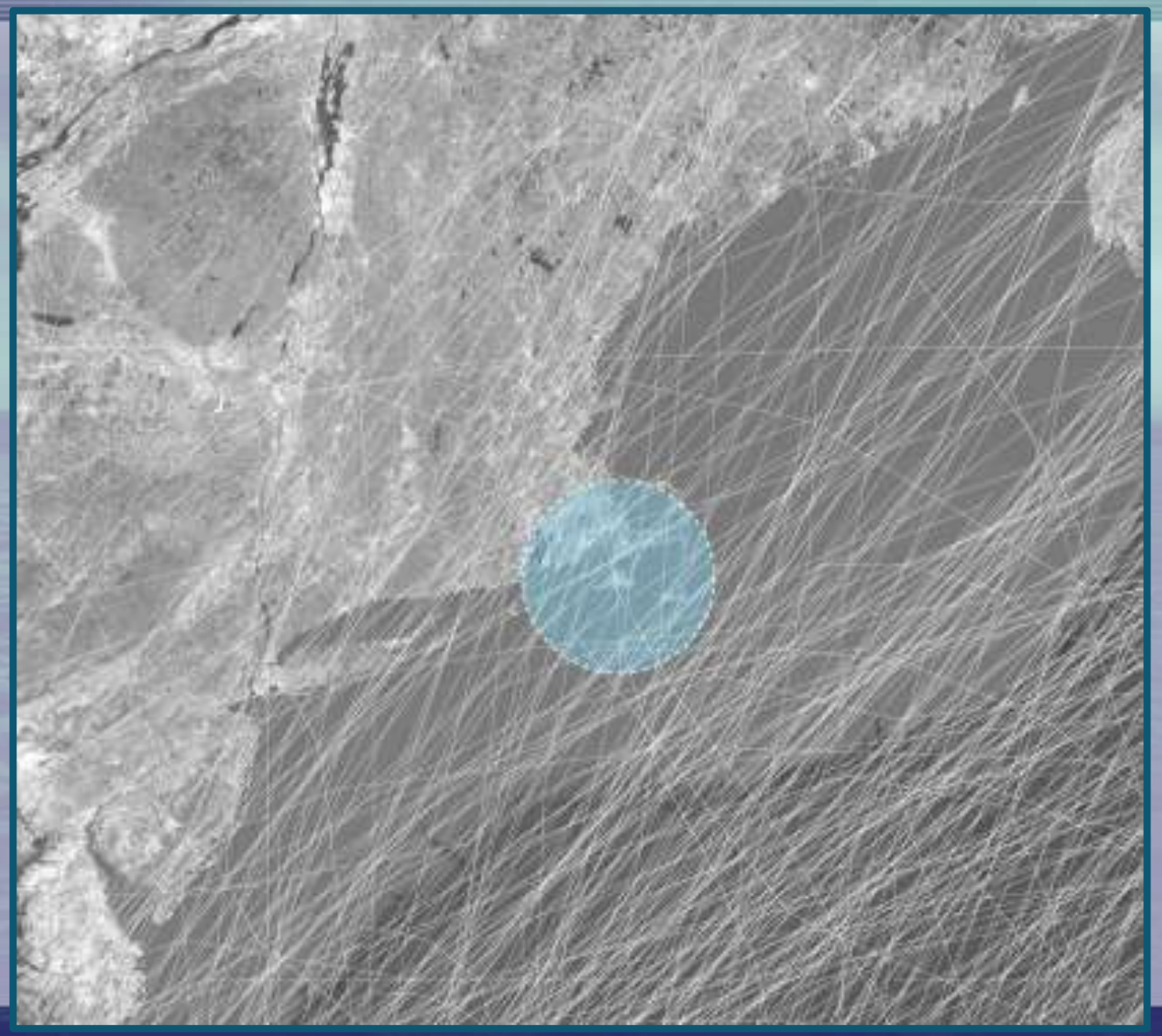

CLIMATE CHANGE AND
ISLAND INFRASTRUCTURE

Storm Tracks



Island Roads

How are roads impacted by climate change?

- Flooding
- Erosion
- Corrosion

"TODAY'S FLOODS ARE TOMORROW'S HIGH TIDES"

William Sweet, NOAA
Oceanographer

Flooding is not a new issue…

Dock Street - 1954

Five Corners - 1975

… But it's becoming more frequent

East Chop Drive 2018

Oak Bluffs

Oak Bluffs Harbor 2018

Wamsutta Ave 2017

Tisbury

Black Dog Bakery 2018

Five Corners 2018

Tisbury Shell Station 2018

Tisbury

Shipyard 2018

Danielle Zerbonne kayaking
next to Beach Road 2017

Edgartown

Dock Street 2018

Chappy Ferry 2018

Up-Island

Lobsterville Beach 2012

Squibnocket Beach 2018

Up-Island

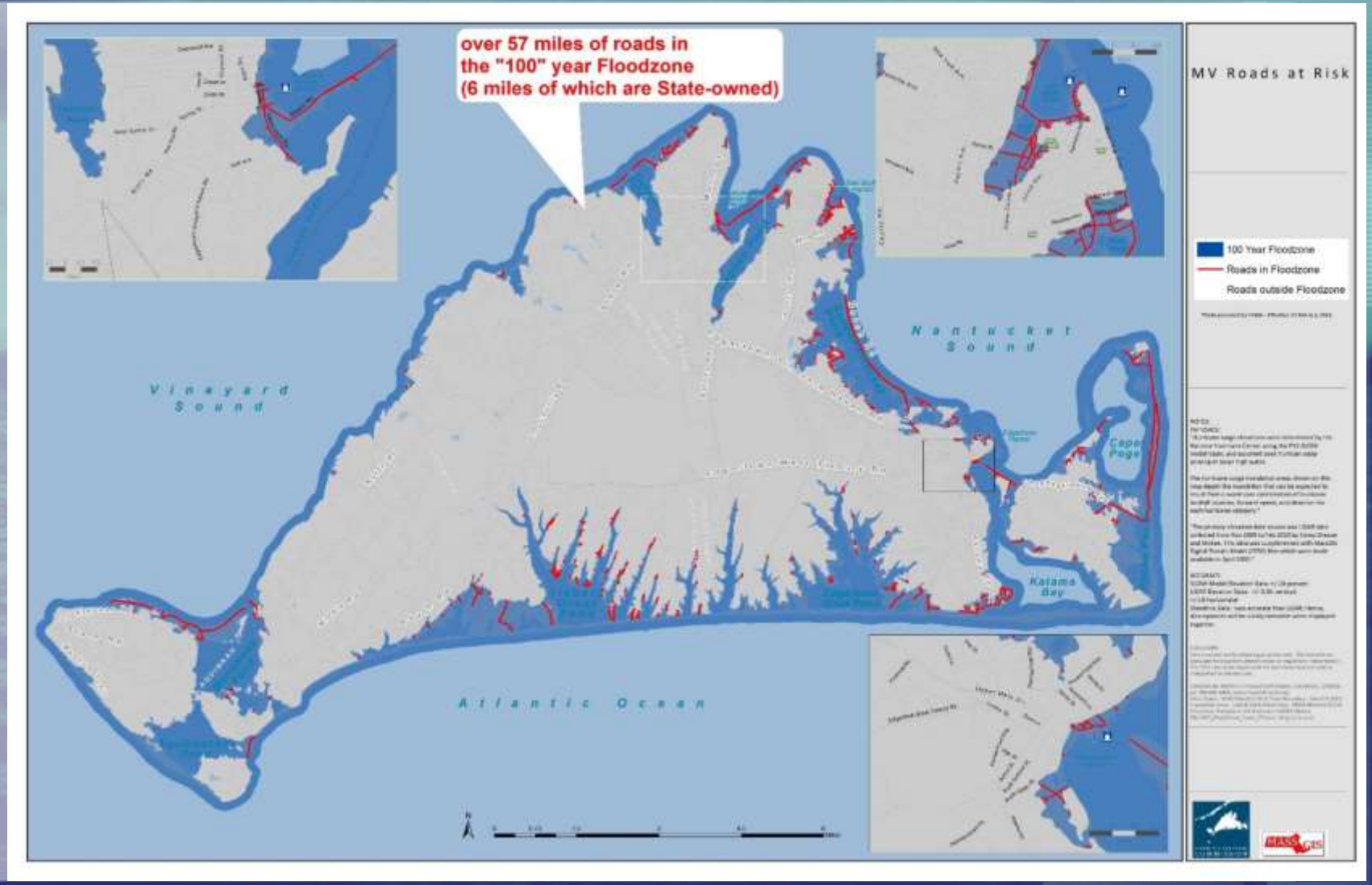
Menemsha 2018

Most At-Risk Roads

What if the roundabout was the only way to get from Vineyard Haven to Oak Bluffs?

What if the Triangle was the only way to get from Oak Bluffs to Edgartown?

If traffic is bad now, imagine those scenarios!



Potential Solutions

- Water can be diverted, if it has somewhere to go

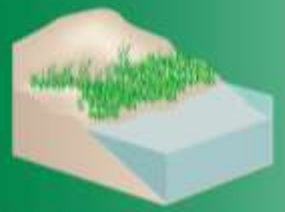
Potential Solutions

- Innovative techniques can be incorporated into new construction projects

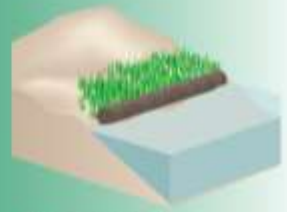
Potential Solutions

GREEN - SOFTER TECHNIQUES ← → **GRAY - HARDER TECHNIQUES**

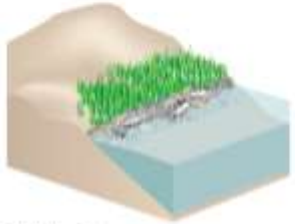
Living Shorelines



VEGETATION ONLY - Provides a buffer to upland areas and breaks small waves. Suitable for low wave energy environments.

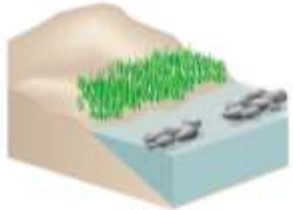


EDGING - Added structure holds the toe of existing or vegetated slope in place. Suitable for most areas except high wave energy environments.

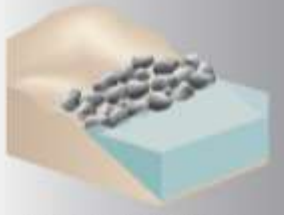


SILLS - Parallel to vegetated shoreline, reduces wave energy, and prevents erosion. Suitable for most areas except high wave energy environments.

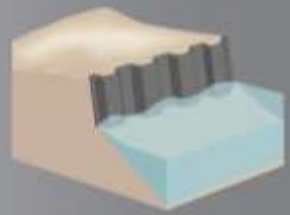
Coastal Structures



BREAKWATER - (vegetation optional) - Offshore structures intended to break waves, reducing the force of wave action, and encourage sediment accretion. Suitable for most areas.



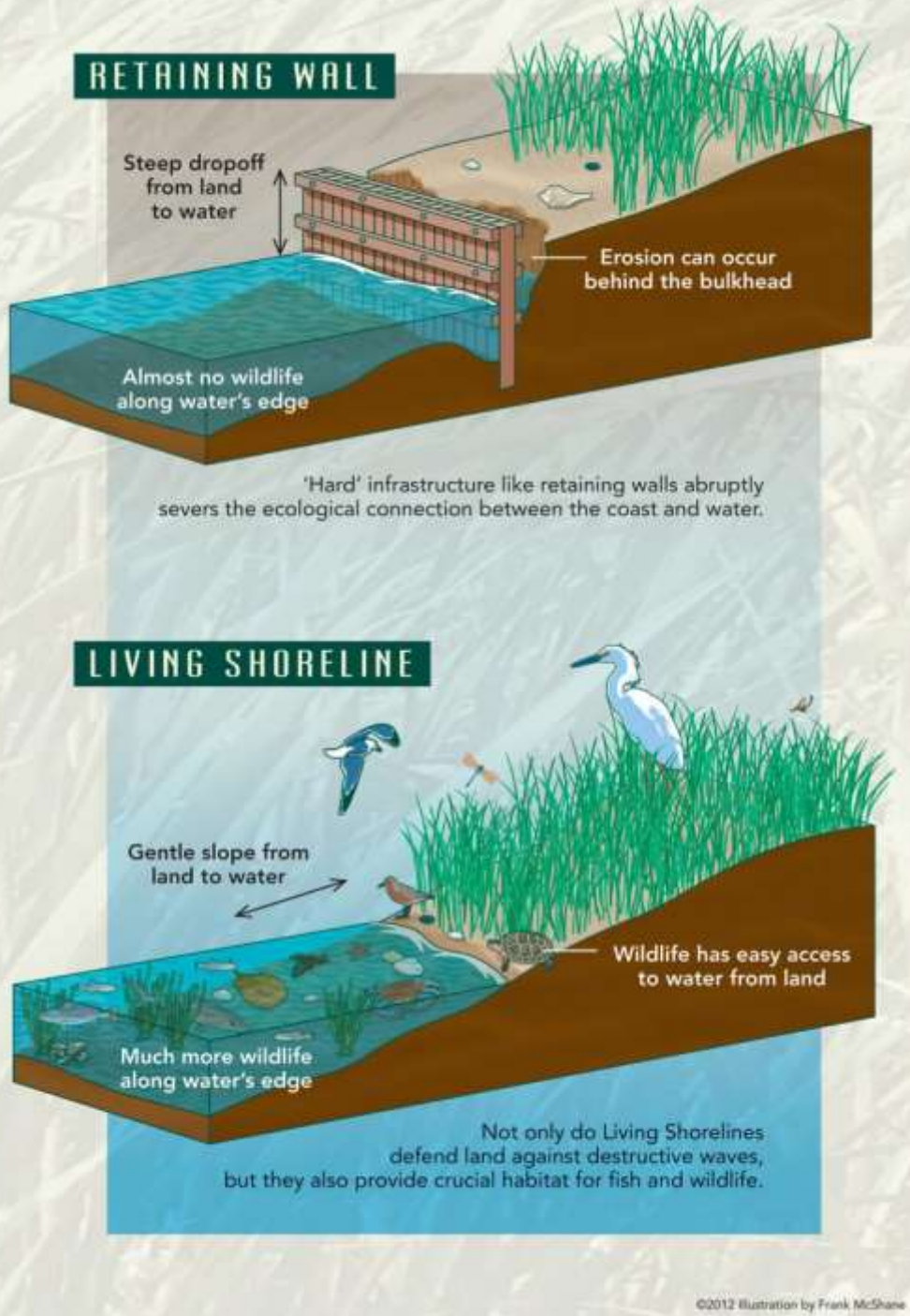
REVETMENT - Lays over the slope of the shoreline and protects it from erosion and waves. Suitable for sites with existing hardened shoreline structures.



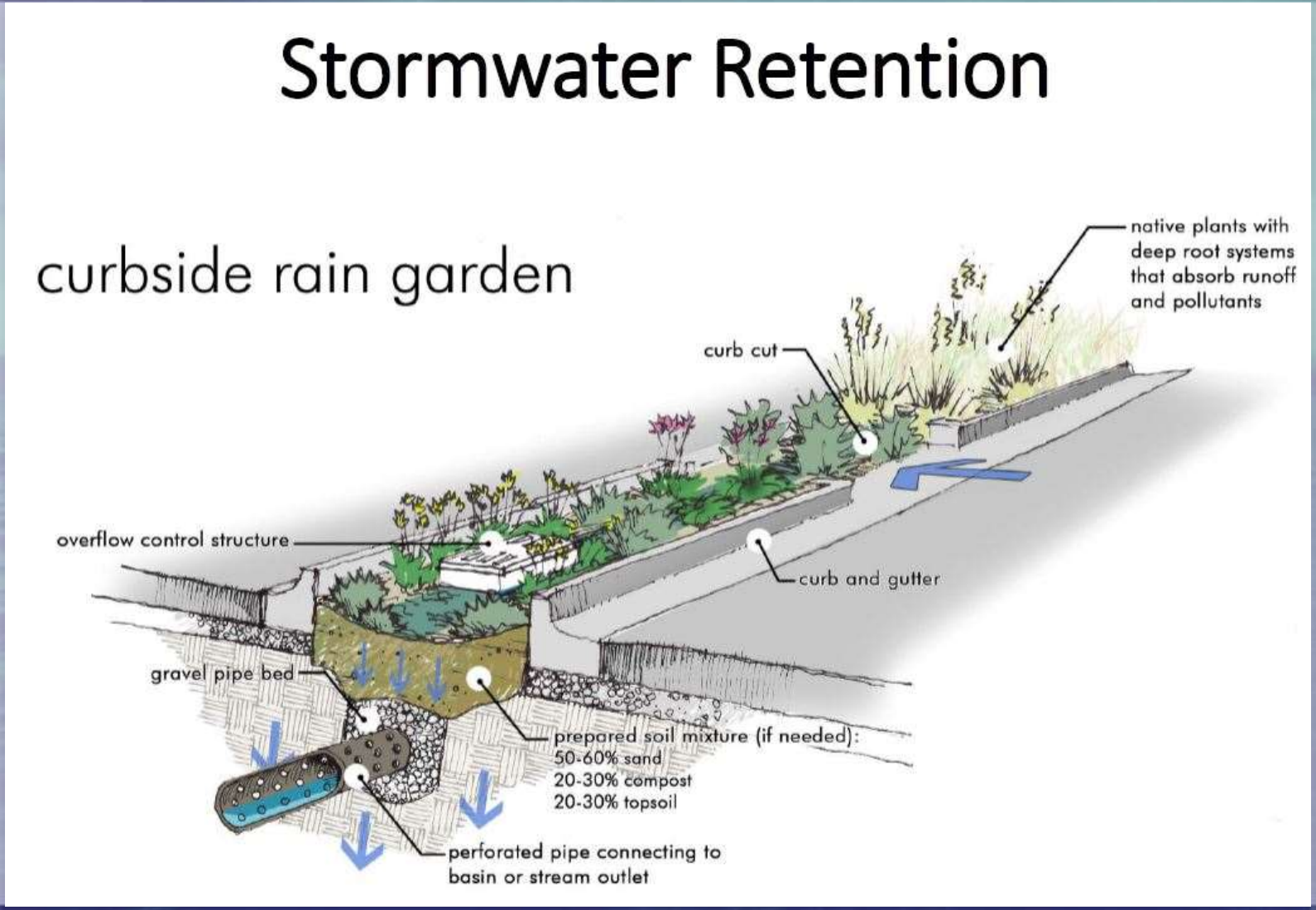
BULKHEAD - Vertical wall parallel to the shoreline intended to hold soil in place. Suitable for high energy settings and sites with existing hard shoreline structures.

Potential Solutions

- Habitat restoration can open up new funding opportunities



Potential Solutions



Maintenance of Existing Systems

Island Challenges:

- Increased costs for maintenance
  - Off-island vendors and operators, ferries, etc.
- Increased sand accumulation

Maintenance of Existing Systems

"Water is the greatest enemy of transport infrastructure."

Christopher Bennett, Lead Transport Specialist

Causeways and Culverts

- Promote tidal flushing to improve water quality in coastal ponds
- Can be elevated to remain passable during storms, but can also be designed to ensure occasional breaching

Retreat (Relocate)

"Some communities have rebranded retreat as progress and a patriotic act, not abandonment or capitulation."

Liz Kozlov, Duke University

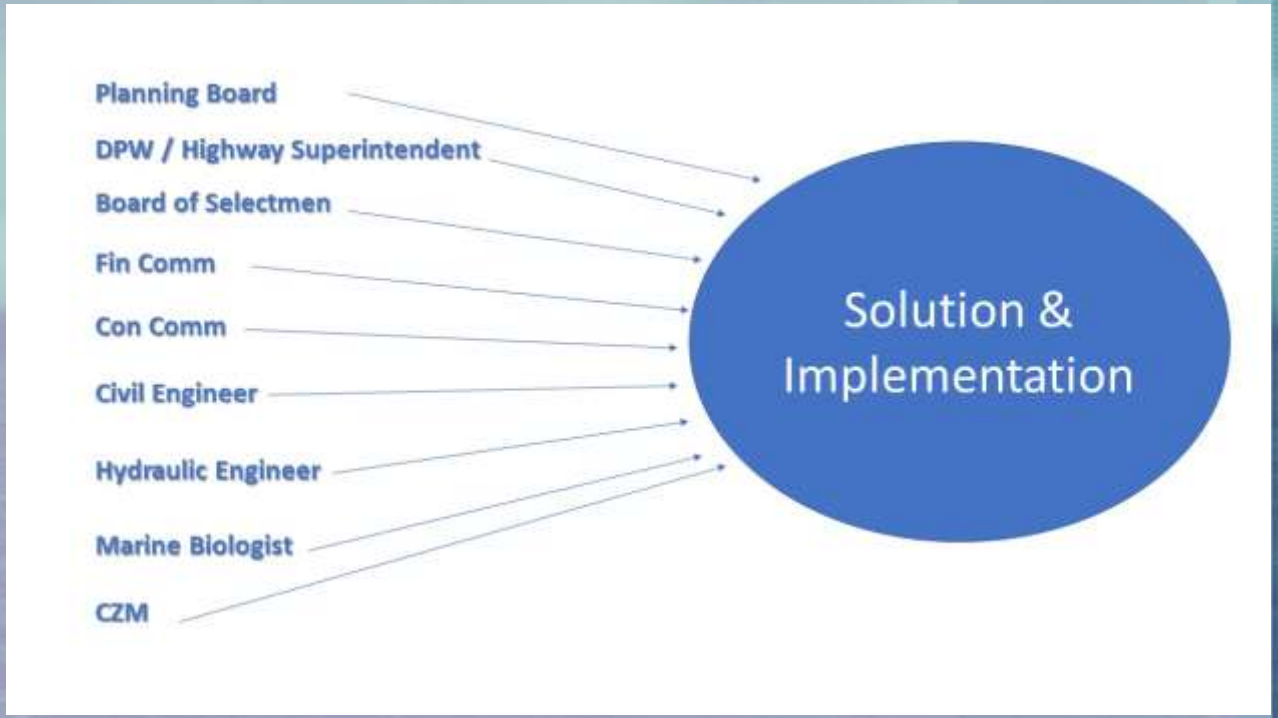
Managed retreat at Squibnocket Beach

Before

After

Implementation

- A hybrid of solutions is often necessary to suit the terrain, topography and water currents.
- Hydrodynamic, wave transformation, and sediment transport are essential precursors.



Costs

New York City

- The Department of Housing & Urban Development will be contributing $930 million on six projects spread out over the city designed to improve flood protection and regenerate areas of waterfront.

"There is no silver bullet solution to the problem of flooding in a coastal city."

Jim Ruocco, Operation SPLASH

Miami Beach

- Miami Beach will be embarking on a $100 million project to raise roads, install pumps and water mains, and redo sewer connections over the next two years.

"There is no playbook on how to safeguard a vulnerable coastal city from rising tides."

Philip Levine, Miami Beach Mayor