



PROTECT

Structural Stabilization Measure

Seawalls



Vertical Seawall in Mokule'ia, O'ahu, HI

DESCRIPTION:

Seawall structures are hardened coastal protection that are built parallel to the shore, with vertical or sloped walls to retain inland property and protect the shoreline against wave forces and erosion. The height of a seawall often matches the total height difference between beach and surface level of the inland area. The primary purpose of a seawall is to protect inland infrastructure and recreation spaces from the energy of tides, waves, and storms. Beachfront private property owners in Hawaii do not have structural shoreline hardening as an option based on current public policies and regulations

ADVANTAGES:

- Prevents storm surge flooding
- Resists strong wave forces, reducing erosion from that section of protected shoreline
- Shoreline stabilization behind structure
- Less space intensive horizontally than other techniques (e.g. vegetation only)
- Creates hard structure for non-mobile marine life
- Possible recreational opportunities (e.g. fishing)
- May be permissible in shoreline areas that are not sandy beaches

DISADVANTAGES:

- Concentrates wave energy, so over time will reduce or eliminate any beach in front of the seawall and cause erosion of the seaward seabed, deepening the water level at the seawall
- Direct loss of resource area including loss and fragmentation of intertidal habitat
- Aesthetic impacts, loss of natural coastline, visually obstructive
- Prevents upland from being a sediment source to the system
- May be damaged from overtopping of the waves

ADAPTATION STRATEGIES FACT SHEET

PROTECTS FROM



Erosion



Storm Flooding



Wave Impact Force



Sea Level Rise Flooding

COST



MAINTENANCE



LIFE SPAN





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Ponokai Seawall in Kaua'i, HI

SITE



Parcel



Regional

CONDITIONS



Sandy Beach



Marsh



Coastal Bluff

POTENTIAL PERMITS



Federal



State



Local

- Department of the Army Permit
- Essential Fish Habitat (EFH) Consultation
- DLNR OCCL CDUP
- DLNR SHPD HRS 6E Review
- DLNR Forestry and Wildlife Section 195 Consultation
- DLNR Land Division Easement and/or Request for Right of Entry on State Lands
- DLNR DAR Approval
- DOH Section 401 WQC
- DOH NPDES
- County Special Management Area Use Permit, Shoreline Setback Variance, Building Permit

DISADVANTAGES (CONT'D):

- Reduces longshore sediment transport
- High up-front costs
- Beachfront private property owners in Hawai'i do not have structural shoreline hardening as an option based on current public policies and regulations
- May negatively impact public access along the shoreline

METHODS/PROCESS:

Material options include stone, rock, concrete, steel/vinyl sheets and steel sheet piles. Structures can be long lasting but are not permanent and do require maintenance. Act 16, Session Laws of Hawaii (SLH) 2020, amended coastal zone management laws to prohibit the use of seawalls and revetments on sites with beaches, unless it is clearly in the interest of the public.

POSSIBLE REGULATORY AGENCIES:

USACE, US FWS, NOAA Fisheries, DLNR OCCL, DLNR LAND, DLNR Forestry and Wildlife, DLNR DAR, DLNR SHPD, DOH ENV, OPSD, Local Planning Departments.

CASE STUDIES:

[37] Beach Loss along Armored Shorelines on Oahu, Hawaiian Islands https://www.jstor.org/stable/4298607#metadata_info_tab_contents

[38] The Impacts of Coastal Protection Structures in California's Monterey Bay National Marine Sanctuary <https://nmssanctuaries.blob.core.windows.net/sanctuaries-prod/media/archive/science/conservation/pdfs/stamski.pdf>

SOURCES AND CITATIONS:

[39] US Army Corps of Engineers: Design of Coastal Revetments, Seawalls, and Bulkheads https://www.publications.usace.army.mil/Portals/76/Publications/EngineerManuals/EM_1110-2-1614.pdf

[40] Seawalls and Jetties <https://climate-adapt.eea.europa.eu/en/metadata/adaptation-options/seawalls-and-jetties>

