

BFS Technical Report # 17¹

**SUMMARY OF WATER QUALITY
MONITORING OF THE OTSEGO LAKE
WATERSHED: 1998-2002**

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EXECUTIVE SUMMARY

High standards for water quality in the Otsego Lake/Upper Susquehanna River Watershed are important, not only for ecological and historical/cultural reasons, but because the watershed also acts as the main water source for the Village of Cooperstown and many area residents. The following report is a statistical analysis and summary of data collected during 1998 to 2003 from the mouths of each of the five tributaries comprising the northern watershed, Otsego Lake itself, and the lakes outflow, the Susquehanna River. Each individual summary (tributary, lake, and river) is composed of a suite of limnological parameters (physical and chemical) and shows both spatial and temporal trends at a variety of scales.

In the northern watershed, data combined from the five major tributaries over the five year period showed falling dissolved oxygen levels that indicate possible increases in microbial decomposition resulting from larger amounts of organic matter. However, total phosphorus and conductivity, the only parameters reflecting organic content, do not show a consistent increasing trend over the same period. Nitrate + Nitrite concentrations show an increasing trend during this time as well. Spatially, the Mt. Wellington tributary and White Creek have comparatively low total loading to the lake. For total phosphorus, Cripple Creek is estimated to contribute more than Shadow Brook which contributes more than Hayden Creek. For nitrate + nitrite, Hayden Creek is estimated to contribute more than both Shadow Brook and Cripple Creek, which are roughly equal.

In the lake, significant temporal differences exist for every physical and chemical parameter measured at depths of 8m or less. Total phosphorus concentrations increased to various degrees (depending on depth) in 2002. Nitrate + Nitrite levels also are rising in epilimnetic waters. However, in deeper waters (>8m) concentrations have leveled off after a two year decrease in '98-'99. The pattern for calcium and chlorides are clear with distinct increases over time. Additionally, the areal hypolimnetic oxygen depletion rate was lower in 2002 than those recorded in previous years.

Only nitrate + nitrite and fecal coliform not to show an increase in recent years for averaged values from all sampling sites along the Susquehanna River. Spatially, physical parameters declined with distance from the lake whereas chemical constituents increase. Increases in TP and NO₃, as well as decreases in DO, have historically been most prevalent downstream of the Village of Cooperstown Wastewater Treatment Plant. Compared with water above the outflow, this discharge introduces high concentrations of nutrients into the river and can depress DO levels by encouraging the growth of plants and microbes which use oxygen dissolved in the river water for the processes of respiration and decay.

The value in analysis such as this is in providing the type of statistically rigorous spatiotemporal comparisons that allow for assessment of ongoing remedial measures undertaken by numerous Federal, State, and local agencies. Validation of these programs not only has significance at a local level by informing policy makers to continue these projects, but also on a larger scale where quantitative support plays a key role in fostering wide spread implementation of similar measures.

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