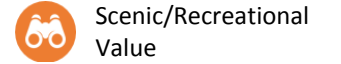
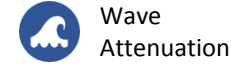
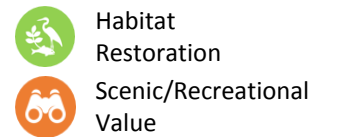




Sample Guide to Coastal Adaptation Strategies

What are Your Project Goals?



Natural Solutions

Remove Invasives



Liz Duff/Mass Audubon



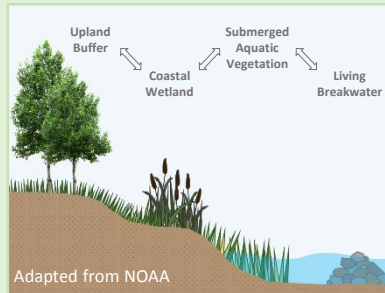
Advantages:

- Supports marsh ecosystem health & function. A healthy marsh provides storm protection, erosion control, and supports wildlife habitat.

Potential Challenges:

- May not be ecologically appropriate
- Requires maintenance

Shoreline Continuum



Adapted from NOAA



Advantages:

- The continuity of coastal habitats from sub-tidal waters to upland buffers provides long-term protection and maximum co-benefits.

Potential Challenges:

- Requires space and time to fully establish
- Limits coastal development

Dune/Beach Complex



Leonardo Dasilva/Flickr



Advantages:

- Beaches and vegetated dunes combine to attenuate wave energy, reduce erosion, and slow inland water transfer.

Potential Challenges:

- Changes shape over time
- Dunes are fragile and susceptible to human impacts

Nature-Based & Hybrid Strategies

Oyster Castles



Lynnhaven River NOW



Advantages:

- Concrete structures that support oyster restoration to enhance water quality, reduce erosion, and buffer wave energy.

Potential Challenges:

- Overtopped by major storms
- Easily damaged by debris and ice

Edging



Partnership for the Delaware Estuary/Flickr



Advantages:

- Natural vegetation combined with engineered structures parallel to coastline; reduces erosion and wave energy, and enhances wildlife habitat.

Potential Challenges:

- Limited storm surge reduction
- Requires more land area to implement

Bioswales



Aaron Volkening/Flickr



Advantages:

- Absorb and filter storm water runoff; improve water quality by preventing pollutants from entering streams and rivers.

Potential Challenges:

- Requires time for vegetation to fully establish
- Requires irrigation

Gray Infrastructure

Revetment



Rachel J. Burckardt



Advantages:

- Rocks or other material placed on a sloping shoreline to stabilize the shore and to mitigate wave energy.

Potential Challenges:

- No major flood protection
- Prevents upland sediment transport to estuarine habitats

Bulkhead



MassDEP/Flickr



Advantages:

- Vertical wall suitable in high-energy settings; stabilizes shoreline and reduces flooding.

Potential Challenges:

- Can erode adjacent areas
- Prevents upland sediment transport to estuarine habitats

Jetty



USACE/Flickr



Advantages:

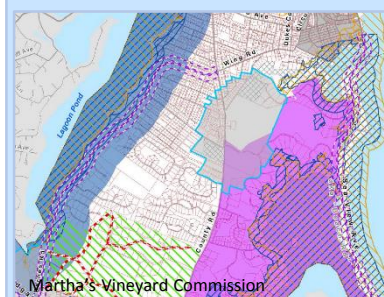
- Prevents beach erosion and reduces wave energy by intercepting the flow of water and sand along the shoreline.

Potential Challenges:

- Can erode adjacent areas
- Prevents upland sediment transport to estuarine habitats

Policy Strategies

Zoning



Martha's Vineyard Commission



Advantages:

- Utilizes zoning overlays to limit development in flood-prone areas (legal precedent exists in MA).

Potential Challenges:

- Can impact property tax base
- May lead to legal challenges

Climate-smart Development



University of Florida



Advantages:

- Requires SLR to be considered in development proposals. Promotes open spaces to increase flood resiliency.

Potential Challenges:

- Creates additional work for developers up front
- Doesn't require action

Transferable Development Credits



King County



Advantages:

- Market-based approach (with existing MA guidelines) that incentivizes development away from flood prone areas.

Potential Challenges:

- Can be costly and complex to implement
- Requires calibrated market