

The Oyster Restoration Program - Part II



By George S. Nammack

Background:

Last month, we published Part I of this article describing the abundance of oysters in local waters with some 350 square miles (225,000 acres) of the elegant edibles living in beds along the Hudson-Raritan Estuary (HRE) and around major islands like Manhattan and Staten as recently as 1887. We related how these shellfish – important food for Native Americans as well as for Dutch and English colonists - were over-harvested, wasted and seriously depleted.

We were grateful to learn that a number of state and federal agencies have embarked on programs of habitat restoration for the oyster as well as other seafood within the HRE...among them the NOAA Restoration Center within the Marine Fisheries Center and The NY/NJ Baykeeper. The Restoration Program has both short-term (0 to 5 years) and long-term (6 to 20 years) goals for this wonderful natural resource.

Among previous and current short-term goals are:

- Restore oyster reef habitat to Raritan Bay near the Chingarora Bed in Keyport, NJ to encourage a spawning stock that could, given good conditions, start to restore oyster populations in other parts of Raritan Bay.
- Partnering with NJDEP, build up reef habitat in the Navesink River near the Oyster Point. This locale was one of the last in which natural oysters were to be found.
- Continue the 2005 efforts to expand the Oyster Gardening Program to 125 locations in the HRE.
- Involve New York and New Jersey in oyster restoration, with each sponsoring a shell-planting program in the HRE.
- Bring back linked clusters of oyster reef habitats in the Shrewsbury and the Hackensack Rivers and in Jamaica Bay, in cooperation with local interests.
- Survey the growth in environmental awareness and stewardship among community volunteers participating in any part of the Baykeeper oyster restoration program.
- Make up focused info-educational materials on the health and well-being of the HRE and the part that each community can handle through participation.

Among long-term goals are:

- The establishment of an oyster hatchery within the HRE watershed to spawn residual, isolated clusters of local oysters gathered from different parts of the estuary, then use this spawn as a larval source to raise spat-on-shell for planting on restored oyster beds within the HRE. The very successful eastern Long Island SPAT program will be the model for this task.
- Restore interlinked clusters of oyster reefs as habitat in the lower Rahway, Raritan, and Hudson Rivers, partnering with local communities, NGOs, and appropriate agencies.
- Bring back what we can of the former “Great Oyster Beds” in western Raritan Bay via a USACE project to moderate the dredging damage to beds that took place in the late 1800’s.

Restoration Methods:

- Increase spat abundance on reefs and beds by planting clean shell during spawning season.
- Raise the heights of oyster reefs to promote sur-



Eastern Oyster

vivorship and habitat for fish and invertebrates.

- Plant a shell base reef and stock it with mature oysters.

Site Selection:

Proper sites for oyster reef restoration will be chosen based on:

- Current or recent occurrence of living oysters.
- Shell or hard bottom type.
- Appropriate intermediate salinity range.
- Tidal circulation patterns that retain larvae in a reef area.
- Adequate water quality for survival and growth.
- Avoidance of areas currently used by fisheries or having a special but limited habitat type.
- Avoidance of navigation conflicts or high boat wake areas.
- Strong community support.
- Potential benefit to other conservation/restoration efforts.
- Convenient for assembling and distributing shell and oysters and loading vessels.
- Readily available for disturbance monitoring by shellfish regulatory agencies or by dedicated local individuals or community.
- Water depths at least a foot below the low tide level where ice occurs.

Reef Construction

Oyster reefs should be built oyster shell on a hard sand to gravelly bottom at depths that will not be affected by heavy ice shifting. Because oyster shell is rather scarce currently, Baykeeper will use surf clam (“skimmer”) shell on restoration sites. They will use whole shell or large half-shell size pieces to provide a complex reef surface with enough space to foster oyster larvae development and spat growth, and water-food flowing. This space is key as it provides the spat refuge from predation. Fresh surf clam shell will age in the open for at least 90 days before being used at restoration sites to ensure it is clean and free from exotic organisms and diseases. If other substrates are used in oyster restoration projects as reef core, they should be covered with several inches of shell or better, spat on shell to promote a living reef.

Restored oyster beds will be stocked with living oysters. Due to a shortage of appropriate habitat (unfouled hard surfaces), Baykeeper believes that there are not enough spawning oysters in the Estuary at this time to support natural recovery of the population in less than one hundred years.

While there have been local reports of spat sets and scattered clusters in various areas, a great deal of human effort must be involved now and in future to restore what previous generations wasted and degraded.

Baykeeper has two ways in which to restore living oyster reefs: its Oyster Gardening Program modeled after the successful one in Chesapeake Bay and on eastern Long Island; and its Aquaculture Program based on remote setting of oyster larvae on clam shell in tanks. Hatchery-raised larvae will be used from disease-resistant strains or local population relic oysters. This spat-on-shell method avoids long time lags, which can take decades.

Top Potential Sites for Oyster Reef Top Restoration

Navesink River: Near Oyster Point and near Fair Haven Yacht Works. Reasons: Historic oyster population, occurrence of living oysters, appropriate substrate, business and community support, ease of moving both shell and oyster to site, good community monitoring opportunity.

Issues: Locating live oysters and not causing navigation problems.

Shrewsbury River: Near Oceanport or Rumson Golf Course. Reasons: Historic oyster population, occurrence of oyster shell, appropriate substrate, and great oyster gardening results.

Issues: Locating live oysters and not creating navigation problems or bigger logistical/monitoring difficulties.

Hackensack River: Near Laurel Hill Park.

Reasons: Historic oyster populations, occurrence of living oysters near boat ramp and PSE&G, nearest suitable area to the highly disturbed former Newark Bay beds.

Issues: Poor water quality and possible logistical difficulties.

Jamaica Bay: Oyster reef or reef ball w/remote set spat as wave attenuation for marshes.

Reasons: Historic oyster populations, couple restoration with marsh preservation and restoration.

Issues: NYSDEC permitting, logistical issues.

Liberty Island: South side of Statue of Liberty.

Reasons: Build upon a previous investment of material and time (1999 oyster shell planting); historic oyster area; within the Harbor and in NYC waters; good logistical support from the Liberty State Park boat launch area; good PR potential for visitors to Long Island or LSP; untapped Jersey City-Bayonne or NYC community support; good security in the area to control “disturbances”.

Issues: High security issues; permitting issues to plant live oysters.

Lower Raritan River:

Reasons: Former prominence as a major seed source.

Issues: Not creating navigation issues; site selection of lower salinity areas to control disease/parasites and/or predators.

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Research Needs For Oyster Reef Restoration

Identify Areas Suitable for Oyster Restorations

Maps that indicate hard sediment, intermediate salinity, tidal flow/current patterns that stimulate larval retention, will be useful to identify potential areas for restoration. And, areas not currently supporting clam fisheries, areas that have special habitat value, or those adjacent to places with erosion problems are all potential restoration sites. GIS mapping would help identify places where sustained restoration efforts would be successful. This could be a contribution from NYDEP/NYDEC in support of aquatic habitat restoration planning.

Surveys for Locating Current HRE Oyster Stock

Isolated clusters of surviving HRE Oysters, or evidence of a recent un-sustained recruitment event should be located for use as a brood stock. Local oysters could contain some residual genetic material from original local oysters. Because they live in the HRE, they may be able to resist naturally factors that inhibit survival. It becomes what methods you choose to use to find a few small beds or isolated clusters in a large area. You might choose to survey clambers, residents and/or old timers who know the shoreline and waters, then follow up on any leads with teams of waders, divers or rakers to explore further, enlisting canoeists and kayakers to research during low tides by checking shorelines and shoals with hard or rough surfaces for evidence of live,

tough survivor oysters. When we have an appropriate hatchery going, the locations of the relic oyster clusters will be given to those who have valid collection permits. They will be able to collect enough to test for spawning viability, and other condition indices, and healthy oyster used a brood stock to restore the HRE oyster. Anecdotal reports of a spat fall within some part of the HRE should be investigated in a short time to attempt to locate the spawning stock for that event.

Disease Monitoring

We will need to increase this effort, hopefully with Haskin Shellfish Research Laboratory, as the number of projects grow. Effort should be based on a suspected problem.

Evaluate Motile Fauna Use of HRE Oyster Reefs

Survey fish and crustacean use of reefs along with epifauna to get data to document the habitat value of restored reefs.

Track Probable Oyster Larvae Dispersal Patterns

Water flow studies are needed to predict probable oyster larval transport patterns around and between reefs. Spat collectors, dye or other water flow studies can be used to plan the creation of a cluster or network of mutually supported reefs.

Evaluate Residual Toxicity Effects on Oyster Health

Examine gonad development and viability of oysters within HRE waters, especially in industrial

areas of the Estuary. Other "scope for growth" metrics are possible. The distribution of Oyster Gardener efforts and good record keeping on growth and survival as well as water quality monitoring data from established governmental programs could be used to evaluate the role of water quality on restoration potential.

Evaluate Effectiveness of HRE Oyster Restoration Effort as Community Outreach

One reason for the emphasis on the oyster as a restoration target is that it is easily recognizable by most people. The public should become more aware of the HRE as a living ecosystem, not just a surface to sail on or a waste removal system. If the community does not understand the issues and restoration values being supported by Baykeeper's Oyster Program, the outreach approaches may need to be altered. A process must be developed to evaluate how the community responds to this type of program.

The Long Island Boating World team is following with great interest the highly commendable and enormously significant Baykeeper's Oyster Restoration Program and is enthusiastically spreading the word throughout its circulation regions in this Part II article and in Part I, published in our October 2006 issue. We are most grateful to Raritan Baykeeper, Inc. for permitting us to reproduce the details of their ongoing efforts, which doubtless will result in the eventual restoration of the delightful oyster within our waters.

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