Island-based Partnerships and Statewide Coordination to Protect Hawai‘i from Invasive Species

Report for the 2007 Calendar Year

KISC
KAUAI INVASIVE SPECIES COMMITTEE

OISC
O'AHU INVASIVE SPECIES COMMITTEE

cgaps
STOP THE SILENT INVASION
COORDINATING GROUP ON ALIEN PEST SPECIES

MoMISC
MOLOKA‘I/MAUI INVASIVE SPECIES COMMITTEE

MISC
MAUI INVASIVE SPECIES COMMITTEE

BIISC

DAR
AQUATIC INVASIVE SPECIES TEAM

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Island-based Partnerships & Statewide Coordination to Protect Hawai'i From Invasive Species

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Safeguarding Hawai'i from Invasive Species

The continuing introduction of invasive species into Hawai'i threatens the survival of the state's unique flora and fauna, costs local farmers money in crop losses and pest control spending, depresses sectors of the state's economy and harms human health. Over the years, state and federal programs have arisen piecemeal to address specific pest concerns, resulting in an array of programs with limited scope and lacking in comprehensive coordination. Two separate reports found that Hawai'i's alien pest problem was the worst in the nation due to the lack of a coordinated and comprehensive program to address the issue (1992 report by The Nature Conservancy (TNC) and National Resources Defense Council (NRDC); 1994 report by the U.S. Office of Technology Assessment (OTA)).

The development of a comprehensive program requires acknowledging the existence of numerous gaps in agency authorities and policies, the commitment of leaders to fix the system, and secure funding that will allow these programs to succeed. A comprehensive protection program should consist of the following measures:

Prevention: This is the most economical and effective measure for protecting Hawai'i. Adequate prevention should include laws preventing importation of plant and animal pests, enforceable penalties, thorough inspection at all ports of entry, interisland quarantine measures to prevent intrastate spread, and clear, non-conflicting agency mandates and jurisdictions.

Early Detection and Rapid Response: Even with the best prevention systems, pests will get through. Clear mandates and set protocols are needed for monitoring, early detection and rapid response; both for new pests around ports of entry and for incipient pests on public and private lands and in aquatic environments.

Ongoing Control of Existing Pests: Some pests are considered too widespread to eradicate but require ongoing control to protect natural resources. Needed action includes research into biocontrol for some species, and active, on-the-ground control of others.

Hawai'i's Invasive Species Partnerships

In the past decade, partnerships and groups have arisen to address significant gaps in Hawai'i's biosecurity system. They include **Hawai'i Invasive Species Council (HISC)** to provide cabinet-level leadership; the **Coordinating Group on Alien Pest Species (CGAPS)** for interagency and NGO communications and collaborative projects; the **Aquatic Invasive Species Team (AIS Team)** for prevention, early detection and control of invasive marine and freshwater species statewide; and the **Invasive Species Committees (ISCs**) for island-based rapid response and on-the-ground control.

Hawai'i Invasive Species Council (HISC)

A 2002 State Legislative Reference Bureau study identified the need for cabinet-level leadership and coordination to address the impact of invasive species on the State. The study called for the involvement of all state agencies responsible for regulating the pathways by which invasive species can gain access into Hawai'i, agencies responsible for controlling invasive species on the ground, and agencies that use and promote the pathways or natural resources.

In 2003, the Hawai'i State Legislature agreed that, "the silent invasion of Hawai'i by alien invasive species is the single greatest threat to Hawai'i's economy, natural environment, and the health and lifestyle of Hawai'i's people and visitors." That same year, the Legislature and Governor Linda Lingle approved legislation that established the Hawai'i Invasive Species Council and directed state agency chairs and department heads to address gaps in Hawai'i's invasive species prevention and response measures.

The HISC, under the co-leadership of the chairpersons of the Hawai'i Departments of Land and Natural Resources and Agriculture, is comprised of leaders of the following agencies:

- Hawai'i Department of Agriculture
- Hawai'i Department of Land and Natural Resources
- Hawai'i Department of Health
- Hawai'i Department of Business, Economic Development and Tourism
- Hawai'i Department of Transportation
- University of Hawai'i

The first official meeting of the HISC convened on October 29, 2003. HISC members adopted a working committee structure to look at laws, policies, procedures, and needs in the areas of prevention, early detection and rapid response, control of widespread pests, and public awareness.

Tasked with a need to look at each agency's organizational and resource shortfalls, HISC recognized the critical need for sustainable funding sources for adequate inspection of incoming goods, the need for early detection and rapid response for priority invasive species, and the need for ongoing control of existing pests. The HISC developed a statewide strategic plan and budget to implement a pilot multi-agency statewide invasive species program that was funded at $4 million for Fiscal Years 2005-2006 by the Legislature via the Hawai'i Department of Land and Natural Resources' budget. Funding has continued at $2 million dollars in Fiscal Year 2007 and $4 million in Fiscal Year 2008. These funds are matched 1:1 with non-state dollars. Portions of these funds are used to support the efforts of the ISCs, the AIS Team and CGAPS in the areas of early detection, rapid response and public awareness.

2007 ACTIONS

- Approved a $4,000,000 spending plan for Fiscal Year (FY) 2008. It addresses the four interrelated plan components:
    - Prevention, $736,400
    - Response and Control, $1,754,500
    - Research and Technology, $700,000
    - Public Outreach, $312,000
    - HISC Support (includes Central Services fees), $497,100
- Supported risk assessments at ports of entry which will enable HDOA to better identify and prioritize high-risk commodities for inspection.
- Supported the production of a statewide invasive ant rapid response plan and a coordinator to implement it.
- Supported West Nile Virus surveillance, analysis and response capabilities.
- Supported 15 research and technology projects for funding in early 2008 which will provide better prevention, early detection and control capabilities.
- Approved small grants less that $10,000 to community-based invasive species projects.
- Documented government-sponsored spending of at least $40.8 million on invasive species mitigation, prevention, and control in 2006.
- Reviewed the *Interim State Hawai'i Strategic Plan for Invasive Species Prevention, Control, Research and Public Outreach.*

The complete report on HISC activities to the Legislature may be found at:

http://www.hawaii.gov/dlnr/reports/FW08-%20Invasive-Species-Report-Chapter-194-Act-213-SLH07%20.pdf

Coordinating Group on Alien Pest Species (CGAPS)

Project Strategy

Two independent studies in the 1990s (TNC/NRDC, 1992; and OTA, 1994) found that Hawai'i had the nation's worst alien pest problem due to gaps in prevention, detection and control programs, and exacerbated by a lack of inter-and intra-agency communication and cooperation. The Coordinating Group on Alien Pest Species (CGAPS) was formed in 1995 in direct response to these analyses. CGAPS is a voluntary partnership comprised primarily of management-level participants from every major agency and organization involved in invasive species work including federal, state, county and private entities. Members participate in quarterly meetings and ad hoc steering committee meetings in an effort to influence invasive species policy and funding decisions, improve communications, increase collaborations, and promote public awareness statewide.

2007 Highlights

- Partnered with Earthlink and KITV to film and broadcast five new public service announcements about how the public can help protect Hawai'i from invasive species.
- Created "Got dead bird? Call 211. www.gotdeadbird.org" campaign to increase public reports of dead birds to aid in disease monitoring. Reports have more than doubled since the July start of the campaign.
- Conducted 2007 Statewide Public Awareness Survey, which shows that awareness and concern about invasive species has risen since the formation of CGAPS.
- Advocated a fee-for-service measure to provide a new funding mechanism for state inspection services on incoming ship cargo, which became a law in 2007.
- Continued building support in the green industry for voluntarily screening new plant introductions to predict whether or not the species might become invasive in Hawai'i.

Public awareness

The overall goal of CGAPS outreach efforts is to raise awareness in Hawai'i residents about invasive species in order to foster a sense of concern and result in supportive actions. Outreach is conducted in a number of ways, including television, print and radio news stories and ads, public displays, educational materials, and direct outreach at community events and schools.

Project: Statewide media campaign to promote public awareness and participation
CGAPS has conducted three television/print/radio media campaigns since 1995, titled the Silent Invasion, and has taken advantage of outreach opportunities via the news media in non-campaign years. In 2007, CGAPS partnered with Earthlink, Inc. and KITV 4 to film and broadcast five public service announcements (PSAs). The PSAs began airing on KITV in September.

PSA 1: Invasive Species Harm Agriculture

Announcer Voiceover: Invasive species are non-native animals, plants, insects and even diseases that can enter Hawai'i, harm us, and the agricultural industry.

Dean Okimoto (Owner & Farmer, Nalo Farms): Invasive pests can damage or even destroy crops. Agriculture is critical to Hawaii's economy and security…and for farmers, it's our livelihood.

Announcer Voiceover: Please, help protect Hawai'i. When you return home, declare all produce and plants for inspection. Most items will be returned to you.

Filming PSA 5 about the need to report dead birds for disease testing.

PSA 2: Invasive Species Harm the Visitor Industry

Announcer Voiceover: Invasive species are non-native animals, plants, insects and even diseases that can enter Hawai'i, harm us, and our visitor industry.

Ted Bush (Beachboy & Owner, Waikiki Beach Service): People come to Hawai'i because of our environment. Can you imagine what this beach would look like if we had biting sand flies?

Jan Abalos (Sheraton Waikiki Guest Services): Our livelihood is at stake, and so is our quality of life.

Announcer Voiceover: Please, help protect Hawai'i by following all import laws.

Slogan, logo and website increased public participation

PSA 3: Invasive Plants Harm the Watershed

Announcer Voiceover: Invasive species are non-native animals, plants, insects and even diseases that can enter Hawai'i, harm us, and our watershed.

Heidi Bornhorst (horticulturist and arborist): What we plant in our yards can impact the forest. Take miconia—it was planted in a garden in 1961. Now, it dominates thousands of acres of watershed forest. New invasive plants are still being sold, so please—ASK for native or non-invasive plants.

PSA 4: Invasive Species Like Snakes Cause Harm

Announcer Voiceover: Invasive species are non-native animals, plants, insects and even diseases that can enter Hawai'i and cause us harm.

Gary Sprinkle (KITV News at 5 Anchor & Journalist): The damage the brown treesnakes has done on Guam is devastating: loss of the birds, costly power outages, infants bitten in their cribs…The same thing can happen here …**any** snake is a problem. Protect Hawaii. Report all snake sightings immediately to 643-PEST.

PSA 5: Invasive Species Harm Public Health

Announcer Voiceover: Invasive species are non-native animals, plants, insects and even diseases that can enter Hawai'i and cause us harm…no matter where we are.

Dr. Cris Ancog (Pediatrician): "We're lucky—Hawai'i doesn't have West Nile Virus or bird flu…yet. But these diseases could arrive. Finding a dead bird could mean that a disease is present, so please help by calling 211 immediately to report it for testing."

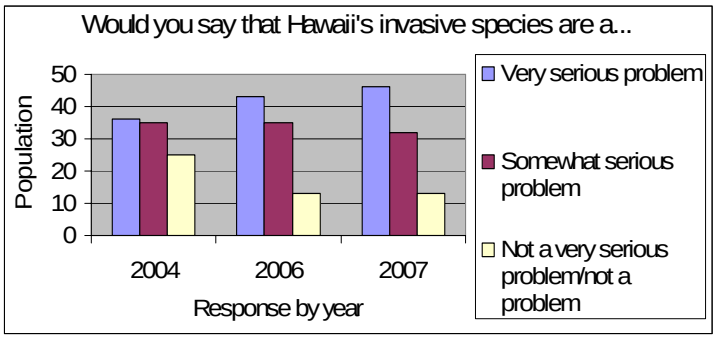
Project: Promote public reports of dead birds for early detection of diseases
CGAPS assisted partner agencies in an early-detection campaign for West Nile Virus and avian influenza. One of the key areas missing in the early detection plans for these diseases is that the public was not reporting dead birds for disease testing. CGAPS implemented a new website for information and online reporting, then created and launched a new awareness campaign to advertise the 211 hotline number and website. Since starting this work in June, 2007, there have been more than 60 online reports and more than 400 people have visited the website.

Project: Promote awareness and use of the HPWRA by the green industry to prevent new plant invasions
Since Hawai'i law does not prohibit the importation of plant species unless they are on the noxious weed or seed list, this leaves the state open to the possibility of importing more than 250,000 species of plants, an estimated 10 percent of which are predicted to be invasive if planted here. Therefore, CGAPS continued to work with the green industry, plant retailers, botanical gardens and arboreta on promoting awareness and use of the Hawai'i Pacific Weed Risk Assessment (HPWRA). The HPWRA is a prediction tool that can be used to identify potentially invasive plants before they are imported and spread. Green industry associations and individuals are asked to sign Codes of Conduct, a list of voluntary actions they will take to reduce the chance of importing new invasive plants by voluntarily submitting the names of new plant introductions for screening using the HPWRA. The Codes also identify some incipient invasive plants that the signer will no longer grow, sell or promote. CGAPS has been successful in promoting the HPWRA and the Codes, with the O'ahu Nursery Growers Association, the Maui Association of Landscape Professionals, the Kaua'i Landscape Industry Council, the Hawai'i Island Landscape Association, WalMart Garden Stores, Lyon Arboretum, Waimea Valley Audubon Center, and the National Tropical Botanical Gardens having signed on. Current and future work is focused on promoting the Codes with additional green industry associations, the Hawai'i Farm Bureau Federation, and tropical fruit growers associations.

Project: Coordinate the design and implementation of a new website for HISC, CGAPS and ISCs
The project to design and populate a new, user-friendly website for HISC, CGAPS and ISCs was completed in July of 2007. The CGAPS Public Information Officer (PIO) worked with web professionals on site design, and with the outreach staff of the ISCs, HISC, and staff of USGS Pacific Basin Information Node (USGS PBIN) and the Hawaiian Ecosystems At Risk (HEAR) to populate the pages. The new site can be found at www.hawaiiinvasivespecies.org.

Project: Conduct measures of efficacy for outreach messages and methods
CGAPS has coordinated four public awareness surveys since forming in 1995. The first was in 1996 and the most recent was in February 2007. Survey results show that public awareness has risen over the past eleven years of concerted efforts, particularly after television, radio and print campaigns.

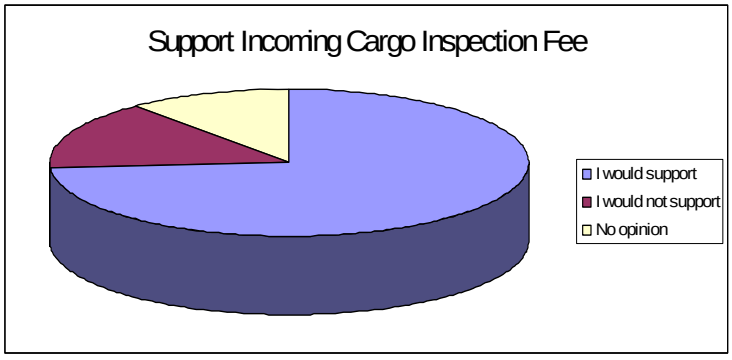
One of the questions aimed at determining if people are concerned about invasive species reveals a steady rise in the percentage of the population that view Hawai'i's invasive species as a "very serious problem".



Forty-seven percent of those polled view Hawaii's invasive species as a "very serious problem", and 32% view it as a "somewhat serious problem."

Since setting up the new statewide toll-free Pest Hotline in December 2005, CGAPS has assisted HDOA with public outreach to encourage reports of pests of concern. Press releases and television PSAs cite the 643-PEST number, but a 2006 awareness survey found that although 87% of people would report a snake if they saw one, nobody knew the hotline number, and few people knew what agency to call. Using HISC Public Outreach funds, CGAPS contracted local comedian Frank DeLima to write and sing a 30-second Pest Hotline jingle to help people remember the number, and it aired on radio stations statewide between January and May 2007. When survey participants were asked what number to call to report a pest during the February 2007 survey, 5% of people were able to recite the number. Re-broadcasts of the radio jingle should be conducted in 2008.

Another question asked in the 2007 survey revealed that people understand that adequate inspection services are necessary to prevent new invasive species from becoming established. Three in four (74%) respondents said that they would support a law that would allow the Department of Agriculture to charge an appropriate fee for inspecting incoming cargo and for quarantine services when applicable. This information was used to support legislation which ultimately passed in 2007.



The 2007 survey revealed that there is widespread support for a new fee-for-service revenue base to ensure that inspection costs are commensurate with incoming cargo.

CGAPS Participants

- Bishop Museum
- ʻE Kupaku Ka ʻAina
- Hawaiʻi Department of Agriculture
- Hawaiʻi Department of Health
- Hawaiʻi Department of Land and Natural Resources (Division of Aquatic Resources Division of Forestry and Wildlife)
- Hawaiʻi Department of Transportation
- Hawaiʻi Farm Bureau Federation
- The Invasive Species Committees of Hawaiʻi
- Maui Land & Pineapple Company, Inc.
- National Park Service
- The Nature Conservancy of Hawaiʻi
- Pacific Cooperative Studies Unit
- Research Corporation of the University of Hawaiʻi
- U.S. Customs and Border Protection
- U.S. Department of Agriculture Animal and Plant Health Inspection Service
- U.S. Forest Service—Institute of Pacific Island Forestry,
- APHIS—Wildlife Services
- U.S. Fish and Wildlife Service
- U.S. Geological Survey (Biological Resources Division—Pacific Island Ecosystems Research Center, Pacific Basin Information Node)
- U.S. Air Force
- U.S. Army
- U.S. Marine Corp Base Hawaiʻi
- U.S. Navy
- University of Hawaiʻi
- Waimea Valley Audubon Center

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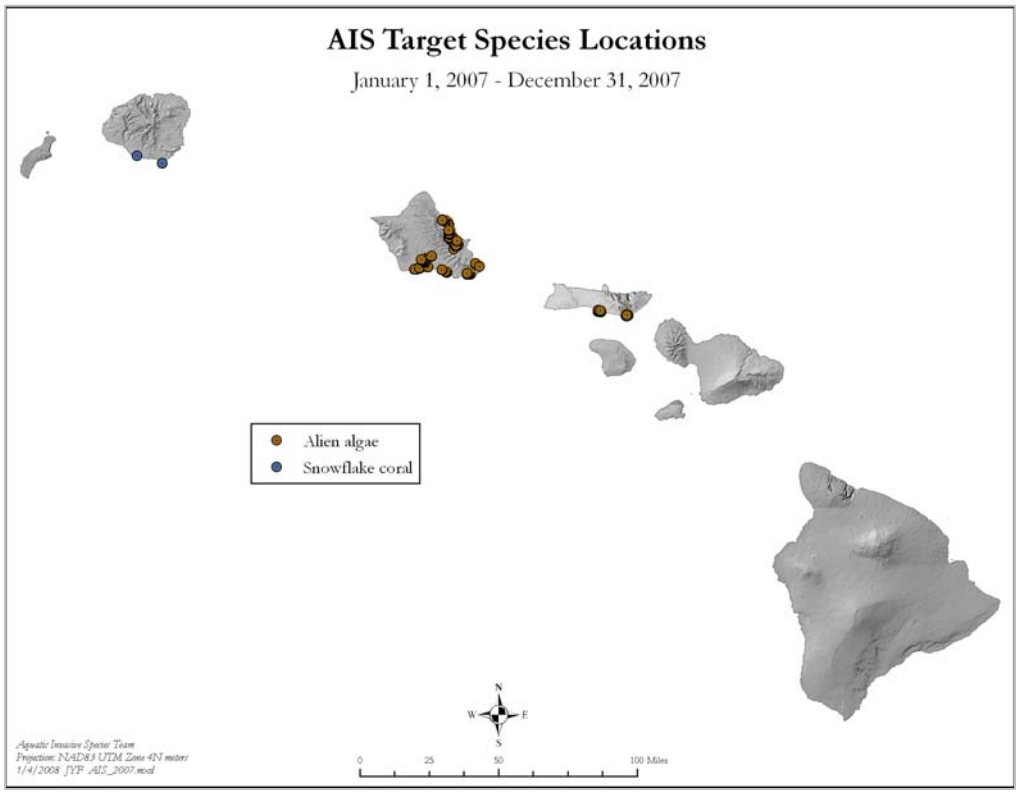
DAR Aquatic Invasive Species Team (AIS Team)



Project Strategy

In 2007, the AIS Team placed a heavy emphasis on mapping the distribution of several key aquatic invasive species and continued control projects for invasive algae and octocoral. AIS team members received training in early detection and preventing transport of aquatic invasive species (AIS). The AIS Team also researched improved control methods for AIS.

Highlights

- "Supersucker Jr." became operational and worked in conjunction with "Supersucker Sr." to clear patch reefs in Kāneʻohe Bay and the south shore of Oʻahu
- Surveyed around Kauaʻi and Niʻihau for invasive octocoral *Carijoa sp.*
- Inspected hulls of vessels traveling to NWHI Monument to prevent transport of potentially invasive species
- Continued mapping of invasive algae around Oʻahu and Molokaʻi
- Conducted stream surveys on Oʻahu for aquatic invasive species.

Prevention

Team members worked with Bishop Museum staff and UH researchers for training in ship hull inspections. This training has allowed the AIS team to inspect ships traveling to Papahānaumokuākea National Marine Monument to ensure the vessels are not carrying

potentially invasive species. This training will also be used in future projects to assess the risk of possible transport of AIS by recreational vessels to the Hawaiian Islands.

Priority Species

Invasive Algae

In a ongoing effort to assess the full extent of the distribution and impact of invasive algae on Hawai'i's coral reefs, the AIS Team continued with their surveying and mapping of invasive algae around the islands of O'ahu and Moloka'i. This information is being utilized to develop a possible control strategy for strategic locations around Moloka'i, and to further optimize efforts on O'ahu.

An AIS diver uses an underwater scooter to survey for invasive octocoral off the coast of Ni'ihau

Team members also continued invasive algae control efforts in Kāne'ohe Bay using "The Supersucker" and in Waikīkī using "Supersucker Jr." A total of ten trips for "The Supersucker" were completed in 2007, removing approximately 15,690 lbs. of invasive algae. Extensive trials with "Supersucker Jr" were carried out in Waikīkī and Kāne'ohe Bay as well, with a total of 17 trips and approximately 25,500 lbs. of algae removed. This training will provide the basis for future projects that are planned in conjunction with UH researchers to enhance the growth of important sea grass beds.

Snowflake Coral *(Carijoa sp.)*

The initial stage of the ongoing control project in Port Allen, Kaua'i for the invasive octocoral snowflake coral was completed, with the removal of the wrapping that had been placed on the pilings to smother the snowflake coral. In addition to removing the wrapping, the AIS Team started extensive surveys around the islands of Kaua'i and Ni'ihau to look for additional colonies of snowflake coral.

The Team also worked with The University of Hawaii's Ocean Engineering Department to map Port Allen Harbor on Kaua'i using a REMUS AUV (Remote Environmental Measuring Units / Autonomous Underwater Vehicle). The state of the art technology uses side scan soar and radio assisted navigation to create detailed imagery of the harbor floor. This was needed to determine possible substratum capable of supporting snowflake coral. Further data analysis is scheduled for early 2008 to identify possible habitat sites to investigate.

Staffing

The AIS Team was formed in 2005 and is comprised of one AIS Research Supervisor, six AIS technicians and one Americorps intern. Two technician positions are located in Hilo, Hawai'i, while other staff is located at the Hawai'i Institute of Marine Biology (HIMB). The collaboration with HIMB has been important to the operations of the AIS Team, and the facilities which they make available allow staff to work on the bay and be associated with a premier research facility, facilitating an increased exchange of information.

Outreach & Education

Both the **"**The Supersucker" and "Supersucker Jr." received considerable media coverage that helped spread the message about the damage that aquatic invasive species can do to Hawai'i's fragile ecosystems. A segment was filmed and aired for The History Channel show "Modern Marvels" that showcased the algae vacuums. There were several articles that ran in publications such as *Hana Hou (*Hawaiian Airlines Magazine*), The National Geographic News*, an online newspaper, *Science* magazine and *The LA Times* newspaper as well as stories on Hawai'i Public Radio and TV station KHNL.

The "Habitattitude" program continued in 2007 as well. This program seeks to educate the public about the problems caused by releasing non-native aquatic plants and animals into the environment. The program also enlists pet stores and other facilities to act as drop-off sites for unwanted aquatic pets.

AIS Partners

- Hawai'i Department of Agriculture
- Hawai'i Department of Land & Natural Resources-Division of Aquatic Resources
- Hawai'i Department of Transportation
- Hawai'i Institute of Marine Biology
- University of Hawai'i-Mānoa
- University of Hawai'i-Hilo
- Windward Community College
- Kaua'i Invasive Species Committee
- National Oceanic & Atmospheric Administration
- U.S. Fish & Wildlife Service
- Bishop Museum
- Hilton Hawaiian Village
- The Nature Conservancy.

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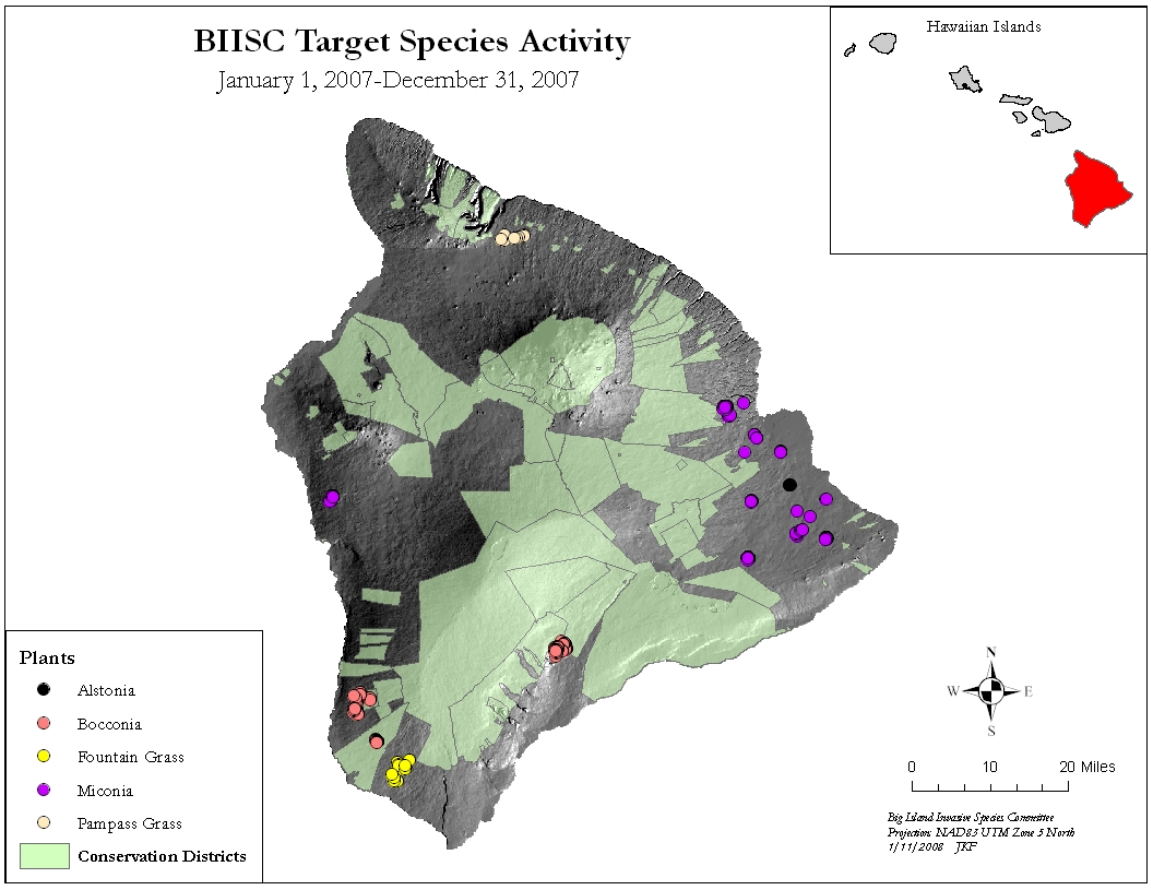
Big Island Invasive Species Committee (BIISC)



Project Strategy

The Big Island Invasive Species Committee was established to coordinate efforts to prevent new invasive pest infestations on the Island of Hawai'i, to stop newly established pests from spreading and to provide local control of established pests. The Big Island contains the largest infestations of miconia, coqui frogs and little fire ants. It is not possible to eradicate these species on the Big Island with the tools and resources currently available. The project's objective for these priority species is to assist local communities and agencies in mitigating their spread as well as assisting planning for the most effective management possible.

Highlights

- Targeted key invasive species utilizing a containment strategy for large populations, while eradicating small or incipient populations away from core sites.
- Conducted ground and aerial surveys and controlled plants using chemical and mechanical methods.
- Continued partnerships with DLNR and Hawai'i Volcanoes National Park to control plume poppy and fountain grass.
- Implemented "What's in Your Backyard" campaign to help community members identify the invasive species in their neighborhoods.

Early Detection & Rapid Response

BIISC completed two pilot early detection (ED) projects in March of 2007, and is expanding on both projects with the addition of an early detection team consisting of one botanist and two technicians. BIISC is currently in the hiring process to fill these positions. The early detection team will be based in Hawai'i Volcanoes National Park with the assistance of the USGS/BRD, with projects expected to take place in S. Kona and Ka'u. One of the priorities for this team is to review and integrate the existing data into the all-ISC early detection database. Currently BIISC allocates just 10 percent of one full-time data assistant to managing early detection data along with other duties. All early detection data duties will transfer to the ED team immediately upon hiring to complete the back log. In addition, the team will be expected to work with the early detection personnel based at the Bishop Museum as well as staff from the Weed Risk Assessment program.

BIISC field crews will act as the rapid response team should any new or targeted invasive species be found and require immediate action. The crew has already responded to devil tree *(Alstonia macrophylla)* by removing the only two known plants and completed a 5.75 acre survey to scout for additional plants. The current list of early detection target species was developed in conjunction with partnership agency's and other professionals. This list is expected to grow.

Priority Species

Miconia (*Miconia calvescens*)

BIISC continues to focus its strategy along a 40-mile containment buffer between Mālama Kī in lower Puna to Nino'ole in the Hāmākua districts. However, during this reporting period BIISC focused survey and control activities of miconia primarily in the upper Pu'ueo-Mauka region of Hilo, upper Puna, and Kona locations.

Hilo

In Hilo, crews focused operations in the Pu'ueo-Mauka area of North and South Hilo. This is probably one of the most difficult sites to conduct ground surveys as this area contains dense thickets of strawberry guava. However, crews expensed a total of 577 work hours to cover the area by foot. Even though aerial surveys did not reveal any large plants within strawberry guava thickets, crews found and controlled a large number of miconia plants within the area. A total of 5,462 plants were controlled of which 629 were mature plants. Roadside and ground surveys covered a total of 415 acres, while aerial surveys covered some 4,330 acres. Aerial surveys are expected to continue at higher elevations in the next two months. No aerial spray operations took place in the Pu'ueo-Mauka area. BIISC expects to review operational tactics for this site given its complexity.

Puna

In Puna, BIISC worked primarily in the upper Puna region focusing on two small isolated populations within the containment perimeter. Crews controlled a total of 746 plants, with 266 of these considered mature. A total of 159 work hours were utilized for ground operations while 40 work hours were dedicated to roadside surveys, covering a total of 181.31 acres. In addition, BIISC provided 3 hours of airtime to a partnership agency (DLNR) to conduct aerial surveys of the Wao Kele O Puna area. This was to assist an

ongoing spectral imaging project conducted by Mr. Greg Asner. Spectral imaging would allow the detection of miconia trees by simply taking an infared photo of forest and analyzing the spectral signatures of the plants. Though the data of this survey is unavailable at this time, BIISC hopes to share in the technology in order to conduct targeted aerial and ground control efforts once a spectral signature for miconia is defined.

BIISC Staff member Kathy Rodrigues (holding Miconia) with student volunteers of the Forest Team program from the Hawaii Community College Nanawale Forest Reserve - Puna

Kona

The strategy for miconia in Kona is full eradication for two locations. BIISC expanded aerial surveys for the Honalo and Honaunau populations, and focused ground control operations in Honalo. Ground operations covered 93.8 acres and controlled 711 miconia plants of which 6 were mature. A total of 320 work hours were expensed in Honalo. Aerial surveys covered a total of 1647.5 acres.

Plume Poppy *(Macleaya cordata formally Bocconia fructescens)*

BIISC continued to expanded aerial surveys in the Kaʻu and S. Kona districts outside of the known control perimeters. These surveys are in addition to those conducted during the last reporting period.

Kaʻu

BIISC focused survey and control activities in the Wood Valley area of Kaʻu. The strategy for this site is containment, as the area is heavily infested with Plume Poppy, particularly on agricultural lands being used to grow eucalyptus. Crews controlled a total of 3583 plume poppy plants of which 1678 were considered mature, covering a total of 127.28 acres. Aerial surveys covered some 2744.2 acres.

Kona

BIISC continues to work at two (2) sites in the Kona area, Honaunau and Honomalino. BIISC conducted aerial surveys for the Honaunau site only. No plants were found during the expanded aerial surveys in Honaunau, and crews were best utilized at the second site located in Honomalino. Ground operations in Honomalino found a total of 342 plants of which 272 were considered to be mature plants. BIISC surveyed a combined total of 1949.64 acres for Honalo and Honaunau from air and ground operations.

Fountain Grass *(Pennisetum setaceum)*

BIISC continues to expand its fountain grass control activities in the Kaʻu and South Kona districts. This project is a joint effort by staff from the Division of Forestry and Wildlife (DOFAW) and RCUH personnel of the Resource Management Division of Hawaiʻi Volcanoes National Park (RM/HAVO). BIISC personnel are controlling roadside populations within the Hawaiian Ocean View Estates (HOVE) - Ranchos subdivision makai of Highway 11, while RM/HAVO personnel continue working roadside areas mauka of Highway 11, and DOFAW crews continue to treat populations located just east of Ranchos in the Manukā Natural Area Reserve. With cooperation of the Ranchos Community Association, BIISC crews have controlled a total of 36.94 acres, treating a total of 3,545 plants of which 1,063 were considered mature. BIISC expended a total of 104 worker hours during this reporting period on fountain grass control. BIISC hopes to combine crews with its partner agencies to treat some of the larger populations in HOVE-Ranchos subdivision.

Pampas Grass (*Cortaderia jubata)*

BIISC crews surveyed roadsides in the South Kohala and Hāmākua regions of the Big Island for pampas grass. BIISC received one hotline report off the Mana Road area in Waimea (S. Kohala) however the report could not be confirmed. BIISC surveyed a total of 1,041 acres. In addition, BIISC recently received permission to remove pampas grass in the Waimea Golf Course as well as a private parcel in the same area. Due to weather constraints, BIISC staff has not been able to conduct control prior to this report, but BIISC expects full eradication in this management area to begin in early January of 2008.

Little Fire Ant *(Wasmannia auropunctata)*

BIISC assisted the Hawaiʻi Department of Agriculture in conducting surveys in West Hawaiʻi for little fire ant (LFA), by hiring one full-time technician. The primary mission of the project was to survey as many nurseries, hotels, golf courses and other venues as possible for the presence of LFA. Thirty two nurseries, 27 resorts/hotels, and 27 miscellaneous locations were surveyed. Miscellaneous locations were locations that were neither resorts nor nurseries that had reported fire ants such as public parks, private residences, or schools. No LFA were found at any of the surveyed locations in West Hawaiʻi. The ants found at these locations were mainly *Solenopsis geminata, Monomorium destructor*, or *Pheidole magacephala*. West Hawaiʻi Today, the Honolulu Advertiser and the Hawaiʻi Tribune Herald reported on the findings presented. The project was completed in June of 2007.

LFA remains a major concern for the coffee and agricultural industries, and poses an imminent threat to West Hawaiʻi given the large populations of LFA affecting nurseries, neighborhoods and agricultural lands spread across the eastern half of the Big Island.

Coqui *(Eleutherodactylus coqui)*

In 2007, BIISC supported community coqui control actions, assisted the DLNR Coqui Coordinator and helped the Coqui Frog Working Group (CFWG) to coordinate data from all agencies conducting control work on the island. BIISC dedicated a GIS technician as well as a data assistant to manage all action data collected by work crews doing control and continuously updated the Coqui Frog Working Group on data analysis on a monthly basis. In addition BIISC continues to monitor the invasive species hotline for coqui and other species reports. BIISC spent an estimated $45,000 on this project and has since passed this

duty on to the DLNR Coqui Coordinator. BIISC will continue to support this project with office space, equipment and 10 percent clerical assistance to the project for the remainder of Fiscal 2008.

BIISC continues to support community efforts in the upper Puna and Volcano Village areas with citric acid as well as two BIISC sponsored cell phones utilized by the community as dedicated hotline numbers for coqui. From 2006 to 2007 spray operations had been supported by coqui control grants from Hawai'i County. In addition, BIISC assisted the Volcano community in securing a small grant from the Hawai'i Economic Development Board to purchase road signs for various communities in and around the upper Puna and Volcano areas. BIISC provide additional tools and staff to assist in sign placements. For this reporting period, these groups have responded to a total of 135 hotline calls to BIISC sponsored cell phones, of which 89 locations were actively treated for coqui.

Treatment Site	Number of Sites	Number of Frogs
Volcano Village/Cymbidium Acres	36	≤ 3
Mauna Loa and Ohia Estates	32	≤ 3
Royal Hawaiian Estates	2 3 16	≤ 24 ≤ 12 1

ACTION SUMMARY FOR BIISC—2007

Target Species	Acres Surveyed	Acres Treated[1]	Mature Plants Treated	Immature Plants Treated	Effort (Hours)
Alstonia (Devil Tree)	5.75	.0002	2	0	4
Plume poppy	5698	.5249	2468	2781	2518
Pampas grass	1073	.078	78	0	177
Miconia	16110	.7762	1042	6720	1795.5
Fountain grass	1145	.5243	2761	2482	169
Little fire ant	17.9768	0	0	0	456
Coqui frog	.47	.0001	0	0	8
Total	24050.20	1.9037			

1. Calculated by multiplying 1/10,000th of an acre by the number of plants controlled.

OUTREACH & EDUCATION

Outreach remains a critical component of BIISC. BIISC completed a number of community presentations building upon its "*What's In Your Backyard?"* campaign. This campaign is to assist community members in identifying invasive species within their respective communities, making good decisions in plant selections for landscaping as part of the "don't plant a pest" campaign, as well as motivate community members to get involved with invasive species management by providing technical assistance in removal and/or herbicide use.

BIISC continues to be involved in numerous educational and fair events across the island. Two of the largest events were the Hawai'i County fair, where the BIISC booth attracted a very large number of people, and the annual Big Island Nurseryman's Association orchid and plant sale. BIISC gave out pens, crayons and coloring books, stickers, decals, posters, brochures, fans and magnets as part of our educational campaign on invasive species. In addition, BIISC continues to send local media multiple articles on invasive species, with one of these articles making the front page of the West Hawai'i Today and the Hawai'i Tribune Herald papers. This story highlighted BIISC surveys for little fire ant in West Hawai'i. The story was later picked up by the Honolulu Advertiser and the Star Bulletin.

BIISC staff Bobby Parsons, Zeada Pachecano and Melanie Wassman tending to the outreach booth at the Hawai'i County Fair

BIISC Partners

- Hawai'i Department of Agriculture
- Hawai'i Department of Land and Natural Resource—Division of Forestry and Wildlife
- University of Hawai'i (College of Tropical Agriculture and Human Resources, Pacific Cooperative Studies Unit)
- County of Hawai'i
- National Park Service—Hawai'i Volcanoes National Park
- U.S. Department of Agriculture (U.S. Forest Service, National Wildlife Research Center, Natural Resources Conservation Service)
- U.S. Fish and Wildlife Service
- U.S. Geological Survey
- Pacific Basin Information Node
- Hawai'i Invasive Species Management and Education Cooperation
- Kamehameha Schools
- Mālama o Puna
- The Nature Conservancy

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Julie Leialoha, BIISC Manager
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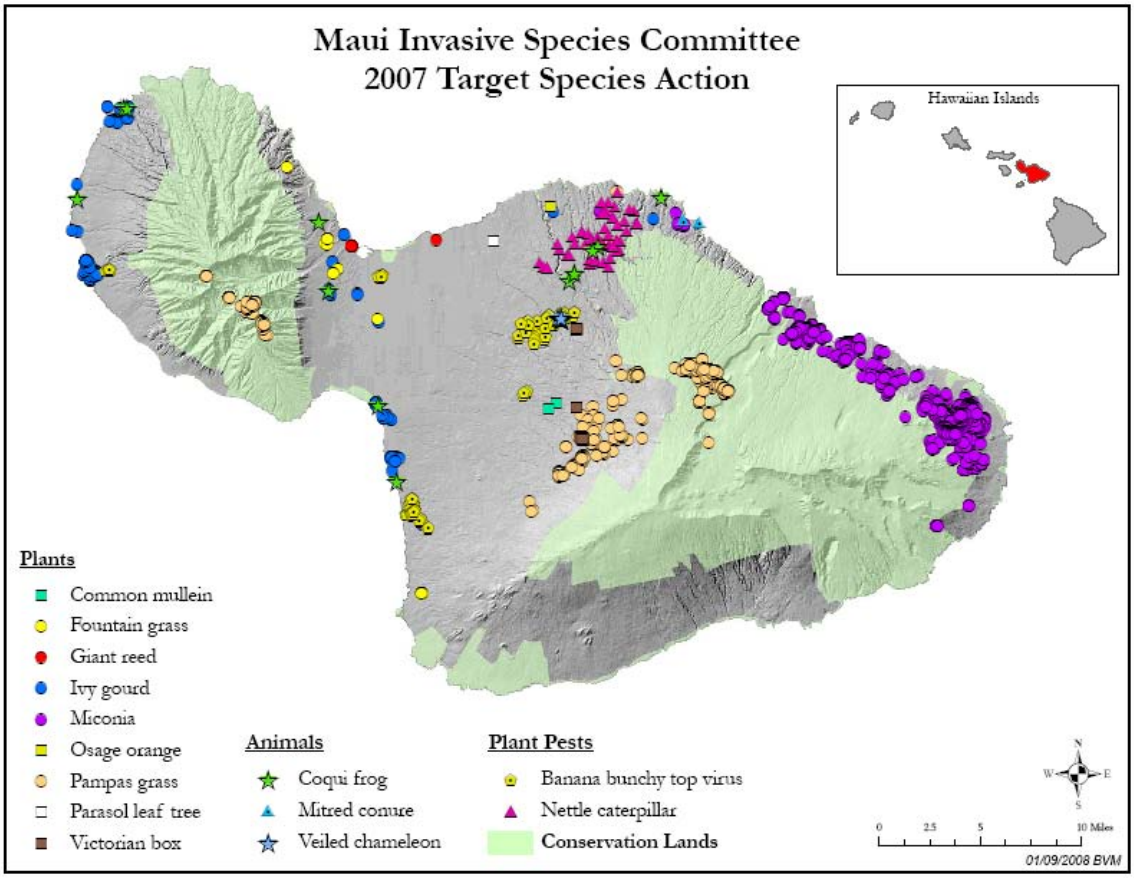
BIISC Excutive Committee Members: Ann Marie LaRosa, U.S. Forest Service; Laura Nelson, The Nature Conservancy; Pat Conant, Hawaii Department of Agriculture

Maui Invasive Species Committee (MISC)

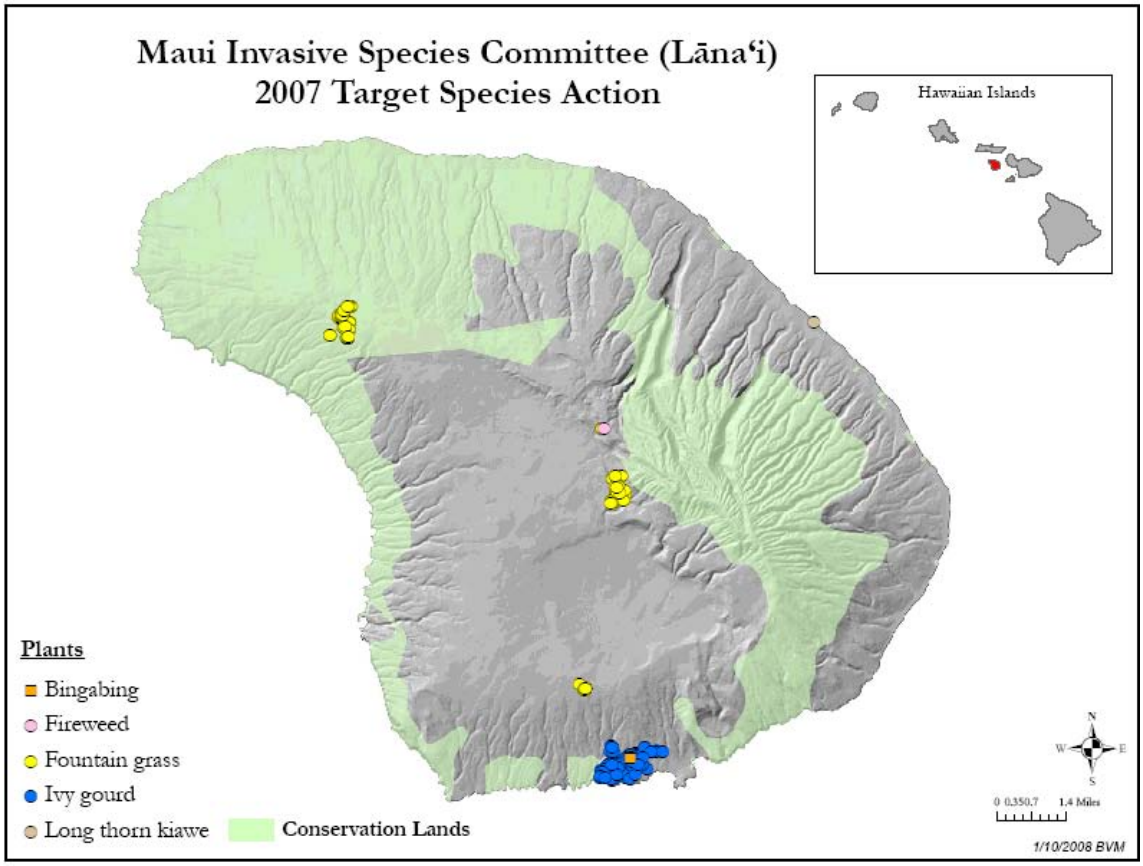


Project Strategy (Maui)

The Maui Invasive Species Committee seeks to limit the impact of biological invasions in order to protect the highly vulnerable and extraordinary endemic plants and animals that call Maui County "home." MISC focuses on invasive plants, animals, and diseases that pose demonstrable threats to Maui's environment, agriculture, economy, or quality of life. Field staff works primarily on the islands of Maui and Lānaʻi, while also providing occasional support on Molokaʻi. MISC provides fiscal oversight and administrative support for the Molokaʻi Invasive Species Committee (MoMISC). Effective partnerships, dedicated staff, a science-driven approach, and strong community support form the basis for MISC's successes to date and provide the inspiration for tackling Maui's challenges into the future.

Highlights

- Initiated roadside and nursery surveys to detect incipient invaders.
- Surveyed and controlled miconia across 37,000 acres.
- Completed eradication of coqui frogs from several known population centers.
- Reached thousands of residents and visitors through public awareness campaign.
- Partnered with other agencies to conduct native plant surveys and outplantings, and control of other invasive plant species.



Project Strategy (Lānaʻi)

On Lānaʻi, work focuses on early detection of new incipient species and on control of two primary target species – fountain grass and ivy gourd. Ivy gourd was added as a target during 2007. MISC sends field crews to Lānaʻi once every quarter. Each year, during one of the quarterly trips, the entire MISC staff participates in control efforts to ensure adequate coverage of the vast areas subject to fountain grass infestation. Work on the island benefits significantly from Castle and Cooke's support and cooperation.

Highlights

- Successful initial suppression of ivy gourd adjacent to the golf course at Mānele Bay.
- Significant decrease in the number of mature fountain grass plants.
- Eradication of the only known occurrence of bingabing on the island.
- Comprehensive survey of 773 properties indicating that banana bunchy top virus has not become established on Lānaʻi.

Clipping and bagging fountain grass flower heads before treatment.

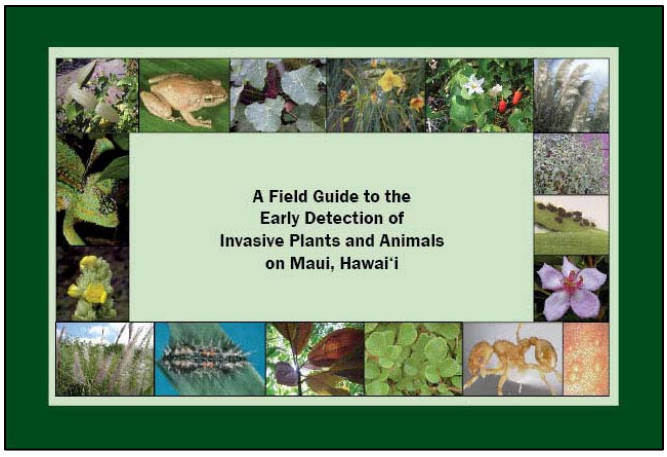
Early Detection & Rapid Response

The early detection of and rapid response to new non-native plants, animals, and plant pests presents the greatest opportunity for cost-effective control of biological invasions. Early detection activities by MISC included roadside botanical surveys, nursery surveys, stinging nettle caterpillar surveys, responding to reports of dead birds, educating students about the little fire ant, and improved staff capacity for detection.

Funds allocated to MISC supported early detection surveys on the island of Lānaʻi. In March, two U.S. Geological Survey botanists and one MISC Field Supervisor conducted roadside surveys. The team drove every publicly accessible paved road and some dirt roads at 5 to 10 mph, covering 104 miles, and searched for a target list of 115 species known to be invasive in Hawaiʻi or elsewhere. A total of 45 species were detected from the target list and an additional nine new island records were discovered. The surveys led to the removal of the only known location of bingabing (*Macaranga mappa*) and the evaluation of other species for control action. Routine survey work for fountain grass on Lānaʻi also led to the discovery and removal of the only known location of the highly noxious rubber vine (*Cryptostegia sp.*).

Botanists began conducting surveys of nurseries and botanical gardens on Maui. These surveys will provide valuable information about what is available to the public via the landscape industry. The weediness of each species observed is noted using the Weed Risk Assessment score, if available, and information from the Global Compendium of Weeds. When complete, the information will be used to guide future surveys or control work and will help with development of public awareness campaigns.

Members of the public regularly provide information about new or unusual species. To help the public recognize invasive species, MISC's Maui News column, "*Kiʻa Moku*," focused on a different species each month. The columns are available online at: www.hear.org/misc/mauinews/ . Staff also completed an Early Detection Field Guide, which will form the basis for workshops offered to the public and targeted industry groups.



Staff conducted weekly surveys of stinging nettle caterpillars using pheromone traps in the Haʻiku area in cooperation with the Hawaiʻi Department of Agriculture and the U.S. Department of Agriculture. The survey area covers 33 square miles. MISC staff checked 43 traps in 13 one-square-mile grids, with USDA and HDOA covering the other areas. During a thirteen-week period, the total number of adult moths caught per week in MISC's survey area varied, with a low of zero in December to highs of 71 and 70 in early October and late November, respectively. HDOA is conducting the surveys to delimit the extent of the population in order to determine whether control of this pest is still feasible on Maui.

Funds from the U.S. Fish & Wildlife Service and the State of Hawaiʻi supported development of a program for the early detection of West Nile Virus and Avian Influenza. MISC staff collected and

submitted dead birds and feral chickens for testing. No incidences of WNV or AI were detected.

The MISC headquarters became the "home" for the HISC-funded Weed Risk Assessment technician. This has proven to be an excellent partnership given the additional plant identification expertise that is now available on site for any unusual reports from the public.

Priority Species

Miconia *(Miconia calvescens)*
Miconia is MISC's number one plant priority, both in terms of its threat to Maui's forested watersheds and in terms of resources dedicated to control efforts. One full-time crew focuses almost exclusively on miconia in the East Maui Watershed. Survey and control also occurred in the peripheral subpopulations, as far west as Haʻiku.

Aerial and ground operations help detect and control this forest invader. Aerial survey and control operations occurred on 32 days, typically using two helicopters simultaneously for maximum efficiency. A total of 34,771 acres were surveyed by air. Ground and aerial operations controlled 101,489 miconia plants. Some miconia infestations include vertical terrain or nearby power lines, making access difficult by ground or air. Staff rappelled into a number of steep slope areas and removed many miconia plants which could not be reached any other way. Aerial operations were possible with funding support from the National Park Service and the State of Hawaiʻi while additional funding from the County of Maui helped staff the Hāna operation.

The U.S. Geological Survey's research scientist presented the results of the accelerated aerial control of miconia at an international conference on plant invasions held in Perth, Australia.

Pampas Grass *(Cortaderia jubata and C. selloana)*
Pampas grass threatens both the East and West Maui Watersheds, ranchlands, and the spectacular resources of Haleakalā National Park. Control efforts in upcountry neighborhoods are successfully containing residential infestations, with the exception of a few properties where recalcitrant landowners continue to deny access. Aerial surveys over more remote areas covered 13,770 acres. The combined ground and aerial approach controlled a total of 2,373 plants.

Field staff continued to use remote camps as a base for ground work in the higher elevations. The annual "Hands Across the Crater" front country sweeps covered 650 acres and involved staff from Leeward Haleakalā Watershed Restoration Project, DLNR-Natural Area Reserves, East Maui Watershed Partnership, and Haleakalā National Park.

Ivy Gourd *(Coccina grandis)*
Most ivy gourd infestations are concentrated in South and West Maui. In many areas, efforts focus on revisits to previously known sites to control new plants that sprout from existing seed banks. A better understanding of how long seeds remain viable and which environmental conditions foster seed germination could help reduce revisit intervals. Staff initiated germination trials at an infested nursery to measure these variables.

Staff completed initiated suppression of ivy gourd at the newly discovered but well established infestation at the Mānele Bay golf course on Lānaʻi and controlled 7,193 plants (counted as root

nodes). Continued revisits will address the seed bank.

Coqui frog *(Eleutherodactylus coqui)*

Consistent control work and habitat modification by the vertebrate crew resulted in continued reductions in coqui frog population densities and infested acreage across the island. On Maui, frog control efforts continue year-round, with habitat work occurring during the day and detection and spray efforts scheduled for the evening. Of the fourteen known population centers on Maui, four are considered eradicated and two more are approaching the one-year mark with no frog activity detected. The infestations are contained at all other sites, with the exception of Māliko Gulch. Reintroduction of frogs, especially at nurseries, continues to thwart eradication efforts.

In spite of the substantial challenges associated with working in the steep-sided, heavily vegetated Māliko Gulch, considerable progress has been made to make access feasible. Additional funding from HISC's Research and Technology grant program helped support development of a fixed high-volume spray-gun system in the lower section of the gulch. The spray guns will be used to deliver citric acid into areas that are otherwise inaccessible. Field staff began opening a trail system into the gulch, have identified spray stations locations, and are acquiring the necessary equipment to initiate operations during spring of 2008. If successful, this approach could be useful for control efforts in similar habitats on the island of Hawai'i.

Other vertebrates

Night-time searches in the Makawao area for the veiled chameleon (*Chamaeleo calyptratus*) turned up nine (9) individuals. Searches occurred on 23 nights and included a total of 124 properties over the year with repeat visits to sites where the chameleons have been recovered. This illegal reptile poses a threat to Maui's native forest birds because of its larger size and adaptability to a wider variety of habitats. All animals are turned over to the Hawai'i Department of Agriculture.

Control of the cliff-dwelling parrots (*Aratinga mitrata*) in the Huelo area continued to reduce the flock size. Surveys at the end of the year indicated that the flock numbers between 40 and 50 birds. Control has been a joint project with staff from the Department of Land and Natural Resources.

Banana bunchy top virus

Inspecting bananas for BBTV.

MISC increased staff capacity for detecting BBTV by training all field staff in how to identify BBTV. This additional training allowed staff to conduct surveys in the Hāna area, where the disease was not found. Increased surveys in 2007 revealed that the virus is present in more areas on Maui than previously known. Infected banana plants have been found in Pukalani, Makawao, Kula, Kīhei, Kahului, Wailuku, and Lahaina. Staff surveyed 2,926 properties on Maui and detected BBTV at 143 sites. An estimated 1,226 banana plants were treated. Given the current distribution, the strategy has shifted to management of the most infested areas and enhanced outreach and education. Staff worked cooperatively with local farmers and collaborated with statewide researchers.

Using information from Hawai'i-based research, staff designed a sampling protocol for surveys around newly detected infestations in order to reduce the need to inspect every property with bananas. Comprehensive follow-up surveys showed that this approach provided a reliable indication of the level of infestation in an area.

Action Summary for MISC – 2007 (Maui)

Target Species	Acres Surveyed	Acres Treated[1]	Mature Plants Treated	Immature Plants Treated	Effort (Hours)
Bully tree	10	0	0	0	-
Cape pittosporum	4	0	0	0	-
Cat's claw	3	0	0	0	-
Common mullein	33	<.01	10	27	6
Fountain grass	520	0.02	11	66	152
Giant reed	45	0	0	0	6
Ivy gourd	1,628	0.22	815	1,372	586
Miconia	37,330	8.06	527	100,962	9,812
Osage orange	4	0.29	0	1,000	6
Pampas grass	16,805	0.20	680	1,693	1,800
Parasol leaf tree	1	<.01	1	0	3
Rubber vine	11	0	0	0	4
Victorian box	2,064	0.01	56	86	180
Wax myrtle	2	0	0	0	2
Total	58,460	8.80			

1. Calculated by multiplying 1/10,000th of an acre by the number of plants controlled.

Action Summary for MISC – 2007 (Lāna'i)

Target Species	Acres Surveyed	Acres Treated[1]	Mature Plants Treated	Immature Plants Treated	Effort (Hours)
Bingabing	2	<0.01	0	2	1
Fireweed	<1	<0.01	1	0	-
Fountain grass	528	0.19	335	2,241	628
Ivy gourd	570	1.80	344	6,849	182
Long thorn kiawe	1	<0.01	2	1	1
Total	1,101	1.99			

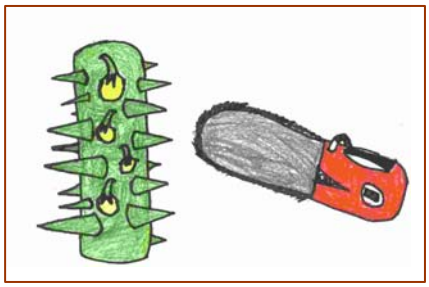
1. Calculated by multiplying 1/10,000th of an acre by the number of plants controlled.

Staffing

At the end of 2007, MISC staff included 25 FTE, plus several part-time positions. MISC has three full-time field crews. The Hāna-based crew focuses on miconia in the East Maui Watershed. Two other crews base out of upcountry Maui. One crew targets plant targets on Maui and Lāna'i, while the other field crew works on coqui frogs, banana bunchy top virus and other targets. MISC staff also includes a data technician, outreach & education specialist, program specialist, and manager.

Outreach & Education

The success of the MISC program is a result of strong public support. Involved and knowledgeable members of the public become additional "eyes and ears" who can help detect new plant or animal invasions. Concerned residents provide essential access to private property, sometimes working alongside field staff to remove target species. And the students and keiki of Maui Nui provide the basis for MISC's future success as they become educated about the threats that invasive species pose to the health of the ʻāina they will inherit.



Keiki drawing of Himalayan raspberry control

During 2007, the MISC message was publicized through a variety of media and at different venues. A total of 31 articles published in local newspapers and trade and agency newsletters featured MISC activities or target species. MISC published its own bi-annual newsletter, *Kiʻa Na Moku O Maui Nui*, with one volume focused on the coqui frog and the next one featuring miconia. Electronic versions of the newsletter are available at: www.hear.org/misc/newsletter . These publications reached a combined audience of at least 35,500 readers. Public presentations to community associations and professional organizations reached an additional 400 individuals.

Having a consistent presence at community events has proven to be an effective way to interact with the public. Hoʻolauleʻas, the County Fair, Earth Day, and other Maui venues allowed MISC to reach an estimated 3,976 people. This year, MISC's participation in the Makawao Fourth of July parade once again snagged the "Most Unusual Entry" Award, with a menagerie of over-sized snakes, frogs, parrots, and a veiled chameleon perched atop the MISC truck/float. During the Arbor Day event, MISC presented its 5th Annual Mālama i ka ʻĀina Award to the Friends of the D.T. Fleming Arboretum for their work in controlling invasive species and protecting Maui's dryland native forests through seed propagation.

During day-to-day control activities, field staff worked at 5,092 sites on Maui, most of which are individual properties. These site visits usually involve direct contact with residents and provide a unique educational opportunity. Activities with Maui County students and teachers included school visits and promotion of the Hoʻike o Haleakalā curriculum through teacher training workshops. Classroom visits and volunteer activities with students involved 985 students.

MISC Partners

- Hawai'i Department of Agriculture
- Hawai'i Department of Land and Natural Resources
- Hawai'i Department of Health
- The Nature Conservancy of Hawai'i
- University of Hawai'i - College of Tropical Agriculture and Human Resources
- University of Hawai'i - Pacific Cooperative Studies Unit
- Maui County Department of Water Supply
- Maui County Office of Economic Development
- U.S. Department of Agriculture - Natural Resources Conservation Service
- U.S. Forest Service
- USDA – Wildlife Services
- USDA - Tri-isle Resource Conservation and Development Council, Inc.
- Haleakalā National Park
- National Park Service – Pacific Islands Exotic Plant Management Team
- U.S. Fish and Wildlife Service
- U.S. Geological Survey -Biological Resources Division
- U.S. Geological Survey – Pacific Basin Information Node
- Maui Land and Pineapple Company

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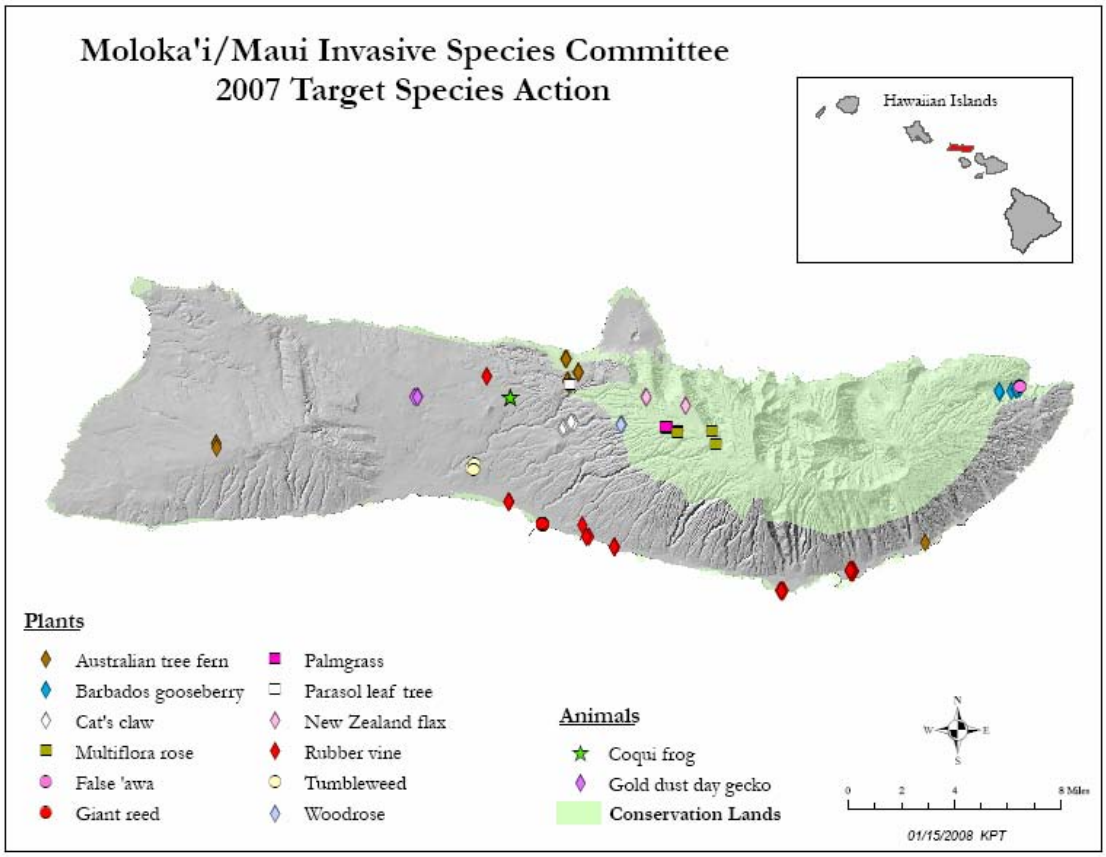
Moloka‘i Invasive Species Committee (MoMISC)



Project Strategy

The Moloka‘i/Maui Invasive Species Committee is a group of knowledgeable people from private organizations, government agencies, and the community working together in a grass-roots effort to protect Moloka‘i from invasive pests. With limited staff, project success depends on efficient common-sense strategies achieved through the commitment and collaboration of diverse agencies and the community.

Highlights

- Received $20,000 grant to continue early detection aerial surveys for miconia. To date, no miconia found.
- Successfully controlled an introduction of the coqui frog.
- Trained Youth Conservation Corps & AmeriCorps interns in identification, and control strategies; worked collaboratively with the new USDA-PPQ officer.
- Assisted in weed control efforts for the East Moloka‘i Watershed Partnership and on The Nature Conservancy preserves.
- Initiated aerial and ground surveys for Australian tree fern.
- Continued public relations and outreach through community workshops, door-to -door canvassing, news articles, display boards, and an airport kiosk.

Early Detection & Rapid Response

MoMISC's priority is the early detection of alien pest species, coupled with rapid response to control them before they become wide spread. MoMISC has consistently followed its established priority to survey all inaccessible remote forests that could serve as potential habitat for miconia (*Miconia calvescens*), Australian tree fern (*Cyathea cooperi*), and other invasive pests. MoMISC's strategy is to complete aerial surveys of the entire forested watershed at three-year intervals. Early detection aerial surveys for the highly invasive miconia tree were initiated in 2005 and have continued each year since then, including in 2007. No miconia has been detected in surveys to date, but MoMISC has a rapid response plan for control of this pest should it ever be detected.

Early detection aerial surveys on Molokaʻi

MoMISC conducted its first early detection road side survey for invasive pests in 2002.

All roads on Molokaʻi were surveyed in 2005 by botanists with the U.S. Geological Survey. Road side surveys have led to the detection and control of invasive species on the island. In 2007, MoMISC controlled a single parasol leaf tree (*Macaranga tanarius*) tree and a patch of palm grass (*Setaria palmifolia*) detected in road side surveys.

MoMISC responded rapidly to a report of coqui frog in 2007. The frog was believed to have "hitchhiked" on a shipment of lumber from a neighbor island. This was the second successful control of coqui on Molokaʻi. The first coqui detected on Molokaʻi occurred several years ago and was believed to have arrived in a shipment of bromeliads from a neighbor island.

MoMISC staff continued to provide the Hawaiʻi Department of Agriculture with voucher specimens for a variety of plant pathogens and pests. Staff also welcomed Molokaʻi's first full-time protective plant quarantine inspector from the U.S. Department of Agriculture. The new port manager has already hired a part-time technician to assist at the airport. The new USDA inspector is currently working with MoMISC staff to become familiar with Molokaʻi's invasive species issues. This positive working relationship is expected to enhance the early detection of new species.

For the past several years, MoMISC has worked to secure a State agricultural inspector for Molokaʻi. In late 2007, the Hawaiʻi Department of Agriculture conducted the first risk assessment for Molokaʻi. The Committee looks forward to learning the results of the risk assessment.

Priority Species

Australian tree fern *(Cyathea cooperi)*

The Australian tree fern has become a serious pest in the native forests of Hawaiʻi. This species is

more aggressive, faster-growing and taller than the native hapu'u fern. The Australian tree fern outcompetes and displaces much of the native vegetation in the forest. The fern's many spores are borne on the wind and disperse great distances. MoMISC's survey and control actions are working to stop the spread of this invader.
Staff has conducted on-the-ground as well as aerial surveys for Australian tree fern. All tree ferns found were controlled. MoMISC has found that manual removal of this invasive fern is highly effective.

Removing Australian tree fern

Giant reed *(Arundo donax)*
All known populations of the giant reed have been successfully controlled on Moloka'i. A new location in Kaunakakai was discovered when plants sprouted after the landowner cleared the land. A cooperative project with the state Highways Division led to removal of the plants. Naupaka, mao, and aki aki plants were donated by U.S. Department of Agriculture's Plant Material Center and MoMISC did the restoration planting.

Rubber vine *(Cryptostegia grandiflora)*
After the 2006 initial suppression of a large infestation of toxic rubber vine and numerous smaller populations, the control efforts appear to be successful. Only new plants and very few re-growths were treated during 2007. The successful control efforts of rubber vine on Molokai proved that large suppression of invasive species could be achieved through the collaboration of agencies and with community support.

Barbados gooseberry *(Pereskia aculeata)*
Control efforts continued for gooseberry with an expanded survey area. A few plants were detected and treated. Control is particularly challenging when gooseberry has been severed from the ground and then grows parasitically in the canopy of large trees. MoMISC's strategy is to kill the large non-native host trees so the gooseberry can be treated when it falls to the ground. MoMISC is killing the host trees slowly by girdling with herbicide to replicate a natural decaying process, as opposed to opening up the forest canopy using chain saws.

Other

MoMISC provided work and invasive species training opportunities to the Youth Conservation Corps, AmeriCorps interns and USDA Protective Plant Quarantine staff.

Action Summary for MoMISC – 2007

Target Species	Acres Surveyed	Acres Treated[1]	Mature Plants Treated	Immature Plants Treated	Effort (Hours)
Australian tree fern	88	0.01	35	123	116
Barbados gooseberry	46	0.01	145	540	102
Cat's claw	72	1.79	37	2160	58
False 'awa	1	<.01	100	200	46
Giant reed	7	<.01	1270	3	73
Multiflora rose	10	<.01	28	81	40
New Zealand flax	135	<.01	0	26	121
Palm grass	6	<.01	104	27	9
Parasol leaf tree	1	<.01	1	0	8
Rubber vine	70	1.77	112	603	122
Russian thistle	5	<.01	14	68	4
Woodrose	5	<.01	4	90	13
Coqui frog	1	<.01	1	0	41
Gold dust day gecko	17	0.50	16	1	6
Total	464	4.11			

1. Calculated by multiplying 1/10,000th of an acre by the number of plants controlled.

Staffing

The Moloka'i / Maui Invasive Species Committee has a full time staff of two technicians. For part of the year, the MoMISC staff expanded to include a part-time position to help with outreach and administration. The Nature Conservancy (TNC) on Moloka'i continued to provide management assistance, office space, and supervision by the Program Director. TNC and MoMISC partner on a variety of field projects, making it feasible for MoMISC to cover larger areas during reconnaissance and control operations.

Outreach & Education

Keeping the public informed about the most likely species to invade Moloka'i is a cornerstone of the MoMISC strategy. An eye-catching educational display was installed at the Young Brothers office at the Kaunakakai wharf. The large display is in an excellent location on the wall of the building, right where many residents must wait to conduct their business. The board features invasive species topics that are changed periodically. MoMISC also has invasive species information in the airport kiosk which is changed periodically. Invasive species news articles that relate to the current displays are released to the local papers.

Staff attended community events on behalf of MoMISC, including the annual Earth Day gathering

in April. During door-to-door canvassing in Kualapuʻu about the coqui frog, MoMISC staff spoke with many residents about a variety of target species. Informational flyers about the tree fern, coqui frogs, and long thorn kiawe were posted at prominent display boards.

MoMISC Partners

- Hawaiʻi Department of Agriculture
- Hawaiʻi Department of Land and Natural Resources
- The Nature Conservancy of Hawaiʻi
- University of Hawaiʻi - College of Tropical Agriculture and Human Resources
- University of Hawaiʻi - Pacific Cooperative Studies Unit
- Molokaʻi-Lānaʻi Soil Conservation District
- Maui County Department of Water Supply
- Maui County Office of Economic Development
- U.S. Department of Agriculture - Natural Resources Conservation Service
- U.S. Forest Service
- USDA - Plant Protection and Quarantine
- USDA - Tri-isle Resource Conservation and Development Council, Inc.
- Kalaupapa National Park
- U.S. Geological Survey – Pacific Basin Information Node

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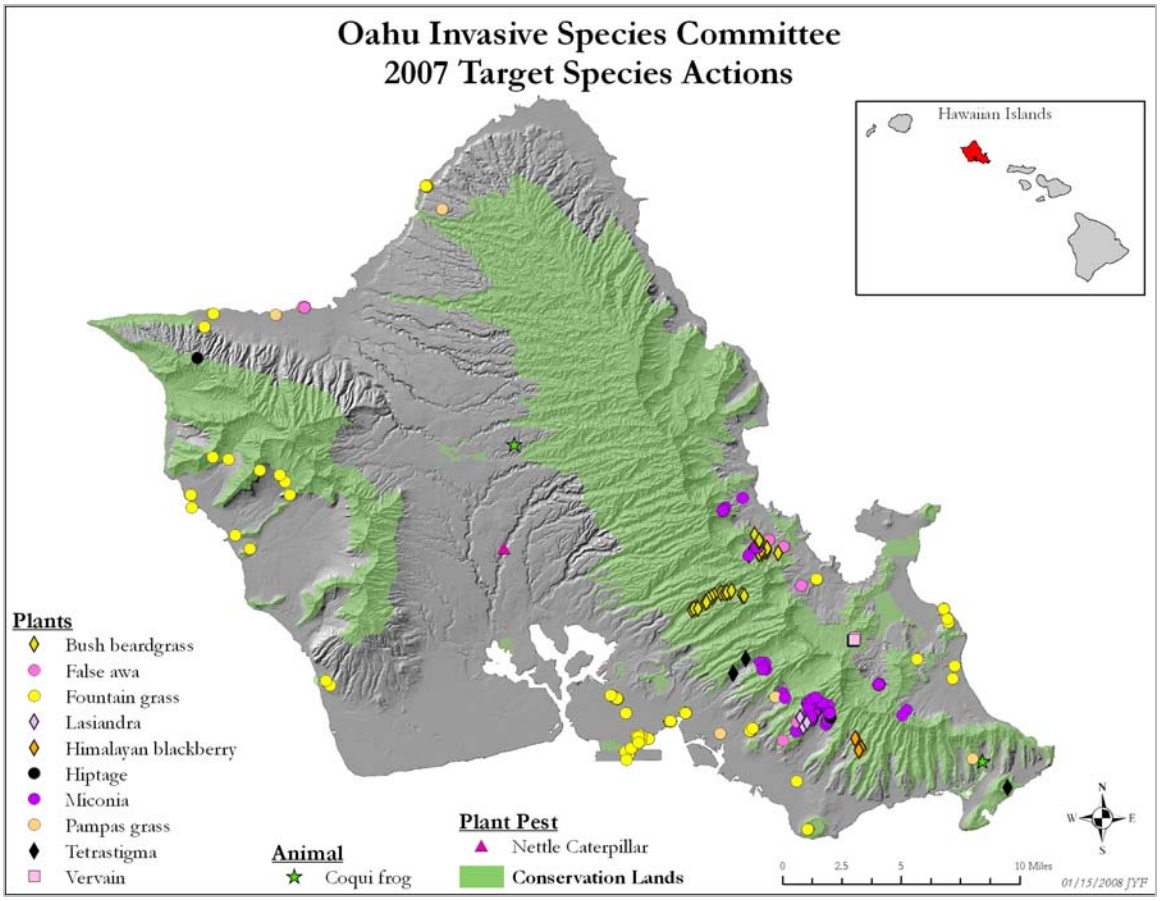
Lori Buchanan, MoMISC Field and Outreach Technician, lbuchanan@tnc.org
Ed Misaki (The Nature Conservancy), MoMISC Chair, emisaki@tnc.org

O'ahu Invasive Species Committee (OISC)



Project Strategy

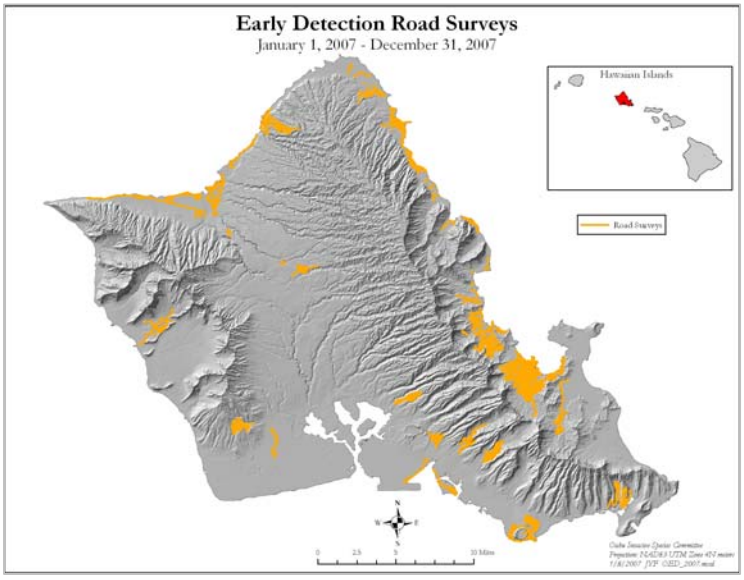
The O'ahu Invasive Species Committee (OISC) is a partnership between government agencies and private organizations united to protect O'ahu from invasive species. Through on-the ground surveys and systematic removal of invasive species, OISC eradicates, contains, or prevents the establishment of those species that pose the highest threat to native forests and watersheds, the economy, and O'ahu citizens' quality of life.

Highlights

- Surveyed 35,835 acres for 31 different invasive species and removed 20,990 individual plants.
- Spearheaded interagency project which eliminated Oahu's only naturalized population of coqui frogs.
- Participated in interagency response to nettle caterpillar incursion.
- Organized three television appearance and 15 outreach events.
- Leveraged HISC core funding and raised $200,000 from other sources.
- Participated in innovative HDOT program to prevent introduction of invasive species via construction equipment.

Early Detection & Rapid Response

Early detection finds invasive species before they have "jumped the fence line" and are easy and cheap to eradicate. Initiated in July 2006 in cooperation with the Bishop Museum, the O'ahu Early Detection Program finds new and potentially invasive plants before they cause environmental, economic, or quality of life problems. This is the first time a program of this scale has been attempted on O'ahu and it is a pioneering effort to reduce the cost of invasive species eradication and control.



Map showing location of O'ahu Early Detection road surveys

The OED team identifies plants that have been newly introduced to O'ahu and then assesses their invasiveness based on the species' biology and history elsewhere. The team visits nurseries and botanical gardens to find new introductions and also conducts road surveys. Once the team recommends a species for control, the O'ahu Invasive Species Committee conducts delimiting surveys and removal. This is an experimental program and the OED team has already discovered that:

- Private citizens (in addition to commercial growers and botanical gardens) are an important introduction point for new plants;
- Landowner consent is crucial for success since new, potentially invasive plants are often on private land.
- Nursery growers themselves are often unsure of the species of plants they are importing for cultivation.

The OED team assists nursery growers by identifying plants for them and assessing their invasiveness. The growers themselves are able to decide whether or not to continue marketing the plant since the distribution of newly introduced and potentially invasive plants is mostly unregulated.

In 2007, the OED team also participated in an innovative Hawai'i Department of Transportation (HDOT) program that will prevent the introduction of new weeds via construction vehicles. Weed seeds are known to hitchhike on dirty equipment and vehicle tires and sometimes the weed in question is not present on O'ahu. OISC believes that construction vehicles introduced bush beardgrass *(Schizachyrium condensatum)* to O'ahu from the Big Island, where it is an established pest.

HDOT has initiated a pilot project requiring the contractors for a large O'ahu project to survey for weeds before and after the project is completed. The contractors will then be responsible for any weeds their activities introduced to the site. The contractors are required to clean vehicles brought

from other islands or the mainland before use at the site. The OED botanists performed the pre-construction surveys for this project and will likely re-survey after the project is over.

Rapid response is the quick control of invasive species whose populations are small and can be eliminated in a short time. OISC staff successfully eliminated a population of purple-headed vervain *(Verbena bonariensis)*, a low-growing herbaceous weed with invasive properties from the Castle Junction highway interchange in Kailua. OISC crew surveyed around known plants to check for spread. In this case, OISC surveyed all ground within 100 meters of the plants and then all suitable habitat within 800 meters of the plants. Initial control was very successful and took only 36 people hours to complete. Follow-up work and monitoring to deplete the seed bank is still necessary.

Priority Species

Coqui frog *(Eleutherodactylus coqui)*
OISC and its partners in the Coqui Working Group (CWG) successfully removed a population of approximately 125 calling male frogs from a forested gulch between Schofield East Range and a residential Wahiawā neighborhood. Funding and logistical support from its partners helped OISC hire a dedicated crew to systematically spray citric acid, remove habitat, and monitor the area. The Coqui Working Group (CWG) consists of OISC, Hawai'i Department of Agriculture, DLNR/DOFAW, O'ahu Army Natural Resources Program, Division of Public Works U.S. Army Garrison and the City and County of Honolulu.

OISC crew member Susie Iott taking down a mature miconia tree spotted during an aerial survey.

The CWG had great success in Wahiawā, but coqui frogs are still being constantly introduced to O'ahu. Continued funding is necessary to prevent coqui frogs from establishing on this island. Coqui frogs are brought to O'ahu in infested plants and vehicles shipped in from the neighbor islands. Although plants are required to be treated some frogs survive.

Proof that frogs are escaping treatment is the number of frogs caught at private homes between January 1, and November 30, 2007. During this time, 11 frogs were caught at private residences in Hawai'i Kai, Honolulu, Nu'uanu, Kalihi, Kailua, Waipahu and Ewa. HDOA and OISC share the work of monitoring nurseries and responding to coqui frog reports from across the island.

Miconia *(Miconia calvescens)*
Miconia continues to be OISC's top priority target. Left uncontrolled, it could completely dominate the forests of the southern Ko'olau Range. Miconia's habitat altering properties could irrevocably

damage the island's soil stability and fresh water supply. When the OISC crew discovers a mature tree, they remove it and survey an 800 meter radius around the place where the tree was. An addition mile from historical trees is surveyed by air. Areas inaccessible by foot within the 800 meter ground buffer are also surveyed by air. Miconia trees set seed between three and five years of sprouting, so OISC revisits previously surveyed areas every three years to catch any seedlings before they mature.

In 2007, the OISC field crew surveyed 7,103 acres and removed 2,869 trees, three of them mature. All the mature trees were found in buffer areas that had not been surveyed before.

OISC leveraged Hawai'i Invasive Species Council funding in 2007 with $35,000 for helicopter surveys from the National Fish and Wildlife Foundation and $85,000 for ground surveys from the Hawai'i Tourism Authority.

Himalayan blackberry *(Rubus discolor)*
Himalayan Blackberry is a thorny bush that can outcompete native plants and blocks access to recreation sites. It is a pest in many mainland states as well as Australia and New Zealand. In 2007, OISC expanded its surveys around the initial Mau'umae Ridge population and found additional pockets of blackberry. These populations have been controlled and follow-up work will continue in 2008. Volunteers contributed 235 hours to help control this species.

Hiptage *(Hiptage benghalensis)*
Hiptage is a pervasive weed in the Ko'olau Range that is already out of control. There had been only one record of it in the Wai'anae in Mokule'ia Forest Reserve. OISC considered this a priority given the historical plant's proximity to intact native forests in natural area reserves and at the summit. The OISC crew surveyed all areas within 100 meters, and suitable habitat (streams and gulches) within 800 meters of the original plant and found only one re-sprout. The re-sprout was removed.

Tetrastigma (*Tetrastigma pubinerve*)
There are only two known populations of *Tetrastigma pubinerve* on O'ahu. One is in a botanical garden and the other is alongside the Likelike Highway, which cuts through the Ko'olau Mountains. Tetrastigma grows quickly and smothers vegetation. Both O'ahu populations have been treated but monitoring and treatment for re-growth is still necessary. In 2007, OISC surveyed 1,850 acres of buffer areas around the two Tetrastigma populations and did not find any additional populations.

Nettle Caterpillar *(Darna pallivitta)*
OISC assisted the Hawai'i Department of Agriculture respond to an incursion of nettle caterpillar, a plant pest with a painful sting that was previously not known to occur on O'ahu. OISC employees assisted HDOA with control work at the nursery where the pest was first discovered and are now regularly checking and setting traps for delimiting surveys.

West Nile Virus
OISC continued to assist the Hawai'i Department of Health in its West Nile Virus early detection efforts by delivering the carcasses of dead birds to the HDOH laboratory for testing. The dead birds are reported by the public who call the 211 hotline. In 2007 OISC personnel responded to 162 dead bird reports.

Action Summary for OISC—2007

Target Species	Acres Surveyed	Acres Treated[1]	Mature Plants Treated	Immature Plants Treated	Effort (Hours)
Coqui frog	NA	NA	NA	NA	1064.5
False ʻawa	31.32	.18	38	1798	227.5
Fountain grass	3183.2	.18	325	1477	666.6
Himalayan blackberry	92.5	.11	12	1101	868
Hiptage	130.75	.02	0	1	200
Lasiandra	13.08	.01	36	79	69.5
Miconia	7103.18	.29	6	2863	4557.25
Pampas grass	3.15	<.01	3	1	106.5
Smoke bush	1299.85	0	0	0	92
Tetrastigma pubinerve	1840.78	.02	0	235	104
Vervain	103.9	<.01	44	28	40
Other	22033.5	1.33	2576	13714	2412.85
Total	35835.19	2.1			

1. Calculated by multiplying 1/10,000th of an acre by the number of plants controlled.

Staffing

OISC's full regular staff numbers thirteen. There are eight field crew members including a field coordinator and one Americorps intern. An additional temporary crew implemented the coqui field work during the 2007 summer season. OISC's vertebrate specialist manages the coqui program and the temporary crew. OISC's outreach specialist educates the public about invasive species and helps to increase awareness of coqui frog and other target species. The OISC operations manager, administrative associate and data analyst support the rest of the team.

Outreach & Education

In 2007, OISC set up an educational booth at fifteen events, appeared in three television appearances and was interviewed for two newspaper articles. The outreach specialist also participated in discussions about invasive species outreach with Hawaiʻi Superferry officials and developed a brochure about invasive ornamental plants.

In 2007, OISC hosted twelve volunteer events that attacked a variety of invasives including Himalayan blackberry, manuka, and fountain grass. Twice in 2007, OISC assisted community groups by using its network to round up volunteers and lending staff expertise. For example, OISC gathered volunteers to assist clearing long-thorn kiawe at Mokuaea Island and to clear various invasive species along the Mānoa cliff trail. In 2007, volunteers contributed 1,062 hours to OISC's work.

OISC Partners

- Hawai‘i Department of Agriculture
- Hawai‘i Department of Land and Natural Resources Division of Forestry and Wildlife
- Hawai‘i Department of Health
- Hawai‘i Department of Transportation Highways Division
- Hawai‘i Army National Guard
- Bernice Pauahi Bishop Museum
- The Nature Conservancy of Hawai‘i
- University of Hawai‘i College of Tropical Agriculture and Human Resources
- University of Hawai‘i Pacific Cooperative Studies Unit
- University of Hawai‘i Lyon Arboretum
- City and County of Honolulu
- Honolulu Board of Water Supply
- USDA Natural Resources Conservation Service
- USDA Forest Service
- USDA Plant Quarantine
- USDA Tri-isle Resource Conservation and Development Council, Inc.,
- O‘ahu Army Natural Resources Program
- U.S. Fish and Wildlife Service
- U.S. Geological Survey Biological Resources Division Haleakala Field Station
- U.S. Marine Corps Base Hawai‘i
- Pono Pacific Ecosystem Restoration Services
- Pisces Pacifica
- Conservation Council of Hawaii
- Hui Ku Maoli Ola
- Sierra Club Hawai‘i Chapter
- Coordinating Group on Alien Pest Species
- Hawai‘i Invasive Species Council
- Ko‘olau Mountains Watershed Partnership

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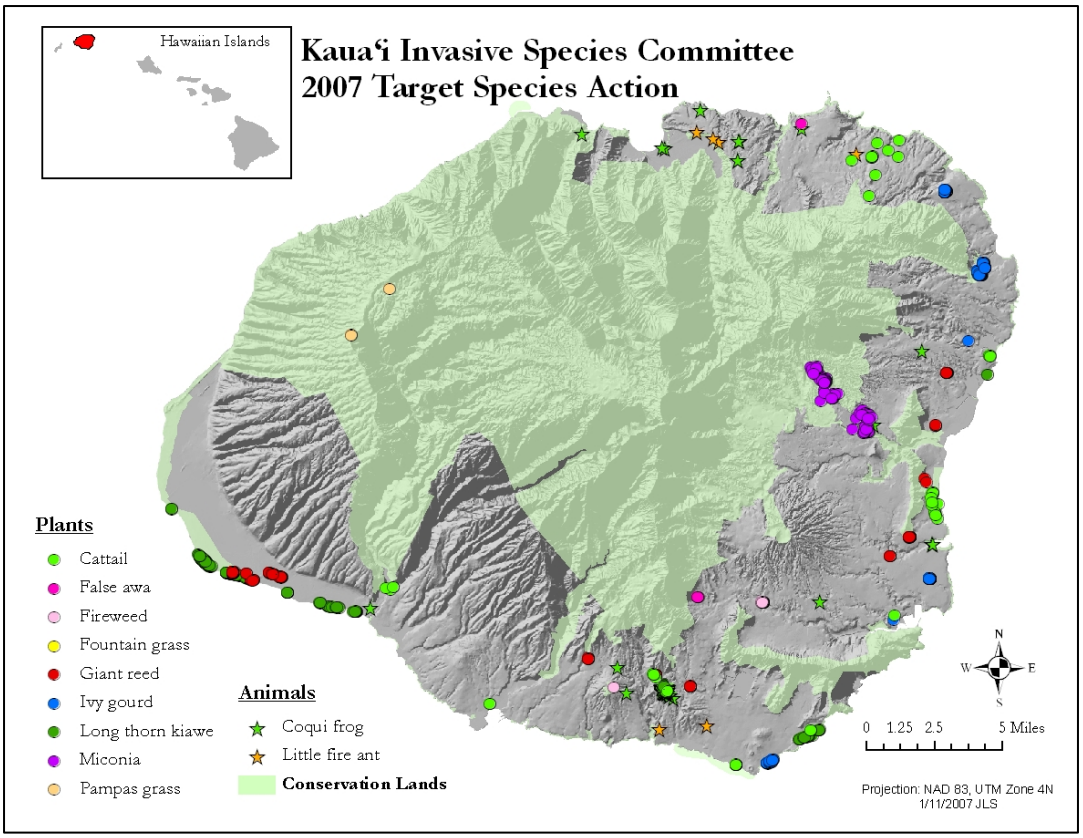
Kaua'i Invasive Species Committee (KISC)



Project Strategy

The Kaua'i Invasive Species Committee (KISC) is a voluntary partnership of government, private and non-profit organizations, and concerned individuals. The partnership works to prevent, eliminate or control the most threatening invasive plant and animal species in order to preserve Kaua'i's native bio-diversity and minimize adverse ecological, economic, and social impacts. KISC collaborates with other island invasive species committees to ensure that the most effective work methods and protocols are being used. Strategies focused this year on early detection of plants, insects, and disease.

Highlights

- Implemented and completed a road-side survey of incipient invasive plants on Kaua'i.
- Entered into an agreement with the Hawai'i Department of Health and the US Fish and Wildlife Service for early detection of West Nile virus and Avian Influenza by picking up and delivering dead birds for analysis.
- Initiated a re-survey of island nurseries for little fire ant and stinging nettle caterpillar presence.
- Leveraged state funding with county funding for control of coqui frogs at Kaua'i's one infestation.
- Increased detection and control work for miconia in the Wailua district.

Early Detection & Rapid Response

Strategies this year focused on building early detection programs as well as following up on past efforts. An island-wide roadside survey of incipient invasive plants, nursery re-surveys for little fire ant (LFA) and nettle caterpillar were initiated, residential property searches for miconia were initiated, and dead bird pick-ups were all projects that involved partnering with many different groups and agencies on Kauaʻi.

By partnering with the National Tropical Botanical Garden, an island-wide survey of incipient plant pests was completed late in the year. This survey utilized a plant pest list that was compiled by a panel of experts on Kauaʻi using information available not only across the state, but throughout the Pacific of invasive species that are likely to introduced to the island. This survey involved driving all primary, secondary and tertiary roads from Keʻe to Mana as well as high into Kokeʻe State Park. Findings of this survey will be evaluated and introduced to KISC at the annual strategic planning meeting. Further surveys to delimit the extent of any populations will follow up this survey and potential targets will be included in KISC's updated Action Plan.

In 2006 an island-wide survey for LFA was conducted at targeted nurseries that import plants from Hawaiʻi as well as resorts and green waste facilities. Outside of Kauaʻi's one known infestation in Kalihiwai, no other populations were discovered. This year, with the continued importation of plants from an infested island, re-surveys for LFA were initiated as well as early detection for nettle caterpillar. These surveys are worked in partnership with the Hawaiʻi Department of Agriculture (HDOA). To date, no new infestations have been detected for either insect pest.

Currently, Kauaʻi's known population of miconia (*Miconia calvescens*) is limited to roughly 3,500 acres in the Wailua District. While most of KISC's field work takes place in Wailua River State Park and the Wailua Game Management Area, a survey of the neighboring residential area was initiated this year. It has been approximately three years since these neighborhoods have been surveyed and KISC kicked off the event with a targeted mailing supplying educational information as well as asking for permission to search properties. These properties are all within suitable miconia habitat with some having historic seeding plant locations. Many in this community are well informed regarding this invasive pest and have been helpful in assisting us in this survey. No new plants have been discovered to date in this neighborhood.

KISC, also this year, entered into contracts with the Hawaiʻi Department of Health (HDOH) as well as the US Fish and Wildlife Service (USFWS) to assist with early detection of West Nile virus and Avian Influenza. An ad campaign requesting the public to report dead birds for testing, by calling 211, was implemented state-wide. Reports of dead birds are then followed up by KISC personnel who are dispatched to retrieve the carcasses and either deliver them to HDOH or ship them to Honolulu for necropsy and testing for these viruses.

As each island has invasive species unique to that island, it is of high priority to rapidly respond to reports of any new species on Kauaʻi as well as new locations of priority species. Focus this year has been to prevent development of new populations of coqui frogs (*Eleutherodactylus coqui*) on Kauaʻi. Four of the frog reports were confirmed to be coqui (all outside of the known location) with one being detected at a local "big box" store, one arriving via a container of flooring tile, and two at private residences.

With the establishment of the new state-wide pest hotline (643-PEST) and an increase in media campaigns advertising it, all calls that are referred to KISC are followed up as soon as possible. Coqui, dead birds (as mentioned in the Early Detection section), fire ants, and miconia are the top species responded to annually.

Priority Species

Miconia (*Miconia calvescens*)
KISC's top plant species is miconia which is considered the biggest threat to Hawai'i's watershed. On Kaua'i, approximately 3,500 acres are infested with this invasive plant. No mature plants were detected this year and all plants detected were within the known infestation area. Aerial surveys this year were not only able to focus in the core area, but outside of this area as well. By surveying drainages and fly-ways for potential spread by birds, we were able to determine that this population is being contained with no mature plants found in the last two years.

Long Thorn Kiawe (*Prosopis juliflora*)
Long thorn kiawe (LTK) has been another priority for KISC as it blocks beach access and obstructs shorebird habitat. This target has long been a partnership project involving HDOA as well as the Department of Defense's Pacific Missile Range Facility (PMRF). Many of the remaining acres of LTK are located on PMRF and they have been instrumental in providing funding, along with the Naval Facilities Engineering Command (NAVFAC) Pacific, to mechanically remove this pest with hydro-axe and bull dozer. KISC personnel, along with HDOA, then follows up with cutting remaining stumps and applying herbicide as well as monitoring for re-sprouts and seedlings. These joint projects have succeeded in clearing over 16 acres of LTK within PMRF. Monitoring has also recorded recruitment of native plants in areas once predominantly occupied by this weedy pest.

Fireweed (*Senecio madagascariensis*)
Another success garnered by diligent field work has been the eradication of fireweed from a site near Halfway Bridge. KISC and HDOA have been monitoring this site for many years and have not found any plants at this site for the last two years.

Other target species that KISC is controlling are:
Pampas Grass (*Cortaderia selloana*)
Ivy Gourd (*Coccinea grandis*)
False Kava (*Piper auritum*)
Cattail (*Typha latifolia*)
Giant Reed (*Arundo donax*)

Coqui frogs (*Eleutherodactylus coqui*)
Work this year has primarily focused on eradication efforts of coqui frogs from the one known infestation site in Lawa'i. Funding from the legislature was leveraged to garner much needed funding from the county of Kaua'i ($320,000). This funding enabled KISC to purchase citric acid and hydrated lime, hire a temporary field crew, and supply all necessary PPE and training.

KISC crew mixing citric acid in sprayer

With this concerted effort, KISC was able to dedicate over 4,600 person hours battling coqui, both working at the Lawaʻi site as well as responding to new reports. With substantial chemical application and utilization of all known methods of control, this population was reduced to only occasionally calling frogs as juvenile frogs mature. Monitoring at this site will continue into the coming year to ensure total eradication.

ʻŌhiʻa Rust (*Puccinia psidii*)

ʻŌhiʻa rust was first found in Hawaiʻi on an ʻōhiʻa plant (*Metrosideros polymorpha*) on Oʻahu in April 2005. It poses a formidable threat to Hawaiʻi's ʻōhiʻa, a species that dominiates perhaps 80 percent of Hawaiʻi's forests and provides essential habitat to much of Hawaiʻi's fauna.

KISC assisted DLNR-DOFAW in gathering specimens of *P. psidii* via leaf collections for further DNA testing by the Forest Service. This testing will hopefully be able to provide further information as to avenues of control before infestations devastate Hawaiʻi's forests.

Little Fire Ant *(Wasmannia auropunctata)*

A comprehensive island-wide re-survey of nurseries is underway for detection of little fire ant (LFA), and stinging nettle caterpillar. This survey work not only serves as a starting point for rapid response, if insects are detected, but also allows KISC personnel to educate the public about these invasive pests.

Kauaʻi currently has only one population of LFA located on the north shore in Kalihiwai. The ant arrived in 1999 and has been reduced to undetectable levels, which is proving difficult to ensure complete eradication. By working with HDOA, further LFA infestations on Kauaʻi can be prevented.

Nettle Caterpillar *(Darna pallivitta)*

With the detection of Nettle Caterpillar on Oʻahu and Maui it is imperative that early detection on Kauaʻi be effective and rapid response immediate to mitigate establishment of these pests.

Action Summary for KISC 2007

Target Species	Acres Surveyed	Acres Treated[1]	Mature Plants Treated	Immature Plants Treated	Effort (Hours)
Giant reed	76	0.1528	1528	0	252
Ivy gourd	128	0.3196	3,196	0	414
Miconia	875	0.0646	0	646	580
Long thorn kiawe	602	1.8099	1,367	16,732	1,118
Cattail	121	0.0855	855	0	151
Coqui frog	272	181[2]	na	na	4,788
Other	1,600	0.0060	0	0	167
Total	3,125	1814.4384			

1. Calculated by multiplying 1/10,000th of an acre by the number of plants controlled.
2. Calculation above does not apply. Acres treated may include repeated acres.

Staffing

KISC formed in 2001 and hired its first staff (two workers) in 2002. In 2007 KISC now has 7 full-time employees. Also during this year, with supplemental county funding, KISC hired 5 temporary crewmembers to control coqui frogs during the peak calling season during late summer.

Outreach & Education

With funding from Hawai'i Invasive Species Council to the Outreach Working Group, KISC has on-island assistance with outreach activities from the HISC Outreach Specialist. In 2007, KISC was able to educate community members by being involved in fairs, clubs, schools, and various meetings. Various public media were employed including radio, internet, signage, flyers, and brochures.


Coqui News

Work update at Lawai infestation site

Management Area Map

Kaua`i Coqui Newsletter

The new state-wide pest hotline (643-PEST) was heavily promoted via all of the above-mentioned methods as well as through "give-away" items like bumper stickers, fly-swatters, magnets, and decals. In January KISC's second issue of their newsletter *Kai 'i Moku (Guarding the Island)* was posted including articles submitted by KISC partner agencies highlighting work in the watersheds by Hanalei Heritage as well as Koke`e Resource Conservation Program. This flyer can be viewed online at http://www.hear.org/kisc/newsletter/pdfs/kiaimoku2006v1n2.pdf as well as other outreach projects at the KISC website www.kauaiisc.org.

Also this year, KISC published in print and online, a weekly newsletter that detailed progress at the coqui infestation site in Lawa'i. These newsletters have been instrumental in alerting neighboring community members as to work being conducted at the site, as well as updating the coqui working group, partner agencies, and the county as to progress on the coqui eradication project. All present and past flyers can be viewed online at www.hear.org/kisc/coqui_news/.

KISC Partners

- US Forest Service
- USDA Natural Resource Conservation Service
- USDA APHIS
- USDA Wildlife Services
- US Fish and Wildlife Service
- Department of Defense Pacific Missile Range Facility
- Hawai'i Army National Guard
- DLNR Division of Forestry and Wildlife
- DLNR State Parks, Hawai'i
- Department of Agriculture
- Hawai'i Department of Health
- UH College of Tropical Agriculture and Human Resources
- UH Pacific Cooperative Studies Unit
- Kaua'i Community College
- Kaua'i County Office of Economic Development
- Kaua'i County Department of Water
- Kaua'i Humane Society
- Koke'e Resource Conservation Program
- Hui o Laka/Koke'e Museum
- Kamehameha Schools
- National Tropical Botanical Garden
- The Nature Conservancy
- Sierra Club Kaua'i Chapter
- USGS Pacific Basin Information Node
- Kaua'i Farm Bureau
- Kaua'i Westside Watershed Council
- Kaua'i Watershed Alliance
- Garden Island Resource Conservation & Development
- Sea Grant, Hanalei Heritage River
- Kaua'i Landscape Industry Council
- A&B Foundation
- Kaua'i Nursery and Landscape
- Grove Farm, LLC
- Private citizens

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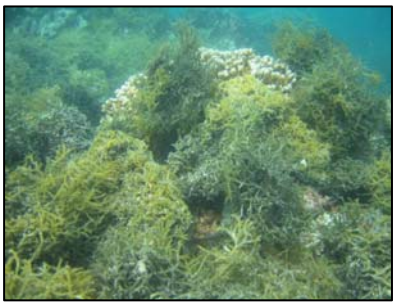
Priority Target Species

The ISCs choose their targets based on the threat they pose to Hawai'i and the feasibility of control of eradication. Species may threaten Hawai'i's unique marine and terrestrial ecosystems, agriculture, fisheries, public health, the economy or Hawai'i residents' quality of life.

	**Australian Tree Fern (*Cyathea cooperi*)** • Large tree fern up to 40 feet, native to Australia. • Displaces native plants, especially in native cloud forests. • Introduced and still sold as an ornamental. •Produces many lightweight spores that are spread long distance by wind. •Priority target for MoMISC.
	**Bushy Beardgrass (*Schizachyrium condensatum*)** • Tufted grass native to Central and South America, introduction history unknown. • Habitat-altering weed that fuels brush fires. • Produces many seeds, spread by wind and humans. • Priority target for OISC.
	**Cattail (*Typha latifolia*)** • Wetland rush native to North America, North Africa and Eurasia, introduction history unknown. • Displaces native plants, and disturbs wetlands. • Reproduces and spreads vegetatively and by wind-dispersed seeds. • Potential range is all low elevation wetlands. • Priority target for KISC.

	**Coqui Frog (*Eleutherodactylus coqui*)** • Native to Puerto Rico, accidental introduction via infested plants. • Consumes native insects, takes prey base away from native birds. • Loud calls disturb the public. • Spreads in infected nursery materials. • Priority target for BIISC, KISC, MISC, MoMISC and OISC.
	**Fountain Grass (*Pennisetum setaceum*)** • Bunch grass native to Africa, introduced as an ornamental. • Highly flammable and creates a fire hazard. • Produces many seeds per year, wind dispersed. Seeds remain viable for 7 or more years. • Potential range is all dry and mesic forests. • Priority target for BIISC, KISC, MISC, MoMISC, OISC.
	**Giant Reed *(Arundo donax)*** • Tall reed native to Mediterranean. • Invades streams and rivers, disrupts flow and displaces native plants and animals. • Priority target for MoMISC and MISC.
	**Gorilla ogo *(Gracilaria salicornia)*** • Seaweed native to the Indo-Pacific. • Threatens Hawai‘i’s reef coral ecosystems by overgrowing and smothering coral colonies. Reduces marine species diversity and alters marine community structure. • DAR/AIST target in Kāne‘ohe Bay and Waikīkī.

Hookweed *(Hypnea musciformis)*

- Seaweed native to Florida and the Caribbean.
- Forms large, dense floating mats and tens of thousands of pounds wash up each year on Maui beaches.
- Fragments easily (facilitating spread) and grows rapidly.
- Target for DAR/AIST on Maui.

Ivy Gourd (*Coccinia grandis*)

- Vine native to tropical Asia, introduced as a food crop.
- Spreads into forests and overtakes native plants.
- Produces many seeds that are bird dispersed; spreads vegetatively.
- Priority target for KISC, MISC.

Little Fire Ant (*Wasmannia auropunctata*)

- Tiny ant native to Central and South America, accidental introduction via infested plants.
- Painful bite is a public nuisance and can hamper orchard and coffee production.
- Spreads in infected nursery materials, particularly palms.
- Priority target BIISC, KISC.

Long-Thorn Kiawe (*Prosopis juliflora*)

- Tree or sprawling shrub native to Africa, introduced for agriculture, possibly accidentally.
- Thorns can puncture truck tires and blocks access to recreation and conservation areas.
- Produces many seeds spread by water and animals.
- Potential range is unknown; appears able to hybridize with short-thorn kiawe.
- Priority target for KISC.

	**Miconia *(Miconia calvescens)*** • Tree native to Central and South America, introduced as an ornamental. • Carpets hillsides, killing native plants and inducing erosion. • Produces millions of seeds per year dispersed by birds, rats, pigs, humans. Potential range is all wet and mesic forests to 6,000 ft. elevation. • Priority target for BIISC, KISC, MISC and OISC.
	**Pampas Grass (*Cortaderia selloana* and *C. jubata*)** • Native to South America, introduced as an ornamental. • Large bunch grass displaces native plants, blocks access to recreation areas, fire hazard. • Produces many seeds per year, wind dispersed. • Potential range is all mesic and wet forests. • Priority target for KISC, MISC, MoMISC, OISC.
	**Plume Poppy *(Macleaya cordata formerly Bocconia fructescens)*** • A large shrub to small tree native to tropical America. Introduced as an ornamental. • Invades dry to mesic forests, forms dense thickets and displaces native plants. • Priority target for BIISC.
	**Rubber Vine (*Cryptostegia grandiflora*)** • Climbing woody shrub native to Madagascar, introduced and still sold as an ornamental. • Produces many seeds that are spread by wind. • Moist forests at risk. • Priority target for MISC.

	**Smothering seaweed *(Kappaphycus sp./Euchuma complex)*** • Seaweed native to the Philippines. • As indicated by its name, this alga forms extremely dense mats that overgrow and smother corals. • DAR/AIST target in Kāneʻohe Bay, Oʻahu.
	**Snowflake coral *(Carijoa sp.)*** • Octocoral that forms dense colonies on shaded underhangs in shallower waters and large carpets in deeper ocean. • Threatens Hawaiʻi's black coral which grows in deeper ocean. • Priority target for DAR/AIST at Port Allen, Kauaʻi.
	**Veiled Chameleon (*Chamaeleo calyptratus*)** • Native to Yemen, illegal introduction for the pet trade. • Could prey on endangered native birds. • Spread by humans. • Priority Target for MISC.

Photos courtesy of TNC, HDOA, Forest and Kim Starr of USGS, US Forest Service, USDA National Wildlife Research Center, CGAPS, DAR/AIST, the ISCs and Christian Sousa.