Hope floated for Pleasant Bay recovery

By **Rich Eldred**/ reldred@cnc.com
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The target has been set, nitrogen level wise, for Pleasant Bay and the bull's-eye is a 52 percent reduction in septic system waste entering the bay.

Whether it will be hit or not depends upon the actions of the towns of Orleans, Chatham and Harwich that are part of the Pleasant Bay Alliance, and to a lesser degree, Brewster, which is not.

Brewster's interest in the matter was signaled by their hosting the public unveiling of the Technical Report from the Massachusetts Estuaries Project last Thursday night [May 25] at Brewster Town Hall.

Life in Waquoit Bay in Mashpee has been pretty much wiped out by an overload of nitrogen flowing in from waste systems, and the Alliance was formed to prevent the same thing from happening to Pleasant Bay.

"Over fertilization results in declining health, plankton blooms, turbid water, the loss of eelgrass, decline in the number and diversity of benthic animals, low oxygen levels and fish kills, and macro algae (seaweed) accumulation, which can lead to a loss of aesthetics," said Dr. Brian Howes of UMass Dartmouth, the project's technical director.

Howes presented the results to a packed house of local officials and Pleasant Bay Alliance volunteers.

"The benthic (sea bottom) life is the basis of the food chain for many fisheries and coastal avian (bird) populations," Howes noted. "Every year we see several big Cape fish kills and you can see examples in Pleasant Bay where this occurs."

The report is the product of more than a decade of data collection by volunteers combined with expert sampling, geological analyses and computer modeling by the Massachusetts Estuaries Project.

"Can estuaries be restored?" Howes asked. "We'd like to think so and we know so but it is really through nitrogen management, which we're trying to do and will be done in Pleasant Bay, to restore the system."

Reducing input by 52 percent is a lofty target.

"Once you implement nitrogen management, you should start to see things within the bay in three to four years," Howes noted. "And once you set up the system and hit the target, it's fixed. If you maintain the target and maintain the flushing, the system will be maintained in perpetuity. And that's the good news."

The results

The ultimate numbers contained in the 227-page report, which is available online at Cape libraries, are 0.16 and 0.21.

The 0.16 represents the maximum milligrams of bioactive nitrogen per liter of seawater that will maintain healthy eelgrass beds, which are necessary as fish nurseries and shellfish habitat. The 0.21 was the threshold level in areas where there are no historic eelgrass beds. That's the level of nitrogen that shouldn't be exceeded in order to maintain healthy diverse benthic life.

Many parts of the bay exceed these levels, which is why Pleasant Bay has lost 583 acres (24 percent) of its eelgrass beds, since 1951.

The 0.16 figure was derived from Bassing Harbor in Chatham, which although it

has lost 43 percent of its eelgrass, the beds appear stable in areas where the nitrogen was less than 0.16.

While parts of Pleasant Bay, such as the Chatham Harbor Area, near the exit to the ocean, are already well below the target levels, many smaller embayments in the upper reaches of the system are well over the threshold level. As a result, Howes recommends a 52 percent reduction in septic loads entering Pleasant Bay.

That could be achieved in a great variety of ways.

Currently, in the smaller embayments where 0.21 is the desired level of bioactive nitrogen, the average levels are 0.24 in Ryder's Cove, 0.28 in Lonnie's Pond, 0.30 in Arey's Pond, 0.41 in Meetinghouse Pond, 0.24-0.30 in the Namequoit River, 0.27 in Pah Wah Pond, 0.25 in The River and 0.21 in Crow's Pond.

In the two tributaries, levels are much worse; 0.35 in Frost Fish Creek in Chatham and 0.70 in the upper Muddy River.

By contrast, in the open parts of the bay, nitrogen levels are much better - 0.13 in Little Pleasant Bay and 0.04 in Chatham Harbor.

The Pochet system also has high nitrogen levels but as a salt marsh it's quite tolerant of that.

Because Meetinghouse Pond is a comparatively large pond, the technical report suggested one resolution scenario where septic waste nitrogen was cut 100 percent at Meetinghouse. That would enable lesser cuts elsewhere. But the combination of septic systems, intercepts and other mitigation efforts that would reduce the total nitrogen input from 88.8 kilograms a day to 42.6 would achieve the same result.

"What we're looking to do is quantify how much nitrogen has to be removed to restore the estuary," noted Brian Dudley, the project manager. "The towns will have to work together to come up with the best management plan. The MEP is a toolbox of strategies."

Other sources of nitrogen

Not all of the nitrogen floating in Pleasant Bay comes from septic systems. The biggest chunk, 42 percent, comes from the atmosphere (rain and snow). Septic systems contribute 41 percent, lawn fertilizers 9 percent, road run-off 5 percent and 3 percent comes from natural sources.

Only the septic and fertilizer sources can be controlled, however. Howes noted that Cape residents aren't fertilizing to the max and if they did, fertilizer input could triple.

There are 95 sub watersheds in the bay, which makes the modeling complicated. There are natural sinks (wetlands), which absorb nitrogen and release it to the atmosphere as a gas before it enters the bay. This natural process can be mimicked, possibly by using trenches filled with wood chips, and that would reduce the need for septic system improvements in some locales.

State of the bay

Report available at www.pleasantbay.org or at local libraries

- Dr. Brian Howes, technical director, Massachusetts Estuaries Project