REPORT TO THE THIRTY-FIRST LEGISLATURE
STATE OF HAWAIʻI
2022 REGULAR SESSION

BUDGETARY AND OTHER ISSUES REGARDING INVASIVE SPECIES

Prepared by:

THE STATE OF HAWAIʻI
DEPARTMENT OF LAND AND NATURAL RESOURCES
DIVISION OF FORESTRY AND WILDLIFE

In response to Section 194-2, Hawaiʻi Revised Statutes

Honolulu, Hawaiʻi

November 2021

Table of Contents

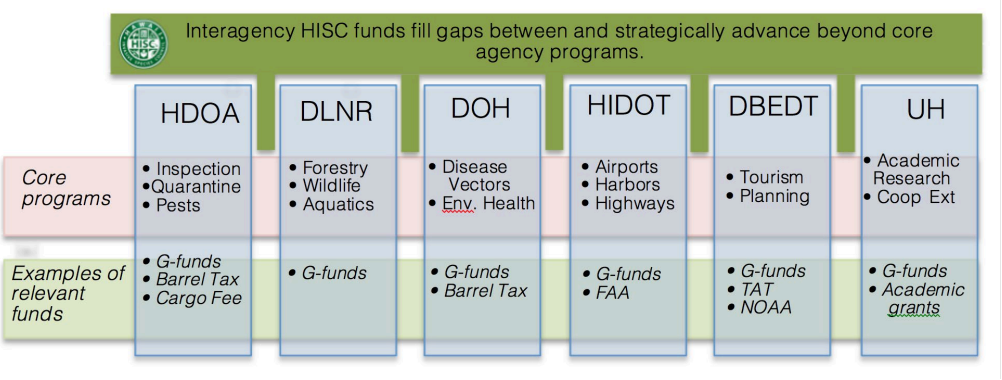
2022 Executive Summary

HAWAI'I INVASIVE SPECIES COUNCIL

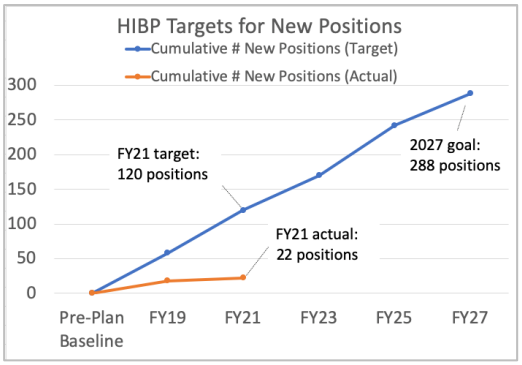
PROVIDING STATE POLICY DIRECTION, COORDINATION, AND PLANNING TO PROTECT HAWAI'I FROM THE IMPACTS OF INVASIVE SPECIES

BUDGETARY ISSUES RELATING TO INVASIVE SPECIES

- State agencies largely address invasive species through existing programs funded by departmental budgets. A 2015 report by the Legislative Reference Bureau found that in FY14, $19.6M (0.15% of a total $13B state budget) in state funding was provided for invasive species programs at state agencies.
- HISC funds support interagency projects and new research that help fill the gaps between permanent programs. In 2021 the legislature maintained its $5.75M appropriation to the HISC.

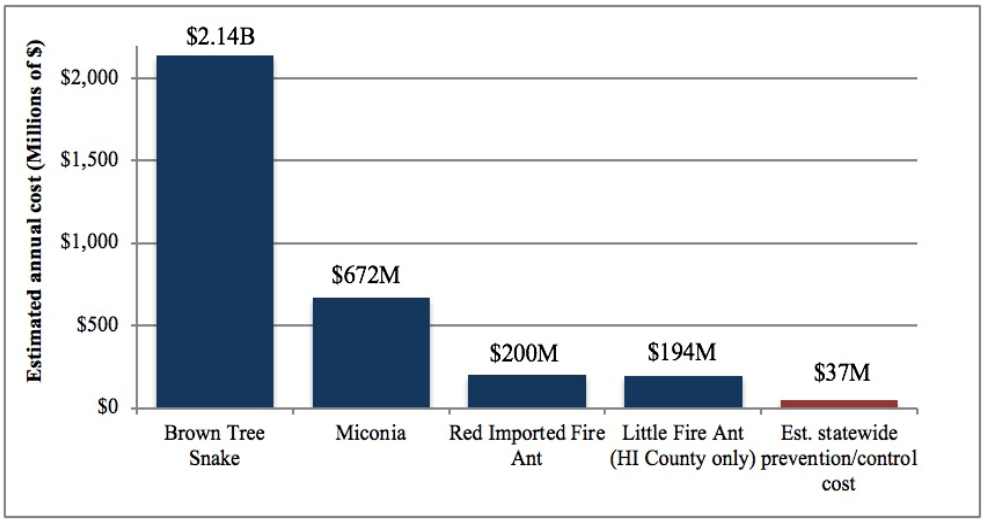


- In FY21 the HISC received 51 requests for research and interagency projects not covered by existing agency programs or funds, totaling $9.1M
- **The primary biosecurity need moving forward is civil service capacity**. Positions are needed at HDOA for commodity inspection and response, and at DLNR DAR for hull inspection. **With the economic challenges ahead due to COVID-19,** we have an opportunity to grow, rather than shrink, our cost-saving biosecurity positions and other resources.



THE COST OF INACTION: ECONOMIC DAMAGES FROM INVASIVE SPECIES

Economic impacts (below) include estimated damages from species that are already in Hawai'i (*Miconia* and little fire ant), and potential damages from species that have so far been kept from establishing (brown tree snake and red imported fire ant).



*L to R: brown tree snake impact ($2.14B/yr in infrastructure, health costs, tourism), Miconia impacts ($672M/yr in lost water recharge, bird habitat); RIFA cost ($200M/yr in lost tourism, agriculture); LFA cost, HI County only ($194M/yr in costs to various sectors); estimated **additional** annual need for invasives programs (HIBP). References available in full 2020 legislative report at http://hisc.Hawai'i.gov.*

ADVICE REGARDING INVASIVE SPECIES IN THE 2022 LEGISLATURE

The primary recommendation of the HISC to the legislature in 2022 is to **continue to implement the Hawai'i Interagency Biosecurity Plan (HIBP)**, the State's 10-year vision roadmap to enhance biosecurity and invasive species mitigation (http://dlnr.Hawai'i.gov/hisc/plans/hibp/). After the 2008 economic downturn HDOA Plant Quarantine, DOH Vector Control Branch positions, and HISC funds were cut. The result was increased invasive species establishment and increased control costs, including substantial events such as the dengue fever outbreak of 2015, the coconut rhinoceros beetle invasion in 2013, and the spread of little fire ants to O'ahu in 2013. **The HIBP provides a path to save Hawai'i money in the long run and provides opportunities for job creation.**

Biosecurity Plan Legislative Goals: Past Successes (2017-20)	
• Fully restored the Vector Control Branch at Department of Health	• Appropriated planning funds for a new HDOA Biological Control facility
• Approved HDOA to use transitional facilities for commodity inspection	• Added two positions for UH Hawai'i Ant Lab to expand services in Kona
• Provided stable funds to the HISC by adding annual appropriation to base budget	• Creation of steering committee to implement landscape-scale mosquito control
• 4 specialist positions for HDOA imports	• CIP funds for dog kennels, coqui barrier, predator proof fencing
• BOA approved restriction of non-native myrtle introductions into the state	• Additional Extension positions at UH CTAHR
Successes from the 2021 Legislative Session	
• HISC funding maintained	• Maintained pesticide subsidy program in response to coffee leaf rust
Examples of Remaining Biosecurity Plan Legislative Needs	
• Add additional positions for commodity inspections at HDOA Plant Quarantine	• Add positions and fee collection for DLNR DAR vessel hull inspection program
• Add additional positions at HDOA Plant Pest Control Branch	• Additional HISC funds to support the increasing need for invasive species prevention and management
• Stable, long-term funding for the airport biosecurity program, Māmalu Poepoe, with eventual expansion to seaports	• Maintain funding for HDOA inspectors and prevention

1. Hawai‘i Invasive Species Council Actions in FY21

1.1 Purpose of this Report

Invasive species are non-native species whose introduction does, or is likely to, cause economic or environmental harm or harm to human health. Invasive species do not fall exclusively under the mandate of any single state agency. Recognizing this, the State Legislature in 2003 authorized the creation of the interagency Hawai‘i Invasive Species Council (HISC, Act 85, Session Laws of Hawai‘i 2003), and stated, “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.”

This document meets the reporting requirements of Section 194-2, HRS, to annually report to the Legislature on budgetary and other issues regarding invasive species. Per Chapter 194, HRS, the HISC is an interagency board placed within the Department of Land and Natural Resources (DLNR) for administrative purposes.

1.2 Composition and Function of the HISC

Chapter 194, HRS, requires that the HISC be composed of the chairs, directors, or designees of the agencies below. In FY21 the Council was composed of:

- Suzanne Case, DLNR
- Phyllis Shimabukuro-Geiser, Hawai‘i Department of Agriculture (HDOA)
- Keith Kawaoka, Department of Health (DOH)
- Mary Alice Evans, Department of Business, Economic Development, and Tourism (DBEDT)
- Nicholas Comerford, University of Hawai‘i (UH)
- David Rodriguez, Department of Transportation (DOT)

Additionally, legislators and federal agency partners are invited as non-voting participants to provide advice and guidance to the HISC. FY21 legislative appointees included:

- Senators Ronald Kouchi, Mike Gabbard, J. Kalani English, Lorraine Inouye, and Chris Lee.
- Representatives Nadine Nakamura, Tina Wildberger, and Nicole Lowen.

The HISC’s function is to coordinate and promote invasive species prevention, control, outreach, and research. Chapter 194, Hawai‘i Revised Statutes (HRS), establishes the interagency HISC, and determines its composition and responsibilities. Several key responsibilities of the HISC include:

- Advise, consult, and coordinate invasive species-related efforts with and between departments. This is achieved through the actions of the Council (Section 1.3 of this report), the staff support program (Section 1.4), and interagency projects funded by the HISC (Section 2.2).
- Identify agency resource shortfalls with respect to invasive species. This is achieved by tracking implementation progress of the Hawai‘i Interagency Biosecurity Plan (Section 1.5).
- Coordinate and promote the State’s position with respect to invasive species issues. This is achieved by adopting Council resolutions (Section 3.1) and testimony (Section 3.2).
- Advise the governor and legislature on budgetary and other issues regarding invasive species. This is achieved by this report, particularly Section 3.

1.3 Council Meetings in FY21

All HISC meeting agendas and notes are available at http://dlnr.Hawai‘i.gov/hisc/meetings/.

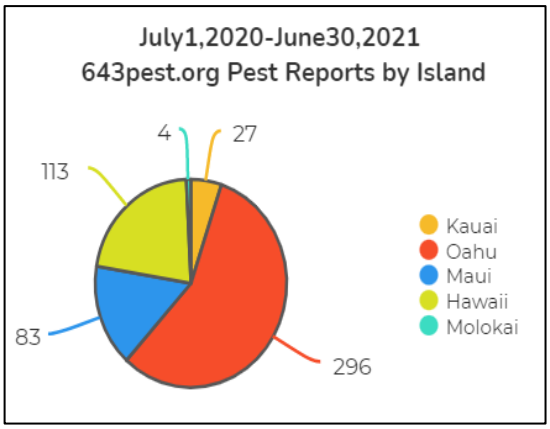
- August 27, 2020: The HISC met to discuss the following agenda items:

    - Discussion from Congressman Ed Case on COVID19 relief funding, Forest bill, and other natural resources updates.
    - Approval of the recommended FY21 budget for interagency projects.
- January 27, 2021: The HISC met to discuss the following agenda items:
    - Hawai‘i Invasive Species Council (HISC) approved the coordination of potential activities as part of a 2021 Hawai‘i Invasive Species Awareness Month (HISAM) and delegated the HISC Support Program staff the annual coordination of activities and the selection of awardees for HISAM to be recognized in the Council’s name.
    - The Council approved delegation to Hawai‘i Invasive Species Council (HISC) Support Program staff the authority to track legislative measures, provide in the Council’s name written and/or oral testimony, and provide comments in legislative hearings, and the Council delegate the HISC Program Support Staff the authority to draft and provide in the Council’s name written and/or oral comments on documents relevant to invasive species and released by other entities for input.
- June 9, 2021: The HISC met virtually to discuss the following agenda items:
    - Approval of HISC Resources Working Group members.
    - The coordinated efforts of the Biocontrol Working Group in the planning, construction, and operation of Pacific Regional Biocontrol Facilities by HDOA, UH, USDA FS, and USDA ARS.
    - Approval of a HISC resolution to support the Planning, Construction, and Operation of Pacific Regional Biocontrol Facilities and Committing Agency Engagement.

1.4 HISC Support Program Projects in FY21

The activities of the HISC are carried out by staff of the HISC Support Program, which is administered by the DLNR Division of Forestry and Wildlife (DOFAW). Non-civil service HISC support staff are provided by the UH Pacific Cooperative Studies Unit and are supported on a year-to-year basis utilizing funds appropriated to HISC by the legislature. HISC funds are administered by DLNR/DOFAW under the Native Resources and Fire Protection Program (Program ID LNR402). The HISC Support Program provides core coordination services across agencies in addition to managing the process of disbursing funds to interagency projects:

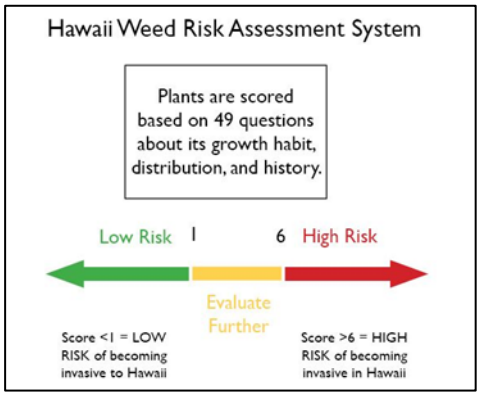
- **Online Pest Reporting via 643pest.org:**
  This service provides an online complement to the 643-PEST telephone hotline. Access is also provided via a 643PEST mobile app on iOS and Android platforms. These services are free to the public and allow the submission of invasive species observation reports. After receiving a report via the online system, trained facilitators help direct reports to appropriate agencies, where determination can be made as to whether a field response is required. 523 pest reports have been followed up during the fiscal year, with 17% of those reports forwarded to state agencies and invasive species management groups for on-the-ground actions. There have been 304 unique species reported and identified via the online pest hotline. More details can be found at: www.643pest.org/Dashboard.aspx

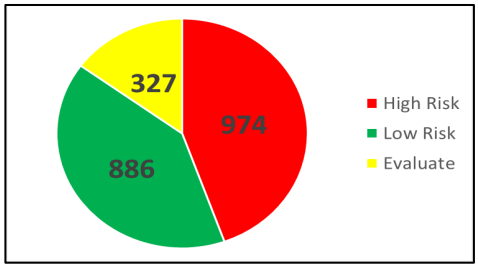


- **Māmalu Poepoe – *Sphere of Protection*:** This interagency project supports invasive species monitoring at airports, utilizing resources across HISC’s constituent agencies. The project was

developed by the Hawai‘i Department of Health (HDOH), Hawai‘i Department of Agriculture (HDOA), Hawai‘i Department of Transportation (HIDOT), and the University of Hawai‘i (UH). The five-year pilot project began in 2016 and boosts monitoring efforts for four key invasive taxa at airports to learn about relative costs and benefits of airport biosecurity. Analyzed taxa include invasive ants, mosquitoes, Africanized honeybees, and coconut rhinoceros beetle. More details on the project are available at http://dlnr.Hawai‘i.gov/hisc/mp/. In 2021 funding from the initial five-year pilot project funded by HIDOT will end. HISC staff will recommend to the Council that this important project continue using general funds appropriated to the Council by the legislature.

- **Hawai‘i-Pacific Weed Risk Assessment:** The Hawai‘i-Pacific Weed Risk Assessment (HPWRA) system is an internationally recognized screening tool that rates the potential of plants to become invasive by answering 49 questions about their biology, ecology, and history of invasiveness elsewhere. This voluntary screening system, implemented by one HPWRA specialist, provides a science-based method of assessing plants being imported into and/or planted within the Hawaiian Islands. The HPWRA system is an integral component of state-wide prevention measures and is currently used by both public and private entities and individuals to assist in making more informed planting and importation choices.



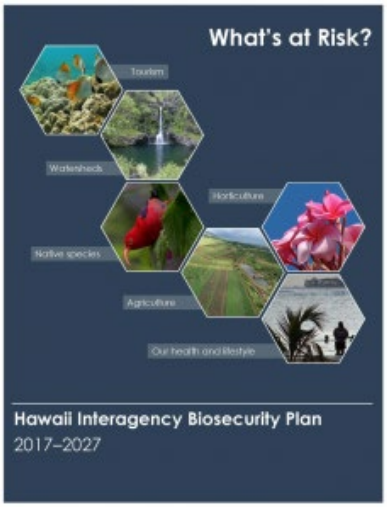


2187 Risk Assessments by Category

During FY21, 122 assessments (94 new and 28 revised) were completed, bringing the total of plants screened to date to 2,187. Assessments are posted on the Plant Pono website (plantpono.org), the public portal for accessing weed risk assessments and other information on native and non-invasive planting choices. Presentations promoting HPWRA and Plant Pono were also given during Hawai‘i Invasive Species Awareness Month and to the statewide 2021 Master Gardener training cohort.

- **Hawai‘i Invasive Species Awareness Month 2021:** February 2021 Hawai‘i invasive species awareness month (HISAM) featured 29 virtual talks highlighting statewide and island-specific invasive species issues, awards given to a business leader, community hero, and island MVP’s, and innovative virtual education and engagement by a wide range of agencies and groups across the state. Visit the HISAM 21 web page (https://dlnr.Hawai‘i.gov/hisc/2021hisam/) to see the recipients of the HISAM 21 awards story map, view the presentation playlist, and view the full calendar of events.

1.5 Hawai‘i Interagency Biosecurity Plan Implementation



The Hawai‘i Interagency Biosecurity Plan (HIBP) provides a 10-yr roadmap (2017-2027) for the State of Hawai‘i to enhance its core biosecurity programs across multiple agencies and direct future research and development to protect our agriculture, natural resources, human health, tourism, and way of life in the islands. Achievements in the HIBP are made by agency staff and by the legislature, with HISC providing tracking and reporting of implementation progress.

The HIBP is comprehensive in scope, defining "biosecurity" as the full set of policies and actions taken to mitigate the impacts from invasive species. This includes pre-border biosecurity (e.g., offshore compliance), border biosecurity (e.g., inspection and interception), and post-border biosecurity (e.g., early detection, rapid response, and biocontrol). The result is a matrix of 147 action items, each assigned to a lead agency and associated with an estimated cost and implementation timeframe.

The HISC produces progress reports on implementation every six months. These reports compile qualitatitive status updates on action items that are provided by staff at implementing agencies, and are available at http://dlnr.Hawai‘i.gov/hisc/plans/hibp/. As of January 2021, roughly 34% of the actions in the HIBP are ongoing tasks that are being addressed in perpetuity with a small portion of that completed, with another 31% in progress toward eventual completion. The remaining 35% of actions have not yet been started. Additional information on remaining legislative goals can be found in Section 3 of this report.

2. Budgetary Issues Relating to Invasive Species

2.1 Agency Resources & Shortfalls Relating to Invasive Species

The Legislative Reference Bureau released a 2015 report, titled *Can’t see the Forest for the (Albizia) Trees: An Invasive Species Update,* that was commissioned as an update to the 2002 report *Filling the Gaps in the Fight Against Invasive Species.* The report details the roles, resources, and shortfalls of government agencies in great detail.

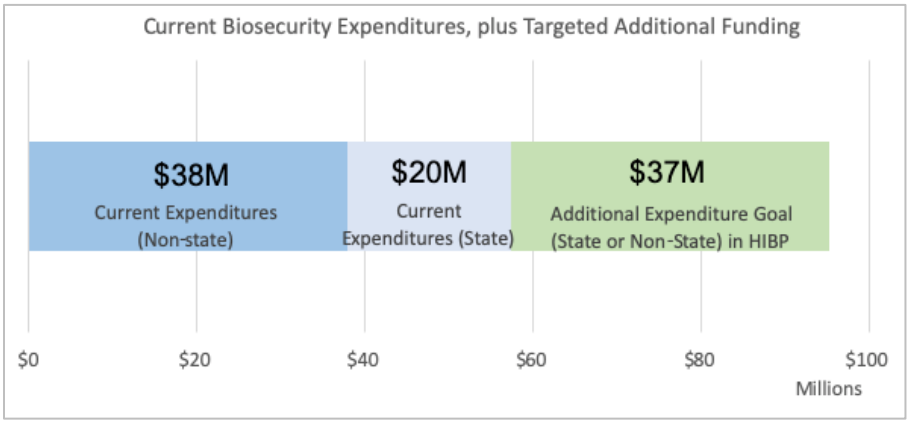


Figure 1: “Current” biosecurity annual expenditures per the 2015 Legislative Reference Bureau Report (FY14), with estimated additional annual expenditure target recommended by the Hawai‘i Interagency Biosecurity Plan. HIBP costs can be supported by State or non-State funding sources.

Most biosecurity or invasive species efforts are addressed by permanent departmental programs, rather than reliant on the interagency “gap filling” project funds provided by HISC. Continued support for, and

enhancement of, departmental programs is critical to making sure that basic infrastructure exists for invasive species prevention and control in Hawai‘i. A summary of permanent biosecurity or invasive species programs at individual State departments is available at https://dlnr.Hawai‘i.gov/hisc/info/policy/.

2.2 HISC Funding and FY21 Funded Projects

The HISC administers an interagency budget that supplements existing departmental programs by strategically filling gaps between mandates, and by funding research to address new threats or develop new tools. State agencies, including the UH system, apply for HISC funds on a competitive basis annually. Counties, local offices of federal agencies, and universities in other states are also eligible.

In FY21, the legislature included the amount of $5.75M per year in the base operating budget. Requests for funds from interagency projects are typically around $9M annually. HISC tends to accommodate a larger number of projects at partial funding rather than providing the full amount of requested funds to a small number of projects. This strategy encourages the use of matching funds and provides the broadest impact possible for HISC funds.

The detection and control projects providing data for Figures 2 and 3 include the Invasive Species Committees, the Ko‘olau Mountain Watershed Partnership, the UH School of Life Sciences, and, the Rapid ‘Ōhi‘a Death Aerial Surveys. Additionally, these figures should be viewed as only a subset of the achievements of HISC-funded projects: many of the projects HISC funds are research or outreach efforts that do not result in a standard deliverable that can be displayed on a map.

Figure 2: Acres Surveyed and Treated for Invasive Species by Detection and Control Projects Supported by HISC Funding in FY21, Separated by House Districts

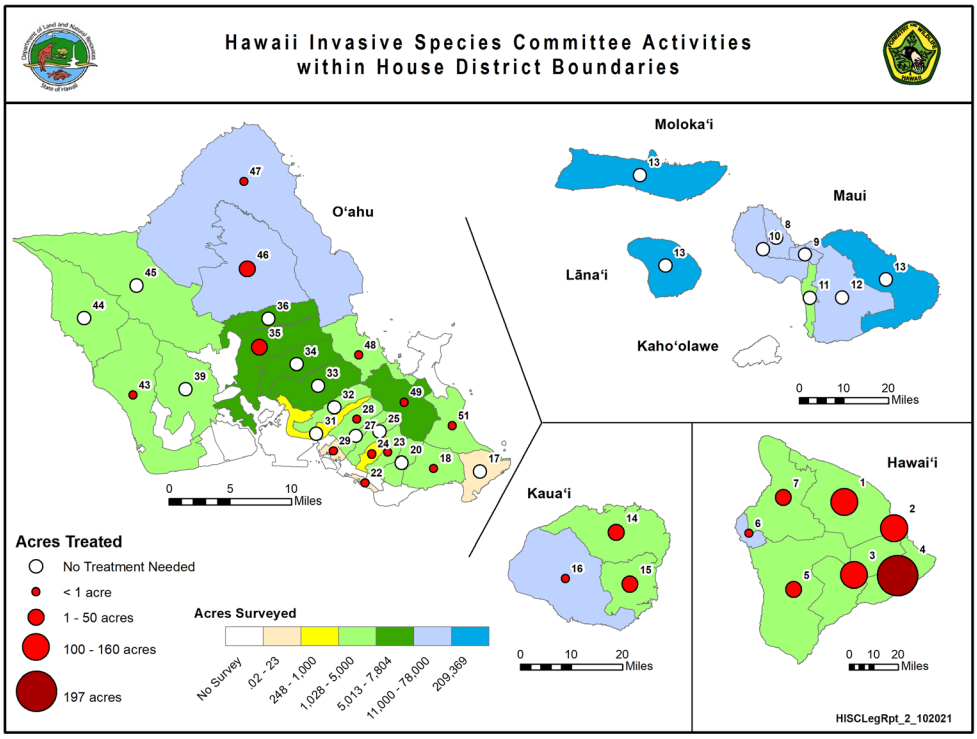


Figure 3: Acres Surveyed and Treated for Invasive Species by Detection and Control Projects Supported by HISC Funding in FY21, Separated b

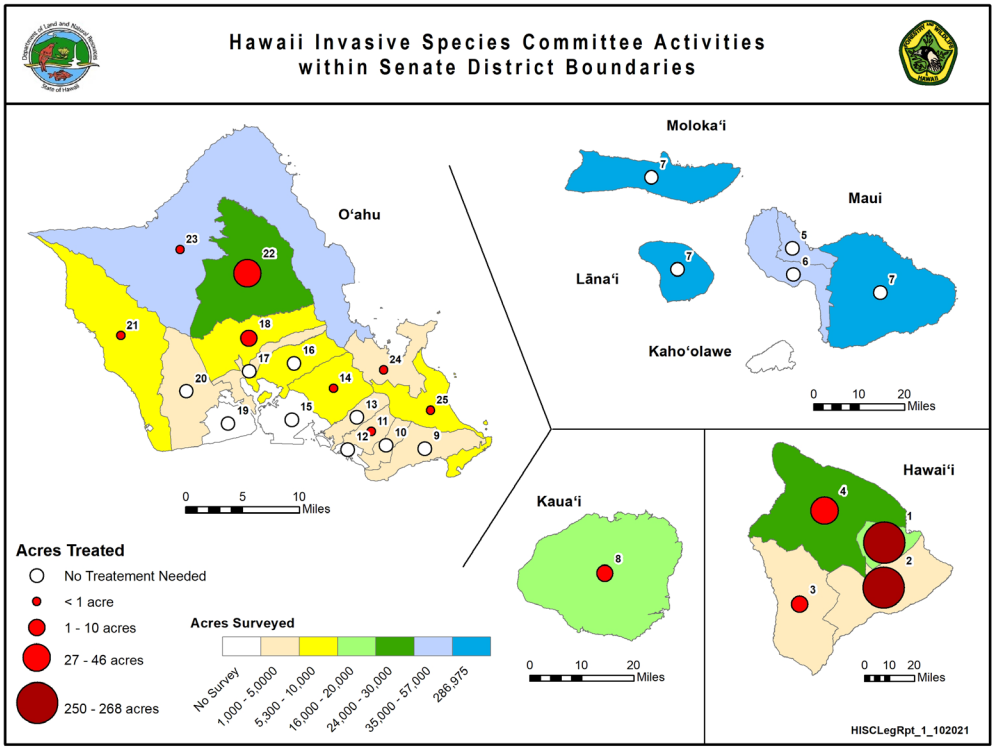


Table 3: Interagency Projects Funded by HISC in FY21

Lead Agency	Project Title	Amount
	FY22 HISC Funds	*$5,750,000*
SOH	*10% Restriction*	*$575,000*
DLNR DOFAW	*DOFAW Overhead (8%)*	*$616,848*
DLNR HISC	HISC Program Support	$484,443
Bishop Museum	Plants of Hawai‘i electronic database	$66,972
DLNR DAR	Hawai‘i Ballast Water and Biofouling	$86,000
DLNR DOFAW	Rapid ‘Ōhi‘a Death Response	$138,485
UH CTAHR	Project Information: Biological control of Christmas Berry	$42,379
DOH Vector Control	Improve mosquito surveillance capabilities on Maui Island	$3,000
UH CTAHR	Outreach and extension for Rapid ‘Ōhi‘a Death on Hawai‘i Island	$44,113
UH CTAHR	Hydrogels for control of invasive yellow crazy ants	$31,548
UH PCSU	Landscape-Scale Mosquito Control - Project Coordination	$30,500
UH PCSU-BIISC	Detection and Control of Invasive Species on Hawai‘i Island	$597,097
UH PCSU-BIISC	Community Engagement on the Island of Hawai‘i	$146,409
UH PCSU-BIISC	Rapid ‘Ōhi‘a Death Detection and Response on Hawai‘i Island	$130,000
UH PCSU-BIISC	Removal of Three Established Rabbit Colonies on Hawai‘i Island	$6,660
UH PCSU-CGAPS	Coordinating Group on Alien Pest Species	$40,000
UH PCSU-HAL	Hawai‘i Ant Lab core funds	$208,000
UH PCSU-KISC	Kaua‘i Invasive Species Committee Early Detection and Control	$514,273
UH PCSU-KISC	Public Outreach and Education on Kaua‘i	$101,255
UH PCSU-KMWP	Oahu Specific Albizia Outreach and Community Control Team	$18,000
UH PCSU-KMWP	KMWP Biocontrol Blitz for strawberry guava	$17,000
UH PCSU-KMWP	Incipient control of *Tibouchina herbacea* on O‘ahu	$15,000
UH PCSU-KMWP	Waiawa Regional *Albizia* Eradication Year III	$12,000
UH PCSU-MISC	Detection and Control of Invasive Species in Maui County	$540,355
UH PCSU-MISC	Coqui Frog Control and Monitoring Program on Maui	$123,484
UH PCSU-MISC	Invasive Species Outreach and Education in Maui County	$103,219
UH PCSU-MISC	Little Fire Ant Control Program for Maui	$61,200
UH PCSU-OISC	OISC Control and Eradication of High Priority Invasive Species	$592,339
UH PCSU-OISC	Outreach, Education, and Community Access on O'ahu	$156,000
UH CTAHR	Investigating invasive leather mudweed in coastal O‘ahu.	$22,000
UH CTAHR	Novel control methods for the new marine invasive green alga	$15,000
USDA FS	Natural enemies for biocontrol of *Albizia*	$89,893
USDA FS	Biocontrol of melastomes	$81,810
USDA FS	Biocontrol of invasive *Rubus*	$26,842
USDA FS	Biocontrol of Himalayan ginger	$17,876
	Total	$5,755,000

Abbreviations
DLNR= Department of Land and Natural Resources; UH = University of Hawai‘i; USDA = US Department of Agriculture; FS = US Forest Service; PCSU = Pacific Cooperative Studies Unit; MISC = Maui Invasive Species Committee; BIISC = Big Island Invasive Species Committee; OISC = Oahu Invasive Species Committee; KISC = Kauai Invasive Species Committee; DOH = Department of Health; HAL = Hawai‘i Ant Lab; CGAPS = Coordinating Group on Alien Pest Species; CTAHR = College of Tropical Agriculture and Human Resources; KMWP = Ko‘olau Mountain Watershed Partnership; DAR =DLNR Division of Aquatic Resources; DOFAW = DLNR Division of Forestry and Wildlife; SOH =State of Hawai‘i

2.3 The Cost of Inaction: Examples of Invasive Species Costs in Hawai‘i

Due to a lack of consistent funding for invasive species programs, many invasive species problems in Hawai‘i have become worse over the past decade. Coqui frogs have spread across Hawai‘i Island, exist in a handful of populations on Maui, and are intercepted regularly on Oahu in small numbers. In December 2013, Little Fire Ants, which had been found throughout the greater Hilo area and on Kauai for 10 years, were detected on Maui and Oahu. A new pest, Coconut Rhinoceros Beetle, was detected on Oahu in December 2013 and threatens to decimate Hawai‘i’s coconut palms. The invasive plant *Miconia* is beyond control on Hawai‘i Island and is at a critical point-of-no-return on Maui and Oahu. *Aedes aegypti*, a species of mosquito, has been detected at an increased frequency at Honolulu International Airport, and is a potential carrier of Zika, yellow fever, dengue fever, and chikungunya disease.

The relatively minimal cost of supporting invasive species prevention and control should be weighed against the potentially devastating economic impact that widespread invasive species can have in Hawai‘i. Notable examples include:

1. **Potential economic damages of Brown Tree Snake in Hawai‘i: estimated at roughly $2.14B annually**. A 2010 study by Schwiff et al. estimated that brown tree snake (*Boiga irregularis,* not yet found in Hawai‘i) impacts could cost $2.14 billion annually in infrastructure and health costs as well as decreased tourism. This figure does not include the cost of conservation programs to mitigate the loss of native bird species.
2. **Economic damages of *Miconia* in Hawai‘i: estimated at around $672M annually.** The invasive plant *Miconia* (*Miconia calvescens*) was introduced by a private resident on Hawai‘i Island in the late 1950s and has since spread to all counties in the state. This fast-growing plant forms monocultures (a forest stand consisting of only one species) by invading forests and shading out competitors. *Miconia* is a prolific producer of seeds, which are dispersed by birds and may lay dormant in soil for 15 years or more (studies are still ongoing) before germinating. A 2007 study by Burnett et al. estimated annual damages in lost groundwater recharge and valuation of endangered bird species with habitat threatened by *Miconia* at roughly $672,000,000.
3. **Economic impact of Little Fire Ant on Hawai‘i Island: estimated at roughly $200M annually.** A 2013 study by Motoki et al. on the economics of Little Fire Ants (*Wasmannia auropunctata*) estimates that without management, the damages on Hawai‘i Island alone in costs to nurseries, agriculture, residents, lodging, parks, schools, and other sectors could reach $6.8B over the next 35 years, or $194,000,000 annually. Total eradication of ants from Hawai‘i Island is not possible. A study published by Lee et al. in 2015 found that an immediate investment of $8M over the next 2-3 years would avoid costs over the next 10 years totaling $1.2B in control and $129M in economic damages. The Hawai‘i Ant Lab, partially funded by the HISC, is currently the primary resource for research and response to Little Fire Ant incursions, with an annual budget between $200-250,000. This species has been on Hawai‘i Island since 1999 and has since spread to Kauai (1999), Maui (multiple occurrences, most recently in 2013), and Oahu (2013), likely through interisland shipment of commodities.
4. **Potential economic impact of Red Imported Fire Ant: estimated at $200M annually.** A 2007 study partially funded by the HISC estimated that the potential impact of red imported fire ant (*Solenopsis invicta*, not yet found in Hawai‘i) at roughly $200 million annually within 10 years of

introduction because of its impact on tourism, infrastructure, and quality of life. (Gutrich et al., 2007).

5. **Economic loss in property value in Hawai‘i County due to of coqui frogs: estimated at $7.6M annually.** A 2006 study of the economic impacts of *Eleutherodactylus coqui* in Hawai‘i by Dr. Brooks Kaiser (Gettysburg College) and Dr. Kimberly Burnett (University of Hawai‘i) highlights that, while coqui frogs present an ecological impact through the predation on native invertebrate communities, the primary economic impact is on property value. The frogs, which can reach densities of 55,000/acre, produce a call between 80-90 A-weighted decibels (dBA, a modified calculation of decibels based on the response of the human ear). For comparison, the Hawai‘i Department of Health sets the threshold for minimizing impacts to human health and welfare at 70 dBA (HRS 324F-1). The estimated damages to property values in Hawai‘i County as of 2006 was $7,600,000 annually. This figure has likely increased as coqui frogs have continued to expand their distribution on Hawai‘i island since 2006. Should coqui frogs establish on Maui and Oahu, the annual loss in property value would drastically increase.

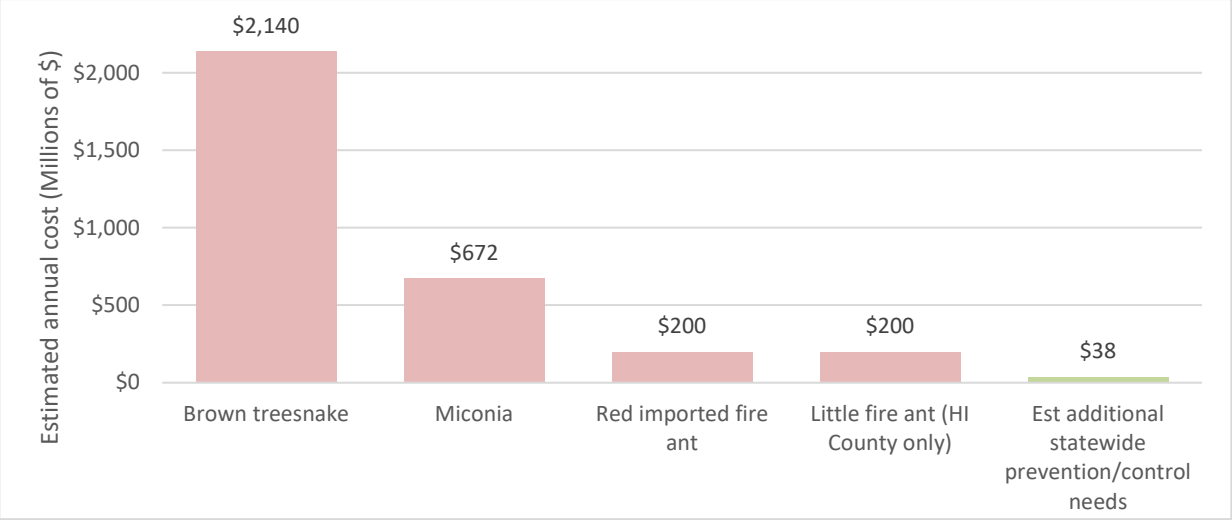


Fig 4: Examples of estimated economic damages from invasive species in Hawai‘i (numbers approximate).

The Hawai‘i Interagency Biosecurity Plan (HIBP) estimates that an additional $37M should be spent annually on invasive species programs in Hawai‘i to adequately mitigate invasive species impacts. The damages associated with invasive species far exceed the estimated cost for prevention and control programs. Investing in departmental programs (such as agricultural inspections and watershed management) and interagency projects under the HISC is an extremely cost-effective strategy for Hawai‘i. Full details of program needs and associated costs can be found in the HIBP at http://dlnr.Hawai‘i.gov/hisc/plans/hibp/.

3. Advice to the Governor and Legislature Regarding Invasive Species

Chapter 194, HRS, requires the HISC to advise the Governor and the legislature on issues regarding invasive species. The HISC fulfills this mandate by adopting resolutions, suggesting legislation, submitting testimony, and by providing other relevant advice in this annual report.

3.1 Recent HISC Resolutions

The HISC approved a resolution in June 2021 “Supporting the Planning, Construction, and Operation of Pacific Regional Biological Control Facilities in Hawai‘i and Committing Agency Engagement. http://dlnr.Hawai‘i.gov/hisc/reports/resolutions/.

3. 2 Review of the 2021 Legislative Session

The 2021 legislative session included roughly 16 measures relating to invasive species. One of these measures passed:

- SB 855, Relating to Coffee Pest Control. Extends the sunset date for the coffee berry borer pesticide subsidy program to 6/30/2023 and the program manager position, including the position's civil service and collective bargaining laws exemption, to 6/30/2024. Provides that no single coffee grower shall receive more than $12,000 for each pest per year in subsidies between 6/30/2021 and 7/01/2023. Requires the department of agriculture to compile a list of certain pesticides.

The final FY21 budget bill maintained HISC operational funding levels, and transferred operating funds to personnel to retain the recently vacated Invasive Species Coordinator position at the DLNR Division of Forestry and Wildlife. Funding for the transfer should be restored in the upcoming session.

3.3 Recommendations for the 2022 Legislative Session

The Biosecurity Plan was developed in large part as a response to the previous economic downturn, when many biosecurity programs were reduced. We have since learned the costly lesson. As we face a downturn due to COVID-19, the Biosecurity Plan framework suggests the following priorities during this trying period:

1. Maintain critical civil service capacity, especially biosecurity positions at HDOA, DOH Vector Control, and conservation positions at DLNR.
2. Maintain critical non-civil service capacity at the UH Invasive Species Committees and Watershed Partnerships through funding to HISC and Watershed Partnership Program.
3. Stay on track in planned growth areas as soon as possible for HDOA electronic import manifesting and ship ballast water and biofouling inspection by the DLNR Division of Aquatic Resources.
4. Support local green-jobs: biosecurity programs have plentiful shovel-ready work and can help stimulate job growth. DLNR and the HISC are compiling hundreds of potential job stimulus ideas relating to invasive species that can put people back to work in short-term positions.

Literature cited

- Burnett, K; Kaiser, B; Roumasset, JA. 2007. Economic lessons from control efforts for an invasive species: *Miconia calvescens* in Hawai‘i. *Journal of Forest Economics* (2007), vol. 13, 151-167.
- Cristini, L; Cox, LJ; Konan, DE; Eversole, D. 2012. *Climate Change and the Visitor Industry: People, Place, Culture, and the Hawai‘i Experience*. University of Hawai‘i Sea Grant College Program, Center for Sustainabile Coastal Tourism, University of Hawai‘i.
- Gutrich JJ, ; VanGelder E, ; Loope L.. 2007. Potential economic impact of introduction and spread of the red imported fire ant, *Solenopsis invicta*, in Hawai‘i, *Environ. Sci. Policy*, doi:10.1016/j.envsci.2007.03.007
- Ikuma, EK.; Sugano, D; Mardfin, JK. 2002. *Filling the gaps in the fight against invasive species*. Legislative Reference Bureau, Honolulu HI.
- Lee, DJ; Motoki, M; Vanderwoude, C; Nakamoto, ST; Leung, PS. 2015. Taking the sting out of Little Fire Ant in Hawai‘i. *Ecological Economics* (111), p.100-110.
- Motoki, M; Lee, DJ; Vanderwoude, C; Nakamoto, ST; Leung, PS. 2013. A bioeconomic model of Little Fire Ant (*Wasmannia auropunctata*) in Hawai‘i. *Technical Report No. 186.* Pacific Cooperative Studies Unit, University of Hawai`i, Honolulu, Hawai`i. p.89 .
- Shwiff, SA; Gebhardt, K; Kirkpatrick, KN; Shwiff, SS. 2010. Potential Economic Damage From Introduction of Brown Tree Snakes, *Boiga irregularis* (Reptilia: Colubridae), to The Islands Of Hawai‘i. *Pacific Science* (64-1), p.1-10.