

# NITROGEN MANAGEMENT OPTIONS FOR EEL POND, MATTAPOISETT

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## INTRODUCTION

In 1998, with funding from the Buzzards Bay Project, the environmental consultant firm Horsley & Witten, Inc. (H&W), contracted with the Town of Mattapoisett Water Department to conduct a water quality analysis and nitrogen loading evaluation of Eel Pond (Figure 1). The study included the delineation of the surface watershed to the pond, water quality sampling, and a detailed nitrogen loading evaluation under existing and build-out conditions within the watershed. After the nitrogen modeling was completed and the results of the water sampling examined, H&W completed critical loading calculations for the pond. The H&W report also identified a series of watershed management options to protect the water quality of the pond. This report summarizes the viability of each of these options in the political and environmental context of Mattapoisett.

## SITE DESCRIPTION

Eel Pond is a 24-acre shallow pond located in the Town of Mattapoisett, at the northwest end of Mattapoisett Harbor (Figure 1). The pond is fed by groundwater discharge across the shoreline and by surface water inputs from a north-south trending stream (Tub Mill Brook), which originates in a wetland just south of Exit 25 on Route 195 at the northern extent of the watershed boundary. The watershed to Tub Mill Brook and the pond is approximately 680 acres. Most of the downtown area of Mattapoisett is located east-northeast of the pond and outside of the watershed. However, much of the land area within the watershed is developable (Figure 2).

## NITROGEN MANAGEMENT

H&W conducted an evaluation of nitrogen loading to groundwater and surface water bodies of the Eel Pond watershed, and included a “build-out analysis of growth potential of the watershed under existing zoning. Based on their findings, H&W identified potential actions that the Town of Mattapoisett could take to preserve the health of Eel Pond and Mattapoisett Harbor in general. H&W noted that most nitrogen inputs to Eel Pond, can be controlled by the Town and/or the State (e.g., runoff from Interstate 195). With respect to the town, H&W identified regulatory and non-regulatory approaches available. The regulatory techniques considered included zoning, subdivision regulations (particularly relevant in the northern and northeastern portion of the Eel Pond watershed), and health regulations (particularly relevant in the unsewered areas of the watershed). Non-regulatory techniques considered included public outreach on individual actions to manage coastal nitrogen loading (e.g., educational notices with tax and utility bill mailings), and procurement of open space.

H&W noted that at full build-out, nitrogen loading to Eel Pond will exceed the Pond's critical nitrogen loading limit as defined by the Buzzards Bay Project's nitrogen strategy defined in the Buzzards Bay Comprehensive Conservation and Management Plan. Specifically, they stated that the watershed to Eel Pond was "overprogrammed" by approximately 335 potential new lots. Below are recommendations and options that were identified to reduce future growth potential.

### 1) Zoning changes

Grandfathering provisions of the Massachusetts Zoning Act (G.L. c.40A) make altering existing zoning regulations, particularly where the purpose is the reduction of platted lots, extremely difficult. However, unsubdivided parcels can be affected by new zoning. As noted in Table 2 of

the H&W report, the largest number of unplatted lots (e.g., lots not yet subdivided) are in the RR30 zoning district. While a reduction in the total number of lots in this district is possible, any noticeable impact in the overall build-out/nitrogen loading analysis would require a dramatic downzoning. While such a downzoning may work mathematically, it is questionable whether such a rezoning is practical in the political sense in Mattapoisett since past efforts to downzone at town meeting have failed to obtain the necessary 2/3 majority of town meeting members.

A second category of lots that could be affected by zoning and theoretically be removed are those labeled as "grandfathered vacant" in Table 2. These lots are removable from the build-out analysis in that they are, as yet, not built upon and, therefore, could be purchased (in fee or easement) by the Town or an affiliated agency. However, downzoning of this category of lots is unlikely to have any impact on their future development as the Zoning Act provides broad protection to lots held in single (and common) ownership prior to the effective date of a downzoning.

## 2) Sewering of Existing and Potential (New) Dwellings

Additional sewerage of the watershed (with the discharge outside of the watershed) can reduce the extent of nitrogen loading impacts to Eel Pond. In fact, if it were feasible, sewerage of the entire watershed would reduce the total nitrogen to Eel Pond at build out conditions to well below the recommended nitrogen loading carrying capacity. Sewerage of 50 existing residential lots would provide a reduction of 880 lbs. N/year. Sewerage of 100 lots would provide a 1,760 lbs. N/year reduction. Currently there is considerable political support to sewer ....., which would eliminate \_\_\_ homes from existing loading conditions....

## 3) Acquisition of Open Space

H&W note that the acquisition of open space, either in fee or easement, could provide significant protection to the pond as land acquired by the Town will be presumably undeveloped and, therefore, contribute virtually no nitrogen to the receiving waters. While the H&W report does not enumerate an exact number of acres to be acquired, the Town of Mattapoisett could conceivably reduce the potential build-out by purchasing the fee or development rights to selected larger parcels within the watershed. However in recent years there has been insufficient interest at town meeting to support municipal purchases of open space and the only viable opportunity if this situation does not change, is to encourage greater land trust activity in Mattapoisett.

## 4) Golf Course Turf Management

H&W identified the golf course as a major contributor of nitrogen to Eel Pond. Although the golf course within the watershed is privately owned, the Town could potentially work with the golf club owner and its superintendent to develop an Integrated Pest Management (IPM) and fertilizer management programs for the golf course. IPM programs have been successfully used to reduce nitrogen (and phosphorus) as well as pesticide loadings in similarly situated settings. At a minimum, the IPM program should focus on management of fertilizer applications to minimize direct runoff of nitrogen into the pond. This can be accomplished by establishing a buffer zone between managed turf areas and the pond. Also, the Town should encourage the use of slow-release fertilizers that increase uptake, thereby reducing leaching to groundwater.

#### 5) New Board of Health Regulations

The Board of Health, under their powers established by G.L. c.111 §31, could promulgate new regulations requiring that development within the watershed not connected to the municipal sewer utilize nitrogen removing septic systems for wastewater disposal. Quantification of the amount of nitrogen removed by this approach is not possible at this time, as total nitrogen removal is a function of several variables, including the technology employed, the volume of wastewater flow, and the localized conditions of the site. However, we do know that use of denitrifying systems can be effective as part of a comprehensive nitrogen reduction plan. However, requiring their use will require greater public and political support, and depend on more state guidelines on nitrogen removal efficiencies of different technologies.

6) H&W noted that the Zoning Bylaw grants the Board of Appeals significant discretion to allow a wide range of land uses within the General Business (GB) district subject to a special permit (Section IV H (2)). They further note that the criteria by which the Board is to judge these miscellaneous uses (as specified in Section VII A. (2)(b)) is too general to judge whether a proposed use would threaten water quality to either Eel Pond or, more generally, Mattapoissett Harbor. H&W goes as far as stating “the fact that virtually “anything goes” within the GB district poses significant threats to water quality, despite the fact that the build-out reveals that no threat exists.” H&W identify two options for remedying this problem. First, the zoning bylaw could be revised to delete the vagaries--open endedness--of Section IV H (2) such that the bylaw is explicit as to what is and is not allowed. A second option would be to tighten the language of Section VII A (2) governing the grant of a special permit. For example, specific language could be included regarding the requirement of the applicant of a special permit to investigate and report on the likely impacts of the proposed development on water resources within the watershed.

H&W further state:

*“Perhaps the greatest non-quantifiable threat to the water quality of Eel Pond and Mattapoissett Harbor lies in the fact that the Board of Appeals has the authority to grant use variances within the Town of Mattapoissett (Section VII A (3)). Use variances, as opposed to variances in area (dimensional requirements), are allowable in the Commonwealth only by express intention by the community. This authority has long been recognized as an “end-run” around the Town Meeting process, vesting substantial power in a limited number of individuals to undo the actions of the citizenry of the community. For example, a use variance could be granted for a commercial use, with the potential to generate excessive nitrogen loading in a residential district within the watershed to Eel Pond. Similarly, a use variance could be granted allowing for a density not previously envisioned by the community (or the build-out analysis) within the same watershed. Although it is assumed that the power to grant use variances has been used sparingly, it is nevertheless strongly recommended that the provision allowing for use variances be removed from the Zoning Bylaw.”*

We believe that changes to the Board of Appeals authority and regulations do not have sufficient political support for enactment at this time.

7) H&W note that the Marine Residence (MR) district (Section V. F) abuts Eel Pond and allows uses that, particularly in light of the discussion noted above, could threaten the Pond's water quality. Further, and as noted above, these uses have not--could not--have been included in the build-out and nitrogen loading analysis. For example, the MR district, in addition to allowing virtually any use proposed as discussed in 2, above, also allows any use allowed in the Waterfront 30 district. These uses include funeral parlors, hospitals, and medical clinics. Again,

while the misuse of the provisions of the Zoning Bylaw may be rare, it is recommended that the Town think in terms of "worst case" scenarios. H&W recommended that the provisions of the MR district be reviewed and revised to reflect the Town's goal of protecting the water quality of both Eel Pond and the Harbor. This recommendation needs to be further examined by the Town.

#### 8) Education and outreach

As noted by H&W, nonregulatory options exist to protect the health of the Town's water resources. Public education will be important for whatever recommendations the Town plans on implementing.

#### 9) Hydrology changes

Although not investigated by H&W, modifying changes in the flushing characteristics of Eel Pond, by either expanding the existing entrance under the railroad bridge or expanding the second overflow entrance through the salt marsh do not appear to be viable in terms of expense or environmental regulatory approval.

## Conclusion

At this time, it appears that the most likely that the Town of Mattapoisett will pursue three actions that will benefit water quality in Eel Pond. First, the town is expanding sewerage in the \_\_\_\_\_ area which will eliminate failing septic systems now contributing to declines in water quality. Second we will pursue an initiative to work with the Golf Course to implement BMPs.... Finally, we will begin an outreach initiative to better educate residents about what steps can be taken to restore and protect Eel Pond. The Buzzards Bay Project can assist the town in these efforts by helping prepare fact sheets, graphics, and outreach materials.

## References

Buzzards Bay Project, Final Comprehensive Conservation Management Plan. August 1991.