

## Executive Summary

This report presents the findings of a three year study of Blue Mountain Lake and its watershed. Additional data from 1998 AAI volunteer monitoring program and Hamilton County's monitoring program were used in some of the trend analyses. There were two main objectives to this study. The first objective was to assess existing water quality in the lake and its tributaries. The second objective was to use the monitoring data in a water quality response model in order to predict the impact of development within the Lake's watershed. The findings of this study were also to be used in evaluating the approval of a second phase of The Woodlands development in Blue Mountain Lake.

Water quality data indicate that Blue Mountain Lake is oligotrophic but has experienced a significant decline in water quality since at least 1993. Total phosphorus concentrations have increased from around 3 parts per billion (ppb) in 1978 to between 8 and 9 ppb in 1998. Chlorophyll *a* concentrations have increased from around 1.5 ppb in 1994 to around 1.8 ppb in 1997, with an average of 3 ppb in the east basin during 1998. Transparency has decreased from around 10 meters in 1993 to around 6.5 meters in 1998.

Existing wastewater systems, which includes individual septic systems and the Adirondack Museum wastewater facility, are apparently having a significant impact on the water quality of the streams and lake. Within the streams, we observed a degradation of water quality as each summer progresses, which correlates to the seasonal loading of the systems due to summer occupancy. Within the lake, we observed the aforementioned decline in water quality. This is also evident in the lake from the sediment core work, which shows a trend of declining water quality over the past 100 years, particularly since the 1940s.

Water quality modeling showed that maximum development of the watershed, even with a mix of seasonal and year-round homes, would cause unacceptable changes in lake water quality. Modeling for a decrease in water quality to a chlorophyll *a* concentration of 2 ppb predicts total allowable new development consisting of 38 seasonal and 20 year-round homes. Given the present trend in water quality, however, it is likely that Blue Mountain Lake will reach that threshold even with the present level of development.

Existing development within the watershed needs to be examined critically and considerable effort needs to be directed towards upgrading all old and non-conforming septic systems. In addition, an alternative to stream discharge by the Museum should be investigated. Since the operation is seasonal, spray irrigation is a likely alternative that should be investigated by a qualified design engineer.

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