2006 Tisbury Great Pond Water Quality Data Report

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Martha's Vineyard Commission

Report on 2006 Sampling Results for Tisbury Great Pond

Acknowledgements: During 2006 Pond sampling was made possible by the assistance of: Tom Osmers, West Tisbury Shellfish Warden, Mike Syslo, Division of Marine Fisheries, Everett Jones, Mary Jane and Mike Pease and Warren Hollinshead. Summer intern Chrissy Pruitt assisted with sample collection and processing. Funding assistance was provided by the Riparian Owners of Tisbury Great Pond.

Ponds Discussed in this document include Sengekontacket, Farm Pond and Tisbury Great Pond. Other ponds sampled including Katama Bay, James Pond and Oyster Pond are discussed in the document titled: Martha's Vineyard Coastal Pond Water Quality Survey— Summer 2006.

Sampling methodology is described in the document titled Martha's Vineyard Coastal Pond Water Quality Survey— Summer 2006. All samples described are for surface water collected within 8 to 12 inches of the surface unless otherwise indicated. Field data was recorded in profile on site using an YSI85 meter. Samples were put on ice, processed and shipped to the University of Massachusetts Coastal Systems Group laboratory the same day. The parameters discussed in this document include total organic nitrogen, total pigments (chlorophyll *a* plus phaeopigment), Secchi extinction depth and dissolved oxygen saturation. Other parameters are analyzed by the lab and are included in the data summary in Appendix 1.

Tisbury Great Pond:

The Pond is approximately 736 acres at high pond. It is separated from the Atlantic Ocean by a barrier beach that is periodically breached by the Riparian Owners to provide tidal flushing and to maintain a brackish condition. Typically the system remains within the range of 10 parts per thousand (PPT) and 25 PPT. The Pond is a source of oysters, blue claw crabs and has a modest alewife (herring) run. The oysters in the system were severely impacted by the dermo disease and the population was low during the sampling period.

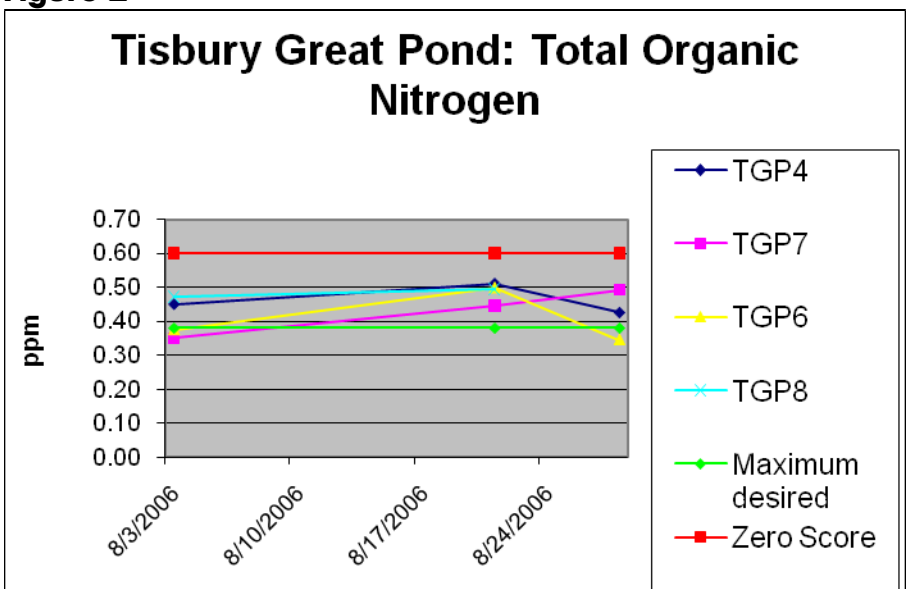
During 2006, the Pond was cut open to the ocean 5 times and was tidal for approximately 25% of the year (Kent Healy, personal communication). It was tidal from about August 22 to September 2.

Sampling stations are located in most of the coves and in the main basin of the pond as shown in Figure 1.

Total organic nitrogen is the sum of dissolved organic nitrogen (e.g. urea) and particulate nitrogen (contained in plant and animal debris) in the water column. The concentration in the water is a good indicator for the potential health of eelgrass as it is directly related to the amount of organic matter, phytoplankton and slime coating algae in the water that reduces the light available that is crucial to eelgrass health. Eelgrass is a keystone plant providing refuge and habitat for numerous marine animals. Recent guidance from the Massachusetts Estuaries Project

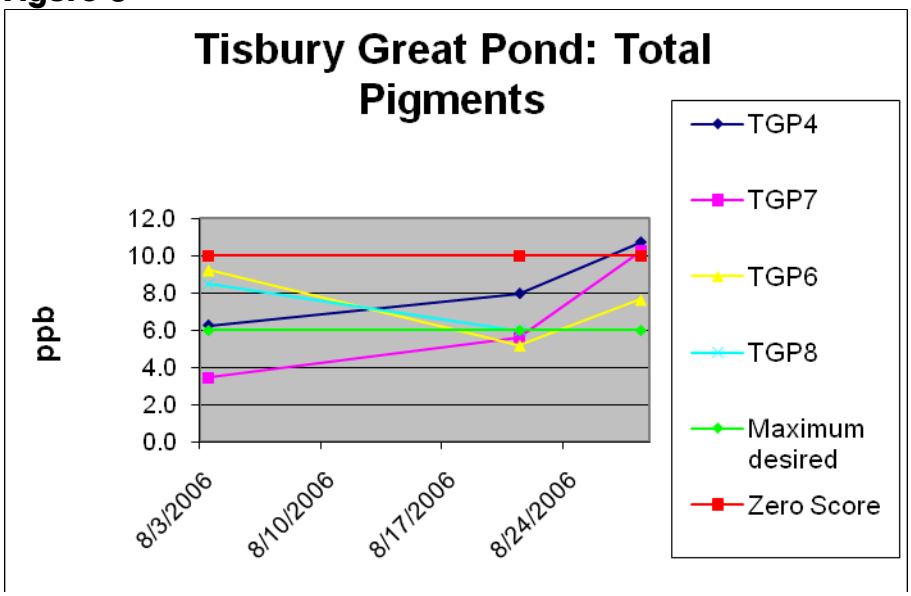
or Edgartown Great Pond is that the average summertime TON should be less than 0.5 milligrams per liter (ppm). For most tidally flushed coastal waters, the desirable concentration is 0.38 ppm. During the summer sampling the TON concentration did meet the goal for of 0.5 ppm but exceeded the desirable target.

Figure 2



The amount of phytoplankton in the water column is another analysis that gets at the question of how much particulate matter is there in a pond interfering with light penetration. The desired target for chlorophyll pigment content is 6 micrograms per liter (ppb) or less. During 2006, the chlorophyll content exceeded the goal.

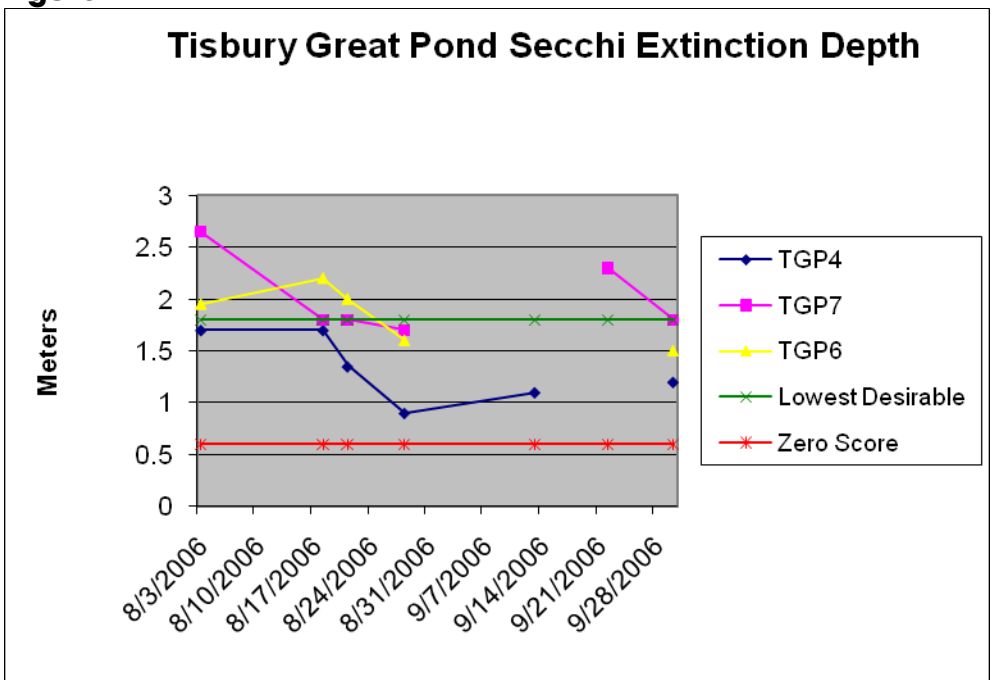
Figure 3



A Secchi disk is a good indicator of the depth to which light penetrates the water column. The depths shown in Figure 4 are the points where the disk fades from view. To assure that eelgrass

can grow at depths of up to 2 meters, the desirable target is to have the extinction depths greater than 1.8 meters over the course of the summer. In addition, the Buzzard's Bay Program has established a rating system for water quality in their ponds and gives a zero score for Secchi depths equal to or lower than 0.6 meters. At the present time, light penetration in Tisbury Great Pond waters is not sufficient to allow eelgrass to begin to recolonize the Pond.

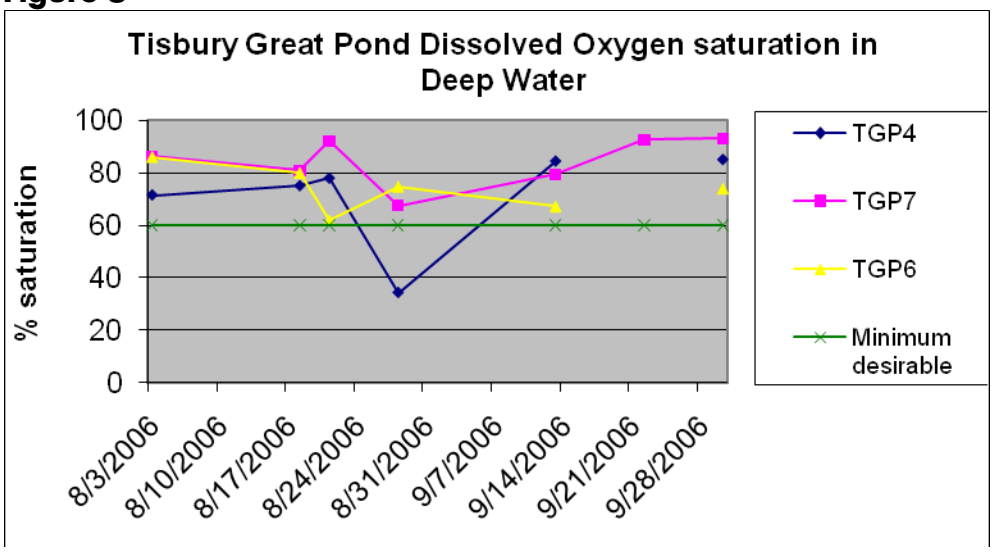
Figure 4



Dissolved oxygen saturation is a measure of the amount of oxygen in the water compared to what the water is capable of holding at that temperature. It is affected by photosynthetic activity that tends to increase oxygen, plant respiration that lowers oxygen content at night and decay of organic matter that lowers oxygen content. When there are algae blooms, the dissolved oxygen saturation may be well over 100 percent during the day but drop to near 0 over night. All of our dissolved oxygen readings are taken during the daytime and so represent values higher than the overnight low.

During the sampling period, dissolved oxygen saturation values in the deeper water (typically more than 1 meter below the surface) were below the desired level of 80% or more. Station TGP4, off Flat Point Farm, recorded the lowest reading on August 28 that coincided with the lowest Secchi reading as well as the high values for total organic nitrogen and pigment. This probably is indicative of an algae bloom in this area.

Figure 5


Tisbury Great Pond Dissolved Oxygen saturation in Deep Water
% saturation
100
80
60
40
20
0
8/3/2006
8/10/2006
8/17/2006
8/24/2006
8/31/2006
9/7/2006
9/14/2006
9/21/2006
9/28/2006
TGP4
TGP7
TGP6
Minimum desirable