



An Electronic Newsletter  
of EEA's Environmental  
Consulting Activities  
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EEA services include  
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*Environmental Consulting*

**INSIGHTS**

## **Wetlands Creation, Habitat Restoration** **Extreme Habitat Makeover: Bronx & Staten Island!**

*(printer friendly version uses Acrobat Reader)*

In its 1992 report, *Restoration of Aquatic Ecosystems*, the NRC (National Research Council) defined restoration as the "return of an ecosystem to a close approximation of its condition prior to disturbance." Further in the report, regarding wetland restoration, it states: "The term restoration means the reestablishment of predisturbance aquatic functions and related physical, chemical and biological characteristics. Restoration is ... a holistic process not achieved through the isolated manipulation of individual elements." Within the restoration model, there are branches that modify this definition. Creation and enhancement are two such branches that still restore habitat, but through different processes. Each "Before" habitat requires a custom made design to ensure a successful restoration. The "Before" may be very different habitats and functions than the "After", but a successful restoration can still be achieved. Our ecologists here at EEA want to let you know about two of these projects that are currently in progress. One is located within The Bronx Zoo and the other project lies within Fresh Kills Landfill in Staten Island (Richmond County).

### **The Bronx Zoo**

The Wildlife Conservation Society (WCS) is designing a Center for Global Conservation at the Bronx Zoo scheduled for opening Spring 2007. Led by [FX Fowle Architects](#), a NYC-based architectural, interior design and planning firm, the design for the WCS world headquarters was recently completed for the 40,000 square-foot office building and the surrounding landscape. The EEA ecology team was called in by [HM White Site Architects](#), an award winning landscape architectural and urban design firm on the team, to assist in the design of the wetland creation phase.

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EEA, Inc. –  
**Founded in 1979**

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*Upland community in the restoration area*

The goals for the wetland creation were multiple; to design a palustrine emergent wetland system to provide stormwater detention and water quality improvement, habitat enhancement and site beautification. This wetland system will be a prominent entry feature for the Global Conservation Hall and a well-traveled wildlife viewing area for visitors.

Currently, the existing footprint for the wetlands creation is a successional old field habitat with a mix of ornamentals and non-natives. Mowed lawn, hilly slopes rock outcrops and sparse trees characterize the project site classified as an Oak Tulip Forest by Reschke, 1990.



*Existing channel sections in restoration zone*



Meandering through this habitat is an existing stream channel that is redirected underground at isolated points with storm water control structures. Flamingo Pond, located in the southern section of the design footprint, lies at the mouth of this aquatic system.

EEA worked with the project team to create a design that would restore and enhance this aquatic habitat. A wet meadow with emergent wetland plants will be created along with three deep



***Waterfowl can be found easily in the Zoo!***



***Flamingo Pond***

pools within the new wetlands, situated strategically to be seen from the Exhibit Hall, terraces and walkways. Native plantings were carefully chosen to attract local wildlife by providing food and shelter to be compatible with the surrounding landscape, and to enhance the educational component of the wetland creation for park visitors.

### ***Inventory It!***

Members of EEA's Ecological Division began by investigating the existing hydrological conditions, wetland and upland communities, soil properties, and storm water system. The analysis of existing conditions is a key step that must be completed first in any design. After this data was analyzed, preliminary designs were formulated for the type and size of both aquatic and upland communities to be created or enhanced. Once HM White's design incorporated our data, EEA reviewed and modified all design details and specifications including plantings, soil amendments, hydrology, flood control measures, soil erosion, substrate stabilization, storm water collection & disposal, micro-habitat analysis and herbivory controls.



***Waterfowl make use of the adjacent uplands***

### ***What's Next...***

Once plans are finalized, it will be time to address the monitoring plan for the restoration. A Monitoring and Maintenance Plan is critical to both the short- and long-term success of any wetland restoration. Created wetlands may be more challenging to sustain during the early

stages of establishment. Monitoring consists of collecting ecological and physical data on the system. Plant health & growth, water level checks, water quality, disease control, wildlife observations and invasive species monitoring are documented. Adjustments are then made to the restoration to ensure continued achievement and successful completion of design performance criteria. The Maintenance Plan will focus on removal of trash and sediment accumulation, particularly around storm water control devices, removal and replacement of dead plant material, long-term site stabilization and repairs/adjustments to all structures as needed.

## Fresh Kills Landfill Wetlands Creation



*Spartina planting begins*

In 1996, Governor Pataki and then NYC Mayor Giuliani jointly announced the plan to close Fresh Kills Landfill in Staten Island. By March 2001, NYC's last solid waste disposal facility was closed. Thereafter, the Department of Sanitation of New York City (DSNY) issued a Solid Waste Management Plan Modification that, among other things, called for the development of a truck-to-rail-facility for Staten Island waste on a site within the Fresh Kills Landfill. An existing rail line was proposed to be extended to reach the new facility and rail yard. The Staten Island Transfer Station has been constructed and is expected to begin operation once the rail connections have been completed.

EEA was called in by the Lead Project Engineering Firm, [HDR, Inc.](#) to address the tidal wetlands issues in the project area and find solutions. HDR is a world-wide architectural, engineering and consulting firm with a reputation for finding innovative engineering solutions. They continue to work closely with DSNY to address solid waste management solutions.



*Elevations are repeatedly taken when crafting tidal wetlands*



*Restoration footprint*



*The area is graded to create tidal habitat zones*

EEA was contracted to conduct an ecological assessment of the affected footprint, design the wetlands, write the specifications for the construction bid, oversee the construction phase, and develop a monitoring and maintenance plan to conform to NYSDEC guidelines. The loss of tidal wetlands resulting from the rail crossing, stormwater outfall apron and erosion control material was mitigated with a wetland creation project adjacent to the site. A 4.5 to 1 ratio was established for the wetlands (for every 1 acre of wetlands lost, 4.5 acres of wetlands are created). The planting phase has begun and will continue in the Spring

of 2006. A little over three acres of tidal wetlands and adjacent uplands will be created.



*Data collection is key to monitoring wetland success before, during and after restoration.*



*Nearshore tidal plantings, wildfowl exclusion barrier in place*

### **Inventory It!**

EEA performed the ecological assessment first, to gather all baseline data on botany, wildlife and habitat characteristics. Alternative wetland creation sites were also investigated by the ecology team within the vicinity of the proposed project. A wetland delineation was conducted and a wetlands line was flagged for future surveying into the design plans. Once the baseline data was processed and analyzed, EEA ecologists worked with HDR to design the wetland creation habitat. The design was submitted with overall project plans to the NYS Department of Environmental Conservation (NYSDEC) for review and approval. Permitting from all Federal, State and local agencies was obtained to progress toward the construction phase of the project.

During the construction phase of the project, EEA's tasks included:

- Review the ecology-related tasks within the Construction Bid Document
- Develop the Seeding and Landscaping Plan and Specifications for the wetland excavation area
- Develop the specifications for the waterfowl exclusion devices
- Develop the specifications for sediment and erosion control
- Coordinate with the Resident Engineer on shop drawings
- Cost analysis for bioengineering and planting tasks
- On-site inspection of wetland plants/soil erosion materials upon arrival
- Management of time-sensitive ecological tasks and materials
- Plant Installation Oversight



*Transfer Facility Building  
is complete*

- Pre- and post-construction monitoring of wetland plantings
  - according to NYSDEC guidelines
- Continued monitoring of erosion control, waterfowl exclusion
- Soil testing as needed for planting suitability



*Transect analysis in planting zone*

EEA's HazMat Team was brought in to review existing subsurface data and perform a subsurface profile of the wetland creation footprint. Test pits were developed across the site for this gross characterization of the soil profile. Results were used to support plant selections and engineering tasks.

### **What's Next...**

EEA will continue to monitor the planting phase as scheduled. The project's Monitoring and Maintenance Plan will be in place once construction is completed. NYSDEC will assist the project team to ensure a thriving and successful wetlands.



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