Crescent Lake Management Report

Crescent Lake Association
Rhinelander, Wisconsin

Prepared for: Crescent Lake Association

Rhinelander, Wisconsin

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Executive Summary

The Crescent Lake Association retained Ayres Associates to conduct a lake study and aquatic plant management plan on Crescent Lake located in Rhinelander, Wisconsin. The purpose of the lake study was to determine the water quality of the lake, assess the watershed and shoreline, and survey the aquatic plants in the lake.

The Crescent Lake Association received a grant to conduct the study in the spring of 2006. Throughout the project, the Association was kept informed of the project progress through several meetings and presentations conducted by Ayres Associates. Members of the Association were also trained to perform water sampling and various other tasks associated with the project.

Water quality testing was performed using samples taken from the deep hole located at the north end of the lake. Parameters that were tested include water clarity, temperature, conductivity, dissolved oxygen, pH, total phosphorus, chlorophyll a, nitrates, iron, potassium, sodium, and calcium. Results of the water quality testing show that the lake is mesotrophic, which indicates the lake is moderately productive, with moderately clean water and a chance of low dissolved oxygen levels at the lake bottom in the summer. Phosphorus levels in the lake have been increasing since the mid-nineties, but are relatively low compared to area lakes, as are nitrogen levels in the lake. Average Secchi disk readings for 2006 were 13.45 feet, which indicates very good water quality according to Wisconsin water quality indices. The average concentration of calcium in the lake is 11 mg/L, which indicates an increase since EPA data was compiled in the seventies and eighties, but it still less than the 20 mg/L concentration necessary to support zebra mussels. Continued testing of the lake's water quality is recommended in order to track changes.

An evaluation of the Crescent Lake watershed was conducted to determine if and where any problem areas may exist. Three models were used to evaluate surface runoff amounts, nutrient loading and phosphorus loading to the lake from the watershed. The surface runoff model indicated an increase in runoff due to the development of areas surrounding the lake, most likely due to the increased impervious surfaces associated with development. The nutrient loading model showed that the evolution from small, summer-use cabins to larger, more modern year-round homes has not appreciatively changed the phosphorous or sediment loading to the lake, but nitrogen and BOD loading have actually gone down. The model used to evaluate phosphorus loading in the lake, indicated that the majority of the phosphorus loading is coming from atmospheric fallout over the lake itself, due to the fact that the lake surface area is nearly 1/3 of the area of the entire watershed. The second largest source of phosphorus loading is agricultural land use followed by the developed area along the shoreline. Changes to the watershed, including a reduction of the amount of impervious area, the removal or repair of failing septic systems, and the implementation of erosion control best management practices, will help to decrease the pollutant loading to the lake.

A survey of the lakeshore residents was performed to assess the views they have of the lake. A majority of respondents think the lake clarity and quality are good and that the condition of the shoreland area is good. However, 137 respondents maintain a lawn on the lake and only have a buffer of one to ten feet between the lawn and the lake. This indicates that more education is needed to help lake residents to understand the importance of shoreland buffers and other improvements.

A survey of the aquatic plants in the lake was conducted to determine variety and density of species. There were no invasive plant species found in the lake. A mixture of submergent and emergent plants was found. Large beds of emergent plants were found in the coves on the lake; a mucky bottom was also present in the coves. The majority of the bottom at the sample points was sand. A detailed Aquatic Plant Management Plan was developed to help the association assess the vegetation in the lake in greater detail.

An assessment of the shoreland development was also conducted by Ayres in conjunction with the aquatic plant survey. The shore of Crescent Lake is fairly heavily developed. The majority of the lakeshore has not been cleared of trees; however much of the herbaceous and shrub layers have been removed for lawns. Many of the lots maintain a small buffer, but most are too narrow to provide much protection. According to the lake user survey 48% stated they have a natural shoreline. When asked if a buffer was maintained 30% responded yes. Of these only 10% met the recommended width of 35 feet or more. There appears to be differing opinions on the term “natural” and what qualifies as a buffer.

Introduction

The Crescent Lake Association retained Ayres Associates to conduct a lake study on Crescent Lake. The purpose of the lake study was to determine the water quality of the lake, assess the watershed and shoreline, and survey the aquatic plants in the lake. The lake study consisted of the following tasks: coordination with the Crescent Lake Association, water quality testing, watershed evaluation, lakeshore resident survey, aquatic plant survey, shoreland assessment, and creation of an aquatic plant management plan.

Crescent Lake is located in Oneida County west of Rhinelander, Wisconsin. Portions of the lake are located in Sections 8, 17, 20 and 21 in T 36 N, R 8 E. The lake covers approximately 626 acres with a maximum depth of 32 feet. The lake has heavy development density and supports a variety of fish and aquatic plants.

The purpose of this study was to collect information on water quality, watershed and aquatic plants in the lakes. This data was used to determine the current water quality of the lake, identify any lake management needs and set goals to achieve these, and establish background data for future studies. The analytical data collected from the lake was used in conjunction with an inventory of the watershed to develop a watershed model using the EPA (Environmental Protection Agency) STEPL program. Additional information was collected to develop an Aquatic Plant Management Plan to help the Association assess the vegetation on the lake.

Task I: Coordination with Crescent Lake

Before the project began a grant was written and submitted to Department of Natural Resources (DNR) to provide funding for the project. The grant was prepared by Ayres Associates with input from the Association. The project scope was developed and tasks listed to achieve the goals of the Association. Responsibility of the tasks was divided between Ayres and the Association so the Association could use donated labor to offset the cash contribution to the project. The grant was received and the work commenced in Spring 2006.

At the beginning of the project a kickoff meeting with members of the Crescent Lake Association was conducted. At this meeting Ayres gave a Power Point presentation outlining the objectives and tasks involved in the study. The project was discussed and a schedule for the project was completed. A second presentation was also given at the annual meeting of the Association at the Bible Camp. The Association was given an update on the tasks completed to date and the future tasks were discussed. A question and answer period followed the presentation. A final presentation was given at the 2007 annual meeting. The presentation included all results of the study including water quality, watershed assessment, aquatic plant survey and aquatic plant management plan. Public input on the aquatic plant management plan was taken at this meeting.

Task II: Water Quality Testing –

The water quality testing included taking samples from the deep hole in Crescent Lake. According to the DNR website, in 2003 the parameters that were tested through the Self-Help program were water clarity, temperature, total phosphorus and chlorophyll a. This program was continued in 2006. Additional parameters that were tested for in this study included nitrates, iron, potassium, sodium, and calcium. Samples were collected each month from May through September from near the surface and near the bottom of the lake at the deep hole. The first and last samples were taken at turnover, at this time only one sample was collected. Turnover

occurs twice each year in a stratified lake such as Crescent. In spring and fall when the water temperature is nearly the same throughout the water column the lake mixes by wind and wave action. During turnover only one sample is collected from the lake since the water in the lake is mixed.

At the first sample collection, Ayres Associates staff was present to train the Association members in the collection procedure. Meters to read dissolved oxygen, temperature, pH and conductivity, Secchi disk and sample collection bottle were provided by Ayres for each sampling. The samples were sent to the State Laboratory of Hygiene for analysis.

Task III: Watershed Evaluation –

For this evaluation the watershed boundary of Crescent Lake was delineated and the land uses in the watershed were mapped. Using this information, the amount of runoff and the pollutant load it carried into the lake was estimated. The amount of runoff was estimated using NRCS (Natural Resource Conservation Service) program Technical Release-55 (TR-55). TR-55 is perhaps the most widely used approach to hydrology in the US. Originally released in 1975, TR-55 provides a number of techniques that are useful for modeling small watersheds. The pollutant load was estimated using EPA (Environmental Protection Agency) program STEPL (Spreadsheet Tool for Estimating Pollutant Load). STEPL employs simple algorithms to calculate nutrient and sediment loads from different land uses and the load reductions that would result from the implementation of various best management practices (BMPs). Using the results of the water quality testing and flow estimates for the watershed, a water quality model for the lake was developed. The WiLMS (Wisconsin Lake Modeling Suite) model developed the hydrologic and morphometric module that evaluated flows to and through the lake. WiLMS is a lake water quality-planning tool. The model uses an annual time step and predicts spring overturn (SPO), growing season mean (GSM) and annual average (ANN) total phosphorus concentration in lakes. The non-point and point source modules evaluated phosphorus loading.

Task IV: Lakeshore Resident Survey –
A survey of the lakeshore residents was taken to assess the views they have of the lake. A survey was created that had questions specific to Crescent Lake. The survey was mailed to lakeshore residents and lake users. The survey was tallied by the Crescent Lake Association and the results are presented in this report.

Task V: Aquatic Plant Survey/Shoreland Assessment –

A survey of the aquatic plants in the lake was conducted to determine variety and density of species. A grid was placed over the lake map, and sample points were determined across the lake; these points were determined by DNR. At each point, the plant species and density were inventoried. A variety of vegetation was found throughout the lake. An assessment of the shoreland development was also conducted by Ayres in conjunction with the aquatic plant survey. A rating scheme was used to determine the amount of shoreland development on the lakeshore.

Task VI: Aquatic Plant Management Plan –

An Aquatic Plant Management (APM) plan was developed to help the Association assess the vegetation in the lake. The plan was developed using the information collected from the aquatic plant survey, lakeshore resident survey and information from the watershed assessment.

Methods

Water Quality Testing

The water quality testing consisted of taking samples from deep hole south of the island on the north section of the lake, the deepest spot of the lake. Samples were collected each month from May through September. One sample was collected from the surface during each sampling period. An additional sample was collected from the bottom during the August and September sampling.

Following is the list of parameters that were tested for in each water sample:

- Nitrate plus Nitrite – N
- Calcium
- Iron
- Potassium
- Sodium

All of the samples were sent to the Wisconsin State Laboratory of Hygiene for analysis. During the collection of these samples additional parameters were measured in the field. Conductivity, pH, and temperature were recorded on samples taken from 3 feet below the surface and 3 feet above the lake bottom. Dissolved oxygen and temperature were also measured at 3 foot intervals throughout the water column.

The first set of water samples was collected by Ayres Associates. A training session was held on the lake to instruct the members of the Crescent Lake Association in the collection procedure and use of the meters. The remaining samples were collected by members of the Association.

Sample bottles were provided by WDNR. Ayres provided water sampling equipment and meters to measure dissolved oxygen, conductivity, pH, and temperature. The meters and equipment were shipped to the Crescent Lake Association for a one-week period during each sampling month. When sampling was complete for that round, the Crescent Lake Association returned the meters and equipment.

Data collected through the Self Help program and the EPA STORET data was used to evaluate current water quality and how it has changed since the 1970's. This information was gathered from DNR and EPA websites.

Watershed Evaluation

The watershed boundary for Crescent Lake was delineated and land uses within the watershed were mapped. The watershed boundary was delineated using a USGS topographic map. Aerial photography from DNR website and Oneida County zoning maps were used to determine the land use in the watershed. The accuracy of these maps was checked in the field. Ayres Associates conducted a windshield survey of the watershed to compare current land use to the mapped land use and aerial photography. A more in-depth look at the land uses was conducted by the Crescent Lake Association. The Association was sent copies of the land use as mapped

by Oneida County, Wisconsin Wetland Inventory (WWI) and NRCS Soils map. The Association was asked to evaluate the land use as follows for the listed maps:

Land Use Map

Check mapped land use to actual land use.

- Residential
  - Density of houses
  - Mowed lawn or wooded lots
- Mixed Forest
  - Types of trees
  - Shrubs present
  - Undergrowth vegetation and amount
  - Age of forest (tall trees with canopy or small trees with less canopy)
- Cropland/Pasture
  - Still used as cropland/pasture
  - Type of crop

Wetland Map

- Check mapped wetland with actual wetland
- Are mapped wetland types wooded, emergent or shrub/scrub
- Are symbols wetlands, what type of vegetation is present
- Any other unmapped wetlands

Soils Map

Check gravel pits (three mapped in watershed)

Check depressions

Check wetlands if not mapped on wetland map

Other: any construction sites with bare soil, cranberry bog at south end, new residential areas not mapped.

Results of the watershed assessment field work conducted by the Association are included in Appendix B.

To assess the watershed areas of land use were determined from the land use maps. These areas were used in the NRCS TR-55 model to estimate runoff amounts. An EPA program called STEPL was used to estimate pollutant loads based on land uses. The areas of each land use were entered along with estimates on septic systems from the lake lots. The program determined the amounts of nitrogen, phosphorous, biological oxygen demand (BOD) and sediment that are reaching the lake from the watershed. Estimates were made for lot sizes. It was assumed each lot was 1 acre. This was based on the length of shoreline divided by the number of lots. A depth of 300 feet was used for each lot so the near shore area would be included in the calculations. For the STEPL model, the number of capita-years was required as

part of the septic tank data. One capita-year is equal to one person occupying a dwelling for one year. Data from the resident survey about the number of people and time spent at residences was used to determine the number of capita-years necessary for septic tank loading. Surface drainage patterns were determined using the topographic maps and a windshield survey visual assessment by Ayres Associates of the watershed. Management recommendations have been made based on the information collected.

Using the results of the water quality testing and flow estimates for the watershed, a water quality model was developed for the lake. The WiLMS (Wisconsin Lake Modeling Suite) program was used to develop the hydrologic and morphometric module, which evaluated flows to and through the lake; the non-point and point source modules evaluated phosphorus loading in the lake. The estimates used in the STEPL program for lot size were also used in this model.

The Association expressed concern that the development of larger homes, an increase in the number of people using these homes, and the modernization of septic systems on the lake properties has affected the watershed drainage into the lake and the resultant lake water quality. In an attempt to quantify these changes in water quality, information from the resident survey and the Crescent Lake Association was used to create separate STEPL models for each stage of Crescent Lake's development.

There are currently 282 residential lots surrounding Crescent Lake, 46 of which are off the lake. Of the remaining 236 lots, 230 have some sort of structure, and six are empty. Lots are assumed to be one acre. Structures on the lots are separated into four categories:

Category 1: Original (1930s) summer cabins built on the lower tier of the lots very near the shoreline (no buffer zone). No indoor plumbing, little insulation, used during weekends and summers.

Category 2: Permanent, year-round homes built for full-time residents (after WWII). Included septic systems with concrete tanks.

Category 3: Older cabins remodeled inside and out (1970s), some to allow for a lower level. Insulation and heating systems added, along with upgraded septic systems.

Category 4: Older cabins destroyed, bigger, more modern homes built (since 1975) for both year-round residents and part-time residents. Included up-to-date septic systems.

A curve number was assigned to each home category by estimating the amount of impervious surface (roof area, driveways/sidewalks, lawn condition, etc.) The curve number used for each category are listed in Table 11. Septic tank assumptions are included in Table 12.

Four STEPL models were set up to provide information on changes in nutrient loading to the lake over the past 70 years. The assumptions made for each model are included in Table 13. Off lake lots (46 lots) were assumed in the model to be year-round homes with a curve number of 62 and are not included in Table 13. A fifth model was used to determine the loading from the current land use in the watershed and evaluate the effectiveness of buffers around the lake shoreline.

Lakeshore Resident Survey

A survey of the lakeshore residents was taken to assess the views they have of the lake. The survey was sent to the residents via mail and they returned them to the Crescent Lake Association. The survey assessed the problems residents foresee with the lake, their activities and use of the lake and management practices that have been implemented.

Ayres Associates provided several surveys to the Crescent Lake Association. The Association then used these examples and created a survey tailored to their lake. The residents completed the survey and mailed them to the Crescent Lake Association for recording.

Aquatic Plant Survey

A survey of the aquatic plants in the lake was conducted to determine variety and density of species. Ayres Associates conducted the survey, with assistance from Crescent Lake Association volunteers. The procedure that was followed during the survey is described below.

The aquatic plant survey for Crescent Lake was performed on August 15-17, 2006. The survey was conducted using the Point-Intercept Method. This method allows for an objective measure of plant distribution and abundance. The data collected was statistically analyzed (using WDNR worksheets) to determine community trends; this is especially useful to compare data to future surveys. The sample points were determined by DNR using a variety of parameters. The points were provided to Ayres and were loaded into a GPS unit. The GPS unit was used on the lake to locate the sample points. At each point, the plant species were inventoried; the depth to the bottom of the lake and the composition of the lake bed (muck, sand, gravel) was recorded. The vegetation samples were collected with a weighted throw rake or a long handled rake.

An assessment of the shoreland development was conducted by Ayres in conjunction with the aquatic plant survey. While on the lake an aerial photograph was used to mark the locations of the various degrees of development. The length of the shoreline in each rating was measured and compared to the entire length of shoreline. A rating scheme was used to determine the degree of shoreland development on the lake. The development was rated from 1 to 5 according to the following criteria:

1: Development with any of the following: riprap, seawall, cleared shoreline, no or little setback on structures, boathouses, and vegetation cleared from lake bottom.

2: Development with shoreline clearing and no buffer.

3: Development with some shoreline clearing, some buffer, docks, swimming rafts.

4: Light development with shoreline buffer, little clearing and no docks or rafts.

5: No development, natural shoreline.

A DVD of the lakeshore was taken to complete the assessment. This DVD is available from the Lake Association. A map was created showing the development on the lake.

Results

Water Quality Testing

The results of the water quality testing conducted for this study are contained in Table 1 through Table 3 and Figure 1 through Figure 3. The Self Help data analyzed for this study is included in Table 7 and Figure 4. Tables 4 through 6 used data collected from this study and the Self Help data to determine the water quality of the lake. The EPA STORET data is included in Table 8.

Watershed Evaluation

The entire watershed of Crescent Lake covers approximately 1,574 acres of land. Following is the area of each land use in the watershed:

- Lake surface - 626 acres
- Forest - 550 acres
- Residential – 165 acres
- Agricultural land - 128 acres
- Wetlands - 80 acres
- Public space - 25 acres

Figure 5 shows the land use as mapped by DNR on their website.

Table 9 includes detailed acreages of the land uses in the entire watershed. The amount of runoff was calculated for the entire watershed using TR-55. According to TR-55 the peak discharge for the 100-year storm is 1,149 cfs. Table 10 indicates the peak discharge for the 2, 5, 10, 25, 50 and 100-year storm event.

The nutrient loading from the watershed to the lakes was calculated using STEPL. This program calculated the amount of nitrogen, phosphorous, biological oxygen demand and sediment load into the lakes from the watershed. Table 15 gives these loads in lb/year and tons/year based on current land use in the watershed. It also lists the results with the best management practice (BMP) of shoreline buffers implemented. The reduction in loading can be seen in these results. Table 14 lists the results of the analysis conducted to determine the effect of shoreland development over the years. Tables 16 through 18 lists the results of these models.

Water quality models for the lake were created using WiLMS. The model determines the amount of phosphorous loading to the lake from point sources, non-point sources and aerial loading. Table 19 shows the results of the WiLMS modeling.

Lakeshore Resident Survey

The results of the lakeshore resident survey are provided in Table 20 and Figure 6 through Figure 17. A copy of the survey is included in Appendix A.

Aquatic Plant Survey

Ayres Associates completed the aquatic plant survey with the help of volunteers from the Crescent Lake Association. From the data provided, a map was created for the lake indicating the location of emergent and submergent beds. The map is included as Figure 18 in the Figures section of this report. The data and results of the plant survey are included in Table 21 through Table 22.

Shoreland Assessment

The results of the shoreland assessment that was completed during the aquatic plant survey are shown below. Figure 18 depicts a map of the shoreland development.

Shoreland Assessment Output

Development type	Feet of shoreline	Percent of total
Riprap, seawall, cleared shoreline, no or little setback on structures, vegetation cleared from lake bottom	6222	16.6
Shoreline clearing and no buffer	6099	16.3
Some shoreline clearing, some buffer, docks	21807	58.3
Light development with shoreline buffer, little clearing, no docks	2151	5.8
No development, natural shoreline	1119	3.0

Results of Lakeshore Resident Survey	
Development Type	**Percentage of Total Responses**
Retaining wall	2
Rock riprap	20
Lawn	29
Landscaped trees, shrubs	12
Undeveloped, natural shoreline	58
Shoreline buffer maintained	42

Discussion

Water Quality Testing

Water samples were collected from the lake each month May through September. The samples were taken at one location in the lake; at the deep hole on the south side of the island in the north portion of the lake. The water samples were collected from 3 feet below the surface during May, June, July, August and September. An additional sample was collected from 3 feet above the bottom of the lake during August and September. The samples were analyzed for nitrate plus nitrite, calcium, iron, potassium and sodium. The water samples were sent to the State Lab of Hygiene for analysis. Additional information was collected during the sampling process using meters. Conductivity, temperature and pH were measured on samples from near the surface and bottom of the lake and dissolved oxygen and temperature were recorded throughout the depth of the lake at 3 foot intervals.

The Association has also been involved with the DNR Lakes Self Help program. Beginning in 1986 and continuing to the present, a variety of water quality parameters have been tracked on the lake. For two years, 1998 and 1999 no data was reported. Each year secchi disk readings were taken throughout the summer months, as well as chlorophyll a for 13 years and total phosphorous for 8 years. This data was used to interpret the water quality of Crescent Lake. Information from the EPA STORET site was also used in the water quality interpretation. Information on the water quality was collected in the 1970's and mid 1980's by EPA. The data that was used for this study is listed in Table 8. An explanation of the results of the water quality testing is included below.

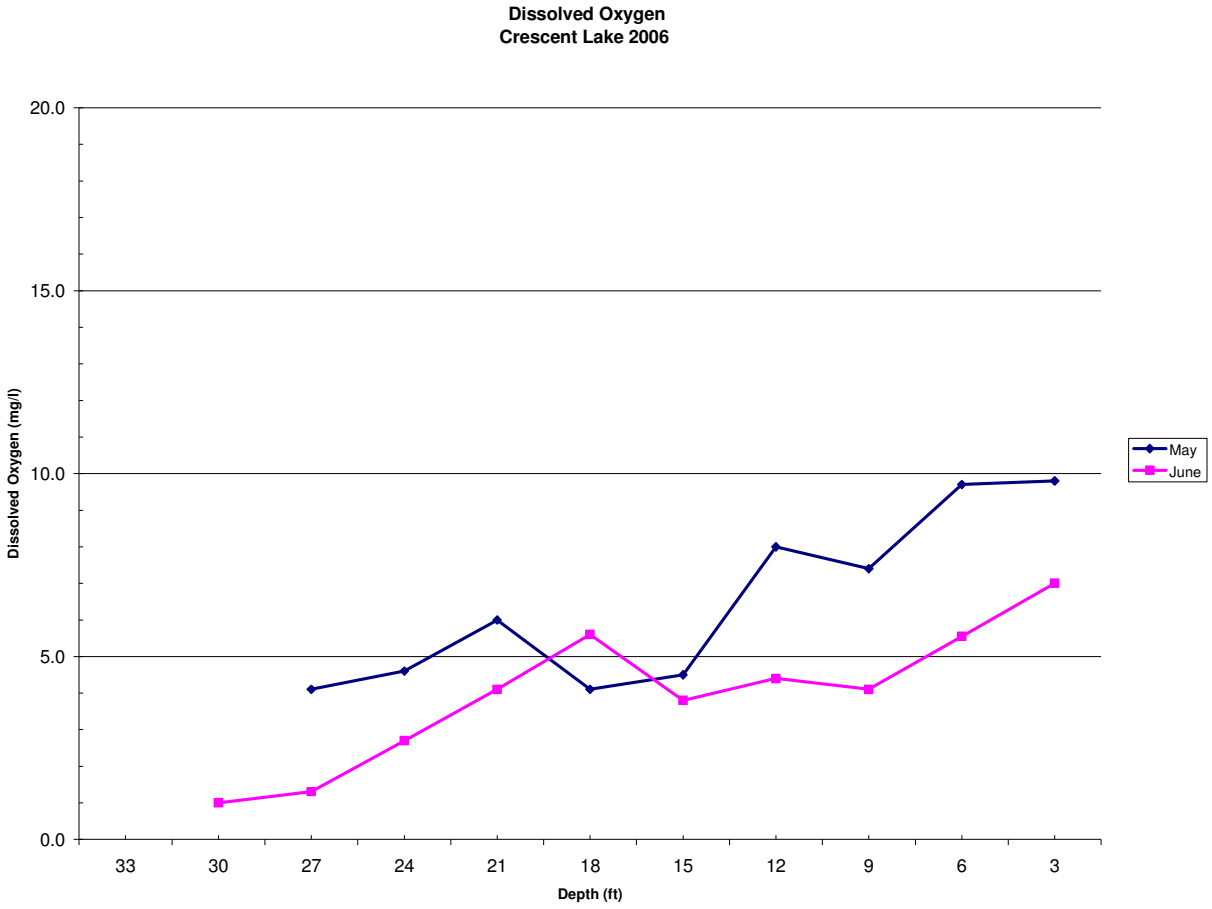
Dissolved Oxygen (DO)

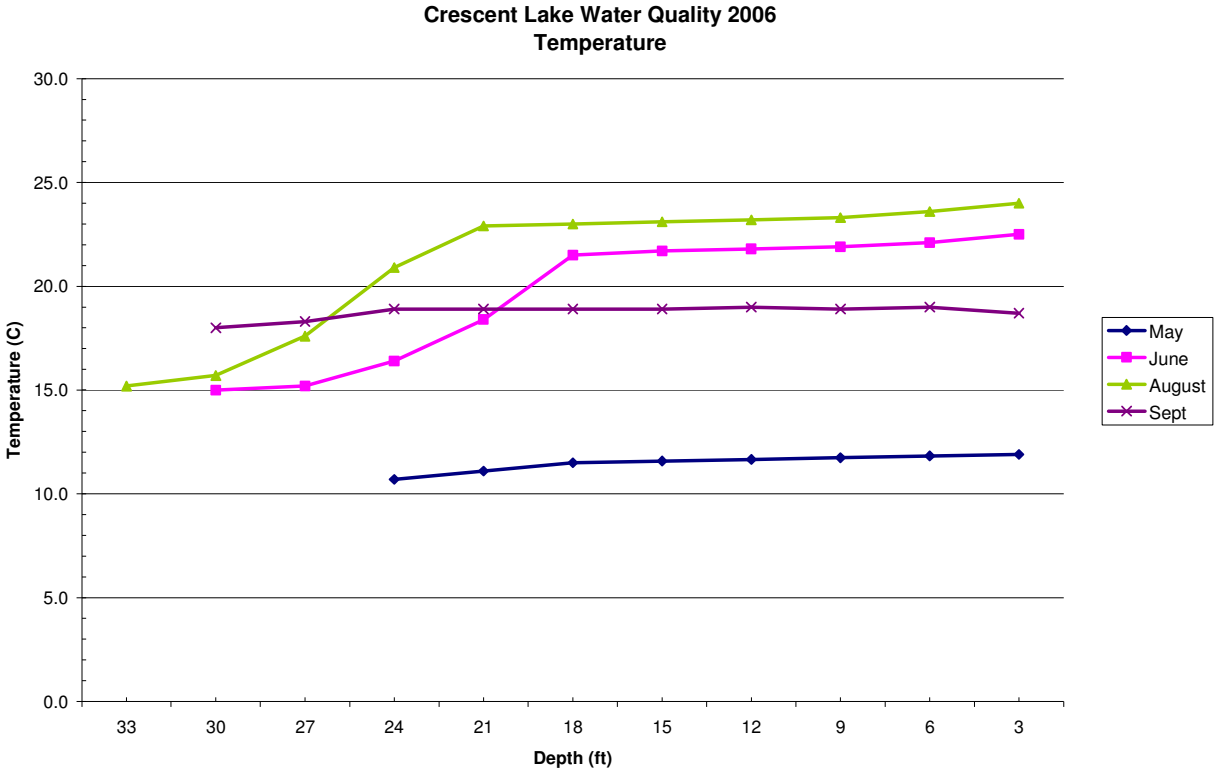
Dissolved oxygen is one of the most important parameters in a lake. The DO is necessary for the survival of fish and the concentration of DO determines the form and concentration of the other chemical parameters in the lake water. Oxygen enters the waters surface from the air, through wind and wave action and from oxygen rich stream water. DO is produced by aquatic plants during daylight hours through photosynthesis and used at night during respiration and during the decomposition of vegetation. For this reason the DO concentrations in a lake are always changing.

The minimum water quality standard for DO in warm water lakes and streams is 5 mg/l. This is the minimum amount of oxygen fish and invertebrates require for survival and growth. If the concentrations dip below this level, fish kills may occur. At these low levels of oxygen, nutrients and other compounds are released from the sediment. The low levels of oxygen may also occur during the summer months in stratified lakes where the water at the bottom becomes anoxic because it can not mix with surface water and replenish the oxygen supply. In a stratified lake such as Crescent, turnover in the spring and fall completely mix the lake spreading the nutrients and oxygen throughout the water column.

Turnover can be typically be detected in DO and temperature graphs. At turnover the temperature and DO readings are nearly the same throughout the water column. As displayed in the temperature readings from May and September the temperature throughout the water column is nearly constant indicating mixing and turnover. When stratification occurs, the temperature decreases with depth and a rather large jump in temperature occurs at the thermocline as indicated in the temperature readings from June and August. The thermocline is the layer of water that separates the top of the lake from the bottom and prevents mixing of

these waters. Theoretically the DO readings should show trends similar to the oxygen readings, at turnover the DO should be relatively constant throughout the column and during stratification the DO should decrease with depth. The readings from Crescent Lake did not indicate this. The trend in the lines for May and June indicate decreasing DO with depth with a few readings in between that are not consistent. The readings from August and September were invalid due to operator error or equipment malfunction.





DO concentrations are also affected by temperature, colder water can hold more oxygen than warmer water. At 32°F water can hold 15 mg/l of oxygen and only 8 mg/l when the temperature reaches 77°F. In Crescent Lake, the DO drops below the 5 mg/l threshold during the summer months. This is due to the stratification. The same results can be seen in the temperature readings. A definite drop is seen near the bottom of the lake in the summer months and the temperature stays level at the turnover events. It appears the thermocline is at about 20 feet in Crescent Lake according to the data gathered in June, but this depth can change throughout the summer months. This generally agrees with the Self Help data. The Self Help data from the DNR website is included in Appendix C. In the areas where the DO drops below 5 mg/l fish will not be found, they move to other areas of the lake that have an adequate oxygen supply. Table 3 lists the temperature and dissolved oxygen readings for 2006.

Nutrients

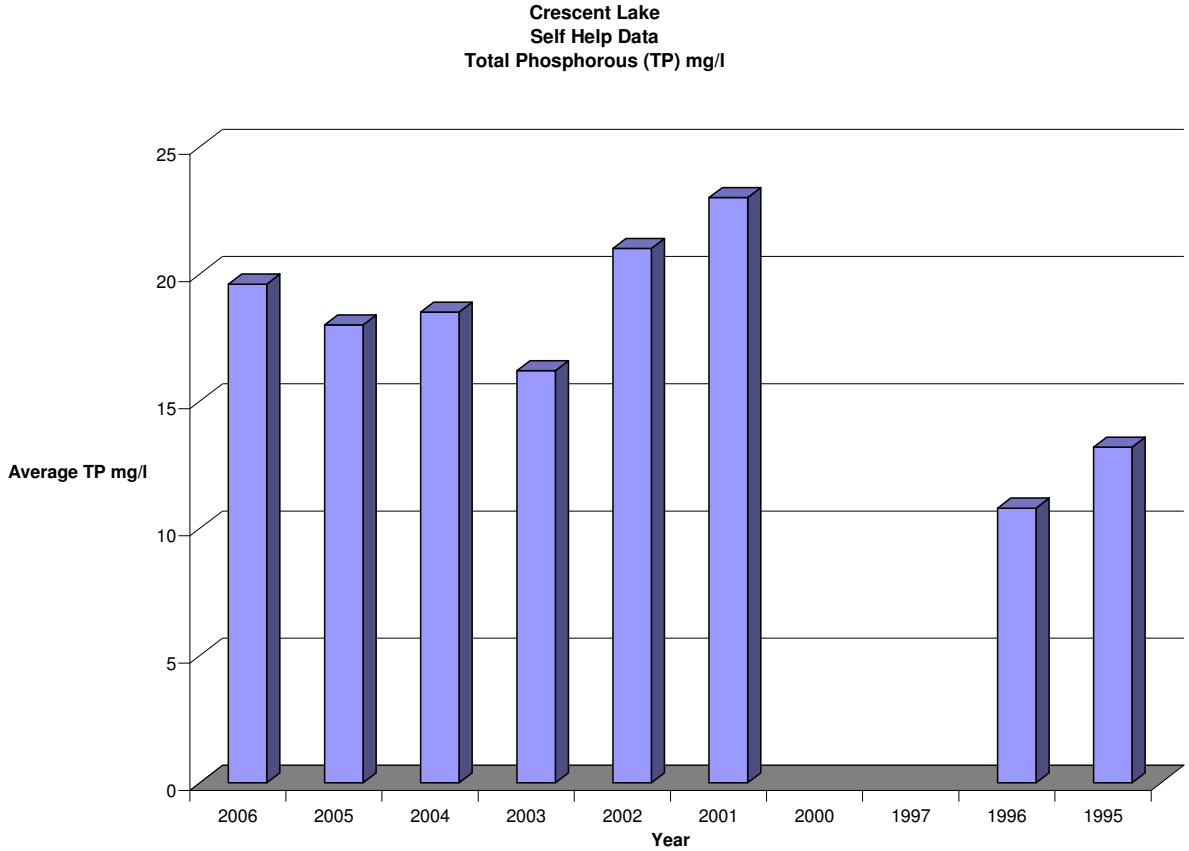
The nutrients that have the greatest impact on vegetation in a lake are phosphorus and nitrogen. Total phosphorus is used to measure the lakes nutrient status. Phosphorus promotes plant growth and is the key nutrient affecting the amount of algae and weed growth. Sources of phosphorus include human and animal wastes, fertilizers, septic systems and decaying plants. The Self Help data includes total phosphorous readings for 8 years. Nitrogen is the second most important nutrient in a lake for plant and algae growth. Sources of nitrogen include fertilizer, human and animal waste and groundwater. Nitrogen exists in several forms in lakes. The analysis for this study measured nitrate plus nitrite. The forms of nitrogen are constantly interchanging in the lake water through the nitrogen cycle. Inorganic nitrogen (nitrate, nitrite, ammonium) can be used by aquatic plants. If these levels are greater than 0.3 mg/l in the spring there is enough nitrogen present to create summer algae blooms. When the plants die

and decay, ammonium is released into the water. This can then be taken up by plants again and cycled through the system or it can undergo the conversions of the nitrogen cycle. If oxygen levels are depleted, the ammonium is converted to nitrate then to nitrite then to nitrogen gas, which is lost to the air.

Lakes in Wisconsin are usually limited in plant growth by the amount of phosphors in the water. The total nitrogen to total phosphorus ratio is used to determine the limiting nutrient. According to Understanding Lake Data (Shaw, Mechenich, Klessig) lakes with values greater than 15:1 are considered phosphorus limited and algae growth is controlled by the amount of phosphorus. Crescent Lake has an N:P ratio of 58:1 indicating phosphorus limited lake.

Total Phosphorus (TP)

The summer average TP measured in Crescent Lake at the deep hole according to the Self Help data is 0.017 mg/L. The average annual concentrations of TP in the lake from the Self Help data are listed in Table 7. This value indicates the lake is mesotrophic, meaning it has moderate productivity. Compared to other lakes in the area this is a relatively low value. Self Help data measured TP from 1995 to 2006 excluding 1998 and 1999. The TP in the lake appears to be increasing from about 0.011 mg/l in the mid 90s to approximately 0.020 presently as shown in the graph below.



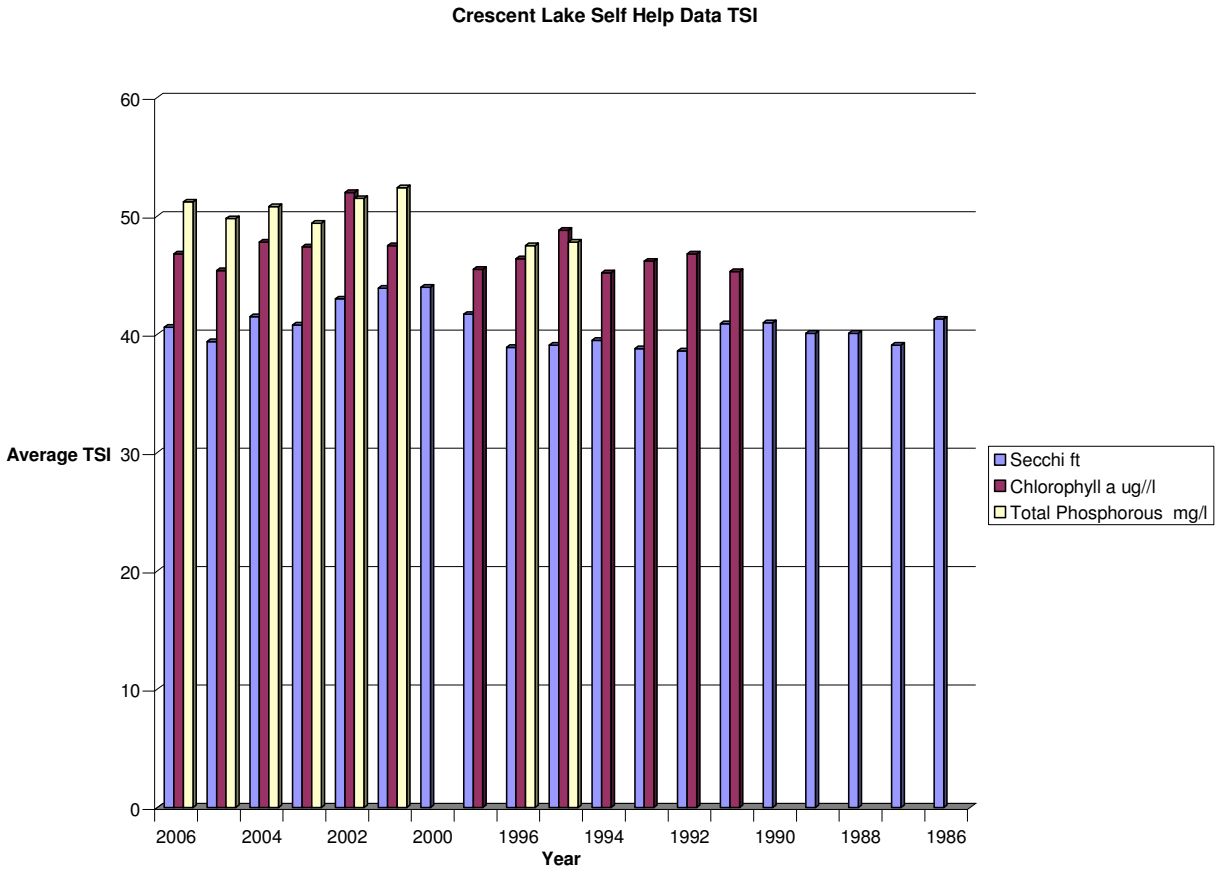
This increase should be noted. Although it does not indicate poor water quality it indicates that the water quality is slowly declining. The increase in phosphorus is likely due from sources within the watershed. Fertilizer on lawns, lawns with little or no buffers, leaking septic systems, agricultural fields, sediment loading all contribute phosphorous to the lake. The phosphorous that enters the lake from the watershed is used by the aquatic plants and high amounts of phosphorous lead to increased aquatic plant and algae growth. The amount of vegetation currently in the lake may have an effect on the TP levels also. According to lake residents Crescent Lake is experiencing a dramatic decrease in the aquatic vegetation. Since the plants take up the phosphorous in the water and there are fewer plants it may lead to an increased level in the water column.

Nitrogen

The samples taken from Crescent Lake indicate that the nitrate plus nitrite nitrogen is very low in the lake. It was not detected in any samples except the September sample at the lake bottom when a very high reading of 0.996 mg/l was found. During the summer when the lake is stratified and there is little or no oxygen at the bottom, ammonia is released from the sediments which then converts to nitrate and nitrite. The low oxygen levels at the bottom of the lake at this time may have contributed to the high nitrogen value. A high reading like this may also indicate contamination of the sample. Overall the level of nitrate plus nitrite in the lake is very low compared to area lakes indicating Crescent Lake may have better water quality. Table 1 lists the concentrations of nitrogen in the lake samples.

Trophic State Index (TSI)

The TSI is a score ranging from 0 to 110 that rates the fertility of a lake, low TSI indicates low fertility. The TSI is based on the phosphorous, chlorophyll a, and Secchi disk readings. A graph of these parameters collected for the Self Help data is in Figure 2. The TSI can be used to break lakes into three categories of productivity: eutrophic, mesotrophic and oligotrophic. Eutrophic lakes have a TSI over 50 and have decreased water clarity, algal blooms/scum, oxygen depleted bottom water, dense plant beds and possible fish kills. Mesotrophic lakes have a TSI range of 40 – 50 with moderately clear water, but increasing chance of low dissolved oxygen levels at the bottom in summer. Oligotrophic lakes have a TSI under 40 with clear water, oxygen at all depths, cold water and excellent water quality. Crescent Lake has an average TSI of 40 to 50 which indicates a mesotrophic, moderately fertile lake. The water is moderately clear but may have low oxygen levels at the bottom during the summer with moderate plant production. Below is a chart showing the TSI based on the available Self Help Data.



Calcium

The calcium was measured in the lake to determine if concentrations are adequate to support zebra mussels. Zebra mussels are unlikely to establish populations in waters with calcium levels below 20 mg/l. The results of the 2006 water testing indicate an average concentration of 11 mg/l. The results of the EPA data indicate an average of 5.6 mg/l calcium based on the results from 1973 to 1985. The concentration of calcium appears to be increasing in the water but it is not near the levels needed to support zebra mussels. Lakes in northern Wisconsin typically have calcium concentrations of less than 10 mg/l. The results of the calcium concentrations for this study can be found in Table 1 and Figure 3. The EPA results are included in Table 8.

Sodium, Potassium and Iron

The concentration of sodium, potassium and iron were measured to evaluate the effect of drinking water treatment system discharge into the lake. Some residents are concerned that there are homes on the lake that have treatment systems that discharge water with higher amount of these elements. The results from the average 2006 surface water data are as follows:

- Sodium – 5.2 mg/l

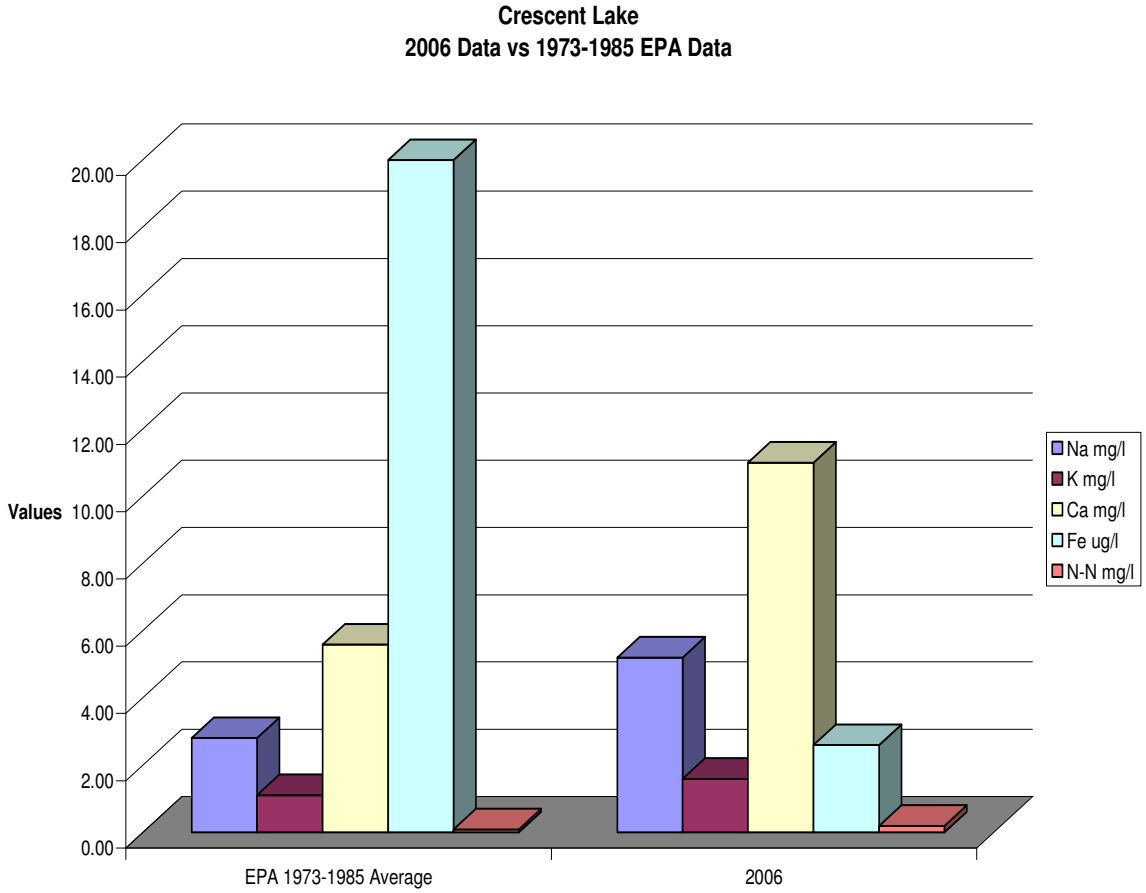
- Potassium – 1.6 mg/l
- Iron 2.6 mg/l.

According to the EPA data the averages (1973-1985) were as follows:

- Sodium – 2.8 mg/l
- Potassium – 1.1 mg/l
- Iron - 0.02 mg/l

An increase in each element is exhibited in the data from the 70's and 80's as compared to present. This may indicate that the discharge of water treatment systems on the lake are increasing these values. The results of the testing conducted for this study are included in Table 1 and Figure 3. The EPA results are included in Table 8.

The following chart shows the averages of the EPA data from 1973 to 1985 against the results from 2006 for calcium (Ca), sodium (Na), potassium (K), iron (Fe) and nitrate plus nitrite (N-N).



(Only one sample was tested for iron in EPA data)

Water Clarity

Water clarity is a measure of water quality related to algal abundance and general lake productivity. The following properties can affect the clarity or transparency of water: algae, zooplankton, water color and suspended sediments with algae commonly the most dominant factor in water clarity. Water clarity is commonly measured using a Secchi disk. This black and white disk is lowered into the water until it can no longer be seen from the surface, this depth is then recorded. The Secchi disk readings for the lake are found in Table 2. The average for the summer readings was 4.1 meters (13.45 ft) which indicated very good water quality according to Lillie and Mason (1983) water quality indices for Wisconsin. Figure 1 is a graph of the Secchi disk readings from the lake. Secchi disk readings have decreased somewhat since 2000. Secchi readings averaged by decade indicate that the readings have decreased from an average of 14.5 feet in the eighties to an average reading of 12.0 feet from 2000 to 2006.

Buffering Capacity

pH is a measure of the concentration of hydrogen ions. A pH of 7 is considered neutral, substances with lower pH are acidic and substances with higher pH are basic. According to information from EPA, the pH of the lake is near 7.2, which is an average reading for Wisconsin lakes. The first pH reading collected at the lake in May 2006 was 7.11 near the bottom of the lake, with no pH reading collected at the top of the lake. Subsequent pH measurements varied between 1.45 and 2.1; the results of the pH measurements are included in Table 2. These readings are not accurate and may be due to operator error or equipment malfunction. The reading taken in May indicates the pH has not changed since the EPA readings taken 1973-1985.

The conductivity is a measure of the water's ability to conduct an electrical current and it gives an indication of the amount of dissolved substances in the water. The geology of a lake's watershed establishes the normal ranges for conductivity in a lake. Some polluted runoff into lakes can cause changes in conductivity especially if the pollutants include inorganic dissolved solids such as ions: bicarbonate, sulfate, chloride, calcium, magnesium, sodium, potassium, and phosphate. If the conductivity is high, it may indicate the presence of one or more of these contaminants. Low conductivity values are characteristic of oligotrophic lake waters that are low in nutrients, while high conductivity values are characteristic of eutrophic lake water with high amounts of nutrient and an abundance of plants. The average values of conductivity in Crescent Lake for this study were determined to be 137 umhos/cm near the surface and 132 umhos/cm near the bottom. According to Environmental Task Force Lab, UW-Extension, there is no health standard for conductivity; it is normally twice the value of the hardness. An increase in conductivity over time may indicate changing water quality. Hardness was not measured during this study so no comparison may be made. Based on the values from the EPA data the average conductivity from 1973-1985 was 63 umhos/cm. The increase in the sodium, calcium, potassium and iron in the water may have affected the conductivity of the water; however other factors can not be ruled out. If future readings are substantially higher or lower than these readings it may be a sign of pollution. The concentrations for all the parameters discussed above can be found in Tables 1 and 2 for 2006 and Table 8 for EPA data.

Watershed Evaluation

The watershed evaluation consisted of delineating the watershed boundary, mapping land uses, estimating runoff and pollutant loading, and modeling water quality of the lakes. Following is detailed information of each task that was completed.

The watershed of the lakes covers approximately 1,574 acres. The total surface area of Crescent Lake is 626 acres. The watershed contributing to the lakes is relatively small compared to the size of the lake. Almost 2/3 of the watershed is lake surface or forest; approximately 550 acres is forested. The remaining land use is as follows: Residential – 165 acres, Agricultural – 128 acres, Wetland – 80 acres, Public space – 25 acres

A map showing the land use throughout the watershed is included as Figure 5 and Table 9 lists the land use and area.

The TR-55 model indicates average runoff for the developed conditions surrounding the lake. The residential lots contribute more water than natural areas so there is an increase in runoff with present conditions as compared to pre-developed conditions. The impervious surfaces such as compacted lawns, rooftops, paved driveways and roads all prevent water from soaking into the ground thus increasing runoff.

The results of the STEPL modeling show that the evolution from small, summer-use cabins to larger, more modern year-round homes has not appreciatively changed the phosphorous or sediment loading to the lake, but nitrogen and BOD loading have actually gone down. The construction of larger homes on the lake lots has increased the amount of impervious area on the lots, which does increase pollutant loading to the lake. However, the modernization of lake homes has also included construction of modern septic systems, which result in less pollutant loading to the lake. The detrimental effects of increases nutrient loading due to development appear to be cancelled out by the positive affects of septic system modernization. The following table lists the results from the STEPL model. The decrease in the loading can be seen here.

STEPL Model Output				
Model	**Total Loading (lb/year)**			
	Nitrogen (lb/yr)	**Phosphorous (lb/yr)**	**BOD[1] (lb/yr)**	**Sediment (tons/yr)**
1940	1530	380	5050	168
1955	1463	388	4525	169
1980	1434	383	4344	169
2006	1396	371	4139	169

[1]Biological Oxygen Demand

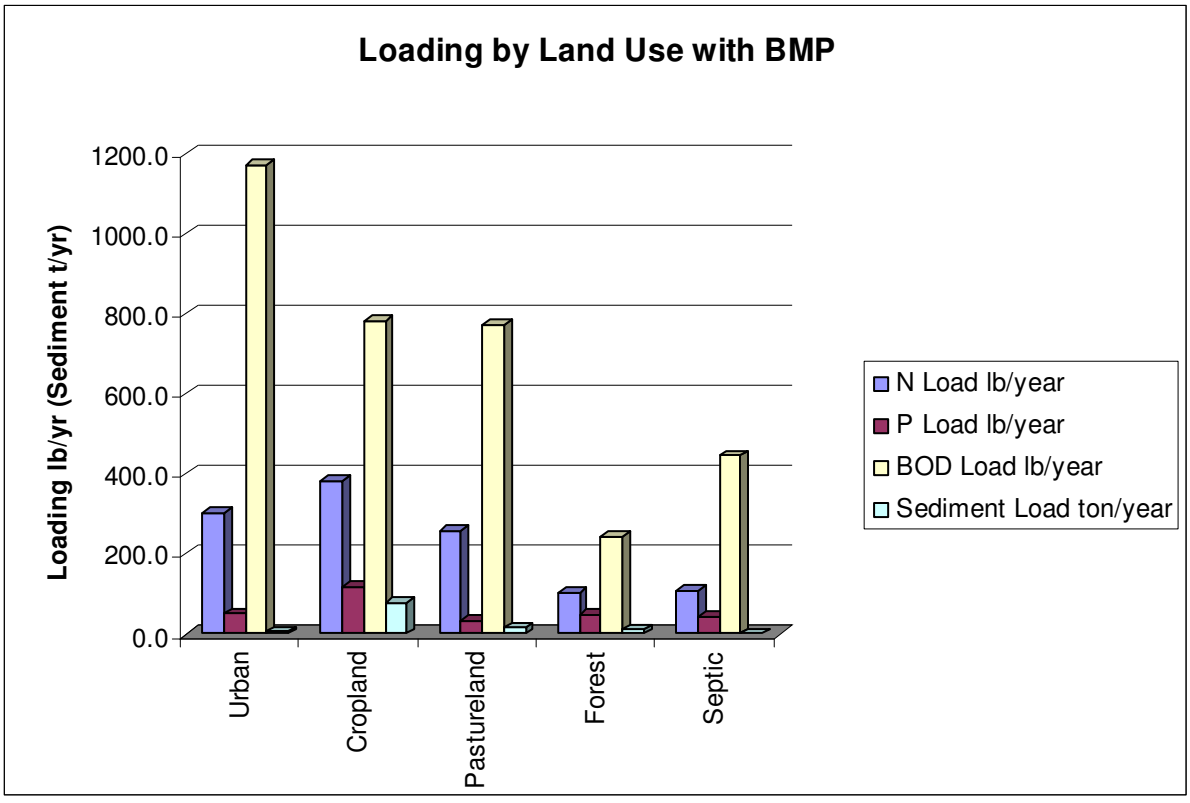
Loading for nitrogen, phosphorous and BOD are decreasing due to increased efficiency of updated septic systems in each category.

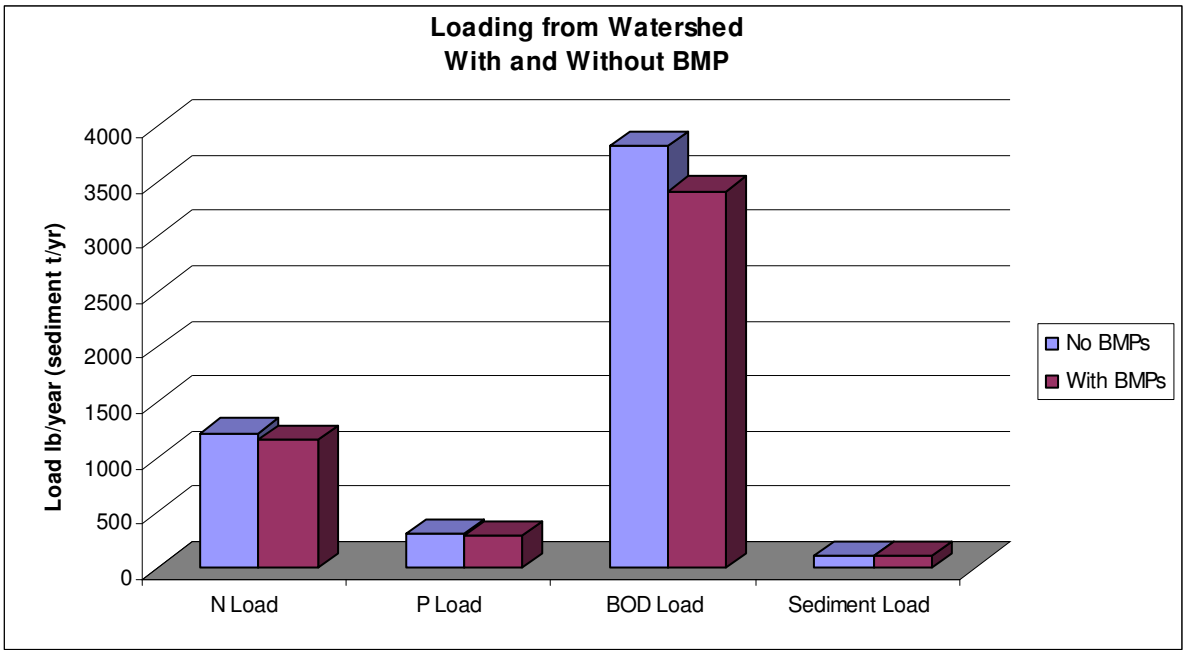
Tables 15 through 18 lists the detailed results of the modeling based on the changes in the near shore development from 1940 to present.

A fifth model was run to exhibit the pollutant loading of the entire watershed in its present state. As expected, according to the STEPL model the majority of the nitrogen, phosphorous and BOD

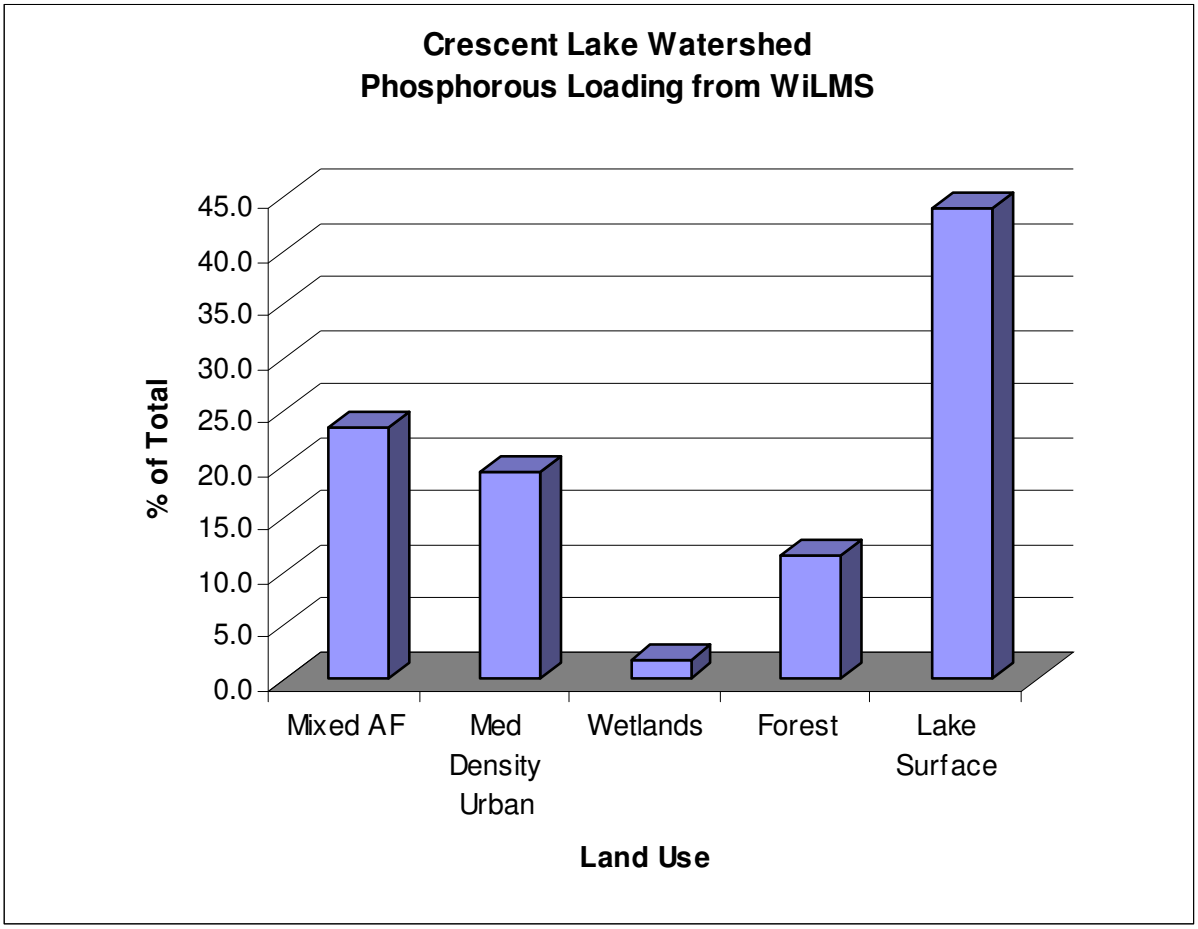
are coming from the agricultural land use in the watershed. According to 2005 NRCS land cover data, the majority of the agricultural lands in the watershed are used as pasture or to grow small grains and/or hay. Agricultural land has a high potential to contribute sediment to runoff water due to the exposed soil on the fields. In the spring and fall and throughout the winter the fields may have little to no vegetative cover. During a rain or spring melt sediment from the exposed soil can easily be transported with the runoff. This leads to the high sediment and nutrient loading results for agricultural land in the model. The second leading pollutant producing land use is urban or developed areas along the lake. The septic systems along the lake rank third and the forested areas are last. A relatively simple way to reduce pollutant loading to the lake from the urban area would be to install vegetated filter strips between lake homes and the lake itself. These filter strips (buffer) infiltrate runoff from the lake lots and collect pollutants before they are deposited into the lake. The STEPL model was run assuming that vegetated filter strips were installed on all lake lots, with 70% of the lot area draining to the filter strips. The model shows that this would result in a yearly reduction of 67 pounds of nitrogen, 12 pounds of phosphorous, 408 pounds BOD, and 3 pounds of sediment. The results of the model are included in Table 15 in the Tables section and the figures below. Similar practices in the agriculture fields in the watershed may reduce the loading from this land use also. The STEPL model did not include agricultural BMPs, the focus of the modeling was to investigate BMPs that the lake district and lakeshore residents could readily implement.

The following graphs show the loading per year by land use with BMPs implemented and the loading from the entire watershed with and without BMPs implemented.





The WiLMS (Wisconsin Lake Modeling Suite) was used to determine phosphorus loading to the lake from the watershed based on land use. The model uses land use as well as parameters of the lake itself to estimate phosphorous loading. The results of the model indicate that the majority of the phosphorus loading is coming from atmospheric fallout over the lake itself. There are two components of atmospheric fallout 1) wind transported material, or dryfall, such as insects, soil and plant fragments and 2) soluble gases or salts that are scavenged by rainfall. Since the lake surface is large compared to the watershed (nearly 1/3 of the area) the atmospheric fallout is the largest contributor. The second is the agricultural land use followed by the developed area along the shoreline and then the forested areas. While only 23% of the land use is agricultural or developed these contribute 42% of the phosphorus load. In contrast approximately 40% of the watershed is forested and wetland which contributes only 13% of the phosphorous load to the lake. The results of the WiLMS model is included in Table 19 in the Tables section. The graph below shows the percent phosphorous loading from the land uses in the watershed.



As illustrated in the WiLMS model, natural areas such as forests and wetlands play an important role in the reduction of pollutant loading from the watershed. Wetlands are protected by state laws, but care should be taken by the residents to protect them also. Wetlands are very beneficial to a lake system by providing cover for fish and wildlife, removing pollutants such as nitrogen, phosphorous and sediment and by retaining flood flows and providing flow from groundwater.

Lakeshore Resident Survey

A survey of the lakeshore residents and lake users was taken to assess the views they have of the lake. A total of 160 surveys were received. According to the survey the majority of the people think the lake clarity and quality are good. The lake users think the fishing has declined over the years. The people also thought the development on the lake is about right, and the condition of the shoreland area is good. A majority of the respondents felt the fishing was fair and there was too little fish habitat and keeper size fish. The residents believe that exhaust and fuel from boats, shoreline vegetation removal, and lawn fertilizer has had a negative impact on the quality of the lake. However 137 respondents maintain a lawn on the lake, most use no fertilizer, and only have a buffer of 1 to 10 feet. Most lake residents support education to increase awareness of shoreline owner's impacts on water quality and to provide incentives and stricter enforcement to protect the shoreline area. Results of the survey are listed in Table 20. Graphs of the most popular answers to a number of questions were created and shown in Figures 6 through 17. The original survey is included in Appendix A.

Aquatic Plant Survey

The aquatic plant survey conducted on the lake indicates that a good variety of plant species are present in the lake. It appears that densities are quite low compared to past years according to resident's comments. Of the 578 points surveyed, vegetation was found at 190. A total of 1,550 points were determined for sampling but the majority of these points were in water too deep to support vegetation. Plants were not found growing much beyond the depth of 20 feet in Crescent Lake. A map showing the locations of the survey points is included as Figure 18. There were a variety of plants found throughout the lake. Following is a list of the 17 species of aquatic plants found in the survey in the order of abundance:

- Coontail
- Common waterweed
- Filamentous algae
- Wild celery
- Robbins pondweed
- Large-leaf pondweed
- Pickerelweed
- Dwarf water milfoil
- Flat-stem pondweed
- Illinois pondweed
- White water lily
- Spatterdock
- Bushy pondweed
- Small pondweed
- Common bladderwort
- White-stem pondweed
- Bulrush sp

Table 21 lists the statistics that were calculated using the collected data. The frequency of occurrence indicates how common or abundant the plant is. As shown the most abundant plant was coontail followed by common waterweed. According to residents who have used the lake for a number of years the density and size of aquatic plant beds is greatly reduced as compared to previous years. This may be due to the Rusty crayfish population in the lake. Rusty's are known to eat large quantities of aquatic plants and reduce the number of species and density of

plants in a lake. Susan Knight from UW Extension was contacted regarding this issue. According to survey information from Trout Lake, that has had a Rusty infestation for several years, the diversity and density of plants has been greatly reduced. If the reduction in plants on Crescent is due to Rusty's a greater decline in vegetation may be seen in the future.

Table 22 lists the species and the benefits of each species of plant found. There were no invasive plant species found in the lake. Figure 18 is a map of the lake indicating the sample points and the type of vegetation found along with the type of bottom sediment. A mixture of submergent and emergent plants were found. Large beds of emergent plants were found in the coves on the lake; a mucky bottom was also present in the coves. The majority of the bottom at the sample points was sand. For more information on the aquatic plants in the lake please see the Aquatic Plant Management Plan.

Shoreland Assessment

The shore of Crescent Lake is fairly heavily developed. There is only one portion of the shoreline that is not developed due to the close proximity of Emma Lake. The remaining shoreline is developed to varying degrees. The majority of the lakeshore has not been cleared of trees however much of the herbaceous and shrub layers have been removed for lawns. Many of the lots maintain a small buffer, but most are too narrow to provide much protection. The areas between most of the lots appears to be left quite natural with trees, shrubs and herbaceous layer left intact. Most lots have docks, boat lifts and some have rafts. There are several boat houses on the shoreline and several lots have riprap along the shoreline. Figure 18 maps the shoreland development found on the lake. There are many areas that could have qualified for a rating of light development with shoreline buffer but docks, boat lifts or rafts were present.

According to the lake user survey 58% stated they have a natural shoreline. Based on the shoreland assessment only 3% of the shoreline was categorized as natural. When asked if a buffer was maintained 30% responded yes. Of these only 10% met the recommended width of 35 feet or more. There appears to be differing opinions on the term "natural" and what qualifies as a buffer. For the purpose of the shoreline assessment, "natural" means undeveloped with no clearing of vegetation. A buffer is a strip of land that begins at the waters edge and extends at least 35 feet inland. This buffer should be vegetated with natural vegetation including herbaceous, shrub and tree layers.

Invasive Species

There are several invasive species that are of concern in northern Wisconsin's lakes. The two that will be discussed in this study are Eurasian water-milfoil and Rusty Crayfish. Eurasian water-milfoil was not found in the aquatic plant survey conducted in 2006 so it is assumed that this species has not yet been introduced to the lake system. Rusty crayfish have been found in the lake. DNR records indicate that rusty crayfish were first discovered in Crescent Lake around 1970.

<u>Eurasian water-milfoil (EWM)</u>

Eurasian water-milfoil is an exotic invasive aquatic plant species that can cause a variety of problems on lakes. It is an aggressive plant that out competes native vegetation thereby displacing these populations. EWM grows in dense stands that form thick mats that reduce or eliminate navigation and provide cover too heavy and thick for many fish species. The EWM

grows quickly in early spring and shades the slower growing native plants, thereby stunting their growth and displacing them. Small patches of EWM can quickly grow into large stands if left untreated. Once EWM is in a lake it is there to stay, it can not be eradicated. Crescent Lake may be especially susceptible to EWM infestation due to the recent decrease in plant density on the lake. Once a colony is established it will spread quickly due to lack of completion from native stands.

Once EWM is in a lake there are a number of methods that can be used to control vegetation based on the density and area of the stands. If individual plants are found they can be hand pulled and disposed of on land. If larger isolated stands are found chemical treatment can be a cost effective, viable method of control. If large areas of the lake are infested a variety of chemical treatment options may be used but can get very expensive. Other methods include harvesting, whole-lake chemical treatments, and drawdown, dredging and milfoil weevils. Further discussion of the options can be found in the Aquatic Plant Management Plan.

The best strategy in dealing with EWM is to prevent it from entering a lake. There are a number of lakes in Oneida, Lincoln and Langlade counties that are infested with EWM, Table 23 lists these lakes. The most effective method is to educate lake users. All lake users should be aware of invasives and how to prevent the spread. A second method is to monitor boat landings to prevent boaters from bringing the invasives into the lake and to educate them. Further discussion of this topic can be found in the Aquatic Plant Management Plan.

Rusty crayfish

Rusty crayfish are present in the lake and may have had an adverse effect on the aquatic plant population in the lake. The crayfish has been present in the lake since the 1950's according to resident reports. During the aquatic plant survey several residents claimed that there are far fewer and less dense stands of aquatic vegetation on the lake than in past years. This may be a result of the rusty crayfish population in the lake. The crayfish are being harvested by trapping in several areas throughout the lake; this seems to have had a positive effect on reducing the population of rusty's in the lake.

Rusty crayfish are a non-native invasive species of crayfish that originated in the Ohio River basin. It is believed that the crayfish were introduced to Wisconsin in the 1960's likely by non-resident anglers using them as bait. The crayfish have spread to several waters through anglers bait use (it is illegal to use them as bait in Wisconsin), release of aquarium crayfish into local waters, or possible release of crayfish by unscrupulous bait trappers to create a viable harvest of the species.

The rusty's inhabit lakes, ponds and streams and will live in both still and fast moving water. They prefer areas with rocks, logs and other debris that offer cover. Bottom types of clay, silt, sand, gravel or rock are suitable habitat. The rusty's are opportunistic feeders and will eat a variety of aquatic plants, benthic invertebrates such as aquatic worms, snails, leeches, clams, insects, side swimmer and water fleas, detritus, fish eggs and small fish.

Rusty crayfish may cause a number of negative environment impacts. They are an aggressive species that displace native crayfish. They compete for the same food source, take the best daytime hiding places and increase fish depredation on the native crayfish because they will fight the fish that try to eat them where the natives do not. One of the most serious impacts is the destruction of aquatic plant beds. They reduce the abundance and diversity of plant species which can be especially damaging in the northern lakes that produce relatively low densities of

plants. The rusty crayfish are more destructive to plants than native crayfish because they eat more plants due to their high metabolic rate. There has been some evidence that the rusty's may decrease fish populations by eating benthic invertebrates that fish feed on and by eating fish eggs. The warm water spawning fish such as smallmouth and largemouth bass and sunfish are at higher risk of this threat.

There are no proven methods of controlling rusty crayfish. There are chemicals that are available that will kill rusty crayfish but they are not selective and will kill the natives as well. Intensive harvest has been used to decrease the population but has not been proven to eradicate or control the rusty's. The best method of control is to prevent the introduction into uninfested waters.

Rusty crayfish can be distinguished from native crayfish but identification is often difficult. The rusty's have larger, more robust claws and have dark rusty spots on each side of their carapace.

Recommendations

The study conducted in Summer 2006 for Crescent Lake was the first of its kind on this lake. The data collected should be used as background or base information. Some conclusions can be drawn from the data, but to make an accurate analysis, future data should be collected and compared to the 2006 data. Following are recommendations that can be made based on the information and data collected in 2006.

Water Quality – continue monitoring for changes

The water quality of the lake is good and the lake is classified as mesotrophic based on total phosphorus, chlorophyll a and Secchi readings from the Self Help data. This is a common rating and classification for large lakes in northern Wisconsin. The lake is mesotrophic at this point but it is near the eutrophic border. The Association's has been involved in the DNR Lakes Self Help program since 1986, which has provided valuable information on the lake's water quality. Monitoring of the lake's water quality should continue in the following ways:

- Continue participating in the DNR Lakes Self Help program, monitoring phosphorous and chlorophyll a levels and obtaining Secchi disk readings
    - Use the data to determine the lake's Trophic State Index (TSI)
    - If the TSI increases, implement additional testing to determine the source of the phosphorus in the lake
- Collect information from the EPA STORET website and analyze it to track changes in water quality from the 1970's to the present

The following additional testing may be helpful in determining the source of chemicals currently found in the lake:

- Perform additional analyses of the sodium, calcium, potassium and iron in the water to determine if the increase in these substances is due to discharge from water treatment systems into the lake
- Investigation of water treatment systems in the lake's watershed may be pursued to determine the number of systems and the type of discharge to the lake

Watershed – reduce pollutant loading

Crescent Lake has a rather small watershed compared to the size of the lake and it is largely forested. These factors lead to a reduced amount of sediments and pollutants entering the lake from the land surrounding it. However, the lake is largely developed around the shoreline; this development contributes greatly to the amount of phosphorus, nitrogen and sediment entering the lake. The land use in the immediate watershed along the shoreline also contributes to the pollutant load. Fertilizers that are applied to lawns increase nutrient loading, erosion from building sites, roads, lawns and driveways increase sediment load and failing septic systems increase nutrient loading. There following are measures that can be taken to reduce pollutant loading to the lake:

- Do not fertilize lawns

- If lawn fertilization is necessary, follow these guidelines:
    - Use the smallest amount of phosphorus-free fertilizer necessary
    - Time fertilizer application so the fertilizer does not wash off in a rain event
- Create natural buffers at least 35 feet inland from the water's edge to filter runoff, stabilize the shoreline, screen noise, provide fish and wildlife habitat, and to preserve aesthetics. There may be incentives by local zoning of the local conservation department to install and maintain natural buffers.
- Use erosion control measures, such as silt fence and buffer and filter strips, on all construction sites
- Seed and mulch open/bare soil areas of land
- Perform a sanitary survey to identify leaking and/or failing septic systems on lots surrounding the lake. Oneida County Zoning has offered to assist in this project if it is pursued.
- Promote the use of agricultural best management practices on agricultural land in the Crescent Lake watershed. Examples of possible BMPs include the following:
    - Installing and maintaining buffers around fields
    - Timing of fertilizer and manure applications
    - Conservation planting and tilling
    - Specific barnyard BMPs to prevent manure runoff

A Lake Association does not have much control over what occurs in the watershed but the Oneida County Land Conservation and Zoning Departments and the local Natural Resources Conservation Service can be contacted to see what kind of programs they offer to local farmers. They may need assistance with these programs that the Association can provide.

<u>Continue current practices to prevent/control invasive species</u>

According to the aquatic plant survey there were not any invasive aquatic plants found in the lake. This is great and every possible action should be taken to prevent the introduction of invasives into the lake. According to the Lake List on the UWEX website the Association is already involved in many activities that help to prevent the spread of invasive species. These activities should be continued. It is also recommended that the Association follow the Wisconsin DNR Aquatic Invasive Species program to enhance the current efforts being made to prevent the introduction of invasive species to the lake and prevent the spread of invasive species already present in Crescent Lake to other neighboring lakes. The following is a summary of current efforts that should be continued and new activities that could be implemented to achieve this goal:

- Continue monitoring aquatic plants visually several times per year. Visual surveys can be conducted by boat and should pay special attention to the boat landing, where

invasions frequently begin. Eurasian water milfoil and purple loosestrife are species to look for.

  - If purple loosestrife is found, investigate the possible use of two safe foliage feeding beetles in combination with traditional methods for controlling loosestrife. This citizen based project aids in the rearing and release of the insects into local wetlands.

- Perform detailed aquatic vegetation surveys every five years. Follow the point-intercept method, using the same sample points used in the 2006 study. This will track changes in the vegetation diversity and density and will likely detect invasives that may enter the lake

- Continue monitoring for zebra mussels. Consider extending volunteer lake monitoring to include monitoring for spiny water flea and rusty crayfish. According to the DNR Aquatic Invasive Species Program, this involves collecting sample for analysis of zebra mussel larva, spiny water flea and rusty crayfish. This may be a worth while venture to avoid the spread of spiny water flea into the lake.

- Continue participating in the Clean Boats Clean Waters (CBCW) watercraft inspection program to prevent the spread of aquatic invasive species and make boaters aware of invasive species, their identification, and how to avoid spreading them. This includes the installation of signs at boat landings to inform the public of current infestation status, state law, and steps to prevent the spread. Inspections should be conducted as often as possible, especially during busy times on the lake. As many people as possible should be trained in the identification of Eurasian water milfoil and other invasive species, and in the boat inspection procedure.

- Grants such as Aquatic Invasive Species, Lake Management Planning and Lake Protection grants are available through DNR to conduct a number of studies and implement recommendations made in the APM plan and lake management plan.

<u>Education, education, education</u>

The best way to protect the lake from pollutants and invasive species and improve water quality is through the education of the people that use the lake and live on the lake. These are the people that are contributing to the pollution and introducing the invasive species, and they are the ones that can stop it. The following recommendations are made relating to education:

- Continue the publication of the lake association newsletter to provide pertinent information to residents living on or near Crescent Lake.

- Contact local DNR and County representatives to learn more about available publications and programs detailing additional ways to educate the public

- Conduct a lake fair. This can be presented by an individual association or members from several area lakes can join to conduct a large fair. Members of the lake associations as well as the general public should be invited to participate. Representatives from DNR, County zoning, County land conservation, NRCS would

likely be happy to participate and provide information on all topics of lake protection from shoreland protection/restoration to invasive species.

- Education on importance of shoreland buffers. According to the results of the resident survey and the shoreland assessment there is a wide variation in the definition of a :"natural" shoreline. Contact DNR and County zoning to obtain educational materials on buffers and the requirements for a shoreland buffer.

Appendix A
Resident Survey

Crescent Lake Association

October 2006

Lakeshore Resident Survey

instructions

This survey is designed to gather your views of the quality of our lake and to gather information about the use of our lake.

Please take a few minutes to fill out and return this survey in the enclosed, stamped envelope. **Your opinions are very important – and completely anonymous.** Even if you decide to include your name, your response will remain anonymous.

A summary of resident views will be published in the Crescent Lake Association Grant final report next spring and available to anyone for review.

lake use

1 Do you own or rent property
- O on the lake
- O near the lake

2 How long have you lived on or near Crescent Lake?
- O less than 2 years
- O 2 to 10 years
- O 11 to 20 years
- O over 20 years

3 What best describes the time you spend on Crescent Lake?
- O year-round resident
- O summer-time resident
- O weekends, year round
- O weekends, summer
- O weekends, occasionally
- O vacations / holidays

4 What are the ages of the property owners / residents?
- O under 25
- O 26-50
- O 51-65
- O 66-75
- O 76 and older

5 How many people, including yourself, regularly spend time at the Crescent Lake property?
- O one
- O two
- O three
- O four
- O five or more

6 What type of recreation do you participate in? Check all that apply.
- O boating
- O fishing
- O water skiing
- O hunting
- O scenic enjoyment
- O other: _____
- O picnicking
- O entertaining
- O ice skating
- O peace, solitude
- O sailing, windsurfing
- O swimming
- O wildlife observing
- O hiking, cross-country skiing

7 How many of the following do you own and operate?
- O ski boat
- O sailboard
- O canoe, kayak, rowboat
- O other: _____
- O fishing boat
- O jet ski
- O pontoon boat
- O paddle boat

8 What horsepower/ cycle (2 or 4) boat motors do you operate on Crescent Lake? List in order of use, starting with most used.
(_____ hp____cycle) (_____ hp____cycle) (_____ hp____cycle)

9 Estimate gallons of marine gas used per year: _____ gallons

water quality & fishing

10 Since you have lived near the lake, do you feel that lake quality has:
- O improved
- O stayed the same
- O declined

11 How would you rate fishing on the lake?
- O improved
- O stayed the same
- O declined

12 How long have you fished on the lake?
_____ years

For each of the following, rate the current condition of the lake:
Mark only one answer for each.

	excellent	good	fair	poor	don't know
13 Water clarity	O	O	O	O	O
14 Water quality	O	O	O	O	O
15 Fishing	O	O	O	O	O
16 Condition of the land area close to shoreline (0-100 ft)	O	O	O	O	O
17 Condition of the land area away from shoreline (100-1000 ft)	O	O	O	O	O
18 Scenic quality of lake and shoreline	O	O	O	O	O
19 Overall condition of lake and shoreland areas	O	O	O	O	O

For each of the following, rate the current condition of the lake:
Mark only one answer for each.

	too much	about right	too little	don't know
20 Rooted vegetation near shore	O	O	O	O
21 Floating algae / scum on surface	O	O	O	O
22 Fish habitat	O	O	O	O
23 Keeper-size pan and game fish	O	O	O	O
24 Diversity of birds and wildlife	O	O	O	O
25 Loons	O	O	O	O
26 Shoreland housing	O	O	O	O
27 Motorized watercraft	O	O	O	O
28 Natural shoreline vegetation	O	O	O	O

In your opinion, how much impact has each of the following had on the water quality of Crescent Lake? Mark only one answer for each.

	great impact	some impact	slight impact	no impact	don't know
29 Septic system seepage	O	O	O	O	O
30 Aquatic plant (weed) removal	O	O	O	O	O
31 Shoreline vegetation removal	O	O	O	O	O
32 Lawn fertilizers & chemicals	O	O	O	O	O
33 Lake home, road, driveway runoff	O	O	O	O	O
34 Soil erosion from home sites	O	O	O	O	O
35 Exhaust & fuel leakage from motorized watercraft	O	O	O	O	O
36 Damage to aquatic plants & lake bottom by watercraft	O	O	O	O	O

land management / use

37 Who do you think is responsible for protecting and improving the lake? Check all that apply.

- ○ lake association members ○ lakeshore residents
- ○ watershed residents ○ local government
- ○ county government ○ state government

38 Do you maintain a lawn on your lake property?

- ○ yes ○ no

39 What type fertilizer do you use on your lake property?

- ○ zero phosphate ○ weed-n-feed
- ○ low phoshate ○ zero phosphate weed-n-feed
- ○ organic ○ none

40 What is the closest distance from the lake to the areas fertilized?

_____ feet

41 What best describes your property shoreline?

- ○ undeveloped natural landscape ○ rock riprap
- ○ retaining wall ○ lawn
- ○ landcaped trees, shrubs

42 If you have undeveloped natural landscape or a combination of un-mowed vegetation with trees and shrubs, how far from the lakeshore onto the property does it extend? _____ feet

private drinking wells

43 Well type: ○ drilled ○ driven

44 Year installed: _____

45 Total well depth: _____ feet

46 Do you have a water treatment system? ○ yes ○ no

47 If yes, does your brine solution discharge to:

- ○ septic tank ○ surface ○ dry well

private sewage disposal

48 Type of septic system on your lake property: Check all that apply.

- ○ septic tank ○ drainage field ○ seepage pit
- ○ privy ○ mound system ○ cesspool / dry well
- ○ holding tank ○ other (describe) _____

49 Number of persons regularly served: _____

50 Number of bedrooms for system: _____

51 Date of original installation:

- ○ prior to 1970 ○ 1970-2000 ○ 2001-current

52 How often septic tank is pumped: _____

summary opinions

Do you support or oppose the following actions to address problems on the lake? Mark only one answer for each.

	support	neutral	oppose	don't know
53 Stricter septic system enforcement to improve water quality	○	○	○	○
54 More shoreline property owner education on impacts of water quality	○	○	○	○
55 Stricter zoning regulations for shoreline character	○	○	○	○
56 More enforcement of existing shoreline protection laws	○	○	○	○
57 Awards program for shoreline property owners who minimize their impacts	○	○	○	○
58 Allowing more aquatic plant (weed) removal	○	○	○	○
59 Development of more voluntary programs for water quality protection	○	○	○	○
60 Increased protection for fish habitat	○	○	○	○
61 More game population management	○	○	○	○
62 More management for non-game wildlife (song birds, loons)	○	○	○	○
63 More erosion and runoff control assistance for property owners	○	○	○	○
64 Motorboat size and speed limits to protect shoreland areas	○	○	○	○
65 Restricted time for water & jet skiing	○	○	○	○
66 Stricter controls for exotic species (such as Eurasian water milfoil	○	○	○	○
67 More public land purchases to protect shoreland areas	○	○	○	○
68 Development of financial incentives for environmentally sound shoreland management	○	○	○	○
69 Form a lake district	○	○	○	○
70 Develop long-term lake management	○	○	○	○
71 Aerate the lake	○	○	○	○
72 Other(please specify)				
_____	○	○	○	○
_____	○	○	○	○
_____	○	○	○	○

Please include additional comments on a separate piece of paper and **mail your completed survey by November 1, 2006.**

Use the enclosed pre-addressed, stamped envelope or send to:

Crescent Lake Survey
c/o Connie Anderson
3021 South Rifle Road
Rhinelander WI 54501

CRESCENT LAKE SURVEY RESULTS OF OTHER COMENTS:

Survey Question #6: What type of recreation do you participate in?

#13 – snorkeling and diving
#14 – loon & eagle watching
#15 – downhill skiing and ice fishing
#23 – snowmobiling
#36 – golf
#38 – ATV
#49 – snowmobiling
#64 – snowshoe
#68 – downhill skiing & golf
#72 – gardening
#91 – ATV
#103 – snowshoe
#110 – kayaking
#111 – snowshoe
#120 – canoeing, kayaking, star gazing, skin diving, scuba diving
#141 – no answer
#159 – snowmobiling & sledding

Survey Question #49: What type of septic system on property

#9 – a lift station
#15 – system in fill
#123 – lift station

Survey Question # 73: Do you support or oppose actions to address problems on the lake?

#13 – restrict fishing hours
#15 – no fish stocking, DNR not add or remove fish from the lake, DNR should arrest poachers motor trolling at night, enforce boating laws relating to boats remaining 100 feet from docks, especially "old farts rubber-necking along the shore and terrorizing swimmers from their pontoon boats".
#17 – install city sewer and water lines

#22 – if restrict times for water skiing, also restrict pontoon & fishing times. Educate residents and users about boating regulations
#26 – support sport craft distance from fishing boats
#34 – restrict jet skis as in not allowed
#35 – support road repair & oppose boat-landing change
#43 – oppose 4th of July fireworks
#44 – oppose 4th of July fireworks because of the pollution in lake
#46 – oppose condos & resorts
#49 – remove rusty crayfish, restock more walleye and Crappies, should be fewer northern & more cribs
#63 – prohibit jet skiing
#64 – support a marina/food-dining-pub establishment on Crescent Lake & set markers at shallow spots and rock bar areas to alert boaters not familiar with the lake
#68 – oppose large home built on land not larger than 50 feet wide
#69 – water quality bad away from shoreline (inland rust)
#71 – encourage decrease in home lighting on lakesides
#93 – no wake bouys in bays (Wausau Bay)
#94 – boat-caused shore erosion
#99 – restrict hours for skiing and jet skis
#107 – use signs to protect weed beds, especially southeast of boat landing
#109 – restrict number of boats for Bible Camp
#111 – burning-air quality issues
#112 – improve fish stocking
#116 – oppose Native American spearing & musky tournaments
#120 – support no wake times, limit boat lifts and over water docking, restrictions on water skiing, tubing, & jet ski times, outdoor & home lighting create light pollution at night, contact Dark Sky Society for ideas, monitor water level at Crescent Creek outflow, and ban lawn watering using water from the lake as it lowers the lake level and adds nutrients to the lake, to limit the number of boats and docks per property kept on the lake, restrict distances of boat lifts away from shore, and enforce permit for rip-rap along shore

#121 – oppose lawn chemicals, lack of buffer zone, lawn clippings, pumping water from lake to water lawns, people washing chemical sprayers in the lake, loads of topsoil being spread along the lake to grow lawn.

Soaps in pressure sprayers used near lake, and shampoo & soap bars used in water.

Support a time and speed restriction for water skis and jet skis

Light pollution with all-night lights kept on, suggest use of timers to reduce amount of glare on lake

Educating people about not firing fireworks into the lake

#122 – muck is filling in Tony's Bay
#127 – supports less association involvement and supports maintaining current state regulations
#135 – stock lake with game fish
#136 – oppose pumping water out of the lake for watering lawns or washing cars
#138 – only own property and plan to build in 2007
#140 – limit spotlights & yard lights, fireworks limitations /controls
Curtail spear fishing and fishing tournament activities
#144 – keep jet skiing and water skiing 200 feet out
#149 – support late-night noise control
#150 – erosion, runoff, & septic seepage are not a problem
#158 – limit hours for jet skis and water skis
#159 – support city/county sewer and water system (mandate), stop spearing walleyes, oppose county landing project

CRESCENT LAKESHORE RESIDENT SURVEY		%Responses to Question	% of 160 Total
1. Do you own or rent property?			
on the lake	156	97.50%	97.50%
near the lake	4	2.50%	2.50%
total	160		
2. How long have you lived on or near Cr Lake?			
less than 2 years	7	4.43%	4.38%
2 to 10 years	36	22.78%	22.50%
ll to 20 years	35	22.15%	21.88%
over 20 years	80	50.63%	50.00%
total	158		98.75%
3. What best describes the time you spent on Cr Lake?			
year round resident	67	38.95%	41.88%
summertime resident	29	16.86%	18.13%
weekends year round	35	20.35%	21.88%
weekends, summer	21	12.21%	13.13%
weekends, occasionally	7	4.07%	4.38%
vacation/holidays	13	7.56%	8.13%
total	172		107.50%
4. What are the ages of the property owner/residents/			
under 25	3	1.76%	1.88%
26-50	40	23.53%	25.00%
51-65	72	42.35%	45.00%
66-75	35	20.59%	21.88%
76 & older	20	11.76%	12.50%
total	170		106.25%
5. How many people, including yourself regularly spend time at the Crescent Lake property?			
one	15	9.32%	9.38%
two	56	34.78%	35.00%
three	15	9.32%	9.38%
four	37	22.98%	23.13%
five or more	38	23.60%	23.75%
total	161		100.63%
6. What type of recreation do you participate in?			
check all that apply.			
boating	146	13.04%	91.25%
fishing	128	11.43%	80.00%
water-skiing	87	7.77%	54.38%
hunting	34	3.04%	21.25%
hiking, cross cnty skiing	59	5.27%	36.88%
picnicking	45	4.02%	28.13%
entertaining	94	8.39%	58.75%
ice skating	22	1.96%	13.75%
peace, solitude	123	10.98%	76.88%
sailing, wind surfing	21	1.88%	13.13%
swimming	123	10.98%	76.88%
wild life observing	103	9.20%	64.38%
scenic enjoyment	118	10.54%	73.75%
other	17	1.52%	10.63%
total	1120		700.00%
7. How many of following do you own or operate?			
ski boat	77	16.67%	48.13%
sail board	13	2.81%	8.13%
canoe, kayak, rowboat	95	20.56%	59.38%
fishing boat	103	22.29%	64.38%
jet ski	27	5.84%	16.88%
pontoon boat	76	16.45%	47.50%
paddle boat	63	13.64%	39.38%
other	8	1.73%	5.00%
total	462		288.75%
8. What horsepower/cycle (2 or 4) boat motors do you operate on crescent Lake			
2 Cycle:			
0 to 10	30	11.72%	18.75%
11 to 50	50	19.53%	31.25%

51 to 100	30	11.72%	18.75%
101 to 200	21	8.20%	13.13%
over 200	1	0.39%	0.63%
other	0		0.00%
4 Cycle:			
0 to 10	3	1.17%	1.88%
11 to 50	32	12.50%	20.00%
51 to 100	17	6.64%	10.63%
101 to 200	17	6.64%	10.63%
over 200	13	5.08%	8.13%
other	5	1.95%	3.13%
no cycle listed			
0 to 10	5	1.95%	3.13%
11 to 50	13	5.08%	8.13%
51 to 100	4	1.56%	2.50%
101 to 200	7	2.73%	4.38%
over 200	2	0.78%	1.25%
other	6	2.34%	3.75%
total	256		160.00%
9. Since you have lived near the lake, do you feel that lake quality has:			
improved	15	9.68%	9.38%
stayed the same	92	59.35%	57.50%
declined	48	30.97%	30.00%
total	155		
10. How would you rate fishing on the lake?			
improved	11	6.96%	6.88%
stayed the same	34	21.52%	21.25%
declined	90	56.96%	56.25%
don't fish	23	14.56%	14.38%
total	158		98.75%
11. How long have you fished on the lake?			
Don't fish	27	17.20%	16.88%
1 to 5 years	21	13.38%	13.13%
6 to 20 years	45	28.66%	28.13%
21 to 40 years	43	27.39%	26.88%
over 40 years	21	13.38%	13.13%
total	157		98.13%
12. Water Clarity			
excellent	35	21.88%	21.88%
good	108	67.50%	67.50%
fair	15	9.38%	9.38%
poor	1	0.63%	0.63%
don't know	1	0.63%	0.63%
total	160		100.00%
13. Water quality			
excellent	31	19.38%	19.38%
good	106	66.25%	66.25%
fair	19	11.88%	11.88%
poor	0	0.00%	0.00%
don't know	4	2.50%	2.50%
total	160		100.00%
14. Fishing			
excellent	4	2.53%	2.50%
good	25	15.82%	15.63%
fair	71	44.94%	44.38%
poor	37	23.42%	23.13%
don't know	21	13.29%	13.13%
total	158		98.75%
15. Condition of the land area close to shoreline(0-100 ft)			
excellent	17	10.56%	10.63%
good	93	57.76%	58.13%

fair	41	25.47%	25.63%
poor	8	4.97%	5.00%
don't know	2	1.24%	1.25%
total	161		100.63%
16. Condition of the land area away from the shoreline (100-1000ft)			
excellent	22	13.92%	13.75%
good	101	63.92%	63.13%
fair	23	14.56%	14.38%
poor	3	1.90%	1.88%
don't know	9	5.70%	5.63%
total	158		98.75%
17.Sceninc quality of lake			
excellent	64	40.00%	40.00%
good	74	46.25%	46.25%
fair	18	11.25%	11.25%
poor	4	2.50%	2.50%
don't know	0	0.00%	0.00%
total	160		100.00%
18 Overall condition of lake			
excellent	28	17.50%	17.50%
good	108	67.50%	67.50%
fair	23	14.38%	14.38%
poor	1	0.63%	0.63%
don't know	0	0.00%	0.00%
total	160		100.00%
19. Overall condition of shoreland areas			
excellent	22	13.75%	13.75%
good	92	57.50%	57.50%
fair	38	3.75%	23.75%
poor	6	3.75%	3.75%
don't know	2	1.25%	1.25%
total	160		100.00%
20. Rooted vegetation near shore			
too much	7	4.43%	4.38%
about right	96	60.76%	60.00%
too little	38	24.05%	23.75%
don't know	17	10.76%	10.63%
total	158		98.75%
21. Floating algae/scum on surface			
too much	29	18.47%	18.13%
about right	103	65.61%	64.38%
too little	4	2.55%	2.50%
don't know	21	13.38%	13.13%
total	157		98.13%
22. Fish Habitat			
too much	0	0.00%	0.00%
about right	49	30.82%	30.63%
too little	83	52.20%	51.88%
don't know	27	16.98%	16.88%
total	159		99.38%
23. Keeper-size Fish			
too much	1	0.64%	0.63%
about right	34	21.79%	21.25%
too little	96	61.54%	60.00%
don't know	25	16.03%	15.63%
total	156		97.50%
24. Diversity of birds			
too much	4	2.52%	2.50%
about right	115	72.33%	71.88%
too little	25	15.72%	15.63%
don't know	15	9.43%	9.38%
total	159		99.38%
25. Diversity of wildlife			
too much	4	2.55%	2.50%
about right	119	75.80%	74.38%

too little	23	14.65%	14.38%
don't know	11	7.01%	6.88%
total	157		98.13%
26. Loons			
too much	3	1.90%	1.88%
about right	136	86.08%	85.00%
too little	16	10.13%	10.00%
don't know	3	1.90%	1.88%
total	158		98.75%
27. Shoreland Housing			
too much	58	37.42%	36.25%
about right	87	56.13%	54.38%
too little	1	0.65%	0.63%
don't know	9	5.81%	5.63%
total	155		96.88%
28. Motorized Watercraft			
too much	66	41.77%	41.25%
about right	89	56.33%	55.63%
too little	1	0.63%	0.63%
don't know	2	1.27%	1.25%
total	158		98.75%
29. Natural Shoreline Vegetation			
too much	1	0.63%	0.63%
about right	92	58.23%	57.50%
too little	60	37.97%	37.50%
don't know	5	3.16%	3.13%
total	158		98.75%
30. Septic system seepage			
negative impact	35	22.01%	21.88%
positive impact	2	1.26%	1.25%
no impact	34	21.38%	21.25%
don't know	88	55.35%	55.00%
total	159		99.38%
31. Aquatic plant(weed) removal			
negative impact	32	20.00%	20.00%
positive impact	18	11.25%	11.25%
no impact	27	16.88%	16.88%
don't know	83	51.88%	51.88%
total	160		100.00%
32. Shoreline vegetation removal			
negative impact	65	40.88%	40.63%
positive impact	12	7.55%	7.50%
no impact	29	18.24%	18.13%
don't know	53	33.33%	33.13%
total	159		99.38%
33. Lawn fertilizers & chemicals			
negative impact	87	54.72%	54.38%
positive impact	9	5.66%	5.63%
no impact	16	10.06%	10.00%
don't know	47	29.56%	29.38%
total	159		99.38%
34. Lake home, road, driveway runoff			
negative impact	51	31.88%	31.88%
positive impact	7	4.38%	4.38%
no impact	39	24.38%	24.38%
don't know	63	39.38%	39.38%
total	160		100.00%
35. Soil erosion from home sites			
negative impact	41	25.79%	25.63%
positive impact	6	3.77%	3.75%
no impact	51	32.08%	31.88%
don't know	61	38.36%	38.13%
total	159		99.38%

36. Exhaust and fuel leakage from watercraft			
negative impact	69	43.13%	43.13%
positive impact	9	5.63%	5.63%
no impact	29	18.13%	18.13%
don't know	53	33.13%	33.13%
total	160		100.00%
37. Damage to aquatic plants & lake bottom by watercraft			
negative impact	55	34.38%	34.38%
positive impact	10	6.25%	6.25%
no impact	29	18.13%	18.13%
don't know	66	41.25%	41.25%
total	160		100.00%
38. Who do you think is responsible for protecting & improving Crescent Lake?			
check all that apply			
lake association members	121	22.20%	75.63%
watershed residents	64	11.74%	40.00%
county government	73	13.39%	45.63%
lakeshore residents	134	24.59%	83.75%
local government	72	13.21%	45.00%
state government	78	14.31%	48.75%
public users	3	0.55%	1.88%
total	545		340.63%
39. Do you maintain a lawn on your Cr Lake property?			
Yes	137	87.82%	85.63%
No	19	12.18%	11.88%
total	156		
40. What type of fertilizer do you use on your Crescent Lake property?			
zero phosphate	29	16.96%	18.13%
low phosphate	17	9.94%	10.63%
organic	6	3.51%	3.75%
weed-n-feed	12	7.02%	7.50%
zero phosphate weed-n-feed	14	8.19%	8.75%
none	93	54.39%	58.13%
total	171		106.88%
41. What is the closest distance from the lake to the areas fertilized?			
less than 30 feet	34	42.50%	21.25%
30-100 feet	20	25.00%	12.50%
101-250 feet	13	16.25%	8.13%
more that 250 feet	13	16.25%	8.13%
total	80		50.00%
42. What best describes your property shoreline?			
undeveloped natural landscape	92	47.67%	57.50%
retaining wall	3	1.55%	1.88%
landscaped trees, shrubs	20	10.36%	12.50%
rock riprap	31	16.06%	19.38%
lawn	46	23.83%	28.75%
no shoreline property	1	0.52%	0.63%
total	193		120.63%
43. Do you maintain a shoreline buffer zone?			
Yes	66	29.33%	41.25%
Ft. from shore:			
1 to 10 feet	27	12.00%	16.88%
11 to 20 feet	14	6.22%	8.75%
21 to 50 feet	14	6.22%	8.75%
over 50 feet	8	3.56%	5.00%
Yes, but no feet given	2	0.89%	1.25%
No buffer	70	31.11%	43.75%
Other	5	2.22%	3.13%
No answer	19	8.44%	11.88%
total	225		140.63%
44.Well type			
drilled	76	50.00%	47.50%
driven	58	38.16%	36.25%

don't know	18	11.84%	11.25%
total	152		
45. Year installed			
don't know	64	40.00%	40.00%
prior to 1970	11	6.88%	6.88%
1971 to 1985	21	13.13%	13.13%
1986 to 2000	36	22.50%	22.50%
2001 to current	28	17.50%	17.50%
total	160		100.00%
46. Well depth in feet			
don't know	76	47.20%	47.50%
under 35 feet	35	21.74%	21.88%
36 to 60 feet	25	15.53%	15.63%
61 to 99 feet	14	8.70%	8.75%
100 and over	11	6.83%	6.88%
total	161		100.63%
47. Do you have a water treatment system			
Yes	87	57.24%	54.38%
No	65	42.76%	40.63%
Don't understand the question	0	0.00%	0.00%
total	152		
48. If yes, does your brine solution discharge to:			
septic tank	62	72.09%	38.75%
surface	9	10.47%	5.63%
drywell	13	15.12%	8.13%
don't understand question	2	2.33%	1.25%
total	86		53.75%
49. Type of septic system on your lake property:			
Check all that apply			
septic tank	135	49.27%	84.38%
privy	3	1.09%	1.88%
holding tank	14	5.11%	8.75%
drainage field	103	37.59%	64.38%
mound system	4	1.46%	2.50%
seepage pit	3	1.09%	1.88%
cesspool/dry well pool/drywell	9	3.28%	5.63%
other	3	1.09%	1.88%
total	274		171.25%
50. Number of persons regularly served			
one to three	93	63.27%	58.13%
Four to six	47	31.97%	29.38%
seven to ten	7	4.76%	4.38%
over 10	0	0.00%	0.00%
total	147		91.88%
51. Number of bedrooms for the system			
one	2	1.32%	1.25%
two	51	33.77%	31.88%
three	70	46.36%	43.75%
four	24	15.89%	15.00%
five to eight	1	0.66%	0.63%
more than eight	3	1.99%	1.88%
total	151		94.38%
52. Date of original installation			
prior to 1970	15	9.80%	9.38%
1970 to 2000	85	55.56%	53.13%
2001 to current	27	17.65%	16.88%
don't know	26	16.99%	16.25%
total	153		95.63%
53. How often Septic Tank is pumped:			
up to 1 year	26	16.99%	16.25%
1 to 2 years	73	47.71%	45.63%
3-5 years	44	28.76%	27.50%
over 5 years	2	1.31%	1.25%
never	4	2.61%	2.50%
as needed	4	2.61%	2.50%
total	153		95.63%
Do you support or oppose the following actions to address problems on the lake? Mark only one answer for each.			

54. Stricter septic system enforcement to improve water quality			
support	80	50.96%	50.00%
neutral	50	31.85%	31.25%
oppose	10	6.37%	6.25%
don't know	17	10.83%	10.63%
total	157		98.13%
55. More shoreline property owner education on impacts of water quality			
support	119	74.84%	74.38%
neutral	31	19.50%	19.38%
oppose	3	1.89%	1.88%
don't know	6	3.77%	3.75%
total	159		99.38%
56. Stricter zoning regulations for shoreline character			
support	50	31.65%	31.25%
neutral	54	34.18%	33.75%
oppose	41	25.95%	25.63%
don't know	13	8.23%	8.13%
total	158		98.75%
57. More enforcement of existing shoreline protection laws			
support	62	39.49%	38.75%
neutral	52	33.12%	32.50%
oppose	32	20.38%	20.00%
don't know	11	7.01%	6.88%
total	157		98.13%
58. Awards program for shoreline property owners who minimize their impact			
support	53	33.33%	33.13%
neutral	69	43.40%	43.13%
oppose	26	16.35%	16.25%
don't know	11	6.92%	6.88%
total	159		99.38%
59. Allowing more aquatic plant(weed) removal			
support	38	24.20%	23.75%
neutral	47	29.94%	29.38%
oppose	49	31.21%	30.63%
don't know	23	14.65%	14.38%
total	157		98.13%
60. Development of more voluntary programs for water quality protection			
support	110	69.62%	68.75%
neutral	41	25.95%	25.63%
oppose	2	1.27%	1.25%
don't know	5	3.16%	3.13%
total	158		98.75%
61. Increased protection for fish habitat			
support	123	77.85%	76.88%
neutral	23	14.56%	14.38%
oppose	4	2.53%	2.50%
don't know	8	5.06%	5.00%
total	158		98.75%
62. More game population management			
support	52		32.50%
neutral	74		46.25%
oppose	14		8.75%
don't know	18		11.25%
total	158		98.75%
63. More management for non-game wildlife(songbirds, loons)			
support	80	50.31%	50.00%
neutral	62	38.99%	38.75%
oppose	11	6.92%	6.88%
don't know	6	3.77%	3.75%
total	159		99.38%

64. More erosion and runoff control assistance for property owners			
support	96	60.38%	60.00%
neutral	43	27.04%	26.88%
oppose	11	6.92%	6.88%
don't know	9	5.66%	5.63%
total	159		99.38%
65. Motorboat size and speed limits to protect shoreland areas			
support	73	46.50%	45.63%
neutral	34	21.66%	21.25%
oppose	46	29.30%	28.75%
don't know	4	2.55%	2.50%
total	157		98.13%
66. Restricted time for water skiing			
support	76	47.80%	47.50%
neutral	29	18.24%	18.13%
oppose	53	33.33%	33.13%
don't know	1	0.63%	0.63%
total	159		99.38%
67. Restricted time for jet skiing			
support	94	59.49%	58.75%
neutral	20	12.66%	12.50%
oppose	43	27.22%	26.88%
don't know	1	0.63%	0.63%
total	158		98.75%
68. Stricter controls for exotic species (ie eurasian water milfoil)			
support	140	88.05%	87.50%
neutral	11	6.92%	6.88%
oppose	2	1.26%	1.25%
don't know	6	3.77%	3.75%
total	159		99.38%
69. More public land purchases to protect shoreland areas			
support	67	42.14%	41.88%
neutral	46	28.93%	28.75%
oppose	33	20.75%	20.63%
don't know	13	8.18%	8.13%
total	159		99.38%
70. Financial incentives for environmentally-sound shoreland management			
support	74	46.84%	46.25%
neutral	54	34.18%	33.75%
oppose	19	12.03%	11.88%
don't know	11	6.96%	6.88%
total	158		98.75%
71. Develop long-term lake management plan			
support	116	73.42%	72.50%
neutral	31	19.62%	19.38%
oppose	4	2.53%	2.50%
don't know	7	4.43%	4.38%
total	158		98.75%
72. Aerate the lake			
support	15	9.55%	9.38%
neutral	57	36.31%	35.63%
oppose	37	23.57%	23.13%
don't know	48	30.57%	30.00%
total	157		98.13%
73. Other(please specify)			
support	38		23.75%
neutral	0		0.00%
oppose	0		0.00%
don't know			0.00%

Appendix B
Watershed Data

CRESCENT LAKE WATERSHED REPORT-JULY 6, 2006

To: Tiffiney Kleczewski
Water Resources Engineer,Ayres Associates
From: Crescent Lake Watershed Committee

The committee has met and studied the land use, wetland and soils maps for the watershed and has observed the watershed from the roads in the watershed and from boat rides around the lake.

The committee found that the maps and charts appeared to be up-to-date and accurate as shown.

We were surprised to learn just how small an area is included in the Crescent Lake watershed.

Except for three areas of cropland(hayfields)approximately 15 acres each(one just north of Highway 8, the second just west of Mirror Lake and a third just off the southwest corner of the lake) and two areas of wetland approximately 10 acres each(one on both sides of Crescent Road just south of Wausau Road that is the inlet to Crescent Lake and the other just south of Highway 8 between the boat landing the South Rifle Road), the watershed is made up of 282 residential lots and the Crescent Lake Bible Camp. 236 of these residential lots are on shoreline of the lake, 230 of which have homes and 6 are empty lots. There are 46 off-lake homes. The Bible Camp has 3700 feet of lake front.

And except for the cropland areas, the entire watershed can be considered "dense mixed forest" with maple, birch, pine, oak and bass the primary tree types. This area was heavily logged off in the late 1890's, then again in the 1930's. Since then there has been minimal cutting or pruning and as a result the woods have grown to full canopy with a considerable amount of deadwood fallen to the ground with heavy undergrowth of shrubs, grass, vegetation and composted leaves.

There appears to be no "active" gravel pits and it would appear that the pits that were active are now overgrown with trees and shrubs.

There are numerous depressions(potholes as we call them) in the watershed. A little ancient history—the glacier and ice age formed the watershed into an irregular surface with depressions and ridges throughout. There are about five deep depressions in the watershed, the deepest at the south end of S. Rifle on both sides of the road. Another is located on the south side of the west end of Wausau Rd and another in the hayfield west of Mirror Lake. As the ice age receded it apparently left the water level 10-15ft higher than the present lake level forming a higher surface level approximately 75 ft. from the present shoreline. As time went on, the lake level dropped leaving a lower tier near the shoreline. As a result many

of the lake lots have two levels-a lower level down on the lake and a higher level in the back part of the lot.

The Bible Camp has 52 acres on the lake with 3700 feet of lake front.Nearly all the shoreline is bordered with natural vegetation. 10 acres are open fields, the remaining 42 acres wooded. All roads are unpaved and run through woods. There are 30 buildings on the property, only 11 close to the lake. The camp does not use fertilizer and most lawns are away from the lake. All septics tanks are less than 15 years old and regularly inspected.

There is one primary "inlet" bringing water into the lake along the west shore of the lake just south of Lair Road. This inlet comes through the wetland area along Crescent Road. There is also a drainage type ditch about 5 feet wide that enters the east shore of the north part of the lake under S. Rifle Rd. Significant drainage seems to occur only during rainy and snow melt times. There is one "outlet" located at the south end of the lake that eventually drains into the Wisconsin River. We assume the part of the watershed area north of Highway 8, drains under the highway and enters the lake through the wetland area just east of the boat landing.

The committee assumes the watershed drains into the lake via the inlets, runoff, seepage, rainfall, snow melt and ground water. In addition, the DNR considers the lake to be a "soft water spring lake". We have assumed over the years that the lake is "spring fed". It is not known just how many or where the location of the "springs" may be or how much they contribute to the lake water. However, the committee as recently had discussion with a full time employee and resident of the Crescent Lake Bible Camp concerning the "springs". He is an experienced scuba diver who has dived numerous times on the bottom of Crescent Lake. He relates that he has located approximately ten springs in the lake most with about 30 feet of sand and silt spread out from the spring. He can tell when he directly over the spring by a drop in water temperature and by being pushed slightly upward as he passes over the spring. If we need more information, such as location of the springs, we can contact him through the Bible Camp.

Now a little less than ancient history—In the early 1900's Crescent Lake was part of the Wausau Gun and Fishing Club and eventually was subdivided into over 200 one hundred foot wide and 200ft to over 500 foot deep lots. By the 1930's there were numerous "summer cabins" built, many on that lower tier very near the shoreline. Many had no indoor plumbing, used outhouses and with little or no insulation. Simply a weekend retreat for fishing and hunting primarily from the middle of June to Labor Day. As time went on, basic septic systems of a metal tank and "dry well" were installed.(see Category 1 below)

Probably after WWII, there were a number of permanent year –round homes built for full time residents (retirees or families who worked in the area). These homes probably installed septic systems with concrete tanks.(see Category 2)

Around the 1970's a number of the older cabins were "remodeled" inside and out, some raised to allow for a lower level. Insulation and heating systems were added along with upgraded septics.(see Category 3)

In the late 1900's there has been a trend to destroy older cabins and construct bigger and more modern year-round homes both for year-round residents or for "vacation" or "second-home" part time residents. One can assume that all of these "recently" constructed homes have up-to-date septic systems that meet the latest code requirements(see Category 4)

With the above information and the feeling of the committee it is reasonable to assume that most of the watershed runoff, seepage, snow melt and ground water has to pass through the 236 lake front lots and the Bible camp to reach the lake, the committee felt one of the main questions to be answered in this study, is what impact does the development of newer and bigger homes and the aging of the older homes have on the water quality of Crescent Lake?

To help with this question, the committee conducted three very informal surveys. We simply observed and classified the homes as we recalled over the past 34 yrs we have been on the lake and info we have received from other property owners. The more formal "residential" survey to be conducted later will no doubt have more detailed and accurate information.

First of all we did a survey to classify each home into one of four categories listed above. In Category 1,we found there were 68(28%) of the original cottages remaining most of which are on the lower tier of their lots. In Category 2 , we found 48(21%) full time homes built prior to 1970, In Category 3 there were 38(35%) remodeled homes and in Category 4(35%) newly constructed bigger and modern homes since 1975.

Second, we did a survey on lawns as we could see from the lake. We identified 150 with mowed lawns and 80 with no lawns.

And last, we surveyed driveways and found 50% had paved driveways and 50% unpaved.

CONCLUSION, (actually a question). With the obvious evolution over the years from Category 1 seasonal homes to Category 4 year around much larger homes, and with the increase in population using these bigger homes, and with a larger percentage of each lot being covered with the bigger homes, driveways and sidewalks, the committee would like to learn what impact this evolution has on the watershed drainage into the lake and the resultant lake water quality?

Sincerely, The Watershed Committee, Glen and Mary Peterson, Mike Jewell, Al Heerey, Bob and Margaret Behmer

We have included a number of pictures (a picture is worth a 1000 words, etc) plus two additional statements concerning one house and the neighbor surrounding that house as specific examples of the above mentioned "evolution".

PROPERTY AT 2984 WAUSAU ROAD

To help understand the evolution of from small summer cottages to larger year round homes on Crescent the following is what we have done with our property. We feel this probably a good example of that evolution.

We purchased the property in 1971. The abstract showed it had been part of the Wausau Gun and Fishing Club during the early 1900's and then became subdivided as a 100 ft by 200 ft lot(with 100 ft of lake front).

In the 1930's the owner built a small cabin next to lake and on the lower tier of the property. In 1952 an addition to provide an living room and small dinning area was added.

Our family used this cabin as our summer vacation home from 1971 to 1983 when we had the cabin destroyed (controlled burn by the local fire departments doing training). We constructed a 3 story, 5 BR, 3 bath house back into the upper tier 75 feet from the lake.

We now use this house an average of 140 days a year as our vacation home. The Oneida County Zoning Board feels that replacement of cabins with homes like ours can result in up to 6-7 times the amount of sewage and waste going into septics. More occupants, more dish washers and clothes washers, etc.

Also, with a new home more surface area is covered. Our new house has a footprint of 40 X 30 in the upper back half of the lot, a 24 X 24 garage, a 20 X 20 driveway apron, a 15 X 100 easement paved roadway in the very back of lot allowing our neighbors access to their homes. Excluding the easement area, we just make the legal 12% limit for footprint coverage.

We leave approximately 15 feet of natural growth along the shoreline and have 80 trees surrounding the house. We have 40 foot wide sight clearance from our house to the lake.

We have of small patch of lawn on the upper tier covering the septic field and a 50 foot by 50 foot lawn on the lower lever. We use non-phosphorus lawn fertilizer.

Our septic is 22 years old and has been inspected as required and to our knowledge is in good working order.

Glen and Mary Peterson

12 HOMES ON WAUSAU ROAD

To help understand further the evolution of the building on Crescent Lake in the last 34 years I would like to relate how our immediate neighborhood has changed in that time.

I will use the 5 lots to our south and around the point and 6 lots to our north as examples.

In 1971, when we purchased our property, there were 8 original cabins and 4 empty lots. All were used as summer cottages, most with little insulation.

In 2006, two original cottages remain and have minimal use in the summer time and none the rest of the year. Two have had extensive remodeling, with upgraded insulation, heating systems and septics. Four have had the original cottages replaced by new modern larger homes with new septics. Three of the empty lots have had new homes built within the last 4 years. And one empty lot remains. Two of the new homes have full time permanent residents, the other nine homes are year round as vacation homes.

This is probably an accurate description of the evolution going on around the entire lake.

Glen Peterson

Appendix C
Self Help Data

COUNTY_NAME	OFFICIAL_NAME	STORET_STATION_SEQ_NO	COLLECTION_DATE	DEPTH	STORET_PARM_DESC	RESULT_AMOUNT	UNITS
Oneida	CRESCENT LAKE	443078	8/25/1990	29	TEMPERATURE OF WATER	65	Deg. F
Oneida	CRESCENT LAKE	443078	8/25/1990	25	TEMPERATURE OF WATER	69	Deg. F
Oneida	CRESCENT LAKE	443078	8/25/1990	15	TEMPERATURE OF WATER	70	Deg. F
Oneida	CRESCENT LAKE	443078	8/25/1990	20	TEMPERATURE OF WATER	70	Deg. F
Oneida	CRESCENT LAKE	443078	8/25/1990	12	TEMPERATURE OF WATER	72	Deg. F
Oneida	CRESCENT LAKE	443078	8/25/1990	6	TEMPERATURE OF WATER	74	Deg. F
Oneida	CRESCENT LAKE	443078	8/25/1990	29	DISSOLVED OXYGEN	2	mg/l
Oneida	CRESCENT LAKE	443078	8/25/1990	20	DISSOLVED OXYGEN	7	mg/l
Oneida	CRESCENT LAKE	443078	8/25/1990	12	DISSOLVED OXYGEN	8	mg/l
Oneida	CRESCENT LAKE	443078	8/25/1990	3	DISSOLVED OXYGEN	7	mg/l
Oneida	CRESCENT LAKE	443078	8/25/1990	6	DISSOLVED OXYGEN	8	mg/l
Oneida	CRESCENT LAKE	443078	8/25/1990	9	DISSOLVED OXYGEN	8	mg/l
Oneida	CRESCENT LAKE	443078	8/25/1990	15	DISSOLVED OXYGEN	8	mg/l
Oneida	CRESCENT LAKE	443078	8/25/1990	25	DISSOLVED OXYGEN	5	mg/l
Oneida	CRESCENT LAKE	443078	8/25/1990	3	TEMPERATURE OF WATER	74	Deg. F
Oneida	CRESCENT LAKE	443078	8/25/1990	9	TEMPERATURE OF WATER	73	Deg. F
Oneida	CRESCENT LAKE	443078	9/22/1990	30	TEMPERATURE OF WATER	62	Deg. F
Oneida	CRESCENT LAKE	443078	9/22/1990	25	TEMPERATURE OF WATER	62	Deg. F
Oneida	CRESCENT LAKE	443078	9/22/1990	15	TEMPERATURE OF WATER	62	Deg. F
Oneida	CRESCENT LAKE	443078	9/22/1990	20	TEMPERATURE OF WATER	62	Deg. F
Oneida	CRESCENT LAKE	443078	9/22/1990	3	DISSOLVED OXYGEN	8	mg/l
Oneida	CRESCENT LAKE	443078	9/22/1990	6	DISSOLVED OXYGEN	8	mg/l
Oneida	CRESCENT LAKE	443078	9/22/1990	9	DISSOLVED OXYGEN	9	mg/l
Oneida	CRESCENT LAKE	443078	9/22/1990	12	DISSOLVED OXYGEN	7	mg/l
Oneida	CRESCENT LAKE	443078	9/22/1990	15	DISSOLVED OXYGEN	7	mg/l
Oneida	CRESCENT LAKE	443078	9/22/1990	20	DISSOLVED OXYGEN	8	mg/l
Oneida	CRESCENT LAKE	443078	9/22/1990	25	DISSOLVED OXYGEN	8	mg/l
Oneida	CRESCENT LAKE	443078	9/22/1990	30	DISSOLVED OXYGEN	8	mg/l
Oneida	CRESCENT LAKE	443078	9/22/1990	12	TEMPERATURE OF WATER	62	Deg. F
Oneida	CRESCENT LAKE	443078	9/22/1990	6	TEMPERATURE OF WATER	62	Deg. F
Oneida	CRESCENT LAKE	443078	9/22/1990	3	TEMPERATURE OF WATER	62	Deg. F
Oneida	CRESCENT LAKE	443078	9/22/1990	9	TEMPERATURE OF WATER	62	Deg. F
Oneida	CRESCENT LAKE	443078	10/20/1990	29	TEMPERATURE OF WATER	48	Deg. F
Oneida	CRESCENT LAKE	443078	10/20/1990	25	TEMPERATURE OF WATER	48	Deg. F
Oneida	CRESCENT LAKE	443078	10/20/1990	15	TEMPERATURE OF WATER	49	Deg. F
Oneida	CRESCENT LAKE	443078	10/20/1990	12	TEMPERATURE OF WATER	49	Deg. F
Oneida	CRESCENT LAKE	443078	10/20/1990	6	DISSOLVED OXYGEN	10	
Oneida	CRESCENT LAKE	443078	10/20/1990	9	DISSOLVED OXYGEN	10	mg/l
Oneida	CRESCENT LAKE	443078	10/20/1990	12	DISSOLVED OXYGEN	10	mg/l
Oneida	CRESCENT LAKE	443078	10/20/1990	15	DISSOLVED OXYGEN	10	mg/l
Oneida	CRESCENT LAKE	443078	10/20/1990	20	DISSOLVED OXYGEN	10	mg/l
Oneida	CRESCENT LAKE	443078	10/20/1990	25	DISSOLVED OXYGEN	10	mg/l
Oneida	CRESCENT LAKE	443078	10/20/1990	29	DISSOLVED OXYGEN	10	mg/l
Oneida	CRESCENT LAKE	443078	10/20/1990	20	TEMPERATURE OF WATER	48	Deg. F
Oneida	CRESCENT LAKE	443078	10/20/1990	9	TEMPERATURE OF WATER	49	Deg. F
Oneida	CRESCENT LAKE	443078	10/20/1990	6	TEMPERATURE OF WATER	49	Deg. F
Oneida	CRESCENT LAKE	443078	6/16/1991	3	UNCORRECTED	1	ug/l
Oneida	CRESCENT LAKE	443078	6/16/1991	30	TEMPERATURE OF WATER	55	Deg. F
Oneida	CRESCENT LAKE	443078	6/16/1991	25	TEMPERATURE OF WATER	55	Deg. F
Oneida	CRESCENT LAKE	443078	6/16/1991	15	TEMPERATURE OF WATER	64	Deg. F
Oneida	CRESCENT LAKE	443078	6/16/1991	12	TEMPERATURE OF WATER	74	Deg. F
Oneida	CRESCENT LAKE	443078	6/16/1991	20	TEMPERATURE OF WATER	59	Deg. F
Oneida	CRESCENT LAKE	443078	6/16/1991	3	DISSOLVED OXYGEN	8	mg/l
Oneida	CRESCENT LAKE	443078	6/16/1991	6	DISSOLVED OXYGEN	8	mg/l
Oneida	CRESCENT LAKE	443078	6/16/1991	9	DISSOLVED OXYGEN	8	mg/l

Oneida	CRESCENT LAKE	443078	6/16/1991	12	DISSOLVED OXYGEN	8	mg/l
Oneida	CRESCENT LAKE	443078	6/16/1991	15	DISSOLVED OXYGEN	10	mg/l
Oneida	CRESCENT LAKE	443078	6/16/1991	20	DISSOLVED OXYGEN	5	mg/l
Oneida	CRESCENT LAKE	443078	6/16/1991	25	DISSOLVED OXYGEN	4	mg/l
Oneida	CRESCENT LAKE	443078	6/16/1991	30	DISSOLVED OXYGEN	4	mg/l
Oneida	CRESCENT LAKE	443078	6/16/1991	9	TEMPERATURE OF WATER	75	Deg. F
Oneida	CRESCENT LAKE	443078	6/16/1991	3	TEMPERATURE OF WATER	76	Deg. F
Oneida	CRESCENT LAKE	443078	6/16/1991	6	TEMPERATURE OF WATER	75	Deg. F
Oneida	CRESCENT LAKE	443078	8/11/1991	1	UNCORRECTED	6	ug/l
Oneida	CRESCENT LAKE	443078	8/11/1991	30	TEMPERATURE OF WATER	62	Deg. F
Oneida	CRESCENT LAKE	443078	8/11/1991	25	TEMPERATURE OF WATER	64	Deg. F
Oneida	CRESCENT LAKE	443078	8/11/1991	15	TEMPERATURE OF WATER	73	Deg. F
Oneida	CRESCENT LAKE	443078	8/11/1991	12	TEMPERATURE OF WATER	73	Deg. F
Oneida	CRESCENT LAKE	443078	8/11/1991	20	TEMPERATURE OF WATER	71	Deg. F
Oneida	CRESCENT LAKE	443078	8/11/1991	3	DISSOLVED OXYGEN	8	mg/l
Oneida	CRESCENT LAKE	443078	8/11/1991	6	DISSOLVED OXYGEN	9	mg/l
Oneida	CRESCENT LAKE	443078	8/11/1991	9	DISSOLVED OXYGEN	9	mg/l
Oneida	CRESCENT LAKE	443078	8/11/1991	12	DISSOLVED OXYGEN	9	mg/l
Oneida	CRESCENT LAKE	443078	8/11/1991	15	DISSOLVED OXYGEN	9	mg/l
Oneida	CRESCENT LAKE	443078	8/11/1991	20	DISSOLVED OXYGEN	6	mg/l
Oneida	CRESCENT LAKE	443078	8/11/1991	25	DISSOLVED OXYGEN	1	mg/l
Oneida	CRESCENT LAKE	443078	8/11/1991	30	DISSOLVED OXYGEN	2	mg/l
Oneida	CRESCENT LAKE	443078	8/11/1991	9	TEMPERATURE OF WATER	74	Deg. F
Oneida	CRESCENT LAKE	443078	8/11/1991	3	TEMPERATURE OF WATER	75	Deg. F
Oneida	CRESCENT LAKE	443078	8/11/1991	6	TEMPERATURE OF WATER	75	Deg. F
Oneida	CRESCENT LAKE	443078	9/3/1991	1	UNCORRECTED	11	ug/l
Oneida	CRESCENT LAKE	443078	9/3/1991	30	TEMPERATURE OF WATER	58	Deg. F
Oneida	CRESCENT LAKE	443078	9/3/1991	25	TEMPERATURE OF WATER	62	Deg. F
Oneida	CRESCENT LAKE	443078	9/3/1991	15	TEMPERATURE OF WATER	73	Deg. F
Oneida	CRESCENT LAKE	443078	9/3/1991	12	TEMPERATURE OF WATER	73	Deg. F
Oneida	CRESCENT LAKE	443078	9/3/1991	20	TEMPERATURE OF WATER	72	Deg. F
Oneida	CRESCENT LAKE	443078	9/3/1991	3	DISSOLVED OXYGEN	9	mg/l
Oneida	CRESCENT LAKE	443078	9/3/1991	6	DISSOLVED OXYGEN	9	mg/l
Oneida	CRESCENT LAKE	443078	9/3/1991	9	DISSOLVED OXYGEN	8	mg/l
Oneida	CRESCENT LAKE	443078	9/3/1991	12	DISSOLVED OXYGEN	9	mg/l
Oneida	CRESCENT LAKE	443078	9/3/1991	15	DISSOLVED OXYGEN	9	mg/l
Oneida	CRESCENT LAKE	443078	9/3/1991	20	DISSOLVED OXYGEN	2	mg/l
Oneida	CRESCENT LAKE	443078	9/3/1991	25	DISSOLVED OXYGEN	1	mg/l
Oneida	CRESCENT LAKE	443078	9/3/1991	30	DISSOLVED OXYGEN	3	mg/l
Oneida	CRESCENT LAKE	443078	9/3/1991	9	TEMPERATURE OF WATER	73	Deg. F
Oneida	CRESCENT LAKE	443078	9/3/1991	3	TEMPERATURE OF WATER	74	Deg. F
Oneida	CRESCENT LAKE	443078	9/3/1991	6	TEMPERATURE OF WATER	73	Deg. F
Oneida	CRESCENT LAKE	443078	7/17/1992	1	UNCORRECTED	4	ug/l
Oneida	CRESCENT LAKE	443078	7/17/1992	30	TEMPERATURE OF WATER	59	Deg. F
Oneida	CRESCENT LAKE	443078	7/17/1992	25	TEMPERATURE OF WATER	64	Deg. F
Oneida	CRESCENT LAKE	443078	7/17/1992	15	TEMPERATURE OF WATER	66	Deg. F
Oneida	CRESCENT LAKE	443078	7/17/1992	12	TEMPERATURE OF WATER	70	Deg. F
Oneida	CRESCENT LAKE	443078	7/17/1992	20	TEMPERATURE OF WATER	64	Deg. F
Oneida	CRESCENT LAKE	443078	7/17/1992	3	DISSOLVED OXYGEN	9	mg/l
Oneida	CRESCENT LAKE	443078	7/17/1992	6	DISSOLVED OXYGEN	8	mg/l
Oneida	CRESCENT LAKE	443078	7/17/1992	9	DISSOLVED OXYGEN	7	mg/l
Oneida	CRESCENT LAKE	443078	7/17/1992	12	DISSOLVED OXYGEN	7	mg/l
Oneida	CRESCENT LAKE	443078	7/17/1992	15	DISSOLVED OXYGEN	9	mg/l
Oneida	CRESCENT LAKE	443078	7/17/1992	20	DISSOLVED OXYGEN	2	mg/l
Oneida	CRESCENT LAKE	443078	7/17/1992	25	DISSOLVED OXYGEN	2	mg/l
Oneida	CRESCENT LAKE	443078	7/17/1992	30	DISSOLVED OXYGEN	0	mg/l
Oneida	CRESCENT LAKE	443078	7/17/1992	9	TEMPERATURE OF WATER	71	Deg. F
Oneida	CRESCENT LAKE	443078	7/17/1992	3	TEMPERATURE OF WATER	71	Deg. F

Oneida	CRESCENT LAKE	443078	7/17/1992	6	TEMPERATURE OF WATER	71	Deg. F
Oneida	CRESCENT LAKE	443078	8/16/1992	1	UNCORRECTED	3	ug/l
Oneida	CRESCENT LAKE	443078	8/16/1992	30	TEMPERATURE OF WATER	62	Deg. F
Oneida	CRESCENT LAKE	443078	8/16/1992	25	TEMPERATURE OF WATER	67	Deg. F
Oneida	CRESCENT LAKE	443078	8/16/1992	15	TEMPERATURE OF WATER	70	Deg. F
Oneida	CRESCENT LAKE	443078	8/16/1992	12	TEMPERATURE OF WATER	71	Deg. F
Oneida	CRESCENT LAKE	443078	8/16/1992	20	TEMPERATURE OF WATER	69	Deg. F
Oneida	CRESCENT LAKE	443078	8/16/1992	3	DISSOLVED OXYGEN	8	mg/l
Oneida	CRESCENT LAKE	443078	8/16/1992	6	DISSOLVED OXYGEN	7	mg/l
Oneida	CRESCENT LAKE	443078	8/16/1992	9	DISSOLVED OXYGEN	7	mg/l
Oneida	CRESCENT LAKE	443078	8/16/1992	12	DISSOLVED OXYGEN	7	mg/l
Oneida	CRESCENT LAKE	443078	8/16/1992	15	DISSOLVED OXYGEN	7	mg/l
Oneida	CRESCENT LAKE	443078	8/16/1992	20	DISSOLVED OXYGEN	7	mg/l
Oneida	CRESCENT LAKE	443078	8/16/1992	25	DISSOLVED OXYGEN	4	mg/l
Oneida	CRESCENT LAKE	443078	8/16/1992	30	DISSOLVED OXYGEN	0	mg/l
Oneida	CRESCENT LAKE	443078	8/16/1992	9	TEMPERATURE OF WATER	71	Deg. F
Oneida	CRESCENT LAKE	443078	8/16/1992	3	TEMPERATURE OF WATER	71	Deg. F
Oneida	CRESCENT LAKE	443078	8/16/1992	6	TEMPERATURE OF WATER	71	Deg. F
Oneida	CRESCENT LAKE	443078	9/26/1992	1	UNCORRECTED	16	ug/l
Oneida	CRESCENT LAKE	443078	9/26/1992	30	TEMPERATURE OF WATER	58	Deg. F
Oneida	CRESCENT LAKE	443078	9/26/1992	25	TEMPERATURE OF WATER	59	Deg. F
Oneida	CRESCENT LAKE	443078	9/26/1992	15	TEMPERATURE OF WATER	59	Deg. F
Oneida	CRESCENT LAKE	443078	9/26/1992	12	TEMPERATURE OF WATER	59	Deg. F
Oneida	CRESCENT LAKE	443078	9/26/1992	20	TEMPERATURE OF WATER	59	Deg. F
Oneida	CRESCENT LAKE	443078	9/26/1992	3	DISSOLVED OXYGEN	9	mg/l
Oneida	CRESCENT LAKE	443078	9/26/1992	6	DISSOLVED OXYGEN	9	mg/l
Oneida	CRESCENT LAKE	443078	9/26/1992	9	DISSOLVED OXYGEN	9	mg/l
Oneida	CRESCENT LAKE	443078	9/26/1992	12	DISSOLVED OXYGEN	9	mg/l
Oneida	CRESCENT LAKE	443078	9/26/1992	15	DISSOLVED OXYGEN	9	mg/l
Oneida	CRESCENT LAKE	443078	9/26/1992	20	DISSOLVED OXYGEN	9	mg/l
Oneida	CRESCENT LAKE	443078	9/26/1992	25	DISSOLVED OXYGEN	9	mg/l
Oneida	CRESCENT LAKE	443078	9/26/1992	30	DISSOLVED OXYGEN	8	mg/l
Oneida	CRESCENT LAKE	443078	9/26/1992	9	TEMPERATURE OF WATER	59	Deg. F
Oneida	CRESCENT LAKE	443078	9/26/1992	3	TEMPERATURE OF WATER	59	Deg. F
Oneida	CRESCENT LAKE	443078	9/26/1992	6	TEMPERATURE OF WATER	59	Deg. F
Oneida	CRESCENT LAKE	443078	10/31/1992	1	UNCORRECTED	3	ug/l
Oneida	CRESCENT LAKE	443078	10/31/1992	30	TEMPERATURE OF WATER	45	Deg. F
Oneida	CRESCENT LAKE	443078	10/31/1992	25	TEMPERATURE OF WATER	45	Deg. F
Oneida	CRESCENT LAKE	443078	10/31/1992	15	TEMPERATURE OF WATER	45	Deg. F
Oneida	CRESCENT LAKE	443078	10/31/1992	12	TEMPERATURE OF WATER	45	Deg. F
Oneida	CRESCENT LAKE	443078	10/31/1992	20	TEMPERATURE OF WATER	45	Deg. F
Oneida	CRESCENT LAKE	443078	10/31/1992	9	TEMPERATURE OF WATER	45	Deg. F
Oneida	CRESCENT LAKE	443078	10/31/1992	3	TEMPERATURE OF WATER	45	Deg. F
Oneida	CRESCENT LAKE	443078	10/31/1992	6	TEMPERATURE OF WATER	45	Deg. F
Oneida	CRESCENT LAKE	443078	5/5/1993	1	UNCORRECTED	4	ug/l
Oneida	CRESCENT LAKE	443078	5/5/1993	30	TEMPERATURE OF WATER	44	Deg. F
Oneida	CRESCENT LAKE	443078	5/5/1993	25	TEMPERATURE OF WATER	46	Deg. F
Oneida	CRESCENT LAKE	443078	5/5/1993	15	TEMPERATURE OF WATER	46	Deg. F
Oneida	CRESCENT LAKE	443078	5/5/1993	12	TEMPERATURE OF WATER	48	Deg. F
Oneida	CRESCENT LAKE	443078	5/5/1993	20	TEMPERATURE OF WATER	46	Deg. F
Oneida	CRESCENT LAKE	443078	5/5/1993	3	DISSOLVED OXYGEN	10	mg/l
Oneida	CRESCENT LAKE	443078	5/5/1993	6	DISSOLVED OXYGEN	9	mg/l
Oneida	CRESCENT LAKE	443078	5/5/1993	9	DISSOLVED OXYGEN	12	mg/l
Oneida	CRESCENT LAKE	443078	5/5/1993	12	DISSOLVED OXYGEN	11	mg/l
Oneida	CRESCENT LAKE	443078	5/5/1993	15	DISSOLVED OXYGEN	11	mg/l
Oneida	CRESCENT LAKE	443078	5/5/1993	20	DISSOLVED OXYGEN	10	mg/l
Oneida	CRESCENT LAKE	443078	5/5/1993	25	DISSOLVED OXYGEN	9	mg/l
Oneida	CRESCENT LAKE	443078	5/5/1993	30	DISSOLVED OXYGEN	9	mg/l

Oneida	CRESCENT LAKE	443078	5/5/1993	9	TEMPERATURE OF WATER	47	Deg. F
Oneida	CRESCENT LAKE	443078	5/5/1993	3	TEMPERATURE OF WATER	51	Deg. F
Oneida	CRESCENT LAKE	443078	5/5/1993	6	TEMPERATURE OF WATER	49	Deg. F
Oneida	CRESCENT LAKE	443078	6/14/1993	1	UNCORRECTED	3	ug/l
Oneida	CRESCENT LAKE	443078	6/14/1993	3	TEMPERATURE OF WATER	68	Deg. F
Oneida	CRESCENT LAKE	443078	6/14/1993	30	TEMPERATURE OF WATER	57	Deg. F
Oneida	CRESCENT LAKE	443078	6/14/1993	20	TEMPERATURE OF WATER	59	Deg. F
Oneida	CRESCENT LAKE	443078	6/14/1993	15	TEMPERATURE OF WATER	63	Deg. F
Oneida	CRESCENT LAKE	443078	6/14/1993	25	TEMPERATURE OF WATER	58	Deg. F
Oneida	CRESCENT LAKE	443078	6/14/1993	3	DISSOLVED OXYGEN	8	mg/l
Oneida	CRESCENT LAKE	443078	6/14/1993	6	DISSOLVED OXYGEN	9	mg/l
Oneida	CRESCENT LAKE	443078	6/14/1993	9	DISSOLVED OXYGEN	9	mg/l
Oneida	CRESCENT LAKE	443078	6/14/1993	12	DISSOLVED OXYGEN	9	mg/l
Oneida	CRESCENT LAKE	443078	6/14/1993	15	DISSOLVED OXYGEN	9	mg/l
Oneida	CRESCENT LAKE	443078	6/14/1993	20	DISSOLVED OXYGEN	7	mg/l
Oneida	CRESCENT LAKE	443078	6/14/1993	25	DISSOLVED OXYGEN	6	mg/l
Oneida	CRESCENT LAKE	443078	6/14/1993	30	DISSOLVED OXYGEN	3	mg/l
Oneida	CRESCENT LAKE	443078	6/14/1993	12	TEMPERATURE OF WATER	64	Deg. F
Oneida	CRESCENT LAKE	443078	6/14/1993	6	TEMPERATURE OF WATER	68	Deg. F
Oneida	CRESCENT LAKE	443078	6/14/1993	9	TEMPERATURE OF WATER	65	Deg. F
Oneida	CRESCENT LAKE	443078	8/8/1993	1	UNCORRECTED	4	ug/l
Oneida	CRESCENT LAKE	443078	8/8/1993	30	TEMPERATURE OF WATER	62	Deg. F
Oneida	CRESCENT LAKE	443078	8/8/1993	25	TEMPERATURE OF WATER	68	Deg. F
Oneida	CRESCENT LAKE	443078	8/8/1993	15	TEMPERATURE OF WATER	72	Deg. F
Oneida	CRESCENT LAKE	443078	8/8/1993	20	TEMPERATURE OF WATER	69	Deg. F
Oneida	CRESCENT LAKE	443078	8/8/1993	12	TEMPERATURE OF WATER	72	Deg. F
Oneida	CRESCENT LAKE	443078	8/8/1993	3	DISSOLVED OXYGEN	9	mg/l
Oneida	CRESCENT LAKE	443078	8/8/1993	6	DISSOLVED OXYGEN	9	mg/l
Oneida	CRESCENT LAKE	443078	8/8/1993	9	DISSOLVED OXYGEN	9	mg/l
Oneida	CRESCENT LAKE	443078	8/8/1993	12	DISSOLVED OXYGEN	8	mg/l
Oneida	CRESCENT LAKE	443078	8/8/1993	15	DISSOLVED OXYGEN	9	mg/l
Oneida	CRESCENT LAKE	443078	8/8/1993	20	DISSOLVED OXYGEN	6	mg/l
Oneida	CRESCENT LAKE	443078	8/8/1993	25	DISSOLVED OXYGEN	4	mg/l
Oneida	CRESCENT LAKE	443078	8/8/1993	6	TEMPERATURE OF WATER	74	Deg. F
Oneida	CRESCENT LAKE	443078	8/8/1993	0	TEMPERATURE OF WATER	74	Deg. F
Oneida	CRESCENT LAKE	443078	8/8/1993	3	TEMPERATURE OF WATER	74	Deg. F
Oneida	CRESCENT LAKE	443078	8/8/1993	9	TEMPERATURE OF WATER	73	Deg. F
Oneida	CRESCENT LAKE	443078	9/6/1993	3	UNCORRECTED	9	ug/l
Oneida	CRESCENT LAKE	443078	9/6/1993	30	TEMPERATURE OF WATER	63	Deg. F
Oneida	CRESCENT LAKE	443078	9/6/1993	25	TEMPERATURE OF WATER	66	Deg. F
Oneida	CRESCENT LAKE	443078	9/6/1993	15	TEMPERATURE OF WATER	67	Deg. F
Oneida	CRESCENT LAKE	443078	9/6/1993	20	TEMPERATURE OF WATER	66	Deg. F
Oneida	CRESCENT LAKE	443078	9/6/1993	3	DISSOLVED OXYGEN	8	mg/l
Oneida	CRESCENT LAKE	443078	9/6/1993	6	DISSOLVED OXYGEN	7	mg/l
Oneida	CRESCENT LAKE	443078	9/6/1993	9	DISSOLVED OXYGEN	4	mg/l
Oneida	CRESCENT LAKE	443078	9/6/1993	12	DISSOLVED OXYGEN	8	mg/l
Oneida	CRESCENT LAKE	443078	9/6/1993	15	DISSOLVED OXYGEN	8	mg/l
Oneida	CRESCENT LAKE	443078	9/6/1993	20	DISSOLVED OXYGEN	7	mg/l
Oneida	CRESCENT LAKE	443078	9/6/1993	25	DISSOLVED OXYGEN	7	mg/l
Oneida	CRESCENT LAKE	443078	9/6/1993	30	DISSOLVED OXYGEN	1	mg/l
Oneida	CRESCENT LAKE	443078	9/6/1993	12	TEMPERATURE OF WATER	67	Deg. F
Oneida	CRESCENT LAKE	443078	9/6/1993	6	TEMPERATURE OF WATER	68	Deg. F
Oneida	CRESCENT LAKE	443078	9/6/1993	3	TEMPERATURE OF WATER	68	Deg. F
Oneida	CRESCENT LAKE	443078	9/6/1993	9	TEMPERATURE OF WATER	67	Deg. F
Oneida	CRESCENT LAKE	443078	11/17/1993	3	UNCORRECTED	5	ug/l
Oneida	CRESCENT LAKE	443078	11/17/1993	30	TEMPERATURE OF WATER	37	Deg. F
Oneida	CRESCENT LAKE	443078	11/17/1993	25	TEMPERATURE OF WATER	37	Deg. F
Oneida	CRESCENT LAKE	443078	11/17/1993	15	TEMPERATURE OF WATER	37	Deg. F

Oneida	CRESCENT LAKE	443078	11/17/1993	20	TEMPERATURE OF WATER	37	Deg. F
Oneida	CRESCENT LAKE	443078	11/17/1993	3	DISSOLVED OXYGEN	11	mg/l
Oneida	CRESCENT LAKE	443078	11/17/1993	6	DISSOLVED OXYGEN	10	mg/l
Oneida	CRESCENT LAKE	443078	11/17/1993	9	DISSOLVED OXYGEN	11	mg/l
Oneida	CRESCENT LAKE	443078	11/17/1993	12	DISSOLVED OXYGEN	12	mg/l
Oneida	CRESCENT LAKE	443078	11/17/1993	15	DISSOLVED OXYGEN	12	mg/l
Oneida	CRESCENT LAKE	443078	11/17/1993	20	DISSOLVED OXYGEN	12	mg/l
Oneida	CRESCENT LAKE	443078	11/17/1993	25	DISSOLVED OXYGEN	12	mg/l
Oneida	CRESCENT LAKE	443078	11/17/1993	30	DISSOLVED OXYGEN	12	mg/l
Oneida	CRESCENT LAKE	443078	11/17/1993	12	TEMPERATURE OF WATER	37	Deg. F
Oneida	CRESCENT LAKE	443078	11/17/1993	6	TEMPERATURE OF WATER	37	Deg. F
Oneida	CRESCENT LAKE	443078	11/17/1993	3	TEMPERATURE OF WATER	37	Deg. F
Oneida	CRESCENT LAKE	443078	11/17/1993	9	TEMPERATURE OF WATER	37	Deg. F
Oneida	CRESCENT LAKE	443078	5/31/1994	30	TEMPERATURE OF WATER	55	Deg. F
Oneida	CRESCENT LAKE	443078	5/31/1994	25	TEMPERATURE OF WATER	56	Deg. F
Oneida	CRESCENT LAKE	443078	5/31/1994	15	TEMPERATURE OF WATER	64	Deg. F
Oneida	CRESCENT LAKE	443078	5/31/1994	20	TEMPERATURE OF WATER	58	Deg. F
Oneida	CRESCENT LAKE	443078	5/31/1994	3	UNCORRECTED	2	ug/l
Oneida	CRESCENT LAKE	443078	5/31/1994	3	DISSOLVED OXYGEN	9	mg/l
Oneida	CRESCENT LAKE	443078	5/31/1994	6	DISSOLVED OXYGEN	7	mg/l
Oneida	CRESCENT LAKE	443078	5/31/1994	9	DISSOLVED OXYGEN	9	mg/l
Oneida	CRESCENT LAKE	443078	5/31/1994	12	DISSOLVED OXYGEN	7	mg/l
Oneida	CRESCENT LAKE	443078	5/31/1994	15	DISSOLVED OXYGEN	9	mg/l
Oneida	CRESCENT LAKE	443078	5/31/1994	20	DISSOLVED OXYGEN	7	mg/l
Oneida	CRESCENT LAKE	443078	5/31/1994	25	DISSOLVED OXYGEN	8	mg/l
Oneida	CRESCENT LAKE	443078	5/31/1994	30	DISSOLVED OXYGEN	4	mg/l
Oneida	CRESCENT LAKE	443078	5/31/1994	12	TEMPERATURE OF WATER	65	Deg. F
Oneida	CRESCENT LAKE	443078	5/31/1994	6	TEMPERATURE OF WATER	65	Deg. F
Oneida	CRESCENT LAKE	443078	5/31/1994	3	TEMPERATURE OF WATER	66	Deg. F
Oneida	CRESCENT LAKE	443078	5/31/1994	9	TEMPERATURE OF WATER	65	Deg. F
Oneida	CRESCENT LAKE	443078	6/15/1994	30	TEMPERATURE OF WATER	59	Deg. F
Oneida	CRESCENT LAKE	443078	6/15/1994	25	TEMPERATURE OF WATER	61	Deg. F
Oneida	CRESCENT LAKE	443078	6/15/1994	15	TEMPERATURE OF WATER	70	Deg. F
Oneida	CRESCENT LAKE	443078	6/15/1994	20	TEMPERATURE OF WATER	69	Deg. F
Oneida	CRESCENT LAKE	443078	6/15/1994	3	UNCORRECTED	3	ug/l
Oneida	CRESCENT LAKE	443078	6/15/1994	3	DISSOLVED OXYGEN	6	mg/l
Oneida	CRESCENT LAKE	443078	6/15/1994	6	DISSOLVED OXYGEN	4	mg/l
Oneida	CRESCENT LAKE	443078	6/15/1994	9	DISSOLVED OXYGEN	4	mg/l
Oneida	CRESCENT LAKE	443078	6/15/1994	12	DISSOLVED OXYGEN	4	mg/l
Oneida	CRESCENT LAKE	443078	6/15/1994	15	DISSOLVED OXYGEN	4	mg/l
Oneida	CRESCENT LAKE	443078	6/15/1994	20	DISSOLVED OXYGEN	2	mg/l
Oneida	CRESCENT LAKE	443078	6/15/1994	25	DISSOLVED OXYGEN	2	mg/l
Oneida	CRESCENT LAKE	443078	6/15/1994	30	DISSOLVED OXYGEN	1	mg/l
Oneida	CRESCENT LAKE	443078	6/15/1994	12	TEMPERATURE OF WATER	70	Deg. F
Oneida	CRESCENT LAKE	443078	6/15/1994	6	TEMPERATURE OF WATER	71	Deg. F
Oneida	CRESCENT LAKE	443078	6/15/1994	3	TEMPERATURE OF WATER	72	Deg. F
Oneida	CRESCENT LAKE	443078	6/15/1994	9	TEMPERATURE OF WATER	71	Deg. F
Oneida	CRESCENT LAKE	443078	7/24/1994	30	TEMPERATURE OF WATER	58	Deg. F
Oneida	CRESCENT LAKE	443078	7/24/1994	25	TEMPERATURE OF WATER	66	Deg. F
Oneida	CRESCENT LAKE	443078	7/24/1994	15	TEMPERATURE OF WATER	73	Deg. F
Oneida	CRESCENT LAKE	443078	7/24/1994	20	TEMPERATURE OF WATER	71	Deg. F
Oneida	CRESCENT LAKE	443078	7/24/1994	3	UNCORRECTED	4	ug/l
Oneida	CRESCENT LAKE	443078	7/24/1994	3	DISSOLVED OXYGEN	8	mg/l
Oneida	CRESCENT LAKE	443078	7/24/1994	6	DISSOLVED OXYGEN	9	mg/l
Oneida	CRESCENT LAKE	443078	7/24/1994	9	DISSOLVED OXYGEN	8	mg/l
Oneida	CRESCENT LAKE	443078	7/24/1994	12	DISSOLVED OXYGEN	7	mg/l
Oneida	CRESCENT LAKE	443078	7/24/1994	15	DISSOLVED OXYGEN	8	mg/l
Oneida	CRESCENT LAKE	443078	7/24/1994	20	DISSOLVED OXYGEN	5	mg/l

Oneida	CRESCENT LAKE	443078	7/24/1994	25	DISSOLVED OXYGEN	1	mg/l
Oneida	CRESCENT LAKE	443078	7/24/1994	12	TEMPERATURE OF WATER	73	Deg. F
Oneida	CRESCENT LAKE	443078	7/24/1994	6	TEMPERATURE OF WATER	73	Deg. F
Oneida	CRESCENT LAKE	443078	7/24/1994	3	TEMPERATURE OF WATER	73	Deg. F
Oneida	CRESCENT LAKE	443078	7/24/1994	9	TEMPERATURE OF WATER	73	Deg. F
Oneida	CRESCENT LAKE	443078	8/21/1994	30	TEMPERATURE OF WATER	61	Deg. F
Oneida	CRESCENT LAKE	443078	8/21/1994	25	TEMPERATURE OF WATER	66	Deg. F
Oneida	CRESCENT LAKE	443078	8/21/1994	15	TEMPERATURE OF WATER	67	Deg. F
Oneida	CRESCENT LAKE	443078	8/21/1994	20	TEMPERATURE OF WATER	67	Deg. F
Oneida	CRESCENT LAKE	443078	8/21/1994	3	UNCORRECTED	9	ug/l
Oneida	CRESCENT LAKE	443078	8/21/1994	3	DISSOLVED OXYGEN	9	mg/l
Oneida	CRESCENT LAKE	443078	8/21/1994	6	DISSOLVED OXYGEN	8	mg/l
Oneida	CRESCENT LAKE	443078	8/21/1994	9	DISSOLVED OXYGEN	9	mg/l
Oneida	CRESCENT LAKE	443078	8/21/1994	12	DISSOLVED OXYGEN	8	mg/l
Oneida	CRESCENT LAKE	443078	8/21/1994	15	DISSOLVED OXYGEN	8	mg/l
Oneida	CRESCENT LAKE	443078	8/21/1994	20	DISSOLVED OXYGEN	7	mg/l
Oneida	CRESCENT LAKE	443078	8/21/1994	25	DISSOLVED OXYGEN	5	mg/l
Oneida	CRESCENT LAKE	443078	8/21/1994	12	TEMPERATURE OF WATER	68	Deg. F
Oneida	CRESCENT LAKE	443078	8/21/1994	6	TEMPERATURE OF WATER	69	Deg. F
Oneida	CRESCENT LAKE	443078	8/21/1994	3	TEMPERATURE OF WATER	70	Deg. F
Oneida	CRESCENT LAKE	443078	8/21/1994	9	TEMPERATURE OF WATER	69	Deg. F
Oneida	CRESCENT LAKE	443078	10/30/1994	30	TEMPERATURE OF WATER	48	Deg. F
Oneida	CRESCENT LAKE	443078	10/30/1994	25	TEMPERATURE OF WATER	48	Deg. F
Oneida	CRESCENT LAKE	443078	10/30/1994	15	TEMPERATURE OF WATER	48	Deg. F
Oneida	CRESCENT LAKE	443078	10/30/1994	20	TEMPERATURE OF WATER	48	Deg. F
Oneida	CRESCENT LAKE	443078	10/30/1994	3	UNCORRECTED	5	ug/l
Oneida	CRESCENT LAKE	443078	10/30/1994	3	DISSOLVED OXYGEN	10	mg/l
Oneida	CRESCENT LAKE	443078	10/30/1994	6	DISSOLVED OXYGEN	10	mg/l
Oneida	CRESCENT LAKE	443078	10/30/1994	9	DISSOLVED OXYGEN	10	mg/l
Oneida	CRESCENT LAKE	443078	10/30/1994	12	DISSOLVED OXYGEN	10	mg/l
Oneida	CRESCENT LAKE	443078	10/30/1994	15	DISSOLVED OXYGEN	10	mg/l
Oneida	CRESCENT LAKE	443078	10/30/1994	20	DISSOLVED OXYGEN	10	mg/l
Oneida	CRESCENT LAKE	443078	10/30/1994	25	DISSOLVED OXYGEN	10	mg/l
Oneida	CRESCENT LAKE	443078	10/30/1994	30	DISSOLVED OXYGEN	10	mg/l
Oneida	CRESCENT LAKE	443078	10/30/1994	12	TEMPERATURE OF WATER	48	Deg. F
Oneida	CRESCENT LAKE	443078	10/30/1994	6	TEMPERATURE OF WATER	48	Deg. F
Oneida	CRESCENT LAKE	443078	10/30/1994	3	TEMPERATURE OF WATER	48	Deg. F
Oneida	CRESCENT LAKE	443078	10/30/1994	9	TEMPERATURE OF WATER	48	Deg. F
Oneida	CRESCENT LAKE	443078	5/16/1995	30	TEMPERATURE OF WATER	49	Deg. F
Oneida	CRESCENT LAKE	443078	5/16/1995	25	TEMPERATURE OF WATER	51	Deg. F
Oneida	CRESCENT LAKE	443078	5/16/1995	15	TEMPERATURE OF WATER	53	Deg. F
Oneida	CRESCENT LAKE	443078	5/16/1995	20	TEMPERATURE OF WATER	52	Deg. F
Oneida	CRESCENT LAKE	443078	5/16/1995	3	DISSOLVED OXYGEN	10	mg/l
Oneida	CRESCENT LAKE	443078	5/16/1995	6	DISSOLVED OXYGEN	10	mg/l
Oneida	CRESCENT LAKE	443078	5/16/1995	9	DISSOLVED OXYGEN	10	mg/l
Oneida	CRESCENT LAKE	443078	5/16/1995	12	DISSOLVED OXYGEN	10	mg/l
Oneida	CRESCENT LAKE	443078	5/16/1995	15	DISSOLVED OXYGEN	10	mg/l
Oneida	CRESCENT LAKE	443078	5/16/1995	20	DISSOLVED OXYGEN	10	mg/l
Oneida	CRESCENT LAKE	443078	5/16/1995	25	DISSOLVED OXYGEN	10	mg/l
Oneida	CRESCENT LAKE	443078	5/16/1995	30	DISSOLVED OXYGEN	8	mg/l
Oneida	CRESCENT LAKE	443078	5/16/1995	3	UNCORRECTED	10	ug/l
Oneida	CRESCENT LAKE	443078	5/16/1995	12	TEMPERATURE OF WATER	54	Deg. F
Oneida	CRESCENT LAKE	443078	5/16/1995	6	TEMPERATURE OF WATER	54	Deg. F
Oneida	CRESCENT LAKE	443078	5/16/1995	3	TEMPERATURE OF WATER	55	Deg. F
Oneida	CRESCENT LAKE	443078	5/16/1995	9	TEMPERATURE OF WATER	54	Deg. F
Oneida	CRESCENT LAKE	443078	6/13/1995	3	UNCORRECTED	2	ug/l
Oneida	CRESCENT LAKE	443078	7/23/1995	30	TEMPERATURE OF WATER	60	Deg. F
Oneida	CRESCENT LAKE	443078	7/23/1995	25	TEMPERATURE OF WATER	66	Deg. F

Oneida	CRESCENT LAKE	443078	7/23/1995	15	TEMPERATURE OF WATER	72	Deg. F
Oneida	CRESCENT LAKE	443078	7/23/1995	20	TEMPERATURE OF WATER	70	Deg. F
Oneida	CRESCENT LAKE	443078	7/23/1995	3	UNCORRECTED	0	ug/l
Oneida	CRESCENT LAKE	443078	7/23/1995	3	DISSOLVED OXYGEN	7	mg/l
Oneida	CRESCENT LAKE	443078	7/23/1995	6	DISSOLVED OXYGEN	6	mg/l
Oneida	CRESCENT LAKE	443078	7/23/1995	9	DISSOLVED OXYGEN	7	mg/l
Oneida	CRESCENT LAKE	443078	7/23/1995	12	DISSOLVED OXYGEN	8	mg/l
Oneida	CRESCENT LAKE	443078	7/23/1995	15	DISSOLVED OXYGEN	7	mg/l
Oneida	CRESCENT LAKE	443078	7/23/1995	20	DISSOLVED OXYGEN	6	mg/l
Oneida	CRESCENT LAKE	443078	7/23/1995	25	DISSOLVED OXYGEN	1	mg/l
Oneida	CRESCENT LAKE	443078	7/23/1995	12	TEMPERATURE OF WATER	72	Deg. F
Oneida	CRESCENT LAKE	443078	7/23/1995	6	TEMPERATURE OF WATER	74	Deg. F
Oneida	CRESCENT LAKE	443078	7/23/1995	3	TEMPERATURE OF WATER	74	Deg. F
Oneida	CRESCENT LAKE	443078	7/23/1995	9	TEMPERATURE OF WATER	74	Deg. F
Oneida	CRESCENT LAKE	443078	8/30/1995	30	TEMPERATURE OF WATER	62	Deg. F
Oneida	CRESCENT LAKE	443078	8/30/1995	25	TEMPERATURE OF WATER	71	Deg. F
Oneida	CRESCENT LAKE	443078	8/30/1995	15	TEMPERATURE OF WATER	71	Deg. F
Oneida	CRESCENT LAKE	443078	8/30/1995	20	TEMPERATURE OF WATER	71	Deg. F
Oneida	CRESCENT LAKE	443078	8/30/1995	3	UNCORRECTED	16	ug/l
Oneida	CRESCENT LAKE	443078	8/30/1995	3	DISSOLVED OXYGEN	8	mg/l
Oneida	CRESCENT LAKE	443078	8/30/1995	6	DISSOLVED OXYGEN	8	mg/l
Oneida	CRESCENT LAKE	443078	8/30/1995	9	DISSOLVED OXYGEN	8	mg/l
Oneida	CRESCENT LAKE	443078	8/30/1995	12	DISSOLVED OXYGEN	8	mg/l
Oneida	CRESCENT LAKE	443078	8/30/1995	15	DISSOLVED OXYGEN	7	mg/l
Oneida	CRESCENT LAKE	443078	8/30/1995	20	DISSOLVED OXYGEN	7	mg/l
Oneida	CRESCENT LAKE	443078	8/30/1995	25	DISSOLVED OXYGEN	5	mg/l
Oneida	CRESCENT LAKE	443078	8/30/1995	12	TEMPERATURE OF WATER	72	Deg. F
Oneida	CRESCENT LAKE	443078	8/30/1995	6	TEMPERATURE OF WATER	73	Deg. F
Oneida	CRESCENT LAKE	443078	8/30/1995	3	TEMPERATURE OF WATER	73	Deg. F
Oneida	CRESCENT LAKE	443078	8/30/1995	9	TEMPERATURE OF WATER	73	Deg. F
Oneida	CRESCENT LAKE	443078	5/16/1996	3	TEMPERATURE OF WATER	49	Deg. F
Oneida	CRESCENT LAKE	443078	5/16/1996	30	TEMPERATURE OF WATER	46	Deg. F
Oneida	CRESCENT LAKE	443078	5/16/1996	20	TEMPERATURE OF WATER	46	Deg. F
Oneida	CRESCENT LAKE	443078	5/16/1996	25	TEMPERATURE OF WATER	46	Deg. F
Oneida	CRESCENT LAKE	443078	5/16/1996	3	UNCORRECTED	3	ug/l
Oneida	CRESCENT LAKE	443078	5/16/1996	6	DISSOLVED OXYGEN	8	mg/l
Oneida	CRESCENT LAKE	443078	5/16/1996	9	DISSOLVED OXYGEN	10	mg/l
Oneida	CRESCENT LAKE	443078	5/16/1996	12	DISSOLVED OXYGEN	10	mg/l
Oneida	CRESCENT LAKE	443078	5/16/1996	15	DISSOLVED OXYGEN	9	mg/l
Oneida	CRESCENT LAKE	443078	5/16/1996	20	DISSOLVED OXYGEN	9	mg/l
Oneida	CRESCENT LAKE	443078	5/16/1996	25	DISSOLVED OXYGEN	9	mg/l
Oneida	CRESCENT LAKE	443078	5/16/1996	30	DISSOLVED OXYGEN	9	mg/l
Oneida	CRESCENT LAKE	443078	5/16/1996	3	DISSOLVED OXYGEN	7	mg/l
Oneida	CRESCENT LAKE	443078	5/16/1996	15	TEMPERATURE OF WATER	46	Deg. F
Oneida	CRESCENT LAKE	443078	5/16/1996	9	TEMPERATURE OF WATER	47	Deg. F
Oneida	CRESCENT LAKE	443078	5/16/1996	6	TEMPERATURE OF WATER	49	Deg. F
Oneida	CRESCENT LAKE	443078	5/16/1996	12	TEMPERATURE OF WATER	47	Deg. F
Oneida	CRESCENT LAKE	443078	6/17/1996	30	TEMPERATURE OF WATER	53	Deg. F
Oneida	CRESCENT LAKE	443078	6/17/1996	25	TEMPERATURE OF WATER	57	Deg. F
Oneida	CRESCENT LAKE	443078	6/17/1996	15	TEMPERATURE OF WATER	64	Deg. F
Oneida	CRESCENT LAKE	443078	6/17/1996	20	TEMPERATURE OF WATER	61	Deg. F
Oneida	CRESCENT LAKE	443078	6/17/1996	3	UNCORRECTED	2	ug/l
Oneida	CRESCENT LAKE	443078	6/17/1996	3	DISSOLVED OXYGEN	10	mg/l
Oneida	CRESCENT LAKE	443078	6/17/1996	6	DISSOLVED OXYGEN	10	mg/l
Oneida	CRESCENT LAKE	443078	6/17/1996	9	DISSOLVED OXYGEN	10	mg/l
Oneida	CRESCENT LAKE	443078	6/17/1996	12	DISSOLVED OXYGEN	9	mg/l
Oneida	CRESCENT LAKE	443078	6/17/1996	15	DISSOLVED OXYGEN	10	mg/l
Oneida	CRESCENT LAKE	443078	6/17/1996	20	DISSOLVED OXYGEN	9	mg/l

Oneida	CRESCENT LAKE	443078	6/17/1996	25	DISSOLVED OXYGEN	6	mg/l
Oneida	CRESCENT LAKE	443078	6/17/1996	30	DISSOLVED OXYGEN	2	mg/l
Oneida	CRESCENT LAKE	443078	6/17/1996	12	TEMPERATURE OF WATER	69	Deg. F
Oneida	CRESCENT LAKE	443078	6/17/1996	6	TEMPERATURE OF WATER	69	Deg. F
Oneida	CRESCENT LAKE	443078	6/17/1996	3	TEMPERATURE OF WATER	68	Deg. F
Oneida	CRESCENT LAKE	443078	6/17/1996	9	TEMPERATURE OF WATER	69	Deg. F
Oneida	CRESCENT LAKE	443078	7/19/1996	30	TEMPERATURE OF WATER	59	Deg. F
Oneida	CRESCENT LAKE	443078	7/19/1996	25	TEMPERATURE OF WATER	63	Deg. F
Oneida	CRESCENT LAKE	443078	7/19/1996	15	TEMPERATURE OF WATER	71	Deg. F
Oneida	CRESCENT LAKE	443078	7/19/1996	20	TEMPERATURE OF WATER	68	Deg. F
Oneida	CRESCENT LAKE	443078	7/19/1996	3	UNCORRECTED	4	ug/l
Oneida	CRESCENT LAKE	443078	7/19/1996	3	DISSOLVED OXYGEN	8	mg/l
Oneida	CRESCENT LAKE	443078	7/19/1996	6	DISSOLVED OXYGEN	8	mg/l
Oneida	CRESCENT LAKE	443078	7/19/1996	9	DISSOLVED OXYGEN	8	mg/l
Oneida	CRESCENT LAKE	443078	7/19/1996	12	DISSOLVED OXYGEN	8	mg/l
Oneida	CRESCENT LAKE	443078	7/19/1996	15	DISSOLVED OXYGEN	7	mg/l
Oneida	CRESCENT LAKE	443078	7/19/1996	20	DISSOLVED OXYGEN	7	mg/l
Oneida	CRESCENT LAKE	443078	7/19/1996	25	DISSOLVED OXYGEN	2	mg/l
Oneida	CRESCENT LAKE	443078	7/19/1996	30	DISSOLVED OXYGEN	0	mg/l
Oneida	CRESCENT LAKE	443078	7/19/1996	12	TEMPERATURE OF WATER	71	Deg. F
Oneida	CRESCENT LAKE	443078	7/19/1996	6	TEMPERATURE OF WATER	72	Deg. F
Oneida	CRESCENT LAKE	443078	7/19/1996	3	TEMPERATURE OF WATER	72	Deg. F
Oneida	CRESCENT LAKE	443078	7/19/1996	9	TEMPERATURE OF WATER	72	Deg. F
Oneida	CRESCENT LAKE	443078	8/25/1996	30	TEMPERATURE OF WATER	62	Deg. F
Oneida	CRESCENT LAKE	443078	8/25/1996	25	TEMPERATURE OF WATER	68	Deg. F
Oneida	CRESCENT LAKE	443078	8/25/1996	15	TEMPERATURE OF WATER	72	Deg. F
Oneida	CRESCENT LAKE	443078	8/25/1996	20	TEMPERATURE OF WATER	72	Deg. F
Oneida	CRESCENT LAKE	443078	8/25/1996	3	UNCORRECTED	7	ug/l
Oneida	CRESCENT LAKE	443078	8/25/1996	3	DISSOLVED OXYGEN	9	mg/l
Oneida	CRESCENT LAKE	443078	8/25/1996	6	DISSOLVED OXYGEN	9	mg/l
Oneida	CRESCENT LAKE	443078	8/25/1996	9	DISSOLVED OXYGEN	9	mg/l
Oneida	CRESCENT LAKE	443078	8/25/1996	12	DISSOLVED OXYGEN	8	mg/l
Oneida	CRESCENT LAKE	443078	8/25/1996	15	DISSOLVED OXYGEN	9	mg/l
Oneida	CRESCENT LAKE	443078	8/25/1996	20	DISSOLVED OXYGEN	8	mg/l
Oneida	CRESCENT LAKE	443078	8/25/1996	25	DISSOLVED OXYGEN	4	mg/l
Oneida	CRESCENT LAKE	443078	8/25/1996	12	TEMPERATURE OF WATER	72	Deg. F
Oneida	CRESCENT LAKE	443078	8/25/1996	6	TEMPERATURE OF WATER	73	Deg. F
Oneida	CRESCENT LAKE	443078	8/25/1996	3	TEMPERATURE OF WATER	73	Deg. F
Oneida	CRESCENT LAKE	443078	8/25/1996	9	TEMPERATURE OF WATER	73	Deg. F
Oneida	CRESCENT LAKE	443078	9/29/1996	30	TEMPERATURE OF WATER	57	Deg. F
Oneida	CRESCENT LAKE	443078	9/29/1996	25	TEMPERATURE OF WATER	57	Deg. F
Oneida	CRESCENT LAKE	443078	9/29/1996	15	TEMPERATURE OF WATER	57	Deg. F
Oneida	CRESCENT LAKE	443078	9/29/1996	20	TEMPERATURE OF WATER	57	Deg. F
Oneida	CRESCENT LAKE	443078	9/29/1996	3	UNCORRECTED	12	ug/l
Oneida	CRESCENT LAKE	443078	9/29/1996	12	TEMPERATURE OF WATER	57	Deg. F
Oneida	CRESCENT LAKE	443078	9/29/1996	6	TEMPERATURE OF WATER	57	Deg. F
Oneida	CRESCENT LAKE	443078	9/29/1996	3	TEMPERATURE OF WATER	57	Deg. F
Oneida	CRESCENT LAKE	443078	9/29/1996	9	TEMPERATURE OF WATER	57	Deg. F
Oneida	CRESCENT LAKE	443078	6/21/1997	30	TEMPERATURE OF WATER	59	Deg. F
Oneida	CRESCENT LAKE	443078	6/21/1997	25	TEMPERATURE OF WATER	59	Deg. F
Oneida	CRESCENT LAKE	443078	6/21/1997	15	TEMPERATURE OF WATER	68	Deg. F
Oneida	CRESCENT LAKE	443078	6/21/1997	12	TEMPERATURE OF WATER	68	Deg. F
Oneida	CRESCENT LAKE	443078	6/21/1997	3	UNCORRECTED	2	ug/l
Oneida	CRESCENT LAKE	443078	6/21/1997	3	DISSOLVED OXYGEN	8	mg/l
Oneida	CRESCENT LAKE	443078	6/21/1997	6	DISSOLVED OXYGEN	9	mg/l
Oneida	CRESCENT LAKE	443078	6/21/1997	12	DISSOLVED OXYGEN	10	mg/l
Oneida	CRESCENT LAKE	443078	6/21/1997	15	DISSOLVED OXYGEN	9	mg/l
Oneida	CRESCENT LAKE	443078	6/21/1997	20	DISSOLVED OXYGEN	7	mg/l

Oneida	CRESCENT LAKE	443078	6/21/1997	25	DISSOLVED OXYGEN	5	mg/l
Oneida	CRESCENT LAKE	443078	6/21/1997	30	DISSOLVED OXYGEN	2	mg/l
Oneida	CRESCENT LAKE	443078	6/21/1997	20	TEMPERATURE OF WATER	59	Deg. F
Oneida	CRESCENT LAKE	443078	6/21/1997	6	TEMPERATURE OF WATER	69	Deg. F
Oneida	CRESCENT LAKE	443078	6/21/1997	3	TEMPERATURE OF WATER	70	Deg. F
Oneida	CRESCENT LAKE	443078	7/28/1997	30	TEMPERATURE OF WATER	57	Deg. F
Oneida	CRESCENT LAKE	443078	7/28/1997	25	TEMPERATURE OF WATER	63	Deg. F
Oneida	CRESCENT LAKE	443078	7/28/1997	15	TEMPERATURE OF WATER	74	Deg. F
Oneida	CRESCENT LAKE	443078	7/28/1997	12	TEMPERATURE OF WATER	74	Deg. F
Oneida	CRESCENT LAKE	443078	7/28/1997	20	TEMPERATURE OF WATER	67	Deg. F
Oneida	CRESCENT LAKE	443078	7/28/1997	3	UNCORRECTED	2	ug/l
Oneida	CRESCENT LAKE	443078	7/28/1997	3	DISSOLVED OXYGEN	8	mg/l
Oneida	CRESCENT LAKE	443078	7/28/1997	6	DISSOLVED OXYGEN	9	mg/l
Oneida	CRESCENT LAKE	443078	7/28/1997	9	DISSOLVED OXYGEN	8	mg/l
Oneida	CRESCENT LAKE	443078	7/28/1997	12	DISSOLVED OXYGEN	8	mg/l
Oneida	CRESCENT LAKE	443078	7/28/1997	15	DISSOLVED OXYGEN	8	mg/l
Oneida	CRESCENT LAKE	443078	7/28/1997	20	DISSOLVED OXYGEN	2	mg/l
Oneida	CRESCENT LAKE	443078	7/28/1997	25	DISSOLVED OXYGEN	0	mg/l
Oneida	CRESCENT LAKE	443078	7/28/1997	30	DISSOLVED OXYGEN	0	mg/l
Oneida	CRESCENT LAKE	443078	7/28/1997	9	TEMPERATURE OF WATER	74	Deg. F
Oneida	CRESCENT LAKE	443078	7/28/1997	3	TEMPERATURE OF WATER	74	Deg. F
Oneida	CRESCENT LAKE	443078	7/28/1997	6	TEMPERATURE OF WATER	74	Deg. F
Oneida	CRESCENT LAKE	443078	9/9/1997	25	TEMPERATURE OF WATER	66	Deg. F
Oneida	CRESCENT LAKE	443078	9/9/1997	15	TEMPERATURE OF WATER	66	Deg. F
Oneida	CRESCENT LAKE	443078	9/9/1997	12	TEMPERATURE OF WATER	66	Deg. F
Oneida	CRESCENT LAKE	443078	9/9/1997	3	TEMPERATURE OF WATER	67	Deg. F
Oneida	CRESCENT LAKE	443078	9/9/1997	6	TEMPERATURE OF WATER	67	Deg. F
Oneida	CRESCENT LAKE	443078	9/9/1997	3	UNCORRECTED	8	ug/l
Oneida	CRESCENT LAKE	443078	9/9/1997	3	DISSOLVED OXYGEN	9	mg/l
Oneida	CRESCENT LAKE	443078	9/9/1997	6	DISSOLVED OXYGEN	9	mg/l
Oneida	CRESCENT LAKE	443078	9/9/1997	9	DISSOLVED OXYGEN	9	mg/l
Oneida	CRESCENT LAKE	443078	9/9/1997	12	DISSOLVED OXYGEN	9	mg/l
Oneida	CRESCENT LAKE	443078	9/9/1997	15	DISSOLVED OXYGEN	9	mg/l
Oneida	CRESCENT LAKE	443078	9/9/1997	25	DISSOLVED OXYGEN	9	mg/l
Oneida	CRESCENT LAKE	443078	9/9/1997	9	TEMPERATURE OF WATER	66	Deg. F
Oneida	CRESCENT LAKE	443078	10/23/1997	30	TEMPERATURE OF WATER	48	Deg. F
Oneida	CRESCENT LAKE	443078	10/23/1997	25	TEMPERATURE OF WATER	8	Deg. F
Oneida	CRESCENT LAKE	443078	10/23/1997	20	TEMPERATURE OF WATER	48	Deg. F
Oneida	CRESCENT LAKE	443078	10/23/1997	9	TEMPERATURE OF WATER	48	Deg. F
Oneida	CRESCENT LAKE	443078	10/23/1997	6	TEMPERATURE OF WATER	48	Deg. F
Oneida	CRESCENT LAKE	443078	10/23/1997	12	TEMPERATURE OF WATER	48	Deg. F
Oneida	CRESCENT LAKE	443078	10/23/1997	15	TEMPERATURE OF WATER	48	Deg. F
Oneida	CRESCENT LAKE	443078	10/23/1997	3	UNCORRECTED	8	ug/l
Oneida	CRESCENT LAKE	443078	10/23/1997	3	DISSOLVED OXYGEN	10	mg/l
Oneida	CRESCENT LAKE	443078	10/23/1997	6	DISSOLVED OXYGEN	10	mg/l
Oneida	CRESCENT LAKE	443078	10/23/1997	9	DISSOLVED OXYGEN	10	mg/l
Oneida	CRESCENT LAKE	443078	10/23/1997	12	DISSOLVED OXYGEN	10	mg/l
Oneida	CRESCENT LAKE	443078	10/23/1997	15	DISSOLVED OXYGEN	10	mg/l
Oneida	CRESCENT LAKE	443078	10/23/1997	20	DISSOLVED OXYGEN	10	mg/l
Oneida	CRESCENT LAKE	443078	10/23/1997	25	DISSOLVED OXYGEN	10	mg/l
Oneida	CRESCENT LAKE	443078	10/23/1997	30	DISSOLVED OXYGEN	10	mg/l
Oneida	CRESCENT LAKE	443078	10/23/1997	3	TEMPERATURE OF WATER	48	Deg. F
Oneida	CRESCENT LAKE	443078	8/13/2000	33	TEMPERATURE OF WATER	58	Deg. F
Oneida	CRESCENT LAKE	443078	8/13/2000	30	TEMPERATURE OF WATER	61	Deg. F
Oneida	CRESCENT LAKE	443078	8/13/2000	24	TEMPERATURE OF WATER	70	Deg. F
Oneida	CRESCENT LAKE	443078	8/13/2000	27	TEMPERATURE OF WATER	64	Deg. F
Oneida	CRESCENT LAKE	443078	8/13/2000	21	TEMPERATURE OF WATER	71	Deg. F
Oneida	CRESCENT LAKE	443078	8/13/2000	15	TEMPERATURE OF WATER	72	Deg. F

Oneida	CRESCENT LAKE	443078	8/13/2000	9	TEMPERATURE OF WATER	74	Deg. F
Oneida	CRESCENT LAKE	443078	8/13/2000	3	TEMPERATURE OF WATER	77	Deg. F
Oneida	CRESCENT LAKE	443078	8/13/2000	6	TEMPERATURE OF WATER	76	Deg. F
Oneida	CRESCENT LAKE	443078	8/13/2000	12	TEMPERATURE OF WATER	73	Deg. F
Oneida	CRESCENT LAKE	443078	8/13/2000	18	TEMPERATURE OF WATER	72	Deg. F
Oneida	CRESCENT LAKE	443078	9/17/2000	33	TEMPERATURE OF WATER	64	Deg. F
Oneida	CRESCENT LAKE	443078	9/17/2000	30	TEMPERATURE OF WATER	64	Deg. F
Oneida	CRESCENT LAKE	443078	9/17/2000	27	TEMPERATURE OF WATER	64	Deg. F
Oneida	CRESCENT LAKE	443078	9/17/2000	24	TEMPERATURE OF WATER	64	Deg. F
Oneida	CRESCENT LAKE	443078	9/17/2000	12	TEMPERATURE OF WATER	64	Deg. F
Oneida	CRESCENT LAKE	443078	9/17/2000	6	TEMPERATURE OF WATER	65	Deg. F
Oneida	CRESCENT LAKE	443078	9/17/2000	3	TEMPERATURE OF WATER	65	Deg. F
Oneida	CRESCENT LAKE	443078	9/17/2000	9	TEMPERATURE OF WATER	64	Deg. F
Oneida	CRESCENT LAKE	443078	9/17/2000	15	TEMPERATURE OF WATER	64	Deg. F
Oneida	CRESCENT LAKE	443078	9/17/2000	18	TEMPERATURE OF WATER	64	Deg. F
Oneida	CRESCENT LAKE	443078	9/17/2000	21	TEMPERATURE OF WATER	64	Deg. F
Oneida	CRESCENT LAKE	443078	6/22/2001	36	TEMPERATURE OF WATER	57	Deg. F
Oneida	CRESCENT LAKE	443078	6/22/2001	33	TEMPERATURE OF WATER	57	Deg. F
Oneida	CRESCENT LAKE	443078	6/22/2001	30	TEMPERATURE OF WATER	58	Deg. F
Oneida	CRESCENT LAKE	443078	6/22/2001	21	TEMPERATURE OF WATER	61	Deg. F
Oneida	CRESCENT LAKE	443078	6/22/2001	24	TEMPERATURE OF WATER	60	Deg. F
Oneida	CRESCENT LAKE	443078	6/22/2001	27	TEMPERATURE OF WATER	59	Deg. F
Oneida	CRESCENT LAKE	443078	6/22/2001	18	TEMPERATURE OF WATER	63	Deg. F
Oneida	CRESCENT LAKE	443078	6/22/2001	12	TEMPERATURE OF WATER	65	Deg. F
Oneida	CRESCENT LAKE	443078	6/22/2001	6	TEMPERATURE OF WATER	66	Deg. F
Oneida	CRESCENT LAKE	443078	6/22/2001	1	TEMPERATURE OF WATER	67	Deg. F
Oneida	CRESCENT LAKE	443078	6/22/2001	3	TEMPERATURE OF WATER	67	Deg. F
Oneida	CRESCENT LAKE	443078	6/22/2001	9	TEMPERATURE OF WATER	66	Deg. F
Oneida	CRESCENT LAKE	443078	6/22/2001	15	TEMPERATURE OF WATER	64	Deg. F
Oneida	CRESCENT LAKE	443078	7/24/2001	6	UNCORRECTED	3	ug/l
Oneida	CRESCENT LAKE	443078	8/8/2001	36	TEMPERATURE OF WATER	58	Deg. F
Oneida	CRESCENT LAKE	443078	8/8/2001	33	TEMPERATURE OF WATER	59	Deg. F
Oneida	CRESCENT LAKE	443078	8/8/2001	30	TEMPERATURE OF WATER	60	Deg. F
Oneida	CRESCENT LAKE	443078	8/8/2001	27	TEMPERATURE OF WATER	62	Deg. F
Oneida	CRESCENT LAKE	443078	8/8/2001	15	TEMPERATURE OF WATER	76	Deg. F
Oneida	CRESCENT LAKE	443078	8/8/2001	9	TEMPERATURE OF WATER	81	Deg. F
Oneida	CRESCENT LAKE	443078	8/8/2001	6	UNCORRECTED	1	ug/l
Oneida	CRESCENT LAKE	443078	8/8/2001	3	TEMPERATURE OF WATER	83	Deg. F
Oneida	CRESCENT LAKE	443078	8/8/2001	1	TEMPERATURE OF WATER	83	Deg. F
Oneida	CRESCENT LAKE	443078	8/8/2001	6	TEMPERATURE OF WATER	83	Deg. F
Oneida	CRESCENT LAKE	443078	8/8/2001	12	TEMPERATURE OF WATER	80	Deg. F
Oneida	CRESCENT LAKE	443078	8/8/2001	18	TEMPERATURE OF WATER	74	Deg. F
Oneida	CRESCENT LAKE	443078	8/8/2001	21	TEMPERATURE OF WATER	71	Deg. F
Oneida	CRESCENT LAKE	443078	8/8/2001	24	TEMPERATURE OF WATER	66	Deg. F
Oneida	CRESCENT LAKE	443078	8/24/2001	36	TEMPERATURE OF WATER	60	Deg. F
Oneida	CRESCENT LAKE	443078	8/24/2001	33	TEMPERATURE OF WATER	60	Deg. F
Oneida	CRESCENT LAKE	443078	8/24/2001	30	TEMPERATURE OF WATER	61	Deg. F
Oneida	CRESCENT LAKE	443078	8/24/2001	18	TEMPERATURE OF WATER	70	Deg. F
Oneida	CRESCENT LAKE	443078	8/24/2001	24	TEMPERATURE OF WATER	69	Deg. F
Oneida	CRESCENT LAKE	443078	8/24/2001	27	TEMPERATURE OF WATER	64	Deg. F
Oneida	CRESCENT LAKE	443078	8/24/2001	15	TEMPERATURE OF WATER	72	Deg. F
Oneida	CRESCENT LAKE	443078	8/24/2001	9	TEMPERATURE OF WATER	71	Deg. F
Oneida	CRESCENT LAKE	443078	8/24/2001	3	TEMPERATURE OF WATER	73	Deg. F
Oneida	CRESCENT LAKE	443078	8/24/2001	1	TEMPERATURE OF WATER	73	Deg. F
Oneida	CRESCENT LAKE	443078	8/24/2001	6	TEMPERATURE OF WATER	72	Deg. F
Oneida	CRESCENT LAKE	443078	8/24/2001	12	TEMPERATURE OF WATER	72	Deg. F
Oneida	CRESCENT LAKE	443078	9/11/2001	36	TEMPERATURE OF WATER	65	Deg. F
Oneida	CRESCENT LAKE	443078	9/11/2001	33	TEMPERATURE OF WATER	65	Deg. F

Oneida	CRESCENT LAKE	443078	9/11/2001	30	TEMPERATURE OF WATER	65	Deg. F
Oneida	CRESCENT LAKE	443078	9/11/2001	27	TEMPERATURE OF WATER	66	Deg. F
Oneida	CRESCENT LAKE	443078	9/11/2001	15	TEMPERATURE OF WATER	67	Deg. F
Oneida	CRESCENT LAKE	443078	9/11/2001	9	TEMPERATURE OF WATER	67	Deg. F
Oneida	CRESCENT LAKE	443078	9/11/2001	6	UNCORRECTED	14	ug/l
Oneida	CRESCENT LAKE	443078	9/11/2001	3	TEMPERATURE OF WATER	67	Deg. F
Oneida	CRESCENT LAKE	443078	9/11/2001	1	TEMPERATURE OF WATER	68	Deg. F
Oneida	CRESCENT LAKE	443078	9/11/2001	6	TEMPERATURE OF WATER	67	Deg. F
Oneida	CRESCENT LAKE	443078	9/11/2001	12	TEMPERATURE OF WATER	67	Deg. F
Oneida	CRESCENT LAKE	443078	9/11/2001	18	TEMPERATURE OF WATER	67	Deg. F
Oneida	CRESCENT LAKE	443078	9/11/2001	21	TEMPERATURE OF WATER	67	Deg. F
Oneida	CRESCENT LAKE	443078	9/11/2001	24	TEMPERATURE OF WATER	67	Deg. F
Oneida	CRESCENT LAKE	443078	9/25/2001	36	TEMPERATURE OF WATER	60	Deg. F
Oneida	CRESCENT LAKE	443078	9/25/2001	33	TEMPERATURE OF WATER	60	Deg. F
Oneida	CRESCENT LAKE	443078	9/25/2001	30	TEMPERATURE OF WATER	60	Deg. F
Oneida	CRESCENT LAKE	443078	9/25/2001	21	TEMPERATURE OF WATER	60	Deg. F
Oneida	CRESCENT LAKE	443078	9/25/2001	24	TEMPERATURE OF WATER	60	Deg. F
Oneida	CRESCENT LAKE	443078	9/25/2001	27	TEMPERATURE OF WATER	60	Deg. F
Oneida	CRESCENT LAKE	443078	9/25/2001	18	TEMPERATURE OF WATER	60	Deg. F
Oneida	CRESCENT LAKE	443078	9/25/2001	12	TEMPERATURE OF WATER	60	Deg. F
Oneida	CRESCENT LAKE	443078	9/25/2001	6	TEMPERATURE OF WATER	60	Deg. F
Oneida	CRESCENT LAKE	443078	9/25/2001	6	UNCORRECTED	18	ug/l
Oneida	CRESCENT LAKE	443078	9/25/2001	1	TEMPERATURE OF WATER	60	Deg. F
Oneida	CRESCENT LAKE	443078	9/25/2001	3	TEMPERATURE OF WATER	60	Deg. F
Oneida	CRESCENT LAKE	443078	9/25/2001	9	TEMPERATURE OF WATER	60	Deg. F
Oneida	CRESCENT LAKE	443078	9/25/2001	15	TEMPERATURE OF WATER	60	Deg. F
Oneida	CRESCENT LAKE	443078	10/12/2001	36	TEMPERATURE OF WATER	54	Deg. F
Oneida	CRESCENT LAKE	443078	10/12/2001	33	TEMPERATURE OF WATER	54	Deg. F
Oneida	CRESCENT LAKE	443078	10/12/2001	30	TEMPERATURE OF WATER	53	Deg. F
Oneida	CRESCENT LAKE	443078	10/12/2001	27	TEMPERATURE OF WATER	54	Deg. F
Oneida	CRESCENT LAKE	443078	10/12/2001	15	TEMPERATURE OF WATER	54	Deg. F
Oneida	CRESCENT LAKE	443078	10/12/2001	9	TEMPERATURE OF WATER	54	Deg. F
Oneida	CRESCENT LAKE	443078	10/12/2001	6	UNCORRECTED	1	ug/l
Oneida	CRESCENT LAKE	443078	10/12/2001	3	TEMPERATURE OF WATER	54	Deg. F
Oneida	CRESCENT LAKE	443078	10/12/2001	1	TEMPERATURE OF WATER	54	Deg. F
Oneida	CRESCENT LAKE	443078	10/12/2001	6	TEMPERATURE OF WATER	54	Deg. F
Oneida	CRESCENT LAKE	443078	10/12/2001	12	TEMPERATURE OF WATER	54	Deg. F
Oneida	CRESCENT LAKE	443078	10/12/2001	18	TEMPERATURE OF WATER	54	Deg. F
Oneida	CRESCENT LAKE	443078	10/12/2001	21	TEMPERATURE OF WATER	54	Deg. F
Oneida	CRESCENT LAKE	443078	10/12/2001	24	TEMPERATURE OF WATER	54	Deg. F
Oneida	CRESCENT LAKE	443078	8/16/2002	36	TEMPERATURE OF WATER	57	Deg. F
Oneida	CRESCENT LAKE	443078	8/16/2002	6	UNCORRECTED	7	ug/l
Oneida	CRESCENT LAKE	443078	8/16/2002	33	TEMPERATURE OF WATER	57	Deg. F
Oneida	CRESCENT LAKE	443078	8/16/2002	30	TEMPERATURE OF WATER	57	Deg. F
Oneida	CRESCENT LAKE	443078	8/16/2002	21	TEMPERATURE OF WATER	72	Deg. F
Oneida	CRESCENT LAKE	443078	8/16/2002	24	TEMPERATURE OF WATER	69	Deg. F
Oneida	CRESCENT LAKE	443078	8/16/2002	27	TEMPERATURE OF WATER	61	Deg. F
Oneida	CRESCENT LAKE	443078	8/16/2002	18	TEMPERATURE OF WATER	72	Deg. F
Oneida	CRESCENT LAKE	443078	8/16/2002	12	TEMPERATURE OF WATER	72	Deg. F
Oneida	CRESCENT LAKE	443078	8/16/2002	6	TEMPERATURE OF WATER	72	Deg. F
Oneida	CRESCENT LAKE	443078	8/16/2002	0	TEMPERATURE OF WATER	73	Deg. F
Oneida	CRESCENT LAKE	443078	8/16/2002	3	TEMPERATURE OF WATER	72	Deg. F
Oneida	CRESCENT LAKE	443078	8/16/2002	9	TEMPERATURE OF WATER	72	Deg. F
Oneida	CRESCENT LAKE	443078	8/16/2002	15	TEMPERATURE OF WATER	72	Deg. F
Oneida	CRESCENT LAKE	443078	10/1/2002	36	TEMPERATURE OF WATER	59	Deg. F
Oneida	CRESCENT LAKE	443078	10/1/2002	33	TEMPERATURE OF WATER	59	Deg. F
Oneida	CRESCENT LAKE	443078	10/1/2002	30	TEMPERATURE OF WATER	59	Deg. F
Oneida	CRESCENT LAKE	443078	10/1/2002	27	TEMPERATURE OF WATER	59	Deg. F

Oneida	CRESCENT LAKE	443078	10/1/2002	15	TEMPERATURE OF WATER	59	Deg. F
Oneida	CRESCENT LAKE	443078	10/1/2002	9	TEMPERATURE OF WATER	60	Deg. F
Oneida	CRESCENT LAKE	443078	10/1/2002	6	UNCORRECTED	14	ug/l
Oneida	CRESCENT LAKE	443078	10/1/2002	6	UNCORRECTED	13.7	ug/l
Oneida	CRESCENT LAKE	443078	10/1/2002	3	TEMPERATURE OF WATER	60	Deg. F
Oneida	CRESCENT LAKE	443078	10/1/2002	0	TEMPERATURE OF WATER	62	Deg. F
Oneida	CRESCENT LAKE	443078	10/1/2002	6	TEMPERATURE OF WATER	60	Deg. F
Oneida	CRESCENT LAKE	443078	10/1/2002	12	TEMPERATURE OF WATER	59	Deg. F
Oneida	CRESCENT LAKE	443078	10/1/2002	18	TEMPERATURE OF WATER	59	Deg. F
Oneida	CRESCENT LAKE	443078	10/1/2002	21	TEMPERATURE OF WATER	59	Deg. F
Oneida	CRESCENT LAKE	443078	10/1/2002	24	TEMPERATURE OF WATER	59	Deg. F
Oneida	CRESCENT LAKE	443078	6/11/2003	36	TEMPERATURE OF WATER	51.2	Deg. F
Oneida	CRESCENT LAKE	443078	6/11/2003	33	TEMPERATURE OF WATER	51.2	Deg. F
Oneida	CRESCENT LAKE	443078	6/11/2003	30	TEMPERATURE OF WATER	51.8	Deg. F
Oneida	CRESCENT LAKE	443078	6/11/2003	21	TEMPERATURE OF WATER	58.2	Deg. F
Oneida	CRESCENT LAKE	443078	6/11/2003	24	TEMPERATURE OF WATER	55.5	Deg. F
Oneida	CRESCENT LAKE	443078	6/11/2003	27	TEMPERATURE OF WATER	53.9	Deg. F
Oneida	CRESCENT LAKE	443078	6/11/2003	18	TEMPERATURE OF WATER	60.8	Deg. F
Oneida	CRESCENT LAKE	443078	6/11/2003	12	TEMPERATURE OF WATER	62	Deg. F
Oneida	CRESCENT LAKE	443078	6/11/2003	6	TEMPERATURE OF WATER	63.3	Deg. F
Oneida	CRESCENT LAKE	443078	6/11/2003	6	UNCORRECTED	3.04	ug/l
Oneida	CRESCENT LAKE	443078	6/11/2003	0	TEMPERATURE OF WATER	63.8	Deg. F
Oneida	CRESCENT LAKE	443078	6/11/2003	3	TEMPERATURE OF WATER	63.6	Deg. F
Oneida	CRESCENT LAKE	443078	6/11/2003	9	TEMPERATURE OF WATER	62.9	Deg. F
Oneida	CRESCENT LAKE	443078	6/11/2003	15	TEMPERATURE OF WATER	61.8	Deg. F
Oneida	CRESCENT LAKE	443078	7/30/2003	37	TEMPERATURE OF WATER	53.7	Deg. F
Oneida	CRESCENT LAKE	443078	7/30/2003	33	TEMPERATURE OF WATER	53.9	Deg. F
Oneida	CRESCENT LAKE	443078	7/30/2003	30	TEMPERATURE OF WATER	57	Deg. F
Oneida	CRESCENT LAKE	443078	7/30/2003	27	TEMPERATURE OF WATER	60	Deg. F
Oneida	CRESCENT LAKE	443078	7/30/2003	15	TEMPERATURE OF WATER	73.2	Deg. F
Oneida	CRESCENT LAKE	443078	7/30/2003	9	TEMPERATURE OF WATER	74.1	Deg. F
Oneida	CRESCENT LAKE	443078	7/30/2003	3	TEMPERATURE OF WATER	75	Deg. F
Oneida	CRESCENT LAKE	443078	7/30/2003	0	TEMPERATURE OF WATER	75.9	Deg. F
Oneida	CRESCENT LAKE	443078	7/30/2003	6	TEMPERATURE OF WATER	74.4	Deg. F
Oneida	CRESCENT LAKE	443078	7/30/2003	12	TEMPERATURE OF WATER	73.7	Deg. F
Oneida	CRESCENT LAKE	443078	7/30/2003	18	TEMPERATURE OF WATER	72.3	Deg. F
Oneida	CRESCENT LAKE	443078	7/30/2003	21	TEMPERATURE OF WATER	70.1	Deg. F
Oneida	CRESCENT LAKE	443078	7/30/2003	24	TEMPERATURE OF WATER	68	Deg. F
Oneida	CRESCENT LAKE	443078	8/14/2003	36	TEMPERATURE OF WATER	56.6	Deg. F
Oneida	CRESCENT LAKE	443078	8/14/2003	6	UNCORRECTED	3.07	ug/l
Oneida	CRESCENT LAKE	443078	8/14/2003	33	TEMPERATURE OF WATER	56.8	Deg. F
Oneida	CRESCENT LAKE	443078	8/14/2003	27	TEMPERATURE OF WATER	60	Deg. F
Oneida	CRESCENT LAKE	443078	8/14/2003	24	TEMPERATURE OF WATER	65.6	Deg. F
Oneida	CRESCENT LAKE	443078	8/14/2003	30	TEMPERATURE OF WATER	57	Deg. F
Oneida	CRESCENT LAKE	443078	8/14/2003	21	TEMPERATURE OF WATER	69.6	Deg. F
Oneida	CRESCENT LAKE	443078	8/14/2003	15	TEMPERATURE OF WATER	73.2	Deg. F
Oneida	CRESCENT LAKE	443078	8/14/2003	9	TEMPERATURE OF WATER	75	Deg. F
Oneida	CRESCENT LAKE	443078	8/14/2003	3	TEMPERATURE OF WATER	76.4	Deg. F
Oneida	CRESCENT LAKE	443078	8/14/2003	0	TEMPERATURE OF WATER	77.1	Deg. F
Oneida	CRESCENT LAKE	443078	8/14/2003	6	TEMPERATURE OF WATER	75.5	Deg. F
Oneida	CRESCENT LAKE	443078	8/14/2003	12	TEMPERATURE OF WATER	74.1	Deg. F
Oneida	CRESCENT LAKE	443078	8/14/2003	18	TEMPERATURE OF WATER	72.6	Deg. F
Oneida	CRESCENT LAKE	443078	9/15/2003	6	UNCORRECTED	12.5	ug/l
Oneida	CRESCENT LAKE	443078	9/15/2003	36	TEMPERATURE OF WATER	56.6	Deg. F
Oneida	CRESCENT LAKE	443078	9/15/2003	33	TEMPERATURE OF WATER	57.3	Deg. F
Oneida	CRESCENT LAKE	443078	9/15/2003	30	TEMPERATURE OF WATER	58.8	Deg. F
Oneida	CRESCENT LAKE	443078	9/15/2003	27	TEMPERATURE OF WATER	63.6	Deg. F
Oneida	CRESCENT LAKE	443078	9/15/2003	15	TEMPERATURE OF WATER	67.4	Deg. F

Oneida	CRESCENT LAKE	443078	9/15/2003	9	TEMPERATURE OF WATER	67.4	Deg. F
Oneida	CRESCENT LAKE	443078	9/15/2003	0	TEMPERATURE OF WATER	67.8	Deg. F
Oneida	CRESCENT LAKE	443078	9/15/2003	3	TEMPERATURE OF WATER	67.8	Deg. F
Oneida	CRESCENT LAKE	443078	9/15/2003	12	TEMPERATURE OF WATER	67.4	Deg. F
Oneida	CRESCENT LAKE	443078	9/15/2003	18	TEMPERATURE OF WATER	67.4	Deg. F
Oneida	CRESCENT LAKE	443078	9/15/2003	21	TEMPERATURE OF WATER	67.2	Deg. F
Oneida	CRESCENT LAKE	443078	9/15/2003	24	TEMPERATURE OF WATER	66.9	Deg. F
Oneida	CRESCENT LAKE	443078	10/13/2003	36	TEMPERATURE OF WATER	51.6	
Oneida	CRESCENT LAKE	443078	10/13/2003	33	TEMPERATURE OF WATER	51.6	
Oneida	CRESCENT LAKE	443078	10/13/2003	27	TEMPERATURE OF WATER	51.8	
Oneida	CRESCENT LAKE	443078	10/13/2003	24	TEMPERATURE OF WATER	53	
Oneida	CRESCENT LAKE	443078	10/13/2003	30	TEMPERATURE OF WATER	51.6	
Oneida	CRESCENT LAKE	443078	10/13/2003	21	TEMPERATURE OF WATER	53.9	
Oneida	CRESCENT LAKE	443078	10/13/2003	15	TEMPERATURE OF WATER	54.5	
Oneida	CRESCENT LAKE	443078	10/13/2003	9	TEMPERATURE OF WATER	54.6	
Oneida	CRESCENT LAKE	443078	10/13/2003	3	TEMPERATURE OF WATER	55.4	
Oneida	CRESCENT LAKE	443078	10/13/2003	0	TEMPERATURE OF WATER	55.4	
Oneida	CRESCENT LAKE	443078	10/13/2003	6	TEMPERATURE OF WATER	54.8	
Oneida	CRESCENT LAKE	443078	10/13/2003	12	TEMPERATURE OF WATER	54.6	
Oneida	CRESCENT LAKE	443078	10/13/2003	18	TEMPERATURE OF WATER	54.5	
Oneida	CRESCENT LAKE	443078	6/5/2004	3	TEMPERATURE OF WATER	62	Deg. F
Oneida	CRESCENT LAKE	443078	6/5/2004	0	TEMPERATURE OF WATER	64.4	Deg. F
Oneida	CRESCENT LAKE	443078	6/5/2004	33	TEMPERATURE OF WATER	53.9	Deg. F
Oneida	CRESCENT LAKE	443078	6/5/2004	27	TEMPERATURE OF WATER	57	Deg. F
Oneida	CRESCENT LAKE	443078	6/5/2004	18	TEMPERATURE OF WATER	58.2	Deg. F
Oneida	CRESCENT LAKE	443078	6/5/2004	6	UNCORRECTED	3.71	ug/l
Oneida	CRESCENT LAKE	443078	6/5/2004	12	TEMPERATURE OF WATER	59.3	Deg. F
Oneida	CRESCENT LAKE	443078	6/5/2004	6	TEMPERATURE OF WATER	60.9	Deg. F
Oneida	CRESCENT LAKE	443078	6/5/2004	9	TEMPERATURE OF WATER	60.9	Deg. F
Oneida	CRESCENT LAKE	443078	6/5/2004	15	TEMPERATURE OF WATER	58.6	Deg. F
Oneida	CRESCENT LAKE	443078	6/5/2004	21	TEMPERATURE OF WATER	57.4	Deg. F
Oneida	CRESCENT LAKE	443078	6/5/2004	24	TEMPERATURE OF WATER	57.2	Deg. F
Oneida	CRESCENT LAKE	443078	6/5/2004	30	TEMPERATURE OF WATER	55.5	Deg. F
Oneida	CRESCENT LAKE	443078	7/19/2004	33	TEMPERATURE OF WATER	58.1	Deg. F
Oneida	CRESCENT LAKE	443078	7/19/2004	6	UNCORRECTED	3.34	ug/l
Oneida	CRESCENT LAKE	443078	7/19/2004	30	TEMPERATURE OF WATER	58.6	Deg. F
Oneida	CRESCENT LAKE	443078	7/19/2004	24	TEMPERATURE OF WATER	62.9	Deg. F
Oneida	CRESCENT LAKE	443078	7/19/2004	21	TEMPERATURE OF WATER	64.2	Deg. F
Oneida	CRESCENT LAKE	443078	7/19/2004	27	TEMPERATURE OF WATER	61.8	Deg. F
Oneida	CRESCENT LAKE	443078	7/19/2004	18	TEMPERATURE OF WATER	67.2	Deg. F
Oneida	CRESCENT LAKE	443078	7/19/2004	12	TEMPERATURE OF WATER	71.2	Deg. F
Oneida	CRESCENT LAKE	443078	7/19/2004	6	TEMPERATURE OF WATER	72.3	Deg. F
Oneida	CRESCENT LAKE	443078	7/19/2004	0	TEMPERATURE OF WATER	73.4	Deg. F
Oneida	CRESCENT LAKE	443078	7/19/2004	3	TEMPERATURE OF WATER	72.8	Deg. F
Oneida	CRESCENT LAKE	443078	7/19/2004	9	TEMPERATURE OF WATER	71.9	Deg. F
Oneida	CRESCENT LAKE	443078	7/19/2004	15	TEMPERATURE OF WATER	70.5	Deg. F
Oneida	CRESCENT LAKE	443078	8/23/2004	33	TEMPERATURE OF WATER	62	Deg. F
Oneida	CRESCENT LAKE	443078	8/23/2004	30	TEMPERATURE OF WATER	62	Deg. F
Oneida	CRESCENT LAKE	443078	8/23/2004	27	TEMPERATURE OF WATER	62.6	Deg. F
Oneida	CRESCENT LAKE	443078	8/23/2004	24	TEMPERATURE OF WATER	64.4	Deg. F
Oneida	CRESCENT LAKE	443078	8/23/2004	12	TEMPERATURE OF WATER	64.7	Deg. F
Oneida	CRESCENT LAKE	443078	8/23/2004	6	UNCORRECTED	10.7	ug/l
Oneida	CRESCENT LAKE	443078	8/23/2004	6	TEMPERATURE OF WATER	65.1	Deg. F
Oneida	CRESCENT LAKE	443078	8/23/2004	0	TEMPERATURE OF WATER	65.4	Deg. F
Oneida	CRESCENT LAKE	443078	8/23/2004	3	TEMPERATURE OF WATER	65.1	Deg. F
Oneida	CRESCENT LAKE	443078	8/23/2004	9	TEMPERATURE OF WATER	64.9	Deg. F
Oneida	CRESCENT LAKE	443078	8/23/2004	15	TEMPERATURE OF WATER	64.7	Deg. F
Oneida	CRESCENT LAKE	443078	8/23/2004	18	TEMPERATURE OF WATER	64.7	Deg. F

Oneida	CRESCENT LAKE	443078	8/23/2004	21	TEMPERATURE OF WATER	64.5	Deg. F
Oneida	CRESCENT LAKE	443078	9/10/2004	33	TEMPERATURE OF WATER	61.8	Deg. F
Oneida	CRESCENT LAKE	443078	9/10/2004	30	TEMPERATURE OF WATER	61.8	Deg. F
Oneida	CRESCENT LAKE	443078	9/10/2004	27	TEMPERATURE OF WATER	62.6	Deg. F
Oneida	CRESCENT LAKE	443078	9/10/2004	18	TEMPERATURE OF WATER	66.5	Deg. F
Oneida	CRESCENT LAKE	443078	9/10/2004	21	TEMPERATURE OF WATER	66.5	Deg. F
Oneida	CRESCENT LAKE	443078	9/10/2004	24	TEMPERATURE OF WATER	64.7	Deg. F
Oneida	CRESCENT LAKE	443078	9/10/2004	15	TEMPERATURE OF WATER	66.5	Deg. F
Oneida	CRESCENT LAKE	443078	9/10/2004	9	TEMPERATURE OF WATER	66.9	Deg. F
Oneida	CRESCENT LAKE	443078	9/10/2004	3	TEMPERATURE OF WATER	67.8	Deg. F
Oneida	CRESCENT LAKE	443078	9/10/2004	6	UNCORRECTED	6.56	ug/l
Oneida	CRESCENT LAKE	443078	9/10/2004	0	TEMPERATURE OF WATER	68	Deg. F
Oneida	CRESCENT LAKE	443078	9/10/2004	6	TEMPERATURE OF WATER	67.4	Deg. F
Oneida	CRESCENT LAKE	443078	9/10/2004	12	TEMPERATURE OF WATER	66.7	Deg. F
Oneida	CRESCENT LAKE	443078	5/31/2005	36	TEMPERATURE OF WATER	52.7	Deg. F
Oneida	CRESCENT LAKE	443078	5/31/2005	33	TEMPERATURE OF WATER	52.8	Deg. F
Oneida	CRESCENT LAKE	443078	5/31/2005	30	TEMPERATURE OF WATER	53	Deg. F
Oneida	CRESCENT LAKE	443078	5/31/2005	27	TEMPERATURE OF WATER	54.1	Deg. F
Oneida	CRESCENT LAKE	443078	5/31/2005	15	TEMPERATURE OF WATER	58.8	Deg. F
Oneida	CRESCENT LAKE	443078	5/31/2005	9	TEMPERATURE OF WATER	59.5	Deg. F
Oneida	CRESCENT LAKE	443078	5/31/2005	6	UNCORRECTED	2.32	UG/L
Oneida	CRESCENT LAKE	443078	5/31/2005	3	TEMPERATURE OF WATER	60.8	Deg. F
Oneida	CRESCENT LAKE	443078	5/31/2005	0	TEMPERATURE OF WATER	62	Deg. F
Oneida	CRESCENT LAKE	443078	5/31/2005	6	TEMPERATURE OF WATER	60.4	Deg. F
Oneida	CRESCENT LAKE	443078	5/31/2005	12	TEMPERATURE OF WATER	59.1	Deg. F
Oneida	CRESCENT LAKE	443078	5/31/2005	18	TEMPERATURE OF WATER	58.2	Deg. F
Oneida	CRESCENT LAKE	443078	5/31/2005	21	TEMPERATURE OF WATER	57.5	Deg. F
Oneida	CRESCENT LAKE	443078	5/31/2005	24	TEMPERATURE OF WATER	55.7	Deg. F
Oneida	CRESCENT LAKE	443078	6/22/2005	36	TEMPERATURE OF WATER	55.3	Deg. F
Oneida	CRESCENT LAKE	443078	6/22/2005	6	UNCORRECTED	2	UG/L
Oneida	CRESCENT LAKE	443078	6/22/2005	33	TEMPERATURE OF WATER	55.5	Deg. F
Oneida	CRESCENT LAKE	443078	6/22/2005	30	TEMPERATURE OF WATER	56.1	Deg. F
Oneida	CRESCENT LAKE	443078	6/22/2005	21	TEMPERATURE OF WATER	64.4	Deg. F
Oneida	CRESCENT LAKE	443078	6/22/2005	24	TEMPERATURE OF WATER	60	Deg. F
Oneida	CRESCENT LAKE	443078	6/22/2005	27	TEMPERATURE OF WATER	57.5	Deg. F
Oneida	CRESCENT LAKE	443078	6/22/2005	18	TEMPERATURE OF WATER	69.2	Deg. F
Oneida	CRESCENT LAKE	443078	6/22/2005	12	TEMPERATURE OF WATER	71.6	Deg. F
Oneida	CRESCENT LAKE	443078	6/22/2005	6	TEMPERATURE OF WATER	72.8	Deg. F
Oneida	CRESCENT LAKE	443078	6/22/2005	0	TEMPERATURE OF WATER	73.9	Deg. F
Oneida	CRESCENT LAKE	443078	6/22/2005	3	TEMPERATURE OF WATER	73.4	Deg. F
Oneida	CRESCENT LAKE	443078	6/22/2005	9	TEMPERATURE OF WATER	72.3	Deg. F
Oneida	CRESCENT LAKE	443078	6/22/2005	15	TEMPERATURE OF WATER	71.4	Deg. F
Oneida	CRESCENT LAKE	443078	7/19/2005	36	TEMPERATURE OF WATER	56.1	Deg. F
Oneida	CRESCENT LAKE	443078	7/19/2005	33	TEMPERATURE OF WATER	56.3	Deg. F
Oneida	CRESCENT LAKE	443078	7/19/2005	30	TEMPERATURE OF WATER	56.6	Deg. F
Oneida	CRESCENT LAKE	443078	7/19/2005	27	TEMPERATURE OF WATER	60.2	Deg. F
Oneida	CRESCENT LAKE	443078	7/19/2005	15	TEMPERATURE OF WATER	74.6	Deg. F
Oneida	CRESCENT LAKE	443078	7/19/2005	9	TEMPERATURE OF WATER	77.9	Deg. F
Oneida	CRESCENT LAKE	443078	7/19/2005	6	UNCORRECTED	2.91	UG/L
Oneida	CRESCENT LAKE	443078	7/19/2005	6	UNCORRECTED	2.91	UG/L
Oneida	CRESCENT LAKE	443078	7/19/2005	3	TEMPERATURE OF WATER	78	Deg. F
Oneida	CRESCENT LAKE	443078	7/19/2005	0	TEMPERATURE OF WATER	78.6	Deg. F
Oneida	CRESCENT LAKE	443078	7/19/2005	6	TEMPERATURE OF WATER	78	Deg. F
Oneida	CRESCENT LAKE	443078	7/19/2005	12	TEMPERATURE OF WATER	77.7	Deg. F
Oneida	CRESCENT LAKE	443078	7/19/2005	18	TEMPERATURE OF WATER	72.8	Deg. F
Oneida	CRESCENT LAKE	443078	7/19/2005	21	TEMPERATURE OF WATER	69.2	Deg. F
Oneida	CRESCENT LAKE	443078	7/19/2005	24	TEMPERATURE OF WATER	64.7	Deg. F
Oneida	CRESCENT LAKE	443078	8/4/2005	36	TEMPERATURE OF WATER	56.1	Deg. F

Oneida	CRESCENT LAKE	443078	8/4/2005	33	TEMPERATURE OF WATER	56.3	Deg. F
Oneida	CRESCENT LAKE	443078	8/4/2005	30	TEMPERATURE OF WATER	56.6	Deg. F
Oneida	CRESCENT LAKE	443078	8/4/2005	21	TEMPERATURE OF WATER	71.4	Deg. F
Oneida	CRESCENT LAKE	443078	8/4/2005	24	TEMPERATURE OF WATER	64.7	Deg. F
Oneida	CRESCENT LAKE	443078	8/4/2005	27	TEMPERATURE OF WATER	60.2	Deg. F
Oneida	CRESCENT LAKE	443078	8/4/2005	18	TEMPERATURE OF WATER	71.9	Deg. F
Oneida	CRESCENT LAKE	443078	8/4/2005	12	TEMPERATURE OF WATER	77.3	Deg. F
Oneida	CRESCENT LAKE	443078	8/4/2005	6	TEMPERATURE OF WATER	77.7	Deg. F
Oneida	CRESCENT LAKE	443078	8/4/2005	6	UNCORRECTED	6.21	UG/L
Oneida	CRESCENT LAKE	443078	8/4/2005	6	UNCORRECTED	6.21	UG/L
Oneida	CRESCENT LAKE	443078	8/4/2005	0	TEMPERATURE OF WATER	78	Deg. F
Oneida	CRESCENT LAKE	443078	8/4/2005	3	TEMPERATURE OF WATER	77.9	Deg. F
Oneida	CRESCENT LAKE	443078	8/4/2005	9	TEMPERATURE OF WATER	77.5	Deg. F
Oneida	CRESCENT LAKE	443078	8/4/2005	15	TEMPERATURE OF WATER	74.1	Deg. F
Oneida	CRESCENT LAKE	443078	9/21/2005	36	TEMPERATURE OF WATER	64.4	Deg. F
Oneida	CRESCENT LAKE	443078	9/21/2005	33	TEMPERATURE OF WATER	64.7	Deg. F
Oneida	CRESCENT LAKE	443078	9/21/2005	30	TEMPERATURE OF WATER	65.3	Deg. F
Oneida	CRESCENT LAKE	443078	9/21/2005	27	TEMPERATURE OF WATER	67.4	Deg. F
Oneida	CRESCENT LAKE	443078	9/21/2005	24	TEMPERATURE OF WATER	67.8	Deg. F
Oneida	CRESCENT LAKE	443078	9/21/2005	21	TEMPERATURE OF WATER	67.8	Deg. F
Oneida	CRESCENT LAKE	443078	9/21/2005	6	UNCORRECTED	12.6	UG/L
Oneida	CRESCENT LAKE	443078	9/21/2005	18	TEMPERATURE OF WATER	68	Deg. F
Oneida	CRESCENT LAKE	443078	9/21/2005	15	TEMPERATURE OF WATER	68.1	Deg. F
Oneida	CRESCENT LAKE	443078	9/21/2005	12	TEMPERATURE OF WATER	68.1	Deg. F
Oneida	CRESCENT LAKE	443078	9/21/2005	9	TEMPERATURE OF WATER	68.3	Deg. F
Oneida	CRESCENT LAKE	443078	9/21/2005	6	TEMPERATURE OF WATER	68.3	Deg. F
Oneida	CRESCENT LAKE	443078	9/21/2005	3	TEMPERATURE OF WATER	69.2	Deg. F
Oneida	CRESCENT LAKE	443078	9/21/2005	0	TEMPERATURE OF WATER	69.8	Deg. F

Figures

Figure 1
Crescent Lake Water Quality 2006
Secchi Disk

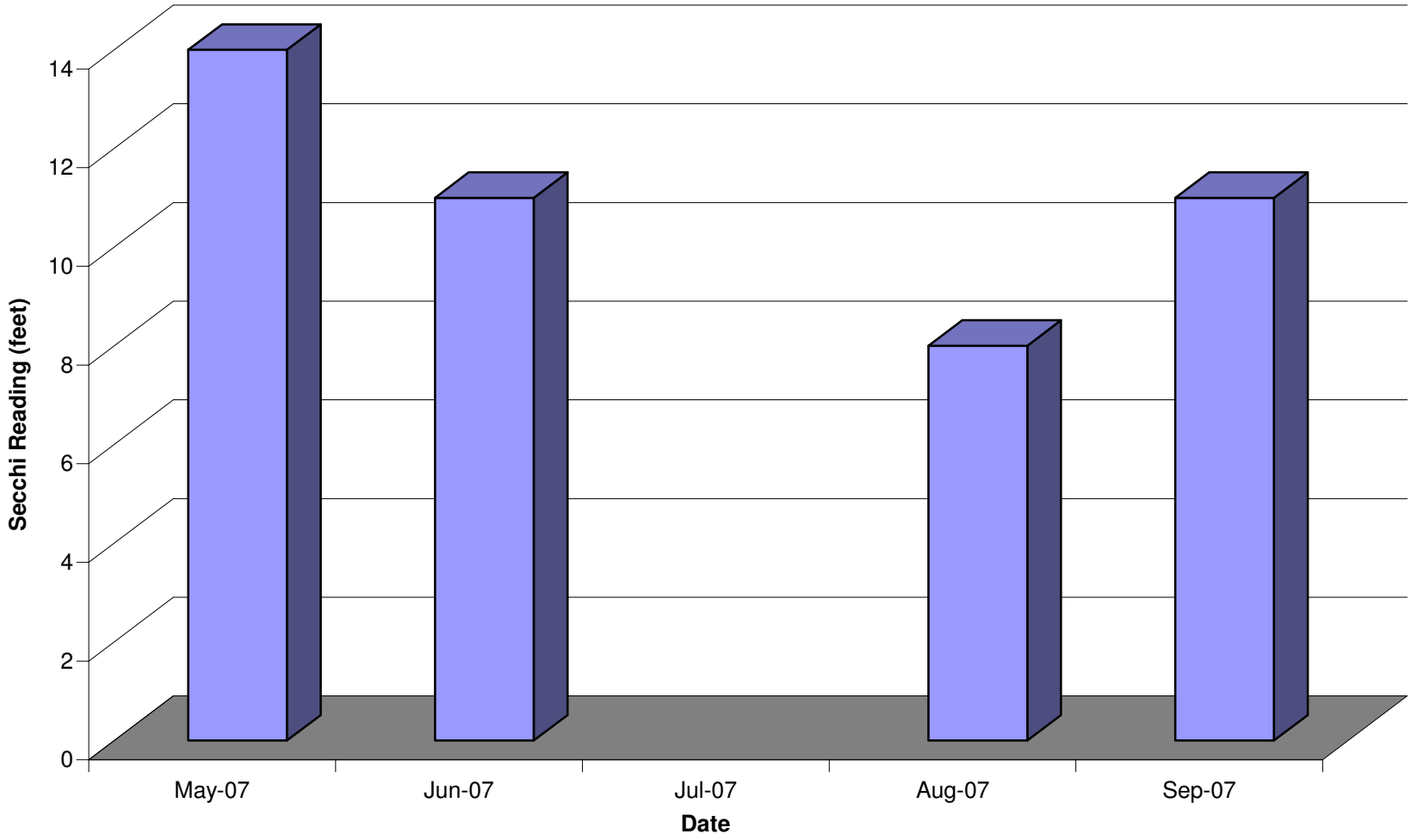


Figure 2
Crescent Lake Water Quality 2006
Self Help Data
Secchi, Chl a, Total Phosphorous

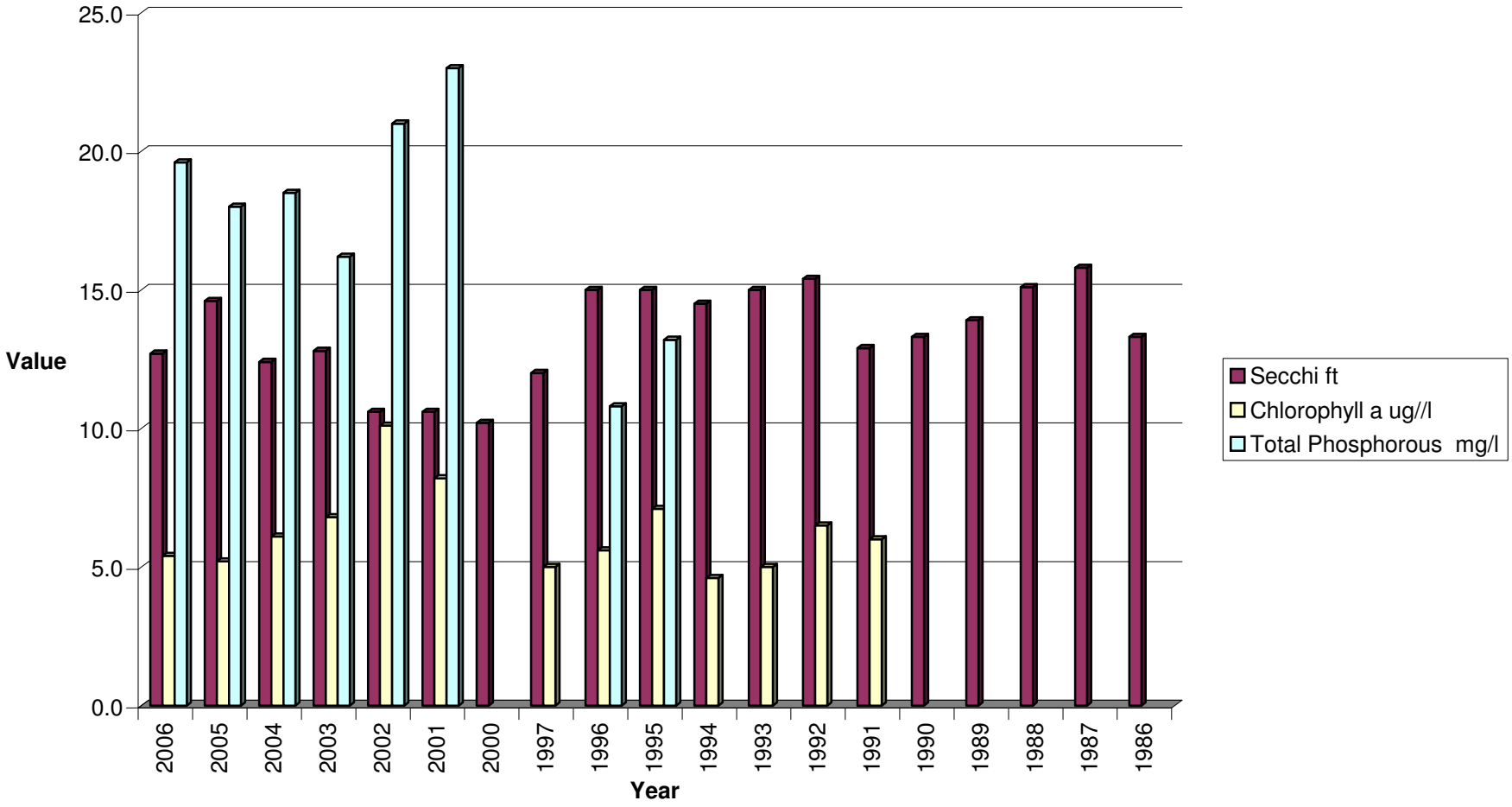


Figure 3
Crescent Lake Water Quality
Calcium, Iron, Potassium, Sodium

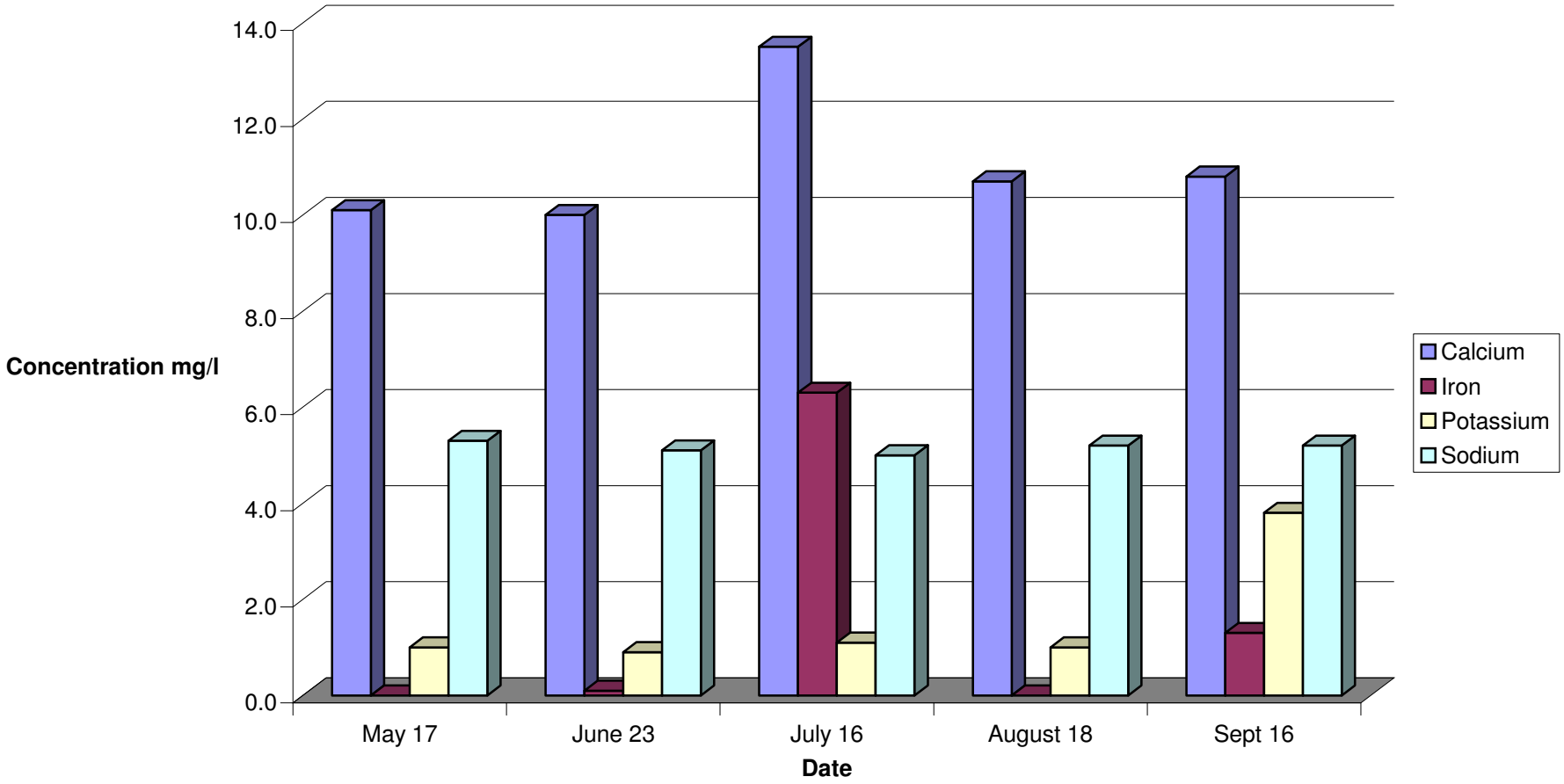


Figure 4
Crescent Lake Water Quality
Self Help Data TSI

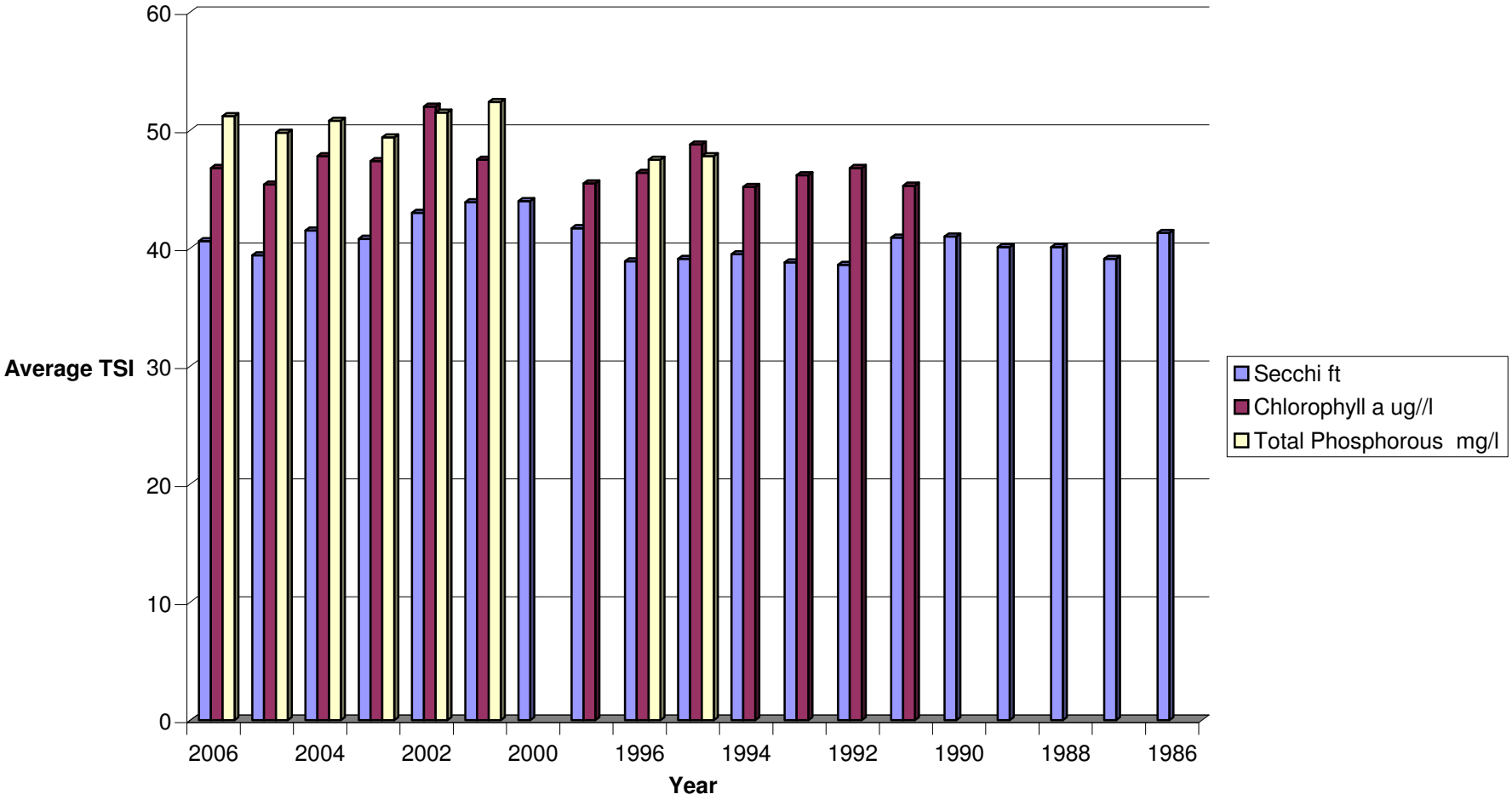
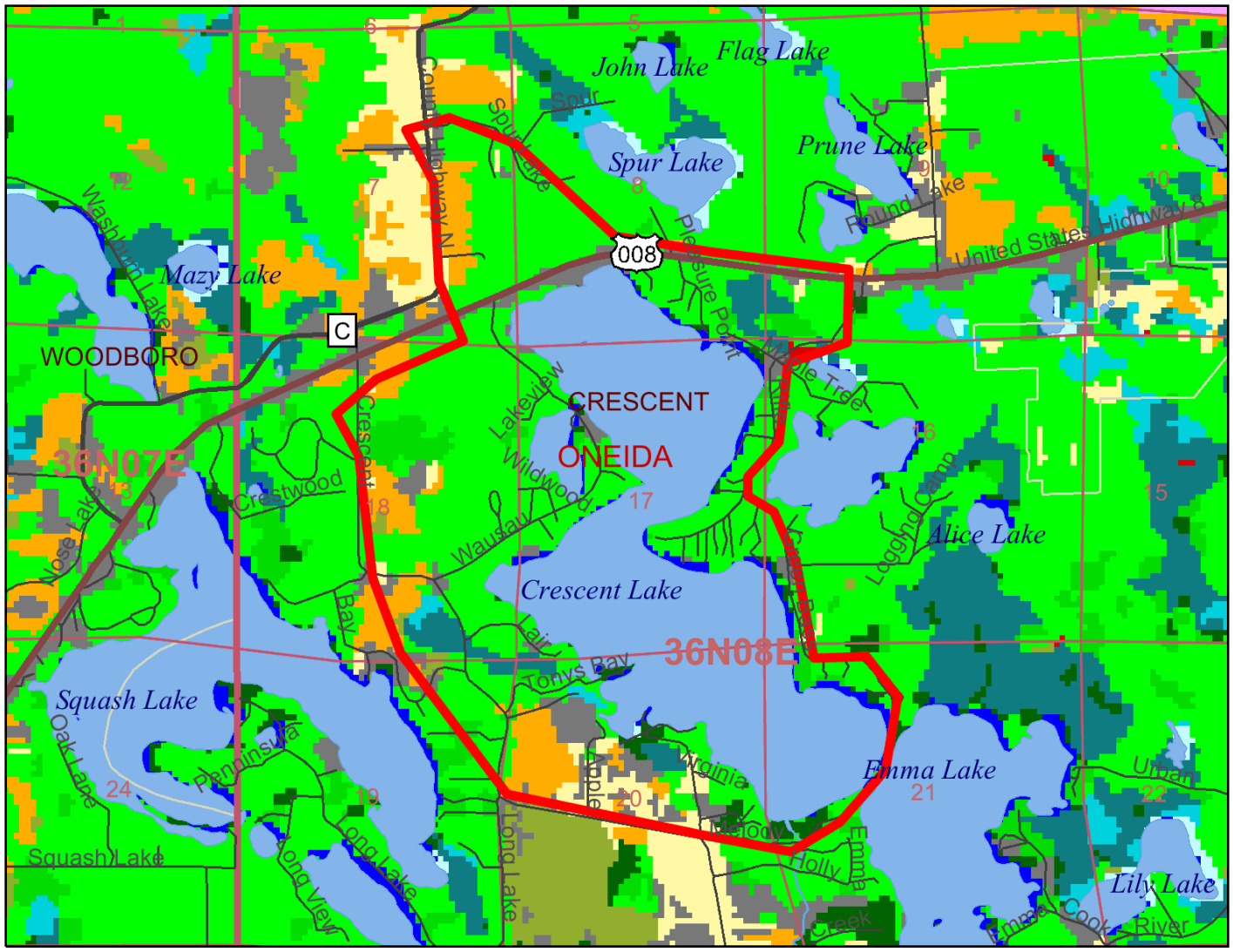


Figure 5 Crescent Lake Land Use



Legend

- Dams
- Major Highways
- Interstate
- State Highway
- U.S. Highways
- County Roads
- Local Roads
- 24K County Boundaries
- PLSS Townships
- PLSS Sections
- Civil Towns
- Civil Town
- DNR Wetland Points
- Excavated Pond
- Dammed Pond
- Wetland Too Small to Delineate
- Filled Excavated Pond
- Filled Dammed Pond
- Filled Wetland Too Small to Delineate
- DNR Wetland Areas
- Upland
- Filled or drained wetland
- Wetland
- 24K Open Water
- 24K Rivers and Shorelines
- Intermittent
- Fluctuating
- Perennial
- WISCLAND Landcover
- High Intensity Urban
- Low Intensity Urban
- Golf Course

N

Scale: 1:34,960

Notes: Approximate watershed boundary

Figure 6
Crescent Lake Resident Survey 2006
Type of Recreation
Question #6

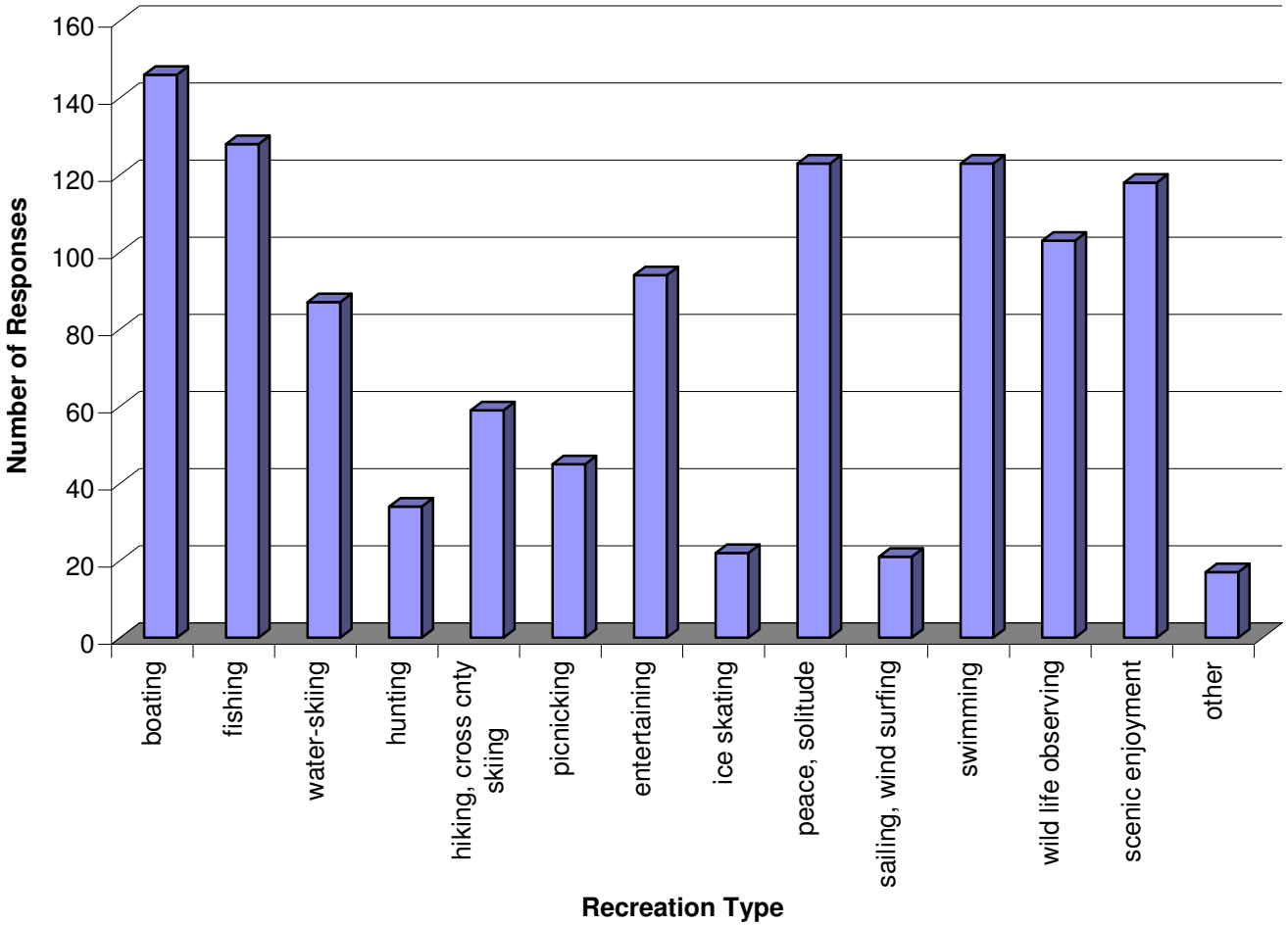


Figure 7
Crescent Lake Resident Survey 2006
Watercraft Owned
Question # 7

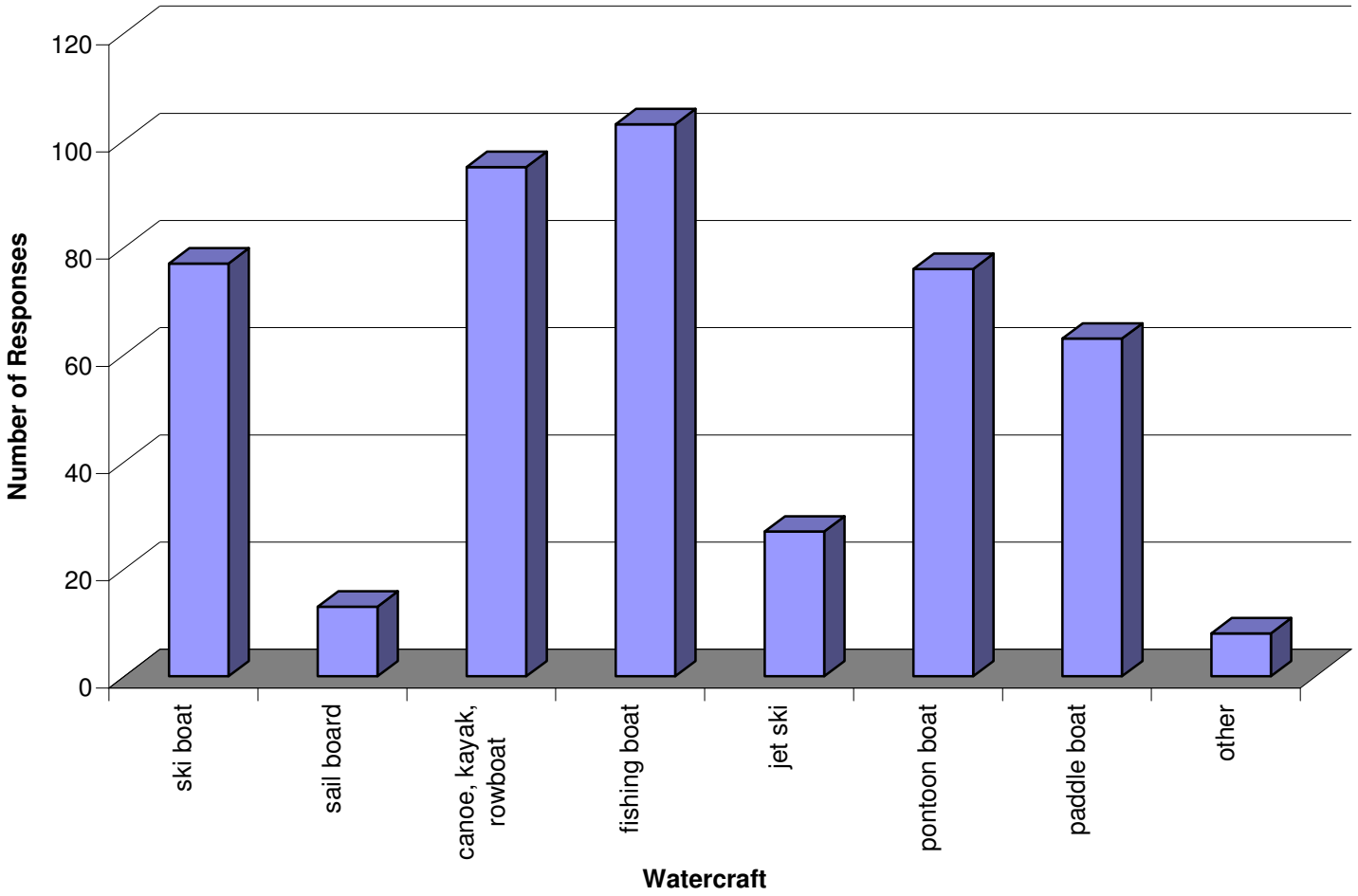


Figure 8
Crescent Lake Resident Survey 2006
Change in Fishing
Question # 10

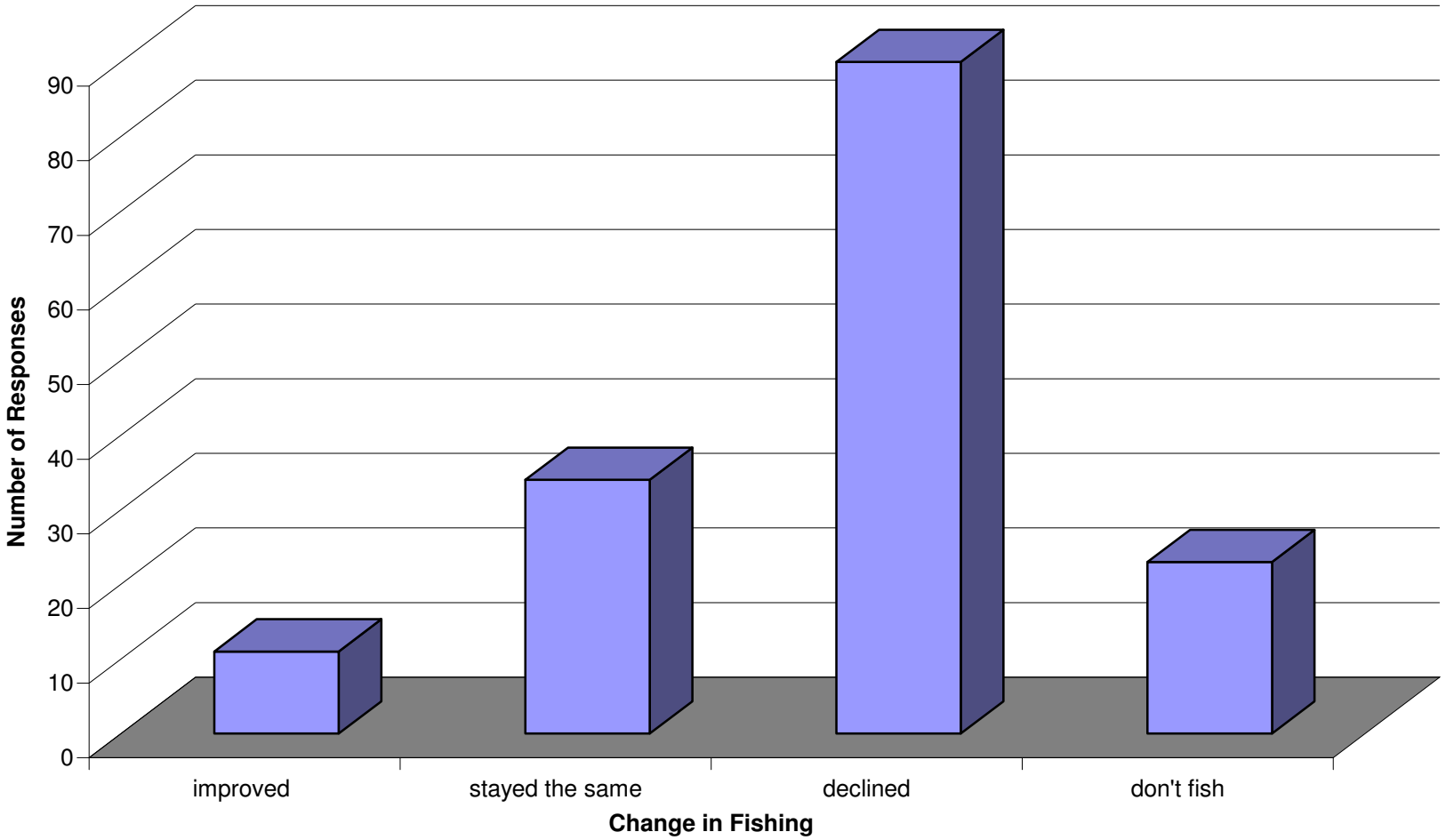


Figure 9
Crescent Lake Resident Survey 2006
Overall Condition of Lake/Shoreland
Questions 18 & 19

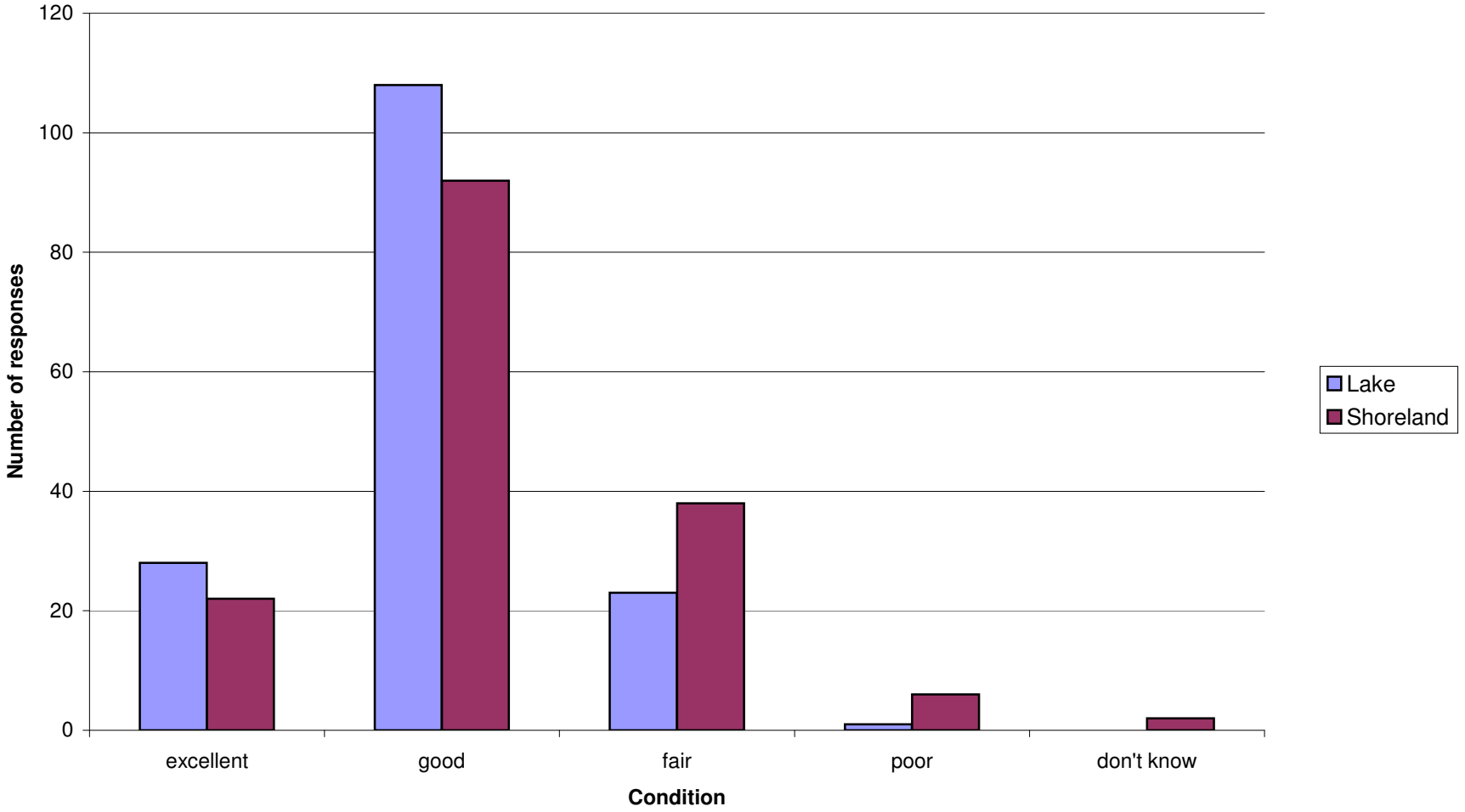


Figure 10
Crescent Lake Resident Survey
Current Condition of Lake Vegetation
Questions 20 & 21

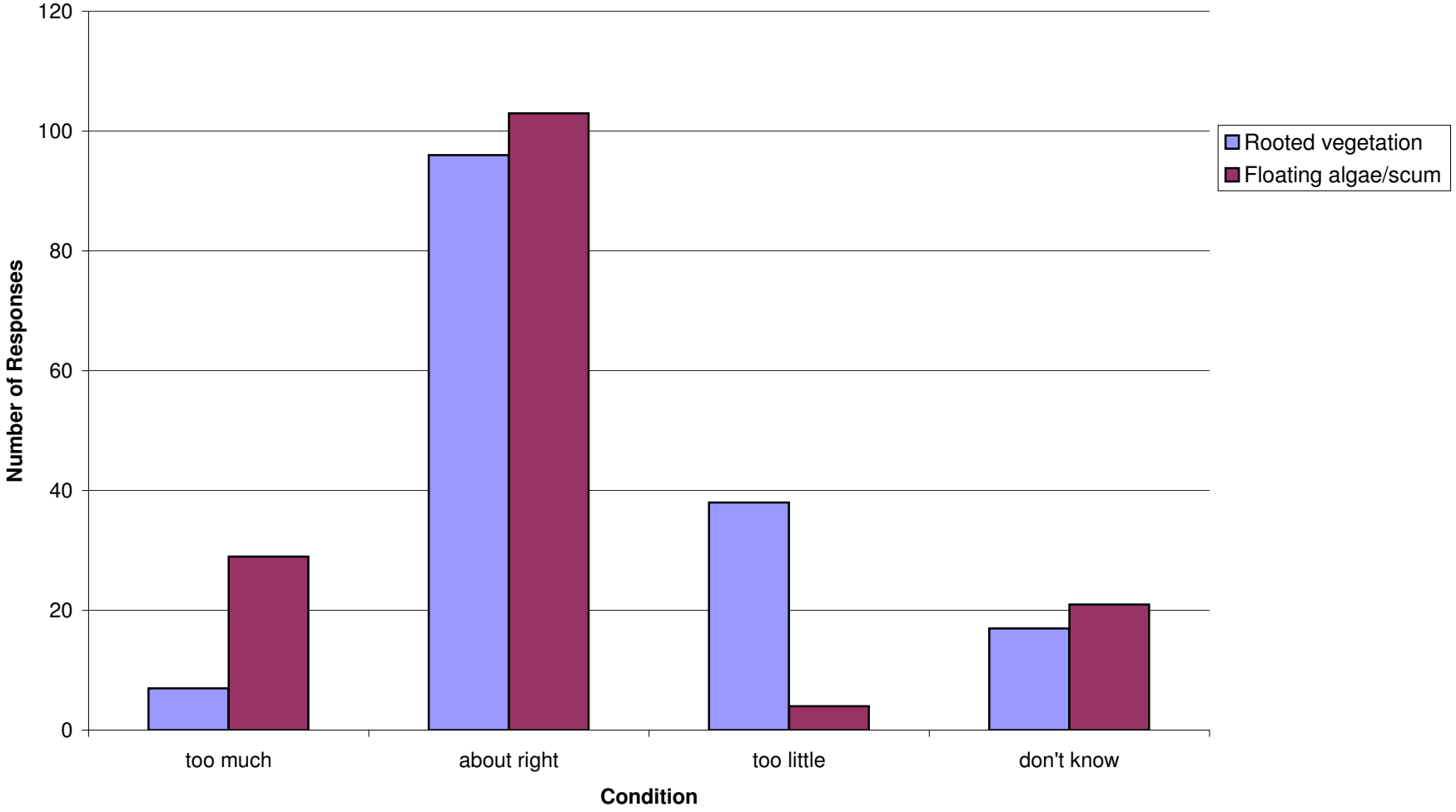


Figure 11
Crescent Lake Resident Survey
Rating of Current Conditions
Questions 12 - 19

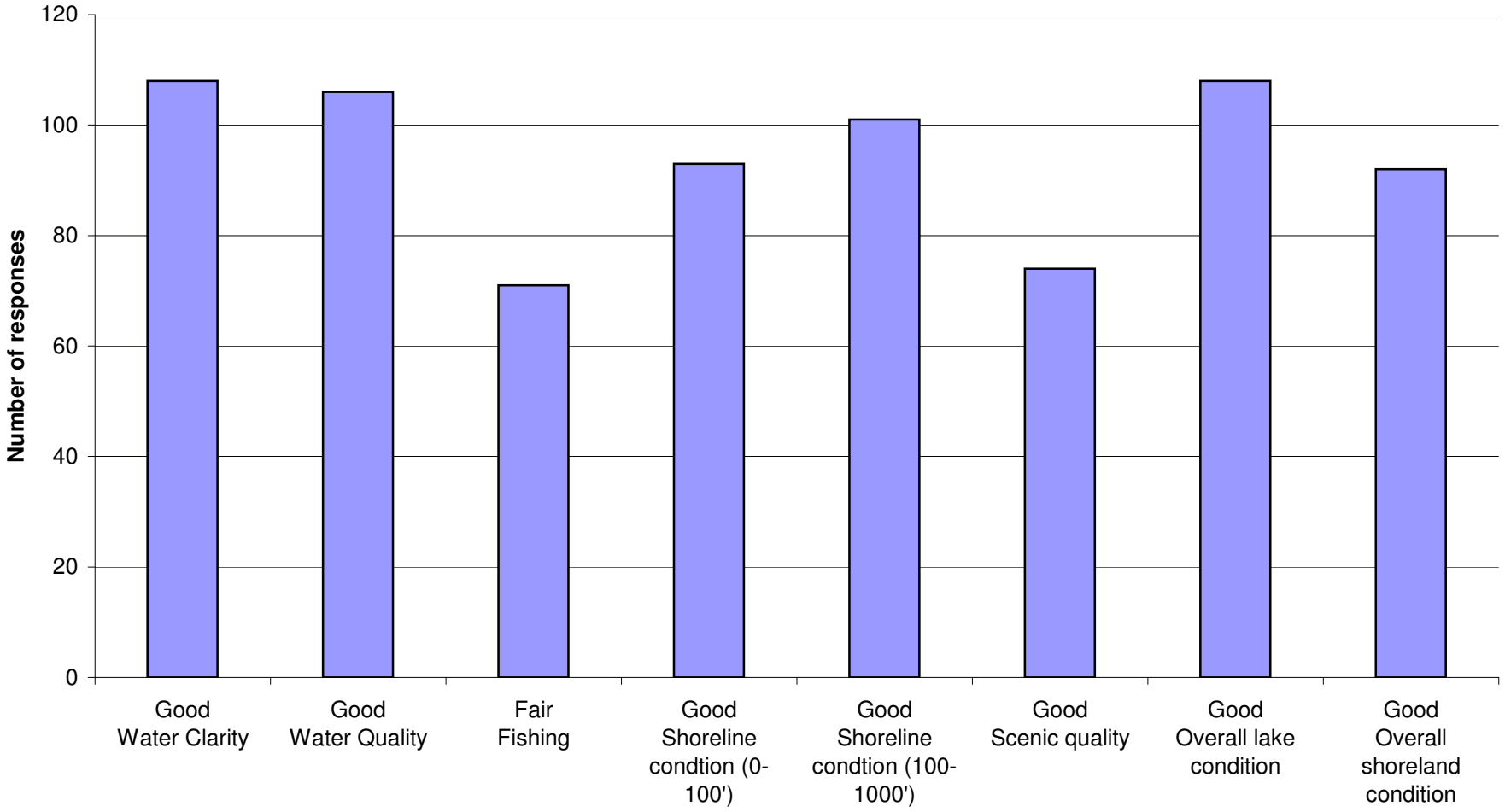


Figure 12
Crescent Lake Resident Survey
Impact on Water Quality
Questions 30-37

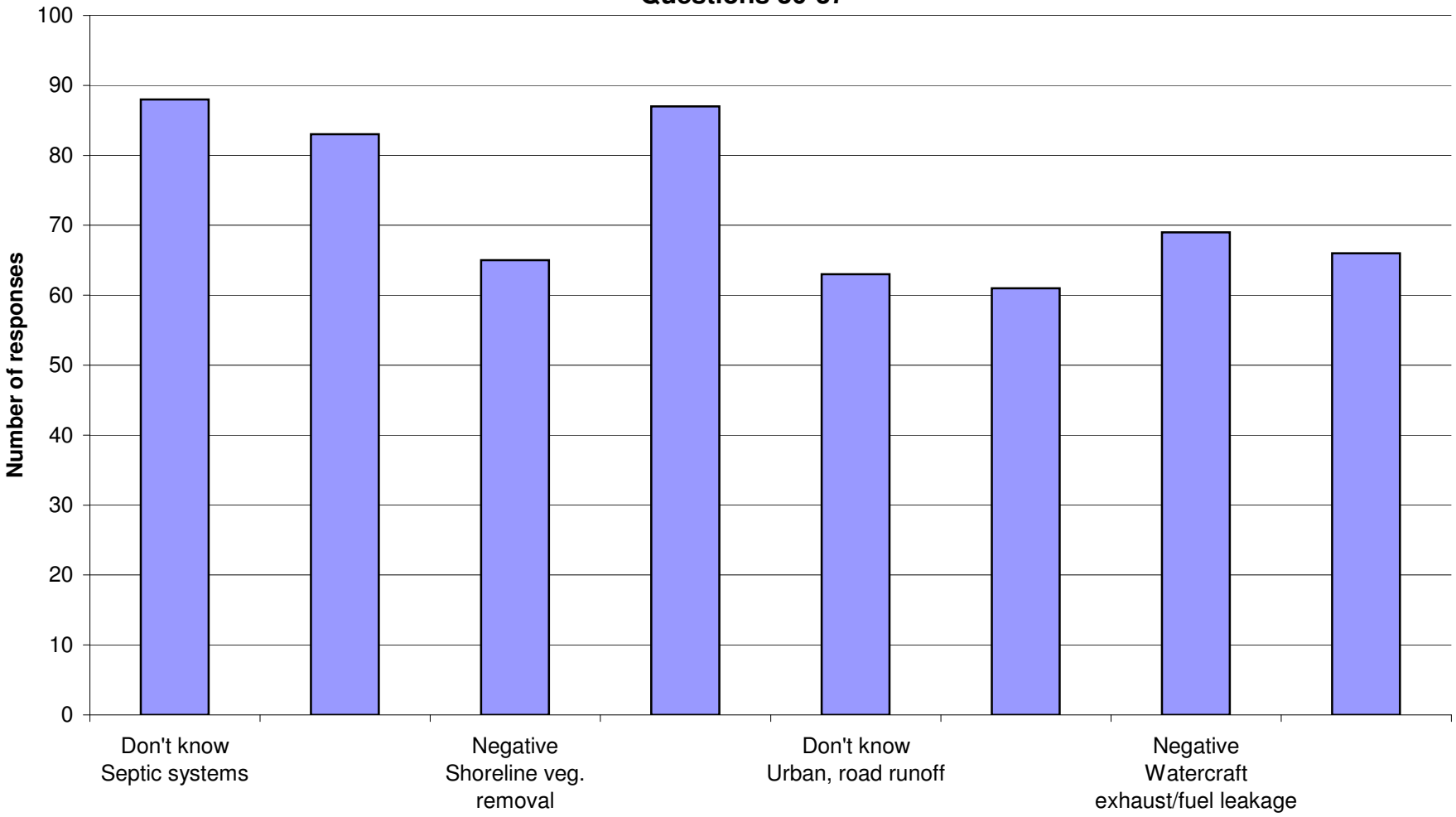


Figure 13
Crescent Lake Resident Survey
Support or Oppose Actions
(Chart 1 of 2)
Questions 54-72

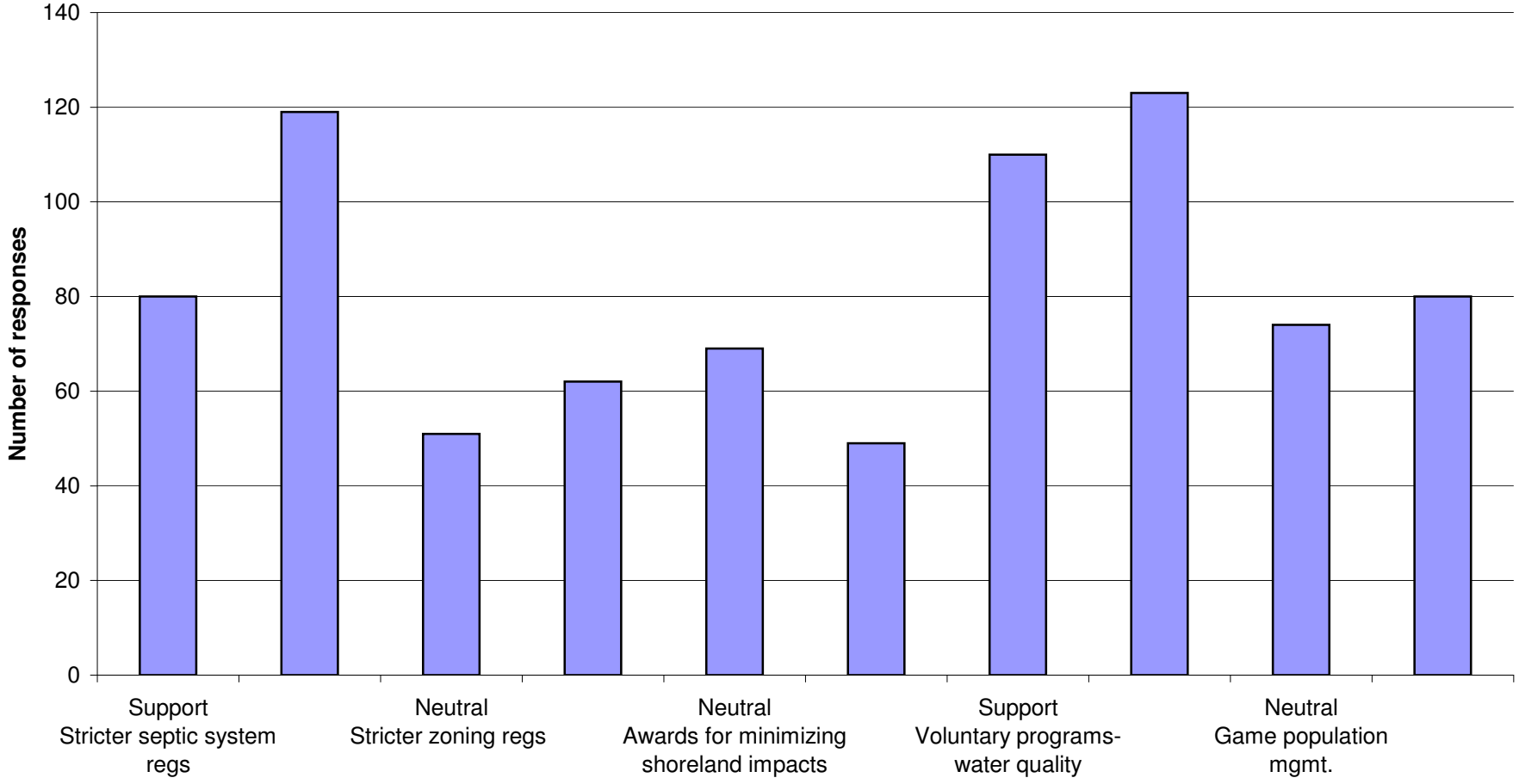


Figure 14
Crescent Lake Resident Survey
Support or Oppose Actions
(Chart 2 of 2)

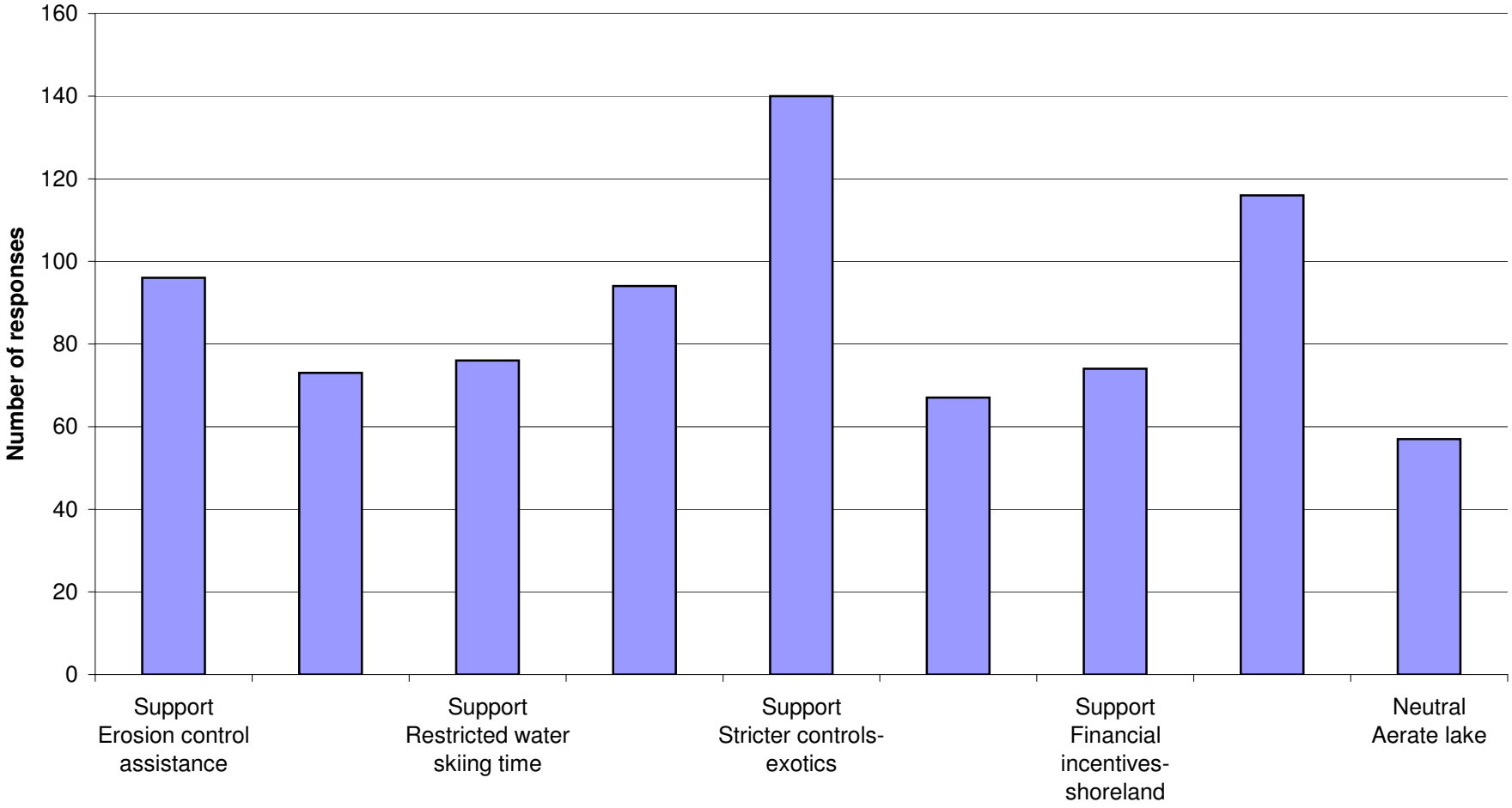


Figure 15
Crescent Lake Resident Survey
Type of Fertlizer
Question 40

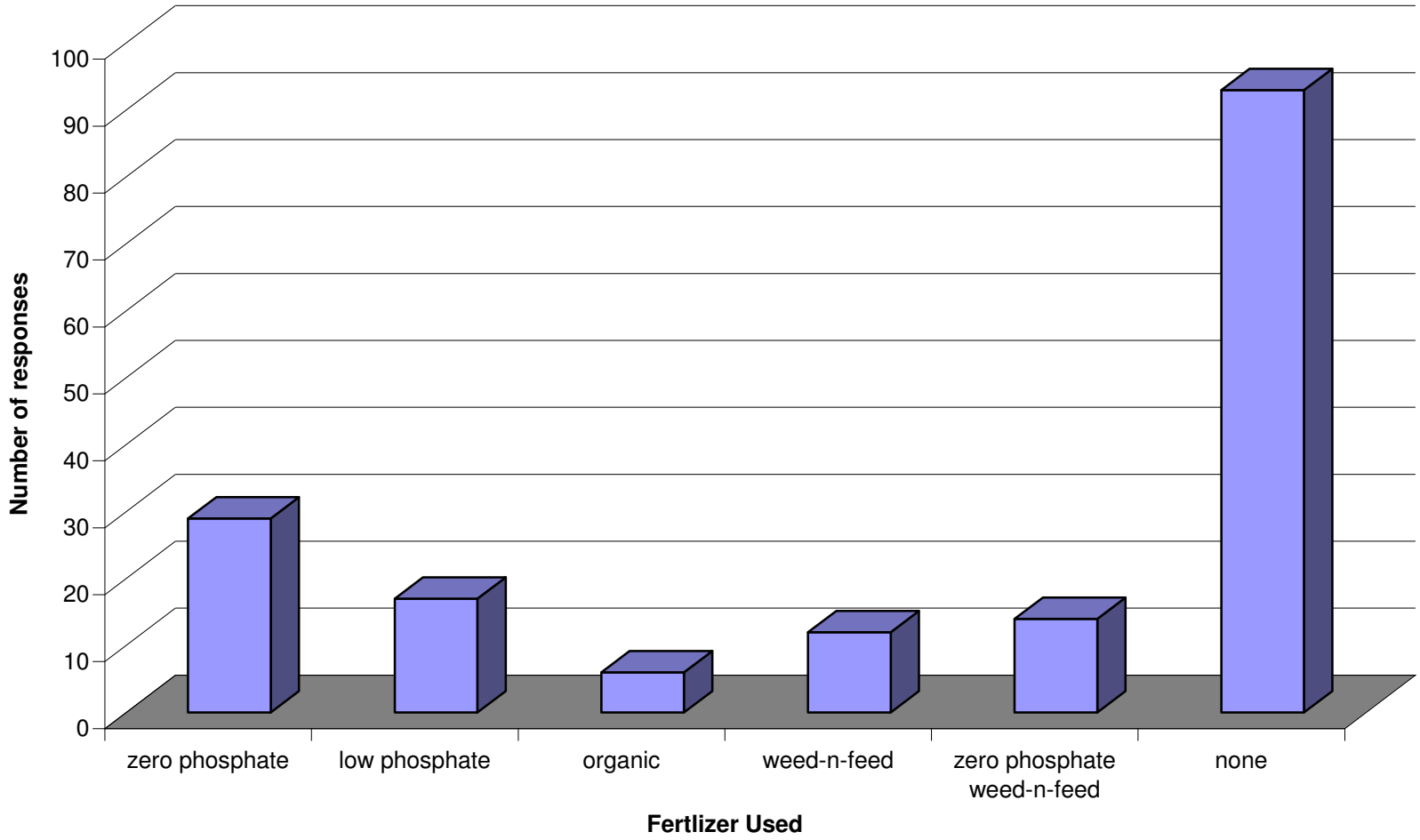


Figure 16
Crescent Lake Resident Survey
Shoreline Description
Question 42

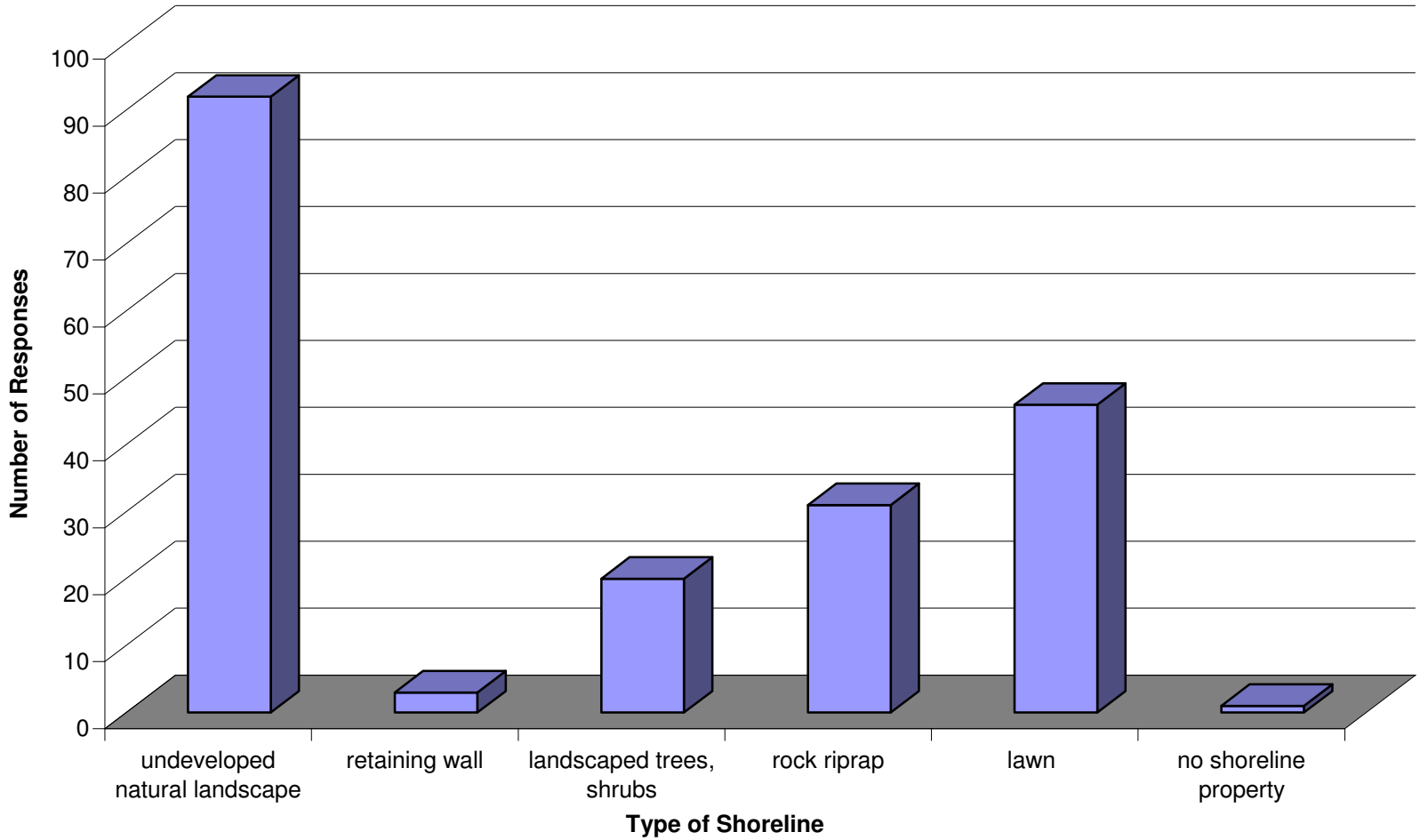
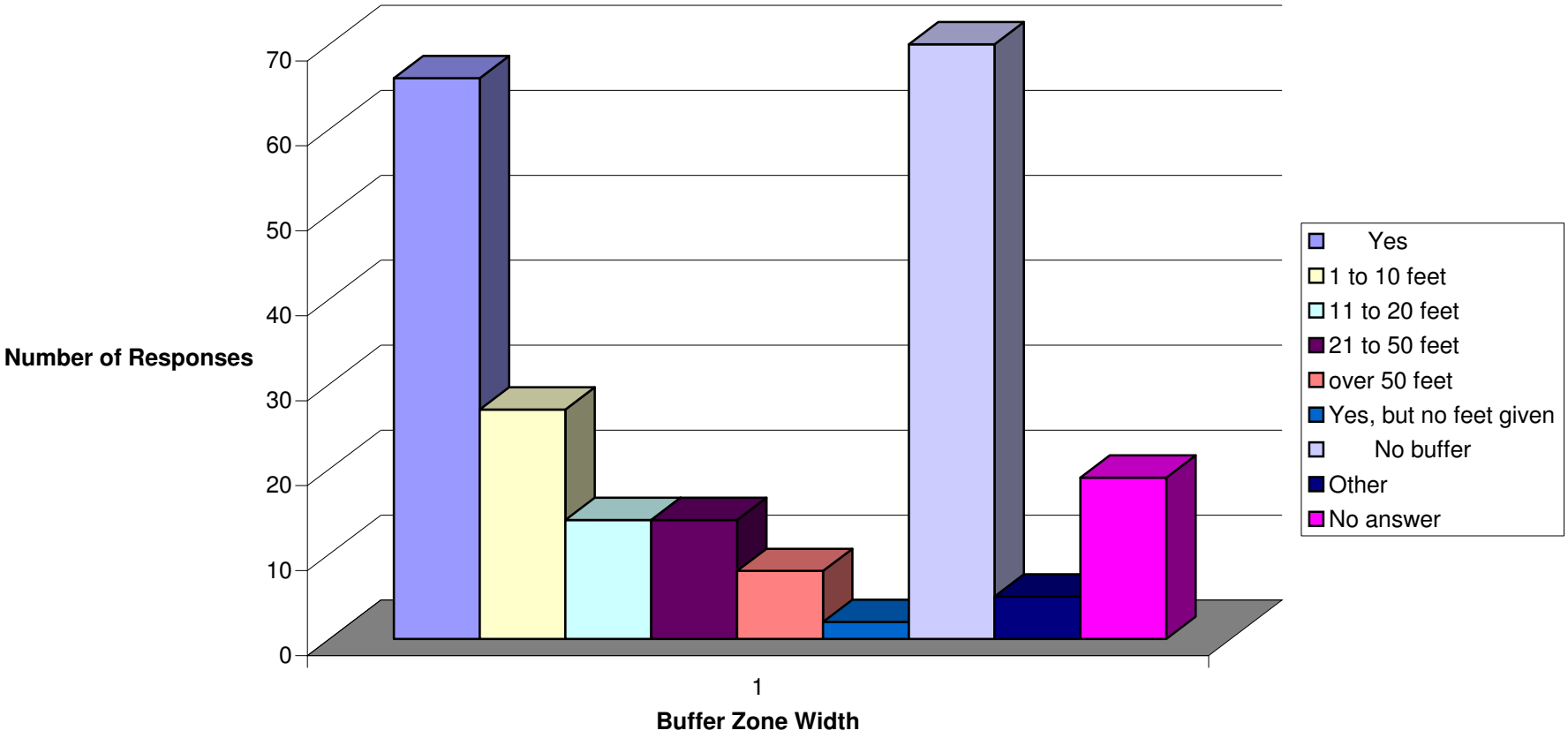
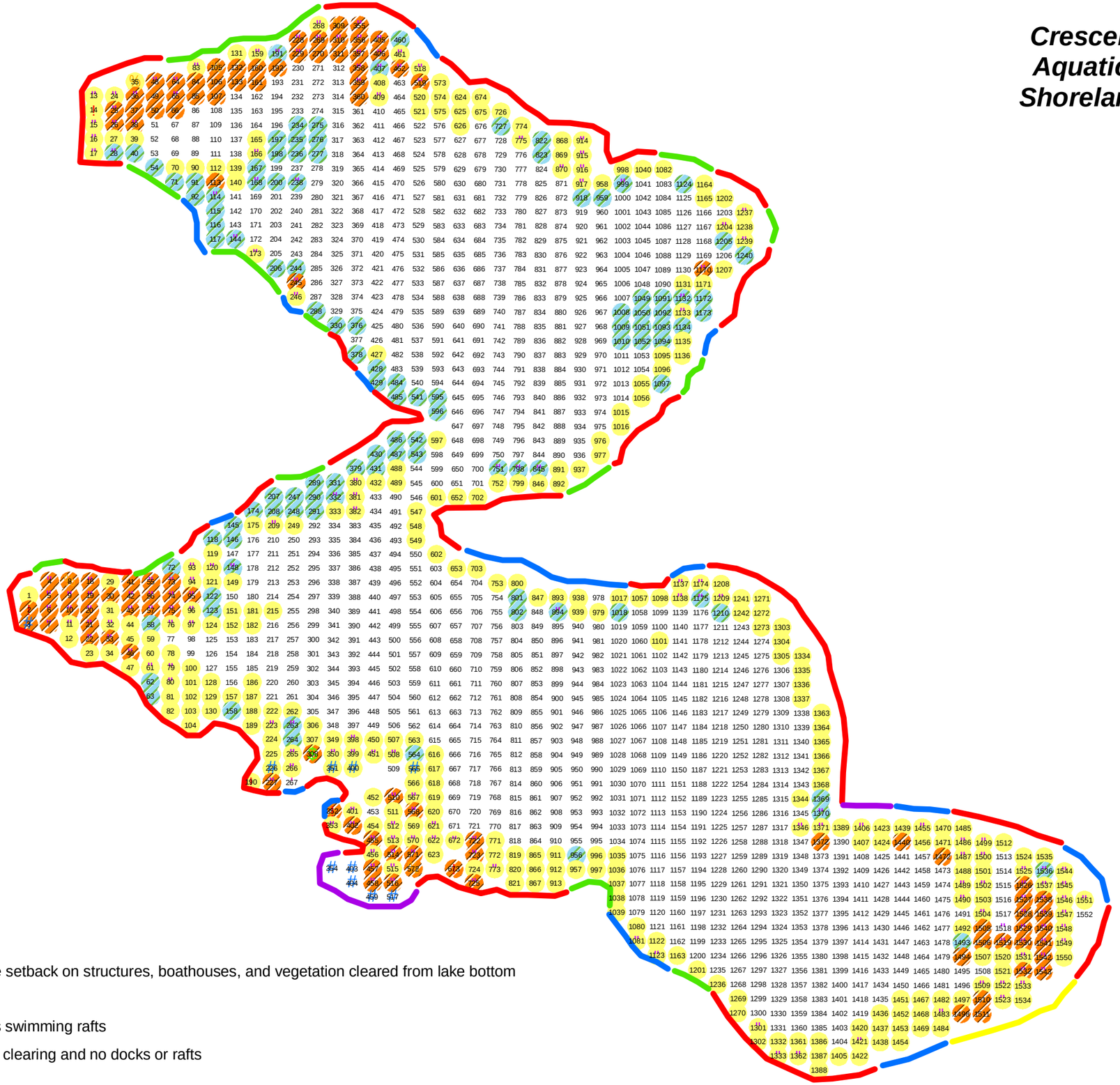


Figure 17
Crescent Lake Resident Survey 2006
Buffer Zone
Question 43



Crescent Lake ~ 2006
Aquatic Plant Survey
Shoreland Assessment



Legend

Vegetation type

- " Submerged
- $ Submerged and floating leaf
- # Emergent
- ' Emergent and floating leaf
- % Emergent and submerged
- ! Emergent, submerged and floating leaf

Dominant sediment type

- Muck
- Rock
- Sand

Development with:

- riprap, seawall, cleared shoreline, no or little setback on structures, boathouses, and vegetation cleared from lake bottom
- shoreline clearing and no buffer
- some shoreline clearing, some buffer, docks swimming rafts
- light development with shoreline buffer, little clearing and no docks or rafts
- no development, natural shoreline

AYRES ASSOCIATES

April 2009 - Not to Scale

Figure 18

Examples of Shoreland Development Ratings

1 - Heavy

Development with riprap, seawall, cleared shoreline, little/no setback, boathouse, vegetation cleared from lake bottom.

2 - Moderately Heavy

Development with cleared shoreline, no buffer, docks, swimming rafts.

Development with some shoreline clearing, some buffer, docks, swimming rafts.

3 - Moderate

Development with shoreline buffer, little clearing, no docks, rafts.

4 - Light

No development with natural shoreline.

5 - None

Tables

Table 1
Crescent Lake Water Quality 2006
Laboratory Testing

Parameter	Depth	Sample Period Summer 2006					Mean	Units
		May 17	June 23	July 16	August 18	Sept 16		
Nitrate plus Nitrite – N	3' from top	ND	ND	ND	ND	ND		MG/L
Nitrate plus Nitrite – N	3' from bottom	**	**	**	ND	0.996	0.996	MG/L
Calcium	3' from top	10.1	10.0	13.5	10.7	10.8	11.0	MG/L
Calcium	3' from bottom	**	**	**	14.6	11.3	13.0	MG/L
Iron	3' from top	ND	0.1	6.3	ND	1.3	2.6	MG/L
Iron	3' from bottom	**	**	**	2.0	0.5	1.3	MG/L
Potassium	3' from top	1.0	0.9	1.1	1.0	3.8	1.6	MG/L
Potassium	3' from bottom	**	**	**	1.4	1.0	1.2	MG/L
Sodium	3' from top	5.3	5.1	5.0	5.2	5.2	5.2	MG/L
Sodium	3' from bottom	**	**	**	5.4	5.1	5.3	MG/L

** Not tested for
ND Not detected

Table 2
Crescent Lake Water Quality 2006
Lake Results - In Field Testing

Parameter	Depth	Sample Period				Mean	Units
		17-May	23-Jun	18-Aug	16-Sep		
Conductivity	0-2 m		50	97	265	137.3	UMHOS/CM
	near bottom	90	130	190	120	132.5	UMHOS/CM
Temperature	0-2 m		25	24	18.3	22.4	^{0}C
	near bottom	11.9	24	20	17.5	18.4	^{0}C
pH	0-2 m		2.03	1.94	1.45	1.8	SU
	near bottom	7.11	2.1	1.7	1.71	3.2	SU
Secchi Disk		14	11	8	11	11.0	FT

***June - September pH readings are in error**

Table 3

Crescent Lake Water Quality 2006

Dissolved Oxygen - Temperature Results - In Field Testing

Depth	May		June		August		Sept	
	D.O. mg/L	Temp	D.O. mg/L	Temp	D.O. mg/L	Temp	D.O. mg/L	Temp ^{0}
33					4.8	59.4		
30			1.0	59.0	5.4	60.3	47	64.4
27	4.1		1.3	59.4	7.5	63.7	50.3	64.9
24	4.6	51.3	2.7	61.5	11.1	69.6	56.5	66.0
21	6.0	52.0	4.1	65.1	46.5	73.2	68	66.0
18	4.1	52.7	5.6	70.7	52.9	73.4	69.1	66.0
15	4.5	52.8	3.8	71.1	29.2	73.6	70.7	66.0
12	8.0	53.0	4.4	71.2	43.8	73.8	70.1	66.2
9	7.4	53.1	4.1	71.4	56.8	73.9	71	66.0
6	9.7	53.3	5.6	71.8	21.5	74.5	73	66.2
3	9.8	53.4	7.0	72.5	34.7	75.2	73.5	65.7

*** August-September DO readings are in error**

MG/L	milligrams per liter		
UG/L	micrograms per liter	ND	not detected
SU	standard units		
UMHOS/CM	micromhos per centimeter		
Temp	degrees f		

Table 4
Crescent Lake Water Quality 2006
Water Quality Indices for Wisconsin Lakes (Lillie and Mason, 1983)

Water Quality Index	Total Phosphorous (mg/l)	Chlorophyll a (ug/l)	Secchi Depth (m)
Excellent	<0.001	<1.0	>6.0
Very Good	0.001 - 0.009	1.0 - 4.9	3.0 - 6.0
Good	0.010 - 0.029	5.0 - 9.9	2.0 - 2.9
Fair	0.030 - 0.049	10.0 - 14.9	1.5 - 1.9
Poor	0.050 - 0.149	15.0 - 30.0	1.0 - 1.4
Very Poor	>0.150	>30.0	<1.0

Based on annual averages from Self Help data

Table 5
Crescent Lake Water Quality 2006
Carslon's (1977) Trophic State Index

Trophic Level	Trophic State Index	Total Phosphorous (mg/l)	Secchi Depth (m)	Chlorophyll a (ug/l)
Eutrophic				
	50	0.024	2	7.2
Mesotrophic		0.0134		6.3
	40	0.012	4	2.6
Oligotrophic			4.1	

Based on annual averages from Self Help data

Table 6
Crescent Lake Water Quality 2006
Crescent Lake TSI

Crescent Lake	Value	TSI
TP	50	Mesotrophic
Chl a	47	Mesotrophic
Secchi	41	Mesotrophic

Water moderately clear, but increasing chance of low dissolved oxygen in deep water during summer.

Based on annual averages from Self Help data

Table 7
Crescent Lake Water Quality 2006
Self Help Data Summary

Sample Year	Annual Average Readings			Annual Average TSI		
	Secchi ft	Chlorophyll a ug//l	Total Phosphorous mg/l	Secchi ft	Chlorophyll a ug//l	Total Phosphorous mg/l
2006	12.7	5.4	19.6	40.6	46.8	51.2
2005	14.6	5.2	18.0	39.4	45.4	49.8
2004	12.4	6.1	18.5	41.5	47.8	50.8
2003	12.8	6.8	16.2	40.8	47.4	49.4
2002	10.6	10.1	21.0	43.0	52.0	51.5
2001	10.6	8.2	23.0	43.9	47.5	52.4
2000	10.2			44.0		
1997	12.0	5.0		41.7	45.5	
1996	15.0	5.6	10.8	38.9	46.4	47.5
1995	15.0	7.1	13.2	39.1	48.8	47.8
1994	14.5	4.6		39.5	45.2	
1993	15.0	5.0		38.8	46.2	
1992	15.4	6.5		38.6	46.8	
1991	12.9	6.0		40.9	45.3	
1990	13.3			41.0		
1989	13.9			40.1		
1988	15.1			40.1		
1987	15.8			39.1		
1986	13.3			41.3		
Average	13.4	6.3	17.5	40.6	47.0	50.1
Std Dev	1.7	1.5	4.0	1.6	1.9	1.8
Maximum	15.8	10.1	23.0	44.0	52.0	52.4
Minimum	10.2	4.6	10.8	38.6	45.2	47.5

Table 8
Crescent Lake Water Quality 2006
STORET EPA Data

Year	Na mg/l	K mg/l	Ca mg/l	Fe ug/l	Cond umhos/cm	pH	N-N mg/l
1985	1	1	2		17	6.77	0.02
1984	2.92	0.89	9.28	20	89.1	7.58	0.199
1979					85	8.2	0
1973	5.5	2.5	8.5		101		0.002
	7.4	1.9	9.4		101		0.05
	4.2	2.9	9.2		107	7.4	0.072
	1.4	0	3.7				
	0	0.6	4.1			7	
	0	0.7	3.9		19	6.8	
		1.3			72	7.4	0.1
	0	0.8	0				
	0		0			6.9	0.122
	0	0.8	0		22		0.145
1974	3	1.3	6			7.5	0.076
	4	1.7	8		80	7.4	
	4	1.9	8				
	5	1	4		22	7.1	
	5	0	3		22		
	7	1.2	0				
	4	3.7	7				0.073
	5	4	10				0.065
	3	0	0				0.133
	4	1.4	14				
	3	0	3				
	2	1.4	13				0.092
	2	0.9	11				0.079
	2	1.4	11		64		0.09
	4	0	11		81		0.204
	6	0	16				
	2	0	0				
	2	0	0				
1975	4	1.3					
	2	1.2	3				0.152
	3	0.8	3		89		
	0	0.9	3		35		
	0	0.9	3			6.9	
	0	0.6	3				
AVE	2.81	1.11	5.59	20	63	7.2	0.093
MIN	0	0	0	20	17	6.77	0
MAX	7.4	4	16	20	107	8.2	0.204
STD DEV	2.1	1.0	4.6		33.9	0.4	0.1

Table 9

Crescent Lake Watershed 2006
Land Use

Land Use for Entire Watershed

Land Use	Area (ac)
Lake Surface Area	626.0
Forest	550.0
Agricultural	128.0
Wetlands	80.0
Public Space	25.0
Residential	165.0
Watershed	1574.0

Table 10

Crescent Lake Watershed 2006

TR-55 Assumptions

Land Use for Entire Watershed

Land Use	Area (ac)	Assumptions for TR-55 model	HSG	CN
Lake Surface Area	626.0	Impervious areas: paved parking lots, roofs, driveways	A	98
Forest	550.0	Woods, good condtion	B	55
Agricultural	**128.0**			
	64.0	close-seeded legumes or rotation meadow, contoured, good condition	B	69
	64.0	pasture, grassland, or range, good condition	B	61
Wetlands	80.0	0% impervious, 0% unconnected impervious	A	85
Public Space	25.0	Open space, good condition, grass cover > 75%	B	61
Residential	165.0	1 acre lots, 20% impervious	B	68
Watershed	1574.0			

Table 11 Curve Numbers for Home Categories									
Home Category	**Roof**		**Driveway**		**Other Impervious (sidewalk, stairs, patio, etc.)**		**Lawn**		**Cumulative CN**
	Area (ft^2)	**CN**	**Area (ft^2)**	**CN (type)**	**Area (ft^2)**	**CN**	**Area (ft^2)**	**CN (type)**	
Category 1	1000	98	500	85 (gravel)	---	---	42060	58 (good condition meadow)	59.2
Category 2	1800	98	500	85 (gravel)	200	98	41060	58 (good condition meadow)	60.1
Category 3	2500	98	650	98 (paved)	350	98	40060	61 (good cond. lawn)	64.0
Category 4	3500	98	800	98 (paved)	700	98	38560	61 (good cond. lawn)	65.2

Table 11 determines curve number (CN) for each category. CN is used to determine the amount of runoff in models. CN is determined based on impervious (does not allow water penetration) surface.

Home Category: Based on year built and assumed septic systems for these structures.

Category 1: Original (1930s) summer cabins built on the lower tier of the lots very near the shoreline (no buffer zone). No indoor plumbing, little insulation, used during weekends and summers.
Category 2: Permanent, year-round homes built for full-time residents (after WWII). Included septic systems with concrete tanks.
Category 3: Older cabins remodeled inside and out (1970s), some to allow for a lower level. Insulation and heating systems added, along with upgraded septic systems.
Category 4: Older cabins destroyed, bigger, more modern homes built (since 1975) for both year-round residents and part-time residents. Included up-to-date septic systems.

Table 12 Septic System Assumptions			
Home Category	**Residents per home**	**Average time spent at dwelling (days/year) [1]**	**Scaled number of septic systems per dwelling[2]**
Category 1	2.5	40	0
Category 2	4.0	365	1.00
Category 3	3.0	75	0.21
Category 4	4.0	275	0.75

[1] Estimated based on seasonal vs fulltime use.
[2]Scaled number of septic systems per dwelling = Average time days/year divided by 365 days. This number is needed because the model assumes fulltime use.

Table 13 STEPL Modeling Input										
Model	**# of Lots**						**CN**	**# Septic Systems [2]**	**People per septic system [3]**	**Septic Failure Rate (%) [4]**
	Cat. 1	**Cat. 2**	**Cat. 3**	**Cat. 4**	**Empty[1]**	**Total**				
1940	150	0	0	0	86	236	57.7	0	0	---
1955	115	70	0	0	51	236	58.6	70	4.0	6
1980	77	70	38	0	51	236	59.3	78	3.9	4
2006	68	48	38	76	6	236	62.0	113	3.29	2

[1] Empty lot CN = 55
[2] Scaled no. of septic systems/no. lots
[3] Based on no. lots, scale factor, no residents/lot and no. of septic systems.
[4] Input values that are required for the model, current national average is 2%, assume older septics have higher rate.

Table 14 STEPL Model Output				
Model	**Total Loading (lb/year)**			
	Nitrogen (lb/yr)	**Phosphorous (lb/yr)**	**BOD[1] (lb/yr)**	**Sediment (tons/yr)**
1940	1530	380	5050	168
1955	1463	388	4525	169
1980	1434	383	4344	169
2006	1396	371	4139	169

[1]Biological Oxygen Demand

Loading for nitrogen, phosphorous and BOD are decreasing due to increased efficiency of updated septic systems in each category.

Table 15
Crescent Lake Watershed 2006
Nutrient Loading from Crescent Lake Watershed from STEPL
Existing Conditions

Total Load by Watershed

	N Load	P Load	BOD Load	Sediment Load
	lb/year	lb/year	lb/year	ton/year
No BMP	1222.9	304.6	3821.2	110.8
Reduction from BMP*	67.2	12.2	407.5	3.1
Load after BMP	1155.7	292.3	3413.8	107.8
% Reduction	5.5	4.0	10.7	2.8

*BMP is vegetated filter strips on residential lots, assuming 70% of lot area drains filter strip

Total by Land Use (no BMPs)

	N Load	P Load	BOD Load	Sediment Load
	lb/year	lb/year	lb/year	ton/year
Urban	371.0	62.8	1579.0	8.5
Cropland	383.4	117.1	781.0	77.8
Pastureland	256.5	34.0	774.0	14.9
Forest	103.0	48.0	242.1	9.6
Septic	109.0	42.7	445.1	0.0
	1222.9	304.6	3821.2	110.8

Total by Land Use (with BMPs)

	N Load	P Load	BOD Load	Sediment Load
	lb/year	lb/year	lb/year	ton/year
Urban	303.8	50.6	1171.6	5.4
Cropland	383.4	117.1	781.0	77.8
Pastureland	256.5	34.0	774.0	14.9
Forest	103.0	48.0	242.1	9.7
Septic	109.0	42.7	445.1	0.0
	1155.7	292.3	3413.8	107.8

Table 16
Crescent Lake Watershed 2006
Nutrient Loading from Crescent Lake Watershed from STEPL
1980 Conditions

Total Load by Watershed

	N Load	P Load	BOD Load	Sediment Load
	lb/year	lb/year	lb/year	ton/year
No BMP	1239.3	308.4	3939.0	110.2

Total by Land Use (no BMPs)

	N Load	P Load	BOD Load	Sediment Load
	lb/year	lb/year	lb/year	ton/year
Urban	341.4	57.4	1444.5	7.8
Cropland	383.4	117.1	781.0	77.8
Pastureland	256.5	34.0	774.0	14.9
Forest	103.0	48.0	242.1	9.6
Septic	155.0	51.9	697.5	0.0
	1239.3	308.4	3939.0	110.2

Table 17
Crescent Lake Watershed 2006
Nutrient Loading from Crescent Lake Watershed from STEPL
1955 Conditions

Total Load by Watershed

	N Load	P Load	BOD Load	Sediment Load
	lb/year	lb/year	lb/year	ton/year
No BMP	1276.0	315.6	4150.4	110.0

Total by Land Use (no BMPs)

	N Load	P Load	BOD Load	Sediment Load
	lb/year	lb/year	lb/year	ton/year
Urban	334.2	56.1	1411.9	7.6
Cropland	383.4	117.1	781.0	77.8
Pastureland	256.5	34.0	774.0	14.9
Forest	103.0	48.0	242.1	9.6
Septic	198.8	60.4	941.4	0.0
	1275.9	315.6	4150.4	109.9

Table 18
Crescent Lake Watershed 2006
Nutrient Loading from Crescent Lake Watershed from STEPL
1944 Conditions

Total Load by Watershed

	N Load	P Load	BOD Load	Sediment Load
	lb/year	lb/year	lb/year	ton/year
No BMP	1342.4	380.4	4676.1	109.8

Total by Land Use (no BMPs)

	N Load	P Load	BOD Load	Sediment Load
	lb/year	lb/year	lb/year	ton/year
Urban	325.3	54.5	1371.3	7.4
Cropland	383.4	117.1	781.0	77.8
Pastureland	256.5	34.0	774.0	14.9
Forest	103.0	48.0	242.1	9.6
Septic	274.1	54.8	1507.8	0.0
	1342.3	308.4	4676.2	109.7

Table 19
Crescent Lake Watershed
Phosphorous Loading from WiLMS

Crescent Lake

Description	Low	Most Likely	High
Total Loadi	176.3	445.1	1123.2
Areal Load	0.3	0.7	1.8
Total PS L	0.0	0.0	0.0
Total NPS	113.1	222.0	386.4

Non-Point Source Data

Land Use	Most Likely Loading (lb/yr)
Mixed AF	90.4
Med Densi	75.0
Wetlands	6.6
Forest	44.1
Lake Surfa	169.8

Table 20

Crescent Lake Resident Survey Results 2006

Most Popular Answer for Each Question

Survey Question			Response	Number of Responses	% of Total Responses
1		Do you own or rent property?	Own	156	97.5
2		How long have you lived on or near Crescent Lake?	Over 20 years	80	50
3		When time is spent at the lake	Year round	67	41.9
4		Ages of property owners/residents	51-65	72	45
5		Number of people that regularly spend time at the lake property	Two	56	35
6		Type of recreation participated in	Boating	146	91.4
7		Watercraft owned	Fishing boat	103	64.4
8	a	Horsepower of 2 cycle boat motors operated on lake	11 to 50	50	31.3
	b	Horsepower of 4 cycle boat motors operated on lake	11 to 50	32	20
	c	Horsepower of boat motors operated on lake, no cycle listed	11 to 50	13	8.1
9		How has lake quality changed since you've lived on/near the lake?	Stayed the same	92	57.5
10		How has fishing on the lake changed in the past?	Declined	90	56.3
11		How long have you fished on the lake?	6 to 20 years	45	28.1
		Rate the current condition of the lake for each of the following:			
12		Water clarity	Good	108	67.5
13		Water quality	Good	106	66.3
14		Fishing	Fair	71	44.4
15		Condition of land area close to shoreline (0-100 feet)	Good	93	58.1
16		Condition of land area away from shoreline (100-1000 feet)	Good	101	63.1
17		Scenic quality of lake	Good	74	46.3
18		Overall condition of lake	Good	108	67.5
19		Overall condition of shoreland areas	Good	92	57.5
20		Rooted vegetation near shore	About right	96	60
21		Floating algae/scum on surface	About right	103	64.4
22		Fish habitat	Too little	83	51.9
23		Keeper-size fish	Too little	96	60
24		Diversity of birds	About right	115	71.9
25		Diversity of wildlife	About right	119	74.4
26		Loons	About right	136	85
27		Shoreland housing	About right	87	54.4
28		Motorized watercraft	About right	89	55.6
29		Natural shoreline vegetation	About right	92	57.5
		How much impact has each of the following had on the water quality of the lake?			
30		Septic system seepage	Don't know	88	55
31		Aquatic plant (weed) removal	Don't know	83	51.9
32		Shoreline vegetation removal	Negative impact	65	40.6
33		Lawn fertilizers and chemicals	Negative impact	87	54.4
34		Lake home, road, driveway runoff	Don't know	63	39.4
35		Soil erosion from home sites	Don't know	61	38.1
36		Exhaust and fuel leakage from watercraft	Negative impact	69	43.1
37		Damage to aquatic plants and lake bottom by watercraft	Don't know	66	41.3
38		Who is responsible for protecting and improving the lake?	Lakeshore residents	134	83.8
39		Do you maintain a lawn on your Crescent property?	Yes	137	85.6

Survey Question			Response	Number of Responses	% of Total Responses
40		What type of fertilizer do you use on your property?	None	93	58.1
41		What is the closest distance from the lake to the areas fertilized?	lLess than 30 feet	34	21.3
42		What best describes your property shoreline?	Undeveloped natural landscape	92	57.5
43	a	Do you maintain a shoreline buffer zone?	No	70	43.8
			Yes	66	41.3
	b	If yes, how many feet from shore do you maintain the buffer?	1 to 10 feet	27	16.9
44		Well type	Drilled	76	47.5
45		Year well installed	Don't know	64	40
46		Total well depth	Don't know	76	47.5
47		Do you have a water treatment system?	Yes	87	54.4
48		If you do have a water treatment system, where does the brine solution drain to?	Septic tank	62	38.8
49		Type of septic system on property	Septic tank	135	84.4
50		Number of persons regularly served by septic system	One to three	93	58.1
51		Number of bedrooms for septic system	Three	70	43.8
52		Date of original installation of septic system	1970-2000	85	53.1
53		How often septic tank is pumped	1 to 2 years	73	45.6
		Do you support of oppose the following actions to address problems on the lake?			
54		Stricter septic system enforcement to improve water quality	Support	80	50
55		More shoreline property owner education on impacts of water quality	Support	119	74.4
56		Stricter zoning regulations for shoreline character	Neutral	54	33.8
57		More enforcement of existing shoreline protection laws	Support	62	38.8
58		Awards program for shoreline property owners who minimize their impacts	Neutral	69	43.1
59		Allowing more aquatic plant (weed) removal	Oppose	49	30.6
60		Development of more voluntary programs for water quality protection	Support	110	68.8
61		Increased protection for fish habitat	Support	123	76.9
62		More game population management	Neutral	74	46.3
63		More management for non-game wildlife (song birds, loons)	Support	80	50
64		More erosion and runoff control assistance for property owners	Support	96	60
65		Motorboat size and speed limits to protect shoreland areas	Support	73	45.6
66		Restricted time for water skiing	Support	76	47.5
67		Restricted time for jet skiing	Support	94	58.8
68		Stricter controls for exotic species (such as Euration water milfoil)	Support	140	87.5
69		More public land purchase to protect shoreland areas	Support	67	41.9
70		Financial incentives for environmentally sound shoreland management	Support	74	46.3
71		Development of a long-term lake management plan	Support	116	72.5
72		Aeration of the lake	Neutral	57	35.6

Table 21

Crescent Lake Aquatic Plant Survey 2006

	STATS	Total vegetation	filamentous algae	Ceratophyllum demersum,Coontail	Elodea canadensis,Common waterweed	Myriophyllum tenellum,Dwarf water milfoil	Najas flexilis,Bushy pondweed	Nuphar variegata,Spatterdock	Nymphaea odorata,White water lily	Pontederia cordata,Pickerelweed	Potamogeton amplifolius, Large-leaf pondweed	Potamogeton illinoensis,Illinois pondweed	Potamogeton praelongis, White-stem pondweed	Potamogeton pusillus,Small pondweed	Potamogeton robbinsii,Robbins pondweed	Potamogeton zosteriformis, Flat-stem pondweed	Utricularia vulgaris,Common	Vallisneria americana,Wild celery	Schoenoplectus sp, Bulrush sp
Lake Name																			
County	**Crescent Lake**																		
WBIC	**Onieda**																		
Survey Date																			
	INDIVIDUAL SPECIES STATS:																		
	Frequency of occurrence within vegetated areas (%)		19.90	33.83	28.86	8.96	1.00		0.50		14.43	2.99	0.50	20.90	16.42	3.48	1.00	23.38	
	Frequency of occurrence at sites shallower than maximum depth of plants		7.13	12.12	10.34	3.21	0.36		0.18		5.17	1.07	0.18	7.49	5.88	1.25	0.36	8.38	
	Relative Frequency (%)		11.3	19.2	16.4	5.1	0.6		0.3		8.2	1.7	0.3	11.9	9.3	2.0	0.6	13.3	
	Relative Frequency (squared)	0.13	0.01	0.04	0.03	0.00	0.00		0.00		0.01	0.00	0.00	0.01	0.01	0.00	0.00	0.02	
	Number of sites where species found		40	68	58	18	2		1		29	6	1	42	33	7	2	47	
	Average Rake Fullness		1	1	1	1	1		1		1	1	1	1	1	1	1	3	
	#visual sightings			2				3	4	20	3	2		8				3	1
	present (visual or collected)		present	present	present	present	present	present	present	present	present	present	present	present	present	present	present	present	present
	SUMMARY STATS:																		
	Total number of points sampled	**592**																	
	Total number of sites with vegetation	**201**																	
	Total number of sites shallower than maximum depth of plants	**561**																	
	Frequency of occurrence at sites shallower than maximum depth of plants	**35.83**																	
	Simpson Diversity Index	**0.87**																	
	Maximum depth of plants (ft)	**20.00**																	
	Number of sites sampled using rake on Rope (R)	**458**																	
	Number of sites sampled using rake on Pole (P)	**60**																	
	Average number of all species per site (shallower than max depth)	**0.63**																	
	Average number of all species per site (veg. sites only)	**1.76**																	
	Average number of native species per site (shallower than max depth)	**0.56**																	
	Average number of native species per site (veg. sites only)	**1.76**																	
	Species Richness	**14**																	
	Species Richness (including visuals)	**17**																	

Table 22
Crescent Lake Aquatic Plant Survey 2006
Aquatic Plants of Crescent Lake

Scientific Name	Common Name	Importance of Plant
Submersed Plants		
Elodea canadensis	Elodea	Some waterfowl eat the seeds. Food and habitat for fish, waterfowl, other wildlife.
Ceratophyllum demersum	Coontail	Provides prime habitat for invertebrates and shelter for fish, especially during winter due to structure. Fruit and foliage grazed by waterfowl.
	Filamentous algae	Provides habitat for invertebrates.
Myriophyllum tenellum	Dwarf water milfoil	Provides good spawning habitat for panfish and shelter for small invertebrates. Network of rhizomes stabilizes sediment.
Najas flexilis	Bushy pondweed	Important food for waterfowl, marsh birds and muskrat. Provides food and shelter for fish.
Potamogeton amplifolius	Large-leaf pondweed	Broad leaves offer shade, shelter and forage for fish. Abundant production of large nutlets makes it a valuable waterfowl food.
Potamogeton illinois	Illinois pondweed	
Potamogeton praelongus	White-stem pondweed	Fruit provides valuable waterfowl food, portions eaten by muskrat, beaver, deer. Good food producer for trout and valuable musky habitat.
Potamogeton pusillus	Small pondweed	Food source for wide variety of ducks and geese. Grazed by muskrat, deer, beaver and moose. Provides food and habitat for fish.
Potamogeton robbinsii	Robbins pondweed	Provides habitat for invertebrates that are grazed by waterfowl. Offers good cover and foraging for fish, particularly northern pike.
Potamogeton zosteriformis	Flat-stem pondweed	Important food for waterfowl, may be grazed by muskrat, beaver, dear, provides cover and food source for fish and invertebrates.
Utricularia vulgaris	Commom bladderwort	Provide food and cover for fish. Provides fish habitat in areas not readily colonized by rooted plants due to free-floating nature.
Vallisneria americana	Wild celery	Premiere source of waterfowl food. All portions of plant are consumed including rhizomes, tubers, foliage and fruit. Primary food source for canvasback ducks. Important to marsh and shorebirds such as rail, plover, sandpiper and snipe. Muskrats graze on plants. Beds are good fish habitat that provide shade, shelter and feeding opportunities.
Floating-leaf Plants		
Nuphar variegata	Spatterdock	Anchors shallow water community, provides food waterfowl, deer, muskrat, beaver. Provides shade and shelter for fish and invertebrates.

Nymphaea odorata	White water lily	Provides seeds for waterfowl. Rhizomes eaten by deer, muskrat, beaver, moose and porcupine. Leaves offer shade and shelter for fish.
Emergent Plants		
Pontederia cordata	Pickerelweed	Flowering stalk haven for insects. Seeds consumed by waterfowl and muskrats. Rhizomes and leaves offer shade and shelter for fish. Beds of plants are important shoreline stabilizer that dampen wave action.
Schoenoplectus sp	Bulrush	Provides habitat for invertebrates and shelter for young fish. Nutlets are consumed by wide variety of waterfowl, marsh and upland birds. Stems and rhizomes eaten by geese and muskrats. Provides nesting cover and material for waterfowl, marsh birds and muskrats.

Table 23

Wisconsin Waters with Eurasian Water-Milfoil Infestation (current as of 1/02/2007) From DNR Website

County	Waterbody Name	Year Infested
Langlade		
	Big Twin Lake	2005
	Enterprise Lake	2004
Lincoln		
	Clear Lake	2003
	Lake Nokomis	2004
	Mohawksin Lake	2001
	Seven Island Lake	2004
Oneida		
	Bridge Lake	2004
	Eagle River *	2005
	Hancock Lake	2006
	Kathan Lake	2004
	Kawaguesaga Lake	2004
	Manson Lake	1989
	Minocqua Lake	2000
	Oneida Lake	2006
	Rainbow Flowage	1994
	Sugar Camp Creek	2005
	Tomahawk Lake	2003
	Tomahawk River	2004
	Willow Flowage	2006
	Willow Lake	2005
	Wisconsin River **	2005

* 1/4 mile upstream from Burnt Rollaways Dam
** Below Rainbow Dam