



Hawai'i Marine Debris Action Plan Accomplishments Report 2010–2020

Credit: Hawai'i Wildlife Fund

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Acknowledgements

The Hawai'i Marine Debris Action Plan is the result of the time, energy, and input of the many government agencies, nongovernmental organizations, academic institutions, industry, and private businesses that make up the marine debris management community in Hawai'i. Their engagement is the foundation that the Action Plan is built upon, and their continued collaboration has nurtured it over the last 10 years. Their continued stewardship will guide efforts over the next several years to address and reduce the environmental, socioeconomic, and human health and safety impacts of marine debris.

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Introduction

Hawai'i has been persistently burdened by mass amounts of marine debris. Each year, thousands of pounds of marine debris from domestic and international sources make their way to the islands. Items such as derelict fishing gear and various consumer goods have plagued the surrounding waters and the shorelines of Hawai'i, damaging its fragile ecosystems, economy, community health, and posing deadly risks to wildlife.

In 2007, various stakeholders from federal, state, private, and nongovernmental sectors, whose diverse expertise, work, and interests intersect around marine debris, met to prioritize and coordinate their efforts. During a three-year period, these stakeholders worked together to create the Hawai'i Marine Debris Action Plan. Publicly released in 2010, the purpose of the Hawai'i Marine Debris Action Plan was to reduce the ecological, health and safety, and economic impacts of marine debris in Hawai'i by 2020. The Hawai'i Marine Debris Action Plan was the first community-based marine debris strategic plan facilitated by the National Oceanic and Atmospheric Administration (NOAA) Marine Debris Program and had the longest time frame compared to those that followed. It was initially jointly facilitated by the NOAA Marine Debris Program and the U.S. Environmental Protection Agency. It is now solely facilitated by the NOAA Marine Debris Program and has been updated four times. In that time, partnerships and participation have increased, and together this steadfast community has made huge strides in understanding and mitigating marine debris in the islands. In doing so, the Hawai'i Marine Debris Action Plan serves as an example for what is possible when communities connect, communicate, and coordinate their efforts.

The Hawai'i Marine Debris Action Plan documents the shared goals, strategies to achieve those goals, and corresponding actions that stakeholders have created and supported. These interdisciplinary partners work tirelessly to address the issue of marine debris in Hawai'i through education, prevention, removal, and research efforts. Dedicated organizations regularly removed huge amounts of debris from local shorelines and beaches through both large community-based cleanup events and more targeted efforts, such as net patrols. Researchers have worked to better understand the sources, tracking, and identification of derelict fishing nets and other marine debris. Source reduction efforts have been championed by partners, which has resulted in policy momentum and comprehensive single-use plastic legislation on county and state levels. Furthermore, thousands of students, residents, and visitors are reached annually through extensive education and outreach programs, increasing the overall awareness and general understanding of marine debris.

The Hawai'i Marine Debris Action Plan and its success would not be possible without the dedication of its partners. A long history of community-led environmental stewardship has laid the foundation for the Hawai'i Marine Debris Action Plan. Every action, from daily tasks to large initiatives, has been a crucial building block in creating the strong marine debris community that exists in Hawai'i today.

Many partners have expressed the value of the networking and resulting community that has been created through the Hawai'i Marine Debris Action Plan. It creates a framework for collaboration and information sharing between government agencies, nongovernmental organizations, academic partners, industry, and private businesses. Partners strive to work in concert while carrying out their own unique missions and responsibilities. They participate in biannual coordination calls, quarterly newsletters, and in-person update workshops every two years. These diverse partnerships have opened the door for cooperation across vastly different sectors and with groups who might not normally have the opportunity to work together. This space has given the opportunity for collaboration and trust to grow, ultimately diversifying the tools and capabilities available to address marine debris of all types.

Though it is difficult to succinctly capture every action taken over the years, this report provides a history of the Hawai'i Marine Debris Action Plan and celebrates the accomplishments of the community. The NOAA Marine Debris Program recognizes and thanks these partners whose on-the-ground work has carried and matured the Hawai'i Marine Debris Action Plan during the past 10 years. Their ability to adapt to the ever evolving issue of marine debris is reflected in their many accomplishments. We are proud of this community, their strong history of stewardship and collaboration, and the completion of the 2010–2020 Hawai'i Marine Debris Action Plan. We look forward to celebrating these accomplishments and continuing to reduce the ecological, health and safety, and economic impacts of marine debris in Hawai'i as a community.

** Though the Hawai'i Marine Debris Action Plan was created through a collaborative process, not all partners support or work on all actions contained herein. Actions are carried out by interested partner organizations, and Action Plan affiliation does not constitute endorsement of all listed actions.*



Timeline and Summary of Each Hawai'i Marine Debris Workshop and Action Plan

2006

NOAA Marine Debris Program established

The Marine Debris Research, Prevention, and Reduction Act was signed into law on December 22, 2006, and established the Marine Debris Prevention and Removal Program (NOAA Marine Debris Program). To fulfill certain directives outlined in the Act, NOAA decided to hold regional workshops in marine debris "hot spot" areas, regions where marine debris activities had been occurring for many years and where marine debris had adversely affected trust resources and navigation.

2007

Regional planning meeting held to address marine debris issues

June 21, 2007 - A Hawai'i regional planning meeting was held at NOAA offices in Hawai'i Kai on the island of O'ahu. It was attended by 21 Hawai'i marine debris experts from state and federal government agencies, academia, and the private sector. It was determined that the workshop should result in specific outputs, such as a preliminary plan to prioritize marine debris efforts in the main Hawaiian Islands, as well as the Papahānaumokuākea Marine National Monument.

Participants determined that a comprehensive approach and strategies to address marine debris issues needed to include the following topic areas:

- Research and assessment
- In-water debris removal and prevention
- Beach cleanup
- Land-based debris prevention
- Outreach and education

2008

A Hawai'i Marine Debris Action Plan workshop to develop focus areas and priority actions

January 16–17, 2008 - A Hawai'i Marine Debris Action Plan workshop was held in Honolulu, Hawai'i. Thirty-four members of the marine debris management community in Hawai'i from federal, state, and local government agencies, nongovernmental organizations, and the private sector, met to develop a working draft of priority actions for the next 10 years and begin the development of a local action strategy for marine debris.

- The original five focus areas consisted of research, education and outreach, land-based pollution prevention, beach cleanup, and reef cleanup.
- The workshop concluded with a commitment from NOAA and the U.S. Environmental Protection Agency to facilitate additional working sessions with interested members of the Hawai'i marine debris management community to finalize the marine debris action strategy.

2008 continued

Three 1-day focus area workshops were held to further characterize new actions needed for each strategy.

- **October 22, 2008** - Outreach and education
- **November 5, 2008** - Land based debris prevention and beach cleanup
- **November 14, 2008** - Research and assessment, and in-water removal and prevention

2009

Plans finalized for first Hawai'i Marine Debris Action Plan

October 16, 2009 - Nearly 30 partners joined in for the last workshop to finalize the Hawai'i Marine Debris Action Plan. Participants provided input and assistance in honing and improving the results chains—diagrams that show in detail how a particular action will lead to a desired result.



2010

Hawai'i Marine Debris Action Plan released

January 12, 2010 - The plan was released at a ceremony attended by over 70 partner representatives, as well as elected officials supportive of the effort.

It was determined that the plan would be updated every two years to both incorporate the results from the previous implementation period and provide planned activities for the next two years. Hawai'i state officials signed a declaration of support that accompanied the plan.

2010 Hawai'i Marine Debris Action Plan

After this three-year planning period, the first iteration of the Hawai'i Marine Debris Action Plan was created and included 42 activities and four goals. The plan articulated a strategic approach to maintaining marine debris removal efforts, reducing the backlog of marine debris, and increasing efforts for debris prevention. The four main goals identified were: 1) Backlog of Marine Debris at Sea Reduced; 2) Introduction of Solid Waste and Fishing Gear at Sea and Coastal Areas Decreased; 3) Number of Abandoned and Derelict Vessels Decreased; and 4) Land-based Debris in Waterways Reduced.



2011

The Fifth International Marine Debris Conference held in Honolulu, Hawai'i

March 20–25, 2011 - NOAA, in collaboration with the United Nations Environment Programme, organized and hosted the Fifth International Marine Debris Conference. The five-day conference was held in Honolulu, Hawai'i, and brought together 440 participants representing 38 countries.

A major output of the event was the [Honolulu Strategy: A Global Framework for the Prevention and Management of Marine Debris](#).



2012

The second Hawai'i Marine Debris Action Plan released

April 26–27, 2012 - A workshop was held to create the second iteration of the Hawai'i Marine Debris Action Plan, which spanned January 2012–December 2013. Over 40 participants attended the workshop. A key output of the workshop was the signing of the Declaration of Support for the Hawai'i Marine Debris Action Plan. By signing the declaration, members of the community agreed to support the goals and work outlined in the Hawai'i Marine Debris Action Plan and Honolulu Strategy.

2012 Hawai'i Marine Debris Action Plan

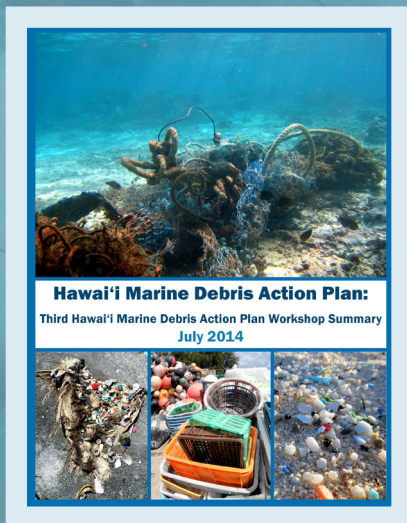
- The second iteration of the Hawai'i Marine Debris Action Plan included 183 activities (132 new, 51 ongoing) and consisted of four goals. These goals were: 1) Backlog of Marine Debris at Sea Reduced; 2) Incidence of Illegal Discharge of Fishing Gear and Solid Waste at Sea Decreased; 3) Number of Abandoned and Derelict Vessels Decreased; and 4) Land-based Debris in Waterways Reduced. Hawai'i Marine Debris Action Plan partners modified the language in Goal 2 and planned to focus on Goals 1 and 4 throughout 2012 and 2013.
- The plan included a conceptual model to illustrate the causal links between the types, sources, and locations of marine debris in the environment and the direct and indirect threats on specific ecosystem targets in Hawai'i. The conceptual model was developed to facilitate the identification of threat reduction goals and strategies and to document the assumptions made in developing these strategies.



**Hawai'i Marine Debris
Action Plan
2012-2013**

2014

The third Hawai'i Marine Debris Action Plan released



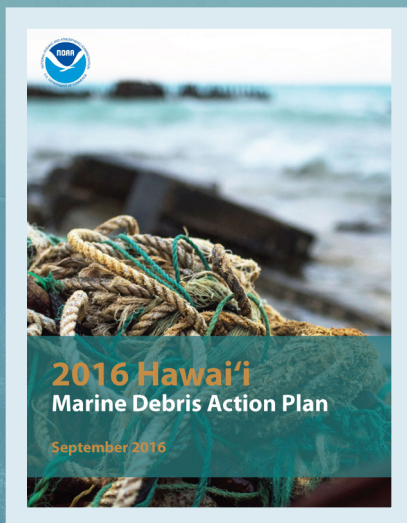
July 2014 - The third Hawai'i Marine Debris Action Plan workshop included 34 participants from across the state. During the workshop, participants discussed the four goals and voted on the strategy that held the most importance to their personal interest or respective organization. The strategy with the highest number of votes was then further discussed and priorities were created to help achieve it.

2014 Hawai'i Marine Debris Action Plan

- The third iteration of the Hawai'i Marine Debris Action Plan included 87 activities (14 new, 73 ongoing) and consisted of four goals with additional prioritized strategies underneath each. The identified priorities were: 1) Removal Priorities: Ocean Stewardship, New Cleanup Campaigns, and Clarify Cleanup Roles; 2) Ocean-based Debris Priorities: Source Identification, Incentive for Fishermen, and New Method for Net Return; 3) Abandoned and Derelict Vessel Priorities: Liability Trust Fund and Abatement Fund Incentive for Fishermen; and 4) Prevention Priorities: Quantifying Baseline, Data Collection Systems, and Ban Plastic or Decrease Use.
- At the end of the 2014–2016 period, 41 actions were successfully completed.

2016

The fourth Hawai'i Marine Debris Action Plan released



July 25–27, 2016 - The NOAA Marine Debris Program hosted the fourth Hawai'i Marine Debris Action Plan workshop at the Inouye Regional Center in Honolulu, Hawai'i. The three-day workshop included 42 participants that represented various federal, state, and local government agencies, nongovernmental organizations, and the private sector across Hawai'i. The focus of the 2016 Hawai'i Marine Debris Action Plan workshop was to ensure that the plan was effectively addressing the current issues of marine debris in Hawai'i, and partners significantly revised the plan to reflect that.

Workshop objectives were to:

- Review and reword goal and strategy language
- Propose actions for August 2016–July 2018
- Share experiences and lessons learned
- Discuss challenges and solutions in current and proposed activities
- Explore mechanisms to improve collaboration and communication

A notable outcome of this workshop was the establishment of four working groups, or *hui*, around the plan's revised goal areas: Prevention, Removal, Abandoned and Derelict Vessels, and Research.

2016 Hawai'i Marine Debris Action Plan

The fourth iteration of the Hawai'i Marine Debris Action Plan included 107 actions (69 new, 38 ongoing) and consisted of five goals, including a new goal focused on marine debris research. The five goals were: 1) Reduce Sources of Marine Debris Through Prevention; 2) Reduce the Amount and Impacts of Ocean-based Marine Debris; 3) Support and Sustain Marine Debris Removal; 4) Increase Capacity to Address Abandoned and Derelict Vessels; and 5) Conduct High-quality Research to Understand Marine Debris.

2017

Hawai'i Marine Debris Action Plan Research Workshop held



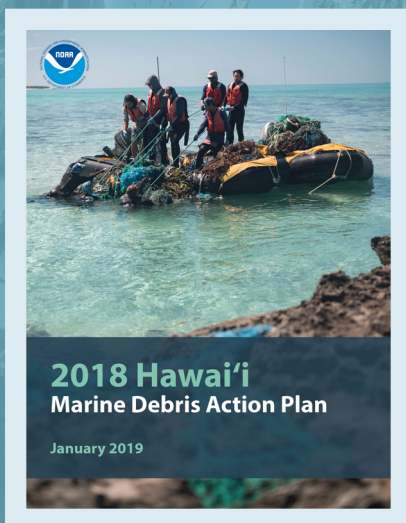
March 30, 2017 - The NOAA Marine Debris Program and University of Hawai'i at Mānoa hosted the first Hawai'i Marine Debris Action Plan Research Workshop at the University of Hawai'i at Mānoa on the island of O'ahu. The one-day workshop included 23 participants who were actively engaged in marine debris research or data collection. The purpose of this workshop was to determine the current state of knowledge, deficiencies, and capacity of stakeholders in the state to further the regional understanding of marine debris.

A summary of the workshop was compiled and published: [2017 Hawai'i Marine Debris Action Plan Research Workshop](#).



2018

The fifth Hawai'i Marine Debris Action Plan released



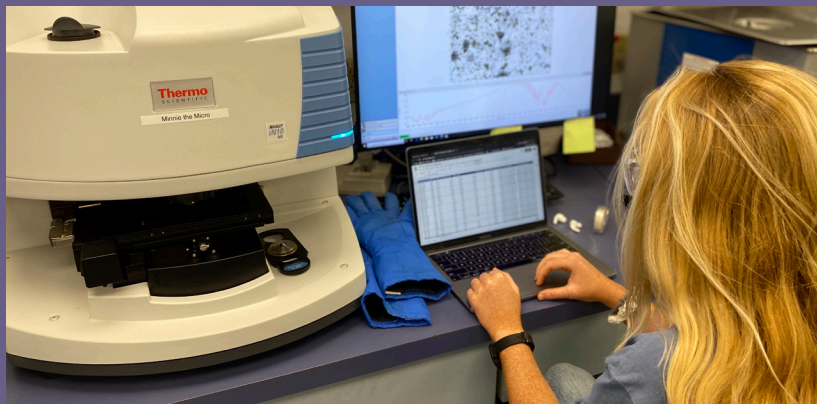
August 13–14, 2018 - The NOAA Marine Debris Program hosted a two-day update workshop at Daniel K. Inouye International Airport in Honolulu, Hawai'i. The workshop provided a time and space for partners to discuss the current state of the Hawai'i Marine Debris Action Plan and propose updates and changes. Thirty-six organizations attended the workshop; 15 of those organizations were new participants.

2018 Hawai'i Marine Debris Action Plan

The fifth and final iteration of the 2010–2020 Hawai'i Marine Debris Action Plan included a total of 120 actions (95 current and ongoing actions, and 25 future actions). *Future actions* were defined as actions that could not be committed to in the short-term, but were considered important and should be documented and worked on in the future.

2019

Hawai'i Marine Debris Action Plan Research Workshop held



July 25–26, 2019 - In an effort to encourage continued information sharing and collaboration, the NOAA Marine Debris Program and the National Institute for Standards and Technology partnered to co-facilitate the 2019 Hawai'i Marine Debris Action Plan Research Workshop. The workshop took place at the Hawai'i Pacific University Makapu'u Campus on the island of O'ahu.

The two-day workshop brought together Hawai'i-based researchers in the field of marine debris to accomplish the following workshop objectives:

- Communicate and share Hawai'i-based research projects and results from a variety of science perspectives
- Update and reassess research priorities set in the 2017 Hawai'i Marine Debris Action Plan Research Workshop
- Identify research gaps and resource needs

A summary of the workshop was compiled and published: [2019 Hawai'i Marine Debris Action Plan Research Workshop](#).



2021

Completion of the 2010-2020 Marine Debris Action Plan

March 2, 2021 - The Hawai'i Marine Debris Action Plan community came together to celebrate the completion of the 2010–2020 Action Plan. Congressman Ed Case, Congressman Kaiiali'i Kahele, and Senator Brian Schatz joined the virtual workshop to provide congratulatory remarks. The workshop continued for the remainder of the month with meetings to discuss goals and actions for the creation of the newest 2021 Hawai'i Marine Debris Action Plan.

Partners Throughout the Islands

The Hawai'i Marine Debris Action Plan is a multi-island effort. Its community is made up of a diverse collection of partners from nongovernmental organizations, academic institutions, private businesses, and government agencies. A total of 124 organizations, listed below, have contributed to and engaged with the Hawai'i Marine Debris Action Plan throughout the last 10 years.

Kaua'i - 8 Organizations

- County of Kaua'i, Civil Air Patrol
- County of Kaua'i, Civil Defense
- County of Kaua'i, Dept. of Parks and Recreation
- Hanalei Bay Watershed Hui
- Kaua'i Westside Watershed Council
- Mālama Nā'Āpapa
- Surfrider Foundation Kaua'i Chapter
- The Friends of Kamalani and Lydgate Park



Maui - 12 Organizations

- County of Maui, Mayor's Office
- County of Maui, Office of Economic Development
- Maui Hulilau Foundation
- Maui Ocean Center Marine Institute
- Maui Reef Fund
- Pacific Whale Foundation
- Pūlama Lāna'i
- Sharkastics
- State of Hawai'i, Kaho'olawe Island Reserve Commission
- Stony Brook University
- Surfrider Foundation Maui Chapter
- Swell Consulting



O'ahu - 96 Organizations

- Archinoetics
- Beach Environmental Awareness Campaign Hawai'i (B.E.A.C.H.)
- Chris Woolaway and Associates, LLC
- City and County of Honolulu, Department of Parks and Recreation
- City and County of Honolulu, Department of Environmental Services
- City and County of Honolulu, Department of Emergency Services
- City and County of Honolulu, Facility Maintenance
- City and County of Honolulu, Office of Climate Change, Sustainability and Resiliency
- Community Work Day Program
- Coral Reef Alliance
- Covanta Energy
- Enchanted Lake Residents Association
- Environmental Science International, Inc.
- Hawai'i Ocean Observing System
- Hawai'i Ocean Safety Team
- Hawai'i Longline Association
- Hawai'i Pacific University
- Hawai'i Pacific University Center for Marine Debris Research
- Hawai'i Tourism Authority
- Island Divers
- Kako'o'O'iwi



Hawai'i Island - 8 Organizations

- County of Hawai'i, Civil Defense
- County of Hawai'i, Parks and Recreation, Aquatics
- Keep Puakō Beautiful
- Hawai'i Wildlife Fund
- State of Hawai'i, Department of Land and Natural Resources, Division of Aquatic Resources
- State of Hawai'i, Department of Land and Natural Resources, Division of State Parks
- Surfrider Foundation Hilo Chapter
- University of Hawai'i Hilo Marine Science

O'ahu organizations continued on next page...

O'ahu Organizations Continued

- Keep the Hawaiian Islands Beautiful
- Kini Beach
- Kōkua Hawai'i Foundation
- Kupu
- Mālama Learning Center
- Mālama Maunaloa
- Marine Management Solutions, LLC
- Matson Navigation
- Nā Kama Kai
- National Institute of Standards and Technology
- NOAA National Marine Fisheries Service, Recreational Fisheries
- NOAA National Marine Fisheries Service, Restoration Center
- NOAA Hawaiian Islands Humpback Whale National Marine Sanctuary
- NOAA Office for Coastal Management
- NOAA Office of Response and Restoration, Marine Debris Program
- NOAA Office of Law Enforcement
- NOAA Office of Marine and Aviation Operations
- NOAA Office of National Marine Sanctuaries, Pacific Islands Region
- NOAA Office of National Marine Sanctuaries, Pāpāhānaumokuākea Marine National Monument
- NOAA National Environmental Satellite, Data, and Information Service
- NOAA National Marine Fisheries Service, Pacific Islands Fisheries Science Center
- NOAA National Marine Fisheries Service, Pacific Islands Regional Office
- NOAA National Marine Fisheries Service, Pacific Islands Regional Office Observer Program
- NOAA Pacific Services Center
- NOAA Unmanned Aircraft Systems Program
- Oceanic Institute
- Oceanit
- Oikonos - Ecosystem Knowledge
- Pāpāhānaumokuākea Marine Debris Project
- Pacific Islands Ocean Observing System
- Pacific Ocean Producers Fishing and Marine
- PlanSea
- Parley for the Oceans
- Reef Watch Waikiki
- Sea Turtles International
- Schnitzer Steel Hawai'i Corporation
- Sheavly Consultants
- Sierra Club Hawai'i Chapter
- State of Hawai'i, Department of Business, Economic Development, and Tourism
- State of Hawai'i, Office of Planning, Coastal Zone Management Program
- State of Hawai'i, Department of Health, Clean Water Branch, Polluted Runoff Control Program
- State of Hawai'i, Department of Health, Environmental Health Administration
- State of Hawai'i, Department of Health, Environmental Planning Office
- State of Hawai'i, Department of Land and Natural Resources, Division of Boating and Ocean Recreation
- State of Hawai'i, Department of Land and Natural Resources, Division of Conservation and Resources Enforcement
- State of Hawai'i, Department of Land and Natural Resources, Division of Forestry and Wildlife
- State of Hawai'i, Department of Land and Natural Resources, Land Division
- State of Hawai'i, Department of Land and Natural Resources, Protected Species Program
- State of Hawai'i, Department of Transportation, Harbors Division
- Surfrider Foundation O'ahu Chapter
- Sustainable Coastlines Hawai'i
- TetraTech EM, Inc.
- The Nature Conservancy
- TransPacific Marine Debris Survey
- TSphere Energy
- United Fishing Agency
- University of Hawai'i, Center for Microbial Oceanography: Research and Education
- University of Hawai'i, Hawai'i Coral Reef Initiative
- University of Hawai'i, Hawai'i Institute of Marine Biology
- University of Hawai'i, International Pacific Research Center
- University of Hawai'i, Kewalo Marine Laboratory
- University of Hawai'i, Office of Sustainability
- University of Hawai'i, School of Ocean and Earth Science Technology
- University of Hawai'i, Sea Grant College Program
- University of Hawai'i, Marine Options Program
- University of Hawai'i, Marine Mammal Stranding Program
- University of Hawai'i, Unmanned Aircraft Systems
- U.S. Coast Guard
- U.S. Environmental Protection Agency, Region 9, Pacific Islands Contact Office
- U.S. Fish and Wildlife Service
- U.S. Navy Region Hawai'i
- USDA Natural Resources Conservation Service Pacific Islands
- Western Pacific Regional Fisheries Management Council
- Zero Waste O'ahu
- 808 Cleanups



Prevention

Beach cleanups and removal efforts are an important part of reducing the amount of marine debris entering our waterways. However, cleanups are not the ultimate solution; prevention is key to solving the marine debris problem over time. For prevention efforts to be successful, they need to begin at multiple entry points. Hawai'i Marine Debris Action Plan partners have made huge progress toward preventing marine debris through the areas of policy, information sharing, education and outreach, and upstream waste prevention.

Legislation

Bag ban

The 2015 plastic bag ban was the second statewide ban in the United States.

The Hawai'i Marine Debris Action Plan has long included and documented partner actions for reducing potential marine debris through legislation. Legislation to prevent marine debris can include regulations, limits, or prohibitions on the use of items that enter the waste stream. Over the past 10 years, coordination by participating Hawai'i Marine Debris Action Plan partners has played a pivotal role in creating legislative change at both the county and state levels, successfully building off of the initial 2013 plastic bag ban in Hawai'i County. Through active civic engagement, encouraging public involvement, and years of testimonies, all counties have a plastic bag ban or reduction policy in place as well as a variety of single-use plastic bans. Most recently, the City and County of Honolulu passed [Bill 40](#) (currently known as Disposable Food Ware Ordinance 19-30), which phases out the use of plastic bags and polystyrene foodware. This legislation was made possible with the support of many Hawai'i Marine Debris Action Plan partners and is believed to be one of the strongest plastic bans in the nation.



Education, Outreach, and Public Awareness

10,000
students

*The Sustainable Coastlines
Hawai'i educational program
efforts regularly reach
10,000 students per year in
classrooms statewide.*

Educating the public about marine debris is a key component to reducing and preventing it over time. The majority of Hawai'i Marine Debris Action Plan partners regularly conduct educational outreach to many different audiences, including students, schools, businesses, the general public, visitors, and more. These dedicated organizations directly and indirectly reach thousands of individuals on an annual basis through their many programs, resources, and educational efforts. Many partners have noted a general increase in awareness of the issue when engaging with community members. Stories related to marine debris are now regularly picked up by the local news. Partners engage the public through school presentations, outreach events, beach cleanups, curriculum, public service announcements, mobile education stations, eco tours, college lectures, and neighborhood meetings. Additionally, large-scale education campaigns around public awareness efforts have helped to fuel this general increase in marine debris knowledge.

Between 2016–2018, the following organizations collectively reached over 15,000 students: Hawai'i Wildlife Fund, Surfrider Foundation O'ahu Chapter, Surfrider Foundation Kaua'i Chapter, Sustainable Coastlines Hawai'i, NOAA Marine Debris Program, NOAA Coral Reef Ecosystem Program, Kōkua Hawai'i Foundation, University of Hawai'i.



Environmental Protection Agency Ruling

In February 2020, Surfrider Foundation, the Center for Biological Diversity, and Sustainable Coastlines Hawai'i sued the U.S. Environmental Protection Agency (EPA) to address plastic pollution under the Clean Water Act. The lawsuit challenged the EPA's listing of "impaired" water bodies under section 303(d) of the Clean Water Act. The EPA responded to the lawsuit by withdrawing its list of impaired waters in Hawai'i that failed to take into account water quality impairment due to plastic pollution. Subsequently, the EPA ordered the Hawai'i State Department of Health to examine the impact of plastic pollution on its ocean, beaches, and wildlife.

No butts

In 2016, the Pacific Whale Foundation launched its Tobacco Awareness Campaign to support the 2014 tobacco-free beaches and parks bill and the reduction of cigarette butt litter along coastlines in Maui.



Upstream Waste Prevention

Zero waste

Zero Waste O'ahu hosted a zero waste summit in Honolulu in 2018 with over 300 participants.

Upstream waste prevention efforts focus on stopping the problem at the source and have helped to build a better understanding of trends in consumption. In 2016, Hawai'i Marine Debris Action Plan partners made a push to prioritize prevention and shift the tone of the Hawai'i Marine Debris Action Plan to become more proactive. Kōkua Hawai'i Foundation's Plastic Free Hawai'i Program works to minimize single-use plastics through many avenues, including presentations, event greening consulting, and working with schools through its Plastic Free Hawai'i School program. Efforts, such as Surfrider Foundation's Ocean Friendly Restaurants program, have worked with many businesses across the islands to create partnerships and reduce plastic waste. Zero waste teams have been formed on many of the islands, creating an exciting network and momentum for upstream waste prevention. New efforts such as Full Cycle Take-Out, a reusable takeout container program, will continue to build upon the awareness that has been established in the community to encourage behavior change and normalize the reduction of plastic waste.

By 2018, Surfrider Foundation's Ocean Friendly Restaurant program certified 165 restaurants on O'ahu and 14 restaurants on Kaua'i.



Ocean-based Marine Debris and Abandoned and Derelict Vessels

The North Pacific Gyre carries lost and abandoned fishing nets and gear from all over the Pacific Ocean. The central location of Hawai'i within the gyre causes this gear and other marine debris to build up in large amounts. Large net masses, oyster spacers, hagfish traps, and fishing lines are regularly found in nearshore waters and along shorelines. Abandoned and derelict vessels originate in a variety of ways, from natural disasters, such as hurricanes, to boat owner neglect. Hawai'i Marine Debris Action Plan partners have steadily worked on the issues of and actions towards addressing both ocean-based marine debris and abandoned and derelict vessels since the start of the Hawai'i Marine Debris Action Plan in 2010.

Ocean-based Marine Debris

Removing ocean-based marine debris while still out at sea is an important part of mitigating its impacts before reaching reefs and shorelines. Groups such as Ocean Voyages Institute use satellite trackers to locate derelict nets and have removed hundreds of thousands of pounds of nets and debris in the North Pacific. A recent expedition in 2020 used forecast modeling and remote sensing techniques from the University of Hawai'i at Mānoa International Pacific Research Center; NOAA National Environmental Satellite, Data, and Information Service; and private satellite companies to increase removal efficiencies and validate (or groundtruth) analysis.

Partners have also conducted targeted outreach to local fishers. Between 2010 and 2011, the Western Pacific Regional Fishery Management Council created signs and posters about the Fisherman's Code of Conduct and partnered with the Hawai'i State Department of Land and Natural Resources Division of Boating and Ocean Recreation to have these placed at various harbors. The Code of Conduct was also disseminated as handouts at public events and placed as ads in publications.

The Hawai'i longline fleet operates in a region of the North Pacific Ocean that partially overlaps with the eastern part of the Great Pacific Garbage Patch, a large accumulation of debris located in the North Pacific Gyre. Fishery observers go out to sea aboard

commercial fishing vessels to collect data from dozens of federally managed fisheries for the NOAA National Marine Fisheries Service. In 2007, observers began to record marine debris data. The data has resulted in a paper, published in 2020, that discusses derelict fishing gear in the Hawai'i-based pelagic longline fishery grounds.



Disposal Options

Having a variety of accessible disposal options for ocean-based marine debris is necessary for engaging different audiences in continued removal efforts. The 2010 Hawai'i Marine Debris Action Plan called for efforts to replicate monofilament recovery and recycling programs that existed at that time in the continental United States. The Maui Ocean Center Marine Institute has installed and now manages nearly 40 fishing line recycling bins on Maui through their Fishing Line Recycling Program, helping to minimize harmful interactions between sea turtles and fishing line. On O'ahu, Hawaii Marine Animal Response is leading an ongoing collaborative effort with NOAA, the Hawai'i State Department of Land and Natural Resources Division of Aquatic Resources, and the Division of Boating and Ocean Recreation to install and manage fishing line recycling bins in boat harbors and popular fishing areas on the island.

Fishers, communities, local removal groups, and trained divers regularly remove derelict nets from the environment, and there has always been a need for low-cost and convenient disposal options. Instead of adding the nets to already congested landfills, in 2002, a public-private partnership created the Hawai'i Nets to Energy program. This unique effort turns marine debris into usable electricity and is supported by groups including Schnitzer Steel Hawai'i Corporation, Covanta Energy, and Honolulu H-Power. There are now seven no-cost net collection bins on O'ahu, Maui, Kaua'i,

Disposal Options

continued



and Hawai'i Island. The first large bin, measuring 22 feet long and located at Pier 38 on O'ahu, has been maintained by Pacific Ocean Producers since 2002, and an additional bin located at the James Campbell National Wildlife Refuge on O'ahu has been managed by the U.S. Fish and Wildlife Service since 2018. On Hawai'i Island, Hawai'i Wildlife Fund, with support from the Hawai'i State Department of Land and Natural Resources, has installed smaller scale bins, measuring 4 feet by 4 feet, at Honokōhau Harbor and at the Division of Aquatic Resources' facility in Hilo. On Kaua'i, the Surfrider Foundation has installed similar sized bins at Nāwiliwili Harbor and Port Allen. The Maui Ocean Center Marine Institute, through Fishing for Energy, a partnership a partnership between the NOAA Marine Debris Program, Covanta, the National Fish and Wildlife Foundation, and Schnitzer Steel Industries, has recently acquired a large bin staged at Ma'alaea Harbor to allow for the collection of decommissioned nets. Some Hawai'i Marine Debris Action Plan partners collect and ship nets to O'ahu courtesy of Matson Foundation's Ka 'Ipu 'Āina Program.





Abandoned and Derelict Vessels

74 ADVs removed

In 2012, the Hawai'i State Department of Land and Natural Resources received and processed 74 abandoned and derelict vessels suspected as potential Japan Tsunami Marine Debris.

In 2016, the Hawai'i Coral Reef Initiative, in partnership with the Hawai'i State Department of Land and Natural Resources and Resource Mapping Hawai'i, developed a strategy to characterize marine debris accumulation along the shorelines of Hawai'i using aerial orthoimagery, a technique that stitches together many individual images, and geographic information system analysis. This analysis resulted in a report documenting 50 vessels and fragments on the islands of Hawai'i, Maui, Lāna'i, Moloka'i, O'ahu, and Kaua'i. The purpose of the report was to assist the Division of Boating and Ocean Recreation with its investigation of vessels within the main Hawaiian Islands and ascertain the feasibility of accessing and removing the vessels in the future. This project was funded by the Ministry of the Environment of Japan Gift Fund in response to the 2011 Tōhoku earthquake and tsunami. Funds were distributed to the North Pacific Marine Science Organization and administered through the Hawai'i State Department of Land and Natural Resources.

In 2015, approximately 11,500 boaters completed state-mandated Boating Safety Education.

Hawai'i has also passed a few laws to help combat the issue of abandoned and derelict vessels. In 2019, Governor David Ige signed a [bill](#) into law requiring vessels 26 feet in length and greater to obtain insurance coverage of no less than \$100,000 to ensure that the removal and salvage of a grounded vessel is covered. Also in 2019, Hawai'i created a certificate of title program, which should provide a system to quickly identify ownership and therefore reduce the potential for vessels to become abandoned and left derelict. Since 2003, the Division of Boating and Ocean Recreation has removed more than 90 vessels statewide, costing more than \$2.3 million, which solidified the reasoning for mandatory insurance legislation.



Marine Debris Removal

Conducting near-shore and in-water debris removal is imperative to reducing the immediate threats and harm caused by marine debris. Through dedicated and consistent removal efforts, Hawai'i Marine Debris Action Plan partners remove thousands of pounds of marine debris every year. Removal operations range from large-scale community beach cleanups to targeted net patrols, long-term missions at sea, and small socially distanced and solo activities.

Huge Amounts of Marine Debris Regularly Removed

Cleanups

808 Cleanups conduct 4-5 cleanups per day on average.

Volunteers

Through the coordination of Friends of Kamalani and Lydgate Park, volunteers devote 5,000+ hours annually taking care of the park, including clearing marine debris that washes into the swimming pond.

Dedicated community-based efforts have long driven marine debris removal efforts in Hawai'i. Local organizations consistently coordinate a wide range of cleanups, both large- and small-scale, and in doing so, have removed tons and tons of debris. In organizing cleanups and engaging the public, partners create an entryway for and amplify outreach and education. These events are used to help build awareness and understanding of the issue. Focused efforts, such as net patrols, strategically target debris types and prioritize cleanup sites. Hawai'i Wildlife Fund and Surfrider Foundation Kaua'i Chapter both conduct these types of patrols on their respective islands of Hawai'i and Kaua'i, removing huge masses of nets on a regular basis. Partners work collaboratively to achieve shared goals. In 2017, the Hawai'i Environmental Cleanup Coalition was established for a 12-month initiative to promote efficient, collaborative cleanup efforts throughout Hawai'i. Prior to the formation of the Coalition, between 2007 and 2016, these groups and their volunteers had

Technology and engineering is also used to support removal efforts. In 2019, crowdfunding paid for shipping of a microplastic apparatus called Ho'ola One that Hawai'i Wildlife Fund collaborated with Sherbrooke University (Quebec, Canada) engineering students to design. Hawai'i Wildlife Fund continues to use the machine to clean remote Ka'u beaches and a new version of the machine is in the works.

already removed 600,000 pounds of marine debris through their cleanup efforts. Partners also work across islands to support neighboring communities and share resources. Sustainable Coastlines, Parley, and the Hawai'i State Department of Land and Natural Resources Division of Aquatic Resources work with the community of Moloka'i to tackle marine debris on its shorelines.

Partners

The Hawai'i Environmental Cleanup Coalition was comprised of the following 11 partners: 808 Cleanups, Hawai'i Coral Reef Initiative, Hawai'i Wildlife Fund, Hui o Ko'olaupoko, Kaho'olawe Island Reserve Commission, Kōkua Hawai'i Foundation, Pūlama Lāna'i, Sharkastics, Surfrider Foundation, Sustainable Coastlines Hawai'i, and Trees to Seas



Removal Milestones

A multi-agency effort

Papahānaumokuākea Marine National Monument multi-agency removal mission partners: NOAA Pacific Islands Fisheries Science Center, NOAA Damage Assessment Remediation and Restoration Program, NOAA Marine Debris Program, Papahānaumokuākea Marine Debris Project, Joint Institute for Marine and Atmospheric Research and University of Hawai'i, Papahānaumokuākea Marine National Monument, Schnitzer Steel Hawai'i Corporation, H-Power (Covanta), U.S. Fish and Wildlife Service, National Fish and Wildlife Foundation, National Marine Sanctuary Foundation

Over the last 10 years, Hawai'i Marine Debris Action Plan partners have reached incredible removal milestones. Collectively, Hawai'i Marine Debris Action Plan partners have removed at least a million pounds of debris between 2010–2020. At the end of 2018, Hawai'i Wildlife Fund cumulatively removed 250 tons of marine debris since beginning their work in 2003. As they neared the end of 2020, they approached 300 tons of debris removed from Hawai'i Island and 350 tons statewide. On Maui, Sharkastics celebrated eight years of volunteer-powered cleanups at Ka'ehu. Since beginning these cleanups in July 2012, they have removed 498,010 pieces of marine debris (48,501 pounds) from the bay. Large-scale, multi-agency coordinated marine debris removal missions have taken place in the Papahānaumokuākea Marine National Monument since 1996. Between 2011–2018, over 234 metric tons of marine debris were removed to protect important habitat and preserve the monument's cultural and natural heritage.

Many of the Hawai'i Marine Debris Action Plan partners participate in the annual International Coastal Cleanup. Over the last 10 years, these dedicated organizations and community volunteers contributed to:

- The removal of 1,274,399 marine debris items
- 22,708 people/participants
- The removal of 404,984 pounds of marine debris

Developing Effective Communication

Cleanup app

The 808 Cleanups app connects volunteers with one another and promotes teamwork to make the islands of Hawai'i cleaner, safer, and stronger. The app allows users to check into cleanups, share cleanup opportunities, report marine debris, and request immediate support.

Disposal and Reuse Initiatives

Priorities

Hawai'i Wildlife Fund and Surfrider Foundation Kaua'i Chapter identified a preferred disposal hierarchy—which identifies reuse, recycle, art and research, landfill, pull above tideline, burn, and do nothing, from preferred to least preferred—and presented this schematic at the Sixth International Marine Debris Conference in 2018.

Innovation

Surfrider Foundation Kaua'i Chapter's pavilion made of ByFusion ByBlock® is now over a year old and is in great condition.



Effective communication is an integral part of coordinating the removal of marine debris. In order to work efficiently with the community, Hawai'i Marine Debris Action Plan partners organizations have created marine debris reporting hotlines, forms, and apps. Some organizations are also alerted to marine debris through their websites and social media, engaging community members through online reporting. Partners also use these apps and online platforms to share cleanup information and opportunities with the public, as well as to collect cleanup data. Recently, the Hawai'i State Department of Land and Natural Resources Division of Aquatic Resources created a Marine Debris Rapid Response Program that uses the Hawai'i State Department of Land and Natural Resources Marine Debris Report Form to respond to and remove debris in a timely manner.

Since the first iteration of the plan, partners have identified a lack of disposal and recycling options as an issue. Over the years, many partners have explored new technologies and sought out ways to bring them to the islands. More recently, there has been a focus on technologies that specifically address plastic waste. On Kaua'i, the Surfrider Foundation has successfully created the first structure made from ByFusion ByBlock®—a building material made from plastic waste that is shredded, heated, and fused together to create building blocks—and they are currently exploring ways of bringing a ByFusion machine to the island. Organizations such as Sharkastics and Mālama Maui Nui are examining the possibility of a local Precious Plastic machine, an innovative plastics recycling machine, on Maui. Parley has also been working with communities to set up Ocean Plastic Intercept Stations on the islands. There is currently one on Maui and another on Moloka'i, which was created and is maintained by the island community there. Parley is planning for another on O'ahu and is continuing dialogue with other island partners for expansion.





Marine Debris Research

The marine debris issue has rapidly evolved, and researchers around the world are constantly working to better understand it. Researchers in Hawai'i are passionately engaging in new and exciting research that will inform the issue of marine debris not only in Hawai'i, but also around the world. In 2016, research was added as a goal in the Hawai'i Marine Debris Action Plan. Researchers in Hawai'i have made great strides over the last 10 years, helping to develop this field of study and create new research opportunities. Our shared comprehension of sourcing, identifying polymers, tracking, and much more have increased over the last 10 years, and there have been no shortages of contributions from Hawai'i Marine Debris Action Plan partners.

2011 Tōhoku Earthquake and Tsunami

Tsunami debris workshop

The November 2011 Japan Tsunami debris workshop was hosted by the University of Hawai'i at Mānoa International Pacific Research Center.

The March 2011 Tōhoku earthquake and tsunami caused widespread destruction and devastation. This tsunami inundated over 217 square miles of coastal Japan and washed an estimated 5 million tons of debris out to sea as it receded. The Government of Japan estimated that 70 percent of that debris sank immediately, leaving 1.5 million tons of marine debris that broke up and dispersed over the North Pacific in the months and years following the tsunami. This catastrophe fueled the evolution of marine debris research in Hawai'i and researchers, groups, agencies, and citizens developed a coordinated response. The University of Hawai'i at Mānoa International Pacific Research Center helped agencies to monitor and predict debris impacts. They worked with PICES (the North Pacific Marine Science Organization) and Japanese agencies to raise funding for numerical model research and used observations to validate models. Efforts such as exploring changes in pelagic ecosystems, finding coastal species rafting on debris, understanding the geometry of floating objects and its effects on transport, and advancing the study of hydrodynamics have continued and grown with ongoing funding.

In January 2015 the report, [Detecting Japan Tsunami Marine Debris at Sea: A Synthesis of Efforts and Lessons Learned](#), was published.

Collaboration and Research Network

23

*Hawai'i Marine Debris
Action Plan Research
Workshop participants
in 2017*

60

*Hawai'i Marine Debris
Action Plan Research
Workshop participants
in 2019*



The Hawai'i Marine Debris Action Plan research community is diverse and extremely effective at collaborating and sharing the limited resources that exist. This research community includes nonprofit, state, federal, private, and academic organizations focused on topics ranging from wildlife plastic ingestion and impacts, tracking and detection technologies, polymer and source identification, and much more. Over the last 10 years, Hawai'i-based researchers have produced more than 150 peer-reviewed papers. Additionally, researchers have participated in many symposiums, conferences, and workshops to present their projects and findings with audiences in and outside of Hawai'i.

With the inclusion of a research goal in the 2016 Hawai'i Marine Debris Action Plan, a research working group was developed. In 2017, the first Hawai'i Marine Debris Action Plan Research Workshop was co-hosted by the NOAA Marine Debris Program and researchers at the University of Hawai'i at Mānoa International Pacific Research Center in Honolulu, Hawai'i. This event brought researchers together to determine the current state of knowledge, deficiencies, and capacity of stakeholders in the state to further the regional understanding of marine debris. During the 2017 workshop, partners identified the need for a hub to bring together the scientific community to develop standards and collaboration synergies. The Center for Marine Debris Research was established on the campus of Hawai'i Pacific University in 2019 with the support of many local researchers. Later that year, the Center for Marine Debris Research was chosen as the ideal location for the 2019 Hawai'i Marine Debris Action Plan Research Workshop co-hosted by the NOAA Marine Debris Program and the National Institute of Standards and Technology. This workshop created a space for increased information sharing and opportunities to establish new partnerships. The clear need for this collaboration space was apparent due to the many researchers in attendance. The research produced and cooperation by Hawai'i-based researchers over the last decade has built momentum that continues to create opportunities for research and encourages a cross-partner collaboration pipeline.

Appendix I: Acronym List

Acronym	Definition
808	808 Cleanups
ADV	Abandoned and derelict vessel
B.E.A.C.H.	Beach Environmental Awareness Campaign Hawaii
CMDR	Center for Marine Debris Research
DLNR DOBOR	Hawai'i State Department of Land and Natural Resources, Division of Boating and Ocean Recreation
DLNR DAR	Hawai'i State Department of Land and Natural Resources, Division of Aquatic Resources
DLNR DSP	Hawai'i State Department of Land and Natural Resources, Division of State Parks
DLNR PSP	Hawai'i State Department of Land and Natural Resources, Protected Species Program
EPA	United States Environmental Protection Agency
GGGI	Global Ghost Gear Initiative
HIMDAP	Hawai'i Marine Debris Action Plan
HPU	Hawai'i Pacific University
HWF	Hawai'i Wildlife Fund
IUCN	International Union for Conservation of Nature
KHIB	Keep the Hawaiian Islands Beautiful
KHF	Kōkua Hawai'i Foundation
PMDP	Papahānaumokuākea Marine Debris Project
PICES	North Pacific Marine Science Organization
PWF	Pacific Whale Foundation
SCH	Sustainable Coastlines Hawai'i
MDRRP	Marine Debris Rapid Response Program
MHF	Maui Huliau Foundation
MOCMI	Maui Ocean Center Marine Institute
NIST	National Institute of Standards and Technology

Acronym	Definition
NOAA MDP	National Oceanic and Atmospheric Administration, Marine Debris Program
NOAA NESDIS	National Oceanic and Atmospheric Administration, National Environmental Satellite, Data, and Information Service
NOAA PIFSC	National Oceanic and Atmospheric Administration, Pacific Island Fisheries Science Center
NOAA PMNM	National Oceanic and Atmospheric Administration, Papahānaumokuākea Marine National Monument
OVI	Ocean Voyages Institute
UAS	Unmanned aircraft systems
UH Hilo	University of Hawai'i at Hilo
UH IPRC	University of Hawai'i, International Pacific Research Center
UH UAS	University of Hawai'i Unmanned Aircraft Systems
USCG	United States Coast Guard
USFWS	United States Fish and Wildlife Service
ZWO	Zero Waste O'ahu

Appendix II: 2018–2020 Accomplishments

During 2018–2020 Hawai'i Marine Debris Action Plan partners provided action progress updates and accomplishments through quarterly newsletters, bi-annual coordination calls, and reporting and meetings at the conclusion of the Action Plan. These updates and accomplishments are compiled in the tables below.

Goal 1: Reduce Sources of Marine Debris through Prevention

Strategy 1.1 - Change consumer behavior through outreach and education

Action 1.1.1

Use social media as a platform for outreach to the general public. Utilize #HImarinedebris and #HIPlasticPollution to capture work being done by partners.

HWF - Continuing to use our social media platforms to promote the Hawai'i Marine Debris Action Plan hashtag #HImarinedebris on our marine debris related posts (we also use #plasticpollution, #bethesolution, and #keephawaiiwild) and @NOAADebris where relevant to our audience of 18,300.

Surfrider Foundation Kaua'i Chapter - We have Twitter, Facebook, Instagram, and email accounts and individuals responsible for each. We use #HImarinedebris and #HIPlasticPollution.

- See our [active website](#)
- We have 6,213 Facebook followers, with 2,500 to 25,000 reached per month.
- Content:
 - » Education about plastic pollution
 - » Posts of weekly net patrol and solo cleanups
 - » Legislative updates
 - » News articles about marine debris and other ocean environment topics
 - » Marine debris art

Sharkastics - Constantly use both of these hashtags.

KHF - Plastic Free Hawai'i shares out plastic pollution resources, educational events, and campaigns through KHF's social media platforms reaching over 117,000 followers.

- "Simplify The Holiday" campaign on social media focused on reducing plastic waste throughout the holidays by sharing helpful tips on how to minimize waste during this wasteful time.
- Martin Luther King Day of Service "Solo Beach Cleanup" on social media focused on socially distanced beach cleanups.

Action 1.1.2

Engage and educate the public through events featuring speakers, film screenings, etc.

KFH -

- Worked with SCH, jumping in to Plastic Free July and partnering on July 11, 2020 cleanup at Mokolé'ia and Kahuku.
- Plastic Free Hawai'i hosted a Plastic Free July Mini Film Festival; created and donated 50 Love Letters to the Sea Teacher Kits for Art Explorium's Creative Reuse Open House; provided a socially distanced presentation at the Hawai'i Nature Center; and shared online resources, tips, inspiration and more all month long.
- Sitting on various committees that now have a need to go virtual, sharing resources and projects that families can do, and creating videos that can be used for virtual events.

NOAA MDP - Attended a public screening event and panel session of "Albatross" at the Honolulu Museum of Art in June 2018. Engaged with 15 individuals to discuss the impacts of marine debris on albatross in the Papahānaumokuākea Marine National Monument.

Strategy 1.1 - Change consumer behavior through outreach and education

Action 1.1.3

Support schools in going plastic-free (e.g., eliminate single-use plastics in the cafeteria).

KHF - The 3R's School Recycling Program empowers students to engage and educate their school community about the 3R's: reduce, reuse, recycle. Plastic Free Hawai'i and our 3R's Recycling Program work closely together and often present together at schools. KHF currently supports 98 schools with their on-campus recycling, waste auditing, and composting solutions. KHF is working with the Department of Education's Farm to School, with positive sharing of solutions/ideas with regards to "grab n go" containers for school lunch as school reopens August 4, 2020.

Action 1.1.4

Create a pre- and post-event survey or other assessment tool (choice of single-use vs. reusable item) to track behavior change.

HWF - Still interested in this action item, but at the moment we are only using pre- and post- assessments for the formal Marine Debris Keiki Education and Outreach youth education program. However, we do ask volunteers about the impact of the cleanup in our recap emails, *"Please also keep in touch and let us know if this experience has impacted your own personal relationship with single-use plastics or other preventable 'future marine debris' items you encounter on a daily basis. We'd love to hear from you!"*

KHF - Pre- and post- beach cleanup surveys have been used in the past. Currently, our focus has been on creating pre- and post- classroom assessments for school/classroom presentations, grades K-12.

Action 1.1.5

Empower communities to get engaged with local and international civics.

DLNR DOBOR - *The Plastics Source Reduction Working Group* - The Plastics Source Reduction Working Group has been newly created by way of Senate Bill 522 Senate Draft 2 House Draft 2 Conference Draft 1 and Act 254 (19) of the 2019 Legislative Session. The Working Group has six goals, the first two of which are: 1) to formulate a plan for reducing and recovering plastic from the Hawai'i waste stream, and 2) develop strategies to encourage plastic reduction and reuse in the food industry. DLNR DOBOR transmitted two support letters to nongovernmental organizations (Sustainable Coastlines and Hawai'i Wildlife Fund) in pursuit of grant monies from NOAA to kōkua, or help, marine debris cleanups.

Surfrider Foundation Kaua'i Chapter -

- In February 2020, Surfrider Foundation, Center for Biological Diversity, and Sustainable Coastlines Hawai'i sued the U.S. Environmental Protection Agency (EPA) to address plastic pollution under the Clean Water Act. The lawsuit challenged EPA's failure to examine studies showing widespread plastic pollution in Hawai'i coastal waters and declare the waters "impaired" under section 303(d) of the Clean Water Act. EPA has responded to the lawsuit by withdrawing their erroneous list of impaired waters in Hawai'i that failed to take into account water quality impairment due to plastic pollution. The EPA has ordered Hawai'i to now examine the impact of plastic pollution on its ocean, beaches, and wildlife.
- Coordinated community efforts to pass a Kaua'i countywide ban on polystyrene food containers.

Strategy 1.1 - Change consumer behavior through outreach and education

Action 1.1.5 continued

Empower communities to get engaged with local and international civics.

KHF -

- It has been nearly a year since the passage of Bill 40, now Ordinance 19-30, a landmark single-use plastics reduction bill for the City and County of Honolulu. This ordinance received a 90-day delay in the form of an “education period” for businesses and consumers, and went into effect on April 1, 2021. Some industry groups continue to push for a further two-year delay in implementation for the entire food service sector on O’ahu, due to “hardship” created by COVID-19. Community groups, residents, and supportive businesses continue to advocate for no further delays and an increase in education and training that will assist the businesses in becoming compliant and still thriving.
- An Ordinance 19-30 petition was created by a coalition of organizations (Zero Waste O’ahu, Surfrider Foundation O’ahu Chapter, Kōkua Hawai’i Foundation, Sierra Club Hawai’i, Hawai’i Youth Climate Coalition, and Sustainable Coastlines Hawai’i). See the petition [here](#).

B.E.A.C.H. - Along with many organizations on-call, worked to pass Bill 40 ([Bill 40 Civil Beat Article](#)) banning disposable plastic (bans start in 2021 and 2022 on O’ahu); Bill 59 banning thick and compostable plastic checkout bags kicked off January 1, 2020 on O’ahu ([Bill 59 Civil Beat Article](#)).

- SB2781 - Bill introduced to ban all balloon releases, no biodegradable balloons allowed. Solid bill that was built off of a New Jersey bill.
- SB2326 - Microbead bill, unfortunately has loopholes in it. Does not address rinse-off microbeads; however, it has to do with leave-on products and will preempt counties from passing bills on microbeads.
- A couple of op-ed pieces in *Civil Beat* (see above) about county bills.
- Right before lockdown, went to Maui to do educational presentations and testified in person on Bill 52. On O’ahu, did educational presentations in schools and colleges.
- Collected signatures on urgent action from the state on plastics and balloon releases. Bill 2781 passed the senate and then the Energy and Environmental Protection committee, but halted in final hearing.
- Working on Bill 2775, polystyrene food container ban on Kaua’i.
- Introduced Bill 72 (plastic grass).

Surfrider Foundation O’ahu Chapter - Worked on Bill 40 and will be following new bills to ensure preemption doesn’t happen.

SCH - Helped provide support for Bill 40. Sitting on the State Plastic Reduction Working Group and working with industry to solve these issues. Plaintiff against EPA for failure to include microplastics as contaminants in Clean Water Act.

ZWO - State session is ramping up, focusing mostly on compost infrastructure. It is the gap that needs to be filled in order for compostable takeout containers to work out.

UH Hilo - A second grad student (Mike Stone) has completed his first year of the program and will be working with Hawai’i Wildlife Fund (HWF) to complete his master’s project internship with a focus on marine debris (fishing gear, microplastics) and inspiring civic engagement.

Strategy 1.1 - Change consumer behavior through outreach and education

Action 1.1.6

Continue education and outreach at schools and universities, including outreach on specific items such as single-use plastics, cigarette butts, and water bottles.

HWF - Continues to use the Marine Debris Education and Outreach lessons to bring awareness about marine debris and plastic pollution to youth statewide. During this 2.5-year period, HWF mentors reached 1,193 students in 42 classrooms on three islands (Hawai'i, Maui, and O'ahu) with this program. This program was also launched online (on our website and YouTube channel) in 2020.

Surfrider Foundation Kaua'i Chapter - Our education team teaches small groups of kids about protecting our ocean environment, plastic pollution, and ocean advocacy. We teach over 1,000 kids a year, typically in grades K–8. After our classroom visit, we often take them on a beach cleanup field trip, where they gain fuller appreciation for the issue of debris coming in from the ocean. Despite the pandemic, we have been highly active, averaging two education events per week during the months of August–October 2020.

- Education topics include:
 - » Plastic Pollution: A Closer Look
 - » Consumer Education and Zero waste
 - » ByFusion
 - » Closer Look at the Gyres
 - » International Coastal Cleanup Day and Citizen Science
 - » Advocacy for Our Oceans and Coastlines
- High School students volunteer by going out on Surfrider Kaua'i Net Patrols. Students also interview Education Program Coordinator Barbara Wiedner when they are planning their Senior Project around topics such as ocean plastic pollution or marine debris. She has about one of these conversations a month and provides realistic project ideas and scope for the students.
- Barbara Wiedner of Surfrider Kaua'i met with Homeschool Now first grade students in Hanalei to discuss gyres, plastics, and nets, and focused on things we can all do to help prevent and reduce marine debris.
- Two teachers, Alex Nelson and Beth Kauwe, from Waimea Canyon Middle School were recently awarded an Innovation Grant through the Hawai'i Department of Education for almost \$7,000 to focus on marine debris issues on Kaua'i. They are working with 40 middle schoolers to "Keep Kaua'i Marine Debris Free" through organizing beach cleanups, building sand sifters, and creating artwork and a documentary. They will continue to partner with Surfrider Foundation for cleanups. Additionally, 140 students did two beach cleanups which removed over 2,000 pounds of nets and plastics off of the beach at Nukoli'i and Māhā'ulepū.

Sharkastics - Conducted outreach to Kihei Elementary, Kihei Charter School, Kamali'i Elementary, Lāna'i High School, Seabury, St. Anthony's, Girl Scout troops, University of Hawai'i Maui College, and University of Chicago.

HPU - We offer an undergraduate Honors 2200 course "Plastic Fantastic?" by Regina Ostergaard-Klem, Spring 2018 (12 students), Spring 2019 (13 students), Spring 2020 (9 students), Spring 2021 (11 students). HPU offered a graduate course "Topics in Marine Plastic Pollution" by Dr. Dave Field in Fall 2019 and plans to offer "Topics in Marine Debris Research" in Fall 2021.

- The Center for Marine Debris Research [graduated 10 students](#) between 2019 and 2020.

UH IPRC - Gave lectures for students of Punahou, Kamehameha, Windward Nazarene, Nānākuli, Wai'anae, and Mālama Honua Charter School (~20 students per a class). Gave lectures and set up a booth at the University of Hawai'i School of Earth Science and Technology Open House.

Strategy 1.1 - Change consumer behavior through outreach and education

Action 1.1.6 continued

Continue education and outreach at schools and universities, including outreach on specific items such as single-use plastics, cigarette butts, and water bottles.

KHF -

- School Year 2019–2020: Plastic Free Hawai'i School Presentations were delivered to 2,300 students ranging from kindergarten to college from July 2019–January 2020. Seventy-three teachers and administrators were also engaged through presentations.
- Wrapped up School Year 2019–2020 with a School Mural Contest. Reached nine schools, four islands, and 480 students. Winner Kailua Elementary "It's A Honu World" received a campus ElKay Water Refill Station.
- School Year 2020–2021: Four online presentations have been given at UH Mānoa College of Education, University of Hawai'i Mānoa Department of Sustainability, and Hawai'i Pacific University's "Plastic Fantastic" course.

B.E.A.C.H. -

- Recently we have been on Kaua'i doing educational outreach presentations in the community and at Kaua'i Community College.
- Provided guest presentations for various University of Hawai'i Mānoa courses.

SCH - Working on how to restructure outreach without being in class. Working with the Ikaika Hawai'i Waterman community, doing small learning groups, and spreading awareness about plastic pollution.

NOAA MDP - Participated in 24 events and engaged with an estimated 1,508 students from kindergarten to post-high school and 51 teachers.

Action 1.1.7

Conduct education and outreach to the general public, residents, and visitors through presentations, events, and booths. Make alternative products accessible and promote the use of reusable take-out containers.

HWF - Continue to give presentations (virtually and remote) to the general public and college students, including at the Zero Waste Big Island meetings, Maui Ocean Center, University of Hawai'i Hilo Marine Science Department and Marine Option Program (MOP), University of Hawai'i Maui MOP, Hawai'i Community College, and at the Lyman Museum during this period. We also promote local businesses that use sustainable products and plastic-free alternatives on our social media platforms.

Surfrider Foundation Kaua'i Chapter -

- During the week of June 17, 2019, NOAA, Hawaiian Islands Humpback Whale National Marine Sanctuary, Kaua'i National Wildlife Refuge, and Surfrider teamed up with Līhu'e and Princeville libraries to share about whales and the dangers marine debris causes to them. In five days, they reached over 300 students and a handful of parents.
- The Surfrider Kaua'i education team is teaching small groups of kids at camps about protecting our ocean environment, plastic pollution, and ocean advocacy. Campers wrote letters of support to Kaua'i County Council in support of [Bill 2775](#) (restricting the use and sale of polystyrene foam food service containers).
- [Personal Protective Equipment awareness campaign](#) started in 2020 to stop the littering of masks, etc. Reported on in the local and Honolulu newspapers and TV.
- Started the [Ocean Friendly Visitors program](#) to instruct visitors on best behaviors with respect to littering, beach cleanups, etc. Reported on in the local and Honolulu newspapers.

Strategy 1.1 - Change consumer behavior through outreach and education

Action 1.1.7 continued

Conduct education and outreach to the general public, residents, and visitors through presentations, events, and booths. Make alternative products accessible and promote the use of reusable take-out containers.

Surfrider Foundation Kaua'i Chapter - (continued)

- Education through art:
 - » Art Show with Kaua'i Society of Artists in 2018, 2019, and 2020 - all received great press.
 - » Community Marine Debris Art with Education: Buoy Jack-O-Lanterns and wreaths.
 - » Marine debris from Kaua'i was sent to artists in Georgia and Portland to be used to educate.
 - » Kaua'i puppets and nets on display in Portland this fall.
 - » Georgia State Resident Artist, Pam Longobardi, just completed a huge piece that included debris from Hawai'i.

Sharkastics - Annual events: Ridge-to-Reef Rendezvous, Whale Tales, Kohola Brewery Science Night, and Earth Day.

DLNR DAR -

- DAR Outreach and Education Specialists regularly integrate and relay information about the impacts of marine debris in every outreach and education presentation. During these presentations, DAR offers some easy solutions for avoiding one-time use products. DAR also promotes the DLNR Marine Debris Reporting Hotline, as well as the online Marine Debris Report Portal.
- Additionally, DAR is interested in potentially participating in, or supporting, a study that researches home-compostable packaging in Hawai'i in terms of their digestibility by aquatic organisms. In order to provide effective options for alternative packaging materials in Hawai'i, it would be beneficial to research the impacts of these home-compostable alternative packaging on aquatic organisms before they are able to microbially decompose (e.g., a pilot project which researches the digestibility or potential ecotoxicity of home-compostable cellulose packaging on aquatic organisms). Some home-compostable cellulose products are approved for vermicomposting (Australian standard AS 5810 takes worm toxicity into account); however, testing with aquatic life may not have been conducted. Documenting the rates of digestibility of these home-compostable materials if they were to enter the ecosystem before they are able to microbially decompose (from escapement during disposal process), or collecting data on the effect of the marine environment (salt water) on decomposition rates, would be beneficial in terms of Hawai'i recommending effective packaging alternatives.

HPU/NIST -

- In 2019, The HPU Center for Marine Debris Research (CMDR) reached over 5 million people through outreach efforts. About 50% of that reach came from being featured in Pattie Gonias' "The Story Behind Everything to Lose." News coverage on publications comprised the majority of the remaining reach.
- In 2020, everyone was faced with the COVID-19 pandemic, which reduced our reach to just over 1 million people. CMDR continued what we could, including:
 - » 200 social media posts, five news stories.
 - » Partnered with Surfrider Foundation O'ahu Chapter to host an educational booth about marine debris at their beach cleanup.
 - » Laboratory tour and interactive activities with School for Examining Essential Questions of Sustainability middle school students and Hawai'i Pacific University's marine biology students.
 - » Guest lectures/seminars for National Institute of Standards and Technology's Chemical Sciences Division; Chevron Phillips Chemical Company; Hawai'i Pacific University's Marine Biology and Global Oceans course, Marine Science Seminar Series; and Mount Holyoke's Plastics in the Environment course.
 - » Conducted phone interviews with several local high school students regarding the marine debris problem in Hawai'i and research at CMDR.

Strategy 1.1 - Change consumer behavior through outreach and education

Action 1.1.7 continued

Conduct education and outreach to the general public, residents, and visitors through presentations, events, and booths. Make alternative products accessible and promote the use of reusable take-out containers.

PWF -

- Change consumer behavior priority and launched single-use plastic campaign.
- *RETHINK Single-Use Plastics* - World Ocean Day launched Pacific Whale Foundation's (PWF) newest year-long conservation campaign, *RETHINK Single-Use Plastics*, to reduce plastic debris by providing creative alternatives to everyday single-use plastics.

UH IPRC - Organized and hosted a public lecture of Paul Lecomte (The Longest Swim) at the University of Hawai'i Mānoa.

KHF -

- School Year 2019-2020: Plastic Free Hawai'i tabled at 45 Outreach Events on O'ahu. Participants at these outreach events totaled 11,600 people in attendance. This included outreach at the North Shore Menehune Surf Championship, Pipe Masters Surf Competition, and the Bishop Museum.
- Worked with Girl Scouts who made and donated 20 microplastic sand sifters for Plastic Free Hawai'i to use at beach cleanups.
- School Year 2020-2021: We continue to provide on-going outreach presentations, including 17 tabling and online presentations. So far 1,212 people were reached, 1,003 Plastic Free Hawai'i merchandise reusable Plastic Free Hawai'i tools were donated, and 56.5 volunteer hours were accrued between 18 volunteers. We were pleased with this outcome considering the drastic effects that COVID-19 has had.
- Twelve local businesses sell our Plastic Free Hawai'i merchandise, helping to raise funds for the program while reaching a diverse audience of consumers, and Kamalani Academy sold our Plastic Free Hawai'i merchandise for their school fundraiser.

Surfrider Foundation O'ahu Chapter - Offered 10 virtual events and webinars, promoting solo beach cleanup projects. Prizes and acknowledgment will be provided, #socialdistancecleanup.

SCH - Clean Beaches Start at Home program, things people can do at home. We don't want to be cleaning beaches forever, focused on prevention and source reduction.

ZWO -

- Doing between one–three outreach presentations a month.
- Received funding to do nine videos on ways to reduce waste, the first video is "Plastics Anonymous.
- Partnering with EAH to do presentations. Trying to educate in non-traditional spaces such as affordable complexes and churches. We want to make people feel that they can get involved in whatever ways feel approachable to them.
- Vying for the NOAA MDP prevention grant, proposing a reusable container program on O'ahu.
- Zero waste coordination meeting/retreat (40 people) took place on how to better coordinate across islands. Mike Ewall (Energy Justice Network) spoke on implications of over-reliance on H-Power and incineration.

KHIB - Gave 1,000 reusable bamboo utensils to Mauna Kea protectors. Can provide to anyone who needs it free of charge.

NOAA MDP - Participated in 23 events and engaged with an estimated 1,783 individuals of the general public.

Strategy 1.1 - Change consumer behavior through outreach and education

Action 1.1.8

Work with HIMDAP research partners to effectively relay scientific information to the local community.

Sharkastics - Ongoing.

DLNR DAR - DAR submitted several updates to the Hawai'i Marine Debris Action Plan e-newsletter to share with the general public during this period. In addition, there was a [DLNR press release](#) about marine debris removal in West Hawai'i.

HPU - CMDR met with Lisa Jeffers-Fabro from Plastic Free Hawai'i to review their science-based school curriculum.

UH IPRC - Built a webpage to coordinate debris interception for approaching Hawaiian Islands and tagged with a satellite tracker.

NOAA MDP - Hosted Pacific Islands Regional Collaboration Portal tutorial as potential communication platform on November 26, 2018 and March 20, 2019.

Action 1.1.9

Educate the public about the commercial fishing industry as part of outreach and education efforts.

KHF -

- December 2020, Plastic Free Hawai'i partnered with Bureo, Sustainable Coastlines Hawai'i, Countercurrent Art, Turtle Bay Foundation, Hydroflask, and WSL PURE on the Plastic Free Wave to raise awareness and inspire solutions to plastic pollution! Bureo was one of the presenters with emphasis on derelict fishing nets and recycling fishing nets. The collaboration included a two-sided mural made from plastic pollution, fishing nets, and reclaimed lumber by Ethan Estess and Mark Cunningham, which was on display at the Billabong Pipeline Masters. The "Plastic Free Wave School Presentations" engaged 821 public students.
- Teacher field trip to visit Ocean Voyages Institute (OVI) at Kewalo Basin was successful in sharing resources.

Action 1.1.10

Participate in international symposiums to highlight the relevance of marine debris in Hawai'i.

HPU/NIST - CMDR presented at the following symposiums/workshops:

- National Academies of Sciences, Engineering, and Medicine Emerging Technologies to Advance Research and Decisions on the Environmental Health Effects of Microplastics
- Sixth International Marine Debris Conference
- Woods Hole's The Science of Microplastics in the World Ocean Workshop
- Hawai'i Marine Debris Research Workshop
- 38th and 39th Annual Symposium on Sea Turtle Biology and Conservation
 - » Marine Debris and Sea Turtles Workshop
 - » Environmental Contaminants and Sea Turtles Workshop
- Society of Environmental Toxicology and Chemistry North American Annual Meetings
- PICES (North Pacific Marine Science Organization) – 2019 Annual Meeting
- American Chemical Society National Meeting and Expo
- NOAA's Annual Hawai'i Hawksbill Turtle Network Meeting
- Hawaiian Green Sea Turtle Diet Workshop
- Asia and Oceania Geosciences Society
- Aquaculture America
- Global Symposium on Plastic Waste

Strategy 1.1 - Change consumer behavior through outreach and education

Action 1.1.10 continued

Participate in international symposiums to highlight the relevance of marine debris in Hawai'i.

UH IPRC - Participated in Plastic Awareness Global Initiative, organized by Scripps Institution of Oceanography and sponsored by National Science Foundation, a workshop on Post-Disaster Debris Removal, and other meetings. Made or contributed to 35 scientific presentations addressing marine debris at national and international meetings.

Action 1.1.11

Increase the number of signs of the [fisherman's code of conduct](#) posted and distributed.

No updates provided.

Related Accomplishments

DLNR DAR - During the last year, DAR participated in the Plastic Source Reduction Working Group as established under Act 254 of the 2019 Legislature, to address the State's plastic waste issue through source reduction. The final meeting concluded on September 24, 2020. The outcome of the working group was a report with recommendations, which will be submitted to the legislature in the next session for review. Information on the Plastic Source Reduction Working Group can be found on the Hawai'i State Department of Health's website. A copy of the report with a synopsis of the final recommendations can be found [here](#).

B.E.A.C.H. -

- Testified online for Bill 2775 (polystyrene foam ban) on Kaua'i. The whole span of Hawai'i now has bills pertaining to polystyrene.
- Currently hosting four interns as part of the Kupu 'Āina Corps program that includes three paid staff doing an eight-week part-time program. Interns and staff will receive a B.E.A.C.H. Certificate in Marine Debris Awareness and Solutions.

Surfrider Foundation O'ahu Chapter - New rise above plastics team on O'ahu.

SCH - In the general area of Kaka'ako, we are working with Hui Aloha helping to build community efforts to prevent debris and conduct cleanups with houseless community.

ZWO - Sitting on the State of Hawai'i Plastic Source Reduction Working Group and Bill 40 working group. The part of Bill 40 to move away from polystyrene does not kick in until the second phase of the bill. The Plastic Source Reduction Working Group is open to the public to join, diverse voices are needed.

Strategy 1.2 - Partner with businesses and industry (plastic producers) to support waste reduction efforts

Action 1.2.1

Certify 300 restaurants to be Ocean Friendly.

Surfrider Foundation Kaua'i Chapter -

- On Kaua'i, 26 current Ocean Friendly Restaurants, more than 100 polystyrene foam-free restaurants. COVID caused the shut down of some.
- Started the program "Upon Request Only" for plastic utensils for takeout food. Provided stickers/decals to 250 restaurants to advertise - great acceptance.

Strategy 1.2 - Partner with businesses and industry (plastic producers) to support waste reduction efforts

Action 1.2.2

Conduct a campaign for restaurants to accept personal containers for takeout.

No updates provided.

Action 1.2.3

Continue to reduce/eliminate expanded polystyrene foam use at schools or other institutions.

KHF - We offer many free online resources for schools and other institutions that vary from school offerings, lesson plans, tips for restaurants to go green, hotel programs, etc. Visit our online resources [here](#).

Action 1.2.4

Hold an open dialogue with plastic producers and distributors.

KHF - We have actively attended webinars hosted by the Hawai'i Restaurant Association to help support Ordinance 19-30. We find that many restaurants are opposed.

Fawn Liebengood - Plastic industry messaging: attending webinars, seeing if there is any common ground we can find to work on shared goals. Trying to break down harsh communication and past miscommunication.

Action 1.2.5

Offer zero waste/plastic waste reduction assistance for events.

HWF - HWF provides feedbags, buckets, and reusable cloth gloves to other nongovernmental organizations and community groups for cleanup and public events.

HPU -

- The 2019 Hawai'i Marine Debris Action Plan Research Workshop event used NOAA MDP waste reduction protocols.
- Participate in glove recycling and reuse of consumer goods for lab supplies.

KHF - (Pre-COVID) School Year 2019–2020: Plastic Free Hawai'i Water Refill Stations were offered at 48 events attended by over 76,000 people. Use of the water stations saved an estimated 8,320 single-use plastic water bottles from the wastestream.

- Our Plastic Free Hawai'i Reusable Cup Program provided 13,100 cups to Plastic Free Hawai'i schools, the community, and business partners.

ZWO -

- Hosting a statewide zero waste gathering in March 2020, wanting to unify voices across Hawai'i to see how we can all continue to build momentum.
- Digging deeper into the waste audit program, helping large institutions like Marriott and Hawai'i Tourism Authority.

Action 1.2.6

Offer assistance to businesses and hotels to increase plastic free efforts.

KHF - (Pre-COVID) Queen Kapiolani "The Deck" purchased 1,050 12oz and 650 22oz cups for use at their poolside restaurant and bar. SurfJack purchased 250 12oz and have been using them for their pool parties. Our free online resources for hotels can be viewed [here](#).

Strategy 1.2 - Partner with businesses and industry (plastic producers) to support waste reduction efforts

Action 1.2.7

Certify tour operators (e.g., hotels) as ocean friendly businesses.

No updates provided.

Related Accomplishments

SCH - Conversation with a farmer in Waimānalo about composting who has had success with breaking down cups.

ZWO - Getting reading to pilot reusable foodware project, initially slated for food truck stop in Hale'iwa, but rethinking location now because of pandemic. Please send any ideas or suggestions.

Strategy 1.3 - Enhance coordinated efforts between state and local government and volunteer groups to create and enforce laws reducing local sources of marine debris

Action 1.3.1

Continue efforts to reduce the use of single-use plastics, including bags, straws, and expanded polystyrene.

DLNR DSP -

- NOAA MDP prevention grant, working to install 19 water bottle refilling stations. First installation at Wailoa Center, Hawai'i. Next three installations at Wailoa River State Recreation Area, Diamond Head State Monument, Hapuna Beach State Recreation Area, then moving on to other parks. Conducting outreach around avoiding single-use plastic bottles.
- In November 2019, Hawaii State Parks celebrated the installation of a water bottle filling station at Wailoa Center in Hilo, Hawaii with the Help Keep the Sea Plastic Free art event. Community members had the opportunity to create art out of marine debris collected from Kamilo Point and fill up their reusable water bottles. To illustrate the issue of marine debris in the Hawaiian Islands, the lava rock fountain at the center was covered in derelict nets and marine debris. The art event and fountain decoration helped to drive home the idea that even small steps, like using refillable water bottles, can help prevent marine debris in our islands.
- Working with the State Parks planner to come up with a plan for the installation of remaining filling stations in parks that will be receiving capital improvements funds in the upcoming fiscal year (waiting on legislature).
- The filling station at Wailoa Center has been getting really positive feedback. The Center will be reopening next week with pop-up exhibits, and Susannah Welch from DLNR's Marine Wildlife Program and I are in the process of developing a marine debris art outreach project that visitors to the exhibits can contribute to. DLNR's Marine Wildlife Program is shifting their outreach focus on how marine debris affects marine wildlife, so we thought it would be a great opportunity to do some outreach connected to marine debris and how to decrease the amount that we produce on the island.

PWF - Working with CMDR on polystyrene ban on Maui. Plastic solutions program moved online virtually.

Surfrider Foundation O'ahu Chapter - *Surfrider Foundation Hawai'i Chapters Promote Personal Protective Equipment (PPE) Awareness Campaign* - Surfrider Foundation's five Hawai'i chapters developed guidelines and are raising awareness to encourage the proper disposal of PPE. The guidelines include properly disposing of PPE in the trash can, wearing gloves and other protective equipment if cleaning up littered PPE, choosing reusable PPE (like masks) when available and per Centers for Disease Control and Prevention guidelines, and sharing findings on your social media accounts (Facebook and Instagram) by tagging #HawaiiPPEdebris.

Strategy 1.3 - Enhance coordinated efforts between state and local government and volunteer groups to create and enforce laws reducing local sources of marine debris

Action 1.3.1 continued

Continue efforts to reduce the use of single-use plastics, including bags, straws, and expanded polystyrene.

Surfrider Foundation - Surfrider launched the statewide Choose To Reuse campaign that includes "Upon Request Only" signs for condiments and utensils. These signs have been distributed to hundreds of restaurants across Kaua'i, O'ahu, and Maui.

ZWO - Worked on Bill 40 and passage.

Action 1.3.2

Track the implementation of the City and County of Honolulu's National Pollutant Discharge Elimination System. Implement Municipal Separate Storm Sewer System (MS4) water permit trash reduction plan requirements.

No updates provided.

Action 1.3.3

Continue efforts to ban expanded polystyrene foam statewide.

HWF - HWF testified in person for both the Maui and Hawai'i County foam legislation efforts in 2017. During this period, HWF sent in online testimony of support for the statewide single-use plastics ban (SB522) and also for both Honolulu City and County's Bill 40 (single-use plastics) and Kaua'i County's Foam Bill 2775. HWF staff and Board members testified in person for Maui's [Bill 52](#) (single-use plastics) and has been working with Hawai'i County Councilmembers and the zero waste community to move forward with a single-use plastics bill for Hawai'i Island and submitted testimony in OPPOSITION of Bill 74 that loosened the requirements for foam alternatives in 2019.

Surfrider Foundation Kaua'i Chapter - Kaua'i has a ban, now all counties have some sort of ban. There is no effort to get the state legislature to pass something.

Sharkastics - Passed our Maui County Bill 127 and supported other statewide and county efforts. We started "Zero Waste Maui" to be the umbrella for Maui-based organizations to collaborate towards these goals.

Surfrider Foundation Maui Chapter - Helped pass Bill 52, the Maui single-use plastics bill that takes effect January 2022.

Action 1.3.4

Increase statewide collaboration and strategies to integrate source reduction/prevention on updates to the counties' Integrated Solid Waste Management Plans (ISWMPs) and other plans regarding waste.

No updates provided.

Related Accomplishments

PWF - Working on a NOAA MDP Prevention grant that focuses on land-based plastics and policy, looking for partners at this stage, reach out to Jens directly if interested.

Strategy 1.4 - Deploy physical mechanisms to prevent debris

Action 1.4.1

Implement coastal nonpoint source pollution control systems (e.g., agriculture, forestry, marinas, and wetlands) to be appropriated correctly.

No updates provided.

Action 1.4.2

Install and evaluate effective technologies to replace the “trash wheel”.

No updates provided.

Action 1.4.3

Build 15 Ocean Friendly Gardens.

No updates provided.

Action 1.4.4

Advocate for a storm drain retrofit to capture land-based trash before it reaches streams or coastal waters.

No updates provided.

Related Accomplishments

B.E.A.C.H. - Currently, there are about 1 million caps and lids in a Matson container that will be sent off to the mainland to be turned into oil in March. Will be collecting more caps and lids at the Aloha ‘Āina (Kōkua Hawai‘i Foundation) and Going Green events in January and February for the same process.

- Through Aloha ‘Āina and Going Green events, and with funding, able to ship over 1.2 million plastic caps and lids to the continent to have it recycled into Bunker Oil, used in shipping vessels and automobiles.
- Made another 100+ wire recycling bins for state parks, and have permission for a few County parks.
- Working with a rotary club to make 65 wire recycling bins to be installed in state parks.

Goal 2: Reduce the Amount and Impacts of Ocean-Based Marine Debris

Strategy 2.1 - Conduct education and outreach to ocean users on proper and legal waste management at sea

Action 2.1.1

Create inventory of existing at-sea waste management educational materials, identify gaps, and develop new materials as needed.

DLNR DOBOR - Ongoing.

DLNR DAR - DAR is actively coordinating with DOBOR to make a flyer to instruct boaters and fishermen on what to do if they come across marine debris, where to report it, and/or how to safely remove and dispose of it without endangering vessels or wildlife. These marine debris instructions are currently in DOBOR's boaters manual, as well as information on protected species. The DLNR DAR Protected Species Program (PSP) is documenting interactions and observations of marine debris on land, as well as at sea. The DLNR PSP team has started removing marine debris on land (with partners) and at sea when safely possible. This project is ongoing.

Action 2.1.2

Continue to conduct marine debris education and outreach, including on waste management, to local fishermen, as well as the Transpac, Pacific Cup, Maui Victoria, and Single Handed Transpac yacht races.

No updates provided.

Action 2.1.3

Expand Ocean Awareness Training to other islands and partnerships.

No updates provided.

Action 2.1.4

Continue to support mandatory boater education and promote boater hurricane and tsunami preparedness.

DLNR DOBOR - Continuing to support proliferation of mandatory education classes in the state and is in a working partnership with course providers, supporting the creation of virtual classes.

Action 2.1.5

Continue education and outreach to fishermen related to derelict fishing gear, other marine debris, and port reception facilities. Print instructional brochures in languages commonly spoken by Hawai'i longline fleet.

Sarah-Jeanne Royer - Citizen science project interviewing fishermen to quantify how much gear is left in the ocean via current fishing practices.

NOAA MDP - Provided a marine debris presentation at the "Scientist and Fishermen Exchange" meeting on August 10, 2019 at NOAA Fisheries Pier 38 facility.

Action 2.1.6

Educate consumers on the real price of tuna, including negative externalities.

No updates provided.

Strategy 2.1 - Conduct education and outreach to ocean users on proper and legal waste management at sea

Related Accomplishments

KHIB - Kicked off marine debris component that will be added to sailing training in Hawai'i - working specifically with yacht clubs.

Strategy 2.2 - Identify funding, and provide low-cost and convenient disposal options, for fishing gear and solid waste

Action 2.2.1

Report adequacy of port reception facilities and general user compliance with MARPOL V regulations.

No updates provided.

Action 2.2.2

Coordinate the placement and transport of reception bins statewide for hard plastics.

DLNR DOBOR - Ongoing.

Action 2.2.3

Continue to support and partner in the Hawai'i Nets to Energy program, including the Pier 38 port reception bin and program.

HWF - Loaded a 40' Matson container with 34,983 pounds in March 2019 and 19,783 pounds in March 2020 thanks to support from their Ka Ipu 'Āina program. In November 2020, HWF and Love the Sea on Maui shipped a 40' container of mixed plastics to Parley, some of which went to H-POWER and some are being saved for recycling. HWF currently has about 10 tons of derelict fishing gear stored on Hawai'i Island and hopes to dispose of them in the best way possible (considering all logistics, landfill space, and greenhouse gas emissions for all alternatives). HWF continues to research disposal options for marine debris recovered.

Surfrider Foundation Kaua'i Chapter - No. Ecologically unsound. Document too much heat, greenhouse gas, and toxic gas emission from H-Power. A major contributor to global climate change. Cannot support.

H-Power - Continue to facilitate discussions with removal partners and provide guidance on acceptable marine debris items for incineration.

NOAA MDP - Continue to facilitate discussions with removal partners statewide about the option to dispose of derelict fishing nets through the Hawai'i Nets to Energy program.

Action 2.2.4

Support tour and fishing boats bringing nets ashore by picking up gear at the dock soon after arrival.

Surfrider Foundation Kaua'i Chapter - Continue to respond to calls received through the hotline, but with lack of visitors the tour/dive/fishing boats are not operating.

Strategy 2.2 - Identify funding, and provide low-cost and convenient disposal options, for fishing gear and solid waste

Action 2.2.5

Research and install marine debris reception bins at new locations throughout the state.

DLNR DOBOR - Ongoing.

HWF - The two HWF drop-off bins on Hawai'i Island that were installed in early 2018 outside of Honokōhau harbor (Kona) and the Wailoa Fisheries stations (Hilo) have recovered over 6,000 pounds of derelict fishing gear to date and have been used by a variety of people in the fishing and marine ecotourism industries. These bins were installed with support from DLNR DAR and DOBOR. HWF hopes to install another drop-off bin on Maui and a third one near South Point in 2021.

Surfrider Foundation Kaua'i Chapter - In 2020, installed bins at Nāwiliwili and Port Allen small boat harbors in collaboration with DOBOR.

Action 2.2.6

Develop partnerships to create products (e.g., surfboards, skateboards) with salvaged marine debris.

Sharkastics - Collaborating with Mālama Maui Nui on a Precious Plastic machine.

Strategy 2.3 - Identify fishing materials and practices designed to reduce marine debris

Action 2.3.1

Establish formal partners for an at-sea monitoring program.

UH IPRC -

- Collaborated with a large number of boats transiting across the North Pacific and other oceans (The Longest Swim, The Vortex Swim, eXXpedition, The Ocean Cleanup, Greenpeace, etc.).
- Partnered with OVI and more than a dozen other nongovernmental organizations and volunteers to tag marine debris with satellite trackers and survey the "garbage patch" area. Assisted in retrieval of >240 tons of marine debris (mainly nets) by two OVI expeditions in summer 2020.
- In partnership with OVI, Smithsonian Environmental Research Center, Scripps Institution of Oceanography, and Applied Physics Laboratory, deployed two arrays of drifters of varying geometry and a float equipped with biological settlement panels. Together with the trackers and panels attached to fishing nets, these instruments provided a large dataset of marine debris dynamics and samples for biological processing.
- Numerical model was successfully validated and used to coordinate OVI cleanup operations.

NOAA MDP - Provide Marine Debris Encounter Report training to new NOAA observers through the Memorandum of Understanding between NOAA MDP and NOAA PIRO Observer Program.

Action 2.3.2

Determine best management practices in regards to coastline fishing gear and practices.

No updates provided.

Strategy 2.4 - Create public-private partnerships to develop industry standards for reducing marine debris

Action 2.4.1

Refresh communication with the cruise ship industry.

No updates provided.

Action 2.4.2

Identify fishing, maritime, shipping, and tourism industry partners that are engaged in reducing marine debris.

No updates provided.

Action 2.4.3

Participate and engage with IUCN Oceania and Pacific Island regional marine debris partners. Develop Pacific-wide partnerships.

HWF - HWF continues to dialogue with marine debris removal and research partners across the Pacific Basin, including members of the World Ocean Collective, and continues to read the Marine Litter News by the Asia Pacific Forum. Upon invitation from the Wilderness Society of Taiwan, HWF's Megan Lamson presented at the Ocean Guardian Forum in Penghu, Taiwan in June 2019.

HPU/NIST -

- Jennifer Lynch is the co-chair of the PICES Working Group 42 Indicators of Marine Plastic Pollution.
- HPU joined as a member of the Ocean Conservancy's Global Ghost Gear Initiative.
- CMDR has a partnership with the International Seafood Sustainability Foundation.

Strategy 2.5 - Build capacity to monitor and enforce against illegal discharge of fishing gear and solid waste at sea

Action 2.5.1

Continue enforcement against illegal fishing gear (e.g., fish aggregating devices, gill nets, etc.).

No updates provided.

Action 2.5.2

Coordinate a meeting on monitoring/training against illegal discharge at sea.

No updates provided.

Action 2.5.3

Continue to support legislation on reducing ocean dumping.

No updates provided.

Goal 3: Support and Sustain Marine Debris Removal

Strategy 3.1 - Utilize effective methods to locate marine debris accumulations

Action 3.1.1

Continue to support the advancement of at-sea detection for marine debris through remote sensing.

UH IPRC -

- Leads Marine Debris Remote Sensing in Scientific Committee on Oceanic Research Working Group 153 on Floating Litter and its Oceanic Transport Analysis and Modelling.
- Looking into collaboration with NOAA NESDIS, NASA International Space Station Lab, and Plymouth Marine Laboratory (UK) to utilize satellites for marine debris detection.
- Member of the International Ocean Colour Coordinating Group Task Force on Remote Sensing of marine litter and marine debris.

NOAA MDP -

Participates in a remote sensing working group with NOAA NESDIS, UH IPRC, OVI, and private satellite agencies to attempt to identify plastics (specifically derelict fishing nets) at sea with various imagery (e.g., WorldView 3).

Action 3.1.2

Work with partners to assist in marine debris detection across the Hawaiian Islands.

UH IPRC - Provided expert opinion and advice on marine debris spills and finds reported by local partners.

NOAA PIFSC - Currently working with a master's student on feasibility of using UAS (unmanned aircraft system) for identifying nets. Collecting data on six nets that have been satellite buoy tagged, three still sending data and have moved out of Pearl and Hermes Atoll.

Resource Mapping Hawai'i -

- Volunteer opportunity to review aerial imagery to help develop a machine learning framework for mapping marine debris.
- Working under Microsoft AI and ConXLabs grant to develop an AI model capable of automatically detecting marine debris from aerial imagery; applicable to UAS as well.
- Project team members Ross Winans and Katie Taladay attended Microsoft's AI for Earth Summit in October 2019 to learn about machine learning (ML), cloud computing, and an online tool for citizen science, making it easier for citizen scientists to catalog and report marine debris. We've developed two ML models: a classifier and an object detector. This two-step strategy offers both computational savings as well as better classification results. The classifier has 75–80% accuracy, while the object detector has lower validation accuracies of 55–60%. As our grant expires this month, we requested a 12-month extension to continue fine-tuning, improve accuracy through citizen science, and create a public-facing online tool for users to submit UAS or other imagery for analysis.

Action 3.1.3

Continue monitoring efforts in the Northwestern Hawaiian Islands to identify accumulation sites and quantify biological impacts.

No updates provided.

Strategy 3.1 - Utilize effective methods to locate marine debris accumulations

Action 3.1.4

Partner with NOAA UAS program and UH UAS program for continued development of UAS platforms for in-land, coastal, and at-sea detection.

No updates provided.

Action 3.1.5

Continue to work with yacht sailors on at-sea visual surveys for large floating marine debris in the North Pacific.

UH IPRC - Marine Debris Collaboration at Work - Large derelict fishing gear tagged at sea has been tracked all the way to Hawai'i. The satellite tracker, fabricated by Pacific Gyre and owned by the OVI, was deployed in the open ocean by Greenpeace in November 2018. On April 17, 2019, Love The Sea retrieved it off of the north shore of Maui. The UH IPRC team provided computer model support and coordination as a part of the FloatEco project. Additionally, other groups were on standby on all Hawaiian Islands.

KHIB - TransPac Race to occur in July 2019, broad member participation and potential for at-sea marine debris observation data.

Action 3.1.6

Design marine debris observing systems.

UH IPRC -

- Led a community white paper, authored by more than 60 partners, which was published in *Frontiers* magazine describing the design of the future Integrated Marine Debris Observing System.
- Based on this paper, chaired a special session at OceanObs'19 conference. Work continues in the OceanObs RCN (Research Coordination Network) group, Scientific Committee on Oceanic Research Working Group on Floating Litter and its Oceanic Transport Analysis and Modelling and International Ocean Colour Coordinating Group Task Force team.

Related Accomplishments

UH IPRC - Continuing to track large debris from the Great Pacific Garbage Patch using an improved numerical model.

UH Hilo - One student (Leah Sherwood) graduated with a master's degree and is developing an app to identify plastics on beaches via automated image analysis. Another student studying marine debris, on track to graduate in the fall.

Strategy 3.2 - Coordinate effective systems for reporting marine debris

Action 3.2.1

Continue to coordinate with partners to report marine debris through the DLNR Marine Debris Report Form and hotline, (808) 587-0405.

DLNR DOBOR - DLNR has added Sustainable Coastlines, HPU, the Hawaii Ocean Safety Team, DLNR DAR Protected Species, DLNR DAR Hawai'i Island staff to the notification list in recent months. These entities join University of Hawai'i School of Ocean and Earth Science and Technology, DLNR DOBOR Admin staff and DLNR DOBOR District Managers in receiving reports of marine debris entering our waters or making landfall in the main Hawaiian Islands.

Strategy 3.2 - Coordinate effective systems for reporting marine debris

Action 3.2.1 continued

Continue to coordinate with partners to report marine debris through the DLNR Marine Debris Report Form and hotline, (808) 587-0405.

NOAA MDP - Worked with DLNR PSP to create a state removal contact list of nongovernmental and nonprofit removal organizations.

Action 3.2.2

Maintain and promote marine debris hotlines utilized by the non-governmental organization community.

HWF - Ongoing (HWF hotline on Hawai'i Island: 808-769-7629; and Maui: 808-280-8124).

Surfrider Foundation Kaua'i Chapter - Surfrider Kaua'i Hotline in use since 2007.

Action 3.2.3

Identify and implement a standardized monitoring protocol for community-based removal efforts on each island.

Sharkastics - Consistent with our protocols at our fourth Sunday of every month Ka'ehu Cleanups since July 2012.

HPU -

- CMDR is participating in removal efforts of large derelict fishing gear, mostly at sea with funds from the Norwegian Retailers' Environment Fund. We coordinate with DOBOR, SCH, DLNR, Hawai'i Wildlife Fund, etc. Together, 12.6 metric tons were removed and sampled for this project.
- CMDR member, Ray Aivazian with Seed World, promotes microplastic beach cleanup with his accessible and affordable invention.

Related Accomplishments

808 - The 808 Cleanups app connects volunteers with one another and promotes teamwork to make the islands of Hawai'i cleaner, safer, and stronger. The app allows users to check into cleanups, share cleanup opportunities, report marine debris, and request immediate support.

MOCMI - *74% of Sea Turtle Strandings on Maui Due to Recreational Fishing Gear* - In partnership with NOAA Fisheries, Maui Ocean Center Marine Institute (MOCMI) responds to reports of sick, injured, distressed, and expired sea turtles on the island of Maui. Among the 141 confirmed strandings in 2019, 74% were due to interactions with recreational fishing gear. Entanglement in monofilament fishing line was the leading documented threat to sea turtles on Maui in 2019 and juvenile green sea turtles were most often impacted. [Sea Turtle Stranding Response & Rescue: 2019 Summary of Results](#).

Strategy 3.3 - Use available information to prioritize cleanup sites

Action 3.3.1

Continue to identify and prioritize cleanup sites and debris types on each island.

HWF - Ongoing (Hawai'i Island and Maui).

Surfrider Foundation Kaua'i Chapter - Hotline, Monk Seal Watch team, and Surfrider's Net Patrol identify large piles of marine debris and report in a timely fashion. Will also use satellite, manned aircraft, drone data as it becomes available.

Strategy 3.3 - Use available information to prioritize cleanup sites

Action 3.3.1 continued

Continue to identify and prioritize cleanup sites and debris types on each island.

Sharkastics - We started a new semi-annual cleanup location: Makamaka'ole (4 cleanups completed so far).

Action 3.3.2

Continue engagement with NOAA/USFWS marine wildlife representatives regarding their high-priority regions/seasons by island.

HWF - Ongoing (Hawai'i Island and Maui).

Sharkastics - We're in close contact with both of these organizations, but haven't received any guidance.

Strategy 3.4 - Develop capacity for marine debris removal and disposal

Action 3.4.1

Create and update island-specific flow charts depicting the marine debris disposal process.

Sharkastics - Ongoing.

Action 3.4.2

Support the development of repurposing and recycling efforts of marine debris across all islands.

HWF - HWF is looking for more disposal options than incineration and landfill.

- **TerraCycle updates:**

- » Sent them 650 pounds of debris in 2019 for their beach plastics recycling program. Foam and PVC CANNOT be used, but they will accept all other types of beach plastic. However, it is not very cost effective. They would need us to fill up a 20 ft or 40 ft containers' worth, but we don't currently have the storage space.
- » Some beach plastics are being turned into Herbal Essences shampoo bottles.

- **Nets to Energy updates:**

- » HWF was asked by the County of Hawai'i in 2020 if we have ever analyzed the "life cycle analysis" of the Nets to Energy partnership. So HWF read through our previous analysis from a couple years back and rationale for continuing to send our nets to O'ahu/H-POWER for Nets to Energy despite the fact that more greenhouse gasses are emitted by incineration vs. landfill. We continue to debate/discuss this topic and are seeking more eco-friendly alternatives. We have been shipping an average of one container per year for Nets to Energy. See 2.2.3 above.

- **Parley updates:**

- » Working with Love the Sea and Pūlama Lāna'i, mixed plastic debris from both Maui and Lāna'i was shipped to O'ahu for recycling by Parley in November 2020, which also included some non-recyclable plastics and nets that were sent to H-POWER. In general, derelict fishing gear is currently being landfilled by HWF on Maui.

- HWF is also in discussions with a local contractor about potentially using derelict fishing gear in some tiny home construction projects, and still hopes that ByFusion will create a facility on Hawai'i Island, Maui, and Kaua'i (locations without H-POWER).

Sharkastics - Ongoing.

Strategy 3.4 - Develop capacity for marine debris removal and disposal

Action 3.4.2 continued

Support the development of repurposing and recycling efforts of marine debris across all islands.

SCH - Working on bringing a compost machine to minimize waste and create healthy soil to increase food production, will be working to test the viability. Expanding Waste Diversion Program, 70% diversion rate during Vans Triple Crown.

Parley -

- Parley AIR station - Avoid, Intercept, Redesign - official launch on Earth Day.
 - » 2 containers (40 ft and 20 ft) - will hold machinery to process plastics into sheets for laser cutting, carabiners, and bricks for building. Other portions of the station will include a learning classroom.
 - » Bishop Museum will be the host location.
 - » Goal is to create a proof of concept for anyone around the world, help to deal with the problem and educate. Hawai'i will be the first in the world, but other countries are underway.
- Ocean Plastic Intercept Stations
 - » One station on Maui.
 - » Moloka'i created and maintains their own station.
 - » Continued dialogue with other neighbor island partners for expansion.

Action 3.4.3

Design/build net collection bins and place them at harbors statewide.

HWF - Ongoing (see 2.2.5 above).

Action 3.4.4

Encourage the use of sustainable/reusable supplies during cleanups through partnerships with stables, breweries, coffee companies, etc. Similarly, encourage zero waste efforts for snacks and beverages distributed at cleanups.

HWF - Ongoing (Hawai'i Island and Maui), discussed before, during, and after cleanup activities.

Surfrider Foundation Kaua'i Chapter -

- Yes, use reusable collection bags like burlap coffee bags and large capacity Super Sacks for cleanups specially during Operation Airlifts. Also use 5-gallon buckets from Ace and Home Depot for smaller stuff.
- Collaborate with Zero Waste Kaua'i on events.

Sharkastics - Ongoing.

KHF - We provide a swap-out sunscreen tent at our beach cleanup with AllGood Sunscreen. Waste free snacks and water refill jugs are also made available. Participants also are gifted with a stainless steel straw and reusable bamboo spork.

Action 3.4.5

Bring and implement ByFusion technology to Kaua'i.

Surfrider Foundation Kaua'i Chapter - The Kaua'i Chapter of Surfrider Foundation removes and weighs approximately five metric tons of marine debris from the coastline of Kaua'i each month. We want to remove plastic from the environment while at the same time capitalizing on the intrinsic value of it. [Surfrider partnered with ByFusion](#) to test the feasibility of taking a sampling of derelict fishing gear and plastic domestic waste from Kaua'i to create ByBlocks. Together, we joined with Island School to build an athletic pavilion on campus. This is the first permanent structure built of ByBlocks in the world. Working to establish a ByFusion plant in Hawai'i.

Strategy 3.4 - Develop capacity for marine debris removal and disposal

Action 3.4.6

Continue to pursue marine debris collection bins at convenience centers and transfer stations.

No updates provided.

Action 3.4.7

Install fishing line recycling bins/containers at recreational harbors statewide.

DLNR DOBOR - DLNR DOBOR executed two Memoranda of Agreement with Hawai'i Marine Animal Response to install used fishing line bins first at He'eia Kea Small Boat Harbor then at other DOBOR facilities on O'ahu. The first bin was installed December 8, 2020.

DLNR DAR - DLNR DOBOR and DAR have supported these efforts during this period. Currently there are two recycling bins/containers on Hawai'i Island (outside the DAR office at Honokōhau Harbor and outside the DAR Hilo Wailoa Fisheries Research Station at the Hilo Bayfront). These recycling bins/containers were installed in 2018 and are co-managed by DAR and Hawai'i Wildlife Foundation. There are also two recycling bins/containers on Kaua'i that were installed in 2020 at Nāwiliwili and Port Allen small boat harbors; these are co-managed by DOBOR and Surfrider Foundation Kaua'i Chapter.

MOCMI -

- *Lawai'a Pono: Fishing Line Recycling Program* - Recreational fishing gear, including entanglement in monofilament fishing line, is identified as the leading cause of sea turtle stranding in the main Hawaiian Islands. To prevent pollution and decrease harmful interactions between sea turtles and fishing line, MOCMI launched the Fishing Line Recycling Program in June 2018. The program has been effective in engaging fishers in conservation activities, and since June, more than 18,000 meters of line has been collected in bins on Maui.
- Fishing Line Recycling Program expanded to 37 high-traffic fishing locations across the island. Since June 2018, more than 20 miles of line, weights, and derelict fishing gear has been collected from bins on Maui.

NOAA MDP -

- Helped procure supplies and materials for bins that were installed by HMAR through their memorandum of agreement with DLNR.
- Worked with DLNR and NOAA PIRO to develop appropriate signage to accompany bins.
- Installed the first bin at Makai Research Pier.

Action 3.4.8

Develop a task force on each island to respond to derelict net masses.

Sharkastics - We respond and are in contact with CMDR about their analyses.

Action 3.4.9

Continuously reevaluate a preferred marine debris disposal hierarchy within the state as informed by research.

HWF - Ongoing and with support from our partners with Surfrider Foundation Kaua'i Chapter and local carbon-emission-offset company, CarbonBuddy.

Strategy 3.4 - Develop capacity for marine debris removal and disposal

Related Accomplishments

DLNR DOBOR - House Bill 717 is an act relating to environmental protection, it will establish funding and a council for addressing marine debris. A hearing took place on December 17, 2020.

DLNR DAR -

- **Hō'ola One:** In May of 2019 the Hō'ola One development team provided a presentation for DAR biologists on their prototype technology to remove plastic from beaches. The Hō'ola One is a machine that vacuums plastic from beaches, while separating organic matter like wood, rocks, and sand from the micro and macro-plastic; the machine utilizes local sea water from the site during the separation process. HWF raised funds for the prototype machine to be shipped to Hawai'i Island to conduct test field trials of removing plastic from rugged and remote areas like the Ka'ū shoreline. After these test trials, HWF acquired the machine and the determination was made that this prototype could be utilized more successfully on islands that have beaches inundated with plastic with easier shoreline access; a new version is being designed that may be able to be more successful on the rugged and remote areas of Hawai'i Island. The long term goal for the current prototype is to donate the machine to O'ahu to either DAR, DLNR Division of Forestry and Wildlife, Sustainable Coastlines Hawai'i, or the City and County of Honolulu (preferably agencies or organizations that have engineers), after training personnel on the maintenance and operation of the machine. The machine will require field technicians with mechanical engineering experience because select components will require maintenance at certain times.
- **Marine Debris Rapid Response Program:** At the start of October 2020, the contract for the O'ahu Marine Debris Rapid Response Program (MDRRP) was awarded to Sustainable Coastlines Hawai'i (SCH). This contract reimburses SCH for costs associated with collection, removal, and recycling of large debris that is hazardous to protected species. The MDRRP receives real time reports through the DLNR Marine Debris Report Form and phone line (808-587-0400). Once a report of marine debris or derelict fishing net is received, SCH staff coordinate response and removal efforts. If a net is removed, it is then transported to Hawai'i Pacific University's Center for Marine Debris Research for sampling and analysis. All debris removed are either upcycled or incinerated at the City and County of Honolulu H-POWER facility. The MDRRP has been a large success as SCH has already rapidly removed three large nets identified by DLNR PSP during regularly conducted shoreline surveys. DAR hopes to expand to neighbor islands and create similar rapid response programs with local marine debris partners.
- DAR is also actively working with multiple partners for potential debris removal projects on Moloka'i (proposal has been submitted; DLNR PSP is awaiting response).

HWF -

- HWF awarded Fiscal Year 18 NOAA MDP removal grant, a collaborative partnership with Surfrider Foundation Kaua'i Chapter and Pūlama Lāna'i.
- 2019 crowdfunding paid for shipping of microplastic apparatus called Hō'ola One that they collaborated with Sherbrooke University (Quebec, Canada) engineering students to design. HWF successfully raised funds to transport the machine and modify it to go off-road to Kamilo Point. Engineering graduates arrived in April 2019 (10 of them) and June 2019 (1 of them). HWF continues to use the machine to clean remote Ka'ū beaches, and plans to ship it to other islands in the state in 2021. Also, working with Dr. Steve Colbert from the University of Hawai'i at Hilo and undergraduate student Nic Vanderzyl on microplastic study. Based on testing at two sites, the machine was over 96.1% effective at removing microplastics from beach sand ($SD=0.8$, $N=3$ per site) – presented at the Hawai'i Marine Debris Action Plan Research Workshop in July 2019. It can fill a feed bag in 10 minutes full of small plastics.
- Successful field testing events in 2019 with four trained HWF team members and one primary operator. Currently being housed in Kona but the intent is for it to be used throughout Hawai'i. Two of the 12 initial students continue to work on version 2.0 of the machine.

Strategy 3.4 - Develop capacity for marine debris removal and disposal

Related Accomplishments (continued)

Surfrider Foundation Kaua'i Chapter - Sorting and weighing takes a lot of time and organization. Tracking area at a higher spatial area (e.g., east side) versus individual beaches. Still collect data by beach.

Sharkastics -

- Received county funding to fly out debris from remote Makamaka'ole.
- Also working on zero-waste efforts with Surfrider and Swell Consulting.
- Obtained county funding to help with helicopter removal.

KHIB -

- Ocean Conservancy, through International Coastal Cleanup coordinators, has given support of a small grants program and we will be applying.
- Trying to push the 2019 International Coastal Cleanup in September, looking to get an idea of supplies needed.

Strategy 3.5 - Increase communication and collaboration to efficiently remove marine debris

Action 3.5.1

Promote and educate HIMDAP partners on the Pacific Islands Collaboration Portal.

NOAA MDP -

- Provided partner tutorials (November 16, 2018 and March 20, 2019) and brief overviews during public or partner engagements.

Action 3.5.2

Gather and disseminate statewide cleanup information to better coordinate removal efforts.

DLNR DAR -

- DAR is working to create a plastic awareness webpage that contains information about organizations that are conducting debris removal, plastic research, plastic outreach, etc.; suggestions for plastic alternatives, and information about micro and macro-plastic/marine debris. The website would contain links to research, upcoming beach cleanups, etc. (webpage is in the beginning stages of development).
- DAR is actively coordinating with other partners (e.g., DOBOR, SCH, 808 Cleanups) through the utilization of the DOBOR Marine Debris Reporting Portal. In the future, there may be an opportunity for the development of an app for this portal.
- DAR is working to update the DLNR PSP page with a link/FAQ on How to Report Marine Debris to the DLNR site through the DLNR Marine Debris Reporting Hotline/Marine Debris Report Portal.

Action 3.5.3

Continue to reach out to partners and entities around the North Pacific for communication and collaboration.

HWF - Attended the Ocean Guardian Forum in Taiwan (2019), they are interested in capturing debris shoreline data, mostly finding PET water bottles and polystyrene foam (50% of total). They have a 2023 goal for reducing plastic cups, lids, and other common single-use plastic items. In addition, we have increased partnership effectiveness with Love the Sea, Pūlama Lāna'i, and Parley for Maui Nui debris collection and disposal efforts.

Strategy 3.5 - Increase communication and collaboration to efficiently remove marine debris

Action 3.5.4

Provide financial and logistic support for large-scale marine debris removal in the Northwestern and main Hawaiian Islands.

PMDP -

- Created a new nonprofit, Papahānaumokuākea Marine Debris Project, in May 2019 to serve as the organization to spearhead collaborative marine debris removal operations in Papahānaumokuākea Marine National Monument. The focus is to relieve NOAA (and other co-trustees) of the planning and implementation of marine debris removal efforts within the monument. Currently working to conduct annual removal missions in collaboration with the co-managing agencies. Conducted the first successful removal mission to French Frigate Shoals in October 2020 in collaboration with USFWS and removed 82,000 pounds of debris over a 16-day project. The 2021 goal is to accumulate assets (small boats, equipment) to enable conducting annual removal efforts independently of agency partners if needed in the future.
- Ahead this year: Working with DLNR Division of Forestry and Wildlife, NOAA, and USFWS to conduct a 24-day Papahānaumokuākea shoreline cleanup in April 2021 and a 43-day in-water reef cleanup in August 2021. Ramping up outreach efforts this spring to increase awareness of the monument debris problem, as well as implementing the Ocean Plastics Student Makerspace program using Precious Plastic recycling machines.

NOAA PIFSC - Still planning a September 2020 mission with state leading. PIFSC will lead small boat operations and shoreline removal of debris. If the project does not take place, funding will be returned to funding sources.

NOAA MDP - Continues to host NOAA partner quarterly check-in calls to facilitate communication. Provided Fiscal Year 2018–Fiscal Year 2020 federal funding to NOAA PIFSC to execute a large scale survey and removal effort in Fiscal Year 2021.

Action 3.5.5

Continue to facilitate, coordinate, and conduct regularly scheduled coastal and stream cleanups, net patrols, and alien and invasive species reporting.

DLNR DOBOR - Kāneʻohe Bay Net Removal - DLNR DOBOR would like to recognize the OVI for commissioning the removal of more than 12,000 pounds of derelict fishing nets in Kāneʻohe Bay during the week of October 7, 2019, conducted in collaboration with Mr. Hank Lynch. Hawaiʻi Pacific University, working in conjunction with Hank Lynch, is to be recognized for removing a net mass beached on Mokumanu Islet on or around September 9, 2020, a net in waters off Kailua on or around September 18, 2020, and nets/floats left unattended in waters of Kaneohe Bay on December 9, 2020.

HWF -

- 2018: With the help of hundreds of volunteers, over 53,000 pounds of marine debris was removed during 60 cleanup events on Maui and Hawaiʻi Island. In October 2018, a milestone was hit on the Big Island, 250 tons of marine debris removed since 2003 (with over 40,000 logged volunteer hours)!
- 2019: We removed 81,154 pounds during 70 volunteer cleanups on Hawaiʻi and 10 on Maui.
- 2020: On Hawaiʻi Island, we had to slow down with some of our public debris removal activities due to COVID-19 protocols but continued with small team net (recovery) patrols from April–July and began cleanups again (hiking or bring your own 4WD only) in August. On Maui, our cleanups mostly corresponded to our youth educational program and outdoor classroom program at Kaʻehu Bay. In total, we have removed a total of 21,474 pounds year-to-date with 42 cleanups on Hawaiʻi Island and four on Maui; however, we have two more planned for 2020. As of today, we are nearly at the 300 ton mark (currently at 295.2 tons) for Hawaiʻi Island and 350 tons statewide – which we expect to hit in Spring 2021 around our 25th anniversary date.

Strategy 3.5 - Increase communication and collaboration to efficiently remove marine debris

Action 3.5.5 continued

Continue to facilitate, coordinate, and conduct regularly scheduled coastal and stream cleanups, net patrols, and alien and invasive species reporting.

HWF - (continued)

- Added a 1-ton Dodge Ram pickup to the Hawai'i Island fleet that is equipped to grab and haul large net bundles from the rocky shorelines.
- About 51.8% of removed debris on Hawai'i Island is derelict fishing gear and lines.
- *Collaborative Efforts Lead to Net Removal on Hawai'i Island* - In step with the derelict fishing and cargo net recovery efforts conducted by DAR in West Hawai'i earlier this summer, members from the community group Hui Aloha Kiholo removed a large conglomerated net bundle (estimated at 300+ pounds) that washed ashore at Kiholo in early October. It was taken to Honokōhau harbor net drop-off bin, along with others, and transported to a staging area in Wai'ōhinu. HWF plans to ship these nets to O'ahu in early 2021 for the Hawai'i Nets to Energy. HWF estimates that over 6,000 pounds of nets have been deposited in the bins outside the DAR offices in Kona and Hilo since this program began in 2018.

Surfrider Foundation Kaua'i Chapter -

- Averaging 10,000 pounds a month as of June 2019.
- Part of the Global Ghost Gear Initiative; sent Carl Berg as our representative. (Jun. 2019)
 - » Have gotten Surfrider Hawai'i statewide program to join in as of 2020.
- Made a push around World Ocean Day, this generated a lot of publicity. Scott Bacon took a team of divers out in water to collect debris.
- Conduct International Coastal Cleanup Day each year.
- *Kaua'i Community Comes Together to Remove Tons of Marine Debris via Operation Airlift-1* - Over the last few months, Surfrider Foundation Kaua'i Chapter focused on cleaning a remote beach on the east side of Kaua'i through nine cleanups. Littered with fishing gear and plastics, access to this area required volunteers to hike in. Fifty-five super sacks, that weighed about 155 pounds each, were filled and larger debris items gathered. The total haul was approximately 9,000 pounds.
- In January and February 2020, conducted eight large net patrols.
- On February 15, 2020, with help from Sustainable Coastlines Hawai'i, 13 super sacks filled at Unalau Bay and four super sacks filled at Glass Beach near Ahukini Landing. Operation Airlift-2 took them out.
- In June and July 2020, core volunteers removed debris from the coastline between Papa'a Bay and Moloa'a Bay.
- Twenty-one super sacks were removed from Unalau Bay by Jack Harter Helicopters in Operation Airlift-3, September 14, 2020.
- In the first three quarters of 2020, 112,991 pounds of debris was removed .
- *Coastal Cleanups During the Pandemic* - Scott McCubbins of Surfrider Kaua'i committed to cleaning up the coastal area between Donkey Beach and Anahola Bay. Scott, with a small group of helpers, removed 29 trailers of debris, three truck loads of tires, and an additional two truckloads of trash. This totaled close to 60,000 pounds of litter, most of which was just yards away from the water on this beautiful coast area.
- *Surfrider Kaua'i International Coastal Cleanup 2020* - The Surfrider Foundation Kaua'i Chapter completed four smaller cleanups rather than a large cleanup. A Nukoli'i Cleanup took place on September 19, where 11 volunteers cleaned up an area spanning from Kaua'i Beach Resort to the south end of the beach. The debris was taken to the Marine Science Center at Nāwiliwili for students to sort and weigh. Detailed data was also collected by first and third graders from Homeschool Now at a Kāhili Beach cleanup. Our Net Patrol crew documented their cleanup efforts on September 23 at an area south of Moloa'a. Volunteers removed a total of 2,130 pounds of debris at these four smaller cleanups.
- Surfrider Kaua'i crew certified in A-100 Interagency Aviation Training and insurance coverage for Operation Airlifts.

Strategy 3.5 - Increase communication and collaboration to efficiently remove marine debris

Action 3.5.5 continued

Continue to facilitate, coordinate, and conduct regularly scheduled coastal and stream cleanups, net patrols, and alien and invasive species reporting.

Sharkastics -

- Having started in July 2012, we finished our eighth year of fourth Sunday of every month cleanups at Ka'ehu in June 2020: removed a total of 48,501 pounds (498,010 individual items). We're continuing these volunteer-powered cleanups through at least 2021.
- New remote Makamaka'ole cleanups, where we need to hike down and helicopter trash out: removed 8,448 pounds (61,318 individual items) through four cleanup events.
- Nearshore reef cleanups by our Turtle Team:
 - » 294 cleanups in 2018: 16,214 items and 124,130 feet of fishing line/rope (2,467 pounds)
 - » 268 cleanups in 2019: 18,772 items and 92,031 feet of fishing line/rope (2,478 pounds)
 - » 338 cleanups in 2020: 16,787 items and 135,224 feet of fishing line/rope (2,088 pounds)
- Annual Waiehu Cleanup community events with Mālama Maui Nui yielded multiple tons of trash and marine debris.
- We respond to nets and other debris accumulations when possible.

DLNR DAR -

- The PSP is working to mitigate potentially life-threatening hazards (via ingestion/entanglement) to endangered Hawaiian monk seals, hawksbill sea turtles, green sea turtles, and other protected species, through conducting net patrols within their regular coastal surveys for protected species and through the coordination with nonprofits/other organizations for marine debris removal.
- PSP will join Hawai'i Wildlife Fund on Hawai'i Island on regular beach cleanups and net patrols in 2021.
- On O'ahu, DAR is participating in a pilot program with Sustainable Coastlines that reimburses the group for costs associated with collection, removal, and recycling of large debris that is hazardous to protected species. Nets identified by PSP during regularly conducted shoreline surveys are reported to SCH to coordinate removal. DAR's PSP hopes to expand these efforts to Moloka'i and other islands in the coming years.

PWF - Beach cleanup kits for citizen science project at two sites, very successful, expanded ability to reach more beaches on Maui.

KHF - Plastic Free Hawai'i participated in Plastic Free July 2020. Island Wide Socially Distanced Beach Cleanup in partnership with Sustainable Coastlines Hawai'i on July 11, 2020. Of the 35 beach cleanups performed island wide that day, Plastic Free Hawai'i facilitated beach cleanups at four North Shore locations and collected over 1,000 pounds of marine debris. Sixty-five community members participated in four groups and practiced safe socially distanced protocols.

Surfrider Foundation O'ahu Chapter - Hosts a beach cleanup every month, per usual about half is marine debris and half is land-based.

808 - Four-five cleanups per day on average, 3,000 pounds of plastic and 5,000 pounds of derelict nets removed.

SCH -

- In June 2019, held a large cleanup in Honolulu, 850 people volunteered and cleaned 2,000 pounds of debris that would have become marine debris.
- In 2019, conducted 45 cleanups, cleaned 85,000 pounds of debris from shorelines. Reached 11,000 students in classrooms across the state. Spent 172 days out of the year at community events.

Strategy 3.5 - Increase communication and collaboration to efficiently remove marine debris

Action 3.5.5 continued

Continue to facilitate, coordinate, and conduct regularly scheduled coastal and stream cleanups, net patrols, and alien and invasive species reporting.

SCH - (continued)

- In 2020, cleanup events occurred on Kaua'i on February 15, working with Surfrider Foundation Kaua'i Chapter to do an extreme beach cleanup, Earth Day cleanup at Waimanalo on April 26, and on Moloka'i in August. Trying to figure out how to do large-scale cleanups without having thousands of people together. Working on a decentralized cleanup with people at 20 sites across the island, 10–20 people at each site. Within 18 hours every site was volunteered for. 1-800-Got-Junk and city and county helping to dispose of collected debris.

KHIB -

- Keep America Beautiful organization is celebrating March 1–May 21, 2019. Hopefully there will be more organizations involved in cleanups. Not focused on collecting information but hoping that our partners can get data.
- Adopt-a-Beach program is up and running again.
- Keep Puakō Beautiful (Cynthia Ho) is implementing cleanup boxes in state parks on Hawai'i Island and plans to expand to Hanauma Bay.

Mālama Nā 'Apapa -

- In collaboration with Makana O Kaua'i Scuba Adventures, received a grant from the State of Hawai'i Workforce Development Council to remove marine debris from waterways and reefs around Kaua'i. As a direct impact of the historic levels of flooding on Kaua'i in April 2018, as well as a second flooding event in August from Hurricane Lane, tons of debris washed onto Kaua'i reefs. Debris types that have been removed and discovered range from household goods to vehicles. The current total for all types of debris removed is 14.65 metric tons from 13 sites.
- World Ocean Day event in collaboration with Surfrider.
- Found about 500 pounds of nets.
- Under a National Fish and Wildlife Foundation grant, conducted 203 community cleanups (1–3 individuals) and removed over 8,000 pounds of debris covering approximately 3 million square feet of in-water and shoreline area.

The Friends of Kamalani and Lydgate Park -

- The Friends of Kamalani and Lydgate Park coordinate beach cleanups every Saturday starting at 8:30 a.m. On April 20, the Friends celebrated Earth Day 2019 in Lydgate Park with a community workday engaging over 200 volunteers. Volunteers devote 5,000+ hours annually taking care of the park, including clearing marine debris that washes into the swimming pond. On January 11, 2020, about 100 volunteers turned out for a beach cleanup to clear a mass of albizia driftwood mixed with plastic marine debris.

Swell Consulting -

- In April 2019, Sharkastics led a large-scale cleanup of remote Makamaka'ole beach. Located on Maui's north east facing shore, Makamaka'ole has limited public access and is exposed to large inputs of ocean-based plastic pollution. A full day of debris collection (requiring helicopter lifts of 32 super sacks) was followed by two days of classifying/counting all debris items by a dedicated group of volunteers. The cleanup resulted in the removal of 36,854 debris items (6,590 pounds)! Most plastic pieces were diverted from the landfill and are currently being evaluated for upcycling opportunities. Funding is provided by the County of Maui. Partners include Hawai'i Association of Marine Education and Research, Mālama Maui Nui, Maui Huliau Foundation, CDF Engineering, Swell Consulting, Protect Our Oceans (P.O.O.) Please, and Pacific Helicopters.

Strategy 3.5 - Increase communication and collaboration to efficiently remove marine debris

Action 3.5.5 continued

Continue to facilitate, coordinate, and conduct regularly scheduled coastal and stream cleanups, net patrols, and alien and invasive species reporting.

Ocean Voyages Institute -

- OVI removed 84,000 pounds of toxic ghost nets and plastics from the North Pacific Subtropical Convergence Zone in June 2019, via the sailing cargo ship KWAI. GPS satellite trackers attached to nets by vessels voyaging through the Gyre area enhanced our effectiveness. We are collaborators in the NASA-funded FloatEco program.

Related Accomplishments

Sharkastics - In-water cleanups daily, created a poster that will be presented at Hawai'i Conservation Conference.

808 - Able to operate through the COVID quarantine through Adopt-a-Site program (six cleanups per day logged via 808 Cleanups App). Reports of derelict nets and ocean plastic hot spots through the app will aid in taking action quickly. Will reintroduce regular events this summer with limited gatherings and social distance. The app and social media are available for partners to share and willing to partner on projects.

KHIB - Working to partner with Kaho'olawe Island Reserve Commission. Due to range fires and high seas, unable to conduct a cleanup last year; however, they are planning to go this year.

Goal 4: Increase Capacity to Address Abandoned and Derelict Vessels (ADVs)

Strategy 4.1 - Prevention and identification of ADVs

Action 4.1.1

Suggest draft legislation to apply mandatory insurance to all vessels required to be registered with the state or documented by the USCG.

DLNR DOBOR - The Governor signed a bill into law in 2019 requiring vessels 26' in length and over to be covered by \$100K in insurance in a form and content to ensure the removal and salvage of a grounded vessel. DOBOR hopes, in a future legislative session, that the requirement will be applied across the board to all vessels operating in Hawai'i waters, including visiting vessels.

Related Accomplishments

DLNR DOBOR - Hawai'i became a title state in 2019. The title system should help identify boat owners in the state or home ported. In addition, instituted a mandatory insurance requirement for vessels greater than 26' in length.

Strategy 4.2 - Effectively respond to ADVs

Action 4.2.1

Appoint or designate a DLNR marine debris coordinator.

No updates provided.

Strategy 4.2 - Effectively respond to ADVs

Action 4.2.2

Revisit discussions to establish a memorandum of understanding or standard operating procedure with USCG for a more collaborative approach to address ADVs at sea.

No updates provided.

Action 4.2.3

Make disposal options for ADVs publicly available.

DLNR DOBOR - Ongoing.

Action 4.2.4

Enhance interagency coordination for addressing ADVs and maintain an ADV inventory for remote or difficult to access coastlines.

DLNR DOBOR - Ongoing.

USCG -

- Working with DLNR on the ADV process, identified how many are on O'ahu (N=74). During the 2019 hurricane season, there were two ADVs that were federalized and opened up the Oil Spill Liability Trust Fund for cleanup. Process to impound ADVs is a bit long, so USCG is exploring ways that ADVs meet the USCG threshold.
- Working with EPA to create ArcGIS overlay of where abandoned vessels are prior to hurricanes to clean up before or to prioritize cleanups there after.
- **NOAA MDP** - Continue to work with DLNR DOBOR and USCG District 14 to work out logistics and mechanisms for ADV removal. Provided ADV inventory to USCG in 2019 based on 2015 main Hawaiian Islands aerial surveys.

NOAA MDP -

- Continue to work with DLNR DOBOR and USCG District 14 to work out logistics and mechanisms for ADV removal. Provided ADV inventory to USCG in 2019 based on 2015 main Hawaiian Islands aerial surveys.

Action 4.2.5

Create, identify, and maintain an ADV situational response contact list

DLNR DOBOR - Ongoing.

Strategy 4.3 - Develop sustainable funding mechanisms and resources for vessel removal and disposal

Action 4.3.1

Propose a rule/amendment to charge a disposal fee at the time of vessel transfer or first time registration to help establish a response fund.

No updates provided.

Strategy 4.3 - Develop sustainable funding mechanisms and resources for vessel removal and disposal

Action 4.3.2

Identify ADV projects or needs viable for EPA Supplemental Environmental Projects.

No updates provided.

Action 4.3.3

Collaborate with DLNR to use the Oil Pollution Act settlement funds to address ADVs.

No updates provided.

Goal 5: Conduct High Quality Research to Understand Marine Debris

Strategy 5.1 - Develop an understanding of marine debris physical and chemical traits, life cycle, transport, quantity, impacts, and accumulation rate

Action 5.1.1

Identify and support marine debris research priorities through a consultative workshop to facilitate island-specific collaboration.

HPU/NIST - We hosted and co-managed the 2019 Hawai'i Marine Debris Action Plan Research Workshop at the HPU Oceanic Learning Center and CMDR, which more than 60 people attended.

NOAA MDP - Co-managed the 2019 HIMDAP Research Workshop with NIST at the Hawai'i Pacific University Makapu'u campus on July 25–26.

Action 5.1.2

Assess research capacity of state-based organizations and identify gaps in capacity.

HPU/NIST - CMDR has substantially increased the research capabilities within the State of Hawai'i. CMDR works cooperatively with DLNR to find and rapidly retrieve large derelict fishing gear.

Action 5.1.3

Explore funding opportunities for research.

NOAA MDP - Provided Fiscal Year 2019 nationwide research federal funding opportunity.

Action 5.1.4

Conduct monthly NOAA accumulation and/or standing stock shoreline surveys.

HWF - Through shoreline monitoring, noticed trends in high debris accumulation from April through September with less in October through March.

PWF -

- Continuing to carry out NOAA accumulation surveys at three different beaches. We currently have three–six months of pre-polystyrene ban surveys and are looking to get six months of post-ban surveys.
- Continue NOAA accumulation surveys at three Maui locations focused on evaluating effectiveness of bans (tobacco and polystyrene).

Strategy 5.1 - Develop an understanding of marine debris physical and chemical traits, life cycle, transport, quantity, impacts, and accumulation rate

Action 5.1.4 continued

Conduct monthly NOAA accumulation and/or standing stock shoreline surveys.

PWF - (continued)

- Continuing shoreline surveys at four beaches (two leeward, two windward) on Maui.
- Resampling beaches during lockdown using NOAA MDP standing stock survey. Anecdotally observing lower numbers of marine debris.
- During the pandemic, the research team has been conducting debris surveys on five beaches since early May and will compare these data to previous surveys on the same beaches in 2018.

Action 5.1.5

Continue to model and forecast marine debris from the 2011 tsunami in Japan and other sources in the Pacific Ocean.

UH IPRC - Operational product has been developed and tested in several expeditions that diagnoses patterns of old marine debris in the North Pacific and predicts efficiency of such operations as ocean cleanup.

Related Accomplishments

Surfrider Foundation Kaua'i Chapter -

- Categorizing six years of data and streamlining the way we report.
- In 2019, debris composed of 54% fishing nets, 29% hard plastic gear, and remaining is other large trash. In 2020, data seems different as homeless living at remote beaches cause more trash and derelict cars. Seemingly less fishing gear coming in.

HPU/NIST -

- A cooperative agreement between HPU and NIST established the Center of Marine Debris Research, located at the HPU Makapu'u campus in Waimānalo, Hawai'i
 - » CMDR's mission is to develop and apply optimal methods to investigate the quantities, sources, transport, fate, and impacts of plastic marine debris. The Center also disseminates this knowledge to inform management and stimulate ocean stewardship. The ultimate goal of all activities of the CMDR is a trash-free ocean.
 - » The facility underwent renovations in 2019.
 - » The center has eight faculty members, one post-doc, one lab manager, three full-time technicians, one part time technician, and several graduate and undergraduate students.
 - » The center has capabilities for wet-sample processing, polymer identification, microplastic quantification and characterization, and plastic additive detection.
 - » The center has a [website](#), and Facebook and Instagram pages.
- HPU CMDR submitted 17 grant proposals. Ten have been funded:
 - » "A pilot project to understand sedimentation rates of microplastics throughout the world ocean: Standardization of microplastic analysis in seafloor sediment samples"
 - » "Reducing the amount and impacts of plastic ghost fishing gear washing ashore on Hawaiian coral reefs"
 - » "Production of a research-grade multiple polymer kit for plastic pollution research"
 - » "Perfluoroalkyl substance (PFAS) concentrations in fillets of nearshore Hawaiian reef fish caught in subsistence fisheries"
 - » "Hawai'i Pacific University / National Institute of Standards and Technology Center for Marine Debris Research (CMDR) Cooperative Agreement"
 - » "Definition of guidelines to reduce the impact of lost and abandoned Fish Aggregating Devices (FADs) on Marine Turtles"

Strategy 5.1 - Develop an understanding of marine debris physical and chemical traits, life cycle, transport, quantity, impacts, and accumulation rate

Related Accomplishments (continued)

HPU/NIST - (HPU CMDR ten funded grant proposals continued)

- » "Measuring ingested microplastics in Marshall Islands reef fish"
- » "Plastic degradation and the effect of biofouling under natural conditions"
- » "Temporary donation of an Agilent Cary 630 ATR FTIR instrument"
- » "Temporary donation of a Thermo Fisher Scientific iN10MX microscope FTIR instrument"
- Research projects also include but are not limited to:
 - » "Quantifying 25 µm and larger plastic debris on James Campbell Wildlife Refuge"
 - » "Characterizing Plastic Ingestion By Bonin Petrels (*Pterodroma Hypoleuca*) From Midway Atoll: Towards Plastic Pollution Bioindicators For The Northwestern Hawaiian Islands"
 - » "Methods Matter for Microplastic Studies: Polymer Chemical Compatibility & Extraction from Fish Larvae"
 - » "Using Polymer Identification to Monitor the Effect of Maui County Ordinance No. 4457 on Plastic Marine Debris on Maui's Beaches"
 - » "Quantifying Harm to sea turtles from ingested plastic: Review of literature and Guidelines for reporting evidence of harm"

PWF -

- Working with Jenn Lynch for polymer identification of plastic removed during surveys.

UH IPRC -

- Lead NASA-sponsored project FloatEco (Floating Ecosystem), including the University of Hawai'i, Smithsonian Environmental Research Center, Scripps Institution of Oceanography, Applied Physics Laboratory, and OVI. The project is in the final year, it provided a large dataset that is currently being analyzed and prepared for publication. Future proposal is discussed.
- Local dynamics is studied on the examples of anomalous debris spills such as large amounts of microplastics, reported from Kailua beach.

B.E.A.C.H. - Continue sorting and researching marine debris in Kāne'ohe.

- Surveyed checkout bags at Ala Moana Beach Park found from 2017–2018: There was a 42% decrease in paper bags, and 2015–2018 there was a 49% increase in thick plastic bags.
- Purchased a vacuum chamber that helps with sorting of plastics from organics.

SCH - Working with the Center for Marine Debris Research on net recovery and source identification.

Sarah-Jeanne Royer - Project to determine the effect of biofouling and photo-degradation onto the sinking and the removal of ocean plastics from the ocean surface (The Ocean Cleanup and HPU).

- Citizen science project: Determine the main sources of plastic in the ocean attributed to fishing gear (i.e., terrestrial versus maritime sources) and investigate selected fishing gears other than ghost nets that contribute to maritime plastic pollution (The Ocean Cleanup).
- Coordinate a citizen science effort to facilitate the characterisation of beach plastics in the Pacific and Indian Oceans (The Ocean Cleanup).
- Quantify the capacity of Hawaiian beaches to store marine plastic debris and evaluate the aging processes of polymers (post-doc at HPU - Feb 2021).
- Assess the degradation of different textiles (synthetic, natural, blend, bioplastic) under oceanic conditions (Scripps Institution of Oceanography).
- Quantify the global distribution of microfibers worldwide in different environments (Scripps Institution of Oceanography).
- Microfibre concentrations from 1984 to 2019 in San Diego coastal waters (Scripps Institution of Oceanography).

Strategy 5.1 - Develop an understanding of marine debris physical and chemical traits, life cycle, transport, quantity, impacts, and accumulation rate

Related Accomplishments (continued)

Sarah-Jeanne Royer - (continued) Project to determine the effect of biofouling and photo-degradation onto the sinking and the removal of ocean plastics from the ocean surface (The Ocean Cleanup and HPU).

- Work with Nikolai Maximenko on different projects at UH IPRC related to beached plastic in Hawai'i and the influence of the North Pacific Garbage Patch. In addition, projects with cyclonic and anticyclonic eddies in the North Pacific Garbage Patch and floating plastics.

Strategy 5.2 - Develop or identify standardized methods or BMPs for applicable aspects of research to ensure data/projects can be meaningfully analyzed

Action 5.2.1

Continue to support and promote NOAA MDP standardized shoreline monitoring protocols throughout Hawai'i.

PWF -

- Since its start in 2015, Pacific Whale Foundation's Coastal Marine Debris Monitoring Program has grown significantly, and currently distributes 50–100 cleanup kits per week. The kits include a recycled grain bag for the trash and a datasheet for recording what you find.
- Continuing citizen science efforts by providing citizen science kits at three locations on Maui. In 2019, this effort resulted in 366 citizen scientists, 234 datasheets, and 30,000 pieces of debris quantified, bringing the total to 90,000 pieces of debris.

Action 5.2.2

Develop standardized laboratory methods.

HPU/NIST - Research projects to improve methods are ongoing for:

- Polymer identification, including use of Fourier transform infrared spectroscopy–Attenuated total reflectance, Differential scanning calorimetry, Fourier transform infrared spectroscopy, and Raman microscopy.
- Harmonization across labs:
 - » Developed and distributing a polymer kit.
 - » Validated Open Specy (online free spectral library tool for microplastics).
 - » Participated in European Commission's Joint Research Centre interlab study on microplastics in drinking water.
- Extraction, quantification, and characterization of microplastic from:
 - » Beach sand.
 - » Fish, seabird, and sea turtle gut contents.
 - » Sediment cores.

Strategy 5.3 - Enhance and advance research on ecological impacts of marine debris

Action 5.3.1

Identify invasive species found on marine debris.

UH IPRC - Abundant coastal species, found in the North Pacific Garbage Patch during the FloatEco project, suggest an ongoing global change in the pelagic system associated with the increased amounts of floating marine debris, triggered by the 2011 tsunami in Japan and sustained by continuous at-sea and on-shore sources.

Strategy 5.3 - Enhance and advance research on ecological impacts of marine debris

Action 5.3.2

Continue marine debris and plastic accumulation research in biota.

HPU/NIST - In addition to the studies mentioned above, CMDR has published 15 scientific manuscripts since 2018. See section below for project titles.

NOAA PIFSC - Currently in the early stages of 'ōpelu (planktivorous) study. Looking at the nearshore water column and maybe looking at microplastics. Looking for partners, starting on O'ahu and hopefully branching out to neighbor islands.

Action 5.3.3

Continue to assess the impacts of marine debris on wildlife.

Sharkastics - Our Turtle Team's successful sea turtle responses (in collaboration with NOAA and MOCMI, permit #21260) primarily related to fishing gear interactions:

- 2018: 60
- 2019: 72
- 2020: 180
- Cheryl King is a primary responder (Level 3) with the NOAA Fisheries Large Whale Entanglement Response Team.

HPU/NIST - See list of projects above and papers below, of note:

- *Seabird Entanglement in Marine Debris and Fishing Gear in the Main Hawaiian Islands* - We compiled published reports, records from wildlife rescue programs, and opportunistic observations of entangled seabirds from the Main Hawaiian Islands. Our review documented entanglement in seven species: three boobies, three petrels (one shearwater and two albatrosses), and one tern. In four instances (wedge-tailed shearwater, brown booby, red-footed booby, white tern) our recent (2012–2020) observations were new species records not previously reported in the literature. While this review suggests that entanglement affects a variety of Hawaiian seabirds, our observations only provide a minimum index of the number of species and individuals adversely affected.

Strategy 5.4 - Improve research on the economic impacts of marine debris

Action 5.4.1

Identify the economic impacts of plastic reduction policies, such as an expanded polystyrene foam ban.

No updates provided.

Strategy 5.5 - Evaluate the effectiveness of mitigation, outreach, and removal efforts of marine debris

Action 5.5.1

Utilize spatial mapping to compare areas of high removal effort to standing debris accumulations in order to evaluate the impact of cleanups and site monitoring.

HPU -

- *Sampling Neuston & Microplastics in a Convergence Zone* - HPU students recently sampled a convergence zone on windward O'ahu with a neuston net. CTD (conductivity, temperature, and depth) profiles indicate that denser oceanic waters are subducting underneath the lower salinity (less dense) waters around Kāne'ohe Bay. This convergence results in huge accumulations of floating debris, organic matter, microplastics, larval fish, plankton, and more, all interacting in a narrow strip of the ocean.
- *Funding Awarded to Study Ghost Fishing Gear Sources* - HPU's Center for Marine Debris Research has been funded by the Norwegian Retailers' Environment Fund to remove ghost fishing nets from coral reefs in Hawai'i and study the sources. Ideally, a long-term program for monitoring and at-sea removal in Hawai'i will be created in partnership with the responsible fisheries. Drew McWhirter will perform the study as his master's thesis at HPU. OVI and Papahānaumokuākea Marine Debris Project are providing net samples from the North Pacific Gyre and Northwestern Hawaiian Islands.

Sarah-Jeanne Royer - Provide assistance with Drew McWhirter master's thesis on sourcing discarded fishing gear to fisheries and prevent their damage to coral reefs.

Strategy 5.6 - Support communication and collaboration of research to all stakeholders

Action 5.6.1

Improve collaboration and data sharing through the publishing, compiling, and sharing of recent scientific findings.

Sharkastics -

- Brignac K.C., Jung M., King C.S., Royer S., Blickley L., Lamson M., Page K., O'Brien K., Potemra J., and Lynch J.M. *In Press*. Identification and Spatial Distribution of Plastic Marine Debris Polymers in The Hawaiian Islands: Beach, Sea Surface, and Seafloor. *Marine Pollution Bulletin*.
- Brignac K.C., Jung M.R., King C.S., Royer S.J., Blickley L., Lamson M.R., Potemra J.T., and Lynch J.M. 2019. Marine Debris Polymers on Main Hawaiian Island Beaches, Sea Surface, and Seafloor. *Environmental Science and Technology*: 53, 21: 12218-12226.

DLNR DAR -

- DAR participated in the 2017 and 2019 HIMDAP Research Workshops. Research from the 2017 Marine Pollution Bulletin publication of aerial survey data from 2015 was shared [here](#).
- Data from Net Collections: Nets located by DAR through the PSP net patrols are transported to Hawai'i Pacific University's CMDR for sampling and analysis. DAR provides data on net location; CMDR will collect and share more detailed data such as the weight of the net, plastic polymer composition and identification, original source of net/plastic, etc.

HPU/NIST - Created the Center for Marine Debris Research website and social media for sharing findings and events. Drafting multiple scientific manuscripts for journal submission. Scientific Publications since 2018:

- Hyrenbach, K. D., McGinnis, Z., Page, K., Horgen, F. D., Lynch, J. M. in press. Are you what you eat? An ecological exploration of plastic ingestion by island-associated predatory fish in Oahu, Hawaii. *Aquatic Conserv:Mar Freshw Ecosyst*. 2020;1-12. DOI:10.1002/aqc.3507

Strategy 5.6 - Support communication and collaboration of research to all stakeholders

Action 5.6.1 continued

Improve collaboration and data sharing through the publishing, compiling, and sharing of recent scientific findings.

HPU/NIST - (continued) Created the Center for Marine Debris Research website and social media for sharing findings and events. Drafting multiple scientific manuscripts for journal submission. Scientific Publications since 2018:

- Egger, M., Nijhof, R., Quiros, L., Leone, G., Royer, S.J., McWhirter, A.C., Kantakov, G.A., Radchenko, V.I., Pakhomov, E.A., Hunt, B.P.V., Lebreton, L. (2020). A spatially variable scarcity of floating microplastics in the eastern North Pacific Ocean. *Environmental Research Letters*, 15(11), 114056. DOI:10.1088/1748-9326/abbb4f
- Hyrenbach, K., Elliott, L., Cabrera, C., Dauterman, K., Gelman, J., Siddiqi, A. (2020). Seabird Entanglement in Marine Debris and Fishing Gear in the Main Hawaiian Islands (2012–2020). *'Elepaio* 80(6): 41–46.
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- Currie J., Stack S., Brignac K.C., Lynch J.M. 2019. Nearshore sea surface macro marine debris in Maui County, Hawaii: distribution, drivers, and polymer composition. *Marine Pollution Bulletin*. 138:70-83. DOI 10.1016/j.marpolbul.2018.11.026
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- Clukey K.E., Lepczyk C.A., Balazs G.H., Work T.M., Li Q.X., Bachman M.J., Lynch J.M. 2018. Persistent Organic Pollutants in Fat of Three Species of Pacific Pelagic Longline Caught Sea Turtles: Accumulation in Relation to Ingested Plastic Marine Debris. *Science of the Total Environment*. 610–611:402–411. DOI 10.1016/j.scitotenv.2017.07.242.
- Donnelly-Greenan, E., Hyrenbach, D., Beck, J., Fitzgerald, S., Nevins, H., Hester, M. 2018. First Quantification of Plastic Ingestion by Short-Tailed Albatross *Phoebastria albatrus*. *Mar Ornithol*. 46:79–84.
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Strategy 5.6 - Support communication and collaboration of research to all stakeholders

Action 5.6.1 continued

Improve collaboration and data sharing through the publishing, compiling, and sharing of recent scientific findings.

HPU/NIST - (continued) Created the Center for Marine Debris Research website and social media for sharing findings and events. Drafting multiple scientific manuscripts for journal submission. Scientific Publications since 2018:

- Jung M.R., Horgen F.D., Orski S.V., Rodriguez C. V., Beers K.L., Balazs G.H., Jones T.T., Work T.M., Brignac K.C., Royer S-J., Hyrenbach K.D., Jensen B.A., Lynch J.M. 2018. Validation of ATR FT-IR to identify polymers of plastic marine debris, including those ingested by marine organisms. *Marine Pollut Bull.* 127:704–716. DOI 10.1016/j.marpolbul.2017.12.061.
- Lynch J.M. 2018. Quantities of marine debris ingested by sea turtles: Global meta-analysis highlights need for standardized data reporting methods and reveals relative risk. *Environmental Science and Technology.* 52:12026–12038. DOI 10.1021/acs.est.8b02848.

PWF -

- Recently published paper with Jennifer Lynch and other researchers on nearshore sea surface macro debris in Maui County.
- Looking to write a research paper on the tobacco product ban.
- Will attend and present virtually at Hawai'i Conservation Conference in August.

UH IPRC - UH IPRC group maintains a large network of collaborators by:

- sharing products of their unique marine debris models;
- working in joint national and international projects and groups;
- sharing most recent scientific findings;
- providing expert advice to assist at-sea operations; and
- through scientific publications and meetings.

NOAA PIFSC - Recently published paper on the impacts of nets on coral reefs utilizing Structure for Motion technology, published in Marine Pollution Bulletin.

Action 5.6.2

Leverage, implement, and transfer knowledge of the marine debris strategy within the Lānaʻi Natural Resources Management Plan.

No updates provided.

Action 5.6.3

Continue compiling and make publicly accessible the feasibility of establishing a marine debris foundation for Hawai'i.

No updates provided.

Action 5.6.4

Compile data from various cleanup organizations.

NIST - Discussed the possibility with NIST co-workers (Jared Ragland), he suggested we look into and invite the creators of other cleanup data apps to help.

Strategy 5.6 - Support communication and collaboration of research to all stakeholders

Action 5.6.5

Collaborate with international marine debris partners.

Surfrider Foundation Kaua'i Chapter -

- Attended 2019 Global Ghost Gear Initiative (GGGI) and Our Ocean conferences in Bali.
- Working with GGGI on fishing gear identification.
- Collaborate with HPU in source identification of nets.
- Enroll Surfrider Foundation Hawai'i Regional in GGGI, not just Kaua'i Chapter.

HPU/NIST -

- Jennifer Lynch is the co-chair of the PICES Working Group 42 Indicators of Marine Plastic Pollution. NIST has a collaboration with Korea Institute of Ocean Science & Technology KIOST researchers on northern fulmar plastic ingestion.
- HPU joined as a member of the Ocean Conservancy's GGGI.
- CMDR has a partnership with the International Seafood Sustainability Foundation.
- See presentation list for national and international scientific presentations.

Related Accomplishments

Sarah-Jeanne Royer - Attendance at international workshops and conferences, research visits, supervision of MSc student projects, general networking. Improve collaboration and data sharing through the publishing, compiling, and sharing of recent scientific findings, share knowledge outside of the scientific community, and influence law and policy makers.

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1. *Hawai'i Wildlife Fund (page 4)*
2. *NOAA (page 5)*
3. *NOAA (page 6)*
4. *Hawai'i Wildlife Fund (page 7, left)*
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6. *NOAA (page 8, left)*
7. *Hawai'i Wildlife Fund (page 8, right)*
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10. *Hawai'i Wildlife Fund (page 10, right)*
11. *NOAA (page 11, left)*
12. *HPU Center for Marine Debris Research (page 11, top right)*
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14. *Kōkua Hawai'i Foundation's Plastic Free Hawai'i (page 14, top)*
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16. *Pacific Whale Foundation (page 14, right)*
17. *NOAA (page 15, left)*
18. *Surfrider Foundation Kaua'i Chapter (page 15, right)*
19. *NOAA (page 16, left)*
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24. *Hawaii Marine Animal Response (page 18, right)*
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27. *Megan Lamson (page 19, bottom right)*
28. *NOAA (page 20, top)*
29. *NOAA (page 20, left)*
30. *Cheryl King, SHARKastics (page 21, top)*
31. *NOAA (page 21, left)*
32. *NOAA (page 22, left)*
33. *NOAA (page 22, right)*
34. *NOAA (page 23, left)*
35. *Pacific Whale Foundation (page 23, top right)*
36. *Surfrider Foundation Kaua'i Chapter (page 23, bottom right)*
37. *Jenna Karr, HPU Center for Marine Debris Research (page 24, top)*
38. *HPU Center for Marine Debris Research (page 24, left)*
39. *HPU Center for Marine Debris Research (page 25, left)*
40. *HPU Center for Marine Debris Research (page 25, right)*



Gina M. Raimondo
United States Secretary of Commerce

Dr. Richard W. Spinrad
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Assistant Administrator for Ocean Services
and Coastal Zone Management

Credit: Hawai'i Wildlife Fund

