Report on HISC Grant FY2023 (Jan 2023-Feb 2024) for Detection & Control of Invasive Species on the Island of Hawai'i: BIISC Early Detection/Rapid Response Invasive Species Control Program

Submitted by BIISC Manager Franny Brewer June 2024

Project Goal: To reduce the future impacts of invasive plants on our forests and farms by implementing strong early detection, rapid response, and containment strategies.

Summary of Activities:

Hawaii Island is 4,000 square miles of rural communities, small agricultural operations, expansive ranches, rocky coastlines, high-end resorts, and lush forests woven across a landscape of active volcanoes. Each day, humans bring onto these landscapes imported materials, potentially infested with a new beetle, a pathogen, or a plant ready to "jump the fence." Early detection of new species is a constant challenge, with so much ground to cover and many remote spaces difficult to access. Our ED/RR Invasive Species Control program seeks to offer protection to our forests and farms, response capacity to our partners, and strategies and support to our island community to mitigate the impacts of these harmful species. The 2023 grant period was a period of revision and capacity building for BIISC in ED/RR, as we worked to build new tools and technologies into our workflows and achieve better efficiency and higher effectiveness in these areas.

Early Detection

In early 2020, after 12 years of work, BIISC had declared pampas grass (*Cortederia spp.*) eradicated from the Big Island. The announcement or eradication in a local newsletter that prompted a community member to email us with a report of pampas grass in her grandparent's backyard in Volcano - a population we could have never seen from the road. This underscores the challenge of working on a rural island where personal properties are commonly 1-5 acres: you cannot see into these private landscapes to find small, lurking populations of your targets. Community connection and awareness is vital to the success of any eradication effort.

Figure 1: Invasive Plant Prevention tam lead Molly Murphy evaluates a new species, Rosa rugosa, found in Kaloko Mauka in 2023. This species is undergoing evaluation as a possible target eradication species for BIISC.

This was never more apparent than with the detection of devil weed (*Chromolaena odorata*, or Chrodo) on the Big Island in 2021. The first detection was made by staff, but for the 9 sites subsequently found in Puna, only about half were found by staff surveys. The rest were found through community reporting after an extensive and targeted awareness campaign. A new population was discovered in 2023 from a phone call

that came in to the office late on a Friday afternoon: a frustrated property owner in the heavily forested off-grid subdivision of Hawaiian Acres had stumbled upon a BIISC Instagram post, and thought the plant that was taking his 6-acre property might be devil weed. It turned out to be our most dense site of Chrodo in Puna found to date. Similarly, in July 2023, staff were tabling at an event in Kona when a woman paused to pick up the pest alert card for rubbervine (*Cryptostegia madagascariensis*). Rubbervine is one of our longest-standing target species, and was in the final phases of eradication with only two mature plants known to be remaining. The woman thought she recognized this plant: she kept sheep, and a plot of land she was borrowing for grazing had a lot of this purple flowered vine. A follow-up visit to the site revealed 7 acres of healthy mature rubbervine!

Community reporting is a critical component of early detection for us, and this was a key concept in mind when we began the overhaul of our plant early detection work in 2023. Our ED new team, called Invasive Plant Prevention (IPP), works in a hybrid fashion, embedded in our Community Engagement team but working in coordination with the Plant Control team. With an overall goal of preventing the spread of invasive plants, IPP performs outreach and education to stop proliferation at the source. For plants that are in the environment already, however, there is a need to document naturalizations, identify the highest threats, and initiate action when warranted. Over 2022 and 2023, IPP staff worked with partners Kevin Faccenda at UH-Manoa and Chuck Chimera of HISC to test online "crowdsourcing" plant ID apps for highest accuracy of ID for plants in Hawaii. Results were presented by IPP team lead Molly Murphy at the 2023 Hawaii Conservation Conference. Beginning in 2023 BIISC began working to incorporate use of screened data from the highest ranked app, iNaturalist, to identify locations of new potential naturalizations and collect voucher specimens to submit to the Bishop Museum for new island records.

At the same time the BIISC leadership team, with support from Steering Committee members, undertook an intensive revision of our Plant Evaluation process to streamline data collection and flow and allow for faster and more accurate evaluation of potential threats and feasibility of control. The new structure, expected to be fully implemented by the end of 2024, allows for better communication and workflow between the early detection team, IPP, and the rapid response team, Plant Control.

Rapid Response

The Plant Control Team handles the core, historical work of BIISC: targeted containment and eradication of the most high-risk invasive plants. BIISC itself evolved from the 1990s Miconia Action Committee, which had the goal of eradicating outliers and containing the dense core population of miconia in North Hilo until a biocontrol could be released. BIISC formed around an expanded mission: to find the "miconias of tomorrow", those plants which were likely to cause significant harm to Hawai'i but which were at an early enough stage of invasion to be stopped.

BIISC Plant Control team struggled with capacity during the Covid restrictions era, at one point down to only team supervisor and 1 staff. By the end of 2023 this team had returned to nearly full strength, with an experienced field crew leader and three crew members and a recruitment planned for early 2024 to fill the 4th position. Because of the increased capacity, the team was able to far exceed anticipated goals for acres surveyed and plants controlled. Having a full team also allowed the field

supervisor to focus more on strategy and planning, and on incorporating new technologies like the use of a detector dog for devil weed surveys, which had been successfully piloted in 2022.

The Plant Control team is pursuing eradication of 9 species of plants and containment of 3 others, which requires carefully timed visits that must reflect phenology, weather considerations, seed bank viability, and community need amongst other considerations. For instance, one of our devil weed sites is located in a densely packed neighborhood in Puna where residents have requested that no herbicides be used, meaning staff must hand pull all plants (often best done during the rainy season, when the ground is soft). *Photinia davidiana* is found at high elevations in and around the Hakalau Wildlife Refuge, and can only be worked on during summer months. This team also works with partner organizations like NARS on exclusion control, preventing highly damaging species like ginger and fountain grass from reaching the highest quality native forests.

Figure 2: Plant Control staff Lawai'a Enos stands atop a pile of target species Lonicera hildebrandiana, a giant honeysuckle found smothering ohi'a trees in Volcano Village. Crews hand-pull before careful treatment of stumps due to the sensitive nature of the area.

Some sites require 2-3 hours of driving just to reach the site, necessitating overnight stays to allow for effective workdays. The Plant Control crew camps for nearly half the weeks of the year, a demanding schedule.

Deliverables

Project goals for 2023 specifically addressed Hawaii Interagency Biosecurity Plan implementation tasks and tasks identified in the BIISC 2018-2023 Strategic Plan, developed and approved by twelve county, state, and federal agencies and community partners. Below is a summary of the progress on the Outputs & Outcomes listed in the grant Agreement (color coding: green=met/exceeded, yellow=approaching, red=not met).

ED/RR Outputs & Outcomes

Expected Outcome	Actual Outcome
Pest traps will be installed at Hilo and Kona airports and Hilo and Kawaihae ship ports and monitored biweekly, monthly, or seasonally as specified by HISC/MMP staff	For several years, BIISC staff have provided monthly trap monitoring at the two island airports in Kona and Hilo to support the HISC Ports of Entry/Exit Pest Monitoring Program (PEEPMP). In 2023, BIISC staff installed and began monitoring

for each pest and results provided immediately to the HISC staff overseeing the program. Staff will participate in all trainings offered for MMP /POE priority pest detection methods.	additional pest traps at the Hilo and Kawaihae ship ports, as well as at the Pohakuloa Training Area. At the request of PTA biological protection staff who reached out to the HISC for assistance, BIISC provided installation & continued trap monitoring at multiple PTA sites.
BIISC will submit at least 6 plant samples to the Bishop Museum for naturalization records, and will complete at least 3 new or revised weed status reports for naturalized species.	During the grant period, 20 plant samples were vouchered to the Bishop Museum for new island or state records, and 7 weed status reports were completed.
BIISC will perform at least 12 thorough scans (averaging lx monthly) of iNaturalist for potential sightings of high-priority pest plants.	Invasive Plant Prevention Staff regularly scanned of iNaturalist during the grant period, anywhere from 1 to 4 times per month.
BIISC will respond to new detections and reports of eradication target species within 3 business days.	All reports of potential pests were responded to within 3 business days (many even on weekends, as social media and email notifications reached our phones). From community reports, two new populations of target species were found in 2023 and extensive control work has already taken place at both sites.
We will use the services of a contractor to increase BIISC's capacity to delimit one of our target species (*Chromolaena odorata).*	BIISC continues to utilize Conservation Dogs of Hawaii to assist with Chrodo surveys, and in late 2023 the Plant Crew supervisor acquired a puppy to be trained as the official BIISC chrodo dog.
BIISC will control upwards of 15,000 individual eradication target plants across 2,500 acres.	In 2023, BIISC Plant Control surveyed 3110.505 acres, and controlled 22,450 plants for our 9 eradication species. For our 3 containment species, crews surveyed 1835.38 acres and treated 8075 plants.

Taxon Name	Common Name	Species Goal	Acres Surveyed	Acres Controlled	Total Plants Controlled
Chromolaena odorata	Devil Weed	Island Wide Eradication	1828.983789	6.657674	19417
Photinia davidiana	Photinia	Island Wide Eradication	600.0765228	0.875903	2315
Cotoneaster pannosus	Cotoneaster	Island Wide Eradication	421.5561745	0.047046	445

Cryptostegia madagascariensis	Rubber Vine	Island Wide Eradication	72.78889349	0.035486	208
Pereskia aculeata	Barbados Gooseberry	Island Wide Eradication	0.4682070017	0.009503	35
Ilex cassine	Dahoon Holly	Island Wide Eradication	82.02203012	0.002956	20
Lonicera hildebrandiana	Giant Burmese Honeysuckle	Island Wide Eradication	26.40467533	0.027371	7
Buddleja madagascariensis	Smoke Bush	Island Wide Eradication	78.2047205	0.002529	3
TOTALS			3110.505012	7.658468	22450

HISC Funding Priorities: Supporting Strategies #1, 2, & 5

The *HISC & CGAPS 2025 Joint Strategy: In Support of the Hawai'i Interagency Biosecurity Plan* provides a guideline for how to plan and prioritize efforts in invasive species work across the state. While our Community Engagement team handles a very broad range of invasive species work, the ED/RR Invasive Species Control work is more narrowly focused. The Invasive Plant Prevention team is the lead on Hawai'i Island for early detection of new plants, and also supplies staff for the Ports of Entry-Exit Pest Monitoring Program (with other staff from the CE team). These efforts address **Strategy #1, Prevention & Early Detection/Rapid Response for New Invasions**. The Plant Control team is very targeted, aiming for the highest proficiency in our historical core mission: controlling high-risk invasive plants, and supporting HISC/CGAPS strategy #1 as well as **#2, Management of the Inter/Intra-Island Movement of Invasive Species**.

Because community support is so vital to BIISC's work on the island, we are working to ensure that all of our teams, not just Community Engagement, have opportunities to work with the public and promote good relationships that support **Strategy #5, Maintain an Engaged & Supportive Community**. In 2023, Plant Control team members worked with the Fern Forest community to begin plans for rubus control testing. The team also supported various outreach efforts, including the Pu'u Wa'awa'a Bioblitz in which the entire team worked with students from multiple schools to learn more about Hawai'i native biodiversity and the invasive threats.

Plant Control field crew leader Kai'a Andaya conducted bioblitz education sessions at Pu'u Wa'awa'a for Hawaiian Immersion School haumana entirely in 'Ōlelo Hawai'I (Hawaiian language).