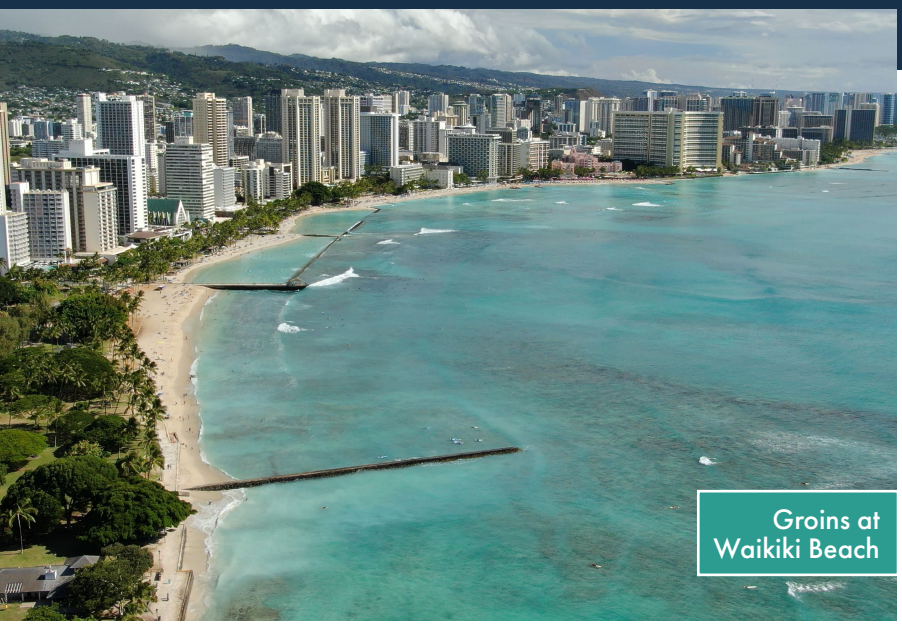
PROTECT

Structural Stabilization Measure | **Groin**



DESCRIPTION:

Groins are structures that project perpendicularly from the shoreline and are designed to intercept water flow and sediment moving parallel to the shoreline. The rigid structure of groins limits the movement of sediment from longshore drift to prevent beach erosion, retain beach sand, and also breaks waves. Groins are typically built in straight alignment, but sometimes have variations in shape, permeability, and materials.

ADVANTAGES:

- Protection from wave forces
- Methods and materials are adaptable
- Can be combined with beach nourishment projects to extend their lifespan
- Maintains coastal landform (beach, dune, etc.) on updrift of groin
- Provides extra sediment through the blockage of longshore sediment transport
- Creates hard structure for non-mobile marine life
- Increases habitat complexity
- Improves fishing access

DISADVANTAGES:

- No high water protection
- Reduces sediment input into estuaries
- Can be detrimental to existing shoreline ecosystem by replacing native substrate with rock
- Reduces natural habitat availability

PROTECTS FROM

COST

MAINTENANCE

LIFE SPAN

PROTECT

Structural Stabilization Measure | **Groin**

Groin at Waikiki Beach

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
- DLNR DOBOR Approval
- DOH Section 401 WQC
- DOH NPDES
- County Special Management Area Use Permit, Shoreline Setback Variance

DISADVANTAGES (CONT'D):

- Change from existing habitat type could have negative impacts to existing resources and degrade habitat by fragmentation and other means
- Aesthetic impact due to change in coastal visual view plane
- May be safety issue for boating and swimming

METHODS/PROCESS:

Groin structures are generally constructed from steel, timber, rock, or stone. If designed properly, shorter groins can help maintain a beach by preventing erosion while still allowing longshore sediment transport. Structures can be long lasting but are not permanent and do require maintenance. In many examples, groins are placed in series on a shoreline, creating areas between them referred to as groin fields.

POSSIBLE REGULATORY AGENCIES:

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

SOURCES AND CITATIONS:

[34] Groin, Science Direct
https://www.sciencedirect.com/topics/earth-and-planetary-sciences/groin