HABITAT RESTORATION AND WATER QUALITY IMPROVEMENT

Two Environmental Benefit Projects within the Long Island Sound Watershed

David Kvinge, AICP, ASLA, CFM
Director of Environmental Planning
## Major Drainage Basins

<table>
<thead>
<tr>
<th>NAME</th>
<th>SQ. MILES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Croton River</td>
<td>183</td>
</tr>
<tr>
<td>Pocantico and Saw Mill Rivers</td>
<td>67</td>
</tr>
<tr>
<td>Coastal LI Sound</td>
<td>65</td>
</tr>
<tr>
<td>Bronx River</td>
<td>48</td>
</tr>
<tr>
<td>Inland LI Sound</td>
<td>45</td>
</tr>
<tr>
<td>Peekskill and Haverstraw Bay</td>
<td>43</td>
</tr>
</tbody>
</table>

**GIS Interactive Mapper**
Coastal Long Island Sound Watershed

14 municipalities, LISWIC

Mamaroneck River
Sheldrake River
Blind Brook
Hutchinson River

Largely dense suburban and urban development, transportation systems
Coastal Long Island Sound Watershed

14 municipalities, LISWIC

Mamaroneck River
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Largely dense suburban and urban development, transportation systems
Watershed Planning

The County has expertise in working with watershed municipalities to develop watershed plans with specific recommendations for action. This makes it easier to obtain grant funding for project implementation.
Stormwater Management Modeling Tool Prepared By HDR/HydroQual

HDR/HydroQual Report (09/30/10) at:
Westchester County Stormwater Retrofit Program

In partnership with County Soil and Water Conservation District
Manursing Lake
Manursing Lake


Feasibility Study: Save the Sound (2003)


WCDP Sends Partnership Letter to ACOE (2005)

WCDP Awarded Grants for Project from NYSDEC and NFWF (2007)

Environmental Benefit Project (Consent Order) (2008/2009)
Manursing Lake

Project Funding:
$190,000 Grant (National Fish and Wildlife Foundation)

$400,000 Grant (New York Department of Environmental Conservation)

$500,000 (Westchester County Capital Funding)

$300,000 (Westchester County Capital Funding, Consent Order)
Manursing Lake

Phases:

1. Replacement of Manually Operated Tide Gate with Automatically Operated Tide Gate to Control Tidal Flow and Lake Water Elevation (Completed October 2009)

2. Restoration and Creation of Tidal Wetlands (Low and High Salt Marsh), Tidal Creek, and Coastal Buffer (Completed summer 2010)
Manursing Lake
Automatic Tide Gate
Manursing Lake
Automatic Tide Gate

DURING CONSTRUCTION

Coffer dam,
replacement of manual tide gate
with automatic gate
Manursing Lake
Automatic Tide Gate
Manursing Lake
Automatic Tide Gate
Manursing Lake
Planting Plan
Manursing Lake
Tidal Marsh Restoration

BEFORE

Degraded tidal zone, erosion, dominated by invasive reed
Manursing Lake
Tidal Marsh Restoration

DURING CONSTRUCTION

Silt boom, coir logs and mats, invasive plant removal, regrading
Manursing Lake
Tidal Marsh Restoration

DURING CONSTRUCTION

Silt boom, coir logs and mats, invasive plant removal, regrading
Manursing Lake
Tidal Marsh Restoration

DURING CONSTRUCTION
Sand base, plugs, goose fencing and waterfowl flagging
Manursing Lake
Tidal Marsh Restoration

DURING CONSTRUCTION
Sand base, plugs, goose fencing and waterfowl flagging
Manursing Lake
Tidal Marsh Restoration

AFTER CONSTRUCTION

Increased tidal flushing, tidal grasses establish, greater diversity of aquatic organisms
Manursing Lake
Tidal Marsh Restoration

AFTER CONSTRUCTION

Increased tidal flushing, tidal grasses establish, greater diversity of aquatic organisms
Manursing Lake
Tidal Marsh Restoration
Mamaroneck River at Saxon Woods
Mamaroneck River at Saxon Woods – Planting Plan
Mamaroneck River at Saxon Woods – Planting Plan
Mamaroneck River at Saxon Woods – Planting Plan
Mamaroneck River at Saxon Woods – Invasive Plants
Mamaroneck River at Saxon Woods – Invasive Plants
Mamaroneck River at
Saxon Woods – Streambank Erosion
Mamaroneck River at Saxon Woods – Invasive Plant Removal
Mamaroneck River at Saxon Woods – Invasive Plant Removal
Mamaroneck River at Saxon Woods – Invasive Plant Removal
Mamaroneck River at Saxon Woods – Invasive Plant Removal
Mamaroneck River at Saxon Woods — Fine Grading
Mamaroneck River at Saxon Woods – Hydroseeding
Mamaroneck River at Saxon Woods – Replanting
Mamaroneck River at Saxon Woods – Replanting, Bank Armor
Mamaroneck River at Saxon Woods — Replanting, Bank Armor
Mamaroneck River at Saxon Woods – After
Mamaroneck River at Saxon Woods – After
Mamaroneck River at Saxon Woods – After
Mamaroneck River at Saxon Woods – After
Educational Signage

The County promotes the projects, methods and techniques used through its website and educational signage at the sites (sample signage shown below).

What is an aquatic buffer?
Aquatic buffers are vegetated strips alongside a stream, pond, lake or wetland. They provide a transition between water resources and adjoining land uses and help filter pollutants from entering the water.

What are the functions of aquatic buffers?
- Water Quality Protection
- Groundwater Recharge and Protection
- Flood Control
- Streambank Stabilization

What materials do you use to restore a stream buffer?
- Coarse fiber (made from reclaimed wood) is used to help prevent erosion and hold in nutrients for the new plants. At left is a coir mat used to stabilize a streambank and at right is a coir “bag” along a pond edge.

What plants should you use?
Native plants should be chosen including trees, shrubs, and herbaceous species. Some examples include black-eyed susan, cardinal flower and buttercup (planted above).

How do you restore an aquatic buffer?
Different phases of restoring an aquatic buffer are shown above such as re-grading the streambank and planting the buffer through a coir mat.

How do you find out more?
Contact your local Soil and Water Conservation District (www.westchestergov.com/waterquality) or the USDA-Natural Resources Conservation Service (www.nrcs.usda.gov).
Educational Signage

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What are salt marshes?
Salt marshes are transitional areas between land and water that occur along the shores of estuaries (where fresh water from rivers meets salt water from the ocean) like Long Island Sound.

Why are salt marshes important?
Salt marshes are one of the most biologically productive ecosystems on earth, comparable to tropical rain forests and coral reefs. Salt marshes are essential habitat for marine life and birds found in and around Long Island Sound, including many of the fish and shellfish that support commercial and recreational fishing. These are just some of the reasons why wetlands should be protected and restored.

Functions of a salt marsh
Many species depend on salt marsh habitats for different purposes.

Nursery
Many fish and shellfish as well as beneficial insects and birds, lay their eggs in salt marshes, since marshes are calmer than open water, have good hiding places, and have lots of food and nutrients for their young.

Fast Food Restaurant
Many small animals live in salt marshes including snails, shrimp, insects, and fiddler crabs. Many migratory birds feed on these high protein critters, when traveling through the area, just as we might stop at a fast food restaurant on the highway, birds see the marsh as a fast food pit stop. Once the birds have had their fill, they continue on their long flight.

Nesting
Several species of migrant and resident bird populations nest in and around marshes. Species that utilize the area depend on the low marsh and open water for food.

Additional functions
A salt marsh provides many other important benefits including:

- Improving water quality by absorbing excess nutrients and other pollutants that originate from surrounding land uses. As rainfall runs off the land (called stormwater runoff) into Long Island Sound, the salt marsh catches sediment and filters pollutants.

- Protecting shorelines against erosion by stabilizing the soil and absorbing the energy of waves during coastal storms.

- Providing recreational opportunities for fishing, boating, and bird-watching.

- Providing educational opportunities to learn about the environment and observe it firsthand.
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www.westchestergov.com/restoration

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