The Science Behind The Little Pond Shellfish Project

By MICHAEL C. BAILEY

Individually, an oyster doesn’t amount to much, except perhaps a tasty meal. Add millions to a compromised body of water, however, and they hold the potential to reduce contaminants and contribute to a pond’s future health.

That is the premise behind the Falmouth Water Quality Management Committee’s pilot shellfish propagation program, which could next week receive a critical green light from the Falmouth Conservation Commission. The commission’s approval would clear the way for the water quality committee to introduce the first batch of 1.25 million oyster seeds into Little Pond in June.

The commission deferred a vote on Wednesday pending the receipt of additional data detailing the pond’s baseline water quality conditions, which the group deemed necessary to determine if the shellfish were indeed having a positive impact.

Oysters have been identified as a natural means of removing nitrogen from saltwater bodies such as Little Pond, which suffers from excessive nitrogen loading due to, primarily, the presence of nearby residential septic systems.

Ronald D. Zweig, a member of the water quality committee, said septic nitrogen discharge entering the groundwater and migrating into the pond, flow originating from runoff carried into the pond by Little Pond Stream, and surface runoff, including of fertilizer from lawns, all contributed to “a relatively steady flow” of nitrogen-rich water.

“Excess nitrogen results in the process of eutrophication: an increase in the supply of organic material to an ecosystem,” stated a technical report prepared by the Woods Hole Group for the water quality committee. “Symptoms of eutrophication include measurable increases in micro and macroalgae, low dissolved oxygen, organic sediments, changes in benthic fauna, fish kills, and significant losses of seagrass habitat.”

Several research projects conducted during the early 1980s revealed the potential of shellfish as a natural filter, and numerous projects were conducted in the United States over the past decade to test the practical applications of such an approach.

“Shellfish have been demonstrated to be important in particle filtration, nitrogen sequestration, and enhanced denitrification and burial of nitrogen in the sediments,” the Woods Hole Group report stated. “Virtually all of the published literature on nitrogen remediation indicates shellfish do play a role.”

“People are always talking about shellfish,” Zweig said. “As the same time the water warms up for the algae to begin to bloom—that is the technical term—you then have the shellfish reviving up, so their feeding behavior also begins.”

Feeding will accelerate over the hot summer months “and then in the fall it will come down again, along with the growth of the phytoplankton,” Zweig said.

About 80 million cubic feet of new water enters the pond annually through groundwater seepage, Little Pond Stream, and precipitation, according to Mr. Zweig, who cited a Massachusetts Estuaries Project report on Little Pond. The pond itself contains, in mean volume, about seven million cubic feet of water.

“That means that there is 11.4 more or less, volume exchanges throughout the year, roughly once a month, just based on groundwater flow,” with pond water discharging into Vineyard Sound, Mr. Zweig said. “Every 4.6 days there is a full volume exchange, thanks to tidal activity.”

Mr. Zweig estimated that about half of the nutrients entering the pond during the winter months are flushed right out because “ponds are essentially dormant during the winter.” This means nutrients are not taken up by microalgae or anything else, because the growth is very low...they’re of no consequence.”

The Net Effect

Despite a constant level of nitrogen-infused water into Little Pond, Mr. Zweig said, the oysters would have a measurable impact on water quality due to the oysters’ seasonal growth cycles, and accompanying weather cycles that influence how and when algae grow.

“The project will basically have an impact on a seasonal basis, when it’s warm,” which is when microalgae growth begins following the colder winter months, Mr.