

Higbee Beach Wildlife Management Area Pond Creek Marsh Restoration Project



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Pond Creek Marsh Restoration Project



Project Sponsor:

State of New Jersey
Department of Environmental Protection
Office of Natural Resource Restoration

Property Owner/ Principal Advisor:

State of New Jersey
Department of Environmental Protection
Division of Fish and Wildlife



Project Location

- Cape May County, NJ
- Site within Atlantic Flyway - migratory superhighway



Project Goals



- Restore salt marsh tidal hydrology
- Improve floristic quality and saltmarsh productivity – eradicate invasive Phragmites
- Construct tidal inundation and flood risk control structures – berm and flow gates
- Protect existing coastal freshwater wetland and groundwater resources from saltwater inundation
- Allow for habitat management of the northern marsh

Project Goals



- Improve/expand migratory bird resting, feeding, and nesting habitat
- Use excavated marsh sediments on former magnesite area and landfill to create upland meadow and maritime forest habitat
- Create an array of unique ecological settings specifically designed for environmental education and research (pre-K to PhD)
- Establish an ecotourist destination by offering extensive nature trails and wildlife viewing opportunities

Site History

- 1910 – Sand mining cuts marsh off from tides
- 1941-1983 – Harbison-Walker refractory brick plant fills marsh with brick byproduct materials (magnesite)
- 1978 – Higbee Beach WMA purchased by NJ DEP
- 1999 – Former magnesite plant site added to WMA

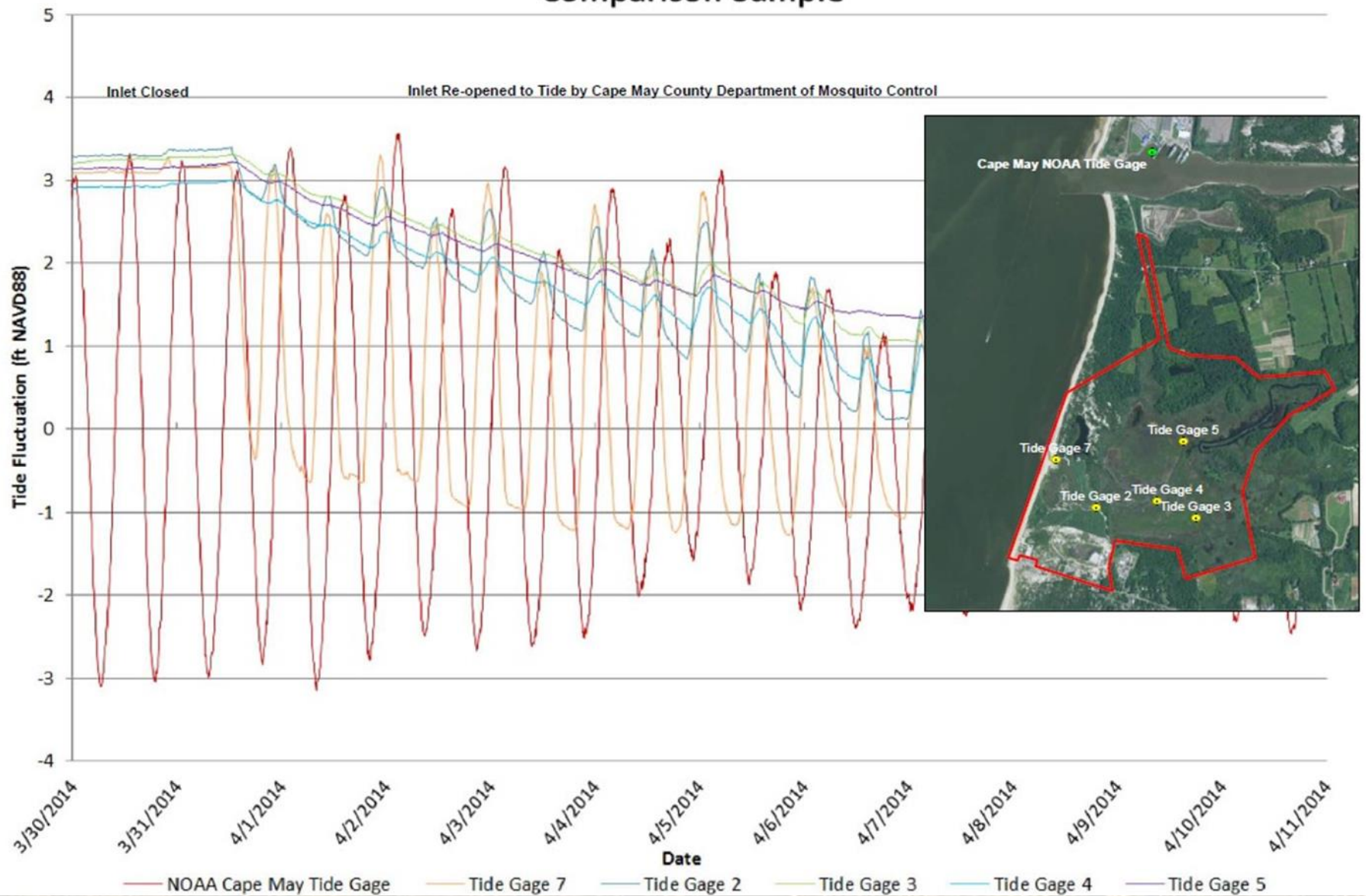


Need for Marsh Restoration



- Poor tidal hydrology
- Inconsistent tidal flow – frequency and extent
- Periodic tidal inundation of freshwater habitat
- Salinity oscillation stifles species adaptation
- Phragmites dominated marsh plain
- Low diversity and abundance across all trophic levels
- **Fixing tidal hydrology will restore productivity**

Comparison Sample



Periodic tidal inundation
of freshwater habitat

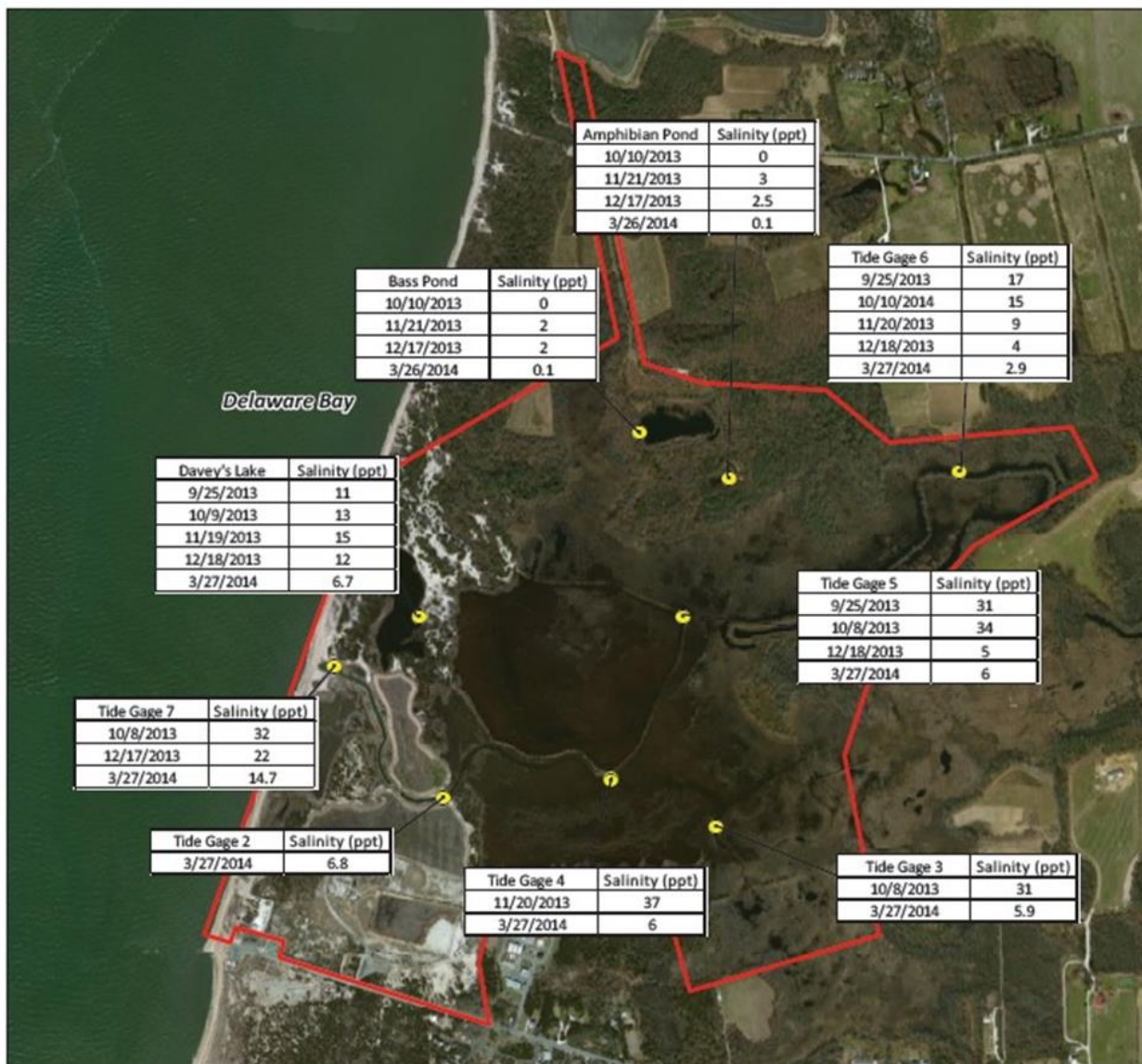
Salinity oscillations
stifles species adaptation

Salinity Classes:

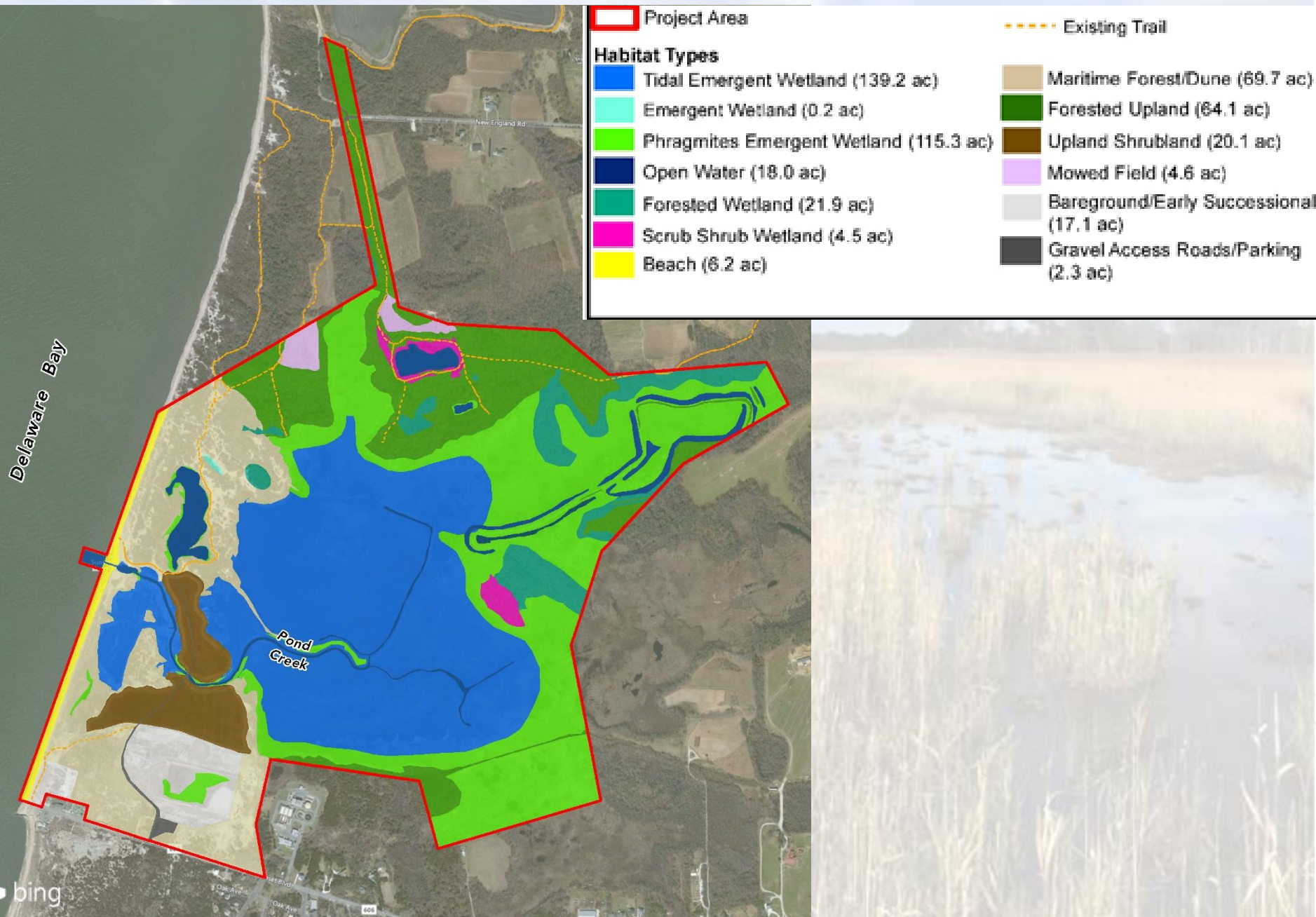
- Freshwater: < 0.5 ppt
- Brackish: 5-18 ppt
- Saltwater: 30-40 ppt

Marsh ranged from 2.9 to 37 ppt

Phragmites occurs up to 18 ppt



Existing Conditions



Proposed Conditions with Recreational Features



Monitoring and Assessment – Reference Marsh Bio-Benchmark Approach

Informs post restoration monitoring, engineering and regulatory/permitting requirements



Sediment/Soil Characterization:

- Guide design – Physical/chemical characterization
- Support regulatory review - Permit approvals

Habitat/Ecological Assessment:

- Guide design - Establish footprint/minimize disturbance
- Support regulatory review - establish wetlands, habitat, plant communities and T& E
- Monitoring - Quantify baseline species diversity/abundance

Floristic Quality Assessment/Evaluation of Planned Wetlands:

- Support regulatory review - Quantify proposed ecological uplift
- Monitoring – Quantify baseline wetland and ecological function for monitoring uplift

Hydrology, Hydraulics, & Hydrodynamics:

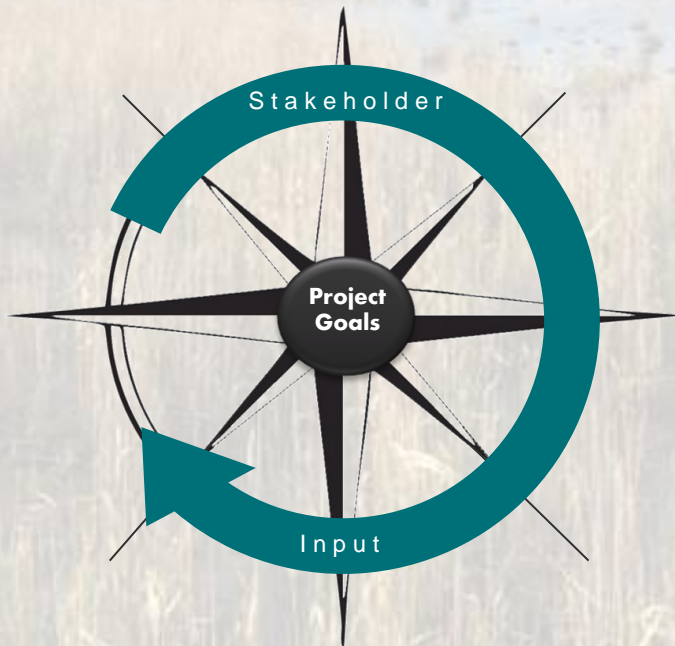
- Guide design – Size inlet opening and tidal channels, berm, and water control structures
- Support regulatory review - Verify project/exposure to tide does not increase flood risk

Permitting Requirements – All have received regulatory agency approvals!

Stakeholder Collaboration and Public Outreach

Intense Technical Coordination and Collaboration: Over 40 meetings and numerous conference calls and discussions over 5 years

- Define target wildlife and habitat needs
- Define target vegetative communities
- Define recreational use elements



Federal

- US Army Corps of Engineers
- US Fish and Wildlife Service
- NOAA National Marine Fisheries Service
- United States Department of Agriculture - Cape May Plant Materials Center

State

- NJDEP Div of Fish and Wildlife Bureau of Land Management
- NJDEP Div of Fish and Wildlife Endangered and Nongame Species Program
- NJDEP Historic Preservation Office
- NJDEP Office of Dredging and Sediment Technology
- NJDEP Division of Land Use Management
- NJDEP Division of Solid and Hazardous Waste
- NJDOT Office of Maritime Resources

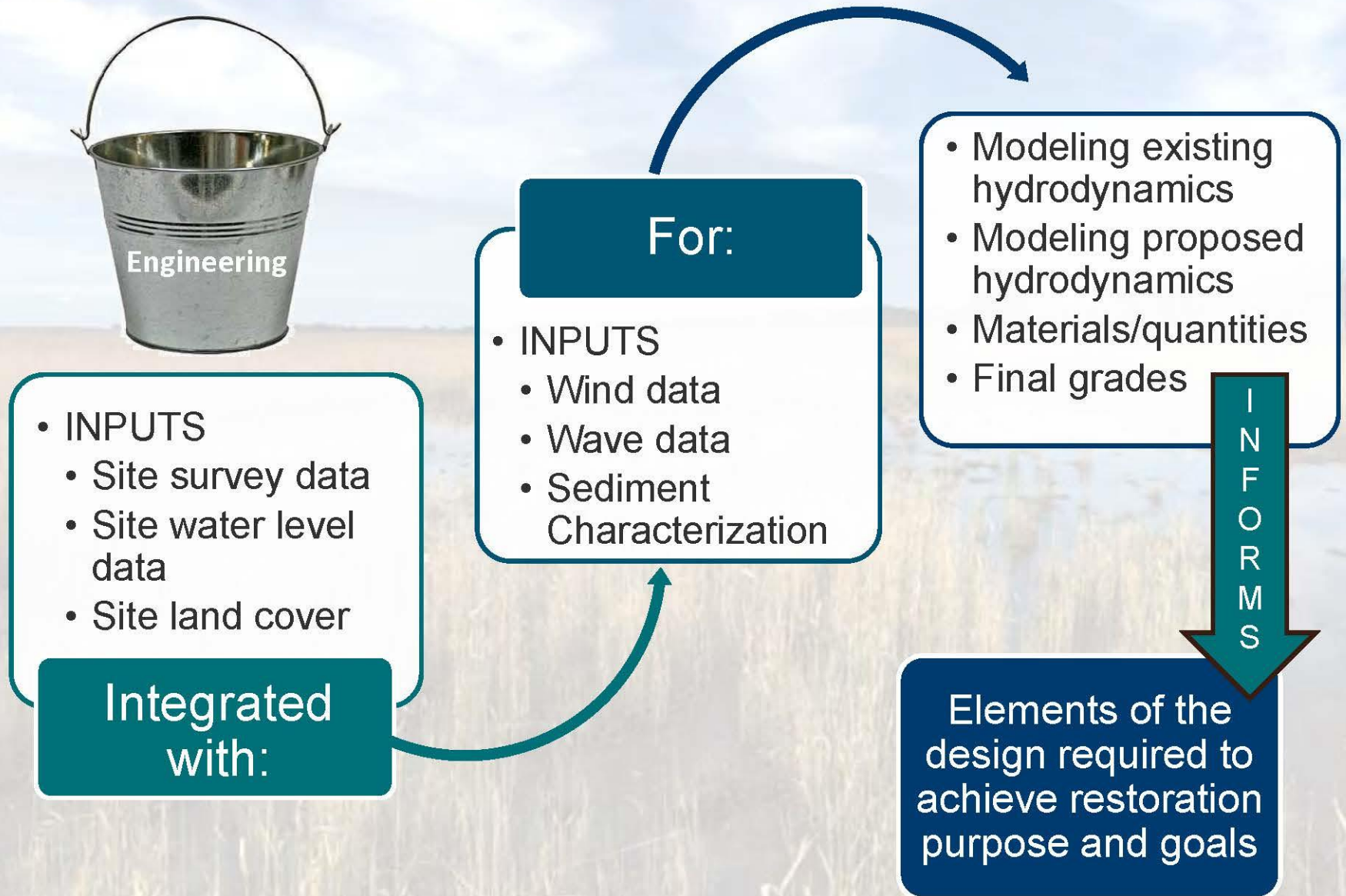
Local

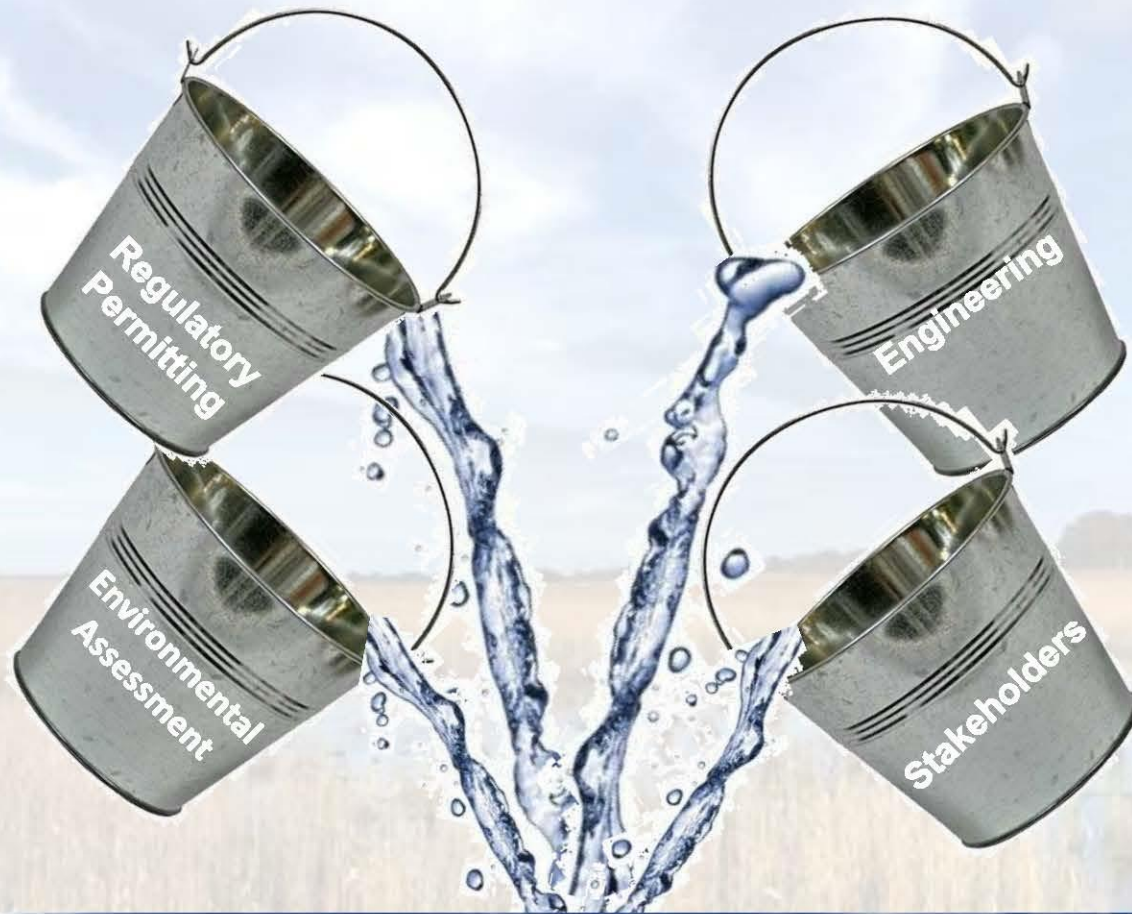
- Cape May County Department of Mosquito Control
- Cape May Point, W. Cape May, Cape May City, Lower Twp., CM Cnty
- Cape Atlantic Soil Conservation District

Other Stakeholders

- The Nature Conservancy
- NJ Audubon
- Ducks Unlimited
- The Wetlands Institute
- Members of the Local Birding Community
- Adjacent Landowners
- Universities w/research interests – Rutgers, Stockton, Stevens

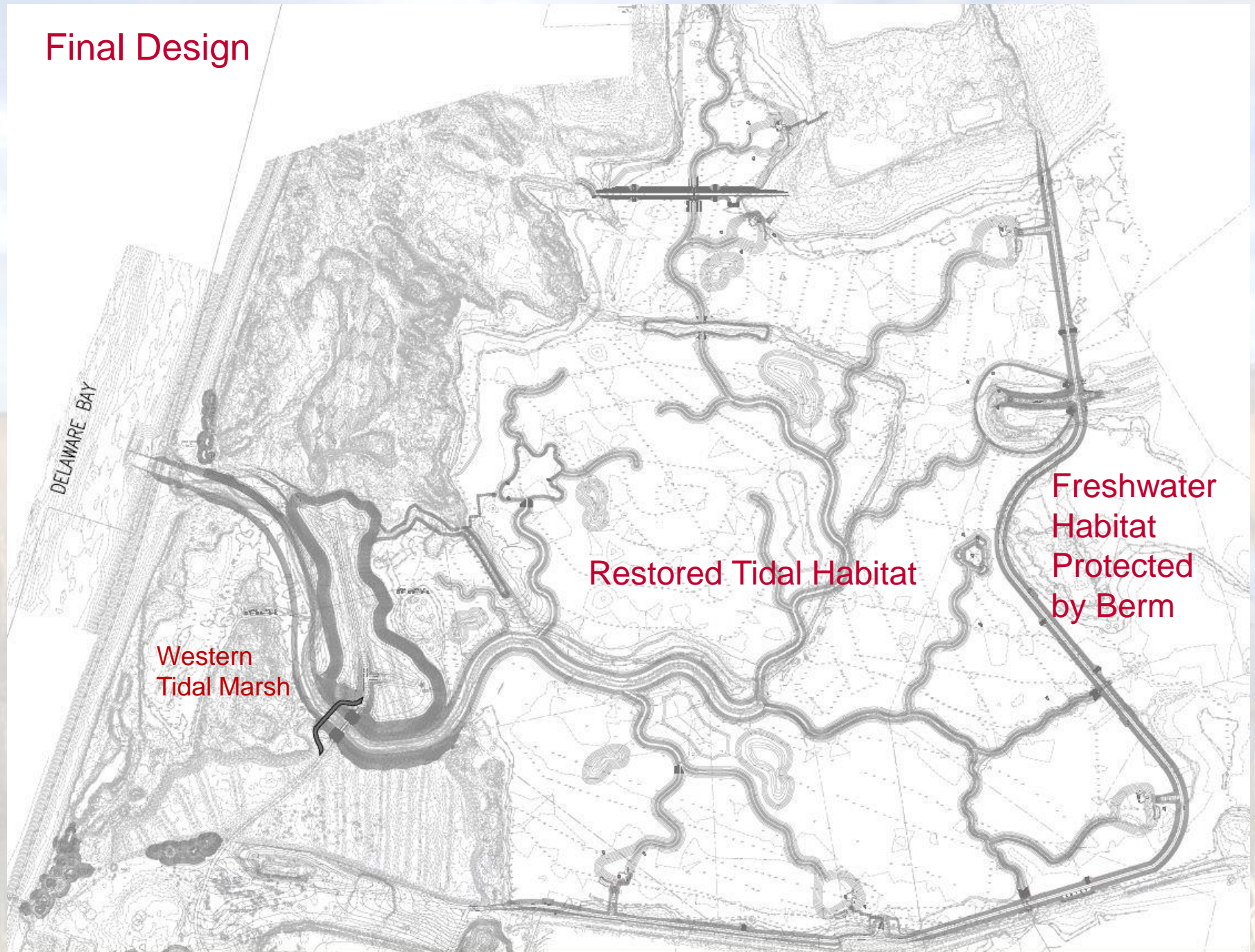
Using Physical and Hydraulic Data to Inform the Design



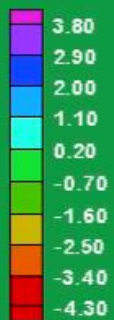


FINAL DESIGN

Final Design

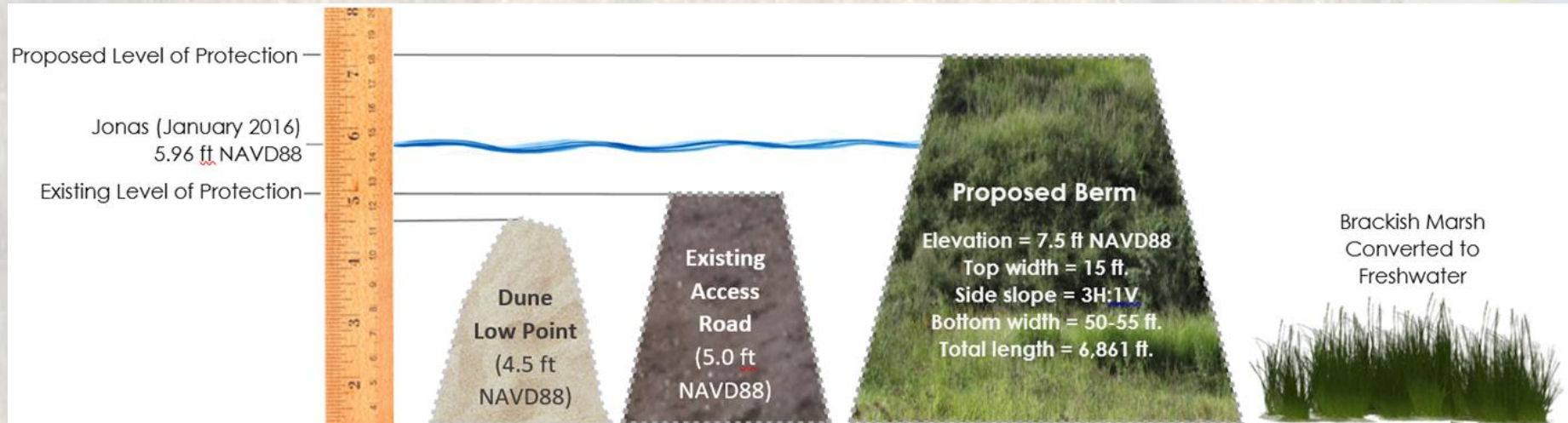
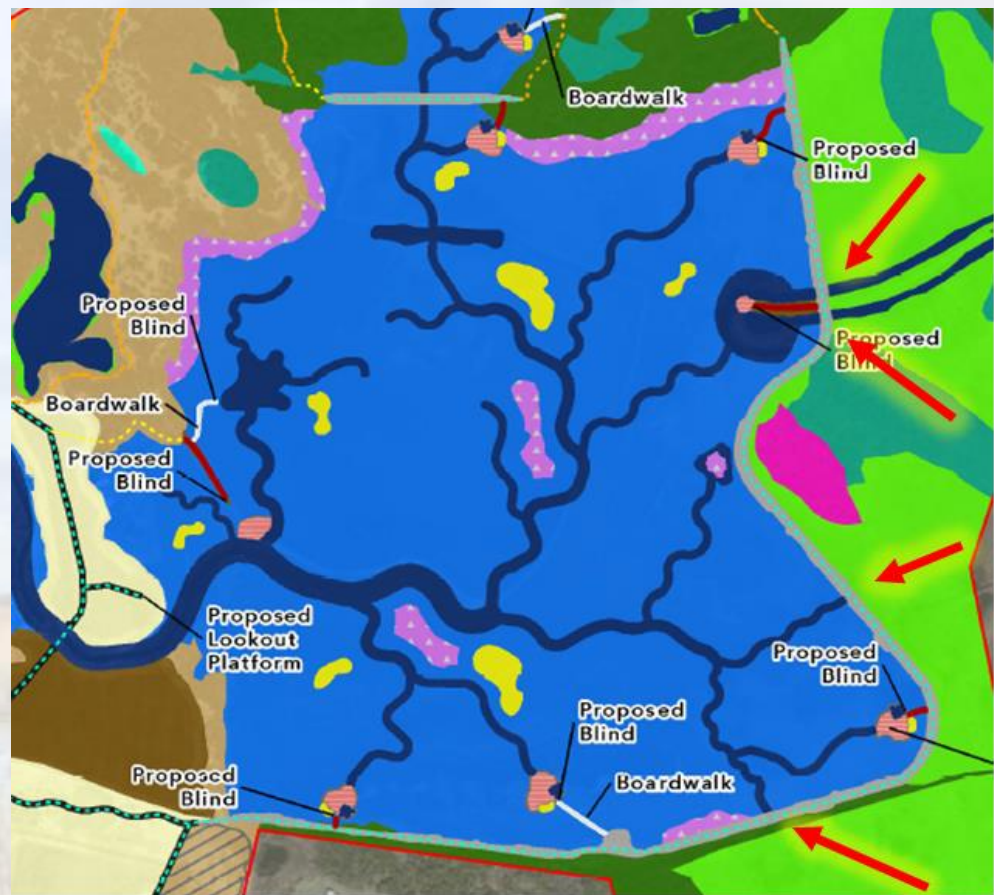
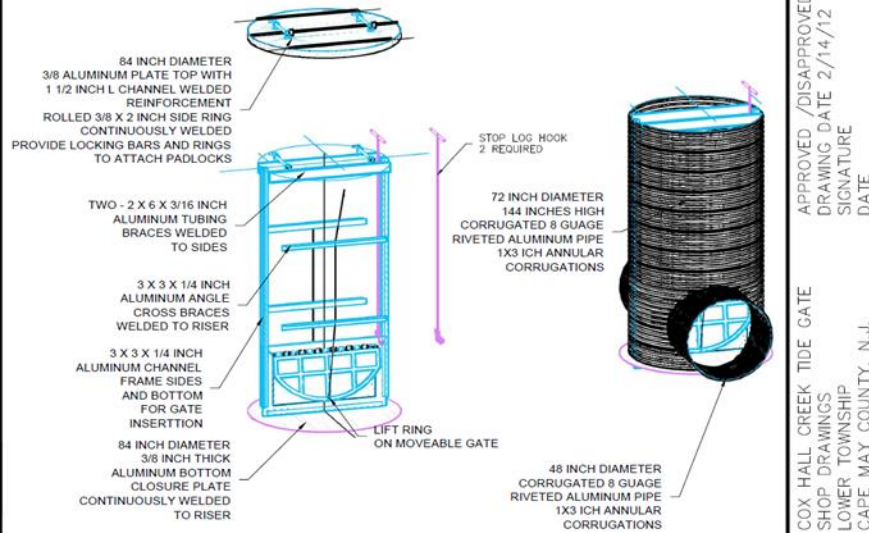


Water Surface Elevation (NAVD88, feet)



Flood Risk Reduction

SHEET 1 ISOMETRIC VIEW
SCALE 1/4"=1 FOOT



Uplands Restoration



FORMER MAGNESITE PLANT SITE LOOKING NORTH ACROSS SUNSET BLVD. FROM TOWER

Old Field Meadow & Maritime Forest

**A good use for excavated marsh material.
90,000 Cubic Yards!**



Higbee Beach Wildlife Management Area

Interpretive/Educational Center Conceptual Design

June 30 2017



Recreational Elements

- Continuous trail network
- Wildlife viewing opportunities
- Based on stakeholder input and end-user needs

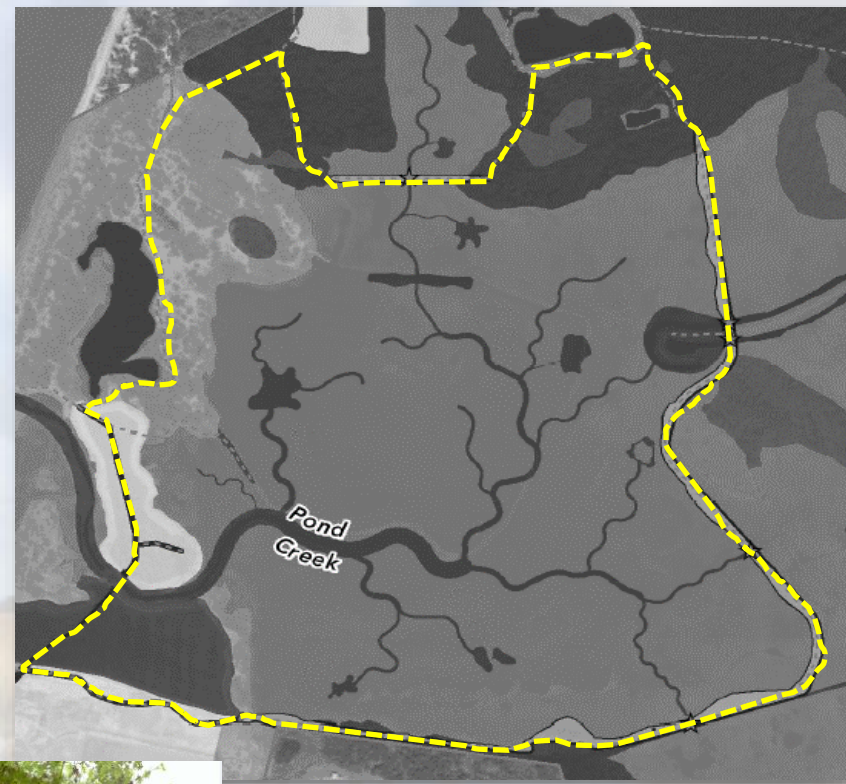
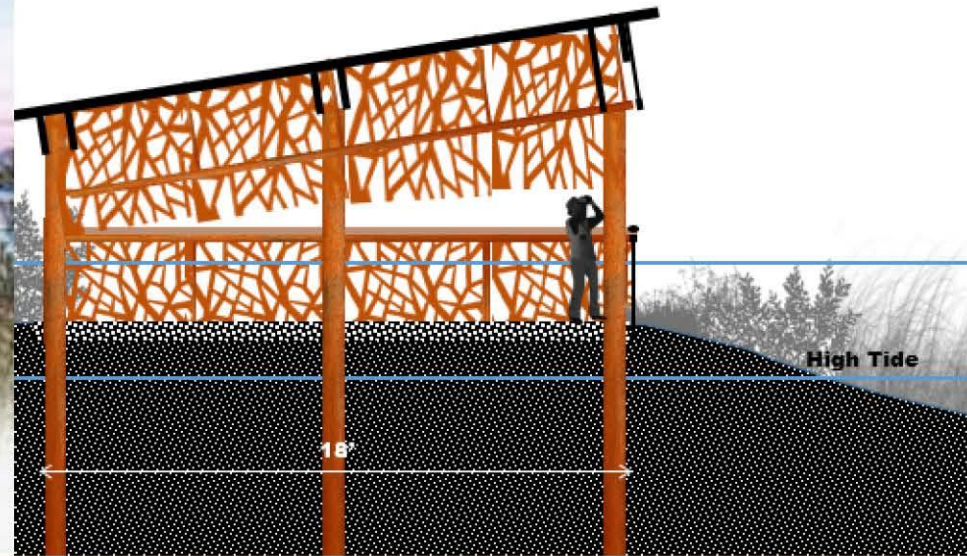


Image Source: Deborah Richie Communications (2015).



Higbee Beach WMA Restoration Project



Pond Creek Channel
Widened, free flowing channel reestablishes tidal regime to salt marsh.



Restored Tidal Marsh
Reestablish tidal regime to support native salt marsh habitat.



Shell Islands
Several islands designed for breeding colonies for shorebirds.



Bird Hide
Multiple birds hides established throughout the restored marsh will provide quality viewing opportunities.



Establishing Native Grassland
Placing amended soils on a former magnesite plant and capped landfill to support native grass and forbs that will benefit pollinators such as butterflies and bees and support grassland bird species.



Preserved Emergent and Forested Wetlands
Future invasive *Phragmites* management will promote reestablishment of native freshwater marsh flora.



**Tidal Inundation Protection/
Nature Trail**
An earthen berm will provide protection to the upper watershed from tidal inundation and allow access to restored habitats.



Future Education Center
Will provide education and research opportunities and interpretation of the site's history, ecology, and restoration.



Maritime Forest Restoration
Returning a portion of the former magnesite facility to its historic habitat.



New Jersey
Department of
Environmental
Protection

For further information or questions about the project please contact:

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THANK YOU

Slide content for this presentation provided by:
Louis Berger/WSP
NJ DEP, Office of Natural Resource Restoration

