


MEMORANDUM

To: Mr. Paul Johnson, Council Member, Town of Southeast
Cc: Mr. John J. Dunford, Supervisor, Town of Southeast
From: Fred S. Lubnow, Ph.D., Princeton Hydro, LLC 
Date: 13 September 2004
Subject: Summary of the water quality conditions for Lake Tonetta

This memorandum is a brief summary of the water quality conditions of Lake Tonetta, which was sampled on 25 August 2004. At this time, *in-situ* data were collected with a Quanta probe for temperature, dissolved oxygen (DO), pH and conductivity at 5 water quality monitoring stations from surface to bottom at 0.5 to 1 meter intervals. In addition, discrete water samples were collected from the mid-lake sampling station for a variety of water quality variables, including total phosphorus, ammonia-N, nitrate-N, nitrite-N, total suspended solids, alkalinity, chlorophyll *a*, phytoplankton and zooplankton. Observational data were also recorded on the lake's resident aquatic plant community.

Lake Tonetta was moderately stratified at depths greater than 3 meters (10 feet). The lake was well oxygenated, with dissolved oxygen (DO) concentrations greater than 5 mg/L from the surface to 3 meters. Between 3 and 4 meters, DO concentrations were moderate (between 1 and 4 mg/L), while no measurable amount of DO was measured immediately over the sediments (DO < 1 mg/L). The pH throughout Lake Tonetta was slightly to strongly alkaline, varying from 7.01 to 8.91.

Water clarity was also measured in Lake Tonetta with a Secchi disk. Secchi depth on 25 August 2004 varied between 1.3 and 1.5 meters (4.3 and 5.0 feet). While these values were lower than those measured during the 19 June 2004 sampling event, they were still above the 1 meter threshold. Typically, Secchi depths less than 1 meter are perceived by the layperson as being unacceptable for recreational use.

Chlorophyll *a* is a photosynthetic pigment all algae and plants possess. Therefore, measuring the amount of chlorophyll *a* in lake water is an excellent means of measuring algal biomass. Concentrations larger than 30 mg/m³ are typically associated with nuisance blooms and surface scums. The August 2004 chlorophyll *a* concentration in Lake Tonetta was moderate at 11.3 mg/m³. Although nuisance conditions were not experienced, the moderate chlorophyll *a* concentration, coupled with a total suspended solid concentration below the limit of analytical detection (< 3 mg/L), indicate that algae were responsible for the lower Secchi depths in August.

Surface water total phosphorus (TP) concentrations were moderate at 0.03 mg/L. However, bottom water TP concentrations were excessive at 0.94 mg/L. The extremely high TP concentration within the anoxic (DO < 1 mg/L) zone of the bottom waters indicates that the internal phosphorus load for Lake Tonetta may be high.

A large canopy of aquatic plants was distributed throughout Lake Tonetta at depths less than or equal to 3 meters. Coontail was the dominant aquatic plant, but the benthic alga *Lyngbya* and yellow and white waterlilies were also identified.

Water quality conditions at Lake Tonetta on 25 August 2004 were generally acceptable for recreational use. While the lake was productive, with a moderate amount of algae, large blooms or surface scums were not evident. However, dense stands of submerged aquatic plants, primarily coontail, were distributed throughout the lake, particularly in the northern and southern ends. The goal of the sterile grass carp stocking program is to reduce the density of these submerged plants.

If you have any questions or comments, please feel free to contact me at our Ringoes office at 908-237-5660. Thank you for your time and for selecting Princeton Hydro for your environmental needs.