

# **Public Shoreline Management Alternatives**



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# Coastal Management Challenge

- Balance protection of natural resource function with human use.



# Coastal Management Needs Analysis

- What is the goal?
- What are the causes of erosion/damage?
  - Tides
  - Waves
  - Currents
- Options to address causes?
  - Upland Runoff?
  - Vegetative Stabilization?
  - Reconfigure uses?
  - Need for stabilization?
    - Impacts
    - Benefits
    - Costs



# Shore Parallel Structures



- Erosion continues
- Cuts off sediment source
- Causes end scour
- Causes increased erosion
- Can be overtopped
- Requires monitoring
- Requires mitigation
- Costly to maintain

# End Effects of Walls

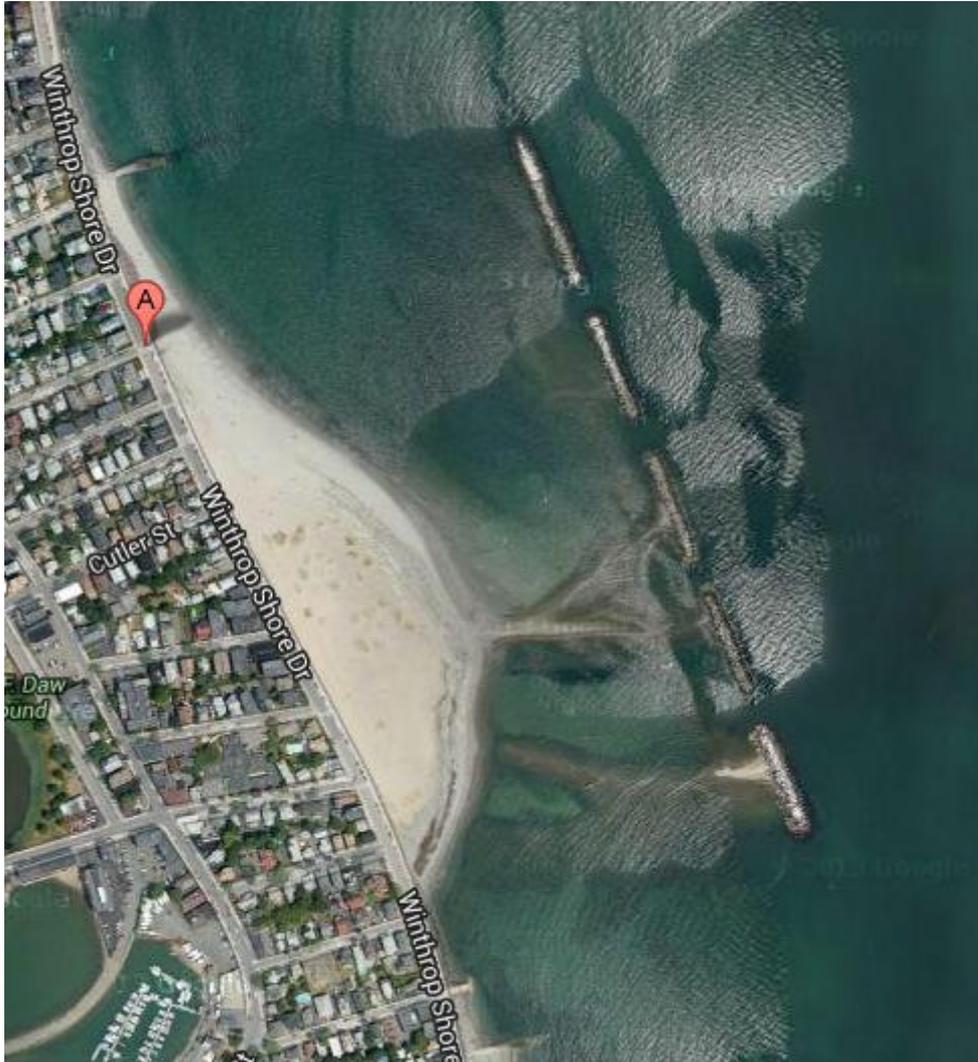


# Shore Perpendicular Structures



- Constructed with rock, wood, concrete or sandbags
- Design minimum length, width and height necessary
- Traps sediment moving alongshore
- Starves downdrift beaches, unless filled to entrapment
- Reflects wave energy
- Can have rip currents adjacent to them
- Reduces erosion of beach nourishment projects
- Requires monitoring
- Requires maintenance to keep filled to entrapment

# Offshore Breakwaters



- May reduce local erosion rate
- Interrupts longshore transport of sediment
- Used with beach nourishment
- Requires monitoring

# Sand-filled bags



- Stops erosion of sediment source
- Reflects wave energy
- May be marine debris hazard
- End effects
- Vegetation often can't establish in them.
- Requires monitoring and maintenance.

Before



# Bioengineering: Coir Rolls & Vegetation

During Construction



10 Years later



- Reflects less wave energy than rocks or sandbags
- Limits erosion of sediment sources
- Can be used to re-establish vegetation

# Bioengineering – Natural Fiber Blankets

- Blankets stabilize soils while vegetation gets established
- Use in conjunction with coir rolls and vegetation
- Do not use synthetic fibers



# Nourishment



- Add sediment to the beach, dune, or nearshore to enhance natural storm damage protection system.

- Requires monitoring.

- Beach

Nourishment: Mass DEP's Guide to Best Management Practices for Beach

Nourishment in MA (2007).

# Dune Nourishment & Artificial Dunes



## Dune nourishment

- Add compatible sediment to eroded dunes
- Vegetation

## Artificial Dune

- Construct dune seaward of an eroding coastal bank/bluff
- Sacrificial
- Use coarser sediment for increased longevity



# Vegetation



- Use native, salt-tolerant plants with extensive root systems
- Establish stable slope
- Address invasives



# Runoff Control

- Remove and reduce impervious surfaces
- Redirect water
- Minimize maintained lawn areas
- Use swales and rain gardens



# Sand Fencing



- Thin wood slats & twisted wire preferred
- Site landward of annual storm waves
- Avoid plastic, metal, fences that become structures



# Modified Public Access



# Coastal Management Needs Analysis

- What is the goal?
- What are the causes of erosion/damage?
  - Flooding
  - Erosion
  - Waves
- Options to address causes?
  - Upland Runoff?
  - Vegetative Stabilization?
  - Reconfigure uses?
  - Need for stabilization?
    - Impacts
    - Benefits
    - Costs



# Site-Specific Analysis

- Shoreline Change Rate?
  - Short and long-term
- Flood Zone(s): type and elevation(s)?
  - V zone, A zone
- Dry beach width?
- Resource type?
  - Beach, dune, bank, floodplain
- Function?