

# A Regional Approach to Land Use Planning

Chris Mikolajczyk

## *A public-private watershed-based management approach of the lakes of the borough of Ringwood, Passaic County, New Jersey*

The Highlands Region of New Jersey covers less than 15 percent of the state, but provides drinking water for 70 percent of its residents. Recognizing the significance and value of this region and a desire to ensure protection of both the natural resources and the economic viability of communities within the Region, the State Legislature of New Jersey passed the New Jersey Highlands Water Protection and Planning Act (Highlands Act) in 2004 ([https://www.nj.gov/dep/rules/rules/njac7\\_38.pdf](https://www.nj.gov/dep/rules/rules/njac7_38.pdf)). The Highlands Act advocated for a regional approach to land use planning, requiring stringent resource protection policies while acknowledging that development, redevelopment, and economic growth in certain appropriate areas of the Region were also in the best interests of the state.

The New Jersey Highlands Water Protection and Planning Council (Council) is a regional planning entity established in the Highlands Act and charged with its overall implementation. The Council is a 15-member appointed body (nominated by the governor, approved by the state senate) assisted in its duties by a professional staff of planners, scientists, and GIS experts. The Council works in partnership with municipalities and counties in the Region to encourage a comprehensive regional, watershed planning approach in the implementation of the Highlands Act. Implementation is guided by the Highlands Regional Master Plan (RMP), adopted by the Council in 2008. The Highlands Council Plan Conformance

process provides municipalities and counties with a framework for this implementation. Plan Conformance includes the revision of local planning and regulatory documents to integrate the land use and resource management requirements of the Highlands Act so those documents will conform to the goals, requirements and provisions of the Regional Master Plan (RMP). Plan conformance is required by the Highlands Act throughout the Preservation Area and is voluntary in the Planning Area. Municipalities and counties participating in the Plan Conformance process have access to planning and environmental science expertise, technical support, and materials for use in updating local regulatory and planning documents to ensure alignment with the Highlands Act and RMP. Grant funding is available to support some of the technical expertise associated with this work.

### **A bloom spurs action elsewhere**

In the summer of 2019, a large-scale harmful algal bloom (HAB) struck Lake Hopatcong, New Jersey's largest lake and also located in the Highlands. Lake Hopatcong is overseen by the Lake Hopatcong Commission (LHC), an independent State agency created in, but not of, the New Jersey Department of Environmental Protection (NJDEP). The LHC is recognized as a steward of the lake and watershed. The 11-member Board of State and local appointees include representatives of the four municipalities and two counties

surrounding the Lake. The LHC is responsible for fulfilling the obligations of the Lake Hopatcong Protection Act, to safeguard Lake Hopatcong as a natural, scenic, and recreational resource. As can be expected, this can be difficult at times given all the governmental and regulatory agencies, as well as citizen stakeholder groups involved. This was especially evident as the HAB persisted in the lake throughout the summer.

Further north, the Borough of Ringwood is also situated in the heart of the Highlands and is home to several public and private lakes. After seeing the events of the Lake Hopatcong 2019 HAB unfold, and in order to take an active role in the management of these natural resources within multiple watersheds, the Borough of Ringwood took the initiative to be the first municipality in the state of New Jersey to take a regional watershed based approach to private lake management through a public-private partnership (PPP) with four separate lake associations.

The four private lakes targeted in the plan: Cupsaw Lake, Erskine Lakes (Upper and Lower), Skyline Lakes (Upper and Lower), and Lake Riconda were created by the Ringwood Company in the 1920s and 1930s to promote the municipality as a hunting and fishing retreat and a summer resort for New York City dwellers (Figure 1). They currently provide private beach clubs and recreational opportunities for surrounding homeowners who can opt to join as members. Generally, in New Jersey, the health of a private lake is funded and managed in isolation by the governing private lake association group. All four sets of lakes drain to the Wanaque Reservoir, a drinking water supply reservoir.

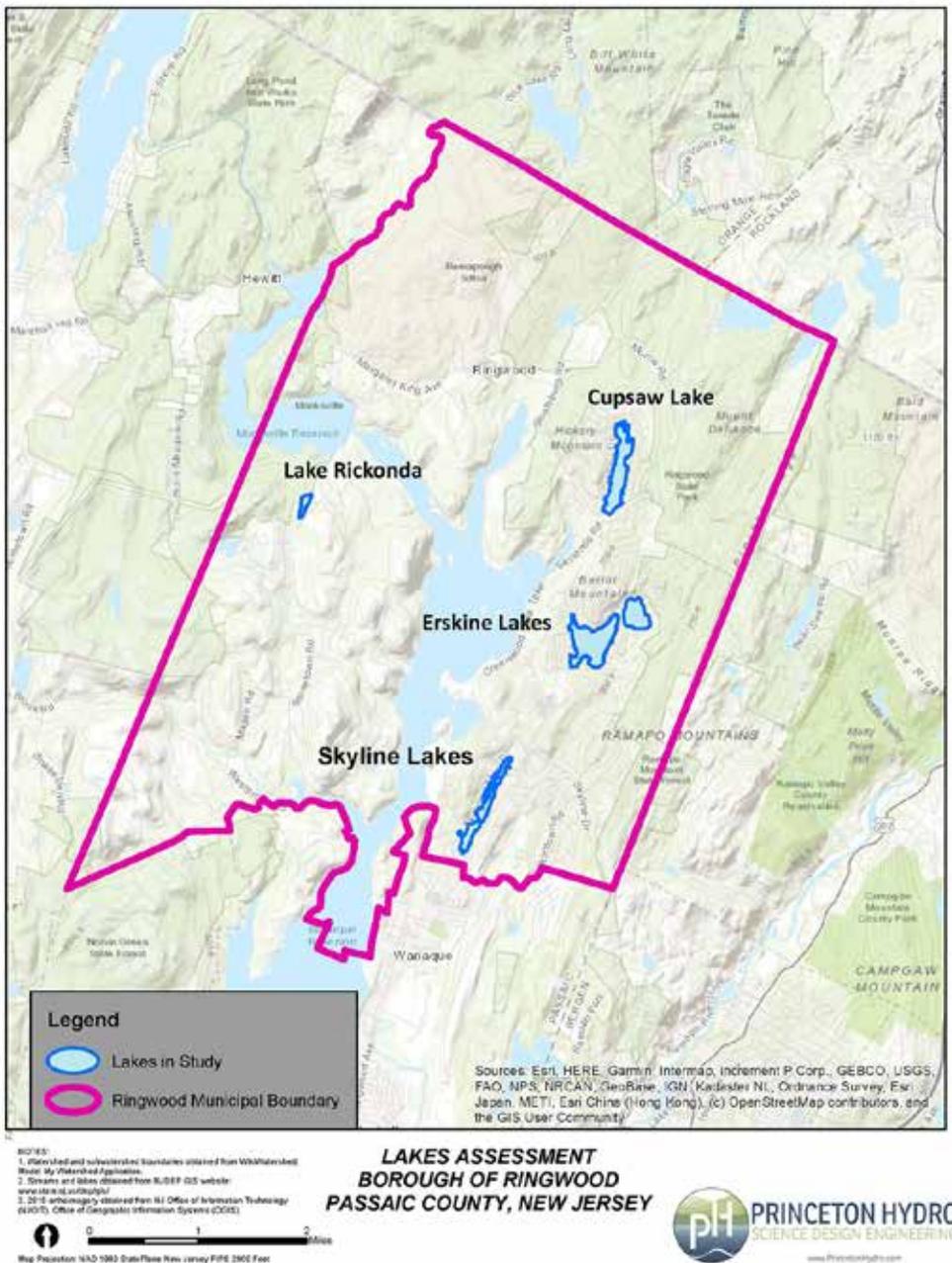


Figure 1. Map of all Ringwood Lakes

**Partnering on holistic watershed management planning**

In consultation with the author, Ringwood Borough Manager Scott Heck and Land Use Administrator Helen Forsa designed and implemented a municipal-wide, holistic watershed management plan to use as a tool to identify capital priorities in order to enhance water quality throughout the community. A regional approach to lake and watershed management is a normal approach from a scientific, technical, and community point of view. However, historically, state and municipal governments and private lake

associations have rarely partnered to take such an approach in New Jersey.

This integrated approach to watershed and lake management is an important preventative measure to improve water quality for millions of people and reduce potential future incidents of aquatic invasive species and HABS throughout the region. Funding for the Watershed-based Assessment for the Lakes of the Borough of Ringwood is being provided by the aforementioned New Jersey Highlands Council through a grant reimbursement to the Borough of Ringwood. As part of the PPP, the Borough of Ringwood will

review and where feasible implement any suggested actions surrounding the lakes, while the lake communities themselves will be responsible for any recommended in-lake actions, such as aeration, mixing, nutrient inactivation, etc., should they choose to implement them. At the conclusion of the study, the final report provided to the Borough will identify and prioritize watershed management techniques and measures that are best suited for immediate and long-term implementation, as well as provide cost projections for implementation and maintenance in both the short-term and long-term.

**A work in progress**

While the project is ongoing, to date in 2020, multiple portions of the study have begun. Specifically, historical data have been obtained from the Borough and each individual lake association, as well as any other regulatory agencies, (such as NJDEP and the U.S. Geological Survey), and reviewed in advance of implementing the watershed assessment activities. By doing so, a capitalization on established water quality trends, problems and issues raised through any past sampling efforts, and evaluation of the relative success of any past restoration efforts can be accomplished.

Additionally, the study has modeled the sub-watershed hydrologic and nutrient loading properties to each lake. The hydrologic and pollutant loading data will enable the Borough to identify and target the primary sub-watersheds or stormwater discharges requiring the greatest load control and evaluate the feasibility of managing these loads. This will aid the Borough in selecting, prioritizing and implementing nutrient and sediment load management efforts, thus ensuring that future restoration practices are directed to the watershed projects having the greatest overall benefit to the long-term management of surface water quality.

Also, using the modeling data, both baseline (no rain in the previous 72 hours) and storm water stream monitoring events are being conducted within each of the top three sub-watersheds with regards to pollutant and hydrologic loading for each lake. During these monitoring events, both *in-situ* (temperature, dissolved oxygen, pH, and specific conductivity) will

and discrete water quality (total phosphorus, soluble reactive phosphorus, total nitrogen, and total suspended solids) data are being collected (Figures 2 and 3).

Moreover, a single growing season investigation and assessment of the water quality of each of the lakes of the Borough is also being performed. During each event and at each in-lake monitoring station, *in-situ* water quality data will be recorded in profile at 1-meter increments, and Secchi depths will be recorded. Discrete water samples will also be collected at a depth 0.5 meters below the surface of the lake and 0.5 meters above the bottom of the lake, and analyzed for total phosphorus, soluble reactive phosphorus, nitrite-nitrate nitrogen, ammonia-nitrogen, chlorophyll-a and total suspended solids. Zooplankton and phytoplankton samples will also be collected and analyzed for species composition, dominant organism and relative density. Last, during each sampling event, a semi-quantitative survey of aquatic vegetation and/or algae growth (planktonic or filamentous) will be conducted (Figures 4 and 5).

### Putting the data to use

Once all of the laboratory data have been received and processed, the watershed modeling has been completed and existing historical data reviewed, a General Assessment Report will be developed. The report will discuss the data and observations compiled during the monitoring and compare these data to established USEPA/NJDEP trophic state standards and NJDEP surface water quality threshold values. The report will also cover in detail any water quality issues that were observed or measured, especially the results of the phosphorus loading and *in-situ* data. The report will also review in detail the results and findings of the field data and the relationships of the modeled data relative to any historical data.

The report will include the identification of which watershed management techniques and measures are best suited for immediate and/or long-term implementation. For each recommended technique a preliminary cost estimate for the implementation, and its associated long-term maintenance, of the specified measure will be generated.



Figure 2. Engineered watershed stream

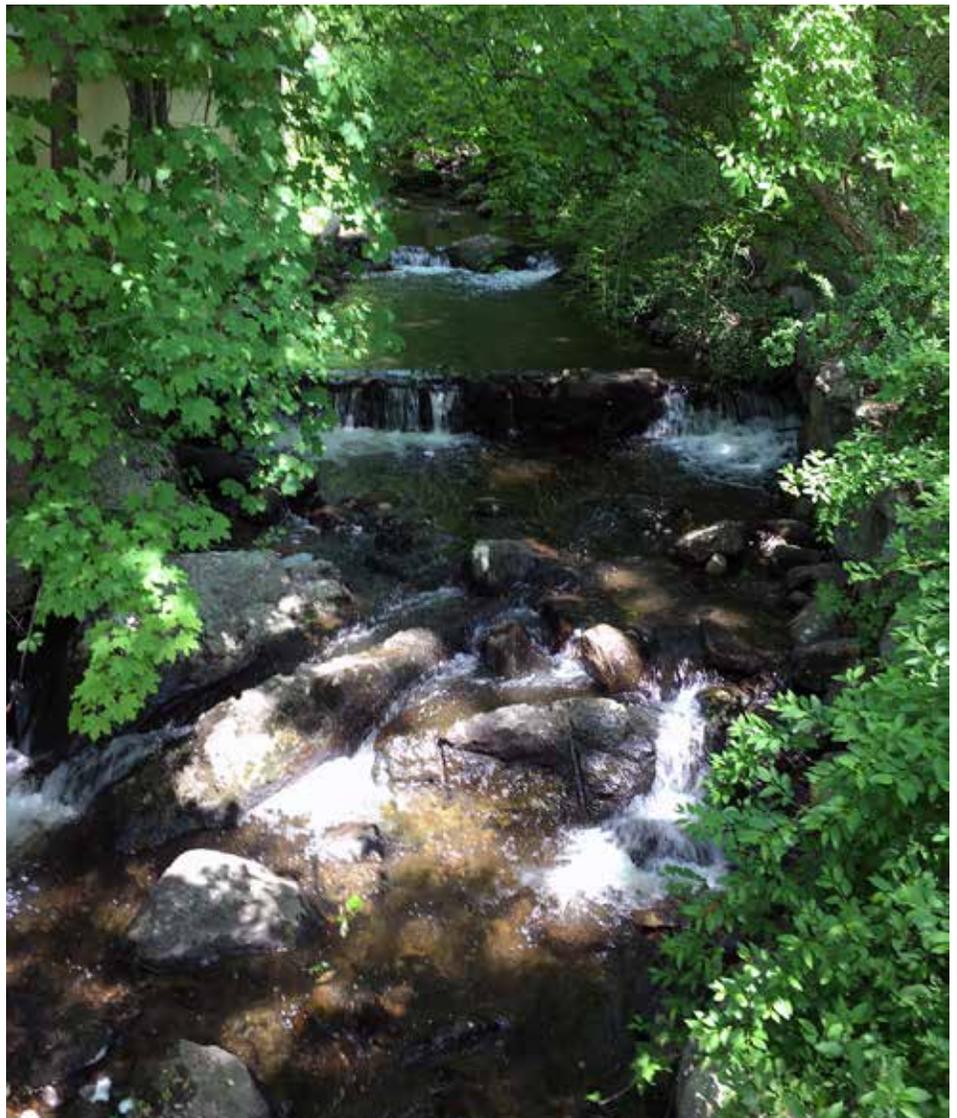


Figure 3. Natural watershed stream



Figure 4. Cupsaw Lake



Figure 5. Lower Skyline Lake

These data will be used in turn to rank each recommended management measure. Also, within the report an identification of any and all the regulatory constraints affecting each of the recommended watershed-based management measures will be discussed.

A schedule will also be generated for implementation of the recommended

watershed management measures. This will provide the Borough with a sense of not only how to prioritize restoration recommendations, but how to budget for their implementation in both the short-term and long-term. Finally, because it is important to monitor the implementation action, the plan will include a long-term water quality monitoring strategy. This

can be used by both the Borough and the lake associations to objectively and quantitatively track the watershed-based water quality improvements and ecological benefits achieved through the implementation of any recommendations provided in the assessment report.

Last, the associations of the private lakes that have received in-lake monitoring will be given all of the applicable data collected in the field. However, it is important to note that the Borough will only focus on recommendations which are watershed-related.

### Initial thoughts

As of June 2020, a single set of data has been collected for each of the three field monitoring types: baseline watershed, storm water watershed, and baseline lake. With a relatively cool spring in New Jersey, it is no surprise that the lake data all revealed signs of the lakes starting to “wake up” after a relatively mild winter that was followed by an unexpected prolonged cold snap. The region even received snow the first weekend of May! But even with this cold snap, the lake and watershed-based storm water data was revealing. All of the lakes were well mixed, and oxygenated to the bottom. For the most part, nutrients were minimal, but one set of lakes did appear to have an early season algal bloom (of the diatom *Asterionella*) occurring. Relative to the stream stormwater concentrations, total phosphorous concentrations ranged from a low of 0.01 mg/L to 0.69 mg/L (the N.J. surface water quality standard for all freshwater streams is 0.10 mg/L) and suspended solid concentrations ranged from 2 mg/L to 290 mg/L. These storm water nutrient concentrations averaged 20-30 times greater than the baseline concentrations, albeit this was only one set of data.

It would be imprudent to draw significant conclusions from this first-round and limited data set, but the key to the project is that all the parties (stakeholders, borough government and State government) are on the same page in regard to the regional watershed management approach as partners versus the typical “every man for himself” approach of the past. Also, it is important to have data to allow for these groups to be able to track water quality conditions

over the season, and to learn about the changes and problems as they are taking place.

One deduction can absolutely be drawn from the project so far. The neighboring Township of West Milford has joined the regional approach to watershed management as well. However, the West Milford project will be significantly larger with a total of 22 Township lakes set to be studied. Additionally, the Township of Rockaway has also agreed to a similar study with the number of lakes expected to be approximately 18-20. While the Township of West Milford project has been approved by the Highlands Council budgetary committee, the COVID-19 virus pandemic has prevented the final Council meeting necessary for final approval from occurring. This final approval is expected by the Fall of 2020, with the following season of 2021 targeted for field efforts. It is expected that the Township of Rockaway's scope of work will be approved shortly thereafter

as well. Perhaps the Borough of Ringwood/Highlands Council project has created the partnership approach truly necessary for lake management in New Jersey?

This is just one model of how people from different affiliations and backgrounds come together to address lake and watershed monitoring and management in a specific geographic area of New Jersey. There are other models out there, so finding one that works best for all parties involved will go a long way to establishing cohesiveness and durability to any plan and its implementation. The key is to have open communication and a common goal!

### References

Borough of Ringwood website:

<http://www.ringwoodnj.net/>

Mikolajczyk, C. A Proposed, Watershed-Based Assessment of the Lakes of the Borough of Ringwood, Passaic County, New Jersey – 11 July 2019.

New Jersey Highlands Council website:

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Princeton Hydro LLC.

### Christopher

**Mikolajczyk**, CLM, is a senior project manager and certified lake manager for Princeton Hydro and conducts the management, oversight, and coordination of aquatic ecology and water resource projects in three main areas: aquatic resource restoration and management, aquatic ecosystem sampling and investigations, and stormwater quality modeling and management. 



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