Squibnocket Pond District Advisory Committee
Report to The Town Committee on Squibnocket

1. Minutes from July 31 2014 meeting
2. 10.29 on barrier beaches from the Wetlands Protection Act
3. The Massachusetts Estuary Project Overview from Roland Samimy

1.Meeting Minutes, July 31, 2014

August 8, 2014

Date: July 31, 2014
In attendance: Wendy Weldon and Leanne Cowley, co-chairs; John Flender, Liz Gude, Rick Karney, Rich Osnoss , Bret Stearns, Jo-Ann Taylor

The Squibnocket Pond District Advisory Committee met on July 31, 2014 to discuss issues about the Pond that relate to the work of the newly formed Town Committee on Squibnocket. This Town Committee is examining ideas and proposals for the Selectmen and Town regarding: access to Squibnocket Farms, Squibnocket beach access, and beach parking lot. Members of SPDAC were charged with discussing any aspects of these issues that may have impact on Squibnocket Pond and its watershed, particularly those that may affect the health and well being of the Pond. We also considered the potential effects of removal of the current parking lot revetment, the future spillover of ocean water into the pond and how all of these items relate to each other and to the health of Squibnocket Pond, its flora and fauna.

Several major categories of concern were discussed:

Breaching, Runoff, and Pollutants

Runoff is a major concern, as it affects the pond water and its inhabitants, as well as groundwater supply. The question was raised whether a breach from ocean to pond is likely, if and when the revetment is removed, and whether that would have an overall positive or negative impact on the pond. Bret, Rick and Jo-Ann agreed that permanent breaching at the east end of the pond is an improbability, even if the revetment is removed. This is a result of having an opening at the west end of the pond, i.e.Herring Creek. A normal process of beach migration would mean that erosion will take place on the shore side, the beach will build up in some places and wear down in others, and as a result of sand buildup, the pond may "move" inward. A shifting barrier beach will always be there.

Washover, similar to what takes place now, is more of a concern. Past washovers have resulted in a deep buildup of sediment in the east end of the pond. Therefore, impervious surfaces of a road or parking lot that sits between the pond and shore pose possible harm; oil, grit, heavy metals, and sediment would wash over into the pond at such times and not only introduce pollution, but contribute to more filling in of the east end. However, since an access road to Squibnocket Farms is necessary, a elevated roadway might have less impact than one at ground level, in terms of runoff. In either case, proper mitigation precautions must be implemented, such as swales, catch basins, vegetative buffers.

New data on nitrogen loading and other nutrients or pollutants are still waiting on the forthcoming Massachusetts Estuary Project (MEP) study. The MEP management has promised to have the study on Squibnocket Pond including Menemsha, Quitsa and Stonewall Ponds finished by December 2014. Although in light of the timeline of the other MEP reports, it is not known when that is projected to be available.

Salinity

The pond's brackish nature allows shellfish to exist at the low end of their salinity tolerance. The shellfish act as very useful natural water filters. Because of high bacterial levels, the MA DMF has classified the pond as "prohibited" for the harvest of shellfish. The high bacterial levels are likely due to waterfowl and poor water exchange. The low salinity also helps keep the harmful oyster drill (a predatory sea snail) in check, since they thrive only at salinity above 20 ppt. It's a good situation for getting oysters started, so they can then be moved to a saline location for maturing to a harvestable state. The herring that reach the pond through the Herring Run seek out fresh water for spawning, near the streams leading into the pond or in the least saline areas of the pond. Generally, spawning takes place under 12 ppt salinity, and embryos have best survival under 5 ppt. Bret Stearns is working on a way to make more precise counts of how many herring enter and leave the pond.

Since a permanent breach is not thought to be likely, we did not explore the consequences of the pond shifting from brackish to saline. The assumption is that an overall goal is to let nature take its course as much as possible. There may be a future dredging of Herring Creek at the Aquinnah end of Squibnocket Pond. This would have little effect on the overall salinity in the whole pond.

Flora and Fauna

We have previous reports from 1989-2001 that indicate the Pond district is home to some species of rare, threatened or endangered plants and animals. A fish survey submitted to Allan Keith by Greg Skomal in 2001 lists 14 species of sampled fish, as well as 10 other reported species. Otters are being reported as returning to the pond in numbers not seen for a long time. Currently a few families of swans make their home there. Ducks, geese, cormorants and ospreys frequent the pond. As is often noted, the pond is a valuable and unusual habitat and ecosystem that we must do our best to protect.

There was consensus by Bret, Rick and Jo-Ann, on the following points that are pertinent to the Town Committee's efforts:

1. Vegetative buffer zones as described in the Town Zoning By-Law Article 12, Zone B, should be adhered to as much as possible.
2. A parking lot more removed from the pond and shore would have less deleterious impact on the pond.
3. In general, a parking lot has more impact close to the Pond than a roadway.
4. A gravel parking lot is better than an impervious surface, in terms of environmental impact. In either case, it should be pitched in such a way as to direct runoff away from the pond. And, runoff controls

must be implemented around the road and parking lot, in the form of vegetative buffers, swales, and catch basins if appropriate.

5. An elevated roadway may have more long-term potential to let future erosion and beach buildup processes take place without endangering the roadway, particularly if the revetment is removed,. An elevated roadway would allow dunes to form in front of and behind the roadway. It eliminates the probable destructive nature of rebuilding a roadway after each main storm event.

10.29: Barrier Beaches

(1) Preamble. Barrier beaches are significant to storm damage prevention and flood control and are likely to be significant to the protection of marine fisheries and wildlife habitat and, where there are shellfish, the protection of land containing shellfish.*
Barrier beaches protect landward areas because they provide a buffer to storm waves and to sea levels elevated by storms. Barrier beaches protect from wave action such highly productive wetlands as salt marshes, estuaries, lagoons, salt ponds and fresh water marshes and ponds, which are in turn important to marine fisheries and protection of wildlife habitat. Barrier beaches and the dunes thereon are also important to the protection of wildlife habitat in the ways described in 310 CMR 10.27(1) (coastal beaches) and 10.28(1) (coastal dunes).
Barrier beaches are maintained by the alongshore movement of beach sediment caused by wave action. The coastal dunes and tidal flats on a barrier beach consist of sediment supplied by wind action, storm wave overwash and tidal inlet deposition. Barrier beaches in Massachusetts undergo a landward migration caused by the landward movement of sediment by wind, storm wave overwash and tidal current processes. The continuation of these processes maintains the volume of the landform which is necessary to carry out the storm and flood buffer function. When a proposed project involves removal, filling, dredging or altering of a barrier beach, the issuing authority shall presume that the barrier beach, including all of its coastal dunes, is significant to the interest(s) specified above. This presumption may be overcome only upon a clear showing that a barrier beach, including all of its coastal dunes, does not play a role in storm damage prevention, flood control, or the protection of marine fisheries, wildlife habitat, or land containing shellfish, and if the issuing authority makes a written determination to such effect. When a barrier beach is significant to storm damage prevention and flood control, the characteristics of coastal beaches, tidal flats and coastal dunes listed in 310 CMR 10.27(1) and 10.28(1) and their ability to respond to wave action, including storm overwash sediment transport, are critical to the protection of the interests specified in 310 CMR 10.29.

(2) Definition. Barrier Beach means a narrow low-lying strip of land generally consisting of coastal beaches and coastal dunes extending roughly parallel to the trend of the coast. It is separated from the mainland by a narrow body of fresh, brackish or saline water or a marsh system. A barrier beach may be joined to the mainland at one or both ends.

For regulations concerning land containing shellfish see 310 CMR 10.34. *

(3) When a Barrier Beach is Determined to be Significant to Storm Damage Prevention, Flood Control, Marine Fisheries or Protection of Wildlife Habitat. 310 CMR 10.27(3) through 10.27(6) (coastal beaches) and 10.28(3) through 10.28(5) (coastal dunes) shall apply to the coastal beaches and to all coastal dunes which make up a barrier beach.

(4) Notwithstanding the provisions of 310 CMR 10.29(3), no project may be permitted which will have any adverse effect on specified habitat sites of rare vertebrate or invertebrate species, as identified by procedures established under 310 CMR 10.37.

3. An overview of the work being done for the Massachusetts Estuary Project submitted by Roland Samimy in an email dated August 4, 2014. Roland Samimy <rsamimy@umassd.edu>

There are a variety of indicators that are used in concert with water quality monitoring data for evaluating the ecological health of embayment systems and specifically the Menemsha-Squibnocket system. The best biological indicators are those species which are non-mobile and which persist over relatively long periods, if environmental conditions remain stable. The concept is to use species, which integrate environmental conditions over seasonal to annual intervals. The approach is particularly useful in environments where high-frequency variations in structuring parameters (e.g. light, nutrients, dissolved oxygen, etc.) are common, making adequate field sampling difficult.

As a basis for the nitrogen threshold determination in the Menemsha-Squibnocket embayment system, the MEP is focusing on major habitat quality indicators: (1) bottom water dissolved oxygen and chlorophyll-*a*, (2) eelgrass distribution over time (taking into consideration presence/absence of macroalgae) and (3) benthic animal communities. Dissolved oxygen depletion is frequently the proximate cause of habitat quality decline in coastal embayments (the ultimate cause being nitrogen loading). However, oxygen conditions can change rapidly and frequently show strong tidal and diurnal patterns. Even severe levels of oxygen depletion may occur only infrequently, yet have important effects on system health. To capture this variation, the MEP Technical Team deployed autonomously recording dissolved oxygen sensors throughout Menemsha-Squibnocket embayment at critical points in the system. The sensors were sited such that they would be representative of dissolved oxygen conditions within major sub-basins comprising the overall embayment. The dissolved oxygen moorings were deployed to record the frequency and duration of low oxygen conditions during the critical summer period.

The MEP habitat analysis uses eelgrass as a sentinel species for indicating nitrogen over-loading to coastal embayments. Eelgrass is a fundamentally important species in the ecology of shallow coastal systems, providing both habitat structure and sediment stabilization. Mapping of the eelgrass beds within the Menemsha-Squibnocket system is limited to that provided from previous studies by the Martha's Vineyard Commission et al., the MassDEP Eelgrass Mapping Program (C. Costello) that relies on both field measurements as well as aerial photo analysis and observations made by MEP divers during related data collection activities. Temporal trends in the distribution of eelgrass beds are typically used by the MEP to assess the stability of the habitat and to determine trends potentially related to nutrient enrichment and water quality. Eelgrass beds can decrease within embayments in response to a variety of causes, but throughout almost all of the embayments within southeastern Massachusetts, inclusive of Martha's Vineyard and Nantucket, the primary cause appears to be related to increases in embayment nitrogen levels.

While a temporal change in eelgrass distribution provides a basis for evaluating increases (nitrogen loading) or decreases (increased flushing- change in breaching schedule) in nutrient enrichment within the Menemsha-Squibnocket System, some areas historically may not have had or presently do not support eelgrass. In these areas, benthic animal indicators (organisms that live in/on the bottom) are used to assess the level of habitat health from “healthy” (low organic matter loading, high D.O.) to “highly stressed” (high organic matter loading-low D.O.). The basic concept is that certain species or species assemblages reflect the quality of their habitat. Benthic animal species from sediment samples are identified and the environments ranked based upon the fraction of healthy, transitional, and stressed indicator species. The analysis is based upon life-history information on the species and a wide variety of field studies within southeastern Massachusetts waters, including the Wild Harbor oil spill, benthic population studies in Buzzards Bay (Sanders, H.L. 1960, Sanders, H.L. *et.al.*, 1980, Tian, Y.Q., J.J. Wang, J. A. Duff, B.L. Howes and A. Evgenidou. 2009) and New Bedford (Howes, B.L. and C.T. Taylor, 1990), and more recently the Woods Hole Oceanographic Institution Nantucket Harbor Study (Howes *et al.* 1997). These data are coupled with the level of diversity (H’) and evenness (E) of the benthic community and the total number of individuals to determine the infaunal habitat quality.

All this information is related back to embayment wide nutrient concentrations obtained over multiple years to ultimately establish a nutrient threshold for the Menemsha-Squibnocket system that is supportive of healthy habitat consistent with state and federal water quality standards.