



BIISC Plant Control Program

2017 IMPACT REPORT





PROJECT PARTNERS AND SPONSORS

The success of the invasive plant control work in 2017 has been possible thanks to the hard work, advice, and generous financial and in-kind support of a large number of sponsors, advisors, and direct participants.

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LOOKING BACK AT 2017

Aloha Kakou!

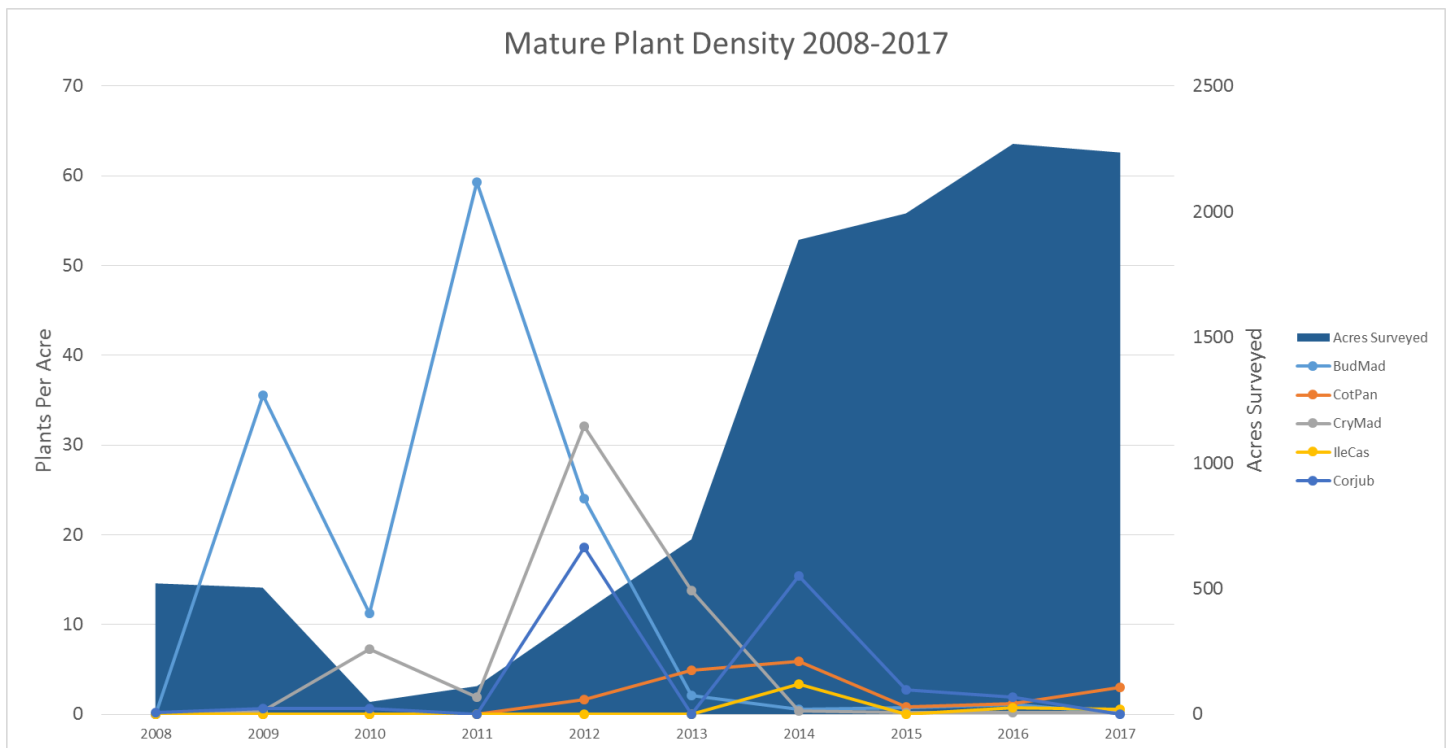
It has been a great year to be at BIISC, full of hard work, daunting challenges, exciting new programs, and many opportunities to celebrate. As we celebrate our 18th “birthday” I think it’s fair to say that BIISC is really growing up!

BIISC closed 2017 with 30 staff members on payroll, and four more being hired. We secured contracts with HDOA and HDOT for the very first time, and made progress with these partners on critical infrastructure projects, programs that will impact key industries and diverse Hawaii Island residents. We welcomed ten bright and dedicated new young people into our program. For many, BIISC is their very first job. And we celebrated the 10th anniversary of two of our staff members, Bobby and Shannon (cover page), who have stuck with us through thick and through very, very thin.

So more than anything this year, I reflect on the people of BIISC, our strongest assets, with gratitude. The advisors who have been with us for much of the past two decades, the communities that have supported us and welcomed us into their backyards, and above all the staff of our original program, the Plant Control Crew, who do back-breaking work in difficult terrain and keep meeting every benchmark we set for them. This document will briefly go over the status of our Plant Control work, our methods, and the progress made in 2017.

Thank you for taking the time to explore our 2017 Impact Report .

—Springer Kaye, BIISC Manager



Eradication Targets

STOPPING INVASIVE PLANTS IN THEIR TRACKS.

Since 2008 BIISC, along with the Hawaii Invasive Species Council, has prioritized invasive species control work that has a clear, well-defined, and cost effective goal—targeting species that can be completely eradicated, eliminating the need for endless maintenance. While widespread, high-impact species must still be managed, the gold standard really is having the ability to go after new arrivals before it is too late. And that is exactly what the BIISC Plant Control Crew does.

In 2017 we went after nine eradication target species, ranging in severity from Markhamia, a 2016 rapid response target, with zero detections this year, to the 3200-acre silver-leaved cotoneaster infestation at eight sites in native forest across the island. BIISC pledged to work on six of these species using HISC '17 funds, more if additional funding could be obtained. With just a small amount of partner support, in addition to substantial HISC funding, we were able to work on all nine target species, and are

making steady progress toward eradication of each. Our assessment takes into account the density of the infestation in the specific areas worked on in 2017, and the overall rate at which we are proceeding through the planned search area in all locations for each target species. Both metrics have been quite sound for the past three years.

The chart above depicts the progress made since 2008 on our five longest running eradication targets, approx. 75% of our eradication effort. A single species, *Cotoneaster pannosus*, appears to tick upward in 2017, from 1.2 to 3 plants per acre, because we have moved from surveying the sparse outer boundaries into the core infestation at our largest worksite. Overall, each species has demonstrated a marked decline in density of mature plants over nine years.

Figure 1. Progress on plant eradication (colored lines) depends on having the staff to survey large areas (blue shaded area)!

As we've progressed on those five older targets, we've added new ones. *Rubus seiboldii* was planted at a ranch house near Hawaii Volcanoes National Park years ago, and has spread via waterways, birds, pigs, and cattle into the surrounding wooded and pastoral area. Luckily, this area consists of large, open parcels, and we've had relatively good success working with landowners to gain access.

That access was not without obstacles! We've donned bee suits to relocate bee boxes for a Buddhist temple, translated our access letter into Mandarin to reach an owner in mainland China, gotten quotes on using heavy equipment to mow infested pastures to reassure herbicide-averse ranchers that we were considering all options, and have deployed drone technology to map out the best course of action to contain and ultimately wipe out this 220 acre *Rubus* infestation. Our plant counts demonstrate the success of these diverse efforts—access to thousands of plants at the core of the population!

Figure 2 depicts these newer species that are still in the “up and down” stage of control. The ma-

ture plant density (Log_{10}) will vary widely as we hit new, high density patches or focus on sparsely settled boundary areas each year. *Markhamia* disappears from the chart with 0 plants found this year, after removing 2,700 from three sites last year. Some progress! (But we expect keiki soon).

Near the end of 2016 we planned to celebrate the eradication of Barbados Gooseberry, but received unconfirmed reports of recent sales of the species at expos. Sadly, those reports proved accurate, and we closed the year with new locations at each of the three farthest points on the island from the original known, and completely eradicated, infestation. We've increased our community education effort as well as our field response.

Photinia density rose as efforts on the species were curtailed due to the diversion of federal Invasive Species Strike Team funds to ROD response. We accepted *Photinia* as an eradication target, based on its aggressive, dominant growth habit and location in sensitive habitat, but progress will depend on regular, adequate funding to meet the field schedule. The USFWS tells us it's looking better for 2018!

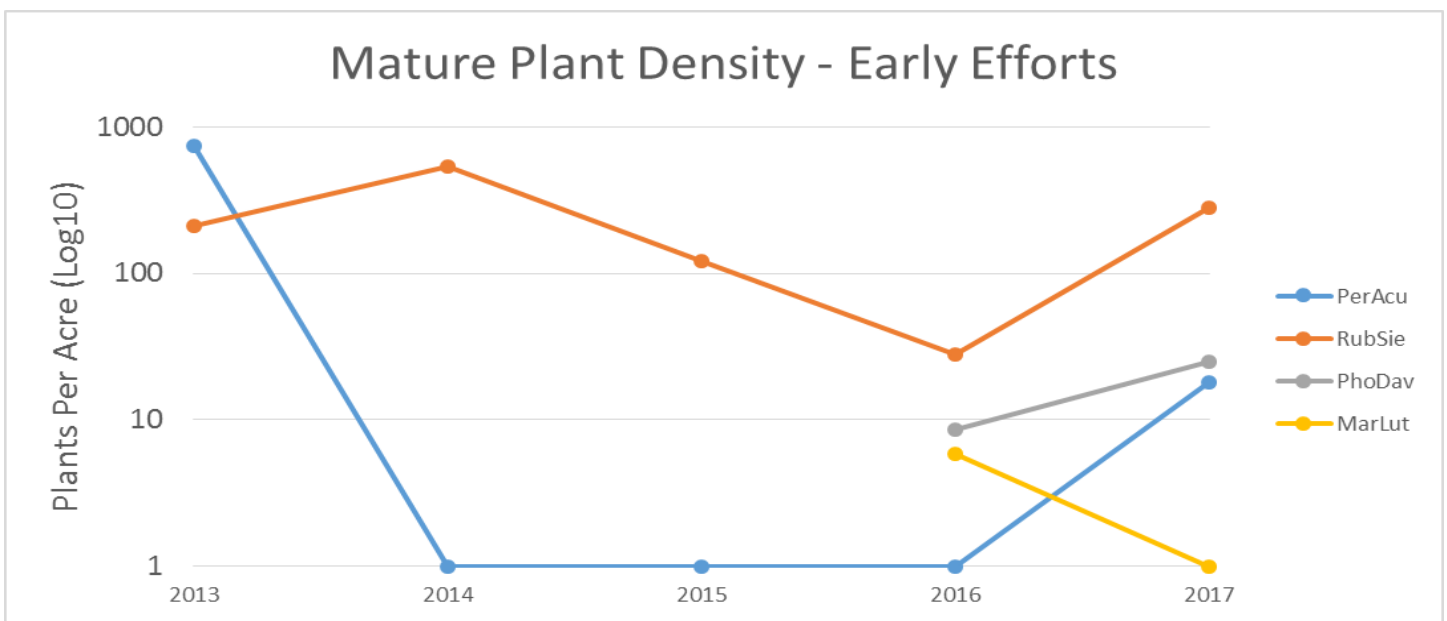
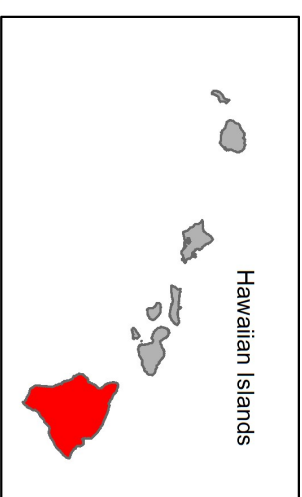


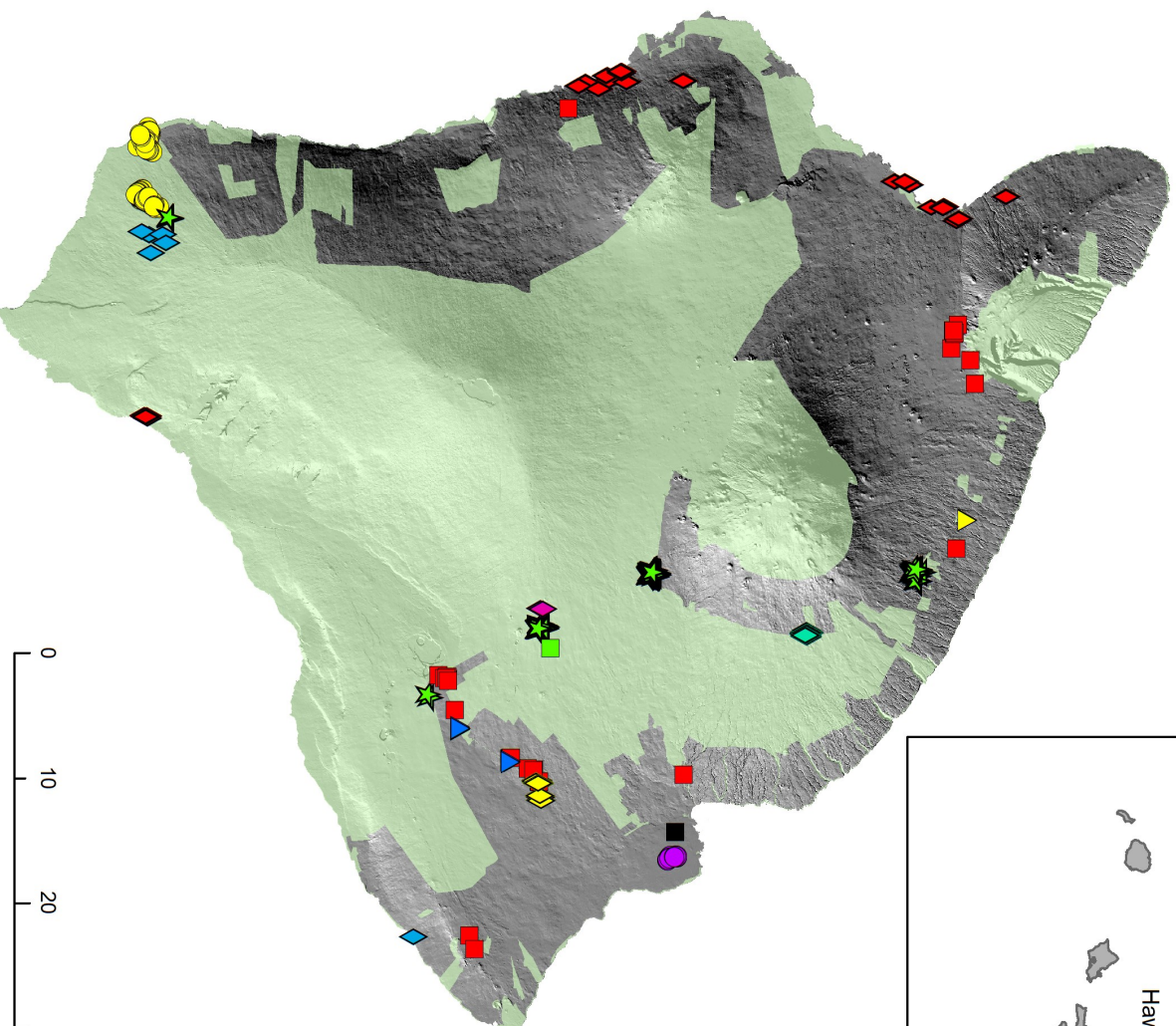
Figure 2. In the first several years of treatment, plant densities rise and fall unpredictably as new patches or distinct populations of each species are encountered. A small, dense population of *Markhamia* was suppressed to zero in a few work trips, while a similarly dense, large population of *Rubus* continues to be explored. UAV surveys are being employed to improve planning and resource allocation to “front load” efforts in the earliest stages.

Invasive Plant Control Sites on the Island of Hawai'i
Jan. 1, 2017 - Dec. 31, 2017



- Plant Treatment**
- *Alstonia macrophylla*
 - *Buddleja madagascariensis*
 - ★ *Cotoneaster pannosus*
 - ◆ *Cryptostegia madagascariensis*
 - ▼ *Ficus macrophylla*
 - ◆ *Hedychium gardnerianum*
 - ▲ *Ilex cassine*
 - *Miconia calvescens*
 - *Morella faya*
 - *Penisetum setaceum*
 - ◆ *Pereskia aculeata*
 - ◆ *Photinia davidiana*
 - ◆ *Rubus ellipticus*
 - ◆ *Rubus sieboldii*

■ Conservation Zoned Lands



0 10 20 40
Miles



Taxon Name	Common Name	Acres		# of Plants Controlled			Control Type			Hours		
		Inventoried	Treated	Mature	Immature	Total	Chemical	Mechanical	BIISC	Partner	Volunteer	Total Hours
ERADICATION TARGETS												
Buddleja madagascariensis	Smokebush	416.2	0.18	54	127	181	91	90	528.0			528.0
CorTarderia jubata	Pampas Grass	0.2	0.01	3	-	3	-	3	8.0			8.0
Cotoneaster pannosus	Cotoneaster	1,151.1	3.06	3,441	10,340	13,781	10,144	3,637	1,945.0		135.0	2,080.0
Cryplostegia madagascariensis	Rubbervine	464.0	0.05	80	185	265	92	173	516.1			516.1
Ilex cassine	Dahoon Holly	133.6	0.24	67	70	137	102	35	445.0			445.0
Markhamia lutea	Nile Tulip Tree	-	-	-	-	-	-	-	5.0			5.0
Pereskia aculeata*	Barbados gooseberry	7.5	0.26	135	41	176	149	27	304.0			304.0
Photinia davidiana	Photinia	61.8	2.18	1,537	2,051	3,588	2,302	1,286	392.0			392.0
Rubus sieboldii	Molucca raspberry	62.2	1.23	17,540	35	17,575	17,575	-	451.0			451.0
	Eradiation Target Species Totals	2,296.5	7.2	22,857.0	12,849.0	35,706.0	30,455.0	5,251.0	4,594.1	135.0	-	4,729.1
PRIORITY INVASIVE PLANTS												
Astonia macrophylla	Devilree	47.0	0.29	63	2,020	2,083	89.0	1,994.0	155.0			155.0
Cinnamomum burmannii	Padang Cassia	0.2	0.00	15	-	15	-	15	23.0			23.0
Ficus benghalensis	Indian Banyan	0.8	0.00	8	-	8	8	-	46.0		9.0	55.0
Hypericum kouryichense	St. Johns Wort	0.0	0.11	134	61	195	182	13	10.0			10.0
Mangifera odorata	Mango	-	-	-	-	-	-	-	60.0			60.0
Megathyrus maximus	Guinea grass	-	0.55	239	1	240	240	-	60.0			60.0
Miconia calvescens	Miconia	308.3	0.62	86	6,086	6,172	104	6,068	540.0		18.0	603.0
Morella cerifera	Wax Myrtle	0.8	0.14	19	1,221	1,240	1,240	-	90.0			90.0
Morella faya	Fire Tree	1.7	0.01	4	5	9	4	5	14.0			14.0
Pennisetum setaceum	Fountain Grass	1,404.8	6.86	3,787	653	4,440	4,037	403	997.0		320	1,317.0
Rubus ellipticus	Raspberry	0.0	0.02	16	12	28	24	4	10.0			10.0
Ulex europaeus	Gorse	1,938.8	-	-	-	-	-	-	2.0		4.0	6.0
	Priority Invasive Species Totals	3,702.5	8.6	4,371.0	10,059.0	14,430.0	5,928.0	8,502.0	1,947.0	351.0	45.0	2,343.0
	PLANT TOTALS	5,999.0	15.8	27,228.0	22,908.0	50,136.0	36,383.0	13,753.0	6,541.1	486.0	45.0	7,072.1



5,999
ACRES

50,136
PLANTS

7,072
FIELD HOURS



Kākou!

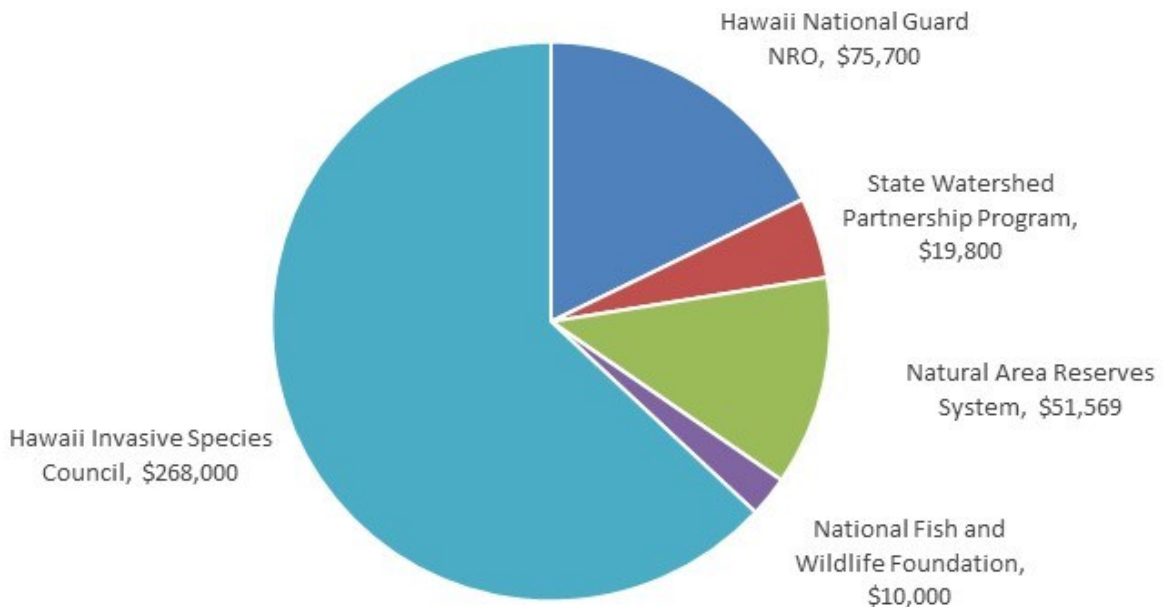
PARTNERING TO IMPROVE OUTCOMES ON INVASIVE SPECIES

When it comes to managing invasive species, the more the merrier! BIISC was founded as a partnership of some of the best minds in Hawaii, protecting some of the best places on Earth. In 2017 BIISC honors that tradition by maintaining long term partnerships and forging new ones.

BIISC partnered with the Hawaii Natural Area Reserves at Manuka NAR to suppress fountain grass, an extremely pyrogenic grass that threatens the rarest of the rare, our tropical dry forests. This newly emerging threat is still sparse enough to be treated with hand sprayers, and staff walked over 1,400 acres to treat a footprint of 7 acres this year. KUPU Intern Belle Zellner demonstrates the value of our youth in conservation partnerships—and how to rock ALL the gear!



Invasive Plant Control: \$425,069



Funding

When it comes to critical partnerships, the Hawaii Invasive Species Authority is the primary funder for the eradication of invasive plant species on Hawaii Island, providing about 2/3 of the costs to maintain the year-round BIISC project in 2017. In 2016 BIISC received a \$169,000 grant from the National Fish & Wildlife Foundation's Pulling Together Initiative. These funds cannot be applied for every year, but \$10,000 carried over. \$19,800 was received from the state Watershed Partnership Program, in cooperation with the Three Mountain Alliance, for the plant control crew to help with gorse removal on Mauna Loa. While gorse is not an eradication target at the island scale, it can be still be contained to the north side of Saddle Road, to protect the Three Mountains Watersheds which include Mauna Loa, Kilauea, and Hualalai—half the island.

Remaining funds were provided as service contracts. The Hawaii Army National Guard (HIARNG) contracts the BIISC plant crew to suppress three high-impact invasive species protecting endangered species habitat and reducing the risk of transporting miconia and alstonia to uninfested areas via the military equipment pathway. The Natural Area Reserves System (NARS) contracted the plant crew to suppress Himalayan Ginger in Kohala and, along with the Three Mountain Alliance, helps control Cotoneaster in East Hawaii.

Annually, BIISC reviews the planned search area and staffing needed to effectively control our target species, with the goal of achieving eradication. We have never been able to achieve sufficient funding to cover the planned area in a single year by ourselves. By reducing the number of species we can address, working strategically with partners and landowners, and combining forces with our Early Detection team and volunteers, we continue to make progress. Realistically, we'd need a full time plant control crew of at least ten, another \$450K per year, to efficiently get the job done.



BIG ISLAND INVASIVE SPECIES COMMITTEE

In 2016 the BIISC Plant Crew had five staff, including Field Supervisor, Joel Brunger, Field Crew Leader, Shannon Karratti, and three field assistants, Bryson Baring, Gizelle Geronimo, and Iokepa Paty-Miner. Americorps intern, Belle Zellner, rounded out the crew. Our GIS/Data Analyst, Brett Gelin, helps the crew map out survey areas, plan operations, and document progress.

All BIISC Plant Control staff must become certified pesticide applicators within six months of hire, ensuring that they have a complete understanding of the regulatory, safety, and efficacy considerations for all the products we use. BIISC does not use any restricted use pesticides, but this obtaining this voluntary licensure sends a strong message that we are

professionals who are serious about the work we do.

BIISC staff must be able to I.D. the native and introduced plants found across our very diverse island. They receive training in helicopter and chainsaw operations, first aid/cpr, field navigation, and a wide variety of field safety procedures. Our active safety program includes documented weekly safety “tailgate sessions,” bi-monthly safety trainings, and an emergency response plan to be sure we are always reducing the risks of active outdoor work. BIISC staff sacrifice a lot to do this work—they camp often, hike long distances, work and sleep on rugged terrain, and it doesn’t pay a lot. With solid training and safety procedures in place, we have a lot of fun, doing a lot of good in service to the island.



Gizelle Geronimo joined BIISC as a KUPU intern after graduating from UH Hilo. She is now a Level 2 Invasive Species Field Assoc. and always has a winning attitude!



An occasional infusion of energy from a KUPU-Hawaii Youth Conservation Corps team is much appreciated and advances the UH mission to provide opportunities for Hawaii's youth.



One thing you can say about BIISC, we can fill a room! BIISC Staff and Steering Committee celebrated Shannon Karrati and Bobby Parsons on their tenth work anniversary .

Below: Cotoneaster control at Puu Maka`ala NAR.





SERIOUSLY, WHAT DOES IT TAKE TO GET THESE GUYS TO SMILE FOR THE CAMERA?



Key Lessons:

We have learned a great deal about the systematic eradication of invasive species over the years, and make an effort to share what we have learned with partners in formal and informal settings.

Some of those lessons we've been thinking about a lot this year:

- 1. Plan for success.** When the invasive species programs first started, we were on the HUNT, that is, a Haphazard, Undocumented, No-Transect “method” of controlling invasive plants. We've come a long way. Today, we use information about a plant's biology & dispersal, and detailed satellite imagery to map our a search area. We use hand-held GPS to follow systematic survey transects, record track-logs of where we have walked, and to document every mature and immature plant controlled. We use demographic data to decide how often to return to an area to sweep up emerging keiki. And we think strategically about our operations—e.g. to suppress a core population first, or sweep through the borders and work our way in. Having a systematic method helps us plan for staffing and funding needs and an efficient response.
- 2. Go high!** Even the most systematic approach can be thwarted when the data is incomplete. Since 2015 BIISC has been testing and integrating Unmanned Aerial Systems (UAS) into our operations. Inexpensive, almost off-the-shelf technology including mission control software is now available with high enough quality image collection and display to find many of our target species by air. The imagery we collect can be analyzed by staff botanists and converted to a GIS Layer to display the extent of the infestation on a map. This allows us to make a more informed decision about the invasion status of the species, resources required to attempt eradication, and where to send the crew. In some cases, we can send staff directly to each target plant, along the shortest possible route. Even when only mature plants are detected, we can use this strategy to rapidly cut off seed production before engaging in transect surveys for keiki. That's a lot more efficient than walking transects in the hope that we find the edge some day!
- 3. Build your toolkit.** Most conservation agencies use a relatively small arsenal of chemicals to deal with invasive plants—triclopyr for broadleaves and glyphosate for grasses. BIISC works with UH Extension to test and identify the most effective product and application method for each weed we go after. This means we can achieve better rates of success while reducing the volume of product we introduce into the environment. Thanks, Dr. Leary! Data collection is also a tool—we use it to track progress and plan our next move. In 2017 the Plant Crew presented a new method to calibrate herbicide use rates as a proxy for counting *Rubus* plants in thickets. This method was far more efficient for the crew, who could scarcely count stems while wearing a back pack sprayer, and met the need to measure change over time.



Field Supervisor Joel Brunger sports Virtual Reality goggles while conducting UAV surveys from a bog in the Kohala Mountains. This Natural Area Reserve is an especially fragile and difficult to traverse ecosystem. The fewer footsteps the better!



MISSION

To address the highest risk invasive species threats to the Big Island environment, economy, and way of life.

In all that we do, our guiding principle is public service.

MOTTO

Hoala i ka maka. Healing the land, awakening the people.



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