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MEMORANDUM

TO: William Turner, Westford Conservation Commission
DATE: 3/27/2009
FROM: Carl Nielsen, CLM
SUBJECT: Nabnasset Lake – Annual Report
PROJECT NO.: N441-000
COPY TO: David Brody, Nabnasset Lake Association

SUMMARY OF ANNUAL MONITORING

ESS completed our water quality and visual survey of Nabnasset Lake on August 22, 2008 at the request of the Nabnasset Lake Preservation Association. ESS has included Table 1 and Figure 1 to summarize the water quality measurements made in the field on that date. ESS was not asked to complete the full scope of our standard testing in 2008 since the winter drawdown of 2007-2008 was only to a level required for minimizing shoreline erosion and promoting dam and ice safely and not for the purpose of managing aquatic weeds.

Summary of findings:

Water Quality:

ESS found water quality in Nabnasset Lake, as measured by turbidity and water clarity to be in fair condition in 2008 (equivalent to a "C" grade on the report card). Turbidity ranged from 2.4 nephelometric turbidity units (NTU) in lake to 3.2 NTU in Shipley Swamp, which is somewhat higher than in 2007 for both stations. Secchi disk depth, a measure of water clarity, was approximately 6 feet (1.8 meters), which is comparable to that obtained in previous years.

A dissolved oxygen profile was taken at the in-lake water quality monitoring station (Table 1, Figure 1). Supersaturated dissolved oxygen levels were noted in the upper portion of the water column (epilimnion) while low oxygen levels were measured below the thermocline (approximately 13 feet [4.0 meters] below the surface of the pond). Dissolved oxygen in Shipley Swamp was also found to be supersaturated at the time of sampling. Supersaturation is typical in situations where plant and algae growth are present and daylight is sufficient to promote photosynthesis.

Invertebrate Community:

The invertebrate community in both Nabnasset Lake and Shipley Swamp appeared to be comparable in 2008 to that documented in previous years. However, there were fewer empty mussel valves observed along the shoreline of the lake in 2008. ESS did not encounter mollusks in Shipley Swamp, although extensive searches were not performed in 2008.

Plant Community:

Curly-leaf pondweed (*Potamogeton crispus*) was not encountered during our visual survey of Nabnasset Lake. As an exotic invasive species it competes with native species of plants within the lake. Curly-leaf is typically at peak levels of growth in early June and quickly dies back by the end of June. As our survey was conducted in late August, this may be the primary reason curly-leaf pondweed was not detected.

Variable-leaf milfoil (*Myriophyllum heterophyllum*) was observed to be present in Shipley Swamp during our August 2008 visual survey. However, milfoil coverage was relatively sparse and herbicide treatment in the swamp is not believed to be necessary at this time. Milfoil coverage in the swamp should continue to be monitored closely. If the milfoil begins to show signs of spreading and funding permits, herbicides or hand harvesting should be implemented.

Variable-leaf milfoil coverage in Nabnasset Lake was also very low. This indicates that management efforts at the lake appear to be working to control milfoil in the shallower waters. Therefore, herbicide application for milfoil control in 2009 is not believed to be essential.

The remainder of the plant community within Nabnasset Lake and Shipley Swamp was similar to previous years. Purple loosestrife (*Lythrum salicaria*) is still present on the periphery of the west end of Nabnasset Lake. However, native aquatic plants, including American wild celery (*Vallisneria americana*) and water lilies (*Nuphar lutea variegata* and *Nymphaea odorata*) were common to dominant in water up to 12 feet (3.7 meters) deep. Branched algae, such as muskgrass (*Chara* sp.) and stonewort (*Nitella* sp.) were also observed. Water shield (*Brasenia schreberi*) and water lilies were observed in Shipley Swamp.

If you have any questions or concerns regarding the management of Nabnasset Lake, please do not hesitate to call Carl Nielsen at (401) 330-1224. Thank you.