Detection & Control of Invasive Species on the Island of Hawai'i: Widespread Invasive Species Mitigation Program

HISC Grant FY2024 (April 2024-Mar 2025) Final Report

Submitted by BIISC Manager Franny Brewer June 2025

Project Goal: Provide reliable and committed support for efforts to study and mitigate the impacts of the deeply devastating disease rapid ohi'a death (ROD), and to reduce harmful impacts from widespread invasive forest species, such as albizia and miconia.

Summary of Activities:

Most of our direct work on widespread invasive species mitigation is carried out by our Forest Response team, casually referred to as the "RAD" team for their historical focus on ROD and albizia. The RAD crew is a highly-skilled field team that is relied upon by many of our partners for training, data collection, and research support. This team possesses a number of technical abilities and licenses to allow for a wide variety of field endeavors: heli-ops, tree felling, GPS and GIS data collection, pesticide application (all field crew are Hawaii RUP licensed by HDOA), UAV operation for imagery, and the backcountry and wilderness skills necessary to find a dead ohi'a tree in thick forest three hours from any vehicle access point. This year, the team also earned the state licensing and FAA exemptions necessary to add aerial pesticide application from drones to their skill set.

The majority of the work undertaken by this team is in response to Rapid Ohi'a Death, a devastating fungal disease discovered on the Big Island in 2014 that attacks our keystone native tree, ohi'a lehua (*Metrosideros polymorpha*). The arrival of ROD, a lethal disease caused by two invasive fungal pathogens (*Ceratocystis lukuohia* and *C. huliohia*), threatens the survival of Hawaii's forests, watersheds, and unique biodiversity, as well as the farms and communities that rely on those systems for fresh water. The response to ROD has been a large-scale, coordinated multi-agency effort since it was first identified, and since the beginning has been part of this much larger effort, working in coordination with many partners at the federal, state, and local levels to implement priority needs as identified by the state-wide and Hawaii Island ROD working groups.

The BIISC RAD team coordinates and carries out aerial surveys and mapping via aerial methods (UAV and helicopter) with DOFAW guidance. BIISC manages the response on private lands, including sampling and felling trees and coordinating access for partners and for the science team. The team works particularly closely with Hawaii Volcanoes National Park and Hakalau Wildlife Refuge, which actively work to manage ROD in their landscapes to protect critical native forest resources. The RAD team uses the aerial surveys to spot suspect trees, arranges for ground access to the property and finds the tree in question, collects sample data for analysis by the PBARC lab, and upon receiving results, follows up with the land managers to assist in determining and implementing the management strategy that best fits the individual situation.

In recent years, the team has contributed significant time to offering field support to researchers working on ROD-related studies. Activities may range from tree-felling or seed collection to long-term assistance in monitoring insect traps or outplanting and monitoring plots for resistance studies. Because of the relationship that developed with USDA-PBARC due to their work on ROD, BIISC also supports PBARC researchers at times with critical projects that might require specialized skills - for instance, felling macadamia nut trees suspected of being infested with a new pathogen. In 2024, BIISC staff began working closely with IPIF Forest Service researchers on a groundbreaking study

looking at pig behavior in forests in an effort to find ways to discourage ungulate interactions with ohi'a, which we now know is a major factor in opening wounds that allow the fungus to enter the tree and cause widespread death.

The RAD team continues its work on albizia, although without the funding at the levels seen in the years directly following Tropical Storm Iselle, the mitigation work is unfortunately much reduced. However the team utilized the HISC funding to maintain our support for our island residents who come together to mitigate the albizia hazards in their communities. The RAD team offers education sessions and workdays to assist these communities. They also perform sweeps of previous large-scale mitigations along Hawaii state roads, in an attempt to manage regrowth and prevent the necessity of another million-dollar clean up effort. These efforts could use additional funding, however, and BIISC continues to pursue avenues for mitigation support from other entities in the hopes that some of the unfinished priorities identified in the 2016 mitigation plan can be undertaken.

The RAD team also began work on a separate contract with Hawaii Volcanoes National Park to control invasive plants in important boundary areas surrounding their high priority conservation areas. While this work is not directly funded with HISC funds, the HISC funds make possible the existence of this highly trained team - capable of enacting on-the-ground operations with a minimum of training and providing high quality maps of granular data about the species controlled. This means that key partners across the island can work with BIISC to expand their capacity for invasive species control, contributing to the overall goals of conservation and protection of natural resources laid out in the HISC plan.

Because BIISC is a small entity, there is often overlap between teams in meeting our project goals. The Outreach and Invasive Plant Prevention teams assisted with providing community support on albizia and ROD questions, answering nearly 50 phone calls and emails from the public about these two species and sharing information about them at more than 20 tabling and general education events around the island. These teams also handle the LFA treatments at the arboretum and CTAHR Waiakea Station. Our Plant Control crew provides field support for camping trips and other endeavors as needed. Every employee at BIISC contributed to the goals of this proposal for widespread mitigation of invasive species.

Project goals for 2024 specifically addressed Hawaii Interagency Biosecurity Plan implementation tasks. Below is a summary of the progress on the Outputs & Outcomes listed in the grant Agreement.

Widespread IS Mitigation Outputs & Outcomes

Green: fully completed/exceeded
Yellow: partially/mostly completed
Red: not completed or very little completed

Expected Outcome	Actual Outcome in 2024
BIISC will conduct three sessions of aerial Sketch Mapping surveys via helicopter and data will be shared immediately with the Statewide WG. Two surveys will be of high-priority areas, with the third being a full island survey across 580,000 acres	Three aerial mapping sessions were completed as anticipated using the DMSM method provided by the US Forest Service. All data was shared immediately. A DMSM survey of PTA was also conducted in January 2025. The team followed up suspect detections from air with on-the-ground surveys and collection of samples, which were processed by PBARC.

At least 200 suspect ohi'a trees will be sampled throughout the year. At least a dozen samples will be collected at the request of private land owners.	130 trees were sampled this year, shy of the 200 estimate, only because that was the number that required sampling based on aerial surveys. More than a dozen samples were from private land owners. There were alarming declines spotted at Hakalau National Wildlife Refuge, so the team undertook camping trips to find & sample the affected trees which were unfortunately found to be positive for ROD. The team also provided support to the Kauai DOFAW/KISC combined ROD response, with two staff traveling to Kauai to fell 14 trees in remote locations.
Up to four peer-reviewed articles related to ROD will be supported by BIISC field efforts.	The team provided support to a number of ROD research projects under multiple partners, including USGS, CTAHR, the UH-Hilo SDAV lab, and the USDA Forest Service Institute of Pacific Island Forestry. Crew time spent on research increased significantly this year, with recurring field expeditions to remote locations to assist with deployment and monitoring of ambrosia beetle traps and deployment and retrieval of game camera footage of pig behavior, as well as other efforts.
BIISC staff will attend and actively contribute to the ROD State, Big Island, Science, and Outreach working groups and work to update, adapt, and implement the Strategic Plan.	BIISC staff regularly attended and actively contributed to all related working groups for ROD, and provided logistical and planning support for Ohi'a Love Fest, the Outreach Workshop, and contributed significant logistical support for the ROD Statewide Science Symposium, which was held in Hilo. BIISC has also been contributing to the development and writing of the new statewide Strategic Plan for ROD.
BIISC will complete monthly LFA treatments o the Hilo arboretum and CTAHR Waiakea Station. BIISC will complete at least 2 LFA surveys of the Hilo arboretum. BIISC will offer 2 trainings in LFA prevention and control to HDOT road crews and provide a plan for LFA control and quarantine at the HDOT Hilo baseyard.	BIISC continues to ensure that the Hilo arboretum is nearly entirely LFA-free by conducting regular surveys and targeted monthly treatments based on survey results. Through coordination by SWCA, the BIISC RAD, IPP and Outreach teams trained HDOT road crews on the east and west sides of the island in recognition of a number of invasive species, and provided hands-on training in decontamination of vehicles and in maintaining baseyards to prevent the movement of LFA between sites.
BIISC will offer at least 4 classes/workshops ir albizia control to our community.	BIISC offered two hands-on albizia workdays for the community during the reporting period and two education presentations. Additional educational sessions were offered for students in the Kea'au HS agricultural program, at the Big Island Disaster Preparedness Fair (coordinated by Hawaii Civil Defense) and at the Hawaii Paradise Park Wildfire & Natural Disaster Preparedness Fair.

Miconia: All areas north of the historical boundary in the Hamakua district will be mapped. A minimum of 2 BIISC staff will become certified to use HBT. The number and location of miconia plants controlled will be reported.	Comprehensive delimiting surveys were performed in 2023 and 2024 to create a map of miconia infestation in the border zone. Two BIISC RAD team members became certified to use HBT, with a third in training. 315 miconia plants were controlled using direct application and ground-based HBT methods.

HISC Funding Priorities

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: 1)Prevention & Early Detection/Rapid Response for New Invasions, 2)Management of the Inter/Intra-Island Movement of Invasive Species, 3)Implementation of Large-Scale Control of Widespread, High-Impact Invasive Species, 4) Increase Pacific Regional Biocontrol Research & Capacity (classical biocontrol), and 5)Maintain an Engaged & Supportive Community.

The bulk of the work of our Forest Response Team is on the second of the 5 priorities, #2 Management of the Inter/Intra-Island Movement of Invasive Species. The fungi that cause ROD are invasive to Hawai’i and the decline of our keystone forest tree species, ‘ōhi‘a lehua, is the biggest threat faced by our Hawaiian watersheds since the days of intentional deforestation. Developing effective management tools, mapping new outbreaks, and providing field support to scientists to better understand the biology and dispersal of this disease are among BIISC’s most important jobs. This team also supports strategy #1 by performing early detection and rapid response to ROD in new areas of the island.

The RAD crew also contributes significant effort to working with and educating the public on these issues, meeting goal #5, Maintain an Engaged & Supportive Community. They support and help to coordinate events for ROD public engagement, including the ROD Outreach Symposium and Ohi’a Love Fest. The team provides training and guided educational visits to teams from other islands, visiting researchers, and even international guests.

Finally, the RAD team has had the opportunity to contribute to Priority Goal #4, Increase Pacific Regional Biocontrol Research & Capacity. As the largest and in the cases of some pests most impacted island in the state, Hawai’i island stands to benefit greatly from effective biocontrols. We have been happy to provide field support to the efforts to find the best method to deploy *Tecoctococcus ovatus*, the biocontrol agent for strawberry guava. In 2024, we continued to work with Tracy Johnson of USFS and Ryan Perroy of UH-Hilo on testing methods for *Tectococcus* deployment in forests.

The Herbicide Ballistic Technology (HBT) method for miconia control was developed by CTAHR on Maui, where it is generally performed from a helicopter. BIISC adopted this method for use in a steep gulch where miconia were growing high on the walls, allowing us to treat otherwise inaccessible plants and work to prevent the spread of this notorious invader into the Kohala district where it is not known to occur.