

# Conservation Considerations for Innovative Shoreline Protection Projects

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# Outline

Background

Innovation in Design: Case Studies

Innovation Labs: Evolution of Design

Programmatic Approaches to Restoration

Advancing the Practice





Landscape-Level Lens

Restore Ecosystem  
Function



Savethebay.org

Dive Magazine

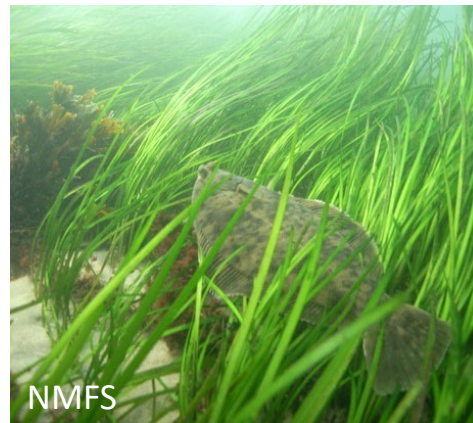
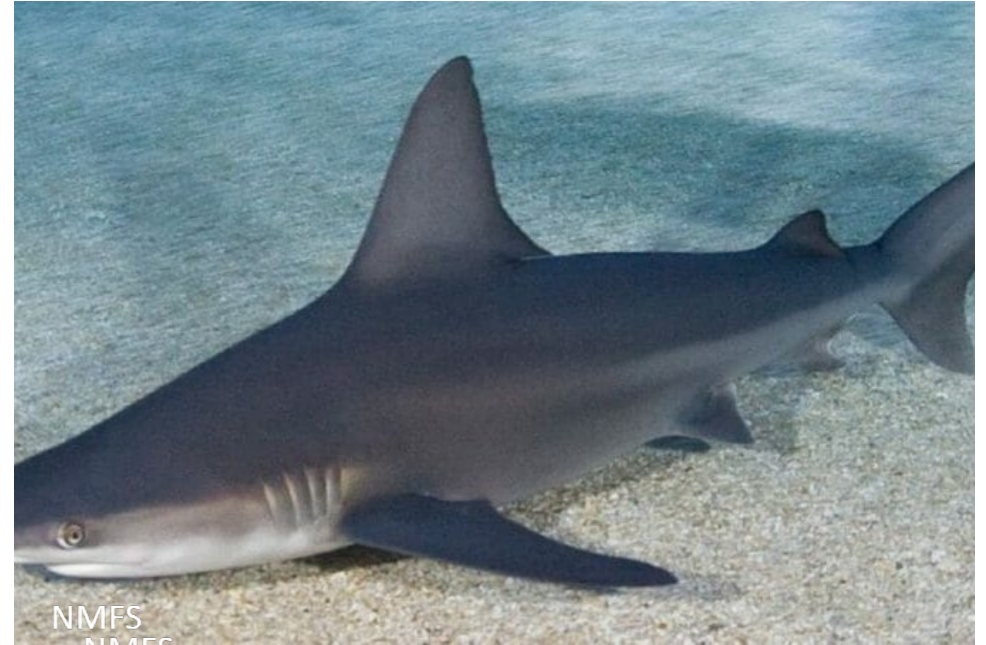
Science news

USFWS NJFO



# Compliance and Conservation Concerns in the Intertidal

- Critical Habitats
- ESA-protected species
- State-listed species
- Essential Fish Habitat
- Habitat Areas of Particular Concern
- SAV
- Shellfisheries



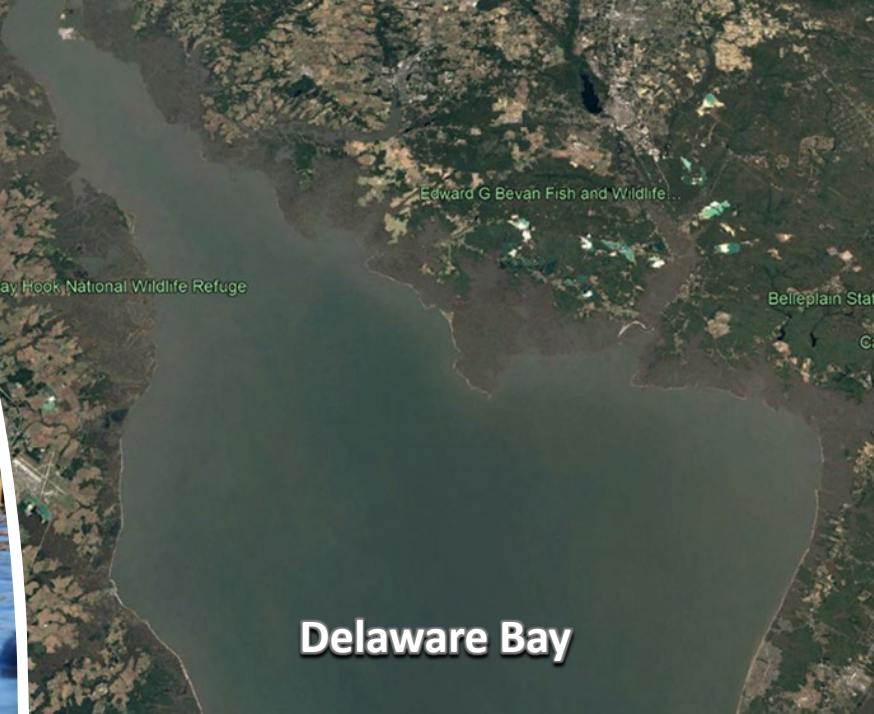


# Delaware Bay Shoreline

- SLR
- Miles of fetch
- Ice
- Beach fringed marsh
- Exposed peat and scarped spartina patches
- HSC and rufa red knot
- Beach restoration work



Shorebird egg foraging



Delaware Bay



Horseshoe Crab Eggs



Rufa Red Knot



# Beach Nourishment + Intertidal Shell Reefs



## Site Characteristics:

- Sand starved beach, adjacent marsh, vital habitat

## Objectives:

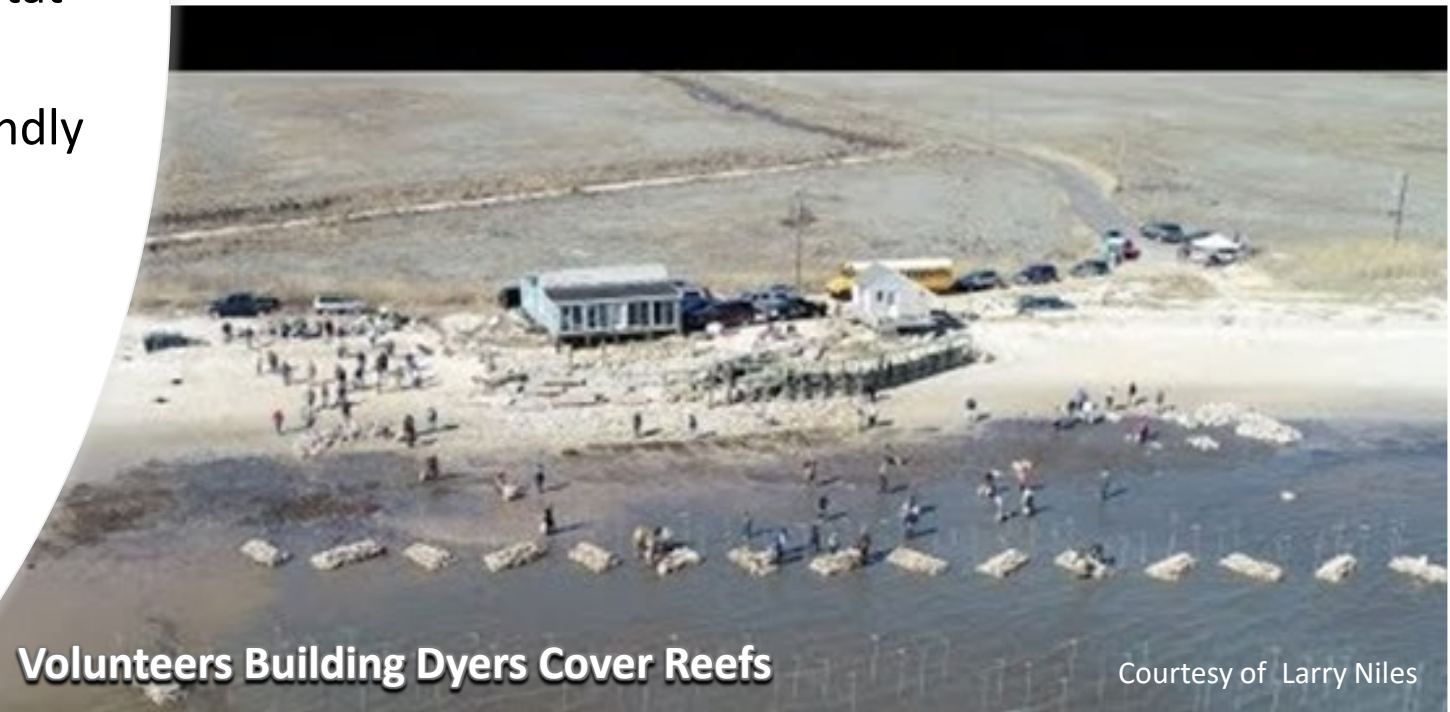
- Reduced erosion, stabilize vital beach habitat
- Recruit oysters/ encrusting bivalves
- HSC passage, shorebird/knot foraging-friendly
- Volunteer-built
- Stable for ice and energetics

## Design:

- Whelk shell reefs, herringbone design

## Compliance:

- aquaculture, red knot, EHF



# Programmatic Approach

## Monitoring program

- American Littoral Society 10 yr permit
  - Beach restoration (i.e., beach slope and berm improvements)
  - Shallow sub-tidal reef construction (i.e., low profile breakwater structures, 2 cm water at the base)
- Fortescue
- Pierce's Point



**Whelk Shell Reefs**



**Pierces Point Site**



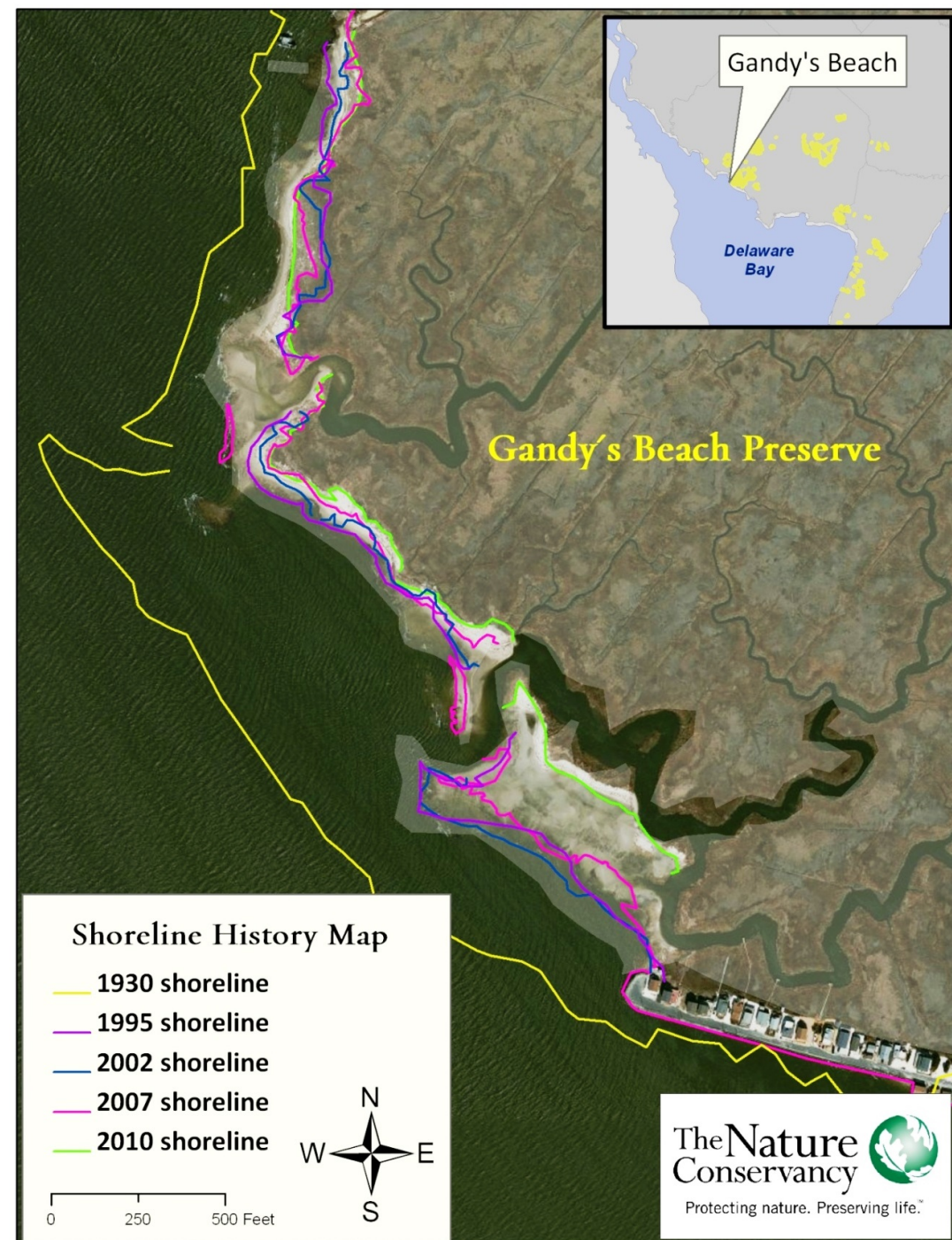
# Gandys Beach



## Gandys Beach Preserve and Fringing Oyster Castle Reefs



Drone Image by Steve Jacobis





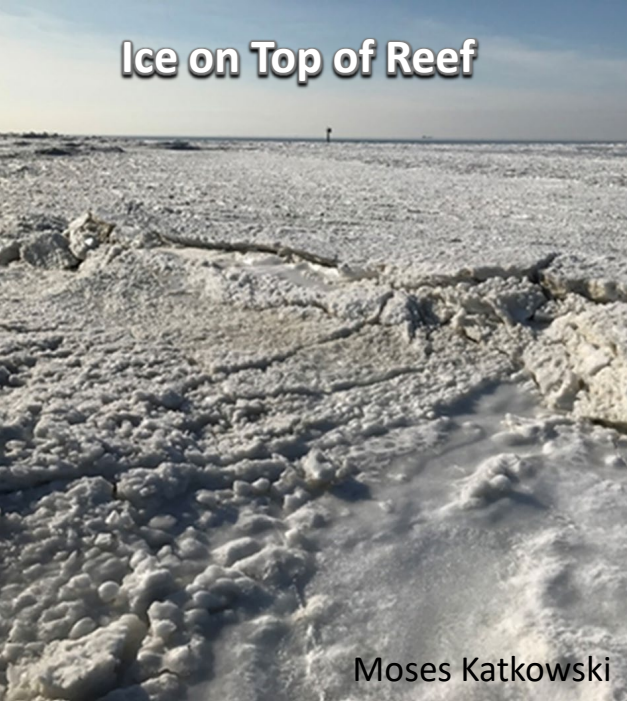
# Gandys Beach Oyster Castles

- Site Characteristics:
  - Erosion =  $\sim 6.5\text{ft/yr}$
  - Sand on exposed peat
  - Sp. alt patches, scarping
- Objectives:
  - Reduce erosion
  - Recruit oysters, HSC passage
  - Volunteers can build
  - Stable for ice and energetics
- Design:
  - Oyster Castle Breakwaters





**Ice on Top of Reef**



Moses Katkowski

**Oyster Recruitment on Castles**



# Gandys Beach Oyster Castles

## Compliance:

- Knot foraging habitat
- EFH
- Shellfish in subtidal

## Results:

- Reduced erosion, not controlled
- Successful recruitment
- Lessons learned

Adaptive Management project

Report 2023

Next steps

**Adaptative Management Project on Land Tombolo**



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AN ENVIRONMENTAL SERVICES FIRM





# Barnegat Bay

- Exacerbated SLR
- Ice
- Large fetch
- Boat wake erosion
- Highly developed shorelines
- Atlantic flyway and fishery nursery

Edwin B. Forsythe National Wildlife Refuge



Barnegat Bay Boat Traffic



Eelgrass Bed



Spartina patens





# Forked River Beach

## Site Characteristics:

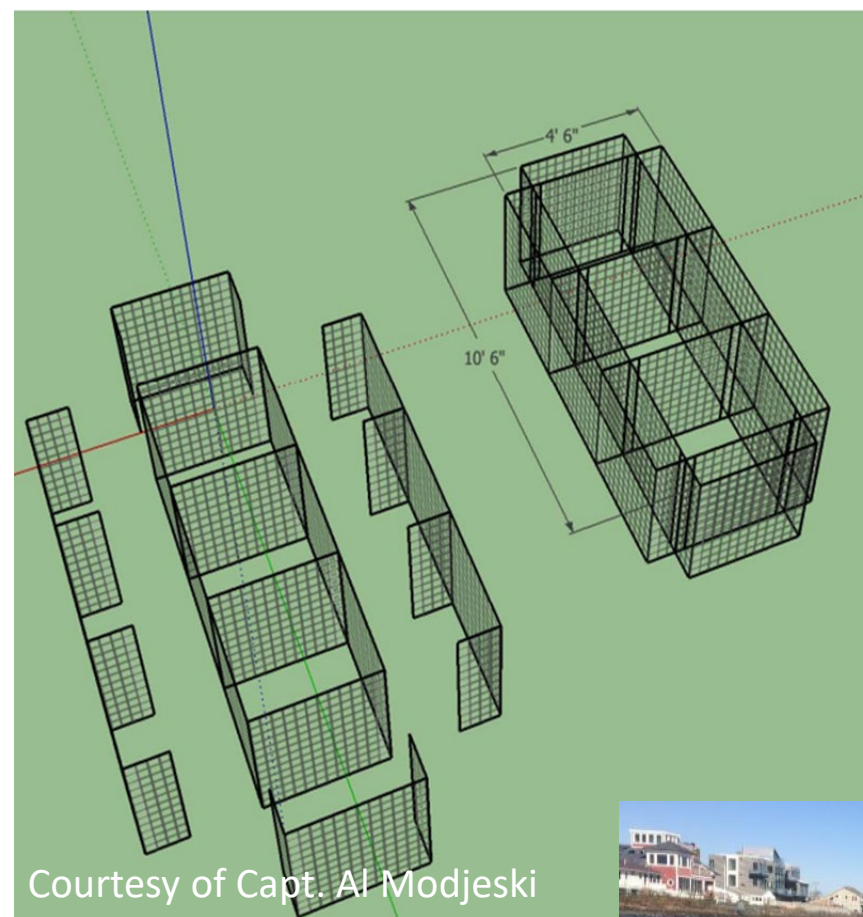
- Developed shoreline

## Objectives:

- Shoreline stabilization
- WQ improvements
- Aquatic connectivity
- Pilot ice and fetch-resilient tactic
- Monitor SAV and oyster benefits

## Design:

- Hesco basket + rock core + shell veneer
- Herringbone placement
- Pilings for ice

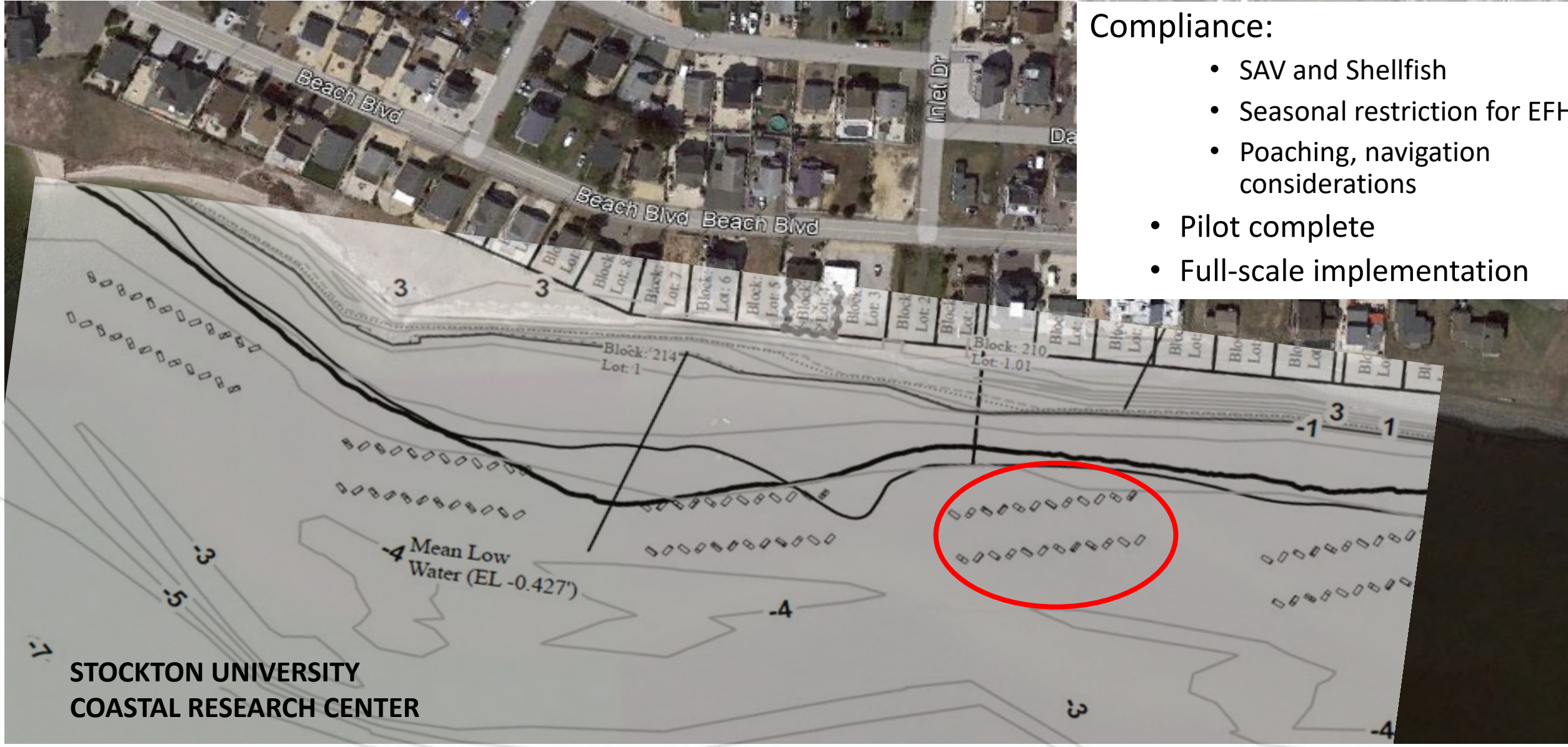


Courtesy of Capt. Al Modjeski



Courtesy of Julie Schumacher



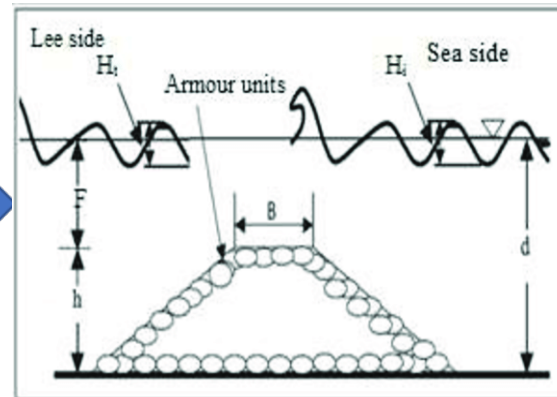


Compliance:

- SAV and Shellfish
- Seasonal restriction for EFH
- Poaching, navigation considerations
- Pilot complete
- Full-scale implementation



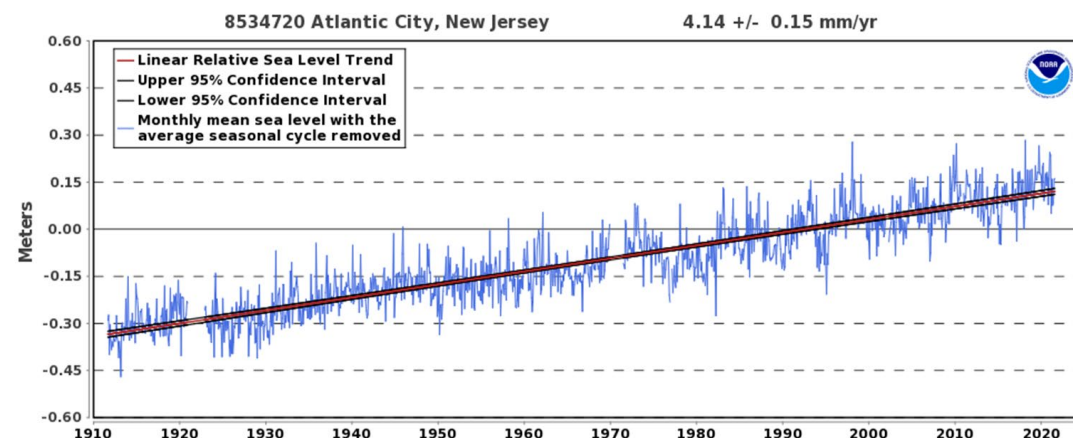
# Innovation Labs and the Evolution of Design





# Advancing the Practice

- Interdisciplinary team
- Partner with regulating agencies
- Clear objectives/ rationale for the design
- Manage risk: Consider near-term impacts vs long-term benefits
- Monitoring plan
- Contingency plan/ Adaptive Mgmt
- Gray infrastructure solutions to restore function
- **A well-researched and monitored attempt is better than a “no attempt alternative”**





# U.S. FWS, Coastal Program Delaware Bay Estuary Project Office

## Resources

- Federal, State, Municipal and Private Lands
- Technical assistance
- Locates funding
- Implementation support
  - OTG, equipment, staff, plants, materials
- Monitoring
  - RTK, bird surveys, wave gauges

## Focal Areas

- Ecologically-responsible solutions to shoreline protection
- Shorebird and tidal marsh bird conservation
- Marsh restoration
- Building partnerships
- Advancing coastal resilience

