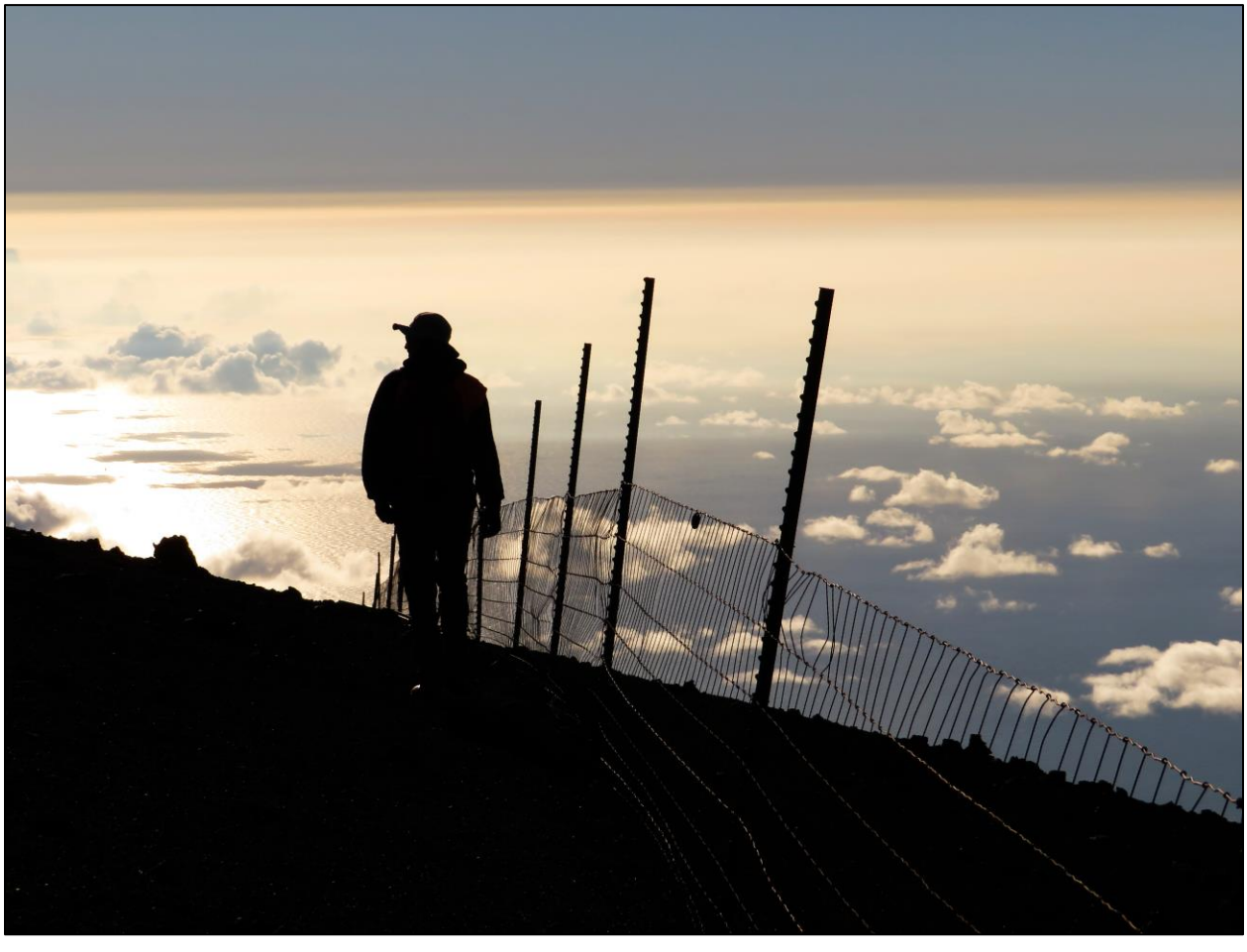
MoMISC
MOLOKA'I/MAUI INVASIVE SPECIES COMMITTEE

MISC
MAUI INVASIVE SPECIES COMMITTEE

DETECTION & CONTROL OF INVASIVE SPECIES IN MAUI COUNTY
HAWAI'I INVASIVE SPECIES COUNCIL
FINAL REPORT – FY17



Above the clouds - survey work on Haleakalā

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 46 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 37 plant species, 3 vertebrates, 5 invertebrate pests, 1 plant disease, and 1 aquatic species, and controlled 62,451 plants, 1,000s of coqui frogs and little fire ants, and 1,689 banana trees for BBTV. Crews surveyed 51,653 acres and work encompassed 15,785 hours, including 763 partner-contributed hours and 1,350 volunteer hours. Funding also supported infrastructure for the miconia control program on Maui and robust outreach and education programs. Work was conducted by staff from the Maui Invasive Species Committee (MISC) and Molokaʻi Invasive Species Committee (MoMISC), which are projects of the University of Hawaiʻi – 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 Hawaiʻi Department of Agriculture (HDOA) and Hawaiʻi Ant Lab (HAL); implement detector dog program.

Accomplishments: MISC and MoMISC staff conducted LFA surveys over 192 acres. The LFA detector dog program has been delayed due to contracting challenges and a focus on controlling new populations. At the close of the reporting period, Maui had 11 LFA infestations, including the largest site in the State, under active control (7 sites) or in a monitoring phase (4 sites). See map on page 13 for locations. 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 are being pursued.

Little fire ant in a macadamia nut

Additionally, 11,797 samples were taken throughout Maui County. Sites include 7 nurseries and 3 new developments.

EDRR CAPACITY

Deliverables: Staff receive training on plant and vertebrate identification.

Accomplishments: Identification skills were reviewed during staff meetings and incorporated into requirements for advancement within the projects' staff progression series. MISC hired the previous brown treesnake rapid response coordinator from Guam as the program Operations Manager. Staff received training on invasive slugs and snails from malacologists from Bishop Museum.

The Hawai'i Plant and Insect ID sites on Flickr continue to provide free identifications to conservation professionals and the general public. In the last quarter there were 286 plants and 55 insects identified.

MISC's Early Detection Specialists published 14 new island records for non-native plants in a Hawai'i Biological Survey manuscript "*New Plant Records from Kahoolawe Island and Midway Atoll*." A few of the species have been targeted for eradication or are now restricted to a seed bank.
http://hbs.bishopmuseum.org/publications/pdf/op119p3-8.pdf

The Specialists also found a new state record, *Arabidopsis thaliana* (mouse-ear cress), while doing plant surveys at high risk sites within Haleakalā National Park. At the summit parking lot (10,000'), they came across a small patch. The plant is Eurasian in origin and a weed in N. America and elsewhere. Much of the patch was pulled and the Park Vegetation Management crew. MISC will continue to monitor the site every six months.

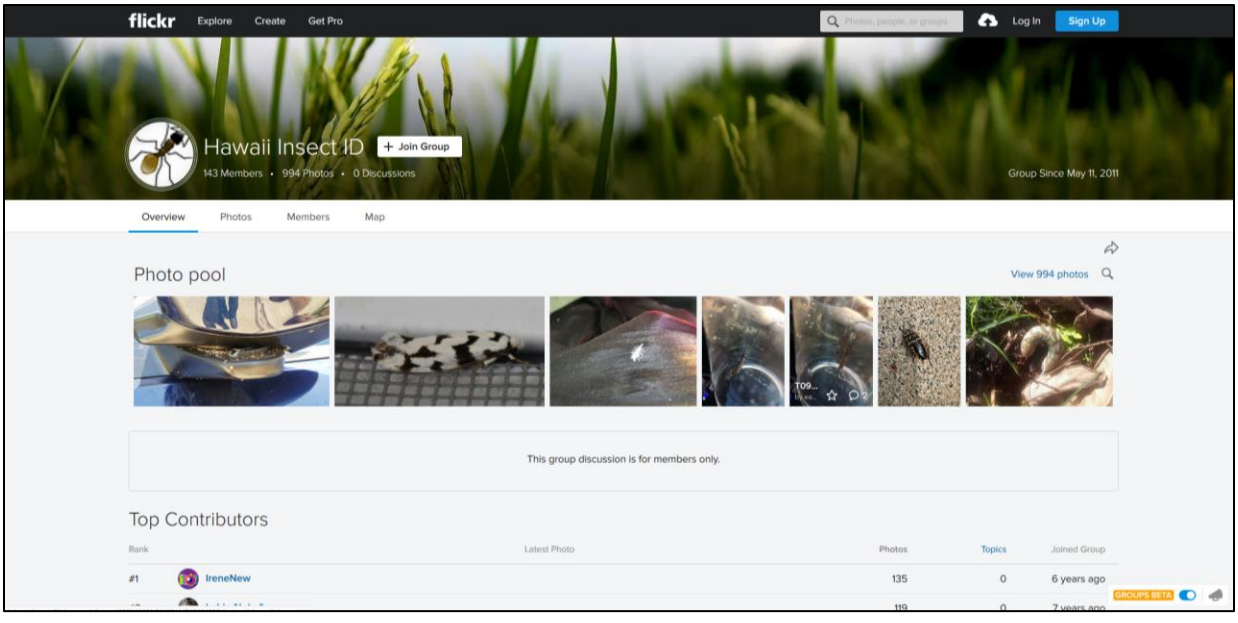
Early detection survey on Molokai

MISC and MoMISC began working on the Mamalu Poepoe project, with the goal to increase capacity for early detection of invasive species at airports. The target species include mosquitoes, Africanized honey bees, coconut rhinoceros beetles, little fire ants, and red imported fire ants.

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.

An unknown Fabaceae (legume) was collected at Kahului Airport. It may be a new state record. The specimen will be sent to Bishop Museum for determination and archiving.

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 four reports of ROD. Samples collected were negative.



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 three reports of CRB damage but found no CRB. Staff also included information about CRB 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.

Accomplishments - **Miconia**: Aerial operations covered 16,093 acres; ground operations covered 887 acres; access was limited by dense *Clidemia* in areas of rose apple dieback. Outlier populations of miconia on Maui continued to decline using the herbicide application technology developed by Dr. James Leary, UH College of Tropical Agriculture and Human Resources.

Funding also supported deconstruction of a decaying field camp in Hāna and facilities improvements at an existing Hāna baseyard. Typically, the MISC plant crew at Pi'iholo assists the Hāna field staff one to two weeks per month. While in Hāna the crew needs somewhere to stay. A bunk house and kitchen were constructed during the performance period.

The new MISC bunkhouse in Hāna

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

Accomplishments - **Pampas grass**: Aerial operations covered 19,746 acres; ground operations covered 1,629 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. Increased acres surveyed was due to good weather which allows for access to hard to reach, high elevation, places.

Aerial control operations over East Maui

OTHER INVASIVE SPECIES

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

Accomplishments - **Plants:** Targeted 37 invasive plant species (20 species on Maui, 20 on Molokai, 3 of the same species were targeted on both islands). See tables on pages 7-8, and maps on pages 10 and 11. 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 three birds. Numbers are relatively stable at about 10-13; future efforts will focus on removing the remaining individuals as feasible. MoMISC and MISC responded to reports of rabbits.

MISC's efforts on coqui frogs focused on responding to new reports across the island (see map on page 12) 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. 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 251 acres for coqui frogs, mostly in the Māliko area. See map on page 12 for efforts in the Māliko area.

Spraying for coqui frogs

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. See map on page 11 for location and treatment activity on Molokai. The virus continues to spread on Maui, survey and control efforts shifted to protect high-value areas with rare Polynesian varieties or areas where the disease has not yet become established.

MoMISC conducted surveys over 6 acres for upside-down jellyfish; 6 were detected and removed.

COUNTY FUNDING
Deliverable: County funding levels maintained or increased.
Accomplishments: County funding levels maintained for core projects at $1.895M for County fiscal year 2018.

COQUI FROGS ON STATE LANDS
Summarized above.

TARGET SPECIES WORK ON MAUI

Taxon Name	Common Name	Acres Inventoried	Number Controlled: Mature	Number Controlled: Immature	Number Controlled: Total	Hours: Total Hours
PLANTS						
Acacia podalyriifolia	Quensland Silver Wattle	121	1	0	0	5
Acacia retinoides	Water Wattle	61	0	0	0	5
Arundo donax	Giant Reed	14	0	0	0	4
Caesalpinia decapetala	Cat's Claw	4	0	45	45	11
Coccinia grandis	Ivy Gourd	906	88	5,673	5,761	431
Cortaderia	Pampas grass	21,375	1,349	2,004	3,353	2,618
Cryptostegia grandiflora	Rubber Vine	1	0	0	0	1
Erica lusitanica	Spanish Heath	84	52	1,057	1,109	146
Macaranga mappa	Bing a Bing	2	0	0	0	1
Macaranga tanarius	Parasol Leaf Tree	163	0	11	11	3
Maclura pomifera	Osage Orange	2	0	0	0	2
Miconia calvescens	Velvet Tree	16,980	568	36,841	37,409	1,826
Morella cerifera	Wax Myrtle	2	0	5	5	2
Nasella tenuissima	Mexican Feather Grass	1	0	0	0	2
Pennisetum setaceum	Fountain Grass	133	3	0	3	61
Persekia aculeata	Barbados Gooseberry	4	0	0	0	0
Pittosporum viridiflorum	Cape Pittosoporum	61	0	5	5	6
Rhodomyrtus tomentosa	Downy Rose Myrtle	0	0	0	0	2
Silybum Marianum	Blessed Milk Thistle	40	0	0	0	23
Verbascum thapsus	Common Mullein	117	11	103	114	82
INVERTEBRATES						
Wasmannia auropunctata	Little fire ant	192				4,491
VERTEBRATES						
Eleutherodactylus coqui	Coqui frog	251				4,460
PLANT DISEASES						
Ceratocystis fimbriata	Rapid 'ōhia death fungus	1	0	0	0	9
	TOTALS	40,518	2,072	45,744	47,815	14,190

TARGET SPECIES WORK ON MOLOKAI

		Acres	Number Controlled			Hours
Taxon Name	Common Name	Inventoried	Mature	Immature	Total	Total Hours
PLANTS						
Angiopteris evecta	Mules foot fern	15	0	9	9	46
Arundo donax	Giant reed	2	0	0	0	4
Atriplex lentiformis	Quail bush	327	0	62	62	26
Caesalpinia decapetala	Cat's claw	91	3	64	67	38
Cryptostegia madagascariensis	Rubber vine	377	131	2,356	2,487	214
Cyathea cooperi	Australian tree fern	170	105	2,099	2,204	260
Falcataria moluccana	Albizia	1	0	0	0	2
Ficus religiosa	Bo tree	891	2	4	6	38
Merremia tuberosa	Wood rose	6	0	38	38	7
Montanoa hibiscifolia	Tree daisy	9	0	0	0	6
Pennisetum setaceum	Fountain grass	66	0	0	0	6
Pereskia aculeata	Barbados gooseberry	32	0	20	20	17
Phormium tenax	New Zealand flax	67	3	28	31	27
Prosopis glandulosa	Honey mesquite	3	4	2	6	5
Prosopis juliflora	Long-thorn kiawe	387	4	51	55	65
Rosa multiflora	Multifloral rose	13	0	1	1	12
Salsola kali	Tumbleweed	2,867	379	7,574	7,953	267
Senecio madagascariensis	Fireweed	64	0	0	0	2
Setaria palmifolia	Palm grass	76	1	0	1	96
Ulex europaeus	Gorse	98	0	0	0	48
INVERTEBRATES						
Apis scutellata	Africanized honey bee	58	0	0	0	11
Banana Bunchy Top Virus	BBTV	4,853	143	1,546	1,689	327
Cassiopea andromeda	Upside-down jellyfish	6	6	0	6	5
Hypothenemus hampei	Coffee berry borer	610	0	0	0	41
Oryctes rhinoceros	Coconut rhinoceros beetle	44	0	0	0	11
Wasmannia auropunctata	Little fire ant	2	0	0	0	17
VERTEBRATES						
Eleutherodactylus coqui	Coqui frog	1	0	0	0	2
Lepus curpaeums	Common rabbit	0	1	0	1	2
	TOTALS	11,135	782	13,854	14,636	1,596

OUTREACH & EDUCATION

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

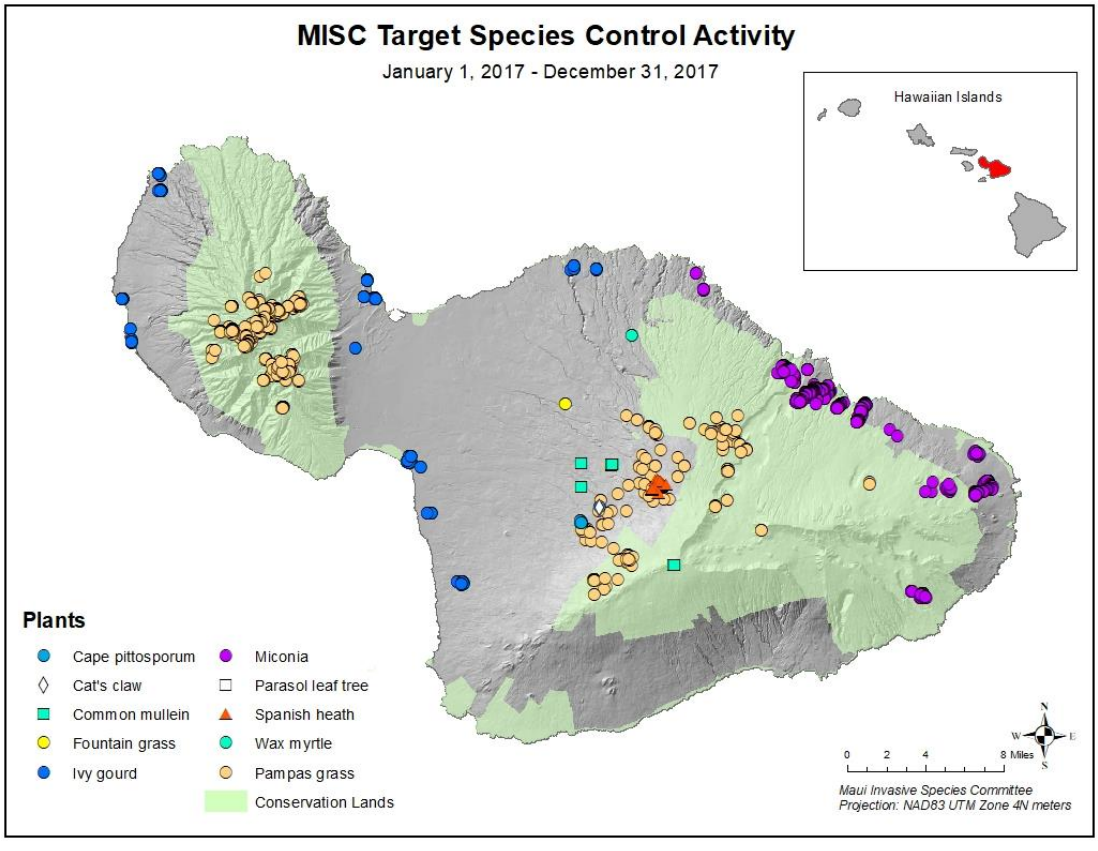
ADDITIONAL INFORMATION

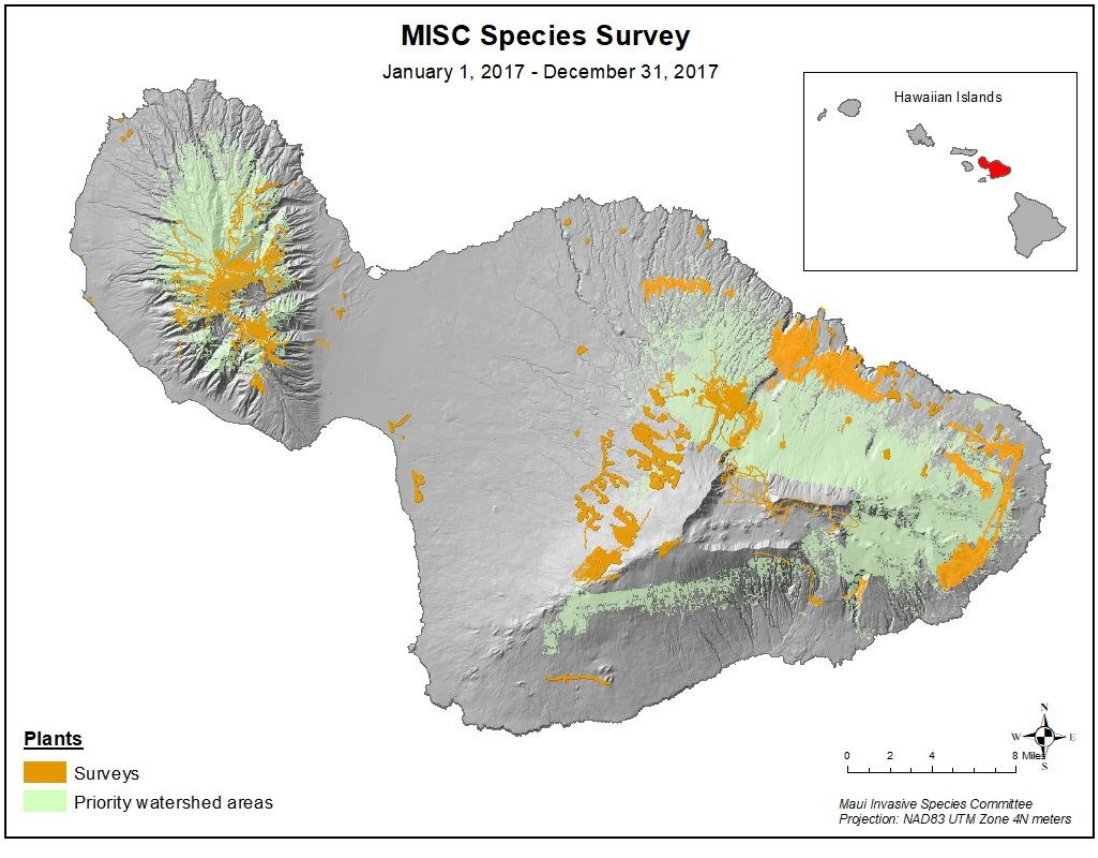
MISC and MoMISC are projects of the University of Hawai‘i – Pacific Cooperative Studies Unit. Work conducted by staff from the Maui Invasive Species Committee and Molokai Invasive Species Committee benefited from strong partner support, including: County of Maui, U.S. Forest Service, Hawai‘i Departments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

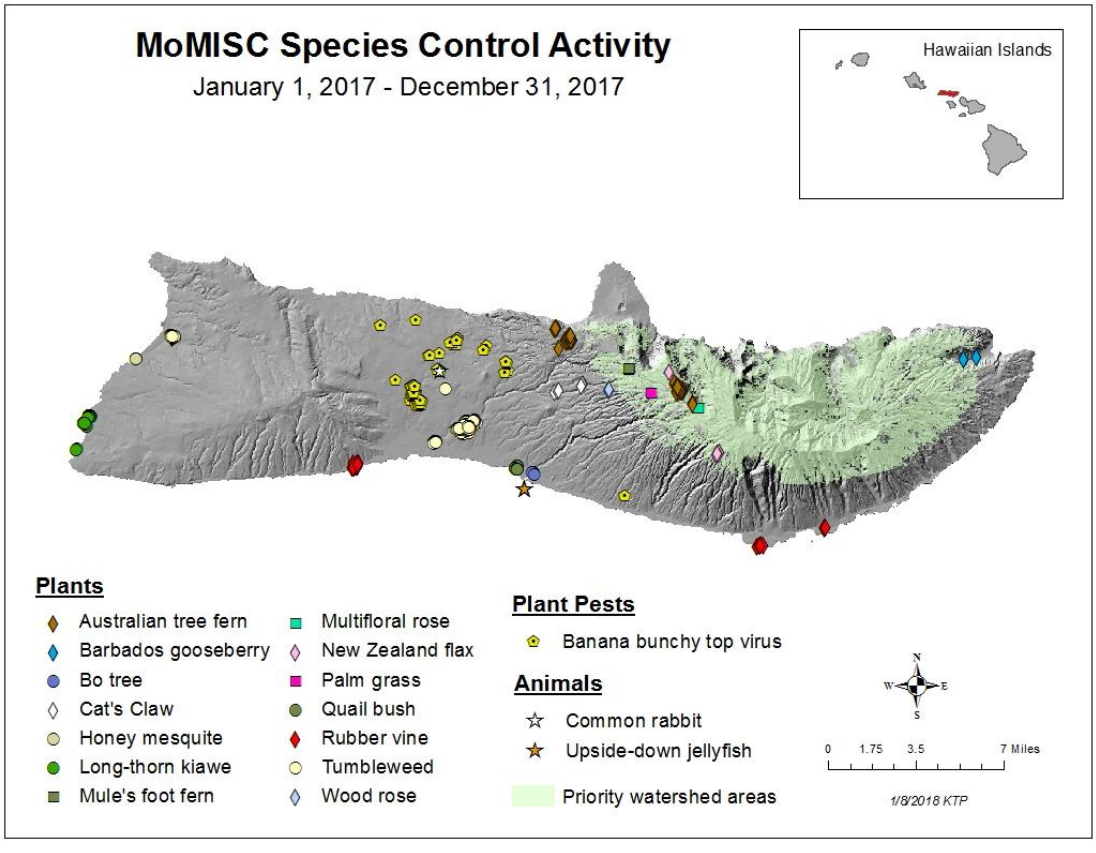
CONTACT INFORMATION

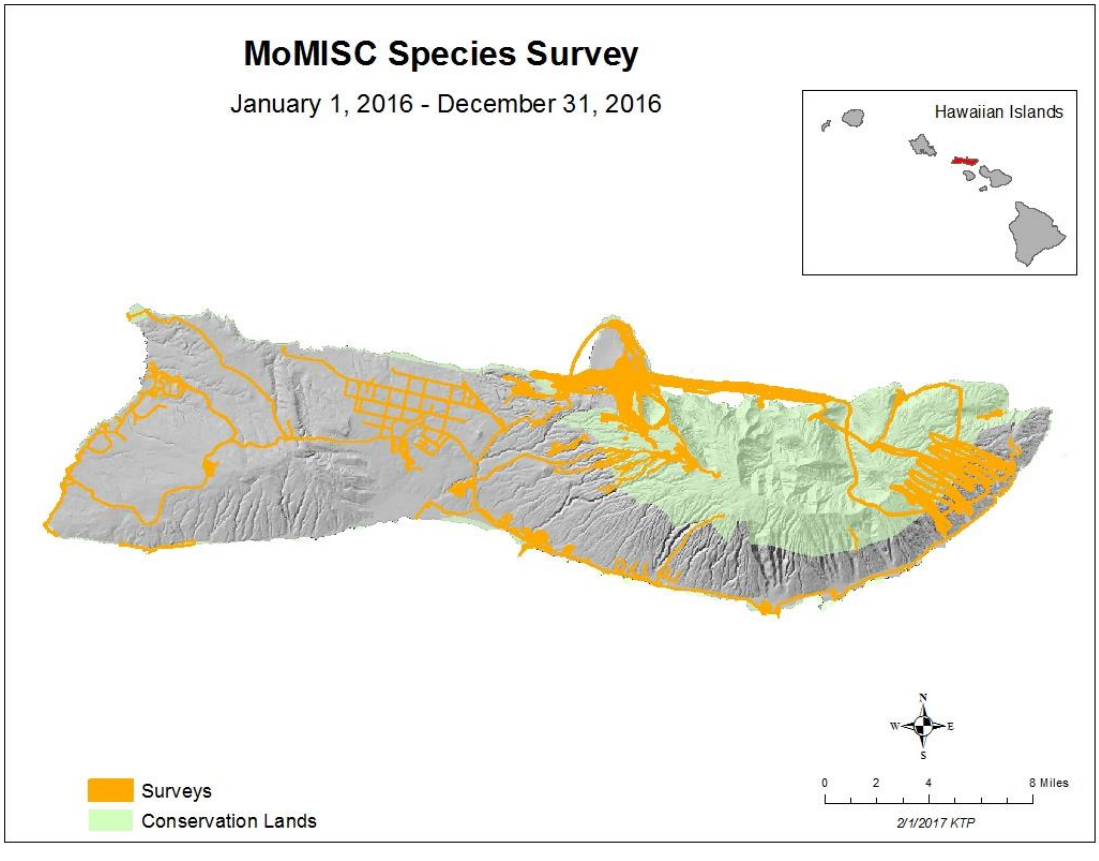
Adam Radford
MISC Manager
P.O. Box 983
Makawao, HI 96768
Ph: 808-573-6472 (MISC)
Email: miscmgr@hawaii.edu

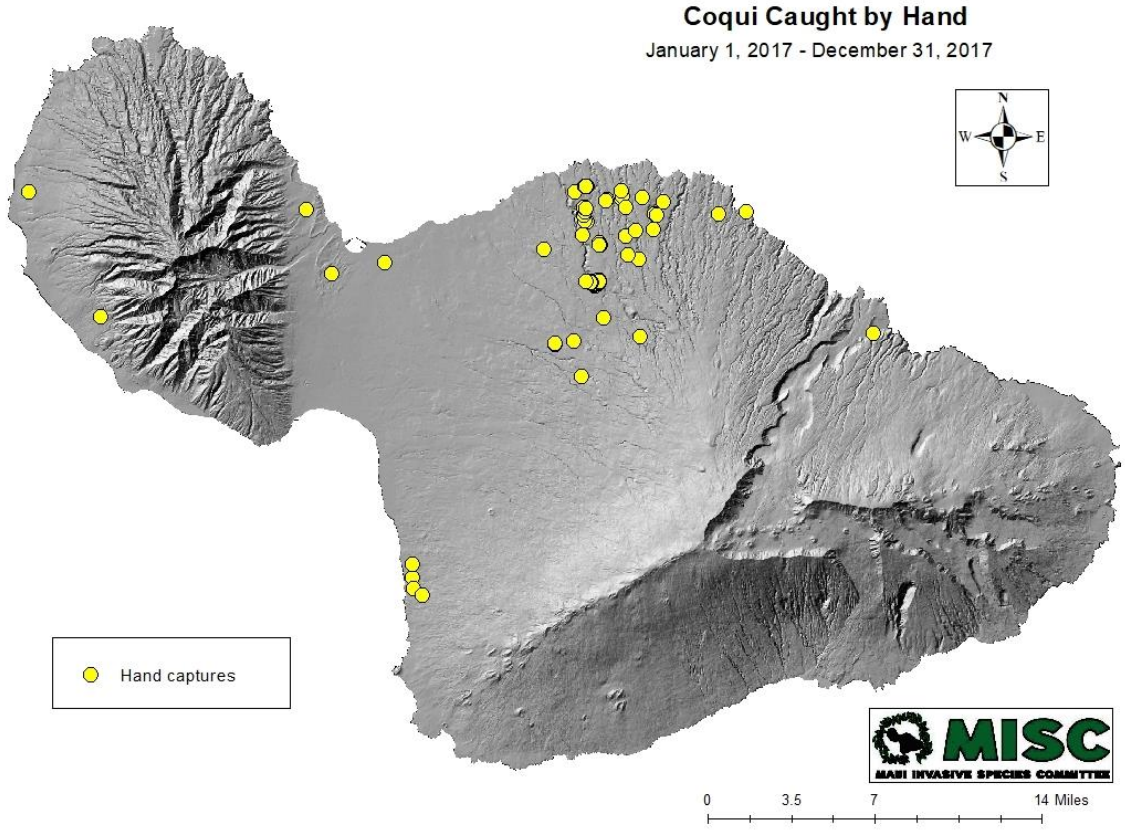
Lori Buchanan
MoMISC Field & Outreach Coordinator
P.O. Box 220
Kualapu‘u, HI 96767
Ph: 808-954-6585
Email: lbuchanan@tnc.org

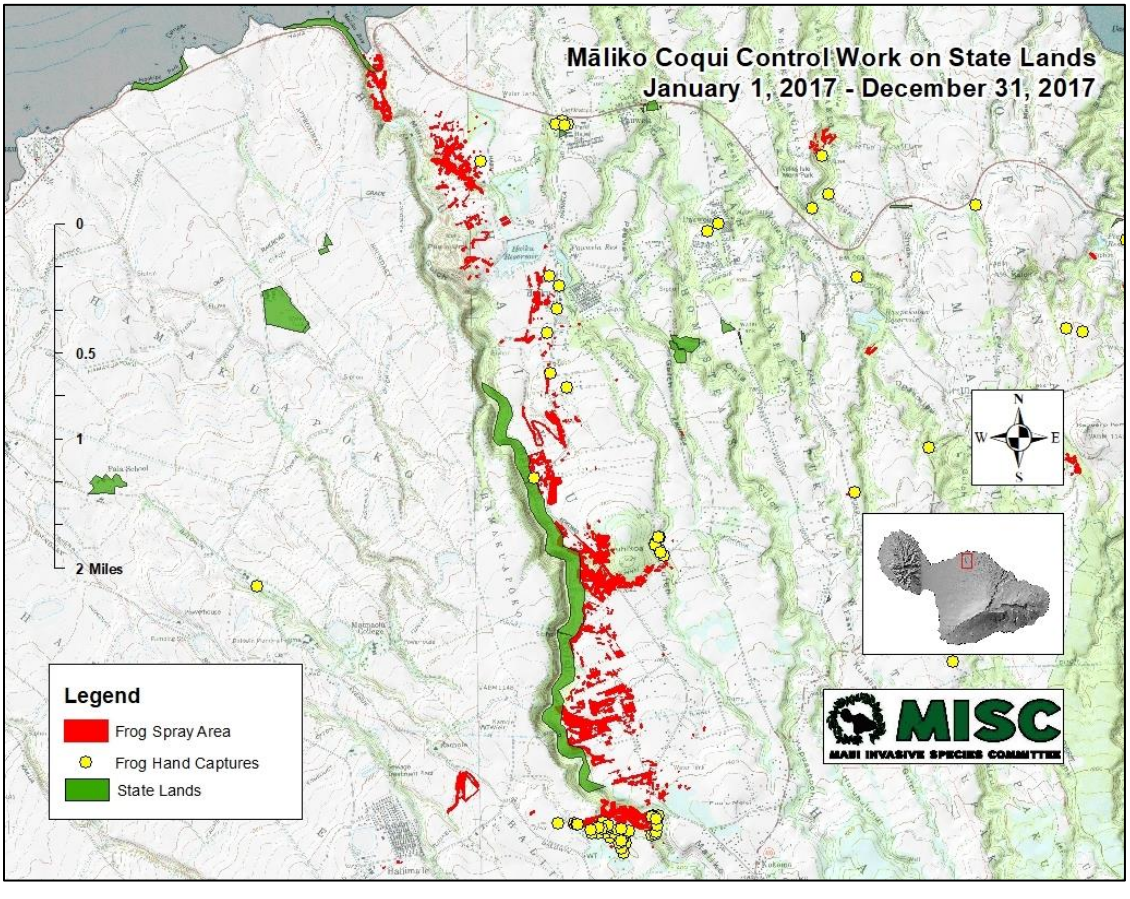

MISC Target Species Control Activity
January 1, 2017 - December 31, 2017
Hawaiian Islands
Plants
Cape pittosporum
Cat's claw
Common mullein
Fountain grass
Ivy gourd
Miconia
Parasol leaf tree
Spanish heath
Wax myrtle
Pampas grass
Conservation Lands
0 2 4 8 Miles
Maui Invasive Species Committee
Projection: NAD83 UTM Zone 4N meters

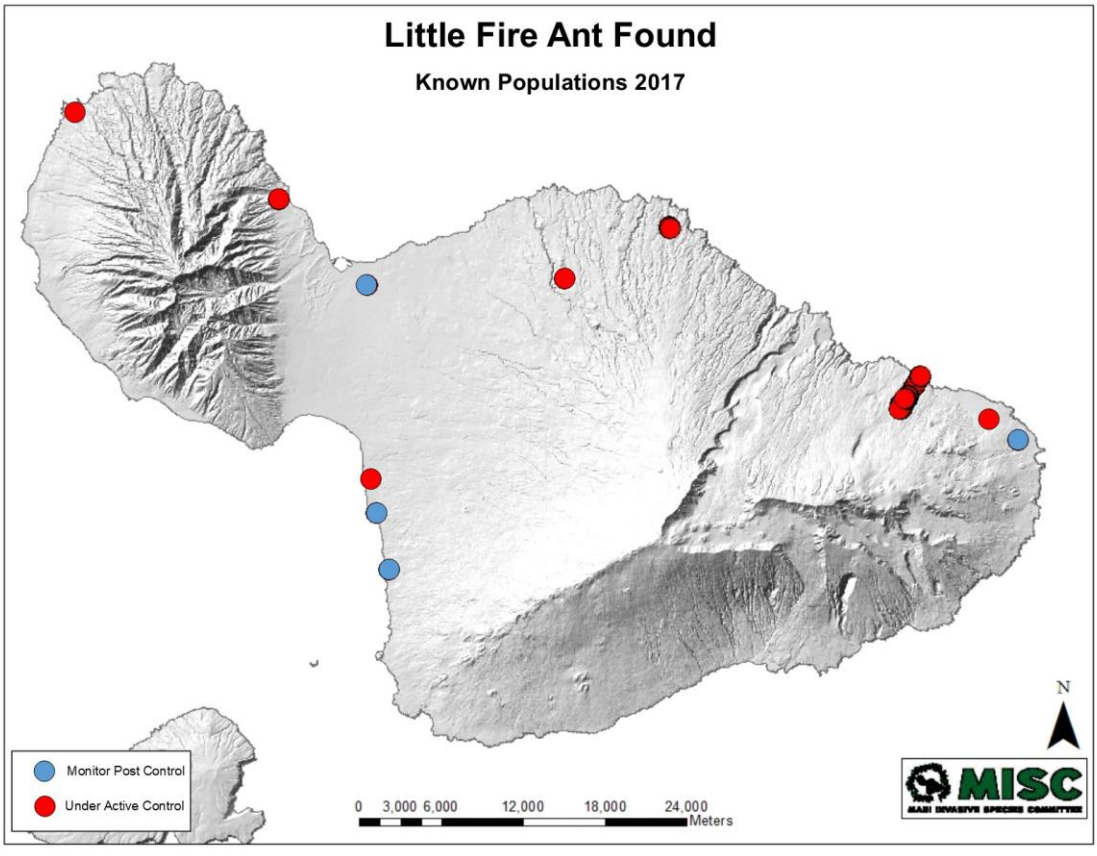

MISC Species Survey
January 1, 2017 - December 31, 2017
Hawaiian Islands
Plants
Surveys
Priority watershed areas
0 2 4 8 Miles
Maui Invasive Species Committee
Projection: NAD83 UTM Zone 4N meters


MoMISC Species Control Activity
January 1, 2017 - December 31, 2017
Hawaiian Islands
Plants
Australian tree fern
Barbados gooseberry
Bo tree
Cat's Claw
Honey mesquite
Long-thorn kiawe
Mule's foot fern
Multifloral rose
New Zealand flax
Palm grass
Quail bush
Rubber vine
Tumbleweed
Wood rose
Plant Pests
Banana bunchy top virus
Animals
Common rabbit
Upside-down jellyfish
Priority watershed areas
N
W
E
S
0 1.75 3.5 7 Miles
1/8/2018 KTP


MoMISC Species Survey
January 1, 2016 - December 31, 2016
Hawaiian Islands
Surveys
Conservation Lands
N
W
E
S
0 2 4 8 Miles
2/1/2017 KTP


Coqui Caught by Hand
January 1, 2017 - December 31, 2017
N
W
E
S
Hand captures
MISC
MAUI INVASIVE SPECIES COMMITTEE
0
3.5
7
14 Miles


Māliko Coqui Control Work on State Lands
January 1, 2017 - December 31, 2017
0
0.5
1
2 Miles
N
W
E
S
Legend
Frog Spray Area
Frog Hand Captures
State Lands
MISC
MAUI INVASIVE SPECIES COMMITTEE


Little Fire Ant Found
Known Populations 2017
Monitor Post Control
Under Active Control
0 3,000 6,000 12,000 18,000 24,000
Meters
N
MISC