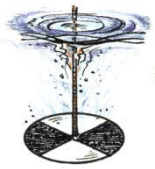
Otsego Lake Water Quality

Biological Field Station Monitoring

Otsego Lake monitoring is conducted bi-weekly during the summer months at the deepest part of the lake ("TR4C").

TRANSPARENCY – SECCHI DISK



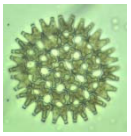
U of Wisconsin-Extension
WI Dept of Natural Resources

Transparency is measured by lowering a Secchi Disk to the depth at which it disappears. This information is useful in assessing general clarity issues over time, and correlates strongly with algal population dynamics.

WATER QUALITY PROFILES

Dissolved oxygen, temperature, pH, and conductivity are collected in profile at TR4C. Readings are recorded at regular intervals from the surface to the bottom. Dissolved oxygen is necessary for most organisms in Otsego Lake, and can limit available habitats for sensitive fish if concentration drop below critical levels.

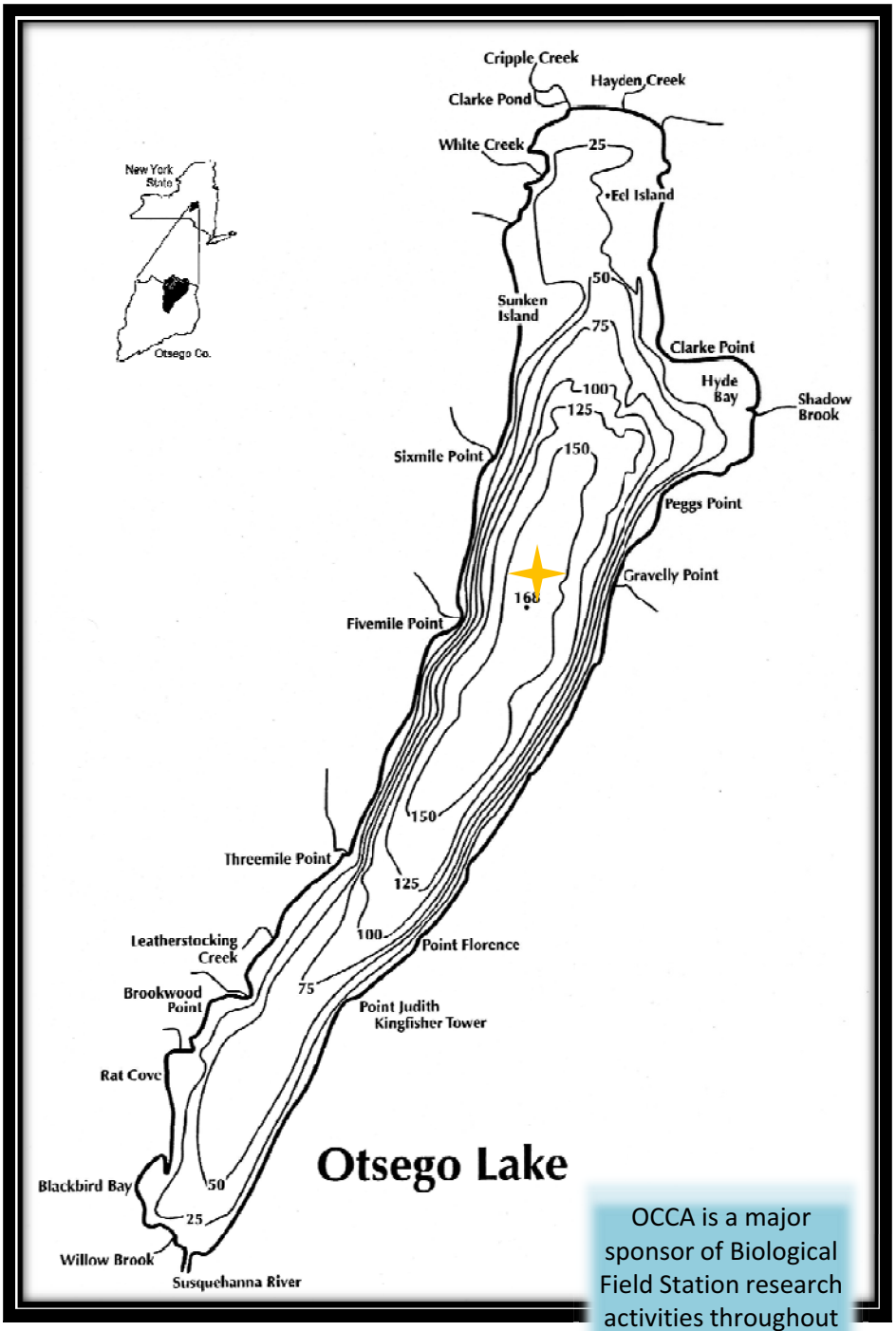
ALGAE COMMUNITY



Algal populations are assessed by analyzing the concentration of chlorophyll *a* in a water sample. Chlorophyll *a* is a common pigment used by algae in photosynthesis & provides an estimate of algal standing crop, or mass of living cells.

ZOOPLANKTON COMMUNITY

Zooplankton are microscopic crustaceans that graze on algae in open waters. Samples are collected with a small-mesh net, and individuals are identified to assess species diversity and abundance.



OCCA is a major sponsor of Biological Field Station research activities throughout Otsego County. The generous support of OCCA and other donors allows the BFS to continue to monitor the state of Otsego County's natural resources.

NUTRIENT & ION CONCENTRATIONS

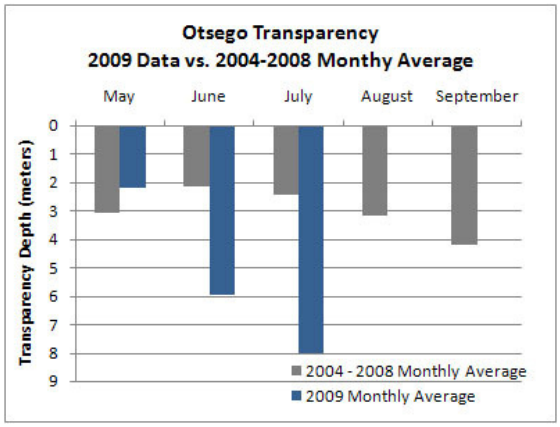
Water samples are collected at 4-meter intervals and analyzed for nutrients and major ion concentrations. Total phosphorus, nitrates, ammonia, and total nitrogen concentrations are used to assess nutrient cycling within the lake. Chlorides can be used to indicate salt runoff from roads, wastewater, and other watershed-derived salts. Alkalinity measures the ability of water to resist pH change (as from acid rain). Calcium can influence the types of organisms that are apt to thrive in a body of water; for example, zebra mussels are able to thrive in calcium-rich waters.

Otsego Lake Water Quality Data

July 2009

TRANSPARENCY

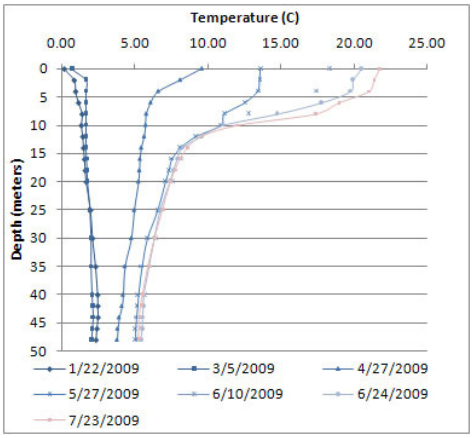
2009 transparency readings have shown a marked increase compared to the monthly average over the past 5 years; this increase likely results from the establishment of zebra mussels, which are efficient filter-feeders of algae.

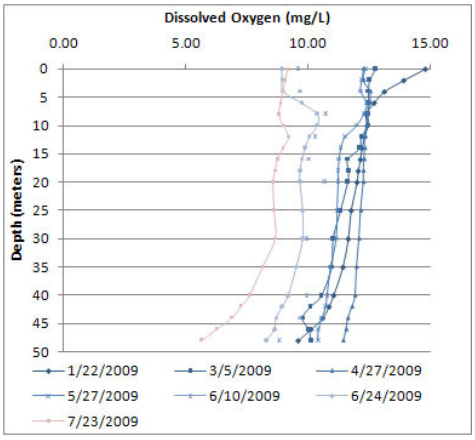


TEMPERATURE & DISSOLVED OXYGEN PROFILES

Dissolved oxygen: the concentration of oxygen dissolved in water. Colder water can dissolve a greater amount of oxygen than warm water.

Temperature profiles over the course of the year show transitions between seasonal thermal stratification regimes. Layers develop through the spring and summer as the surface waters are warmed and mixed by sun and wind, while the water below remains cold and therefore is more dense. These layers provide different habitat conditions in the open water (off-shore) areas of the lake.





Dissolved concentrations also follow a predictable progression throughout the year. During spring and fall turnover, when temperatures are constant from the surface to bottom, oxygen is distributed throughout the water column. Once thermal stratification is in place, oxygen in the bottom waters cannot be replenished via atmospheric interactions.

As the growing season progresses, oxygen is consumed by organisms living in the bottom waters and by bacterial decomposition of dead algal cells. When algal production is excessive, usually due to high phosphorus levels , oxygen can fall to levels approaching those needed by cold water, sensitive fish such as lake trout and salmon.

DETERMINING AVAILABLE FISH HABITAT

All cold-water organisms have both temperature and oxygen requirements; when considered together, they determine the available habitat, or volume of water, that is suitable for different species. For example, lake trout prefer temperatures up to 10°C (50° F) and may be stressed when dissolved oxygen is less than 6 mg/L. Current profiles for Otsego Lake show that oxygen levels in the cold bottom waters are sufficient for lake trout populations (see graphs below), though they are beginning to decline at the bottom as oxygen is consumed by fish and the decomposition of dead organisms such as algae. Oxygen levels will continue to decline until fall overturn, usually occurring in December. Blue shading indicates suitable habitat available to lake trout.

Though it may appear that lake management efforts target conditions specific to the lake trout population, ideal management programs consider the most sensitive organisms for end results and management goals.