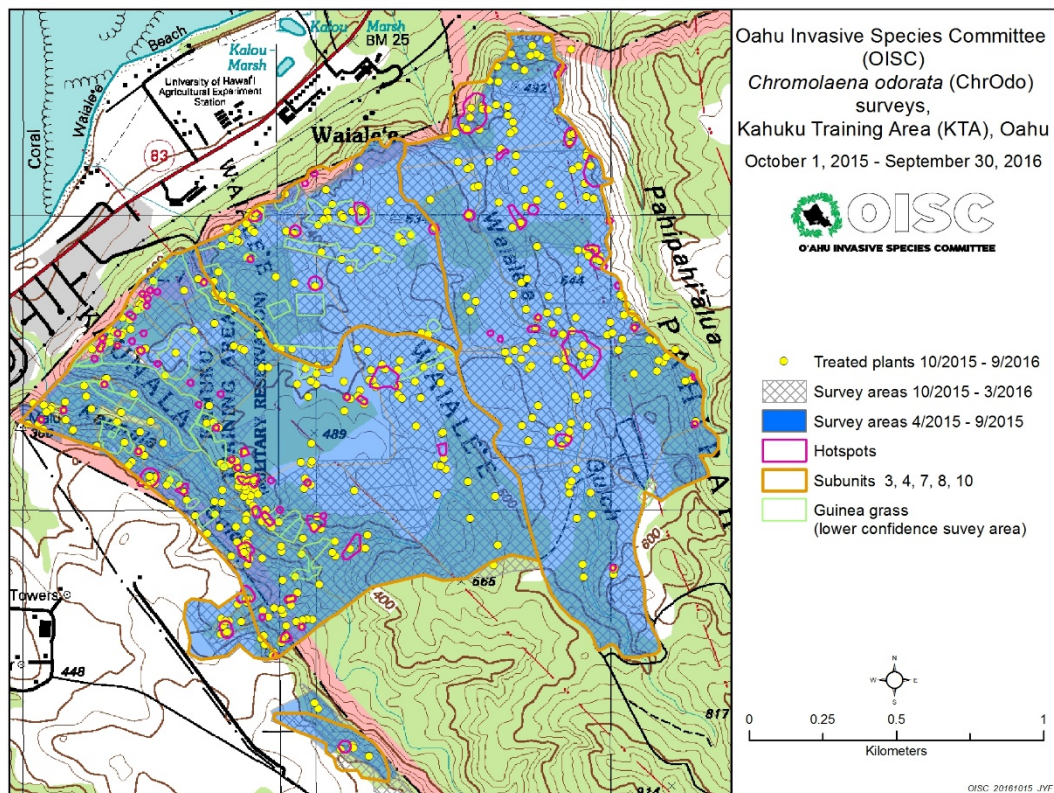
The dirt road into the survey area was extremely degraded and after a rainy spell, OISC's 4WD trucks got stuck. The road has since been re-graded making entry much easier. The crew saw many plants in Pahipahi'ālua gulch that were inaccessible by foot because of the steep terrain. A new hotspot was found in Kaunala Gulch that may be difficult to access to treat. Aerial sprays may be necessary here for both areas and individual outlier plants.

Motorcross activities continue to spread plants. While surveying, the crew saw plants along the motorcross trails used by the public on the weekends. The crew noted an area where earth had been mounded and disturbed, presumably to create a more exciting trail. A *C. odorata* was found in the mound. Guinea grass is a continuing challenge. It is difficult to see when surveying through guinea grass and these areas are therefore labeled with a lower confidence level. At KTA, small ledges that present a safety hazard are hidden throughout guinea grass areas.

**Table 1: OISC *Chromolaena odorata* Work Effort Summary at Kahuku Training Area
October 1, 2015—September 30, 2016**

Location	Acres Surveyed	Mature Plants Treated	Immature Plants Treated	Total Plants Treated	Effort (Hours)
KTA Subunits 3, 4, 7	1519.99	705	5547	6252	
KTA Subunits 8	21.85	1	35	36	
KTA Subunits 10	25.36	0	45	45	
Total	1567	706	5627	6333	1740

**Figure 1: OISC *Chromolaena odorata* Work Effort in Kahuku Training Area
October 1, 2015 – September 30, 2016**



***C. odorata* activities Supported with Other Funds:**

Public Education & Outreach:

The OISC manager talked to the O'ahu Pig Hunters Association about *C. odorata* as well as *Miconia calvenscens* and Rapid 'Ōhia'a Death. OISC also printed *C. odorata* pest alert rack cards to give out at events and presentations. OISC's outreach specialist provided educational materials at the Hawai'i Motorcross Association's (HMA) July 4th festival. The HMA uses KTA on weekends. Information about *C. odorata* is a prominent part of OISC's educational booth which is displayed at numerous events.

Surveys and Control for *C. odorata* outside of the Kahuku Training Area (KTA):

'Aiea: OISC conducted a 697-acre aerial survey in 'Aiea and did not see any large patches. We do not expect to see small individual plants on an aerial survey. The survey was primarily for *Miconia calvenscens*, which was also not seen. At Camp Smith, the crew treated several large *C. odorata* and conducted additional surveys and treatment. Marine Corps Base Hawai'i Environmental staff assisted with access onto Camp Smith and bought us the parts to resurrect our power sprayer, which made treating the large patches at Camp Smith much more efficient. The crew also treated a large hotspot along the 'Aiea Loop Trail. Delimiting and treatment in ongoing at Camp Smith and in 'Aiea.

Kahana: OISC met with the Ahupua'a 'O Kahana park manager to discuss aerial treatment options. The field crew also conducted limited control work. OISC plans to aerially spray in Kahana in October of 2016.

Kaukonahua (Wahiawā):

Portions of Schofield Barracks fall inside OISC's search area for *Miconia calvenscens* and was up for survey for that species. Since the area is suitable habitat and used by the military there seemed to be a reasonable probability that *C. odorata* had been dispersed here so the crew surveyed for both species. None was found.

Keamanea and 'Ō'io

(Hale'iwa): The OISC crew usually surveys portions of these two watersheds for

fireweed (*Senecio madagascariensis*) before the KTA camp trips. One mature and one immature were found in the portion of the wind farm that is located in Keamanea watershed.



Treatment area along 'Aiea Loop Trail

Public Reports and Early Detection Surveys:

OISC conducted numerous early detection surveys outside KTA. OISC received a report from a motorsports enthusiast of *C. odorata* in Waiawa Valley, behind the prison. OISC was able to get

access from the prison to look at the area, but did not find any plants. There was a very similar looking species in the spot described. OISC also surveyed for devil weed while checking out a public report of *Miconia calvescens* along the Pupukea Loop Trail. Neither species was found. Because there is so much *C. odor* at Camp Smith, the crew conducted a presence/absence survey around Joint Base Pearl Harbor Hickam thinking it could be dispersed there by vehicles or landscapers. No *C. odorata* was found.

Table 2: OISC *Chromolaena odorata* Work Effort Summary on non-KTA lands. October 1, 2015–September 30, 2016:

Location	Aerial Acres Surveyed	Ground Acres Surveyed	Mature Plants Treated	Immature Plants Treated	Total Plants Treated	Effort (Hours)
‘Aiea	2094.986	1044.023	624	6671	7295	1650.50
Hālawā		200.875	0	0		12
He‘eia		100.976	0	0		32
Ka‘elepulu		50.987	0	0		110
Kahana		11.591	1067	1897	2964	72
Kaukonahua (Wahiawā)		64.980	0	0	0	21
Keamanea		371.440	1	0	1	405
‘Ōi‘o (Hale‘iwa)		74.232	0	0	0	56
Paumalu (non-KTA)		369	13	16	29	333
Marine Corps Base Hawai‘i.		63.213	0	0	0	16
Waiawa		2.473	0	0	0	4
Total	2094.986	2353.790	1705	8584	10,289	2711.50

Compliance:

OISC is a project of the Pacific Cooperative Studies Unit through the Research Corporation of the University of Hawai‘i, an equal opportunity employer. OISC utilizes RCUH and PCSU standard operating procedures and employee guidelines. OISC employees are trained in wilderness first aid, off-trail hiking safety and pesticide safety.