



PROTECT

Structural Stabilization Measure

Revetment



Rock Revetment at Mauna Lahilahi

DESCRIPTION:

Revetments are sloped walls of boulders, stones, or sometimes concrete blocks, constructed along coastal banks to provide shoreline protection by reducing wave energy and helping to prevent erosion. They are often permeable to absorb wave action and can be constructed from interlocking slabs to maximize strength. Unlike seawalls, the permeability and sloping structure of revetments does not typically accelerate erosion in the coastal profile.

ADVANTAGES:

- Mitigates wave action, reducing erosion for that section of protected shoreline
- Shoreline stabilization behind structure
- Creates hard structure for non-mobile marine life
- Increases habitat complexity

DISADVANTAGES:

- Concentrates wave energy, so over time will reduce or eliminate dry beach in front of the revetment
- Direct loss of resource areas, including loss and fragmentation of intertidal revetment
- Can have significant negative impacts to adjacent properties through redirecting wave energy and erosion, contributing to increased erosion of adjacent unreinforced sites
- No high-water protection
- Prevents upland from being a sediment source to the system
- Reduces longshore sediment transport
- 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

PROTECTS FROM



Erosion



Storm Flooding



Wave Impact Force



Sea Level Rise Flooding

COST



MAINTENANCE



LIFE SPAN





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Rock Revetment at Mauna Lailahi

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

METHODS/PROCESS:

Revetment structures are built of boulders and sometimes of poured concrete slabs, constructed parallel to the shoreline, typically built on a 1:1.5 slope, or flatter. Material options include stone, rubble, concrete blocks, cast concrete slabs, sand/concrete filled bags, and rock-filled gabion baskets.

Structures can be long lasting but are not permanent and do require maintenance. Permits likely require annual nourishment to replace the material that the revetment prevents from entering the system.

POSSIBLE REGULATORY AGENCIES:

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

CASE STUDIES:

[35] Assessment of Coastal Revetment: Case study of Rosetta Revetment

<https://www.sciencedirect.com/science/article/pii/S2090447921003865>

SOURCES AND CITATIONS:

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

