

2023

Hawai'i Annual Code Challenge (HACC)

Challenge Title	Large marine debris reporting, dispatching, documenting platform
Department / Organization	Hawaii Pacific University Center for Marine Debris Research (CMDR)
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The Challenge	
Describe situation to be solved	Large marine debris (mostly plastic derelict fishing gear) washes ashore frequently in Hawaii and needs to be removed. The detection by public needs to be more efficiently dispatched to the removal organizations. Their removal efforts need to be coordinated. And in order to quantify how much debris is being removed and disposed, a database is needed that captures information from detection in the ocean, removal, debris type assessments, to disposal/recycling choices.
Preconditions <i>(How does it work now)</i>	1. Public can report to a DOBOR web form or call a DAR state-wide hotline. Commercial fishers call CMDR's cell phone to report large debris at sea that they are bringing in. Dispatch could be improved. Follow up and reporting is disjointed. No quantities or debris types are documented. Disposal options are hap hazardously chosen and not reported by removal organizations.
Assumptions/Issues <i>(list any conditions that could impact the solution)</i>	1. The reporting mechanism needs to be marketed to the public. Removal organizations change often, and staff within them turnover very frequently. Neighbor islands have different removal and disposal options so the database needs to be flexible to some extent. Smart phones with signal will be required.
Current Approach <i>(how is situation currently being handled)</i>	1. Public can report to a DOBOR web form or call a DAR state-wide hotline. The DOBOR form automatically dispatches to removal organization emails. Removal organizations are encouraged to reply once the debris is removed, but not everyone follows up or emails the entire group, many of which want to know. Removal organizations on Oahu need better communication tools to reduce redundant efforts or assuming the other one will do the work or to ask for assistance if needed. The Center for Marine Debris Research studies quantities, sources, transport and recycling of plastic pollution in the ocean. CMDR has received Sea Grant funding to house a database of marine debris that's detected, removed, assessed for type, and how it's all disposed of in the hopes to improve plastic recycling of the materials. Currently, we

	do not know how much marine debris is washing ashore, removed and disposed of. Disposal options today are landfill on neighbor islands and Nets to Energy on Oahu. CMDR is actively working to build a Plastic Recycling Research Facility on Oahu to innovate products that can be made from the debris and used locally to benefit infrastructure needs of all socioeconomic groups in Hawaii. CMDR does not have a database developer or manager.
Users <i>(Who would use the application - employees or constituents or both? How many users would there be?)</i>	1. Public (millions) would interface at the reporting part of the platform. DOBOR, DAR, CMDR, and about 9 removal operations across the state would receive the dispatch information. The removal operations would communicate within island before and during the removal phase in a texting-like application like What's App – CMDR wants access to these communications. After removal, the removing organization is reminded to report if the removal was successful or not, explain the debris' location and disposition. Information from the reporting and removal would be entered into the database ideally automatically but monitored by a researcher at CMDR. Debris will be assessed and sorted by a combination of removal organizations and CMDR. Data entry from the assessments of types, source markings, polymers, disposal mechanisms would be entered into the database by 4 neighbor island people and several at CMDR.
Business Rules	N/A
Special Requirements	N/A
Technical Platforms <i>(in use or desired to be used)</i>	CMDR prefers to use What's App and Google Drive. As far as database software, Microsoft Access is available to all CMDR staff.
Data set to be used or collected	Debris detection data (where when how big), Debris removal data (e.g. where, when, how big, what type, what environment), Debris storage data (where, separate or combined), Debris transport data (when, where, purpose), Debris assessment data (debris types, sizes, mass, markings, materials and polymer types), Debris disposal data (which components and mass of the above went to which disposal option such as left in environment, open pit burned, landfilled, waste to energy facility, pyrolysis, mechanical recycling, recycling research, repurposed for similar reuse, art or education.

Data set calculations or reporting needs	<p>What is the frequency and amounts of debris being detected and removed from each island? What percentage of reported debris was removed from the environment? What percentage of removed debris is fishing gear vs other sources? What percentage of debris fishing gear is which type (float, net, line, lead weight) and which polymer (polyethylene, nylon, polypropylene)? What percentage of debris removed was sent to each of the disposal options? How fast do removal operations respond to detection reports?</p>
Solution Road Map	
Basic Flow <i>(steps of user action/system response)</i>	<ol style="list-style-type: none"> 1. Public reports debris 2. Platform dispatches detection information automatically to appropriate removers and documenters and authorities 3. Removers and documenters begin discussion removal logistics in a text-like app. 4. Removers are reminded to report their success. 5. Detection and removal response is recorded in a database. 6. Database is shared to follow the storage, assessment and disposal of each debris event or components of each event. 7. CMDR quality checks the data and makes sure it's complete. 8. CMDR runs reports from database to ask questions above on a frequency of something like every 6 months. 9. CMDR reports the answers to DOBOR, DAR, NOAA Marine Debris Program, and Sea Grant.
Goal of Solution	<p>Determine the quantity of marine debris washing ashore in Hawaii, the efficiency of removal operations, and improve disposal options so they are more environmentally friendly.</p>
Business Value <i>(potential financial or time savings)</i>	<p>Automating the communication tools and data collection could save 1000s of hours of labor per year. Currently no organization has this time, so nobody is answering the questions of how much debris and what happens to it. The environmental benefits to removing the debris quickly and before it does coral damage has economic benefits to the state.</p>
Success Scenario <i>(how you know a solution is working)</i>	<p>People are communication through the platform efficiently. Data is being entered accurately and efficiently in the database. The database can be mined to answer the important questions stated above.</p>
To be completed by the HACC Planning Committee	
Community/Industry Data Available	
Potential Community/Industry Co-Sponsors	