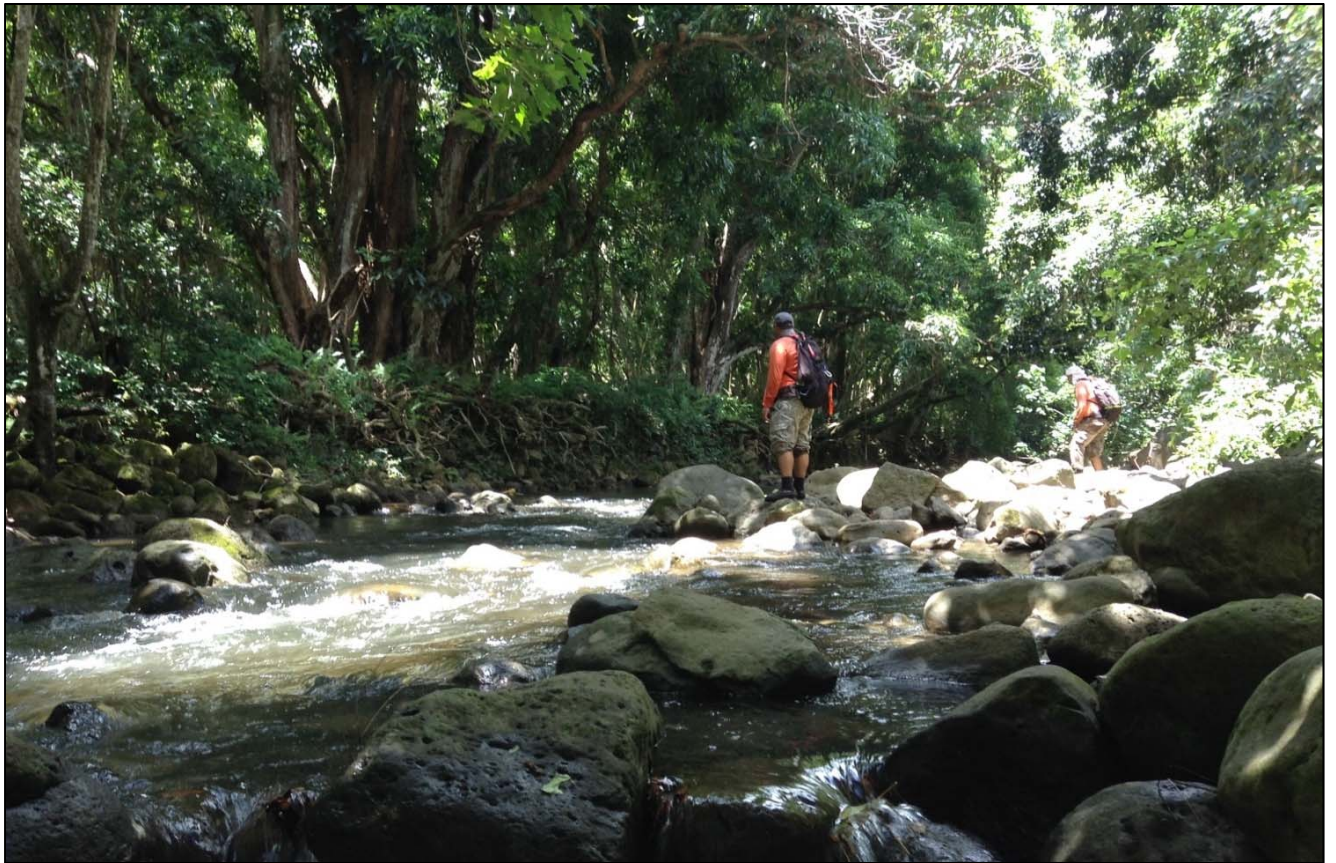




**DETECTION & CONTROL OF INVASIVE SPECIES IN MAUI COUNTY  
HAWAI'I INVASIVE SPECIES COUNCIL (HISC)  
FINAL REPORT – FY18**



*Invasive plant survey Halawa Valley - East Molokai*



**INTRODUCTION & OVERVIEW**

Invasive species threaten Maui County’s life-giving watersheds, agricultural sustainability, extraordinary biological diversity, and quality of life. HISC funding was critical to the accomplishments outlined in this report. Survey and control operations focused on 41 invasive species, with work occurring on the ground and in the air, on state and federal land, private rural and residential properties, and agricultural lands and ranches. Work targeted 32 plant species, 2 vertebrates, 3 invertebrate pests, 2 plant diseases, and 1 aquatic species, and controlled 28,245 plants, 1,000s of coqui frogs and little fire ants (LFA), and 1,901 banana trees for banana bunchy top virus (BBTV). Crews surveyed 39,598 acres and work encompassed 23,410 hours, including partner-contributed hours and volunteer hours.

Funding also supported development of a control system for LFA in the Nāhiku area. Never before attempted, an aerial control platform has been developed. A robust outreach and education program reached at least 26,000 people.

Work was conducted by staff from the Maui Invasive Species Committee (MISC) and Moloka’i Invasive Species Committee (MoMISC), which are projects of the University of Hawai’i – Pacific Cooperative Studies Unit (PCSU).

**TARGET SPECIES: DELIVERABLES & ACCOMPLISHMENTS**

**LITTLE FIRE ANTS**

**Deliverables:** Survey at 7 nurseries and 3 new developments; control at new and known sites in partnership with Hawai’i Department of Agriculture (HDOA) and Hawai’i Ant Lab (HAL); trial of new control options in Nāhiku.

**Accomplishments:** MISC and MoMISC staff conducted LFA surveys over 190 acres at nurseries, new construction areas, and coqui frog sites. At the close of the reporting period, Maui had 13 LFA infestations (Figure 1), including the largest site in the State, under active control (3 sites) or in a monitoring phase (10 sites). The ability to control all infested areas in Nāhiku is restricted by the presence of ants in waterways. Fortunately, all residents in affected areas are supportive of control and alternative control options have been successfully tested. Full implementation of the control program is expected in 2019.



*Newly developed LFA aerial applicator*





Additionally, 11,728 samples were taken throughout Maui County. Sites include 7 nurseries and 5 new developments.

#### **EDRR CAPACITY**

**Deliverables:** Staff receive training on plant, vertebrate and invertebrate identification and appropriate control methods.

**Accomplishments:** Identification skills were reviewed during staff meetings and incorporated into requirements for advancement within the projects' staff progression series. MISC retains the previous brown treesnake rapid response coordinator from Guam as the program Operations Manager. Two staff participated in the brown treesnake rapid response training on Guam. Staff received training on invasive slugs and snails from malacologists from Bishop Museum. Staff also received training on rapid 'ōhi'a death and testing methodology.

The Hawai'i Plant and Insect ID sites on Flickr continue to provide free identifications to conservation professionals and the general public. There were 342 plants and 91 insects identified during the reporting period.



The goal of the Mamalu Poepoe project is to increase capacity for early detection of invasive species at Hawai'i airports. Monthly monitoring of Kahului and Molokai Airports continues. Thankfully no coconut rhinoceros beetles, LFA, bees or other pests have been detected. MISC's early detection specialists also submitted plant vouchers to Bishop Museum, and published a manuscript highlighting new plant records from Maui, Kahoolawe, and Midway Atoll.

<http://hbs.bishopmuseum.org/pubs-online/pdf/op123p3-6.pdf>

Semi-annual naio thrips surveys on Maui focused on cultivated naio (*Myoporum sandwicense*) and naio near ports of entry, as part of the statewide Early Detection and Rapid Response Plan for *Myoporum* thrips (*Klambothrips myopori*). No thrips or thrip damage was encountered.

MISC and MoMISC staff continue to participate in monthly statewide rapid 'ōhi'a death (ROD) conference calls and local meetings to stay informed of current ROD science and management insights. MISC and MoMISC also responded to three reports of ROD. Samples collected were negative. MoMISC remains the early detection experts for the island.

#### **COCONUT RHINOCEROS BEETLE (CRB)**

**Deliverables:** Assist with CRB surveys as feasible.

**Accomplishments:** MISC's assistance was not needed at this time. CRB was included as a target species during roadside surveys on Maui and staff responded to reports of CRB damage but found no CRB. Staff also responded to reports on Molokai with no CRB found. Information about CRB was included during outreach and education events.

#### **CONTROL AND ERADICATION**

The proposal identified specific deliverables for *Miconia calvescens* and *Cortaderia spp.*

**Deliverables - Miconia:** Conduct aerial operations over 7,500 acres; 700 acres by ground. On Molokai, aerial early detection surveys over 2,000 acres.

**Accomplishments - Miconia:** Operations covered 191 acres by ground; access was limited by dense *Clidemia* in areas of rose apple dieback. Crew were also tasked with treating LFA infestations on East Maui. Aerial operations were ceased mid-2018 due to an issue with the special local needs label for aerial applications of herbicide ballistic technology. Prior to that, 10,717 acres were surveyed. Survey work on Molokai was coordinated with partner agencies who paid for flight time.

**Deliverables - Pampas grass:** - Conduct aerial survey and control operations over 7,500 acres; cover 1,000 acres by ground.

**Accomplishments - Pampas grass:** Aerial operations covered 14,547 acres; ground operations covered 1,555 acres. Mature pampas grass plants continued to decline in East Maui, while control of the West Maui population remained problematic due to terrain and access limitations. A National Fish and Wildlife Foundation grant was received to help address terrain and equipment limitations on West Maui.



*Pampas grass aerial control operations*

### **OTHER INVASIVE SPECIES**

**Deliverables - Plants:** Conduct survey and eradication operations for 25 invasive plant species (12 on Maui, 13 on Molokai).

**Accomplishments - Plants:** Targeted 32 invasive plant species (17 species on Maui, 19 on Molokai, 4 of the same species were targeted on both islands). See tables Figures 2 and 4 for maps showing the locations of control work. Figure 3 shows an example of survey effort. The number of mature plants for most target species declined on both Maui and Molokai. Most target plant species on Molokai are at the seedbank depletion stage.

**Deliverables - Vertebrates:** Conduct survey and eradication operations for 2 invasive vertebrates (mitred conure and coqui frog); respond to all new coqui frog reports; contain Māliko Gulch (spray operations cover 100 acres).

**Accomplishments - Vertebrates:** No mitred conures were removed by MISC staff due to a firearms stand-down at the University; but, area residents reported removing at least four birds. Department of Land and Natural Resources (DLNR-DOFAW) staff have also started to help with control efforts. Although they have not yet controlled any conures MISC anticipates their assistance to be highly productive. There are approximately 15 birds remaining.



*Searching for coqui frogs*

MISC's efforts on coqui frogs focused on responding to new reports across the island (Figure 5) and expanded control at the Māliko infestation. MISC also worked to address all outlying populations and worked closely with local landowners in the Māliko Gulch area to help limit spread. MISC's sprayer loan program puts tools in the hands of local residents and frees up staff time. MISC provides sprayers, citric and training to empower affected communities. All outlier infestations (i.e., not Māliko) have very low numbers of frogs or are in a monitoring phase (Figure 6). MISC monitors population centers for at least one year from the date the last calling male is heard before considering it eradicated. Expanded capacity was directly responsible for increased spray operations and reduced coqui numbers. Also, significant contributions of staff time and equipment from DLNR-DOFAW and HDOA helped make a notable impact. Staff and partners treated 464 acres for coqui frogs, mostly in the Māliko area.

**Deliverables - Invertebrate Species/Plant Pests:** Conduct survey and eradication operations for 3 invertebrate pests (LFA, CRB, and naio thrips); 1 plant disease (BBTV), and 1 aquatic species (upside-down jellyfish). Conduct island-wide surveys for BBTV on Molokai and work to contain the virus on both islands.

**Accomplishments - Invertebrate Species/Plant Pests:** EDRR roadside surveys included looking for signs for all three invertebrate pests. No naio thrips or CRB have been detected on Maui or Molokai.

BBTV remains restricted to one main area on Molokai; all known infested areas were surveyed and infected plants treated. The virus continues to spread on Maui, survey and control efforts have shifted to protect high-value areas with rare Polynesian varieties or areas where the disease has not yet become established.

MoMISC conducted surveys over 7 acres for upside-down jellyfish; 5 were detected and removed.



COUNTY FUNDING

**Deliverable:** County funding levels maintained or increased.

**Accomplishments:** County funding levels increased for core projects at \$2.145M for County fiscal year 2019.

COQUI FROGS ON STATE LANDS

Summarized above.

TARGET SPECIES WORK ON MAUI

		Acres	# of Plants Controlled			Hours
Taxon Name	Common Name	Inventoried	Mature	Immature	Total	Total Hours
PLANTS						
Acacia podalyriifolia	Quensland Silver Wattle	4	-	-	-	0
Arundo donax	Giant Reed	5	-	-	-	1
Caesalpinia decapetala	Cat's Claw	1	-	58	58	10
Coccinia grandis	Ivy Gourd	890	232	8,532	8,764	474
Cortaderia	Pampas grass	16,102	409	1,139	1,548	2,070
Cryptostegia grandiflora	Rubber Vine	1	-	-	-	1
Erica lusitanica	Spanish Heath	53	158	1,311	1,469	130
Macaranga mappa	Bing a Bing	2	-	-	-	0
Macaranga tanarius	Parasol Leaf Tree	161	-	11	11	1
Maclura pomifera	Osage Orange	2	-	-	-	1
Miconia calvenscens	Miconia	10,908	1,018	8,091	9,109	724
Nasella tenuissima	Mexican Feather Grass	1	-	-	-	0
Pennisetum setaceum	Fountain Grass	55	1,099	1,265	2,364	173
Pereskia aculeata	Barbados Gooseberry	4	-	-	-	0
Pittosporum viridiflorum	Cape Pittosoporum	3	-	-	-	0
Silybum Marianum	Blessed Milk Thistle	7	-	-	-	2
Verbascum thapsus	Common Mullein	56	1	10	11	34
INVERTEBRATES						
Wasmannia auropunctata	Little fire ant	190	-	-	-	5,066
VERTEBRATES						
Eleutherodactylus coqui	Coqui frog	464				13,003
Aratinga mitrata	Mitred conures	4				18
TOTALS		28,913	2,917	20,417	23,334	21,708

TARGET SPECIES WORK ON MOLOKAI

		Acres	# of Plants Controlled			Hours
Taxon Name	Common Name	Inventoried	Mature	Immature	Total	Total Hours
<b>PLANTS</b>						
Acacia mangium	Mangium wattle	149	1	-	1	6
Angiopteris evecta	Mules foot fern	54	69	618	687	37
Atriplex lentiformis	Quail bush	528	-	4	4	22
Caesalpinia decapetala	Cat's claw	132	14	1,382	1,396	72
Ceratocystis fimbriata	Rapid ohia death	15	-	-	-	9
Cryptostegia madagascariensis	Rubber vine	605	33	390	423	168
Cyathea cooperi	Australian tree fern	374	45	524	569	403
Ficus religiosa	Bo tree	1,325	-	4	4	41
Merremia tuberosa	Wood rose	5	1	56	57	8
Montanoa hibiscifolia	Tree daisy	47	-	-	-	21
Pennisetum setaceum	Fountain grass	65	-	-	-	4
Pereskia aculeata	Barbados gooseberry	149	-	8	8	45
Phormium tenax	New Zealand flax	53	-	17	17	13
Prosopis juliflora	Long-thorn kiawe	740	1	62	63	144
Rosa multiflora	Multifloral rose	11	2	-	2	11
Salsola kali	Tumbleweed	1,700	585	1,045	1,630	184
Senecio madagascariensis	Fireweed	68	7	2	9	12
Setaria palmifolia	Palm grass	3	-	-	-	5
Thunbergia alata	Black-eyed susan vine	0	7	34	41	3
Ulex europaeus	Gorse	202	-	-	-	65
<b>INVERTEBRATES</b>						
Aedes aegypti	Yellow fever mosquito	9	-	-	-	18
Apis scutellata	Africanized honey bee	86	-	-	-	10
Banana Bunchy Top Virus	Banana Bunchy Top Virus	3,640	43	1,858	1,901	296
Cassiopea andromeda	Upside-down jellyfish	7	1	4	5	3
Oryctes rhinoceros	Coconut rhinoceros beetle	207	-	-	-	24
Wasmannia auropunctata	Little fire ant	10	-	-	-	13
<b>VERTEBRATES</b>						
Eleutherodactylus coqui	Coqui frog	499	2	-	2	72
	<b>TOTALS</b>	10,685	811	6,008	6,819	1,702



### ***OUTREACH & EDUCATION***

Activities under the Outreach and Education portion of this grant are covered in a separate report.



### ***ADDITIONAL INFORMATION***

MISC and MoMISC are projects of the University of Hawai'i – Pacific Cooperative Studies Unit. Work conducted by staff from the Maui Invasive Species Committee and Molokai Invasive Species Committee benefited from strong partner support, including: County of Maui, Hawai'i Departments of Land and Natural Resources, Agriculture, Transportation, and many others.

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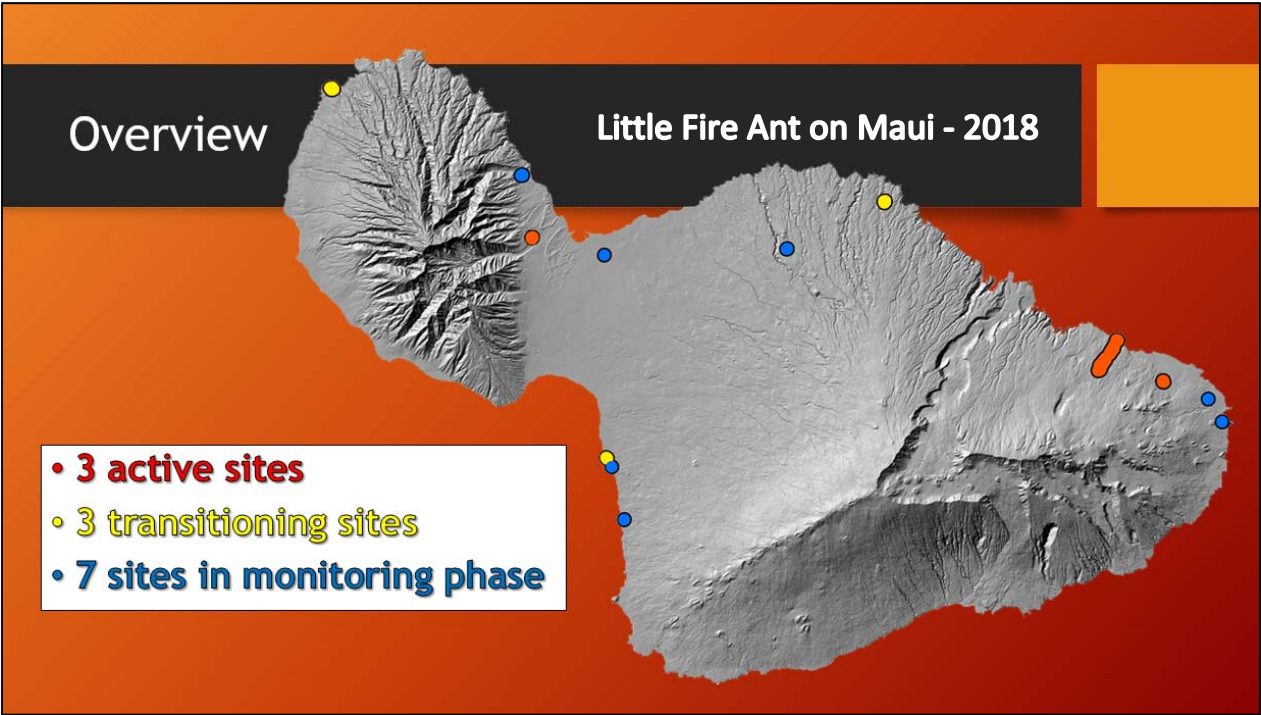


Figure 1

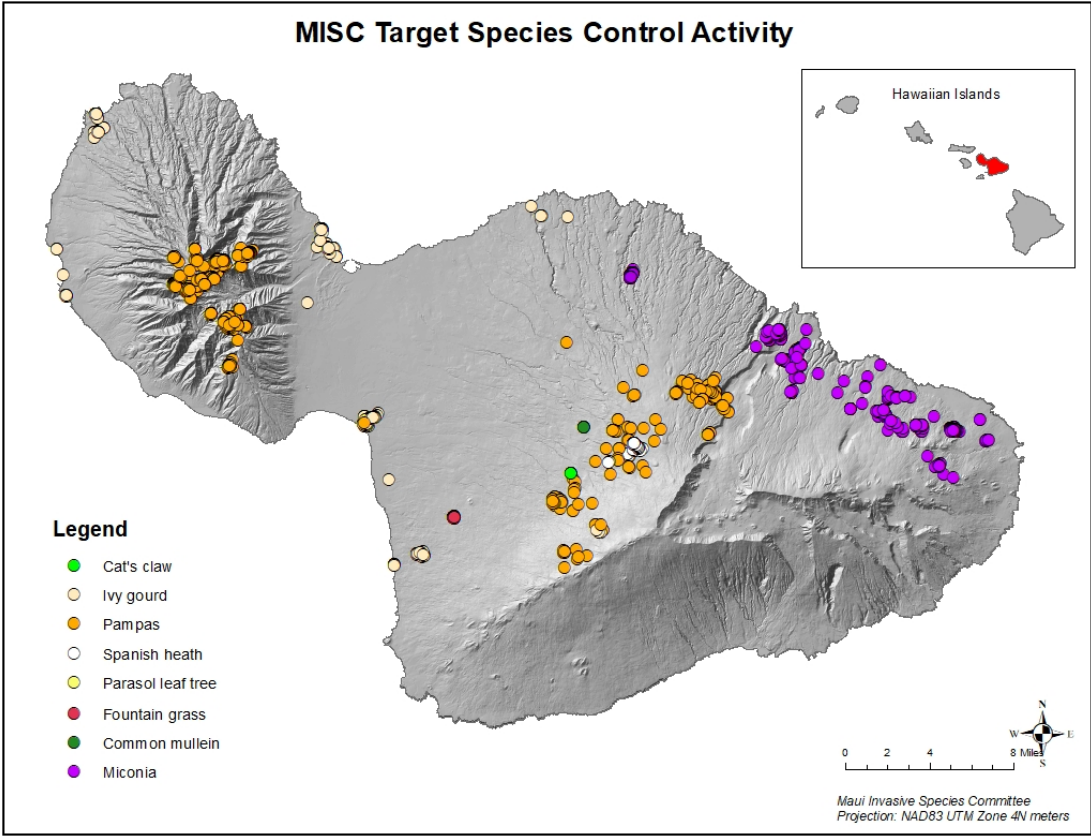


Figure 2

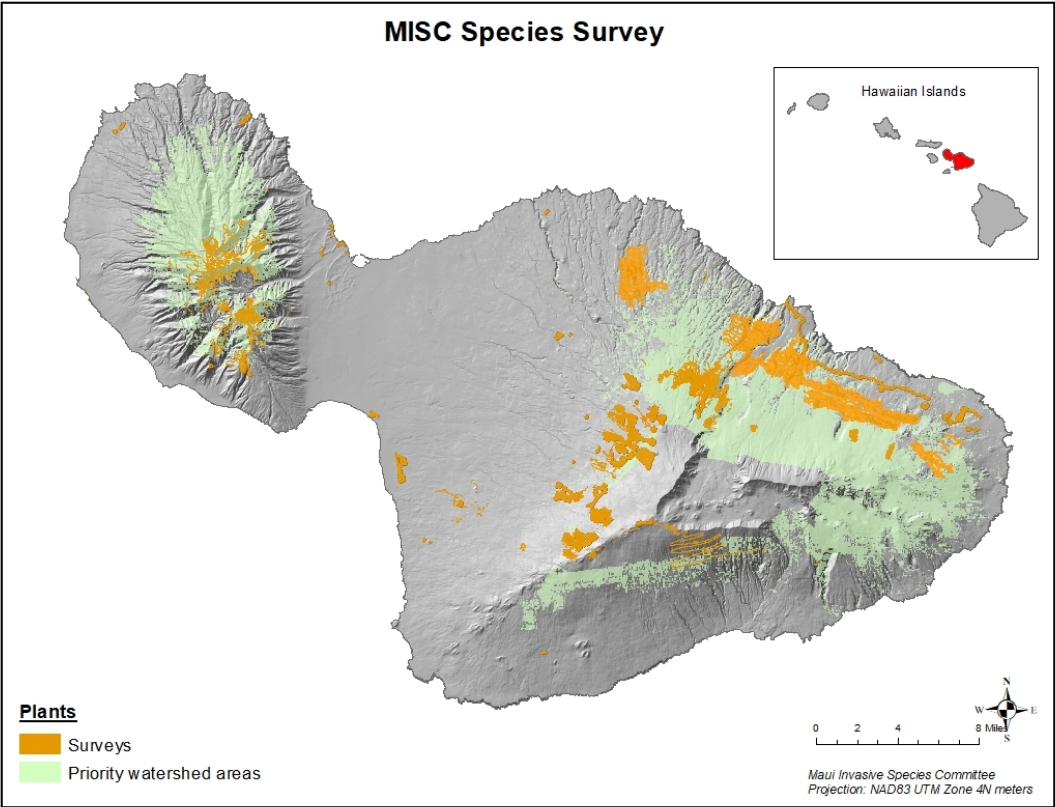


Figure 3

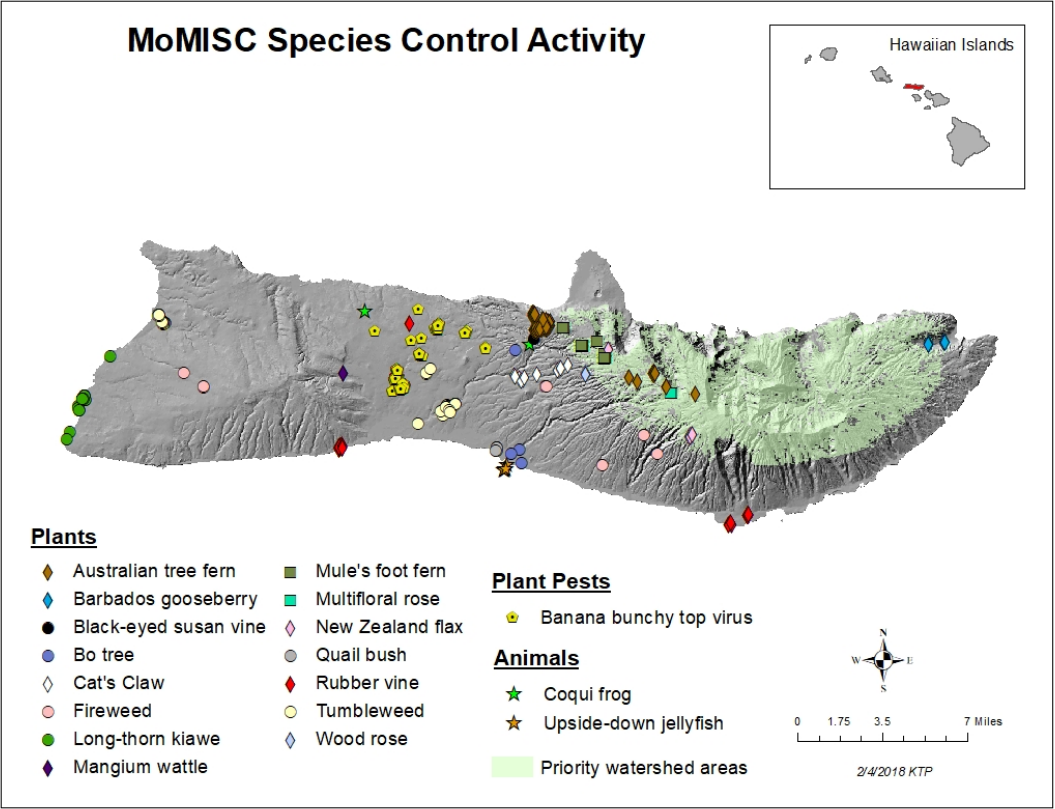


Figure 4



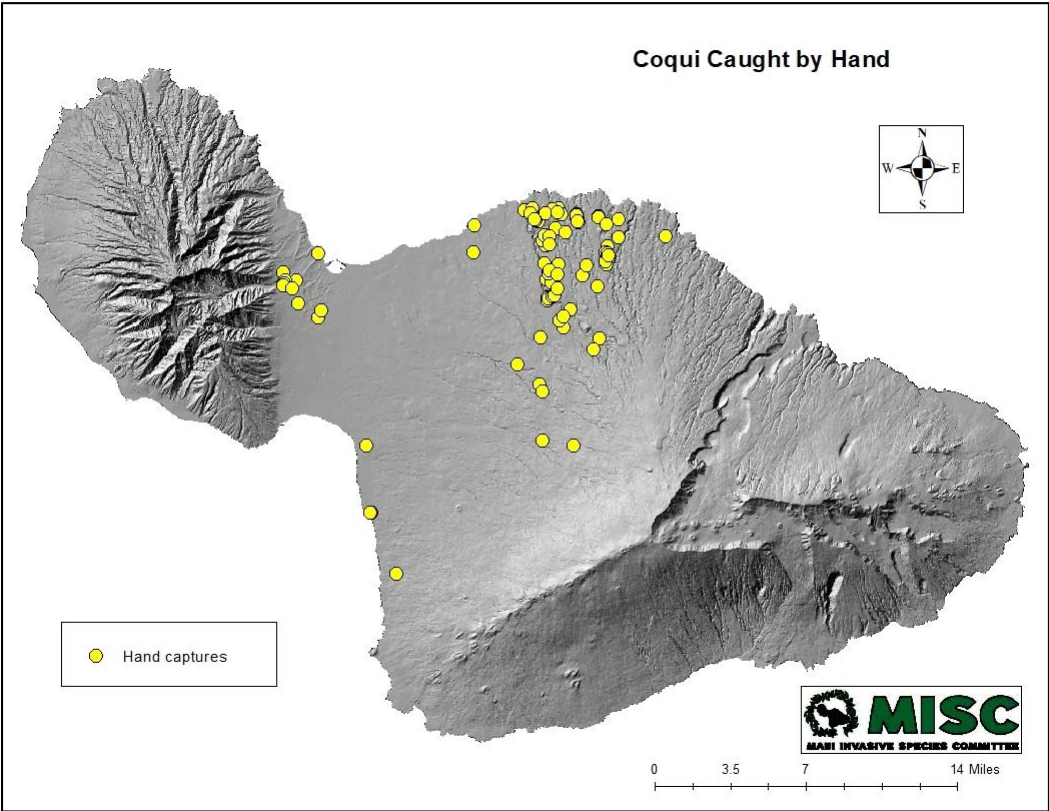


Figure 5

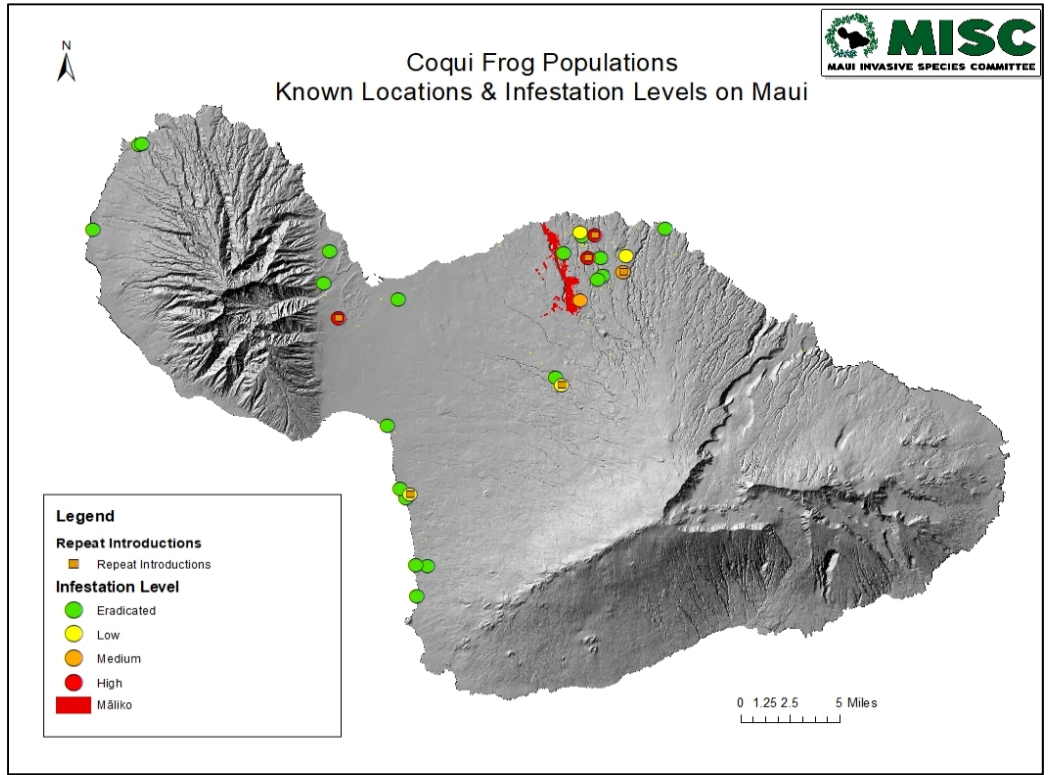


Figure 6