



## **Comprehensive Lake Management Planning – General Scope**

### **Pioneer Lake – Vilas County, WI**

#### **Introduction and Management Needs**

This document summarizes several of the key elements that will be included in a comprehensive lake management plan for Pioneer Lake, Vilas County, WI. These elements are a blend of Wisconsin Department of Natural Resources (WDNR) Northern Region recommendations, and our understanding of the system and management needs. A full technical proposal detailing the project area, problem statement, management needs, specific tasks to meet objectives/management needs, work plan, timelines and local cost share will be created with guidance and input from the WDNR. The full technical proposal will seek funding under the WDNR Surface Water Grant's Program. The final category to submit the proposal under will be determined with guidance from regional WDNR staff. Grant applications are due December 10<sup>th</sup> on an annual basis. Many Waters would create a proposal on the behalf of Pioneer Lake Association (PLA) to the WDNR at no charge. However, the actual proposal will need to be submitted by the Association electronically. In the event, that the lake management planning grant is awarded, it will be stated under contractual agreement that PLA will contract with Many Waters, LLC for their services to develop the comprehensive lake management plan.

The primary overarching planning goal for Pioneer Lake will be determined, however, general goals are to preserve the ecological integrity of Pioneer Lake for current and future residents and lake-users. Working towards this goal, a lake management plan will (1) provide an understanding of the existing ecological condition, (2) identify and illustrate stakeholder values and behavior, (3) identify current and potential ecological stressors to Pioneer Lake, (4) provide management options/objectives, and (5) devise an implementation plan. Below is a general outline of the objectives and overview of task items that would be included in this plan.

## **Data-Mine Existing Sources that Characterize Current and Past Environmental and Social Conditions**

Collect and synthesize existing data for Pioneer Lake related to wildlife, fisheries, water quality, critical habitat, threatened and endangered species and other pertinent physical, chemical, biological and social information. We will use known databases including the Natural Heritage Inventory, SWIMS, agency personal, and outside studies to investigate wildlife communities and habitats and also social/historical perspectives of Pioneer Lake. If necessary, information reported from these efforts will be ground verified with on site field visits. Furthermore, lake residents, under guidance of the steering committee, will compile lake observation data available including angling records, wildlife viewing, unique reports and local history of Pioneer Lake.

### **Characterize In-Lake and Shoreland Habitat**

A point intercept (PI) aquatic plant survey following the Recommended Baseline Monitoring of Aquatic Plants in Wisconsin shall be completed for Pioneer Lake (Hauxwell et al., 2010). This survey uses a grid format, where the surveyors sample each point using a rake apparatus. At each site the depth, substrate type, species and species abundance information is recorded. This survey will provide detailed information about the aquatic plant community of Pioneer Lake. Synthesis of this information includes species diversity mapping (richness and evenness), maximum depth of vegetation mapping, substrate mapping and calculating floristic indices. Indices generated from the this synthesis will help gauge the overall flora health of Pioneer Lake and are used to compare the floristic quality of Pioneer Lake to other lakes within the Northern Lakes and Forest Eco-Region.

The WDNR aquatic plant survey (PI) will provide detailed information on the overall aquatic plant community. However, this survey is limited on mapping extent and distribution of emergent and floating leaf plant communities. Emergent and floating leaf plant community mapping will delineate the extent and composition as they currently exist. Maps generated from these surveys are useful to monitor long-term changes to these communities, including both ecologically and human driven changes.

Use the WDNR Lake and Shoreland and Shallow Habitat Monitoring Field Protocols to collect habitat data on riparian buffers, bank and littoral zones. Specific data collected includes: georeferenced photos, percent cover of riparian buffer, structures and runoff concerns, bank quality, modification and erosion concerns and shallow coarse woody debris assessment. Deliverables include graphical and tabulated information on the condition and quality of shoreland and shallow habitats of Pioneer Lake. This information will be used to identify protection and restoration areas and create baseline data to understand long term trends.

Many planning projects in Northern Wisconsin are protection based. However, aquatic invasive species is one known potential ecological threat. To address the threat of aquatic invasive species the strategy will be two fold-education/prevention and monitoring. Annual monitoring is key to “catch” an early or pioneering population of an aquatic invasive species. The two species of primary concern are curly-leaf pondweed (*Potamogeton crispus*) and Eurasian watermilfoil (*Myriophyllum spicatum*).

The difference between AIS monitoring surveys and the PI survey is that PI’s are designed to systematically collect information across the entire water body at a pre-determined grid or resolution necessary to adequately sample the lake. They are designed to be unbiased, repeatable and quantitative in nature allowing comparison across other water bodies in the State. Surveys designed to target a particular aquatic invasive plant are generally qualitative and biased, meaning these surveys seek areas where aquatic invasive species may be, including boat landings and shallow water. There is not a determined grid, but rather the shallow water zone is traversed under ideal visual conditions (no rain, little wind).

## **Stakeholder Engagement and Information Sharing**

Several meetings to facilitate information sharing and engage stakeholder involvement are included in the planning process. We will be looking to have a core group of people that we will work directly with to share information and plan activities. This group will be responsible for planning outreach activities, sharing information with the rest of the lake-community and reviewing drafts and providing input. We generally write into grants a commitment of 6 meetings lasting about 3 hours each that includes 5 people. This is obviously flexible, but gives a general time commitment for this aspect of the planning process.

Initial landowner or stakeholder information will be collected in the form of a written survey. This survey will provide input on stakeholder's lake use patterns, opinions, values and concerns. We would be responsible for drafting the survey, however, we will ask the Association to be responsible for stuffing envelopes, sending and receiving the returned surveys. Drawing from the results of the written survey, field assessment and other information collected, a charrett will be developed to learn more about specific items, issues or values expressed from the written survey. A charrett is simply a face to face hands on process used to engage stakeholders. A charrett planning activity can also assist in the development of specific management and implementation pieces to be included within the lake management plan. The size of participation in the charrett will vary, however, should include at a minimum the core group of people involved in the planning process. We estimate one meeting lasting about 3 hours for this.

## **Watershed and Water Quality Assessment**

The proposed water quality sampling will collect information on a set of parameters that are useful to gauge lake "health" and provide a set of baseline information. Proposed parameters include: transparency, total phosphorous, chlorophyll *a*, dissolved oxygen and temperature, conductivity, pH, nitrogen (NO<sub>2</sub>, NO<sub>3</sub> and TKN), calcium and magnesium. Also, a historical review of all known water quality data will be included.

Using the results of the annual water quality monitoring efforts, we will synthesize and relate this data to the ecological parameter associated with the type of sampling work, develop trophic status indices for key parameters (transparency, chl *a* and phosphorous) and compare these indices to other lakes within the eco-region.

Pioneer Lake's watershed, land use type and percentage of type within the watershed will be identified. Watershed characteristics will be modeled in WiLMS (Wisconsin Lake Modeling Suit) or a comparable modeling program. Modeling is helpful to investigate how the type and extend of land use within the watershed may affect a lake. As important as watershed impacts are those within the immediate "lake-shed" of Pioneer Lake. WiLMS modeling will also

incorporate nutrient loading. From this initial modeling, prediction scenarios to land use change and impacts to Pioneer Lake can be generated.

### **Develop a Comprehensive Lake Management Plan for Pioneer Lake**

Using all the objectives above, a comprehensive lake management plan for Pioneer Lake will be generated. This plan will detail the reasoning, process, methods, and results for each objective. It will also include an implementation plan and action items for what the implementation plans seeks to accomplish. We ask participation during the plan development including being involved in revisions and edits. A typical commitment will be for 3 people to spend up to 40 hours over the entire planning period (2-3 years) on this aspect of the plan. We also anticipate about 20 hours of grant administration during the course of the entire project.

A plan becomes active when the user group understands the reasoning for the plan, the content of the plan and when management objectives and implementation items are clear, feasible, and realistic. To facilitate understanding and acceptance of this comprehensive lake management plan, a summary of the plan will be created. This summary plan (generally less than 10 pages in length) will highlight key aspects of the plan in a short, concise and easy to follow format.

Hauxwell, J., S. Knight, K. Wagner, A. Mikulyuk, M. Nault, M. Porzky and S. Chase. 2010. Recommended baseline monitoring of aquatic plants in Wisconsin: sampling design, field and laboratory procedures, data entry and analysis, and applications. Wisconsin Department of Natural Resources Bureau of Science Services, PUB-SS-1068 2010. Madison, Wisconsin, USA.

Hein, K.. 2014. Revised. Lake Sampling Procedures – LLT Water Quality.

Lake Shoreland and Shallows Habitat Monitoring Field Protocol. 2016. Wisconsin Department of Natural Resources.