



Aquatic Invasive Species Program



2019 ACCOMPLISHMENT REPORT



Aquatic Invasive Species Program 2019 Annual Accomplishment Report

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**State of Hawai'i
Department of Land and Natural Resources
Division of Aquatic Resources**

In Cooperation with
**The Research Corporation of the University of Hawai'i
Pacific Cooperative Studies Unit
And
Social Science Research Institute**



Aquatic Invasive Species Program



Aquatic Invasive Species Control

- Outplanted over 51,000 urchins. 520,000 urchins outplanted since 2011
- Treated approximately 6.15 acres of invasive algae on twelve patch reefs in Kāneʻohe Bay and began treatment in the Waikīkī MLCD
- Rapidly Responded to a report of a new species to Hawaiʻi– the Caribbean Corkscrew Anemone. Tried control methods for the anemone in collaboration with USGS and USFWS.



AIS Monitoring and Planning

- Completed annual benthic monitoring of Kāneʻohe Bay. Started monitoring of the Waikīkī MLCD .
- Drafted the AIS Strategic Plan.
- Continued Environmental DNA sampling of *Salvinia molesta* on KauaʻI
- Retrieved and began sorting the first of twenty harbor monitoring arrays deployed in 2018.



Ballast Water & Biofouling Coordination

- Developed a 4-year strategic plan in light of VIDA, enforcement of VIDA with USCG, and budget for BW/BF Biosecurity Program
- Completed the development of ballast water discharge risk assessment matrix
- Efficacy tested a ballast water compliance assessment tool for reliability and procedural simplicity for inspections



Outreach

- Participated in a variety of local outreach events and campaigns
- Featured on local news reports concerning Coral Bleaching, Nile Tilapia in Hilo, Hawaiʻi and Black Chin Tilapia in Nuʻalolo, Kauaʻi.
- Participated in professional conferences and workshops



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Acronym List

- AFRC – Ānuenue Fisheries Research Center
- AIS – Aquatic Invasive Species
- BW/BF – Ballast water/Biofouling
- CGAPS – Coordinating Group on Alien Pest Species
- DAR – Division of Aquatic Resources
- DLNR – Department of Land and Natural Resources
- DOCARE – Division of Conservation and Resources Enforcement
- eDNA – Environmental DNA
- HCRS- Hawai`i Coral Reef Strategy
- HDOA – Hawai`i Department of Agriculture
- HDOT – Hawai`i Department of Transportation
- HIBP- Hawai`i Interagency Biosecurity Plan
- HIMB – Hawai`i Institute of Marine Biology
- HISC – Hawai`i Invasive Species Council
- HOST – Hawai`i Ocean Safety Team
- MLCD – Marine Life Conservation District
- NIS – Non-indigenous species
- NOAA – National Oceanic and Atmospheric Administration
- NRAT – Native Ecosystems Protection & Management
- OCCL – Office of Conservation and Coastal Lands
- ORMP – Ocean Resources Management Plan
- TNC – The Nature Conservancy
- USCG- United States Coast Guard
- USFWS- United States Fish and Wildlife Service
- USGS- United States Geological Survey
- VIDA- Vessel Incidental Discharge Act



Introduction

The Division of Aquatic Resources (DAR), Aquatic Invasive Species (AIS) Program is committed to managing AIS threats to Hawai'i with the goal of minimizing the ecological, economic, and human health impacts of AIS through the prevention and management of AIS introduction, expansion, and dispersal into, within, and from Hawai'i (SOH, 2003)¹. The AIS program's focus areas include:

- Invasive algae management and control in Kāneʻohe Bay, Oʻahu
- Managing and operating the sea urchin hatchery
- Ballast water and hull fouling data gathering and policy development
- Prevention of AIS introductions and early detection
- Rapid response to AIS introductions, marine debris, disease outbreaks, coral bleaching, and other threats to Hawai'i's coral reefs
- Ecosystem monitoring
- AIS focused outreach, education, and community engagement
- AIS policy development
- Collaboration with fellow researchers, stakeholder, community groups, and partners

This year (2019) has been productive for the AIS Program, with a wide range of accomplishments including management and control work conducted in Kāneʻohe Bay, AIS monitoring on Oʻahu and Kauaʻi, community engagement, and participation in state and national conferences and workshops. This report summarizes the accomplishments of the AIS program in 2019 and lays out the program's direction for 2019 and beyond.

Invasive Species Early Detection, Monitoring, and Control

Overview

Invasive algae control has been one of the primary management priorities of the Department of Land and Natural Resources (DLNR)-DAR AIS Program. The proliferation of introduced invasive algae throughout Kāneʻohe Bay poses a major threat to coral reef ecosystems. As a result, extensive invasive algae management has been conducted throughout the Bay over the past decade. Past efforts primarily included manual removal of algae by divers using the "Super Sucker" underwater vacuum system followed by a biocontrol application: out-planting native sea urchins (*Tripneustes gratilla*) that were hatched and reared in the DAR Ānuenue Fisheries Research Center (AFRC) on Sand Island, Oʻahu. Following the 2014 and 2015 warm water events, which lead to mass coral bleaching, the algae in Kāneʻohe Bay declined to levels too low

¹ State of Hawai'i, 2003. Aquatic Invasive Species (AIS) Management Plan. Available online at <https://dlnr.hawaii.gov/ais/files/2013/12/HAWAII-mgt-PLAN-03.pdf>



for manual removal. Invasive algae persist throughout the Bay, but at levels effectively controlled by urchin grazers. Therefore, ongoing management efforts have shifted to urchin out-planting and herding.

This year, with additional funding from the Kapalāma Terminal Expansion Project, the AIS Program began out-planting urchins in the Waikīkī MLCD with the end goal of controlling 4.3 acres of invasive algae within an 18 acre area.

The AIS team also carries out various ecosystem monitoring and response efforts throughout the State. The AIS team's experience and ongoing efforts contributed to a wide range of steering committees, workshops, and trainings focusing on AIS and marine resource management.

2019 Key Accomplishments

- Outplanted over 51,000 hatchery raised juvenile sea urchins to reefs in Kāne`ohe Bay and the Waikīkī Marine Life Conservation District, totaling over 520,000 urchins out planted since inception in 2011.
- Treated approximately 6.15 acres of invasive algae on twelve patch reefs in Kāne`ohe Bay and began treatment in the Waikīkī MLCD
- Conducted AIS surveys and control methods in Kāne`ohe Bay, Waikīkī MLCD, Maunalua Bay and Kaua`i.
- Participated in conferences, outreach events, trainings and presented for multiple events.
- Drafted Aquatic Invasive Species Strategic Plan following multiple interagency steering committee meetings.

2019 Activity Highlights

Hatchery Improvements and Advancements

- Conducted five urchin spat count outreach events at AFRC. These events involved students and colleagues from Kewalo Marine Lab, The Hawai`i Institute of Marine Biology (HIMB), Windward Community College (WCC), Chaminade University, University of Hawai`i at Mānoa, and the University of Hawai`i Marine Option Program (MOP).
- Conducted three additional urchin spat count events with AFRC project staff including Flattery staff, Coral Nursery staff and civil service staff.
- Continued to work with and refine dedicated larval settlement system to improve post-settlement survival.
- Captive held adult urchins were spawned on multiple occasions. Larvae were reared, settled and grown out.
- Second generation (F2) offspring from urchins spawned in 2018 were successfully outplanted in Kāne`ohe Bay during the first half of 2019.
- Supplied juvenile urchins and supported an HIMB research project investigating climate change.
- Supplied juvenile urchins to the AFRC Coral Nursery for tank maintenance.
- Supplied juvenile urchins to the Waikīkī Aquarium for tank maintenance and exhibit.



- Supplied early stage larvae and gametes to Chaminade University developmental biology course for DNA extraction.

Cape Flattery Reef Restoration Plan

- Continued maintenance stocking of urchins on all prioritized patch and fringing reefs
- Continued annual monitoring of all prioritized reefs and Marker 12 in Kāne`ohe Bay
- A HEC RAS 2D flood model was presented to He`eia stakeholders in May 2019 and is intended to be used as a tool in the overall planning process for the He`eia basin
- Maintained 62 PVC reef markers on 33 different reefs to reduce number of boat strikes on patch reefs

Kāne`ohe Bay Ecosystem Monitoring

- Completed annual surveys of long-term coral monitoring sites on reefs in mid-bay:
 - Fish belt transects, benthic photo transects, rugosity measurements, benthic habitat mapping, photo plot mosaics, and urchin belt transects
- Continued to monitor corals of opportunity at out-planting locations
 - Assessed coral coverage using photo-mosaics

Kapalāma Container Terminal Expansion Project

- Removed coral from planned construction impact area for fragmenting and grow-out by Coral Nursery
- SNAP survey of Waikīkī Marine Life Conservation District (MLCD) invasive algae control site
- Began outplanting of sea urchins in the Waikīkī MLCD with the end goal of controlling 4.3 acres of invasive algae within an 18 acre area

Other AIS Projects

- *Bartholomea annulata*/ Caribbean Corkscrew Anemone
 - Rapidly responded to a new report of *B. annulata* in Kāne`ohe Bay
 - Determined the distribution of the anemone- Found to be widespread throughout Kāne`ohe Bay
 - Tried two control methods (calcium carbonate paste and hot water) partnering with United States Geological Survey and United States Fish and Wildlife Service.
 - Next steps are to continue distribution surveys and potentially tap into community or partner organizations for reports of *B. annulata*. Treatment on a larger scale was not considered feasible.
 - Hot water treatment also was tried on invasive algae in Maunalua Bay.



- *Salvinia molesta* surveys
 - Phase 3- conducted eDNA testing on Kauaʻi: Due to inconsistencies in visual surveys and eDNA results from previous phases, methodology was tested for detection ability.
- Harbor Monitoring: Autonomous Reef Monitoring Structures (ARMS)
 - Retrieved first of 20 ARMS deployed throughout the Main Hawaiian Islands in 2018.
 - Contracted Bishop Museum for taxonomic identification and sorting training
- Created list of high-risk aquatic species to add to Hawaiʻi Department of Agriculture’s (HDOA) Prohibited List for importation.
- Participated in Black Chin Tilapia Community Removal Pilot at Nuʻalolo, Kauaʻi
- Participated in invasive fish species cast net surveys in Kauaʻi estuaries
- Participated in planning Nile Tilapia Fishing Tournament in Hilo.

Other DAR Projects

- Assisted in species assessment surveys of artificial reefs off Waianae, Kāneʻohe Bay and Maunalua Bay
- Assisted monitoring team’s fish and benthic surveys on Oʻahu and Kauaʻi
- Coral Bleaching Surveys on Oʻahu and Kauaʻi
- Moved office and storage container locations within AFRC. New Modular Building at AFRC was installed, awaiting power hook-up
- Participated in Creel Surveys for Waikīkī- Diamond Head Fisheries Management Area (FMA) opening
- Participated in DAR’s Hawaiʻi Coral Reef Strategy (HCRS) and “30x30” strategic planning sessions
- Participated in eDNA stream study on Maui funded by CWRM
- Participated in Pepeʻekea Point Marine Survey in South Hilo, Hawaiʻi

Interagency Cooperation

- Reviewed permit applications to HDOA Plant Quarantine Branch for species imports
- Conducted Environmental Reviews for new project applications across Oʻahu
- Participated in multi-year shipworm surveys in Oʻahu harbors
- Hawaiʻi Institute of Marine Biology
 - Assisted the Point Lab with Heʻeia Watershed Restoration monitoring
 - Planning for installation of “No Fishing” signage around Coconut Island
 - Boat Support for Gates Lab Corals of Resilience Project
- Provided boat and dive support and technical assistance for a National Oceanic and Atmospheric Administration (NOAA) Coral Table restoration project; which is a staging



area for loose coral colonies following a damage event that will be used in future restoration efforts

- Participated in meetings for:
 - Coordinating Group on Alien Pest Species (CGAPS)
 - Hawai'i Invasive Species Council (HISC)
 - Ocean Resources Management Plan (ORMP)
 - Western Regional Panel (WRP)
- Provided input on HISC/ CGAPS Strategic Plan, Limited Distribution and Prevention Priority lists
- Provided updates to the Hawai'i Interagency Biosecurity Plan (HIBP) accomplishments
- Participated in Main Hawaiian Islands Reef Assessment and Monitoring Program with NOAA
- Donated old "Super Sucker" barge to Pae Pae o He'eia for invasive algae removal in their Loko I'a

Reports and Publications

- Aquatic Invasive Species Program Strategic Plan 2019-2024.
- *Bartholomea annulata* Rapid Response Plan.
- Cape Flattery Settlement Restoration Project: Restoring Reefs in Kāne'ohe Bay" Bi-annual report
- Contributed to Pepe'ekeo Point Marine Survey, South Hilo, Hawai'i Island Trip Report.
- Hodin J., A. Heyland, A. Mercier, B. Pernet, D.L. Cohen, J.-F. Hamel, J.D. Allen, J.S. McAlister, M. Byrne, P. Cisternas and S.B. George (2019) Culturing echinoderm larvae through metamorphosis. In: KR Foltz and A Hamdoun (eds), *Methods in Cell Biology – Echinoderms*. 150. Chapter 6. Elsevier: New York. In Press.

Presentations

- DAR Brown Bag: two presentations
- Delivered presentation to WWCC AQUA 106 lecture section: *The Sea Urchin Tripneustes gratilla as Biocontrol for Invasive Seaweeds: Aquaculture Methods*.
- Hawai'i Conservation Conference – four oral talks and two posters
- Waikiki Aquarium Lecture Series: two oral presentations

Steering Committees, Workshops, and Trainings

- CGAPS
- CoralNet Workshop
- Hālau `Ōhi`a
- Hazard Analysis and Critical Control Point Project Planning
- HIMB Coral Bleaching and Recovery Workshop



- NOAA- Pearl and Hermes Algae Working Group, Structure From Motion (Photomosaic) Workshop, Natural Resource Damage Assessment Workshop, Grant Writing Workshop
- Pacific Center for Collaboration: Facilitative Skills Workshop
- Rotenone Application Training- UT
- Western Regional Panel Annual Conference- Missoula, MT

Staff

AIS Team

- Aquatic Biologist III position filled
- Border/ Post Border Aquatic Biologist IV position vacated and filled
- Two 89-day Fishery Technician IVs hired transitioned to civil service Fishery Technician IVs (1 vacated shortly after)

Hatchery Team

- Two Hatchery Technician positions vacated and filled
- Hosted Kupu intern Sawyer Johnson (Oct 2019- present)
- One part-time Assistant Technician hired

Funding

- Cape Flattery Coral Damage Mitigation Trust Funds
- Port Royal Coral Damage Mitigation Trust Funds
- Kapalāma Terminal Expansion Funds
- OCCL Trust Funds (*Salvinia molesta* Project)

2020 Program Priorities

Kāne`ohe Bay Restoration

- Continue invasive algae control on patch and fringe reefs
- Annual SNAP surveys of treated reef areas
- Continue coral reattachment monitoring

Kapalāma Container Terminal Expansion Project

- SNAP survey of Waikīkī MLCD invasive algae control site
- Continue outplanting of sea urchins in the Waikīkī MLCD

AIS Control and Management

- Submit petitions/ work with HDOA to update import regulation lists
 - Add unlisted high-risk AIS to the list of prohibited species
 - Update list placement following risk assessments (e.g. move species from conditionally approved to restricted or prohibited list for more stringent regulation)



- Develop and disseminate standard operating procedures for rapid response to new aquatic species introductions.
- Complete reports for Maunalua Bay invasive algae, *B. annulata* control efforts and *S. molesta* eDNA.

Staff

- Hire 2 Civil Service Fishery Technician IVs, 1 RCUH Reef Habitat Monitoring Technician
- Hire Pre-Border Aquatic Biologist IV (Accomplished January 2020)

Program Development

- Revise AIS Strategic Plan to prioritize future projects

Ballast Water and Biofouling Program

Overview

On average, more than 1,000 commercial ships visit Hawai'i annually, each carrying the potential threat of AIS introductions into the State. Vessel ballast water and biofouling (BW/BF) has been estimated to be responsible for nearly 80% of the 350 non-indigenous (NIS) marine algae and invertebrate species currently established in Hawai'i, and scientific evidence indicates that vessel-borne AIS have been linked to a number of significant socioeconomic and human health implications worldwide (Davidson et. al., 2014).²

The Ballast Water and Biofouling Program was developed to address these top two introduction vectors. The 2012 §187A-32 Hawai'i Revised Statutes, designated DLNR-DAR as the lead State agency for preventing and managing AIS introductions through the regulation of BW/BF organisms.

Hawai'i's Ballast Water and Biofouling Program's vision is:

To effectively manage the ballast water and vessel biofouling vectors of aquatic alien species transfer into and among the Hawaiian Islands to mālama (protect) native marine habitat.

The Program's mission is:

To preserve and protect the native Hawai'i an marine ecosystem from further alien species introductions and transfer among the islands, through a strong alliance with the local, national and international maritime industry, and government and community stakeholders.

² Davidson I., Ruiz G., Gorgula, S. (2014) Vessel biofouling in Hawaii: current patterns of a potent marine bioinvasion vector and potential management solutions. Report to the Department of Land and Natural Resources (DLNR), Coordinating Group on Alien Pest Species (CGAPS), and the Hauoli Mau Loa Foundation. Honolulu, Hawaii.



The Program is heavily focused on preventative measures including developing or optimizing legislation for managing both sources of NIS transfer, conducting biosecurity risk assessments of commercial vessels, creating enforcement standard operating procedures, and monitoring current and newly established NIS.

This year, efforts were focused on gathering stakeholder support and collaboration aimed at preparing the Program for the co-enforcement of Vessel Incidental Discharge Act (VIDA) with the United States Coast Guard (USCG), providing consultation to federal agencies on compliance standard development under VIDA, continuing to perform outreach/education to targeted stakeholders and general public, and participating in important local, national and international working groups to review technical reports, strategic plans, and make informed decisions on Program direction.

2019 Key Accomplishments

- Adopted Senate Resolution 121: urging all applicable state agencies to work together with interested stakeholders, including the Honolulu Harbor Users Group, in assessing the risk of aquatic invasive species to Hawai'i , vectors, and possible mitigations, in preparation for the establishment of new federal standards in 2022 (VIDA).
- Coordinated with partner agencies, organizations and stakeholders to address Ballast Water and Biofouling Issues.
- Developed outreach materials and performed outreach to targeted audiences including members of the Hawai'i State Legislature.
- Efficacy tested a ballast water compliance assessment tool for reliability and procedural simplicity for inspections
- Developed a 4-year strategic plan for the BW and BF Program in light of VIDA, enforcement of VIDA with USCG, and budget for BW and BF Biosecurity Program
- Completed the development of ballast water discharge risk assessment matrix
- Developed a preliminary in-water cleaning and grooming regulatory decision tool framework

2019 Activity Highlights

- Developed a 4-year strategic plan for the BW and BF Program in light of VIDA, enforcement of VIDA with USCG, and budget for BW and BF Biosecurity Program
- Designated as the Hawai'i State point of contact for VIDA to the USCG by the Governor and DLNR Chairperson
- Draft the Senate Resolution 121 Report on findings and recommendations to the State legislature of 2020



- Coordinated with partner agencies, organizations and stakeholders to address Ballast Water and Biofouling Issues.
 - Two industry stakeholder meetings with CGAPS and HDOT Harbor's.
 - Submitted a west coast regional state letter and formal comment to EPA relating to preserving states' authority on regulating presence of biofouling
- Met with Division of Conservation and Resources Enforcement (DOCARE) Chief to discuss safety with vessel boarding
- Participated in the coordination of the transfer of a dry-dock from Washington State to Hawai'i State to minimize introduction of aquatic non-indigenous species in coordination with the Environmental Protection Agency, USCG Sector Honolulu, USCG Sector Puget Sound, Washington Department of Ecology, Washington Department of Fish and Wildlife, and HDOT Harbor's Division
- Rapid Ballast Water Efficacy Tool: tested a ballast water compliance assessment tool utilizing epifluorescence microscopy for reliability and procedural simplicity for inspections.
- Participated in the Alliance for Coastal Technologies review of the technical report that came out of testing a vessel in-water cleaning debris capture system trial in Alameda, CA
- Developed a preliminary in-water cleaning and grooming regulatory decision tool framework
- Reviewed International Maritime Organization documents related to amending large vessel biofouling management guidelines
- Coordinated National Ballast Information Clearinghouse creating data portal for HI (attended meeting in Maryland and toured Smithsonian Environmental Research Center)
- Completed the development of ballast water discharge risk assessment matrix
- Begin trialing a biofouling risk matrix tool and biofouling management reporting form database platform developed by regulators and software engineers in Australia, in consideration for DLNR to subscribe annually to the tool
- Provided objectives on BW and BF action items in the Hawai'i Coral Reef Strategic Plan
- Provided objectives on BW and BF action items in Governor's 30 x 30 Initiative
- Provided updates to the HIBP accomplishments

Working Groups, Workshops, and Conferences

Local

- 30 x 30 Plan Working Group
- Aquatic Alien Organism Stakeholders (AAOS)
- Ballast Water and Biofouling Steering Committee



- Coordinating Group on Alien Pest Species Steering Committee
- Hālau `Ōhi`a
- Hawai`i Coral Reef Strategy Plan Working Group
- Hawai`i Ocean Safety Team (HOST)
- Hazard Analysis and Critical Control Point (HACCP) Training Workshop
- HISC-CGAPS Strategic Plan Working Group
- Natural Resources Advancement Team (NRAT)
- Ocean Resources Management Plan Working Group (ORMP)

Regional

- California State Lands Commission Technical Advisory Group
- Western Regional Panel Coastal Committee
- Washington Ballast Water Working Group

National

- USCG Delegation to the International Maritime Organization
- VIDA EPA State Consultation Group
- VIDA USCG State Consultation Group

International

- Alliance for Coastal Technologies In-water Cleaning Capture System Core Testing Team
- Biofouling International Regulators Discussion Group (BIRD)

Presentations

- Australia, New Zealand, and Pacific Biofouling Management for Sustainable Shipping Workshop on Vessel Biofouling Regulation and Technology
- Biofouling International Regulators Discussion Workshop
- DLNR DAR and DOT Harbors Division VIDA Co-enforcement Meeting
- HISC Brown Bag Presentation
- Pacific Ballast Water Group Meeting
- USCG-NRL Aquatic Nuisance Species Meeting
- Western Regional Panel Coastal Committee Meeting

Staff

- Completed the hiring of one Kupu intern
- Recruited UH Manoa volunteers for sorting ARMS

Funding

- HISC FY20 grant awarded to support Hawai`i's Ballast Water and Biofouling Program
- U.S. Fish and Wildlife Service Aquatic Nuisance Species FY19 grant awarded



2020 Priorities

- Support and promote the adoption of State legislative bills that provide personnel and operational funds for the Hawai'i Ballast Water and Biofouling Program and fulfills 19 action items in the Hawai'i Interagency Biosecurity Plan
- Provide consultation
- Ground truth the ballast water risk matrix via boarding vessels to survey
- Begin to survey biofouling on large vessels
- Conduct recreational vessel biofouling management survey
- Develop Fishing Vessel biofouling best management practices outreach document
- Develop Mobile Marine Infrastructure best management practices outreach document
- Continue developing BW/BF reporting form database
- Continue developing the multi-purpose laboratory at AFRC
- Continue collaborating with maritime industry stakeholders, government partners, scientists, and educators to develop solutions to regulatory challenges and inform science-based decision-making
- Continue to investigate and efficacy test BW and BF management technology that minimize biosecurity risks associated with those pathways
- Continue to provide consultation to the DLNR Chair, Hawai'i Governor, EPA, and USCG on topics related BW, BF, and VIDA

Outreach and Community Engagement

Overview

The AIS Field Team, Urchin Hatchery Team, and BW/BF Team participated in a variety of outreach and community engagement events in 2019. Events were aimed towards legislature members, local community members, resource managers, researchers, students, and the public. The teams also developed and distributed outreach materials in order to better communicate AIS issues.

2019 Key Accomplishments

- Participated in a variety of local outreach events and campaigns
- Featured on local news reports concerning Coral Bleaching, Nile Tilapia in Hilo, Hawai'i and Black Chin Tilapia in Nu'alolo, Kauai.

2019 Activity Highlights

- Waipahu High School Career Day: Two Events
- DHRD Job Fair
- Legislative Pau Hana
- UH Student Interview on invasive algae management



- Co- hosted biofouling survey demonstrations with CGAPs and Sause Brothers for Senator Hirono's and Representative Gabbard's office staff.
- Contributed to or developed outreach materials concerning BW/BF, the Urchin Hatchery and AIS Field team.
- Rotary Club Meetings: Hilo and Kona
- Coordinated tour for DOT Harbor Division Planning Group

2020 Priorities

- Continue to engage community members and groups, stakeholders, resource managers and legislators.
- Continue serving on steering committees and working groups for AIS and aquatic resource conservation initiatives in Hawai'i
- Utilize iNaturalist and other citizen reporting platforms to increase non-native species distribution reporting.

