RESTORATION

BENEFICIAL USE OF DREDGE MATERIAL COASTAL RESTORATION CASE STUDY

Hale'iwa Small Boat Harbor

Partners

- City and County of Honolulu: owns and maintains Hale'iwa Beach Park (HBP) State of Hawai'i
- State of Hawai'i Department of Land and Natural Resources (DLNR)
- Office of Conservation of Coastal Lands (OCCL): non-federal sponsor of Hawai'i Regional Sediment Management Program
- Waialua Hawai'ian Civic Club and Malama Loko Ea Foundation (USACE, 2023)
- U.S. Army Corps of Engineers (USACE) consulted: the U.S. Fish and Wildlife Service (USFWS), National Marine Fisheries Service (NMFS), U.S. Environmental Protection Agency (USEPA), State of Hawai'i Historic Preservation Division (SHPD), Coastal Zone Management Program (CZMP), Hawai'i Department of Health (DOH), Office of Hawai'ian Affairs (OHA), and Hawai'i Office of Planning (USACE, 2023)

Contractors

- Non-federal Sponsor (Section 1122 of the *Water Resources Development Act (WRDA) of 2016* Pilot-Project Proposal Form, 2016) Department of Land and Natural Resources
- Department of Boating and Ocean Recreation (DOBOR); Sea Engineering, Inc. (USACE, 2023)

Key Information

PROJECT LOCATION
Head of Waialua Bay on the northern coast of O'ahu

HABITAT
Beach

LANDSCAPE
Island Beach

PROJECT SIZE
Dredging will yield approximately 22,638 cy of beach suitable sand and will be used to restore 4.2 ac of beach (USACE, 2023)

USACE DISTRICT
Honolulu District

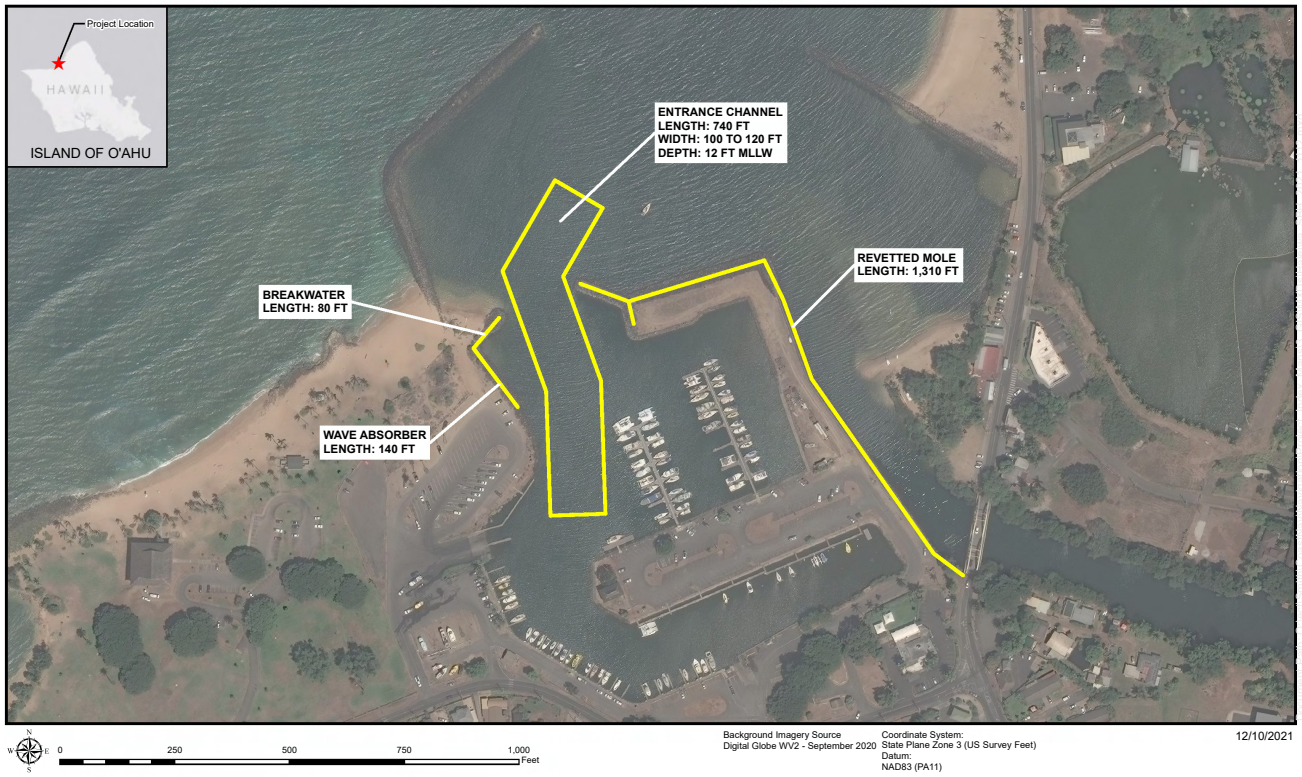
PROJECT WEBSITE
https://www.poh.usace.army.mil/Missions/Civil-Works/Civil-Works-Projects/Hale%CA%BBiwa-Small-Boat-Harbor/

PROJECT STATUS
Design Phase

ABSTRACT

The Hale'iwa Small Boat Harbor Maintenance Dredging and Beach Restoration Project was initiated in 2018 under the WRDA 2016 Section 1122 Beneficial Use of Dredge Material (BUDM) Pilot Program to address erosion and sea level rise threats to a beach that provides important public shoreline access to the local community and critical habitat for the Hawaiian Monk Seal, sea turtles, and migratory birds. Many of Hawaii's small boat harbors (including Hale'iwa Harbor) are dredged relatively infrequently (10- to 15-year interval), and sediment is typically disposed offshore. The Hale'iwa project has built partnerships and experience in the jurisdiction for BUDM approaches.

Figure 1. Hale'iwa Small Boat Harbor, Island of O'ahu, Hawai'i



PROJECT GOALS

Placement of sand on the adjacent beach will provide coastal storm damage reduction to upland infrastructure (a city park with facilities along the shoreline), as well as provide recreational benefits to an area that is used extensively by commercial businesses, tourists and residents throughout the year.

Additionally, the Honolulu District stakeholders expressed interest in BUDM measures given notable observations of the effects of climate change on the island communities that comprise the Honolulu District area of responsibility. (USACE, 2023)

This project is being developed for the purposes of reducing storm damage to property and infrastructure, and promoting public safety, recreation, and ecological opportunities (USACE, 2023). Reduce coastal storm damages at Hale'iwa Beach and Hale'iwa Beach Park (HBP), restore habitat for aquatic life at Hale'iwa Beach, enhance the value of recreational opportunities at Hale'iwa Beach and HBP, and expand beneficial use capabilities by dredging areas outside of the navigation, channel. Provide protection to culturally and historically significant structures including the comfort station and the World War II Memorial and partner with state, county, and local partners to carry out projects that beneficially use dredge materials (USACE, 2023).

Goals include:

- protect and preserve nesting, roosting, and foraging habitat
- storm surge attenuation
- floodplain capacity
- erosion control / shoreline stabilization
- water quality / water filtration
- carbon sequestration
- recreation amenity

Focal Species

Brown Booby (*Sula leucogaster*) and the Laysan Albatross (*Phopebastria immutabalis*) are listed as Birds of Conservation concern and may be present in the project area. Brown booby are found in tropical oceans including those around Hawai'i. Laysan albatross are pelagic birds of the open Pacific Ocean. Breeding populations of Laysan albatross are found on O'ahu.

Additional Species

Sea turtles forage within the open water near the beach and use the beach to haul out and rest. Migratory shorebirds use the beach habitat for nesting and foraging. Hawaiian Monk Seals may also haul out on the sandy beach to bask.

OVERALL COST

The Recommended Plan is the National Economic Development (NED) plan and provides an incremental average annual economic benefit of $499 thousand with a benefit to cost ratio of 7.65 (USACE, 2023).

The total project first cost (constant dollar cost at FY23 price levels) of the Recommended Plan is estimated at $6.753 million. This is the incremental cost and includes construction, preconstruction, engineering, and design, construction management, lands, easements, rights-of-way, relocations, and disposals (USACE, 2023).

Budget Summary

Based on FY22 price levels, the estimated project first cost is $3.901 million (Table 1). This represents the incremental cost over the Base Plan cost for implementation and includes construction; pre-construction, engineering, and design (PED); construction management, i.e., supervision and administration (S&A); lands, easements, rights-of-way, relocations, and disposals (LERRDs). The feasibility study costs-to-date of $485 thousand are not included in this estimate of project first cost. The fully funded total project cost, including feasibility study costs-to-date and escalation to the estimated midpoint of construction (2024), is $4.502 million at the FY22 price level (Table 1).

Table 1. FY22 price level

Disposal Method	Mob/Demob	Dredging Project Costs	Total Project Costs	Dredging Unit Costs ($/cy)
Stockpile	$501,121	$593,948	$1,095,069	$91
Beach Placement	$501,121	$621,450	$1,122,571	$96
Landfill	$501,121	$1,220,902	$1,722,023	$188
South O'ahu Operational Data Management System (ODMS)	$626,888	$212,880	$839,768	$33

FUNDING

Under Section 1122 of the Water Resources Development Act (WRDA) of 2016 (Public Law 114- 322), as amended, the costs of beneficial use projects in excess of the Base Plan will be 100% federally funded.

PARTNERSHIP DEVELOPMENT AND MAINTENANCE

USACE consulted the following organizations for information to develop this study: the U.S. Fish and Wildlife Service (USFWS), National Marine Fisheries Service (NMFS), U.S. Environmental Protection Agency (USEPA), State of Hawai'i Historic Preservation Division (SHPD), Hawai'i Hale'iwa Small Boat Harbor Maintenance Dredging and Beach Restoration Project DRAFT Integrated Feasibility Report and Environmental Assessment, 15 August 2023 Coastal Zone Management Program (CZMP), Hawai'i Department of Health (DOH), Office of Hawaiian Affairs (OHA), and Hawai'i Office of Planning. The city and county of Honolulu contracted Sea Engineering, Inc. to study erosion problems at Hale'iwa Beach Park.

Partner Contact: Jessica Podowski

Restoration Outcomes and Lessons Learned

This project still in design phase (Podowski, 2024)

RESTORATION OUTCOMES

- The beach may provide foraging habitat for shorebirds and haul out areas for Hawaiian Monk Seals (USACE, 2023).
- The project piloted an approach, novel in this District, to using sediment from an infrequently dredged harbor for beach restoration. It will serve as a model for future sites.

LESSONS LEARNED

- Despite ideal sediment for beneficial reuse and clear cost benefits, there were obstacles to project acceptance by the vertical team. Building study momentum required that leadership be invested in the study success from its commencement. Leadership turnover required that the feasibility study team remain committed to completing the project despite a lack of external motivation or internal structural incentive.
- Beneficial use in Hawaii had not been explored previously due to high permitting costs, despite monetary benefits. BUDM permitting in Hawaii is nearly triple the cost of other states. Hawaiian sediment management plans are strict, with intense regulation outlining dredging, dewatering, and placement. The ecological environment surrounding the Hale'iwa Beach Park, including coral reefs and fish ponds, demanded careful planning and permitting considerations. The project required extensive public scoping meetings to review permitting requirements unique to Hawaii. State and federal agencies extended the project timeline to overcome these barriers.
- Ultimately, the long timeline of the project was pushed forward by the championship of the USACE team and non-federal sponsor. Extensive support from USACE staff and the non-federal sponsor ensured that permitting obstacles were overcome as a team, streamlining the permitting process. Having established this project as a successful model for using dredge material for beach restoration, the state of Hawaii and Pacific Ocean Honolulu District can utilize this effort as a roadmap to successful BUDM implementation in other projects throughout the state.

PLANNING	
Overall cost	$3.901 million
Cost summary	Non-federal = $2.731 million / Federal cost-share = $1.17 million
Link to USACE dredge project	Yes
Beneficial use	Yes
Low cost / no cost alternative to USACE	No
Federal Standard	No; offshore disposal was identified as the federal standard / base plan.
Cost estimate strategy	Past dredging estimates
Type of project	One off
Plan and permitting development	Information Meeting: 3 August 2017 with DLNR Division of Aquatic Resources (DAR), U.S. Fish and Wildlife Service (USFWS), and the National Oceanic and Atmospheric Administration, National Marine Fisheries Service Protected Resources Division to provide oversight for the Fish and Wildlife Coordination Act and the Endangered Species Act
Alternate sediment relocation if BUDM project hadn't happened	• Hale'iwa Harbor has been dredged twice since initial construction: (1) 7,214 cubic yards (cy) in 1999 and (2) approximately 6,500 cy in 2009 (Table 1). Both times, the material was disposed upland. Some of the clean, sandy material from the 2009 dredging was used at the HBP for repair work, and some was made into concrete. At the time, placing suitable dredged material on Hale'iwa Beach was identified as a potential beneficial reuse option. The necessary environmental permits were not in place, however, and the maintenance dredging schedule and budget did not allow for them to be acquired at that time. • Routine maintenance dredging of the channel with transport of beach-grade sand for ocean disposal, rather than returning it to the shoreline, is a missed opportunity and increases risk for erosion of park and nearby infrastructure. As such, Hale'iwa Beach Park presents a high-value opportunity for receipt of beach-grade sand, i.e., dredged material, pursuant to Section 1122 of WRDA 2016, as amended (USACE, 2023).
Public outreach/education efforts	
Public perception challenges	• POH met with members from the Hawaii regulatory agencies on 4 August 2017 to discuss the permitting requirements for disposing of dredged material from the Hale'iwa Small Boat Harbor. Agencies included the State DLNR OCCL, State Coastal Zone Management Office, and the State Department of Health, Clean Water Branch (DOH). The State Department of Land and Natural Resources (DLNR) Division of Boating and Ocean Recreation (DOBOR) was also in attendance as the local sponsor of the harbor project. The main concern brought up during this discussion was whether the placed material would remain on the beach. • Concerns regarding the effects of the proposed plan on the Loko Ea Fishpond were raised during the public comment period and responses were coordinated with the Malama Loko Ea Foundation resulting in modification of the concept design to avoid impacts to the fishpond.

PERMITS	
Required permits	USFWS & NOAA, NMFS (ESA, MSA)- USFWS Coordination Act, Endangered Species Act; USACE 404, R&H - DA Permit; NEPA; State wetland, coastal, or marsh permit - CDUP (Conservation District Use Permit), CZM Special Management Area Review; State subaqueous land permit/authorization; State WQS (401) - Section 401 WQC, Section 402 NPDES; State Endangered, Threatened, or Rare (ETR) species, habitat protections; Section 106 Historic Preservation; Mini-NEPA; Federal Consistency - CZM Federal Consistency Review; Other: State Stockpiling Permit
Responsible party	USACE
Adaptive management	Overall, the agencies (during 2017 meeting on permitting requirements) saw a need to evaluate and identify the resources to better understand the potential impacts. The agencies prefered an adaptive management approach to ensure that the nourished beach does not become a source for sedimentation, disrupt natural drainage, or get washed away shortly after placement.
Policy incentives and regulatory barriers	FIRST time doing project… leads to issues. Hawaii is very strict with dewatering dredge material, may need an exemption to this process to save money and time (Podowski, 2024)
Impact on design or implementation	No

MAINTENANCE AND MONITORING	
Ongoing maintenance	If the pilot project is successfully implemented, the intention is to make BUDM an integrated part of the O&M dredging cycle (10- to 20-year interval) (USACE, 2023). The 1122 authority only allows for pilot projects and, therefore, a long-term plan for beach re-nourishment as part of the HSBH Dredge Material Management Plan (DMMP) Preliminary Assessment is beyond the scope of this study. However, a goal of this project is that it will demonstrate the benefits of the proposed measures and provide lessons learned that can be applied to future maintenance of this harbor (USACE, 2023).
Monitoring provided by	USACE
Monitoring details	Continuous post-placement monitoring of Hale'iwa Beach Park (Unmanned Aerial System survey, GPS of shoreline, photos) will be conducted as part of state permitting requirements (for 1 year) and thereafter as part of the Inspection of Completed Works program. This monitoring will assist with determination of beach fill performance and what placement interval would be optimal. This will be integrated into the long-term O&M plan and DMMU plan for Hale'iwa Harbor (USACE, 2023).
Monitoring protocol	This project will be inspected on a yearly basis through the USACE Inspection of Completed Works program (USACE, 2023).

DESIGN/CONSTRUCTION ELEMENTS

Lifespan of project	Based on estimated rates of erosion for the area, it is anticipated that the beach created under this alternative would persist for 23 years before returning to the existing condition.
Materials used	• USFWS FWCA Report characterized the offshore sand borrow area as consisting almost entirely of high-quality beach sand • Sandy material from the outer harbor of Hale'iwa Small Boat Harbor will be excavated and then placed into a scow for natural dewatering. Once dewatered, the material will be placed near the beach groin
Volume of material used	Historical dredging records at Hale'iwa Harbor indicate that about 6,500 cubic yards of material may be dredged from the Federal channel during the next dredging event.
Sediment volume and composition sufficient or augmented	Sufficient
Equipment required	Barge haul via scow, mechanical dredge
Distance material was transported	To facilitate efficient transport and unloading of dredged material to the beach, a barge access zone will be excavated along the north face of the root of the southern groin of the Hale'iwa Beach Shore Protection Project to a depth of -10 feet MLLW. Material excavated to construct the barge access zone is beach sand and will also be placed along the shoreline fronting Hale'iwa Beach Park.
Method of sediment suitability assessment	• The Corps anticipates dredging from these four areas will yield 24,638 cubic yards (cy) of dredged material, of which, 22,638 cy is expected to be suitable for beneficial use. • Jet probing was conducted to determine the thickness of sediments overlying consolidated or hard bottom substrate within an area covering approximately 80,000 square yards, or about 16.5 acres. The preliminary investigations in this area, including reconnaissance-level cores of approximately 3 to 4 feet depth, indicate that the sand deposit contains in excess of 200,000 cy of sand in the area identified.

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