Sustainable Remediation of Abandoned & Degraded Jack's Marina Site along Neshaminy Creek Croydon, Pennsylvania

Presented by:
Peg McBrien, P.E., PWS  Louis Berger

Co-Authors:
Lisa Magee, P.E.; Philadelphia Regional Port Authority (PRPA)
Sachin Apte, P.E. Louis Berger
Bethany Bearmore, P.E. Louis Berger
Jack’s Marina Compensatory Mitigation

Aerial View Prior to Remediation

- Mitigation for PRPA’s Southport Marine Terminal Project at former Philadelphia Navy Yards
- Louis Berger and AP Construction Design-Build
- Permits from Corps of Engineers, PADEP, PADCNR, Bucks County Cons. District and PA Fish & Boat Commission
Abandoned and Degraded Jack’s Marina Site

- 35 acre site
- Formerly dredged/filled for recreational marina
- Historically used as dumping ground
- Severely degraded since marina operations ceased in late 1990s.
- Purchased by PRPA for compensatory wetland mitigation
- Existing freshwater tidal wetlands contain invasive species
- Unsafe public access
Preliminary Field Investigations

Prior to construction

- Baseline design studies for habitat restoration
- Detailed soil characterization for on and off site disposal of historic fill and debris
- Plant and wildlife surveys
- Topographic, bathymetric surveys verification
- Permitting requirements for state, federal and local agencies
- Design/Build construction plans
Initial Clearing of Site – 2014

- Re-establishment - 11.52 acres tidal freshwater wetland
- Enhancement - 13.65 acres tidal wetland
- Establishment - 3.29 acres SAV in former boat basins
- Creation - 0.45 acres red belly turtle nesting habitat
- Creation - 4.26 acres upland buffer
Soil Erosion & Sediment Control Measures

- Protected existing wetlands with super silt fence
- Stabilized construction entrance for material disposal traffic
- Silt fence around perimeter of site boundary
- Installation of temporary sheet pile and turbidity barriers for water control during dredging
Rescuing Fish & Red Belly Turtles from Basins

- Threatened Species - Red Belly Turtles
- Fish relocated from work area during dewatering
- Extra care taken for native bird species relocation during construction
- Other wildlife carefully kept away from entering construction site
Excavation of waste/disposal

Piece of history uncovered

- Excavation and off-site disposal of 165,000 cubic yards of historic fill
- Max depth of excavation - 20 feet
- Uncovered newspapers dating back to 1947
- Advanced mechanical separators to separate out tires, concrete, metal, wood, and other debris for off-site disposal
- Clean on-site soil used to create design topography
- One location with benzo-a-pyrene exceeded clean fill criteria
Benzo-a-pyrene excavation/disposal

- Benzo-a-pyrene area isolated during construction
- Detailed sampling protocol using delineation ring implemented to define extent of contamination
- Contaminated material carefully excavated and incorporated within upland berms with minimum of 4 feet of cover
- Berm slopes and height designed to fit surrounding topography and accommodate maximum amount of allowable material
- Erosion control matting placed along berm slopes
South Basin Construction

- Excavation and grading of the south basin
- PADEP site visit to inspect construction progress
- Surveyor collecting as-built grades information
Refurbished public access trail

- Former trail to fishing pier refurbished
- Fishing pier completely reconstructed
- Walkway provides access for emergency vehicles with turnaround area
- Provides expansive views of restored & enhanced wetlands
Rebuilt fishing pier platform

Enhancing the waterfront

- Structural analysis performed to develop cost effective pier design
- ADA compliant path and pier access
- Low maintenance metal fence provided around fishing pier
- Provides views of south basin, turtle nesting habitat and wetland
Upland Slope Construction

- Excavation and Grading of upland slope
- North basin grading to create more open water
- Dewatering for north basin to excavate perimeter grades
Installation of E&S measures & turtle basking structures

- Enhancing turtle habitat in deepened and widened south basin
- Excavation around south basin slope for reconnecting restored and existing wetlands
- Wildlife returning to project site during construction
- Upland slope erosion control matting and seeding operation
Planting intertidal wetland & scrub shrub vegetation

- Spatterdock planted from elevation 0 to 2
- Pickerelweed, Sweetflag, Taperleaf water horehound and duck potato from elevation 2.0 to 3.5
- Black willow, smooth alder and buttonbush from elevation 3.5 to 4.0
Permitting Agencies monitor compliance

Project found to be compliant

- USACOE, PADEP And PRPA site visits to monitor progress
- Agency representatives walked entire site with keen interest in latest updates to schedules
- Coordination meetings to tackle key issues during construction progress
State Endangered Species

- Sand brought in for red belly turtle nesting habitat
- Rip-rap stone protection for nesting mounds
- Osprey nest platform installation
- Submerged aquatic vegetation transplanted from Southport impact site to Jack’s Marina mitigation site
Wetlands in Context

Wetlands are shallow, wet areas that are home to thousands of species of animals and plants. Wetlands are like natural sponges. They help prevent flooding by absorbing extra stormwater that flows down from our built environment, filtering it before it flows out to our waterways.

People used to think wetland were wastelands. They plowed them so they could build in that area. This practice destroyed almost half of the wetlands in the lower 48 states.

Today we know how critical it is to restore and preserve wetlands. They clean our water, help control flooding and provide important habitats for plants and animals. Over one third of the endangered and threatened plants in the U.S. can be found in wetlands.

Jack’s Marina is an example of a restored tidal freshwater wetland. The wetland basin, with its plants and animals, helps clean and protect the Delaware River watershed.

Interpretive & Warning Signs

- Interpretive signage designed by SALT Design Studio
- Warning sign of shallow obstructions at south basin for boaters

The Philadelphia Regional Port Authority (PRPA) is building a new marine terminal at the former Philadelphia Navy Yard on the Delaware River. The development of the new terminal, Southport Marine Terminal, will displace terrestrial wetland and shallow water habitats.

Jack’s Marina, a 26-acre degraded wetland area in Bucks County, at the confluence of the Delaware River and Nechaminy Creek, was purchased by PRPA and restored to balance the loss of wetland habitat at Southport.

The restoration of Jack’s Marina involved creation of intertidal and subtidal habitats, removal and management of invasive species, establishment of underwater plants, shoreline stabilization, and creation of habitat for redhotties.
Site status Fall 2014

Site construction complete

- All excavation/disposal and slope stabilization complete
- Erosion control measures in place before winter season
Spring 2015 site monitoring

- Site withstood harsh winter season
- Remaining planting and slope stabilization completed in spring 2015
- 5 years of performance monitoring initiated per permit requirements
Fall 2015 Monitoring

- Adequate hydrology present
- Observations of wildlife including painted turtles, redbelly turtles, bald eagles, egrets, and shore birds
- Site is slowly establishing diverse population of native vegetation
- Cover by invasive plants will be monitored and maintained to keep percent cover low
- Site will be transferred to Neshaminy Creek State park system in ~2020
Questions?