

## 2019-22 RCLA 3-Phase Planning Grant Application

### **Project Area**

Dowling Lakes is located in central Douglas County. It has a surface area of 141 acres, a max. depth of 13-ft, a mean depth of 7-ft, and 2.06 miles of shoreline. There is a public access site on the northeast shore. The Amnicon-Dowling Lakes watershed covers 3,120 acres (1,432 acres for Amnicon and 1,688 acres for Dowling). The land cover is predominantly forests (45%) and wetlands (32%). Water (17%), residential areas (4%), grass/shrubland (2%), and agriculture (<1%) make up the rest. The shoreline of Dowling Lake is heavily developed containing 2 and 3 tier development. In 1994 it was observed there were 82 lots around the lake. That number has increased to at least 131 parcels in 2018 for an average parcel width of 83-ft.

Dowling Lake is a “shallow headwater” (Amnicon River) lake and was listed by the WDNR as “impaired” due to excess algae growth and unknown pollutants in 2018 based on satellite imagery. Water quality data collection on the lake has been sporadic even though it has been part of the Citizen Lake Monitoring Network program since 2002. Between 2002 and 2009 there is pretty consistent Secchi disk readings of water clarity, but nothing really after that time. Nutrient parameters including total phosphorus (TP) and chlorophyll A (ChlA) are limited to just a few years in the late 1990’s, 2004, 2012, and 2016.

There is no public land on Dowling Lake. Dowling Lake is primarily used for swimming, relaxing, fishing, viewing wildlife, and quiet sports. It is considered an outstanding musky lake. Dowling Lake is a Priority Navigable Waterway based on its natural reproduction of walleye and muskellunge.

The Amnicon Dowling Lake Management District (ADLMD) was formed in 1994.

### **Problem Statement**

In 2014 Dowling Lake was proposed for listing on the official impaired waters list. Its listing was confirmed in 2016 and again in 2018 being listed due to excess algae and unknown pollutants. Anecdotally lake property owners have noticed a significant decline in water quality particularly in the last few years with multiple complaints about blue-green algae, including comments made in 2018 about conditions so bad that a person could not open windows or be close to the lake due to the overwhelming stench coming off it.

Aquatic plants are limited in Dowling Lake. In a 2014 summer aquatic plant survey, only 29 out of 253 sample points had vegetation growing at them. Of the sites with vegetation, an average of 1.79 species were found, but that average dropped to only 0.54 species per site when considering just the littoral zone. The mean and median depths of plant growth were both 3.5ft, and the total rake fullness was moderately low averaging 1.52 at sites with vegetation. This lack of rooted plants appears to be creating a negative feedback loop: Lack of light kills macrophytes → decomposing macrophytes release nutrients into the water column → excessive nutrients results in more algae which further decrease clarity.

The reasons for declining water quality in Dowling Lake are likely many. The last time water quality in Dowling Lake was studied in detail was in the early 2000's by Thacher Engineering. Recommendations for improving water quality were made in that report. Since then, water quality has continued to decline. Whether this is because recommendations made have not been implemented or because something has changed to make conditions worse is unknown. This project is being proposed to find out.

### **C1 – 1st Goal/Job Objective (2000)**

The first goal of this project is to determine nutrient loading from that part of the watershed drained by tributaries to Dowling Lake. An earlier report indicated that the bulk of the nutrient loading was coming from the watershed of the lake. Land use in the watershed is already known, but the amount of water, phosphorus, and sediment coming into the lake via the tributaries has not been looked at since the early 2000's. There is one main tributary that comes into the lake by the boat landing on the northeast side of the lake. There are two much smaller intermittent (not flowing all the time) tributaries. The main tributary into the lake will be monitored once a month for TP and total suspended solids (TSS) from April through October in both 2019 and 2020. In addition to the monthly sampling, three additional events: one snowmelt and two rain events will be sampled each year. The outlet of the lake will be sampled for TP once a month and during the same three runoff events. The two intermittent streams will only be sampled during the snowmelt and two rain events.

### **C1 – 1a Activity (1000)**

Volunteers from the ADLMD will monitor inflow from the main tributary and two intermittent tributaries to Dowling Lake; and outflow from Dowling Lake. Volunteers will collect stream flow and volume, TP, and TSS data from the main tributary up to 10 times each year, and from the two intermittent sites three times a year. The outlet will be sampled up to 10 times per year for flow, volume, and TP. One snowmelt and two significant rain events will be sampled each year. Significant rain events could vary but are generally considered 2 inches or more in a single event. Each month a date will be predetermined with sampling occurring rain or shine. Snowmelt and rain events will be completed if it is safe to do so. Training will be provided by the Project Consultant.

### **C1 – 1a Method and Data Collected (1000)**

Tributary sampling procedures are based on those set forth in the Water Action Volunteer (WAV) stream monitoring program. Water samples will be collected mid-stream by volunteers. A cross-section of the streams will be made measuring the depth every foot across the channel. Volunteers will determine the volume of water in each tributary, each time, using cross-section data and flow rate determined by floating a tennis ball along a 20-foot length of stream and timing its float from the upper end of the reach to the lower end. The speed of the tennis ball will be determined in feet per second. When available, flow will also be determined by Global Waters Water Flow Probe and compared to the tennis ball method. Water samples for TP will be preserved with sulfuric acid. Samples will be kept cool until shipping occurs. During shipping, samples will be packed with ice. Sampling materials including labslips, pre-marked bottles, and shipping coolers will be prepared by the Project Consultant.

### **C1 – 1a Deliverables/Outcomes (1000)**

Lab results from each tributary sampling run are automatically entered into the SWIMS database. Flow and volume will be calculated for each site and recorded in an Excel spreadsheet. Volunteers will track their time and mileage for sponsor match purposes. Shipping costs will be tracked and are considered a reimbursable expense. At the end of the monitoring season and when SLOH results are all in, the Project Consultant will calculate loading values. Loading values will be compared to past loading values to identify changes and used to help set goals and objectives in a new lake management plan. As a result, appropriate management actions can be identified and implemented.

### **C2 – 2nd Goal/Job Objective (2000)**

The second goal of this project is to collect more complete surface and bottom water quality data for Dowling Lake. There could be many explanations for the deteriorating water quality in Dowling Lake. High phosphorus levels in the lake could be coming from internal loading. Phosphorus alone might not be the driving force behind deteriorating water quality. Nitrogen may be adding to the problem. Reduced aquatic plant growth could be the direct result of high phosphorus and/or nitrogen promoting algae growth that reduces light penetration, or it could be caused all or in part by other factors. High chloride levels in the water caused by road salt and de-icer applied by local residents could be affecting plant growth. Soft, organic sediments could be producing high levels of sulfates that may inhibit aquatic plant growth. Although Dowling Lake is generally thought to be a mixed lake, even very short time periods of stratification could create conditions where bottom sediments release previously stored phosphorus back into the water column. High pH in the water can cause this to happen even under conditions when there is adequate oxygen in the water.

Although Dowling Lake is a part of the CLMN program, that program only supports the collection of Secchi disk readings. In order to make comparisons of past and present conditions a more thorough data collection project is needed. TP, orthophosphates (ortho), nitrites/nitrates (N:N), ammonia(NH<sub>3</sub>), and Total Kjeldahl nitrogen (TKN) in the surface waters will be sampled monthly from May through October in both 2019 and 2020. Bottom waters of the lake will be sampled for all of the above parameters plus sulfate and iron three times between July and September. Chloride in the surface waters will be collected in the spring and fall. Alkalinity, conductivity, and pH will be collected at three different times during the season in both years. ChlA will be collected in the surface water once a month from June through October.

### **C2 – 2a Activity (1000) Surface**

Volunteers from the ADLMD will collect surface water samples at the Deep Hole in Dowling Lake once a month from May through October. Volunteers will collect a suite of water quality parameters including Secchi disk readings of water clarity, temp/DO profiles, TP, ortho, TKN, N:N, NH<sub>3</sub>, ChlA, chloride, sulfate, and pH conductivity and alkalinity at various times during the season in both 2019 and 2020. Volunteers are encouraged to collect Secchi disk readings and temp/DO profiles more frequently than once a month, but will at a minimum collect them once a month May through October. Volunteers will be trained by the Project Consultant and provided with assistance when needed.

## **C2 – 2a Method and Data Collected (1000) Surface**

Volunteers will collect the suite of water samples discussed above using materials provided by the Project Consultant. A schedule of what to sample and when will be provided to the Volunteers by the Project Consultant. Sampling equipment including a 6-ft integrated sampler, Van Dorn sampler, and DO meter will be used by volunteers. ChlA samples collected as a part of this project will be lab-filtered instead of field-filtered. Volunteers already have access to a DO meter. An integrated water sampler will be provided by the Project Consultant. Surface water samples will be collected with a 6-ft Integrated Sampler. Water sample bottles will be filled and preserved, packed in ice and then shipped to the SLOH. Temp/DO measurements will be recorded every ½ meter top to bottom. Water sampling materials including labslips, bottles, and coolers will be prepared by the Project Consultant and delivered to volunteers. Training and/or refresher training will be provided by the Project Consultant.

## **C2 – 2a Deliverables/Outcomes (1000) Surface**

ADLMD volunteers will enter Secchi and temp/DO data into the SWIMS database prior to the end of the sampling year. All lab results are automatically entered into SWIMS. Volunteers will track their time and boat use for sponsor match purposes. New data will be added to existing data for long-term trend analysis and past/present comparison completed by the Project Consultant. Long-term trend and comparison data will be used to help determine goals and objectives in a new lake management plan for Dowling Lake. Specific water quality goals and objectives will lead to management recommendations to help meet those goals and objectives.

## **C2 – 2b Activity (1000) Bottom**

Volunteers from the ADLMD will collect bottom water samples at the Deep Hole in Dowling Lake three times between July and October in both 2019 and 2020. Volunteers will collect a suite of water quality parameters including TP, ortho, TKN, N:N, NH<sub>3</sub>, iron, chloride, sulfate, and pH conductivity and alkalinity during these sampling events. Volunteers are encouraged to collect Secchi disk readings and temp/DO profiles more frequently than once a month, but will at a minimum collect them once a month May through October. Volunteers will be trained by the Project Consultant and provided with assistance when needed.

## **C2 – 2b Method and Data Collected (1000) Bottom**

Volunteers will collect the suite of water samples discussed above using materials provided by the Project Consultant. A schedule of what to sample and when will be provided to the Volunteers by the Project Consultant. Sampling equipment includes a Van Dorn sampler to be provided by the Project Consultant. Bottom samples will be collected within 3-ft of the bottom using the Van Dorn water sampler. Water sample bottles will be filled, preserved, packed in ice and shipped to the SLOH. Water sampling materials including labslips, bottles, and coolers will be prepared by the Project Consultant and delivered to volunteers. Training and/or refresher training will be provided by the Project Consultant as necessary.

## **C2 – 2b Deliverables/Outcomes (1000) Bottom**

ADLMD volunteers will enter Secchi and temp/DO data into the SWIMS database prior to the end of the sampling year. All lab results are automatically entered into SWIMS. Volunteers will track their time and boat use for sponsor match purposes. New data will be added to existing data for long-term trend analysis and past/present comparison completed by the Project Consultant. Long-term trend and comparison data will be used to help determine goals and objectives in a new lake management plan for Dowling Lake. Specific water quality goals and objectives will lead to management recommendations to help meet those goals and objectives.

## **C3 – 3<sup>rd</sup> Goal/Job Objective (2000)**

The 3rd goal of this project involves quantifying P loading from other sources including nearshore development and septic systems. Different land uses in the watershed and the nearshore area of a lake contribute different levels of P, sediment, and other pollutants to a lake. Activities in this goal include a Shoreland Habitat Assessment (SHA), Nearshore area survey, a social survey to collect “time at the lake” data, and precipitation monitoring.

A SHA looks at a 35-ft buffer strip around the lake to determine the condition it is in, and how it measures up for providing habitat. Also included is a woody habitat survey. Results from the survey can be used to identify small projects to improve shoreland and lake health.

The nearshore area of the lakes is defined as a 300-ft strip of land around the lake where a majority of lakeshore development takes place. Once quantified, estimations of the amount of P-loading from different land uses can be made. Land use around the lakes will be quantified digitally by looking at aerial photos and using GIS systems to map out different land uses.

Conventional septic systems, both functioning and not functioning properly, contribute nutrients to the groundwater. When these systems are in close proximity to lakes, groundwater flow can carry nutrients into lakes. Bad systems or grey-water disposal systems can contribute nutrients overland and into lakes. Septic system loading can be estimated using several parameters that can be easily obtained with social survey work and with default values established in models like WiLMS.

The amount of precipitation received over and within the watershed of a lake impacts many aspects of that lake. Lots of rainfall and the surface runoff that occurs can carry large amounts of sediment and nutrients into a lake. Lots of rainfall can also help flush out a slow moving or stagnant system thereby improving it. Daily rainfall on Dowling will be monitored for two years by volunteers in this project.

## **C3 – 3a Activity (1000) SHA**

Using WDNR Shoreland Habitat Monitoring Field Protocol the Project Consultant and ADLMD volunteers will complete a shoreland habitat assessment of Dowling Lake. There is a lot of development on Dowling Lake, and in many cases improvements are needed to create healthy habitat for fish and wildlife and to reduce the negative impacts on water quality. Disturbed shoreline and disturbances in the water adjacent to the shore also promotes the spread of AIS. The survey is completed from the water by

patrolling the entire shoreland of the lake. Only a 35-ft wide strip of land around the lake will be evaluated in this survey. There are four parts to this survey: 1) photos of individual parcels, 2) individual parcel visual evaluation, 3) a shoreland woody habitat survey, and 4) Compilation of the data collected into a resource document that can be used by the ADLMD to focus efforts related to shoreland improvements around the lake. A similar survey was completed on Lake Amnicon in 2015-16.

### **C3 – 3a Method and Data Collected (1000) SHA**

The shoreland survey will be completed using a standard methodology established by the WDNR for assessing and mapping habitat in shoreland areas, including riparian, bank, and littoral zones. Implementing this protocol will require circling the lake (loops) a minimum of three times. In Loop 1 georeferenced photos that slightly overlap will be taken of individual lots that make up the shoreline. In Loop 2, the riparian, bank, and littoral habitat will be assessed by parcel. In Loop 3, all pieces of large woody habitat in water less than 2-ft deep will be counted and mapped. The inventory will be conducted during the growing season late enough for plants to leaf out and landowners to landscape their property, but before plants senesce and landowners store piers and other equipment for the winter. The survey will be completed under the guidance of the Project Consultant, but using ADLMD volunteers and their boats.

### **C3 –3a Deliverables/Outcomes (1000) SHA**

All data generated by this activity, including maps, GPS/GIS data, photos, forms, and assessments are considered deliverable for this activity. A document will be put together that shows the results of this survey and makes general recommendations for all parcels evaluated. It is expected that the data generated by this survey will be used by the ADLMD and their consultant to help focus shoreland improvement efforts encouraging property owners to implement one of best management projects that not only will improve wildlife habitat on the lake but also reduce surface runoff from developed parcels into the lake.

The Healthy Lakes grant program created by the WDNR provides funding for small-scale shoreland improvement projects including native plantings, rain gardens, infiltration trenches, runoff diversions and fish habitat projects known as "Fishsticks".

### **C3 – 3b Activity (1000) Digitizing**

The Project Consultant will digitize land use in a 300-ft band around Dowling Lake in 2020. Impervious surfaces including rooftops, roads, and driveways; mowed lawns; agricultural land; forests; shrub/prairie; wetlands; and water will be quantified during the digitizing. Once quantified, phosphorus loading values from the nearshore area will be calculated using export coefficients identified in many different studies and included in modeling programs like the Wisconsin Lake Modeling Suite (WiLMS) model used as a lake water quality-planning tool.

### **C3 – 3b Method and Data Collected (1000) Digitizing**

Digitizing will be completed using a GIS software program like MapWindows or Q. Several different aerials photos of the lake that are available without cost will be evaluated to determine which one will provide the best resolution for digitizing. Typically this is leaf-off aerials from around 2010. Using a computer and a large screen shapefiles will be created for different land uses around the lake. Digitizing involves zooming into an aerial photo of the lake and creating shapefiles of each different land use. Shapefiles will be created for impervious surfaces, lawns, forests, shrub/grasses, wetlands, and open water.

### **C3 –3b Deliverables/Outcomes (1000) Digitizing**

Digitizing results for the lake will be displayed on a map in 11x17 format. An Excel spreadsheet will summarize the digitizing results. All shapefiles and GIS mapping results will be considered deliverables for this activity. Loading values will be calculated and used in developing a new water quality management plan for Dowling Lake.

### **C3 – 3c Activity (1000) Septic Survey**

The Project Consultant will work with volunteers from the ADLMD and the WDNR to produce a one to two page paper survey to be distributed to all property owners on Dowling Lake. The purpose of the survey is to collect basic information about property owners on the lakes that can be used to estimate nutrient loading from private onsite wastewater treatment systems (POWTS) or septic systems around the lakes. The survey will be distributed and tallied by the Project Consultant.

### **C3 – 3c Method and Data Collected (1000) Septic Survey**

A one to two page paper survey will be developed in cooperation with the WDNR survey guru and the ADLMD. The survey will be sent to all property owners on Dowling Lake to collect social data including the number of people who spend time at residences on the lakes and how much time they spend. The survey will ask property owner to identify what type septic system they have. If budget allows, a general information pamphlet will be sent out with the survey. Property owners will be asked to complete the survey and return it in a stamped envelope provided with the mailing. Survey results will be tabulated by the Project Consultant.

### **C3 –3c Deliverables/Outcomes (1000) Septic Survey**

The final paper survey and results are considered deliverables for this activity. Results from the survey and previous data related to soil types around the lakes will be used to generate the necessary numbers to estimate septic system loading into Dowling Lake. Septic system loading will be built into the nutrient budget for the lake.

### **C3 – 3d Activity (1000) Precip**

A volunteer from the ADLMD will monitor rainfall on Dowling Lake in 2019 and 2020. The monitors will be encouraged to join the CoCoRaHS network ([www.cocorahs.org](http://www.cocorahs.org)). CoCoRaHS is an acronym for the Community Collaborative Rain, Hail and Snow Network. Sponsored by the National Oceanic and

Atmospheric Administration and the National Science Foundation, its mission is to 1) provide accurate high-quality precipitation data for many end users on a timely basis; 2) increase the density of precipitation data available throughout the country by encouraging volunteer weather observing; 3) encourage citizens to have fun participating in meteorological science and heightening their awareness about weather; 4) provide enrichment activities in water and weather resources for teachers, educators and the community at large to name a few.

### **C3 – 3d Method and Data Collected (1000) Precip**

CoCoRaHS is a unique, non-profit, community-based network of volunteers of all ages and backgrounds working together to measure and map precipitation. By using low-cost measurement tools, stressing training and education, and utilizing an interactive Web-site, the aim of the Network is to provide the highest quality data for natural resource, education and research applications. CoCoRaHS has volunteer monitoring stations in all fifty states. A volunteer will sign up to be a member of CoCoRaHS, and use the official rain gauge to document rainfall. Each time it rains, the volunteer will take measurements of precipitation. Precipitation reports are then recorded on the CoCoRaHS website. The data are then displayed and organized for end users to analyze and apply to daily situations ranging from water resource analysis and severe storm warnings to neighbors comparing how much rain fell in their backyards.

### **C3 –3d Deliverables/Outcomes (1000) Precip**

Once recorded on the CoCoRaHS website, the data are then displayed and organized for end users to analyze and apply to daily situations ranging from water resource analysis and severe storm warnings to neighbors comparing how much rain fell in their backyards. Volunteer data from Dowling Lake will be used to quantify rainfall for water quality management planning and modeling. Five minutes a day on the part of the volunteer to record rainfall data will be included as sponsor match for this project. An annual download of the rainfall data recorded will be made and included as a deliverable.

### **C4 - 4<sup>th</sup> Goal/Objective (2000)**

The fourth goal of this project is to review and compare old and new data and create a new, hopefully, more usable Water Quality Improvement Plan for Dowling Lake. A initial study of the water quality in Dowling Lake was completed circa 1994; again circa 2003, and is now, 15 years later, being completed again. Over this study timeframe, water quality in Dowling Lake appears to be getting worse. It has been considered a eutrophic or nutrient rich lake for some time, but based on a 2013 Paleocore Study completed by the WDNR, it was likely not always so in Dowling Lake. The study concluded that as a result of shoreland development Lake Amnicon has experienced little change in phosphorus concentrations in the last 100 years but there has been an increase in the growth of submerged aquatic plants. In contrast, Dowling Lake has experienced a very large increase in phosphorus concentrations and a loss of aquatic plants. All of these studies have sought to figure out why, and given recommendations to improve conditions, but for whatever reason changes in water quality in Dowling Lake have not been positive. This new plan will build on past planning and is expected to make recommendations that the ADLMD and Dowling Lake property can and will want to implement.



#### **C4 – 4a Activity (1000) WQI Plan**

The Project Consultant along with input from the ADLMD will assemble a new Water Quality Improvement Plan for Dowling Lake. The new plan will contain a review of past data and management recommendations and analysis of new data that will be used (along with the old) to make new management recommendations and a plan for implementing them.

#### **C4 – 4a Method and Data Collected (1000) WQI Plan**

The Project Consultant will pull together a new Water Quality Improvement Plan based on past and new data collection. Recommendations made in past management planning endeavors will be reviewed for the level of implementation they received. New water quality data will be compared to past water quality data. New parameters being measured in this project, that have not been measured before will be analyzed and their role in declining water quality determined. Certain aspects of 9-Key Element Planning will be addressed in this new plan, but this not considered a 9-Key Element Plan.

#### **C4 –4a Deliverables/Outcomes (1000) WQI Plan**

The completed water quality improvement plan is the main deliverable of this activity along with the data review and analysis that was completed. The Plan will be distributed to the ADLMD, WDNR and any other interested party. Part of the Plan will be an implementation matrix that gives the ADLMD a place to prioritize management recommendations based on the resources they have available, and will identify where additional resources may be obtained. A suggested timeline of implementation over the next five years (expected to be 2021 to 2026) will be part of the Plan. A lake management plan is intended to be a utilized document that is modified often based on what happens in a lake. It is not assembled to be put on a shelf and ignored for 15 years.

#### **C5 – 5<sup>th</sup> Goal/Objective (2000)**

The last goal of this project is to make it possible for the Project Consultant with input and support from the ADLMD to assist the ADLMD in other facets of lake management and education. Project Consultant time and resources are provided for attending ADLMD meetings. Additional time is included in this project giving credit to ADLMD Board Members and volunteers to help in the general administration of this project, including final reimbursement claims.

#### **C5 – 5a Activity (1000)**

The Project Consultant and ADLMD volunteers will work together to help ensure effective and efficient implementation of this project from start to finish.

#### **C5 – 5a Method and Data Collected (1000)**

As previously outlined in project activities, both ADLMD volunteers and the Project Consultant are responsible for making this project work. ADLMD volunteers are involved in many of the activities included in the project and it will be up to the Project Consultant to help the ADLMD do the things they

are being asked to do. Daily phone and email, visits to the lake for training and data collection, and attendance at ADLMD meetings are all a part of what the Project Consultant needs to do.

#### **C5 –5a Deliverables/Outcomes (1000)**

It falls on the shoulders of the Project Consultant hired by the ADLMD to make sure this project stays on track. Keeping this project on track is one of the measurable outcomes of this project. The most important deliverable associated with ADLMD volunteer participation in this project is record keeping. Tracking of volunteer time, boat use, mileage (where appropriate), equipment use, and project expenses are necessary for project reimbursement. Many of the activities included in this project will not get done without the involvement of ADLMD volunteers. By involving volunteers in this project, more residents of the lake take responsibility for the well-being of the lake. They learn that everything they do while at the lake, impacts the lake – good or bad. This project will instill a sense of responsibility in many property owners that will translate into them being better lake stewards that can lead by example – hopefully bringing others in along the way.

#### **D. Role of Project in Planning/Management of Water Body (2000)**

Water quality management planning for Dowling Lake was completed in both the early 1990's and the early 2000's. In both of those planning efforts it was determined that water quality in Dowling Lake would continue to deteriorate from where it was during the times of each of those studies. Even though management recommendations were made to hopefully make improvements or at least to maintain a level of water quality, the predictions were correct. Water quality in Dowling Lake has continued to deteriorate to the point where the severity of it likely concerns even the most complacent property owner. All of the reasons for this are at present unknown, but several could be increasing nutrient loading from different sources, changes in the lake and water that has created new problems, or even just a lack of adequate implementation of recommendations due to a whole host of reasons. It is the goal of this project to collect new data to compare to the old as a means to quantify changes that are being observed. It is also to revisit existing ascertains made about the lake and its water quality in an effort to determine how much, if at all, they still apply in the late 2000-teens.

Whether it is implementing past recommendations or working to implement new recommendations, something needs to be done to arrest the continued deterioration of the lake. This project aims to make it easier for the ADLMD to do this.

#### **E. Existing and Proposed Partnership (1500)**

Partnerships with the ADLMD begin with the property owners on both lakes. Property owners need to be willing to take part in projects that will make improvements to the lake. Through this project, the ADLMD hopes to create a better partnership with the property owners on Dowling Lake to facilitate shoreland improvement projects and reduce nutrient loading. It is also part of the Douglas County Land and Water Resources Plan to "facilitate partnerships and support efforts of other organizations where consistent with their priorities" and to "restore and protect native habitats while meeting water quality objectives."

## **F. Plan for Sharing Results (2000)**

Lake Amnicon is a long-term trend lake monitored annually by the WDNR. Dowling Lake, immediately adjacent to Amnicon and a main source of surface water to Amnicon is not. There is a surprising lack of regular lake monitoring on Dowling Lake for whatever reason. It is a small lake, a shallow lake, one that does not have wild rice in it, has public access that is limited to relatively small watercraft, and has been fully developed along its shores for decades. Property Owners on Dowling Lake have frequently groused that Lake Amnicon gets all the attention. This project intends to bring to the attention of Lake Amnicon people the condition of Dowling Lake. Deteriorating water quality in Dowling will lead to deterioration in Amnicon, and perhaps has done so already. Project results will be shared with the WDNR, Douglas County, Tribal Resources, and other local authorities and through the implementation of recommendations in the new plan, hopefully get these entities more involved in protecting and improving the resource that is Dowling Lake.

## **G. Other**

The following documents are attached to this grant application as support materials:

- Letter of Resolution
- Public Access and Monitoring Sites
- Project Budget and Task List
- Watershed Map
- Shoreline Parcels Map
- Nearshore Area Map
- CoCoRaHS Brochure
- 2013 Paleocore Study
- Aquatic Plants Map
- SLOH Spreadsheet