Appendix 3-6

O'AHU INVASIVE SPECIES COMMITTEE

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

Annual Progress Report
October 1, 2015—March 31, 2016

OISC crewmember removing devil weed (*Chromolaena odorata*).

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 Oʻahu 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.

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 through guinea grass in Kaunala gulch.

- 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.

Project Accomplishments: October 1, 2015—March 31, 2016.

Fieldwork:
OISC conducted four multi-day trips to control *C. odorata* for a total of 973 fieldwork hours. In addition the OISC crew:

- Conducted survey sweeps over 676 acres.
- Marked hotspots with flagging or something equivalent for later aerial or ground treatment by OANRP staff.

- Treated a total of 566 mature and 3,302 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 with power spray treatment of 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.

Getting to the root of the matter. OISC crewmember ensuring the entire plant is removed.

Data Management and 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 Hawaiʻi, 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 staff began communicating with OANRP staff to discuss the use of drones over guinea grass fields. Guinea grass grows thickly and is usually well over six feet tall making it hard to see very far in any direction. Survey confidence in guinea grass is low and it also presents a safety risk; cliffs and drop offs are sometimes hidden in the grass. Drones may be able to find *C. odorata* on the edges of these fields or plants that have grown above the grass.

Challenges:

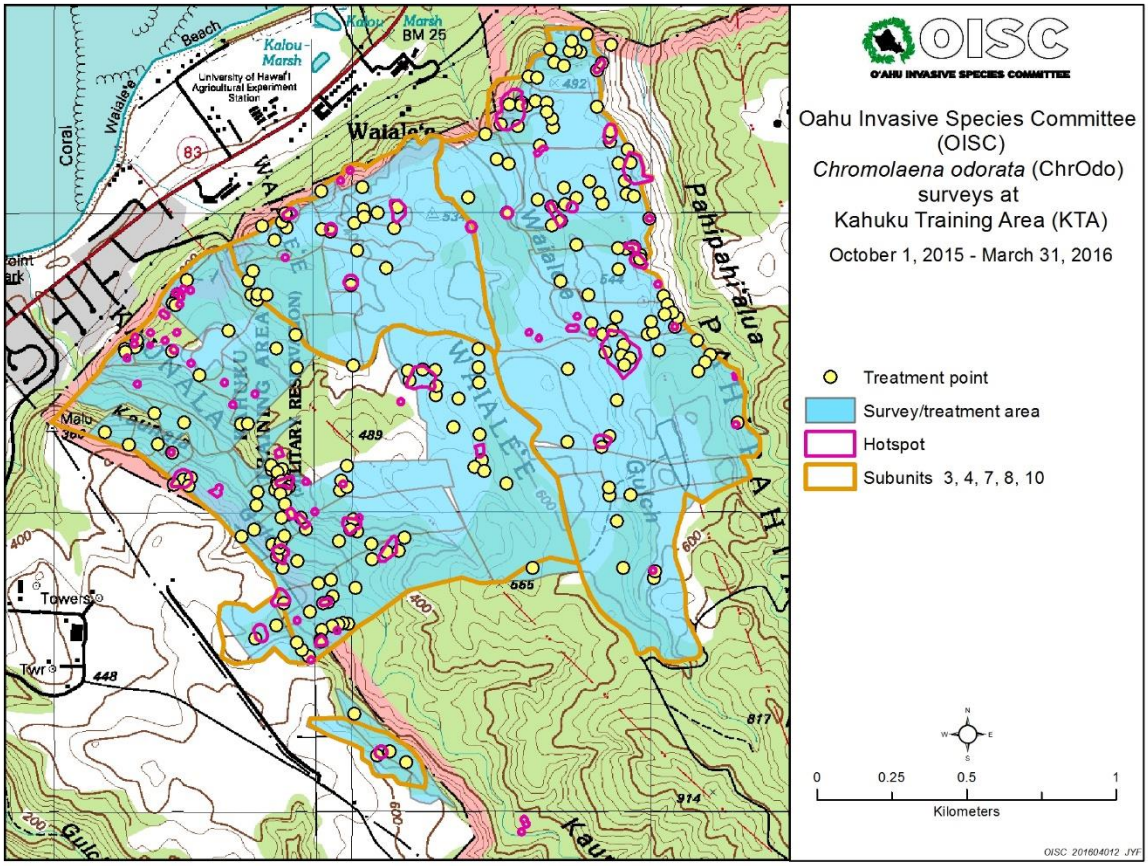
The dirt road into the survey area was extremely degraded and after a rainy spell, OISC's 4WD trucks got stuck. The road has since been re-graded making entry much easier. The crew saw many plants in Pahipahiʻālua gulch that were inaccessible by foot because of the steep terrain. Aerial sprays may be necessary here for both hotspots 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 in the mound. The field crew also expressed a little confusion over the definition of a hotspot and asked for a clear cutoff criteria for when it was acceptable decision to leave treatment to OANRP. After discussion, it became clear that there were too many variables to decide on a hard and fast rule. The OISC Manager and Field Supervisor reassured the field crew leaders that their judgement for whether it is inefficient to treat a population with hand sprayers or by hand-pulling will be trusted. As long as they are as detailed as possible when filling out the hotspot spreadsheet the area will be treated.

Table 1: OISC *Chromolaena odorata* Work Effort Summary at Kahuku Training Area October 1, 2015-March 31, 2016

Location	Acres Surveyed	Mature Plants Treated	Immature Plants Treated	Total Plants Treated	Effort (Hours)
KTA Subunits 3, 4, 7, 8, 10	676	566	3,302	3,868	973*

*This includes 45 hours of OANRP staff time.

Figure 1: OISC *Chromolaena odorata* Work Effort in Kahuku Training Area
October 1, 2015 – March 31, 2016



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

Public Education & Outreach:
The OISC manager talked to the Oʻahu Pig Hunters Association about *C. odorata* as well as *Miconia calvescens* and Rapid ʻŌhiaʻa Death. OISC also printed *C. odorata* pest alert rack cards to give out at events and presentations.

Surveys and Control for *C. odorata* outside of the Kahuku Training Area (KTA)
ʻ**Aiea:** OISC conducted a 697-acre aerial survey in ʻAiea 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 calvescens,* which was also not seen. At Camp Smith, the crew removed a large *C. odorata* from a parking area and conducted additional surveys and treatment. Marine Corps Base Hawaiʻi 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 ʻAiea Loop Trail.

Kahana: OISC met with the Ahupuaʻa ʻO Kahana park manager to discuss aerial treatment options. The field crew also conducted limited control work.

Kaukonahua (Wahiawā):
Portions of Schofield Barracks fall inside OISC's search area for *Miconia calvescens* 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 ʻŌʻio (Haleʻiwa):
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.

Removing the "Giant ChrOdo Megabush"—as the field crew called it—from a Camp Smith parking lot

Table 2: OISC *Chromolaena odorata* Work Effort Summary on non-KTA lands. October 1, 2014 – September 30, 2015:

Location	Aerial Acres Surveyed	Ground Acres Surveyed	Mature Plants Treated	Immature Plants Treated	Total Plants Treated	Effort (Hours)
ʻAiea	697.836	558.555	368	5,984	6,302	185
Kahana Valley		11.5910	1,067	1,897	2,964	40
Kaukonahua (Wahiawā)		64.980	0	0	0	72
Keamanea		240.610	1	1	2	40
ʻŌiʻo (Haleʻiwa)		74.2320	0	0	0	48
Total	**697.836**	**949.968**	**1,436**	**7,882**	**9,268**	**385**

Compliance:
OISC is a project of the Pacific Cooperative Studies Unit through the Research Corporation of the University of Hawaiʻi, 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.