RESTORING URBAN SALT MARSHES – 10 YEARS OF LESSONS LEARNED

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Where are the Meadowlands?
What makes the Meadowlands unique? *(It's not just that Jimmy Hoffa might be buried there!)*

- Largest greenspace / urban wilderness in NYC area
- 3,400 ha (8,400 ac) or 40% of the NJMC District comprised of wetlands and waterways including the Hackensack River
- Ecologically degraded - dominated by *Phragmites australis*
- Hydrologically disturbed - dikes, ditches, tide gates
- Significant contamination - 520 ha (1,300 ac) of landfills, >130 contaminated sites
- Intense transportation infrastructure; large existing developments; intense development pressure
- Supports ~ 250 bird, 60 fish and 23 invertebrate species including 21 threatened or endangered species
- Active wetland restoration/enhancement program
A Decade of Wetland Restoration

- 1999 - Marsh Resources, Inc. (MRI) Phase 1 constructed
- 2001 - MRI Phase 2 constructed
- 2007 – Secaucus H.S. Marsh constructed
- 2009? – Kane Mitigation Bank to be constructed
MRI 1, Design/Construction Challenges (1997-1999)
Restoration Plan

- Remove fill placed during construction of NJ Turnpike
- Remove invasive species (*Phragmites*) that dominated the site
- Enhance hydrology to allow for twice-daily tidal inundation
- Revegetate with native salt marsh species
- Create adjacent wooded upland habitats
- Provide tidal low marsh dominated by *Spartina alterniflora* (salt water cordgrass), diversely vegetated tidal high marsh, scrub-shrub wetlands, mudflat and meandering tidal streams
- Provide better fish and wildlife habitat, and increased opportunities for wetland research, passive recreation and public enjoyment
Site was flooded; Channels and Marsh were DREDGED
Dredged Material Pumped to Create Upland Islands
Site drained for planting
Plants Thrived
10 Years Post-Construction

Site is functioning well

ongoing maintenance required
MRI Bank, Phases 1 and 2
(206 acres)

Legend:
- Low Marsh
- High Marsh
- Uplands
- Open Water
Channel and Marsh constructed with excavators, working around the tide
MRI Phase 2
(pre and post construction)
Six Years after Construction and Planting

In 2006, MRI received regulatory agency concurrence that both phases of the Bank successfully met all performance standards, thereby releasing for sale all mitigation credits.
SECAUCUS H.S. WETLAND ENHANCEMENT SITE
2005 - 2007
Project Location

- We even made the Sopranos final episode trailer.  
  http://www.youtube.com/watch?v=B8lHGw4arsM&feature=related

- You can see the Williams towers in the background ½ way through. I would advise not listening to the sound, it is R rated.
PRE-CONSTRUCTION CONDITIONS
(note areas of unvegetated pools/soft soils)
In 2006, NJMC conducted borings to identify location and depth of problematic soils using hand-held Russian peat-borer. Multiple locations with unconsolidated mucky surficial soils were identified. Depth of these soils ranged from 3 inches to almost 3 feet.
Restoration Plan
Design/Construction Measures to Address Problematic Soils

- Timber mat road used so that crossing vehicle load < 2 lbs of bearing pressure per in\(^2\)

- Contractor (Dawson Corp) excavated marsh with one pass of heavy equipment. Once wetland and stream design grades were established, no heavy equipment

- In areas where muck was encountered, use of heavy equipment was avoided and/or minimized

- In areas with >100 ft\(^2\) of unsuitable planting substrate, design called for installation of coir fiber biomats to stabilize the area
Construction in “the dry”

To expedite construction, site was cut off from tide and constructed/planted in the dry

- Once cut off from the tide, the mucky areas dried sufficiently so that they ALL could be planted.
- One year after construction/planting, most of these mucky areas are heavily vegetated with desirable tidal marsh species.
Newly Constructed Tidal Channel
Planting low marsh while earthwork conducted in other parts of the site
One Year after Construction and Planting (August 2008)
Two Years after Construction and Planting
Secaucus Marsh Summary

- Mucky areas were restored to vegetated tidal marsh by design & construction methods
  - restricting tidal influence
  - using timber mats
  - limiting heavy equipment use

- Diverse tidal marsh is providing wildlife habitat, research opportunities and public enjoyment in urban area
Richard P. Kane Wetland Mitigation Bank (currently under design)

- Berms and tide gates prevent tidal flow to wetland
- Adjacent to NJ Turnpike
- Bisected by natural gas pipeline
- Surrounded by dense urban development
New Challenges at Kane

- Since the site has been cutoff from tidal influence, it has subsided and parts are too low to support salt marsh grasses.
- Two stream crossings of the gas pipeline are required to restore tidal hydrology.
- Adjacent properties were developed at low elevations; flooding must be prevented.
- AND
Miracle on the Hudson leads to....
Major Headache in the Meadowlands
Lessons Learned

- To manage *Phragmites* over a large site, eradication should be accomplished up front, both on the ground and in the design.
  - Excavation is more effective than dredging.
  - Excavation in the dry can improve the ability to construct the site.
  - Oversight of the construction by the designers is essential.
  - A 1-year plant guarantee should always be required.
  - Plant over-wintered material at the beginning of the growing season.
  - Place goose herbivory fencing immediately after plants are placed.
  - Over a large site, planting (rather than seeding) is much more successful.
  - Introduction of “Phragmites-free” soils can improve high marsh success.
  - Manage invasive species on a consistent and thorough basis, particularly providing a rapid response to new incursions.
Even after 10 years of successful restoration, there are always new obstacles to overcome in the Meadowlands!