



Sources and Transport Pathways of Sediment Infilling Kahului Harbor, Maui

Description

Sediment accumulation and shoaling in the major ports of Hawaii, including Kahului Harbor on the island of Maui, is an ongoing concern for the Honolulu District. Identifying the sediment sources and associated transport pathways, as well as the specific hydrodynamic conditions under which these sources transport sediment to the harbor, will result in a refined regional sediment budget. This budget will then be used to identify opportunities to more effectively manage sediment in a regional manner in order to both potentially reduce Navigation and O&M costs associated with managing contaminated sediment, while also improving the overall health of the regional ecosystem by reducing the impact of contaminated sediment.

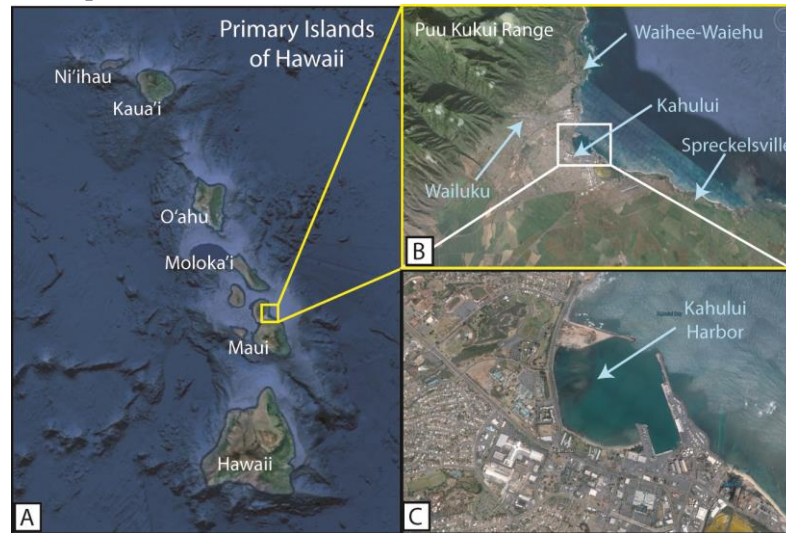


Figure 1: RSM region. A) Island of Maui, B) Kahului, Maui, C) Kahului Harbor.

Issue/Challenge To Address

Little is known about the sources of sediment accumulating in the Kahului Harbor and entrance channel, the pathways along which sediment is transported, or the type of events that result in the highest net sediment accumulation, resulting in shoaling. Potential sources and pathways from identifiable sub-regions in northern Maui include gully erosion from the largely undeveloped Puu Kukui range to the north, runoff from the dominantly agricultural region southwest of Spreckelsville, as well as runoff from the urban city of Kahului via multiple, episodic-only runoff channels. Under certain hydrodynamic conditions, sediment may also be transported into the harbor from erosion along the shoreline, or from the reef system offshore. Sediment from these different environments will potentially vary in their geochemical makeup, including via distinctive mineralogy, grain size, stable isotopes, and/or contaminants. With respect to sediment transport, a variety of processes could be influencing sediment accumulation in Kahului Harbor, including episodic rainfall and associated terrestrial runoff, as well as landward-directed swell that could bring sediments from offshore into the harbor.

A field data collection effort will be conducted to: (1) identify geochemical markers that distinguish sediment sourced from different regions on Maui; (2) collect hydrodynamic data to identify sediment transport pathways; and (3) incorporate existing historical data to fully delineate a sediment budget for Kahului Harbor. These data will then be used to develop recommendations for sediment mitigation options to reduce shoaling in Kahului Harbor, entrance channel, and the adjacent lagoon.



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Successes Lessons Learned

Lessons learned will be compiled during the duration of this study.

Expected Products

- Refined Sediment Budget, to include sediment sources, transport pathways, and mechanisms.
- Initial recommendations for reducing sediment transport into and accumulation within Kahului Harbor
- Final Report/Journal Publication and Presentation

Stakeholders/Users

Primary stakeholders include federal agencies such as the USGS, the Hawaii DLNR (in particular the Department of Health, Clean Water Branch), as well as the County of Maui, which hopes to beneficially reuse beach quality material from the harbor.

Projected Benefits Value Added

Developing a robust regional sediment budget for Kahului provides an opportunity to recommend sediment mitigation strategies that effectively reduce sedimentation not only in the harbor, but also on the adjacent reefs. These strategies could result in significant cost savings not only by reducing the frequency and volume of maintenance dredging, but also by providing value by improving local ecosystem health. Additionally, reducing contaminants entering the harbor will allow the beneficial reuse of any material which continues to shoal within the harbor.

Leveraging Opportunities

The field study will be designed based on an analysis of historical data (e.g. RSM results from previous studies, shoreline change rates, previous dredging volumes & sediment characteristics), as well as currently collected data, including rainfall hydrographs, geotechnical data, and local land use practices available for the Kahului region from The Iao Stream Federal Flood Control Project. In addition, other federal agencies such as the USGS have conducted extensive studies in the area. These existing data will allow a more targeted, and thus economical, field study. In-state agencies such as the Department of Land and Natural Resources (DLNR) also have a stake in reducing terrestrial input to the littoral system. The County of Maui is interested in beneficial use of dredged material from Kahului Harbor. These, and other agencies, will be recruited to help with this effort and the eventual remediation of the unsuitable constituents found in the material infilling Kahului Harbor.

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Participating Partners

TBD