

# OYSTER POND SENTINEL

May 25, 1991

MEETING AT STAN AND PAM HART'S, 7:00PM JUNE 8

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## WELCOME TO THE THIRD ANNUAL EDITION OF THE OYSTER POND SENTINEL

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Keeping with our aim of communicating important news to Quissett residents surrounding Oyster Pond, five major news worthy items have occurred, or will happen soon:

1. Historical concentration of nitrogen increase in Oyster Pond.
2. Report on the culvert improvement on fish health and water quality.
3. Approval of residential denitrification septic units.
4. Park trails and fund raising.
5. Surf Drive and Oyster Pond shore trash pickup.

The Sentinel serves to increase awareness of community projects directed toward improvement of the quality of Oyster Pond.

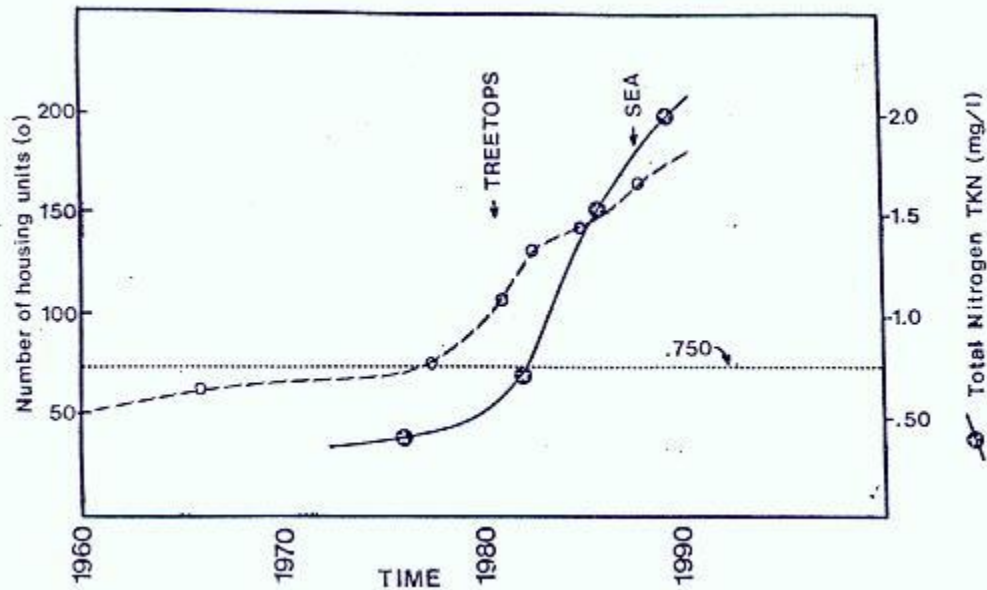
## HISTORICAL NITROGEN CONCENTRATION INCREASE IN OYSTER POND

At four separate times during the last two decades water quality measurements have been made centrally in the northern basin of Oyster Pond. The samplings were performed by CCPEDC in 1976 as part of the 208 region-wide water quality study, (2) following approval of the Treetops development (1982) (3) during public hearings on the proposed Peterson development (1986), and most recently with the "pond watcher project" (1989). The figure below reports total nitrogen concentration as TMN (total Kjeldahl nitrogen) found in the central north basin. Methodology varied somewhat with the samplings, ranging from aerial sampling just above the thermocline to mean level from a integrated top-to-bottom sampling. They show a distinct rise in total nitrogen (TKN) from below .750 to about 2.0 mg/l, at least a three-fold rise.

The total number of residential units lying within the recharge zone is plotted from USGS and town topographical mappings and those approved by subdivisions. The number rises from about 50 during the 1970's to over 200 units by the 1990's. The largest jumps occurred with the Treetops subdivision in 1980 and the SEA Student Housing in 1987.

About a 3-year lag time exists between the Treetops completion and the most rapid rise in total nitrogen.

Significantly, the .750 mg/l level proposed for the town nutrient bylaw was crossed in 1982 at the same time as visual changes became apparent. Aquatic vegetation became heavy enough to obstruct small sail boats (centerboards) . Discoloration of the north shore (yellowing) occurred during summer with some odor production. The white perch also became hardly noticeable. The pond watchers study in 1989 confirmed that the high levels of nitrogen appear to be related to oxygendepletion and poor water quality.



### About the Culvert into Oyster Pond

Bob Livingstone, previously with NOAA as a marine fisheries specialist, volunteered his effort to review the culvert improvement. During the past year, he and other pond watchers have studied the flusing results, as well as the trapped fishes in the southern pond. Here he offers his report.

"Has these efforts helped the Pond? You will recall that the old culvert was totally jammed up and had been that way for many months. The new culvert was installed a year ago April along with the re-paving of Surf Drive. The opening of the new culvert is roughly three times the size of the old one, and you would expect that the tide would pour into the pond. Conditions remained about the same until late May when the DPW dug out a very shallow area of the Trunk River. this problem area was shown to me by Mr. Dick Rapoza of the DPW in the fall of 1989. He said before the tides would run in and out every day. The dredging worked and I have an observation in my Pond log on the morning of May 28, 1990: "Glorious tide running out of pond - plastic float took two minutes to go through culvert." There were to be other glorious moments. On June 10, I note "Water boiling into pond -- 33 seconds to travel 72 feet!" On June 22 at 10:30 a.m.:

"Tide pouring into pond - orange float 25 seconds to travel 72 feet - waht a magnificent change to the flushing of the pond."

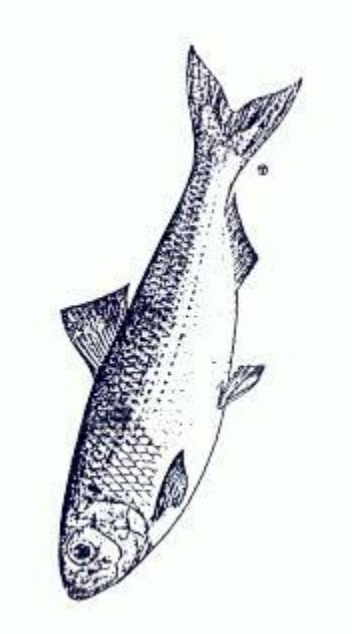
Since these observations in May and June of 1990 I began a study to examine the salinity at a number of different locations for both ebbing and incoming tides. Don and Margery Zinn have been working with me helping to determine salinities and making other observations on a fairly regular basis. I have also collected a number of fish and invertebrates, several new to Oyster Pond, in wire mesh fish traps and by small mesh dip nets. Some of our preliminary findings follow.

One effect of the new culvert has been to raise the salinity of the pond. Our observations show that the salinity coming into the Trunk River is about the same as the Sound, averaging about 31 parts per thousand (ppt). By the time the incoming tide reaches the culvert the salinity drops slightly to 27 ppt. Dilution occurs halfway up the pond and toward the northern end near the John Dowling property. Tidal effect becomes minimal as you approach the northern end of the pond. In the middle of August the salinity was about 12 ppt in my cove off Spohrs dock and in other locations. There is considerably more variation with salinity during the ebbing tides which are influenced more by rainfall, runoff, and other seepage into the pond. The average salinity for an ebbing tide was 16 ppt at the Trunk River and 14 ppt at the culvert. How-ever, the range for an ebbing tide was from 5.3 ppt to about 19 ppt.

The increase in salinity brought a number of fish and marine organisms into the pond as shown on the following list:

1. Mummychogs or minnows, species common along the shore
2. American eels, a nuisance in traps during September to mid-November
3. Pipefish - dip-netted at the culvert and observed at "pond watchers" station in July (new)
4. Winter flounder juveniles seen while wading near culvert (new)
5. White perch juveniles in August and September samples
6. Alewife juveniles dip-netted in June at Trunk and culvert; some found dead July 27th along shore of Trunk
7. Butterfish juveniles, taken in September collection in my cove (new)
8. Silverside juveniles dip-netted at several locations, attracted to light (new)
9. Silver gar (bill fish) observed at pond side of culvert in September (new)
10. Stickelbacks, smallish fish with many spines Collected commonly (new)
11. Comb-jelly (Ctenophore) invaded pond in Acycat, captured in traps and dip-net, highly phosphorescent (new)
12. Grass shrimp collected in traps, but also observed on bottom (new)
13. Dragonfly nymphs clinging to vegetation on trap lines

I am sure there must be other invertebrates in the pond and could use some help in this endeavor.



Unfortunately the remainder of this report is on the down-side. The tides cycled into and out of the line pond and flushed the pond up until the time of the fall and winter storms. These storms created a condition that increased the blockage in the trunk River for many days. The pond behaved as a giant bathtub with a little water spilling over the rim continuously. This was seen on the daily observations of tide gauges and by noticing the frequency of ebbing tides. Storm damage and the continuous build-up of a "delta" of decaying vegetation are major hindrances that interfere with the normal daily cycle of tides into and out of the pond. That is where we begin in 1991." --RL

**Editor's note:**

The Trunk River appears to have reverted to its previous condition after the time of one year. Only during strong storms does substantial inflow enter Oyster Pond. Unfortunately, during this time it appears to carry in excessive algal weeds harvested by the strong scouring currents and deposit the vegetation in the pond. The plant matter decays and lowers pond oxygen.

During February of this year, a final onsite inspection of a test RUCK denitrification unit on Bournes Pond was conducted by the DEP. The encouraging results led to a tentative approval of home RUCK systems by DEP on a case-by-case basis. The RUCK system combines black water and grey water to induce loss of 80% nitrogen in septic systems

RUCK systems have been widely installed in the New Jersey Pine Barrens to reduce groundwater nitrogen loading. Currently, denitrification systems are required in Rhode Island in critical coastal regions.

Holmes and McGrath, a local engineering firm, is the regional licensee for the system. For information, contact Michael McGrath at 508-548-3564.

## **PARK PAILS AND FUND RAISING**

If you have been by the entrance to the Eleanor Blevins Memorial Park off Ransom Road recently, you might notice that a new pathway is open. A central pathway now heads downward from the high path just past the big boulder and goes by the twin White Pines before intersecting the Hackmatack Path.

During the first week in May, we take the pathways to look at the bloom of pink lady-slippers. Large areas of the delicate flowers occur on the uplands regions. Please do not pick them, since they are protected by State law.

We greatly appreciate those of you who have contributed to the Oyster Pond Trust fundraising effort during the past two years. We are making steady progress towards achieving our goal.

### **Join the Effort!**

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This page updated July 25, 2002