

# Upper Saranac Foundation

*It still is, and always will be, about Water Quality.*



Edition 3

June 2014

## WELCOME BACK



### The Trophic Level of Upper Saranac Lake: Who Cares? by Ross Whaley

In addition to the water sampling that has been done on Upper Saranac lake since 1989, Dan Kelting of the Adirondack Watershed Institute has found water quality data from 1930 and 1971. Therefore, Upper Saranac Lake is likely the most intensively monitored large lake in the Adirondack Park. This is more than a bragging right, it means that the monitoring work funded by the Foundation gives us the basis for understanding and maintaining the quality of the lake. This is critical not only to the recreational enjoyment of the lake, but protection of the investments made in lake properties.

What follows is a brief summary of one part of the recently completed *Water Quality Database and Monitoring Program* by Dan Kelting of the Adirondack Watershed Institute at Paul Smith's College. The complete report can be found on the Upper Saranac Foundation website. This summary focuses on Phosphorus, Nitrogen, Chlorophyll a and water transparency. These four were picked from the 30 variables that have been measure over the years, because they are the ones commonly measured to determine the trophic level of lakes.

What is the *trophic level* of a lake, and who cares? The trophic level of a lake refers to its biological productivity. Lakes generally fall into one of three catagories; oligotrophic (low productivity), mesotrophic ( medium productivity), and eutrophic (high productivity). One needs to be careful of ranking any one of these classes as good or bad. For example, an oligotrophic lake's water may be crystal clear, and look terrific for swimming or boating. But that lake may have been the victim of acid rain, which has killed most of the aquatic vegetation--therefore, good for swimming but not habitable for

fish. On the other hand, a lake with high biological productivity might have abundant plants and algae--therefore great for ducks, but not the kind of water conducive to most summer time recreational pursuits. Upper Saranac Lake in 1989 was becoming a eutrophic lake, according to some indicators.

### Trophic level of Upper Saranac Lake

Below you will find average conditions for Upper Saranac Lake over two different three year periods. The first period was during the fearful algae bloom that nudged the citizens of the lake into action. This is compared to the most recent 3 year period for which analysis has been completed. Caution should be taken when drawing conclusions from the information below because within the three year periods there is quite a range in measurements between samples, between the north and south basin and between years. Nonetheless, some general conclusions can be reached from these comparisons.

#### Comparison of surface water quality variables between 1989 to 1992 and 2008-2011 in Upper Saranac Lake\*

Indicator	Mean 1989-92	Mean 2008-2011
Total Phosphorus (ppb)	24	12
Total Nitrogen (ppm)	1.3	0.3
Transparency (meters)	4.0	3.2
Chlorophyll a (ppb)	4.8	4.8

\* These data are excerpted from a more complete table and charts in the *Upper Saranac Lake Water Quality Database and Monitoring Program*. The means are for all samples in both the north and south basins

The above data can be compared with the following assessment criteria established by the New York Department of Environmental Conservation.

Indicator	Oligotrophic	Mesotrophic	Eutrophic
Total Phosphorus (ppb)	< 10	10-20	> 20
Total Nitrogen (ppb)	301 - 630	361 - 1387	393 - 6100
Transparency (meters)	> 5	2 - 5	< 2
Chlorophyll a (ppb)	< 2	2 - 8	> 8

### So what?

- The Phosphorus and Nitrogen in the lake during the 1989-92 period indicated that the lake was eutrophic
- The efforts at working with DEC and other has resulted in the lake now being solidly classified as mesotrophic.
- Careful monitoring of water quality can lead to remedial actions that will assure us of a special lake in the decades to come. Elsewhere you will find an article by our Lake Manager Guy Middleton describing current activities of the Upper Saranac Foundation in monitoring and then moving to action to assure that the positive trends in water quality continue.

A remaining question is if the Phosphorus and Nitrogen levels have declined why has the transparency not improved. A likely explanation is that the reduction in acid rain impacting Adirondack lakes has increased their biological productivity independent of the fertilization effect of Phosphorus and Nitrogen on any individual lake, and therefore transparency has declined in lakes across the Park. Therefore, even though we have had encouraging declines in Phosphorus and Nitrogen there has been a slight increased in algae, and therefore a decline in transparency. Fortunately, transparency of Upper Saranac Lake is solidly within the limits of a mesotrophic lake.



# USF - KEEPING A WATCHFUL EYE ON PHOSPHORUS LEVELS

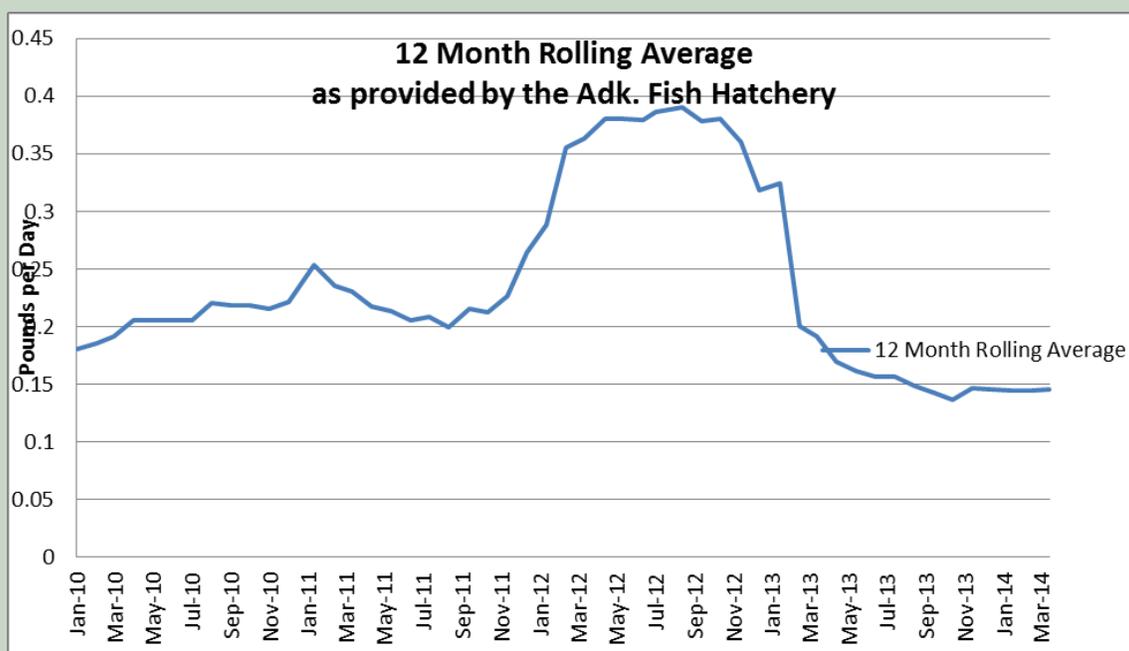
by Guy Middleton

The Foundation has known for some time that in order to maintain the ecological integrity of our Lake, we need to look outside the Lake and into the Lake's watershed for answers. Part of this process includes doing scientific monitoring of our tributaries by collecting water samples. Through the direction of the Adirondack Watershed Institute at Paul Smiths College, we test and record a multitude of important chemical parameters and have built up a robust data base to analyze the trends in the water quality of Upper Saranac Lake.

Through the ongoing scientific monitoring of our tributaries, it became apparent that Phosphorus levels in Hatchery Brook, a tributary of the north basin, were increasing. This trend began in late 2010 and intensified even more so in 2011 and 2012. The Hatchery Brook basin includes the outlet of Lake Clear and the Adirondack Fish Hatchery.

High Phosphorus levels entering the Lake feed the growth of weeds and algae, degrading water quality. Potential nuisance algae blooms generated from increased Phosphorus levels can yield unpleasant odor, produce toxins that can be harmful to people and animals, and have an appearance that reduces the aesthetic and recreational appeal of lakes. Phosphorus can enter the water naturally through wetlands, but Phosphorus is also generated from septic systems, storm water runoff and agriculture or industrial by-products.

Before we go any further, let's take a step back to 1990 when a slimy green algae bloom first appeared on Upper Saranac Lake and lasted for nearly a year. The Lake turned a pea green color causing the Foundation to investigate the source of the phosphates. Water quality tests determined that the Adirondack Fish Hatchery was a likely source of the bloom, and thus the Foundation sued in 1993, alleging the Hatchery was operating under an improperly granted permit. The suit led to a 90% reduction in pollution flowing from the New York State Fish Hatchery.

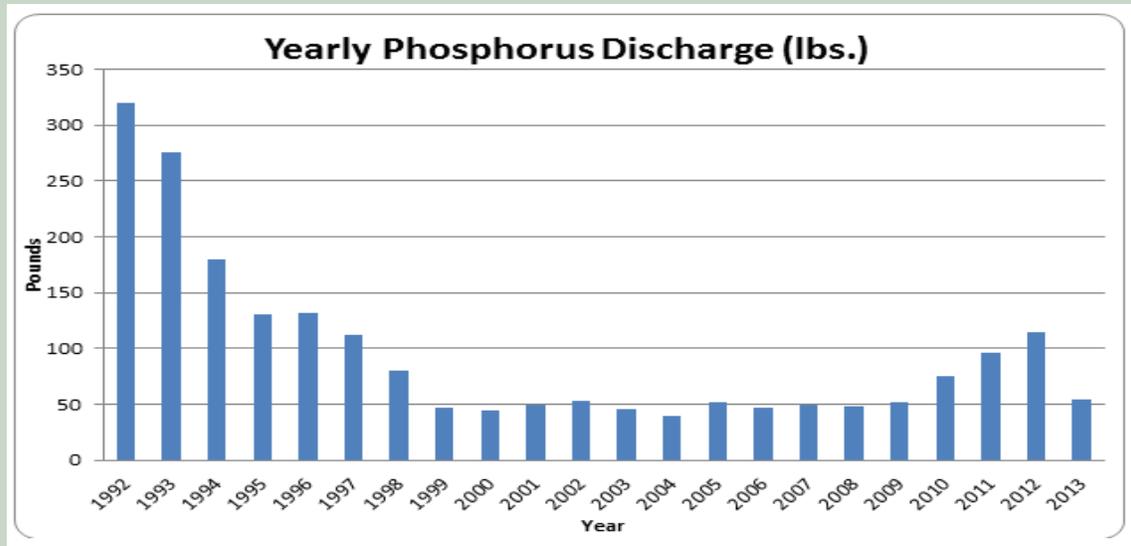


**Annual total Phosphorus discharge reported for the Adirondack Fish Culture Station.**

**(Data provided by the Adirondack Fish Hatchery Best Management Practices Annual Report, 2013)**

Potentially, the 2010-12 increase in phosphate discharge could have led to another Lake-wide algae bloom, similar to what happened in 1990. Fortunately, our pre-emptive testing and monitoring of the watershed brought attention to the increase. Although the Hatchery was well under the State Pollutant Discharge Elimination System (SPEDES) permit discharge limitation of .045 ppd, there was still reason for concern of the rising level of Phosphorus. Ultimately, it was determined that a change to a less costly Fish Hatchery fish food corresponded to the increased Phosphorus levels and was likely the cause.

Since the suit and recent threat, the Upper Saranac Foundation and the Fish Hatchery/DEC have worked closely together. Discussions have resolved the feed problem, and the Hatchery has reverted back to a more environmental friendly food, ensuring the best water quality possible for Upper Saranac Lake. Recent data immediately showed the positive effects of our combined efforts beginning in 2012.



While the Foundation monitors the watershed, its tributaries, and the activities of the Fish Hatchery, other factors impact the health of our Lake. What can you do to help keep our Lake's health? Proper care of septic systems, limiting use of fertilizers, slowing shoreline erosion, and planting shoreline buffers can all have profound positive effects on our Lake.

**Together, we can make a difference.**



Photo credits: Foxglove -Richard Moseson, Tommy's Rock - Guy Middleton,  
Gramps - Ginny B. Schwartz, Gazebo - Sara Sheldon,  
Gull Hi - Michelle Brown Garcia

## *Upper Saranac Foundation*

*P.O. Box 564*

*Saranac Lake, New York 12983*

*www.uslf.org*