

VI. USING THE OLYMPIC PROGRAM FOR ENVIRONMENTAL ENHANCEMENT

Many projects fail environmentally because the fundamental criteria of ecological enhancement – energy flow, material cycles, natural systems development, and biodiversity – are not integrated into the planning process from the onset. This can readily be avoided in the Olympic rowing program if specific ecological enhancement goals for the watershed, park, and lakes permeate the planning and design process.

The specific steps that will be necessary include addressing the size of wetlands and their drainage areas, as well as the functional capacities and biological diversity of wetland and upland habitat and buffers. Details such as the richness of the soil in the watershed must be addressed, since upland soils in and around Flushing Meadows are presently depauperate. The opposite problem exists in and around the lakes, where the nutrient rich sediments degrade the aesthetic and ecological value of the water bodies. Park and lake design will have to take a new turn, since the pastoral smooth curves of the great 19th century parks do not generally work ecologically, and probably cannot work in Flushing Meadows. Floating garbage cannot continue to be an acceptable by-product of stormwater catchment. Nor can public exclusion from the quiet, naturalizing landscape around Willow Lake remain an acceptable land use. We learn best through encounters with what is close to our day-to-day lives, and in this context the NYC2012 proposal should join forces with educational interests – from grammar schools, to colleges, to museums of science – to realize and enhance the learning potential of what we have made of Flushing Meadows.

Given the intrinsic aim of producing an ecologically sustainable, low nutrient water body surrounded by a mosaic of native plant communities, soil buffers, and biologically diverse, productive wetlands, there is no essential conflict between the goals of NYC2012 and environmental quality. In fact, in this instance, given the history of landfill and ash dumping, as well as the high nutrient sediments at lake bottom left from thousands of years of marsh growth, there are many potentially fruitful restoration steps and enhancement scenarios which could increase biological diversity and ecosystem services that are only likely to be taken with the kinds of funds available for developing the park for Olympic use.

Opportunities and constraints are best evaluated in the context of prior impacts on Flushing Meadows. The hydrology of the area was entirely changed prior to construction of the World's Fairs. Robert Moses himself may be said to have increased the hydroperiod, or the amount of time water was held on the site prior to discharge into Flushing Bay, by creating Willow and Meadow Lakes. These lakes were designed to receive and hold stormwater runoff from the Grand Central Parkway and are scaled such that they keep water on the site for an average of about two- to two-and-a-half months.

While such water retention goals are often worthy, in this case it was not connected to a means for enhancing the ecology of the area in terms of size or structural diversity of wetlands. Potentials for beneficial changes are thus enormous, since the stormwater spends minimal time on the land, and the lakes and surrounding landscape are simple structures not designed to increase contact between pollutants and natural filters. In this context, were it to be conceived and executed according to strict performance criteria, the Olympic proposal would represent the largest and best potential investment in the ecology of Flushing Meadows on the horizon.



The Olympic Rowing proposal

The design of the 2,000-meter rowing course proposed for use during the Olympic Games has been environmentally engineered by the Gaia Institute to more than quadruple the acreage of productive wetlands and dramatically expand natural habitats. In order to be used for competition, the lakes must also be deepened below the racing lanes to a depth of 3.5 meters, and the necessary dredging will remove many of the nutrient-rich sediments that contribute to the poor water quality of the lakes today.

The Olympic Rowing proposal necessitates radical and dramatic water quality improvements at several levels. Local and regional interests support the conservation of valuable habitat and the elimination of fish kills and odors in the Twin Lakes and their surroundings. The U.S. and International Olympic Committee are increasingly committed and demanding of real, as opposed to apparent, environmental quality standards. World-class athletes in rowing also bring their own high standards, which are not likely to be met by the lakes in their present condition. In the past, water quality has been momentarily improved with short term chemical treatments, as was done to improve the appearance of the water for the 1964 World's Fair, or by high powered bubblers to oxidize sediments as has been done for some prior Olympic rowing events. These approaches

do not produce sustainable improvements, and therefore will not attain the legacy of permanent environmental quality enhancement sought by the International Olympic Committee.

Finally, the increased recreational use of the water is not inherently at odds with environmental enhancement. Rowing is in many ways a sport aimed at minimizing impacts: boat are designed with shallow draft and smooth skins to shear and glide over the very surface of the water with little wake. Trained rowers slice oars into water, and aim to eliminate turbulence and splash with each entry and return. Speed comes from quiet strokes, that leave the water as calm as possible. It is perhaps then not surprising that mergansers, buffle heads, black ducks, and rafts of brant, amongst others, are often within 50 meters of the sculls in Pelham Bay Lagoon. A number of the rowers here have even described this closeness to wildlife in Pelham Bay as one of the attractions of their sport here.

Incorporating Environmental Concerns

Below are specific techniques that can be incorporated into the NYC2012 proposal to ensure that it not only benefits the Olympic rowers, but the environment of the park as well. Many have already been incorporated into the preliminary design through the extensive input of the Gaia Institute.

Increasing wetland size

While the twin lakes hold water for two to three months before discharge into Flushing Bay, the roadways, paths, parking lots and lawns hold water minimally, discharging during or shortly following a storm event. For every acre of impervious area, a meadow with deep soil about a hundred feet long and thirty feet wide would be needed to capture, treat, and infiltrate the runoff. The shape, size, and depth could be varied to meet local aesthetic and land use patterns, but the scaling of catchment to runoff is necessary to reach performance criteria in ecological engineering, and, specifically, the ratio of runoff to catchment area provides the physical and geometric requirements for clean water production.

The twin lakes today are rimmed by about 15 acres of low diversity wetlands, which remove a substantial quantity of pollutants. The ring of common reed, however, is positioned to only intercept a limited proportion of flow into Willow Lake. The NYC2012 program, however, could expand the wetland areas substantially in both lakes, providing 80 to 90 acres, or increasing coverage by some 500%. Placed strategically to intercept runoff, this wetland buffer area would be sufficient to handle runoff from 1,250 acres of impervious surface – or at least 50% of the entire watershed. At the same time, soil buffers and wetlands could be positioned to intercept a much larger proportion of stormwater from the surrounding landscape. All of this can be physically accommodated along with the Olympic Rowing proposal.



Creating archipelagoes and wetlands in series

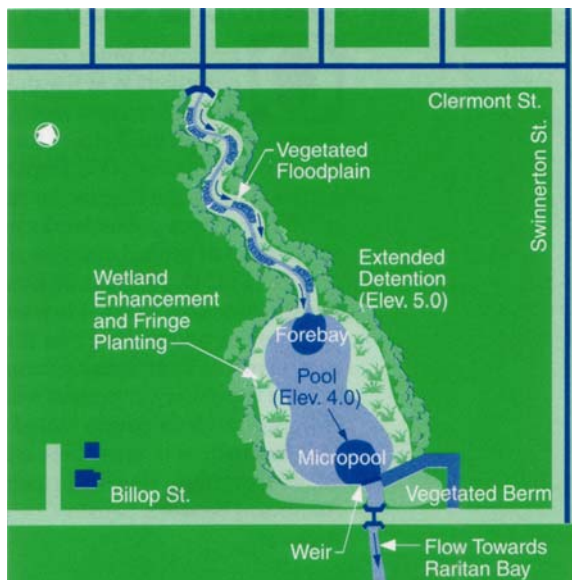
The Gaia Institute design framework for the rowing facility in Flushing Meadows incorporates an integrated mosaic of landscape and wetland features, including a series of spits of land, terraces, and soil berms creating multiple wetland cells. The land connecting and dividing these wet areas provides landscapes for groups of terrestrial plant communities, from sweet gum and red maple swamp forest to Atlantic white cedar pools, wild rice meadows, shrublands, and water lily ponds. Connecting the two lakes in this context can increase habitat types by coupling deep-water environments with a greatly increased number of shallow water and littoral habitat types.



By filtering stormwater through an alternating series, i.e., soils-wetlands-soils-wetlands-soils, the removal capacity of these systems is increased dramatically. Water passing through a single wetland prior to entering lakes and ponds has approximately 50–90% of nitrogen, heavy metals, and pathogens removed, depending on hydroperiod. The wetland series proposed in the NYC2012 plan would pass that same water through three to four cycles before allowing it to enter the twin lakes, removing approximately 90 to 99% of nitrogen, phosphorus, heavy metals, and pathogens. Removal rates are likely to be even higher as the natural systems develop in and around the wetland cells.

Daylighting stormwater pipes

Re-opening or daylighting the buried streams in underground pipes and culverts that channel water directly in the twin lakes will have two major benefits. First, it will allow nature to filter the water with plants, soil and sun. Second, it will allow the restoration of more natural landscape features, instead of the concrete bulkheads that grace Willow Lake today.



The typical stormwater pipes that dot the edge of Willow Lake today (above) could easily be replaced with a much more ecologically beneficial treatment. Stream, floodplain, and wetland restoration projects, such as the one proposed at Conference House Park on Staten Island (plan pictured at left) provide the most cost effective means of increasing environmental quality by creating habitat and protecting natural resources.

Enhancing wetland quality

In addition to increased filter area, the NYC2012 proposal could incorporate more efficient filters. By incorporating some of the existing *Phragmites* in more diverse wetland communities, replacing areas of invasive *Phragmites* monoculture with a mixture of native plantings, the structural diversity and habitat value of the wetlands will be substantially enhanced. Tree and shrub plantings should also increase the depth of the biogeochemical filter on this site. A literature review is presently underway to evaluate the contribution of structural diversity, soil diversity, and species diversity to biogeochemical filtration capacity.

Adding a humic layer

The NYC2012 proposal includes re-landscaping the park as a means of enhancing its aesthetic value and improving its sustainability. A new humus layer a foot and a half thick and the restoration of pore spaces in compacted subsoils would allow these below ground features to support ecosystem function. Infiltration capacity would likely increase from present negligible rates (0 to 1/2 inches of runoff per hour) to a foot per hour or more. While testing of existing soils will be required (and has been initiated) to accurately evaluate and predict results, the application of a humic layer over compacted urban fill has achieved similar results elsewhere in New York City and around the country.

Adding a fresh topsoil layer, like this one shown earlier, could bring the compacted soil around Meadow and Willow Lakes back into the ecosystem of the park, while also reducing flooding and enhancing biogeochemical filtration.



Contaminant removal through dredging

The NYC2012 proposal requires dredging to depths necessary to accommodate the 2,000-meter rowing competition. By removing sediments, the primary source of phosphorus will be removed. If layers of sediment-free sand lie beneath these, or if such a material is used to cap deeper sediments, this source of phosphorus for the lakes can be removed or greatly diminished. Tests of the exact depth of the nutrient-rich sediments, presence or availability of clean sand or another appropriate “capping” material, and ecologically sound methods for moving and removing sediments are critical elements in the solution to the undesirable eutrophic condition which prevails in the twin lakes today.



The cores from Willow Lake pictured above are 2.5” in diameter and 18” to 20” long.

Ecosystem growth and development

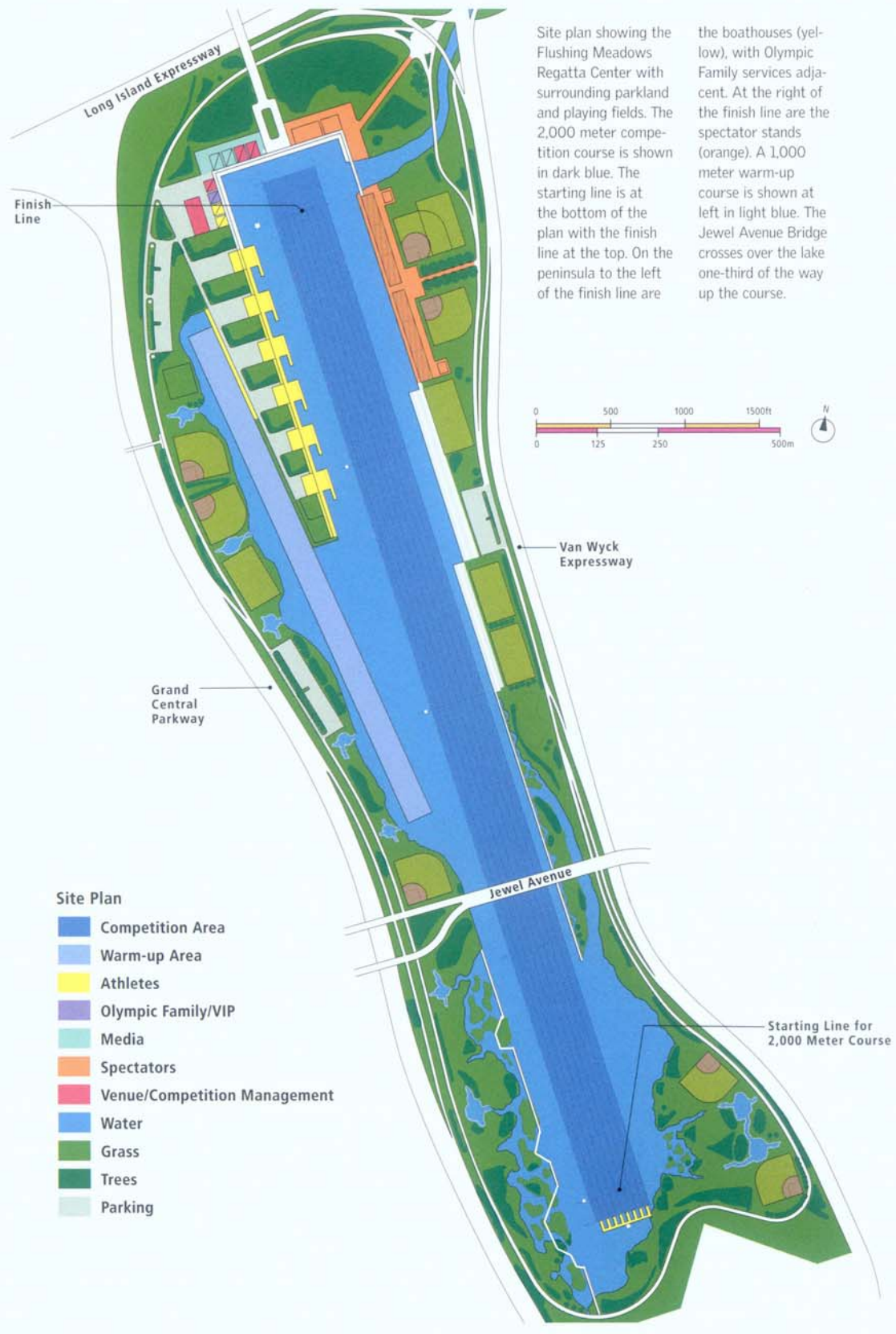
Three critical steps are included in the NYC2012 proposal that are necessary to increase or enhance structures to integrate multiple natural and ecologically engineered filters. These are essential to achieve aesthetic and environmental quality goals, particularly when the lake volume is increased.

1. **Ecological mosaics in variegated upland terraces,** water features, shore and near-shore habitat. Water catchment structures stepping down slopes and around roads, walkways and thoroughfares can capture water on the land and treat it in multiple vegetated cells prior to release into the lakes. Such multiple modules are the optimal means of maximizing water filtration and purification while providing habitat for wildlife, including migratory and nesting birds.
2. **Open creeks, wetlands, and water features and soil berms for stormwater runoff.** Daylighting underground bodies of water and exposing them to the sun and air can replace buried culverts with biogeochemically powerful yet aesthetically pleasing biofilters. The path of stormwater can be filtered first through coarse rushes, sedges and cattails to remove major pollutants, sediments, and suspended solids. Downstream, water-lily gardens, white cedar bogs and pools, meadows of marsh mallow and cardinal flower, shallows of wild rice, edges of native iris and deltas of arrowhead may be used to achieve wildlife support and aesthetic goals which are far beyond the developmental capacity of the lake system as it is presently structured.
3. **Garbage catch-basin systems.** Trash migrating from the land must be stopped before it can enter the water at all drainage points from highways and city streets. Each storm pipe should be identified with signage and a map of its drainage watershed or catchment area. The size and land-use pattern of these areas should be used to determine maintenance and cleanout schedules. Coupled with an educational program within the watershed of each catch-basin, this approach can clearly demonstrate to the public that a portion of the Styrofoam cups, soda cans, straws and plastic bags dropped on a specific block are inevitably delivered as garbage to a particular part of the lake, diminishing the value of the park for visitors here.



A shallow stream bed under construction in Blue Heron Park will reduce flooding and erosion, much as the daylighted wetlands will in the Olympic rowing proposal.

Rowing: Site Plan



Human access and environmental education

The surrounding communities, educational facilities, neighborhoods and visitors to the park are the ultimate barriers against ecological degradation in Flushing Meadows. Human beings are known to protect what they know and love. By enriching the experience of neighboring community members and school groups by designing inroads and pathways around the waterways, marshes, meadows and developing forests, those of us who walk around the south end of the lake can learn to mark the seasons' arrivals and departures of kinglets, warblers, and thrushes. Naturalists and parents can teach young people how to watch the comings and goings of mergansers and grebes without disturbing these fishing birds.

The proposed boardwalk in the NYC2012 plan across "marshes" and "archipelagos" can allow for observation while also creating habitats presently non-existent where *Phragmites* dominates the existing shoreline. By keeping park visitors at a safe distance, wildlife habitats can be left undisturbed. Nearby educational facilities can themselves become centers of habitat restoration and study, focusing the curriculum on plantings attractive for specific groups of birds, reptiles, amphibians, and fish. Projects to make wildlife habitat from old logs, timbers, bark, bird houses, and other structures could also become an ongoing feature of curricula in surrounding schools, from pre-K to Queens College. By such steps, it may be possible to make Flushing Meadows a richer habitat for human beings and their neighbors, including an increasing number of species.



The Olympic rowing proposal would incorporate six new boathouses for recreational use by the public, high schools, colleges and universities. At the same time, the natural areas to the south will be accessible only by a raised boardwalk, allowing public access with limited disturbance to wildlife.