

## Report on HISC Grant FY2023 (Jan 2023-Feb 2024) for Detection & Control of Invasive Species on the Island of Hawai'i: Widespread Invasive Species Mitigation Program

Submitted by BIISC Manager Franny Brewer June 2024

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

### Summary of Activities:

BIISC's Forest Response team, affectionately called the "RAD" team for their traditional focus on rapid oh'i'a death and albizia, has become a highly-skilled team that is relied upon by many of our partners for training, data collection, and research support. This team possesses a number of technical skill sets that allow for a variety of field endeavors: data collection from helicopter, tree felling, use of UAV (drone) to collect imagery & generate maps, and of course the backcountry and wilderness skills necessary to find a dead oh'i'a tree in thick forest three hours from any vehicle access point.

The majority of the work undertaken by this team is in response to ROD, a devastating fungal disease discovered on the Big Island in 2014. The arrival of ROD, a lethal disease caused by two invasive fungal pathogens (*Ceratocystis lukuohia* and *C. huliohia*), threatens the survival of Hawai'i's forests,



Figure 1: DMSM surveying from helicopters allows for rough GPS locations of dying oh'i'a that the RAD crew can use to plan ground surveys for collection of samples. Samples are tested for ROD by the USDA-PBARC lab in Hilo.

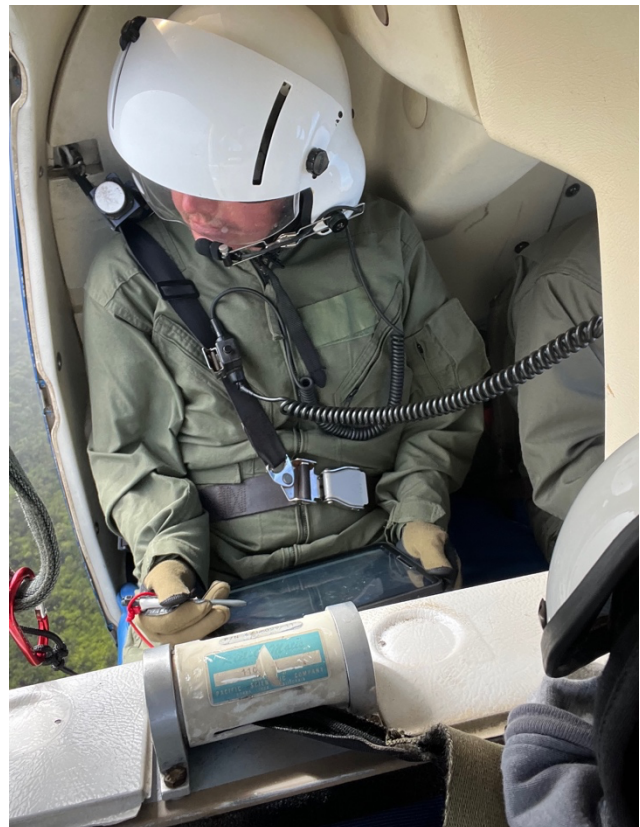
watersheds, and unique biodiversity. Our native forest birds, invertebrates, understory plants, even the ferns and moss that capture mist and rain to recharge the watershed all rely on 'ohi'a for food, shelter, and structure. Our farms and drinking water rely on that recharge, and the appeal of our unique native biodiversity and viewscapes does as well. The response to ROD has been a large-scale, coordinated multi-agency effort since its identification in 2015. BIISC is a part of this much larger effort, and works 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 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(s) 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.

The BIISC RAD team provides staffing to carry out research-related field tasks (i.e. felling trees or seed collection activities). Staff provide field support as varied as tree felling, plot fencing, seed collection, and outplanting. 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. Being able to provide these small but critical supports allows the team to provide some role in early detection and rapid response to new potential invasive species. BIISC provides training and support to teams from other islands, and even from around the world. In late 2022, RAD team supported the visit from New Zealand conservation professionals, and subsequently RAD team lead Dustin Swan was invited to present on ROD work at the 2023 International Conference on Biological Invasions in Christchurch.

The RAD team is also the primary team for controlling albizia on Hawai'i Island, a widespread and hazardous tree that has caused tens of millions of dollars in damage to public and private infrastructure in the last decade and a half. After Tropical Storm Iselle devastated Puna in 2014, BIISC received funding to do extensive control work to protect HELCO and HDOT priority areas as laid out in the 2015 Hawaii County Albizia Mitigation Plan. In 2022, BIISC worked with the Puna Councilperson's office to push for a reconvening of the key stakeholders to update this plan. Over 2023, BIISC staff met several times with the HELCO designated contractor, HELCO representative, and COH Dept of Public Works to revise the Albizia Mitigation to reflect the new priorities for the County.



*Figure 2: RAD team lead Dustin Swan uses USFS digital sketch mapping technology to mark suspect ROD infections in forests.*

## Deliverables

Project outputs & outcomes 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).

Expected Outcome	Actual Outcome
BIISC will conduct 3 sessions of aerial Sketch Mapping surveys via helicopter and data will be shared to the Statewide WG. Two surveys will be of high-priority areas, with the third being a full island survey across 580,000 acres of ohia forest.	All 3 aerial mapping sessions were completed in the time frame as anticipated, and all data was shared immediately. Any detections of note were brought up at working group meetings for immediate discussion and planning for response.
At least 300 suspect ohia trees will be sampled throughout the year. At least a dozen samples will be collected at the request of private land owners.	The total number of ohia trees sampled was 269, not due to any failure, but because this was simply the number of suspect trees found that the team had cause to sample (live trees are not sampled). At least two dozen samples were taken at the requests of private large landowners.
Up to five 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. Including projects related to ambrosia beetle activity and disease resistance. The team also provided support to research on deployment of the Tectococcus biocontrol for strawberry guava and on koa response to gorse control.
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 attend all related working groups for ROD and provide logistical and planning support for any Hawai'i Island gatherings or public outreach efforts.
BIISC will work closely with the Puna County Council office to coordinate at least two Albizia Mitigation Task Force meetings in 2023, and will attend meetings and will commit to all follow-up tasks as identified by the Task Force.	BIISC was able to successfully engage the County to convene a meeting of albizia stakeholders, where HECO committed to updating the COH Albizia Hazard Mitigation plan. BIISC staff worked closely with the HECO contractor throughout 2023 to revise the plan and include new priorities for the stakeholders. BIISC also applied to the State GIA for funding to continue mitigation alongside the highest priority County Roads,



	for which we completed Phase 1 in 202, but were unsuccessful.
BIISC will offer at least 6 classes/workshops in albizia control to our community.	BIISC offered more than 6 educational opportunities for albizia in 2023, including educational presentation, hands-on workshops, and community volunteer days.

At least two staff will become fully trained and proficient in use of HBT for miconia control. All areas north of the historical boundary in the Hamakua district will be mapped and a plan to control new miconia populations will be created. Control operations will have begun by the end of 2023.	All of the areas have been surveyed and mapped, landowners contacted, and permissions secured for the miconia control in Hamakua. Control operations were launched in late 2023. For those trees requiring use of Herbicide Ballistic Technology (HBT), we secured funding from the Hawaii County Council to purchase equipment and have trained 3 staff to proficiency. We have not yet been able to begin field use of HBT however, as we are waiting on the University (PCSU) to update the job descriptions for the staff. We hope to continue control operations using HBT in 2024 pending PCSU clearance.
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### 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. 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.

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 Ohī'a Love Fest. The team provides training and guided educational visits to teams from other islands, visiting researchers, and even international guests. In 2023, after being restricted from offering much in the way of in-person events during the Covid era, the team relaunched the community workshop portion of the albizia education program. This allows for the crew to take community members to pre-selected areas of albizia infestation to receive hands-on training in albizia control. For neighborhoods that have formed volunteer groups, the team works side-by-side with the community members to treat non-hazard albizia in and around the community.

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 *Tectococcus ovatus*, the biocontrol agent for strawberry guava. In 2023, we worked with Tracy Johnson of USFS and Ryan Perroy of UH-Hilo on testing methods for *Tectococcus* deployment in forests.



*BIISC participated in the Pahoehoe Holiday Parade in the heart of Puna. Here RAD field crew leader Charlie Tommy wears a ROD "cookie" costume loaned by Forestry & Wildlife, and our truck float features albizia and little fire ant - all invasive species that plague the Puna community.*