

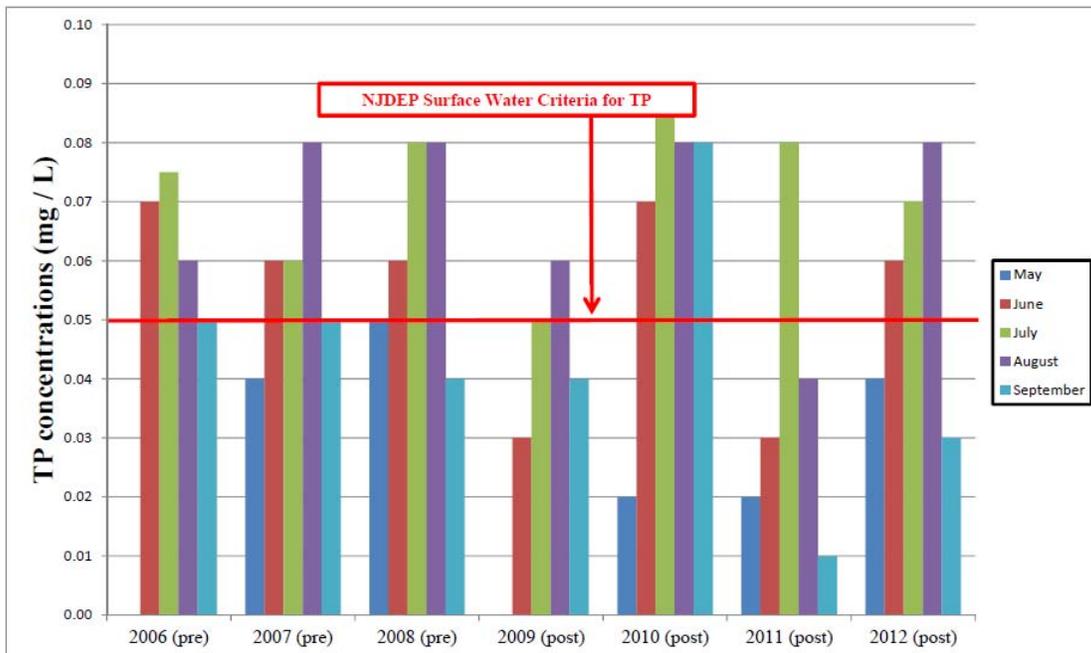
**SUMMARY OF THE 2012 WATER QUALITY MONITORING FINDINGS FOR
LAKE HOPATCONG, SUSSEX AND MORRIS COUNTIES, NEW JERSEY**

Submitted by: Princeton Hydro, LLC

December 2012

1. In contrast to 2011 that was a relatively wet and cool year, the summer of 2012 was relatively hot with sporadic storm events. Thus, anoxic conditions (dissolved oxygen concentrations < 1 mg/L) appeared in the bottom waters by late July and were documented during the August and September sampling events as well. All near-shore, shallow NPS sampling stations were well oxygenated from surface to bottom.
2. It has been well documented that phosphorus is the primary limiting nutrient in Lake Hopatcong. That is, a slight increase in phosphorus will result in a substantial increase amount of algal and/or aquatic plant biomass. TP concentrations in the surface waters of Lake Hopatcong typically varied between <0.01 mg/L and 0.04 mg/L, with three instances of the TP concentration being 0.05 mg/L and one instance of the TP concentration being 0.06 mg/L. Similar to past monitoring years, Station #3 (River Styx/Crescent Cove) tended to have the highest TP concentration with a growing season mean of 0.044 mg/L, above the TMDL-based threshold for Lake Hopatcong of 0.03 mg/L.
3. In spite of the elevated concentrations at Station #3, overall TP concentrations were generally low in Lake Hoaptcong. For example, the mean 2012 TP concentration at the mid-lake station was 0.018 mg/L. This is slightly higher than the 2011 mean but is still well below the TMDL-based threshold value.
4. Based on the *in-situ* conditions, carry-over brown trout habitat was available throughout the entire 2012 growing season. In contrast, optimal brown trout habitat was present in May and June, was not present in July and August and re-appeared in September 2012. However, carry-over habitat was available through the entire 2012 growing season. Such results are consistent with those measured in previous monitoring years at Lake Hopatcong.
5. Mechanical weed harvesting started on 2 July and ended on 6 September 2012. This year's program removed approximately 1,980 cubic yards of wet plant biomass. This resulted in removing 42 lbs of TP, accounting for 1.3% of the TP targeted for removal under the TMDL. It should be noted that the amount of TP removed in 2012 was almost twice the corrected amount removed in 2011.
6. Within recent years there has been a general trend of lower TP concentrations (since 2007), lower chlorophyll *a* concentrations (since 2004) and improved water clarity (since 2005). These long-term data were collected from the mid-lake sampling station and indicate that the lake has been trending toward better water quality conditions. However, there are still some locations that require additional attention (River Styx / Crescent Cove; northern end of the lake).

7. An Aqua-Filter, a large Manufactured Treatment Device, was installed in the Crescent Cove drainage basin in November / December 2008. Thus, 2009 was the first year the lake was monitored after this stormwater structure was installed. Overall TP concentrations in the southern end of Crescent Cove were lower in 2009 after the installation of the Aqua-Filter, in spite of it being a wetter year. As shown below only one sampling event displayed a TP concentration greater than the State's TP water quality standard in 2009.
8. In contrast, in 2010 four of the five sampling events at the southern end of Crescent Cove were greater than the State's TP water quality standard. Based on these results, it is more than likely that the first Aqua-Filter unit installed in late 2008 needs to be cleaned out and/or the filter pillows need to be replaced.
9. After the second Aqua-Filter was installed in the end of June 2011, TP concentrations were high in July 2011 but were below State's TP water quality standard in August and October 2011. However, by June 2012, TP concentrations in Crescent Cove were above the State standard and remained so through August 2012. By September 2012, the TP concentration fell below the State standard; however, these data clearly demonstrate that the Aqua-Filters need to be cleaned out and/or have the filter pillows replaced. At a minimum, both structured should have their Aqua-Swirl components cleaned out with a Vac-all truck



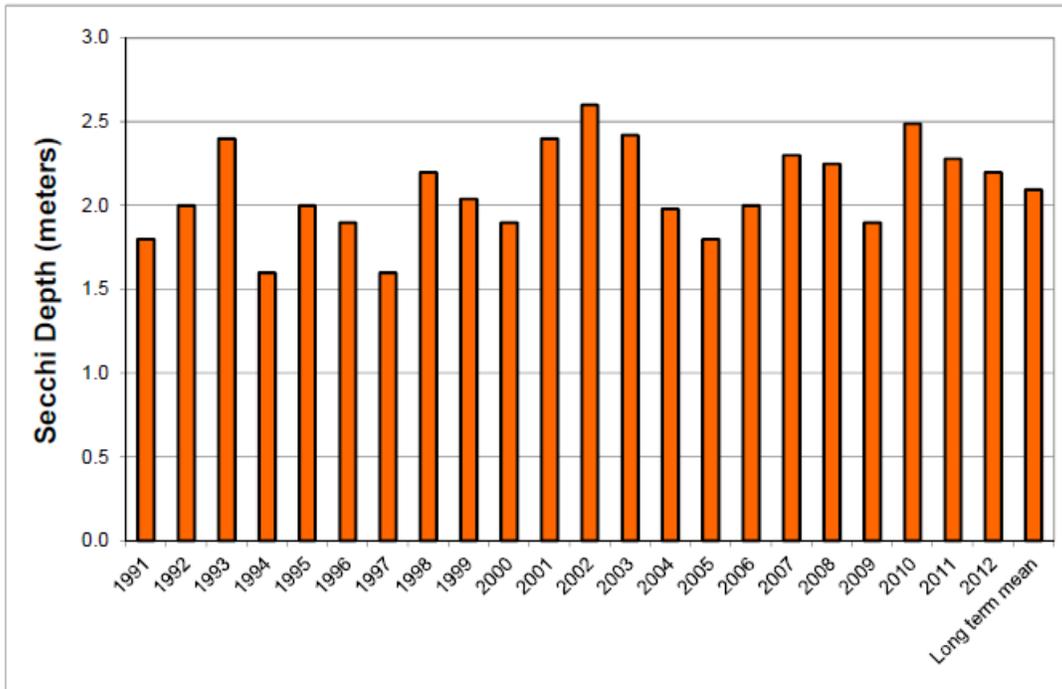


Figure 2 - Lake Hopatcong Long-Term Secchi Depth (meters)

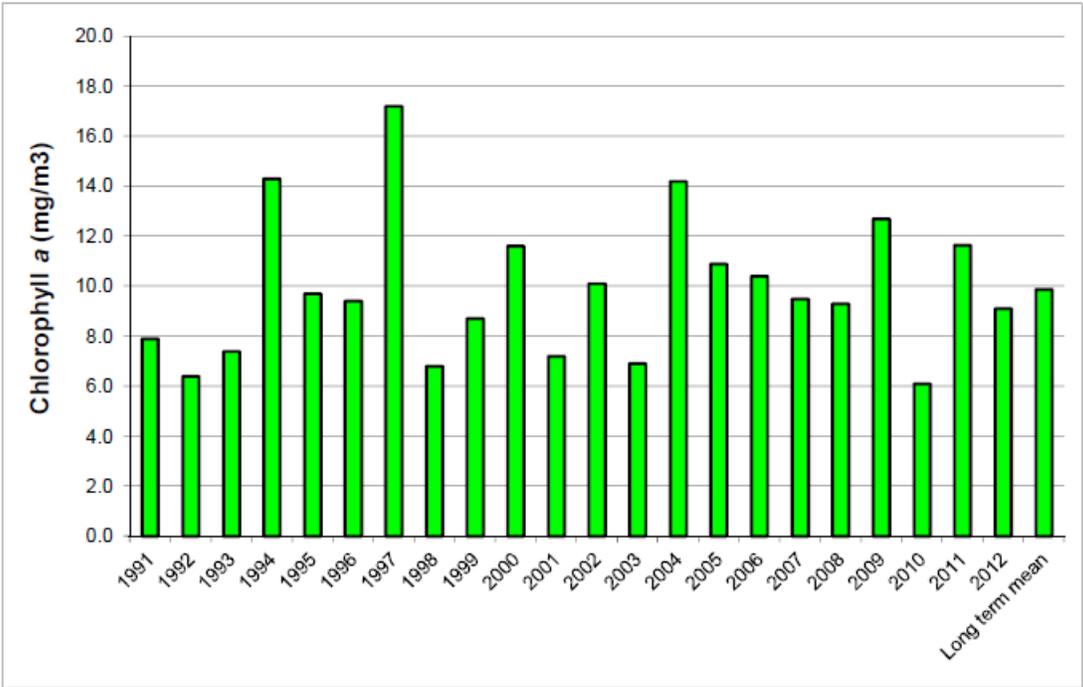


Figure 3 - Lake Hopatcong Long-Term Chlorophyll a Concentrations (mg/m³)

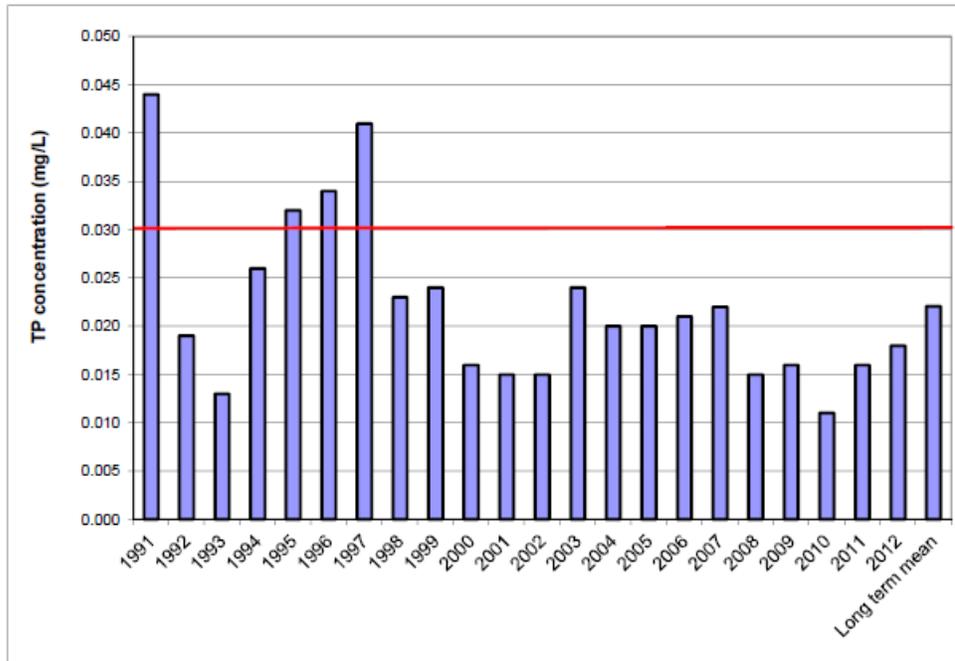


Figure 4 - Lake Hopatcong Long-Term Total Phosphorus Concentrations (mg/L)