LAKE COUNTY, ILLINOIS

2010 TIMBER LAKE (N) SUMMARY REPORT

PREPARED BY ENVIRONMENTAL SERVICES

LAKE COUNTY HEALTH DEPARTMENT

POPULATION HEALTH ENVIRONMENTAL SERVICES

Fishing pier along east shore of Timber (N) Lake

Timber Lake is a 33-acre glacial lake east of Antioch in northern Lake County. Timber Lake receives water from two small intermittent streams, one at the northwestern corner of the lake and the other along the southeastern shoreline. The outflow at the northeast corner of the lake flows into a small wetland complex, which drains to North Mill Creek and eventually to the Des Plaines River.

The Lake County Health Department - Environmental Services (LCHD-ES) sampled the lake and stream water quality of the North Mill Creek watershed in 2010. Other lakes sampled include Deer Lake, Redwing Slough, White Lake, Lake Linden, Waterford Lake, Potomac Lake, McDonald Lake 1 and 2, Hastings Lake, Crooked Lake, and Slough Lake. Reports for these lakes can be found in the detailed lake reports section of our website: LCHD-ES Lake Reports.

In 2010 the LCHD-ES collected water samples at the inlet and outlet May - September and conducted an aquatic plant survey in July.

A majority of the land surrounding Timber Lake along with most oft he lake bottom is owned by the Lake County Forest Preserve District (LCFPD). The remaining parcels include an active farm on the north shore and some rental cottages on the south west shore.

In 2006, the Lake County Forest Preserve District (LCFPD) implemented a master plan of improvements to the land around Timber Lake. The improvements included wetland and woodland restoration and the installation of educational loops, fishing piers, overlooks, a picnic area, and trails for hiking, biking, and horseback riding with future trail access planned at the northwest, southwest, and southeast corners of the property.

SPECIAL POINTS OF INTEREST:

- *Managed by the LCFPD*
- *Abundant Wildlife*
- *Well buffered and low impact lake*
- *Participate in the VLMP*

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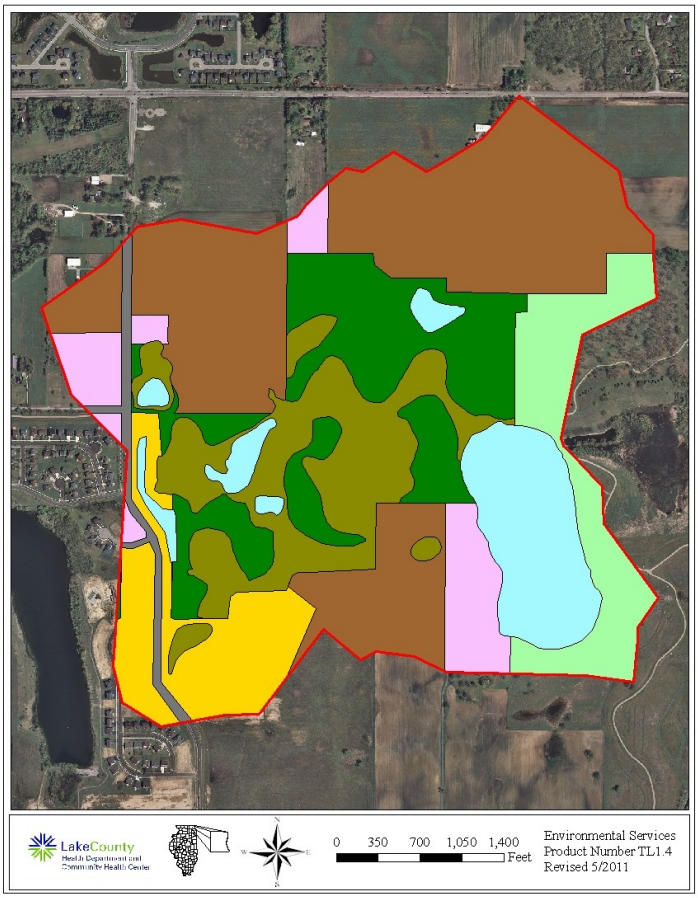
WATERSHED



- Agricultural
- Disturbed Land
- Forest and Grassland
- Public and Private Open Space
- Single Family
- Transportation
- Water
- Wetlands

Land use within the Timber Lake watershed

We all live in a watershed. A watershed is the land and water around a lake that drains to that lake. This means that any management of the land within the watershed can directly affect the lake.

What can you do to help protect Timber Lake?

The health of a lake is directly affected by the health of its watershed. This means that any management of the land within the watershed can directly affect the lake. Timber Lake has a 412 acre watershed that carries nutrients and pollutants to the lake with each rainfall.

Timber Lake has a diverse watershed with a mix of land uses. The major land uses within the watershed were agriculture (33%), forest and grassland (16%), and wetlands (140%). Each type of land use contributes differently to the stormwater run-off. The developed land uses contain more impervious surface and allow less infiltration into the ground. The two smallest land uses single family (7%) and transportation (2%) were the land uses contributing the highest percentages of estimated run-off to Timber Lake. It was calculated that the single family land use contributed 24% of the estimated run-off while transportation contributed 18%. Any increase in urban and transportation land use will likely increase the amount of chlorides (Cl^-) entering the lake due to the increased surface area that will require winter de-icing. It is important to keep in mind that although the amount of estimated run-off from certain areas may be low, they can still deliver high concentrations of sediment and nutrients.

To reduce impacts to lakes residents can minimize fertilizer use or, if needed, use phosphorous free fertilizer on their lawns, have their septic tanks pumped and serviced regularly, and use alternative methods for winter de-icing of sidewalks and roads. The use of rain gardens can help stormwater infiltrate into the ground producing less run-off and help recharge groundwater. Also, increased impervious surface creates increased run-off which can raise lake levels. Increased water in a lake creates a larger volume of water and can also lead to flooding.

The retention time (the amount of time it takes for water entering a lake to flow out of it again) of Timber Lake was calculated to be approximately 6.27 years .

The in the south western part of the watershed is currently undeveloped, disturbed land. This area was originally part of a housing development that went backrupt and was left disturbed. It is also important to monitor any existing or future development within the watershed and encouraged that the lake health be considered in the development plans.

WATER CLARITY

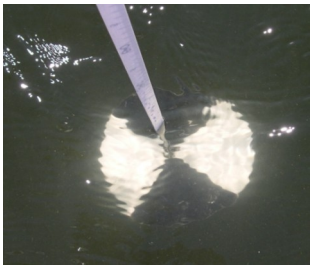
Water clarity is the most commonly used indicator of water quality. Generally, clearer water indicates better the water quality. The water is generally clearer due to less algae, sediment, or microscopic animals in the water column. It is important to remember that to have a balanced lake ecosystem there has to be some algae and microscopic animals present.

A way for residents to monitor the lakes health is to participate in the Illinois Environmental Protection Agency (IEPA) sponsored Volunteer Lake Monitoring Program (VLMP). Timber (N) Lake participated in the VLMP since 2005 collecting water clarity data. This data provides valuable information on the annual water clarity trends of the lake.

In 2010 the VLMP average Secchi depth was 9.22 feet, while the LCHD-ES average was 8.37 feet. This difference can be explained by the time of day when the sampling took place and the weather conditions prior to and during sampling. The LCHD-ES had rain prior to three of the sampling events.

In 2006 the LCHD-ES average Secchi depth was 10.35 feet. This was the clearest average recorded by the LCHD-ES. The greatest Secchi depth average recorded by the VLMP 13.58 feet in 2005.

The 2010 average was three feet less than the 2006 average. The decrease is likely due to the increased rain that fell during the 2010 sampling season. There was over 21 inches of rain recorded from May - September by the Lake County Stormwater Management rain gauge located in Lindenhurst.



A Secchi disk is an eight-inch diameter weighted metal plate painted black and white in alternating quadrants. A calibrated rope is used to lower the disc into the water and measure the depth to which it is visible.

TOTAL SUSPENDED SOLIDS

Generally, Secchi depth is inversely correlated with total suspended solid (TSS) concentrations, meaning a decrease in Secchi depth would indicate an increase in TSS. This was indeed the case in 2010. The 2010 average TSS concentration of 2.5 mg/L was a slight increase from the 2006 average of 2.4 mg/L.

TSS is comprised of nonvolatile suspended solids (non-organic clay or sediment materials), and volatile suspended solids (algae and other organic matter).

Run-off from construction projects can be a source of TSS. It is important that proper erosion control is used during construction to keep as much sediment on the construction site as possible. Another possible source of TSS is the severely eroded north shore of the lake. The erosion is caused from cattle entering and leaving the lake. Steps should be taken to keep the cattle out of the lake and the shoreline repaired to prevent further loss of the shore and increased sediment into the lake.

Lake Facts:

Major Watershed: Des Plaines River

Sub-Watershed: North Mill Creek

Location: T46N, R10E, Section 23, NE 1/4

Surface Area: 33.3 acres

Shoreline Length: 1.0 miles

Maximum Depth: 33.3 feet

Average Depth: 16.5 feet

Lake Volume: 547.1 acre-feet

Watershed Area: 412.1 acres

Lake Type: Glacial

Management Entity: Lake County Forest Preserve District and private landowners

Current Uses: fishing, hiking, boating, swimming and aesthetics

BATHYMETRIC MAP

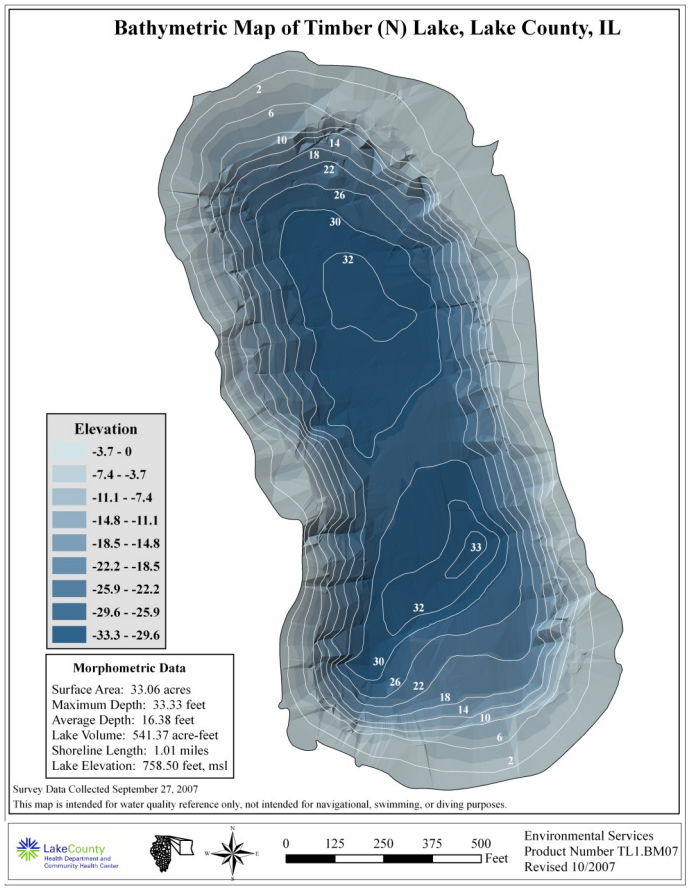
A bathymetric (depth contour) map is an essential tool for effective lake management since it provides critical information about the physical features of the lake such as depth, surface area, and volume. This information is particularly important when intensive management techniques such as chemical treatments for plant or algae control, dredging, fish stocking or habitat enhancement are part of the lake's overall management plan. It was recommended in the 2006 report that an updated bathymetric map be created since the previous map was over ten years old, especially since herbicides were becoming a part of the aquatic plant management plan.

In 2007, the Lake County Forest Preserve District contracted with the LCHD-ES to create a bathymetric map of Timber (N) Lake. In September the LCHD-ES collected the field data and later in the fall produced the final product.

The LCHD-ES used Biosonics equipment along with a Trimble GPS unit with sub-foot accuracy to gather the field data.

Once collected, the data was analyzed and imported into ArcGis for further analysis. In ArcGis, the contours were drawn and the volume was calculated.

Timber (N) Lake had an elevation of 758.50 feet above mean sea level the area of was 33.06 acres, the maximum depth was 33.33 feet, the average depth was 16.38 feet, the shoreline length was 1.01 miles, and the volume was 541.37 acre-feet.



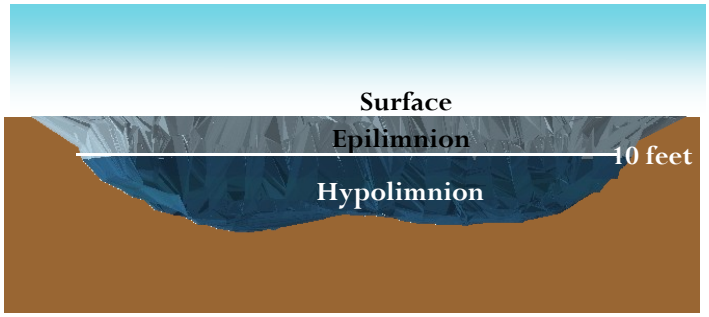
2010 Bathymetric Map

Click here for more Lake Maps

DISSOLVED OXYGEN

Timber (N) Lake was thermally stratified from May through September. Thermal stratification is when a lake divides into an upper, warm water layer (epilimnion) and a lower, cold-water layer (hypolimnion). When stratified, the epilimnetic and hypolimnetic waters do not mix, and the hypolimnion typically experiences anoxic conditions (where dissolved oxygen [DO] concentrations drop below 1 mg/L) by mid-summer. In 2010, Timber (N) Lake was weakly stratified in May at approximately 12 feet. By June it was strongly stratified at approximately 10 feet. The thermocline (the transitional region between the epilimnion and the hypolimnion) remained strong throughout the season. Turnover (mixing) was beginning during the September sampling, although the thermocline was still present at approximately 18 feet.

A DO concentration of greater than 5.0 mg/L is required to maintain a healthy fishery in a lake. DO concentrations in the epilimnion did not indicate any significant problems.



An illustration of Timber (N) Lake looking east showing the epilimnion and hypolimnion, September 2009 - LCHD-ES.

However, anoxic conditions existed from May through September in the hypolimnion. This is a normal phenomenon in large, deep lakes that stratify. The anoxic boundary ranged from 22 feet (June) to 14 feet (August). This represents 17.0% to 40.6%, respectively, of the lake volume based on the bathymetric map created by the LCHD-ES in 2007.

NUTRIENTS

Nutrient concentrations can also play a role in lake health. Elevated levels of the nutrients nitrogen or phosphorus are commonly the cause of poor lake health. A ratio of total nitrogen (TN) to total phosphorus (TP) is used to determine which nutrient is limiting the lakes productivity. In 2010, Timber Lake had a TN:TP ratio of 39:1 indicating that phosphorus was the limiting nutrient. This is consistent with previous monitoring. In 2001 the TN:TP ratio was 41:1 and in 2006 it was 59:1 indicating phosphorus as the limiting nutrient. This being the case, any addition of phosphorus to Timber Lake would likely cause an increase in plant and/or algal growth.

In 2010 the epilimnetic TP concentration was below the county median (0.065 mg/L) at 0.021 mg/L. This was a slight increase from 2006 (0.018 mg/L) and lower than the 2001 concentration of 0.0278 mg/L. The hypolimnetic TP was greater than the county median (0.181 mg/L) in 2010 at 0.452 mg/L. This was an increase from previous monitoring. In 2001 it averaged 0.211 mg/L and in 2006 the average was 0.172 mg/L. The hypolimnetic concentration varies with the stratification of the lake. The longer the lake is stratified, the greater the TP concentration will become. This is due to phosphorus released from particles settling out of the water column and the re-release of phosphorus from the sediments under an anoxic environment.

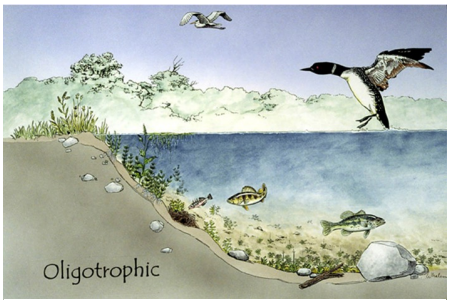
TROPHIC STATE INDEX

Total phosphorous can be used to calculate the trophic state index (TSIp), which classifies lakes according to the overall level of nutrient enrichment. The trophic state of Timber Lake in terms of its phosphorus concentration during 2001 was eutrophic, with a TSIp score of 51.7. In 2006 the TSIp score decreased to 45.8, and classified Timber Lake as mesotrophic. In 2010 the TSIp increased slightly to 48.1, still mesotrophic and ranked 15th out of 165 lakes in Lake County based on average TP concentrations.

It is strongly recommended that homeowners within the watershed only use lawn fertilizers that contain no phosphorus unless a soil test indicates the need for phosphorus This would help reduce further inputs of phosphorus to the lake. Also, it is recommended that the cattle be fenced out of the lake to reduce the erosion along the shoreline and further nutrient inputs.

Tips to limit phosphorus

- ⇒ Use phosphorus free lawn fertilizers
- ⇒ Have your septic system maintained on a regular basis
- ⇒ Do not burn leaves/ brush where ashes will was into the lake
- ⇒ Install buffer strips or rain gardens to filter run off.
- ⇒ Do not feed wildlife such as waterfowl and fish.



Oligotrophic lakes have low nutrient levels. They are often clear lakes with little aquatic plant and/or algae growth. Oligotrophic lakes have a TSIp score less than 40.

Mesotrophic lakes have moderate nutrient levels. These lakes are generally clear with beds of submersed aquatic vegetation. Mesotrophic lakes have a TSIp score between 40 and 50.

Eutrophic lakes are nutrient rich and productive in the terms of aquatic plants and/or algae. Eutrophic Lakes have a TSIp score between 50 and 70. Lakes with a TSIp score of greater than 70 would be classified as Hypereutrophic.

Illustrations from the Wisconsin Department of Natural Resources

IEPA ASSESSMENT

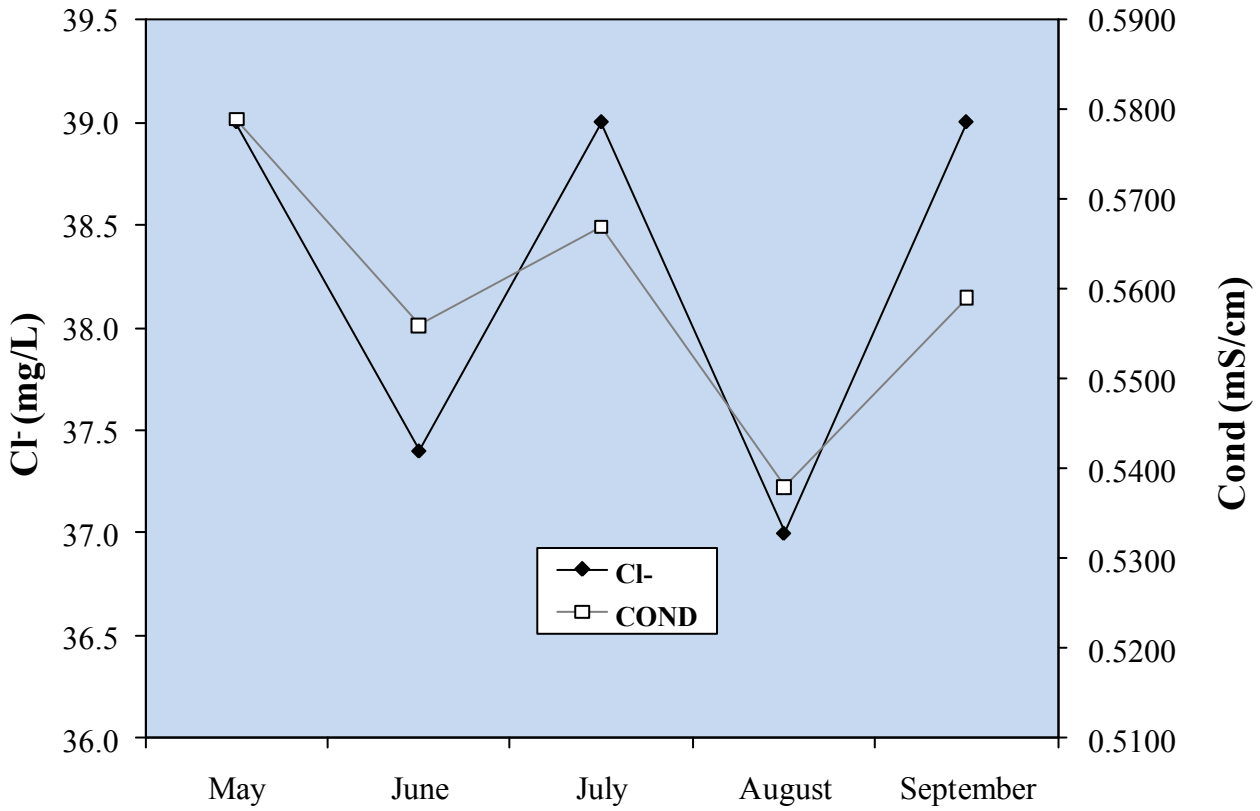
The Illinois Environmental Protection Agency (IEPA) has assessment indices to classify Illinois lakes for their ability to support aquatic life and recreational uses. The guidelines consider several aspects, such as water clarity, phosphorus concentrations (TSIp), and aquatic plant coverage. According to this index, Timber Lake provided *Full* support of aquatic life and *Full* support of recreational activities. The lake provided *Full* overall use.

CONDUCTIVITY/CHLORIDES

Conductivity is a measurement of water's ability to conduct electricity and is correlated with chloride (Cl^-) concentrations. Lakes with residential and urban land uses in their watershed often have higher conductivity readings and Cl^- concentrations because of the use of road salts, compared to lakes in undeveloped areas. Stormwater runoff from impervious surfaces such as roads and parking lots can deliver high concentrations of Cl^- to nearby waterbodies. The Lake County epilimnetic median conductivity reading was 0.7800 milliSiemens/cm (mS/cm). During 2010, the Timber Lake average epilimnetic conductivity reading was lower, at 0.5598 mS/cm. This was an 11% increase from the 2001 average (0.5027 mg/L) and a decrease from the 2006 average (0.5996 mS/cm).

The Cl^- concentration in Timber Lake was lower than the Lake County epilimnetic median of 142 mg/L during 2010, with an epilimnetic average of 38 mg/L and the hypolimnetic average of 45 mg/L was also lower than the County median of 111mg/L. Although there is no chloride data for the 2001 monitoring, the increased conductivity indicates an increase in chloride concentration.

The conductivity and Cl^- concentrations have decreased from the previous sampling which was likely due to a flushing of the lake. The last three years have had more rain causing some of the Cl^- ions to be diluted or washed out of the lake.



An illustration of the positive correlation between chloride concentration and conductivity

AQUATIC PLANTS - SUMMARY

Aquatic plants appear in many shapes and sizes. Some have leaves that float on the water surface, while others grow completely underwater. In moderation, aquatic plants are aesthetically pleasing and desirable environmentally. Their presence is natural and normal in lakes.

Using ArcGIS mapping software, the LCHD created a sampling grid consisting of 148 points each located 30 meters apart. This was also the same grid used during the 2006 sampling. In July 2010, 59 points were sampled with plants being found at 54 sites. The maximum depth rooted plants were found was 10.5 feet.

The most frequently encountered plant was Eurasian Watermilfoil (EWM) at 78% of the sampled sites. The next most common species was White Water Lily (71%). Sago Pondweed (49%), Coontail (42%), and American Pondweed (39%) followed in frequency. There were a total of 15 aquatic plant species and one macro-algae species. This is an increase in species diversity from 2006 when 12 species and one macro-algae were found. This is a decrease, however, from 2001 when 18 species and one macro-algae were found. EWM was first discovered in Timber Lake in 2001. At that time it was confined to a small area along the south west shoreline. By 2006 it was found at 52% of the sampling sites only to increase to 78% of the sites in 2010.

The decrease in plant diversity and the increased presence of EWM is a concern for Timber Lake. Steps should be taken to control further spread of EWM.

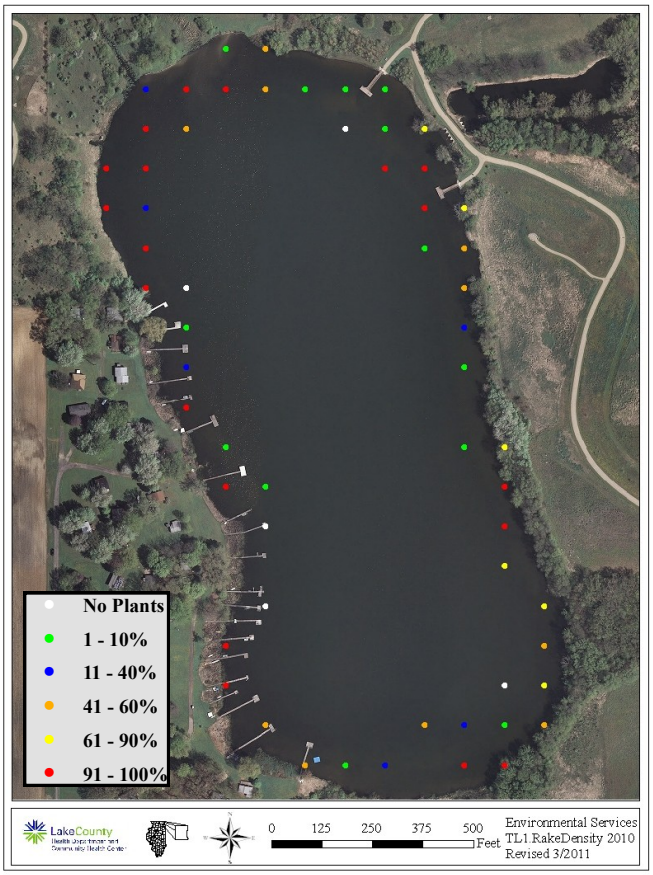
There were two exotic plants found in Timber Lake, EWM and Curlyleaf Pondweed. Exotic plants compete with native species eventually crowding them out, providing little or poor natural diversity. They also provide poor habitat for wildlife. Removal or control of exotic species is recommended.

To maintain a healthy sport fishery the Illinois Department of Natural Resources recommends plant coverage of 30%-40% across the bottom. It was calculated that Timber Lake had a plant coverage of 36% in 2010. It was also calculated that EWM covered 31% of the lake bottom of Timber Lake. Although Timber Lake falls into the desired plant coverage, EWM is not good habitat for fish.

The overall density of aquatic plants has also increased since 2006. When comparing the sites that had plants in 2006 with the sites that had plants in 2010, more sites had a density of greater than 40% in 2010. In 2006 approximately 50% of the sites has a density greater than 40% while in 2010 approximately 65% of the sites has a density greater than 40%.

Water clarity and depth are the major limiting factors in determining the maximum depth at which aquatic plants will grow in a specific lake. Aquatic plants will not photosynthesize in water depths with less than 1% of the available sunlight. During 2006, the 1% light level was available down to 14-16 feet deep throughout the summer. Even though the 1% light level was 14-16 feet, plants were only found down to 10.5 feet in July. This could be due to other factors limiting plant growth in Timber Lake such as substrate type and the rapid depth changes. Along the southern and eastern near shore areas the substrate consists of more sand than silt or muck and the plants were scattered closer to the shore. The morphometry of Timber Lake is such that the depth increases dramatically relatively close to the southern and western shores.

A floristic quality index (FQI) has been developed to rank lakes on there plant diversity and abundance. A high FQI number indicates that there was a large number of sensitive, high quality plant species present in the lake. Timber Lake had a FQI of 20.9 ranking it 35th among lakes in Lake County. This is similar to the 2006 value of 20.8 and a decrease from the 2001 value of 25.5. The decrease is likely due to the reduction in plant species and increased EWM.



Timber Lake Rake Density July, 2010.

NOTEWORTY OBSERVATIONS

Snapping Turtle from Timber Lake, Lake County, IL.

Each time the LCHD-ES visited East Loon Lake they recorded any wildlife encounterd.

Timber Lake is located in a rural setting with the shoreline mainly undeveloped. This provides excellent habitat for a variety of birds, mammals, and other wildlife. Good numbers of wildlife, particularly birds, were noted on and around Timber Lake. The Sandhill Crane, a threatened species in Illinois, was noted in 2001, 2006, and 2010.

Habitat around Timber Lake was good. The undeveloped areas had a mix of open fields and small woods. Deadfalls were located along the southern and eastern shorelines providing habitat for many species. The developed areas provided some habitat in the form of the buffer strips located between the lake and manicured lawns. Increasing the widths of the buffer strips would provide more habitats for wildlife and help reduce future inputs of nutrients and pollutants. Additional habitat was created by LCFPD as they converted the old campground and adjacent farm fields on the eastern shoreline to natural areas.

In July 2010, a small Snapping Turtle was observed making its way to the lake. This indicates that there is a reproducing population of Snapping Turtles located in Timber Lake.

In 2003, LCHD-ES with the Max McGraw Wildlife Foundation found the Iowa Darter, endangered in Illinois, during a non-game fish survey. The most common species collected were Brook Silverside, Bluegill, Bluntnose Minnow, and Largemouth Bass. Also found during the survey were Black Crappie, Green Sunfish, Johnny Darter, Yellow Perch, and Yellow Bass. Fishing is allowed at the fishing piers through the LCFPD Raven Woods access. Catch and release fishing is encouraged but not mandatory.

SANDHILL CRANE

Sandhill Crane in Middlefork Savanna, Lake County, IL.

Sandhill Cranes were seen on two different occasions around Redwing Slough. The Sandhill Crane was listed as threatened in Illinois until the list was updated in 2010. Under the Endangered Species Act, "threatened" is defined as "any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range". The Illinois Department of Natural Resources removed it from the threatened status because it is now considered to be recovered from endangerment or the threat of endangerment in Illinois.

The Sandhill Crane, *Grus canadensis*, is a large bird with a long neck and legs. The adult will generally be gray in appearance, but may be stained reddish. The top of the head is red and the cheeks will be white. Full grown birds will have a six to eight foot wingspan.

The morphology of Redwing Slough makes it ideal Sandhill Crane habitat. They breed on open marshes, bogs, wetlands, or meadows. They build a nest out of vegetation that will be out in the water. The Sandhill Crane feeds on grains, seeds, insects, invertebrates, and small vertebrates that they find in marshes or grain fields.

The Sandhill Crane does not breed until it is two to seven years old. Once a mate is found, they stay together year round and migrate south with their young. Sandhill Cranes can live up to 20 years.

Locally, the Sandhill Crane is often confused with the Great Blue Heron. Although they are similar in size, the Great Blue Heron is most often found on the shore of a lake or river. Also, the Great Blue Heron will nest in trees versus on the water. While in flight the Sandhill Crane will have it's neck fully extended while the Great Blue Heron will have it's neck tucked in tight to its body like other herons.

Raven Glen Forest Preserve

Raven Glen features gently rolling hills and woodlands, and allows for the restoration of prairie and savanna areas. The site also contains 33-acre Timber Lake and nine high quality wetlands. The site's largest wetlands are positioned along the northern edge of the property. Proper restoration of the wetlands will improve the overall water quality of Timber Lake and habitat for aquatic species.

The Preserve features two trail systems divided by Timber Lake. East of Timber Lake, a 2.1-mile multi-purpose trail system offers a gravel trail for hiking, bicycling and cross-country skiing, and a separate grass trail for horseback riding only. Where possible, the two trails remain separate, joining only briefly near trail intersections. Raven Glen also features a 0.4-mile woodland walk open to hikers only.

West of Timber Lake and accessible by the west trailhead entrance on Route 173 just west of Savage Road, a 2.12- mile shared trail is open for hiking, bicycling, horseback riding, and cross-country skiing. Trails east and west of Timber Lake do not connect.

In addition to these multi-use trails, Raven Glen also offers picnic tables, a water pump, two wheelchair-accessible fishing piers with benches, an overlook, a toilet and a horse trailer parking area.

Fishing is allowed at Timber Lake, but not at White Slough.

The main entrance and parking area is located on Route 45 south of Route 173 and north of Miller Road. A second entrance with parking and trail access is located on Route 173 just west of Route 45. Note: this trail section does not connect to the main Preserve.

The northern portion of the site was formerly a campground and contains Timber Lake, two smaller connected ponds, wetlands, and an oak-hickory grove. There are also several woodland areas near Timber Lake and interspersed throughout the wetland areas along the parcel's northern border.

The southern portion of the site was a dairy farm consisting mostly of rolling cropland, a farmstead and a stream. Prior to 1998, Raven Glen Farm was used for dairy operations and houses several buildings that were once considered state-of-the-art for dairy production during the 1950s and 1960s.

The Preserve was acquired in various stages with funds from voter-approved referenda. A $400,000 grant from the Illinois Department of Natural Resources was received for the development of the trails, parking area and fishing piers.

The most prominent natural features of Raven Glen are Timber Lake, which is a glacial lake, Hastings Creek, scattered wetlands and rolling terrain with oak and hickory groves.

With a sandy base, Timber Lake supports the population of rare Iowa darter fish. While the Forest Preserve owns 95 percent of Timber Lake, the northern portion of the lake is privately owned and not accessible for public use.

LakeCounty
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ENVIRONMENTAL SERVICES

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http://www.lakecountyil.gov/Health/want/BeachLakeInfo.htm

Protecting the quality of our lakes is an increasing concern of Lake County residents. Each lake is a valuable resource that must be properly managed if it is to be enjoyed by future generations. To assist with this endeavor, Population Health Environmental Services provides technical expertise essential to the management and protection of Lake County surface waters.

Environmental Service's goal is to monitor the quality of the county's surface water in order to:

- Maintain or improve water quality and alleviate nuisance conditions
- Promote healthy and safe lake conditions
- Protect and improve ecological diversity

Services provided are either of a technical or educational nature and are provided by a professional staff of scientists to government agencies (county, township and municipal), lake property owners' associations and private individuals on all bodies of water within Lake County.

MANAGEMENT RECOMMENDATIONS

The water quality of Timber Lake is good and has remained constant over the last 4 years. This is likely due to the small watershed with little development. The aquatic plant community has changed however. There was an increase in species diversity, but there was also an increase in Eurasian Watermilfoil.

Timber Lake is primarily managed by the Lake County Forest Preserve and is part of the Raven Glen Forest Preserve. To help improve and maintain the overall quality of Timber Lake, the Lake County Health Department-Environmental Services encourages the continued participation in the Volunteer Lake Monitoring Program and the following recommendations:

- **Educate lake users on how to control the spread of exotic species**
- **Develop an aquatic plant management plan that targets the removal of Eurasian Watermilfoil.**
- **Assess the fish population of Timber Lake.**
- **Mitigate shoreline exhibiting erosion.**

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Prevent the transport of nuisance species.
Clean all recreational equipment.
www.ProtectYourWaters.net

When you leave a body of water:

- Remove any visible mud, plants, fish or animals before transporting equipment.
- Eliminate water from equipment before transporting.
- Clean and dry anything that comes into contact with water (boats, trailers, equipment, clothing, dogs, etc.).
- Never release plants, fish or animals into a body of water unless they came out of that body of water.

Water quality sampling sites on Timber Lake (N), 2010

Water quality data for Timber Lake (N) 2006, and 2010.

2010	Epilimnion															
DATE	DEPTH	ALK	TKN	NH_3-N	NO_2+NO_3-N	TP	SRP	Cl^-	TDS	TSS	TS	TVS	SECCHI	COND	pH	DO
19-May	3	215	0.85	<0.1	<0.05	0.026	<0.005	39	NA	2.3	386	109	8.79	0.5790	8.47	11.11
16-Jun	3	211	0.78	<0.1	<0.05	0.022	<0.005	37	NA	2.6	360	124	8.25	0.5560	8.36	7.49
21-Jul	3	212	0.78	<0.1	<0.05	0.019	<0.005	39	NA	1.8	342	114	10.70	0.5670	8.36	6.49
18-Aug	3	199	0.88	<0.1	<0.05	0.020	<0.005	37	NA	3.3	337	114	5.43	0.5380	8.44	8.36
21-Sep	3	206	0.77	<0.1	<0.05	0.018	<0.005	39	NA	2.3	336	107	3.70	0.5590	7.99	6.75
	Average	209	0.81	<0.1	<0.05	0.021	<0.005	38	NA	2.5	352	114	7.37	0.5598	8.32	8.04

2006	Epilimnion															
DATE	DEPTH	ALK	TKN	NH_3-N	NO_2+NO_3-N	TP	SRP	Cl^-	TDS	TSS	TS	TVS	SECCHI	COND	pH	DO
10-May	3	210	1.20	<0.1	0.177	0.027	<0.005	41	NA	4.5	395	124	4.46	0.6130	NA	12.80
14-Jun	3	191	0.98	<0.1	<0.05	0.012	<0.005	42	NA	1.7	293	140	12.53	0.5870	8.16	9.80
12-Jul	3	192	1.01	<0.1	<0.05	0.015	<0.005	43	NA	1.6	393	136	12.10	0.5930	7.77	7.58
9-Aug	3	192	1.02	<0.1	<0.05	0.016	<0.005	45	NA	2.5	389	129	8.86	0.6030	8.54	8.55
13-Sep	3	195	0.92	<0.1	<0.05	0.020	<0.005	45	NA	1.8	370	118	13.81	0.6020	8.15	6.80
	Average	196	1.03	<0.1	0.177[k]	0.018	<0.005	43	NA	2.4	368	129	10.35	0.5996	8.16[a]	9.11

Glossary

ALK = Alkalinity, mg/L $CaCO_3$
TKN = Total Kjeldahl nitrogen, mg/L
NH_3-N = Ammonia nitrogen, mg/L
NO_2+NO_3-N = Nitrate + Nitrite nitrogen, mg/L
NO_3-N = Nitrate nitrogen, mg/L
TP = Total phosphorus, mg/L
SRP = Soluble reactive phosphorus, mg/L
Cl^- = Chloride, mg/L
TDS = Total dissolved solids, mg/L
TSS = Total suspended solids, mg/L
TS = Total solids, mg/L
TVS = Total volatile solids, mg/L
SECCHI = Secchi disk depth, ft.
COND = Conductivity, milliSiemens/cm
DO = Dissolved oxygen, mg/L

a = Does not include May due to bad pH probe
k = Denotes that the actual value is known to be less than the value presented.
NA= Not applicable
* = Prior to 2006 only Nitrate - nitrogen was analyzed

Water quality data for Timber Lake (N) 2003, 2006, and 2010. Continued.

2010	Hypolimnion															
DATE	DEPTH	ALK	TKN	NH_3-N	NO_2+NO_3-N	TP	SRP	Cl^-	TDS	TSS	TS	TVS	SECCHI	COND	pH	DO
19-May	31	282	3.42	2.710	<0.05	0.264	0.193	46	NA	4.5	450	126	NA	0.7140	7.27	0.16
16-Jun	32	283	3.87	3.040	<0.05	0.336	0.275	45	NA	4.5	442	176	NA	0.6990	7.22	0.29
21-Jul	30	299	4.4	3.840	<0.05	0.538	0.455	45	NA	4.4	417	124	NA	0.7120	7.24	0.22
18-Aug	31	295	4.98	4.070	<0.05	0.506	0.479	44	NA	5.4	435	131	NA	0.7175	7.16	0.17
21-Sep	30	301	5.33	4.590	<0.05	0.617	0.558	45	NA	3.6	440	147	NA	0.7140	6.97	0.49
	Average	292	4.40	3.650	<0.05	0.452	0.392	45	NA	4.5	437	141	NA	0.7113	7.17	0.27

2006	Hypolimnion															
DATE	DEPTH	ALK	TKN	NH_3-N	NO_2+NO_3-N	TP	SRP	Cl^-	TDS	TSS	TS	TVS	SECCHI	COND	pH	DO
10-May	31	216	2.01	1.010	0.550	0.081	0.060	38	NA	2.3	369	114	NA	0.6215	NA	0.27
14-Jun	30	239	3.48	2.490	<0.05	0.190	0.139	41	NA	4.0	412	139	NA	0.6290	7.53	0.09
12-Jul	30	253	4.12	3.000	<0.05	0.143	0.090	41	NA	4.5	393	121	NA	0.6410	7.24	0.21
9-Aug	30	265	5.38	4.010	<0.05	0.259	0.182	42	NA	4.8	396	123	NA	0.6610	7.27	0.11
13-Sep	30	263	4.74	1.770	<0.05	0.186	0.126	41	NA	4.8	400	128	NA	0.6760	7.24	0.14
	Average	247	3.95	2.456	0.550[k]	0.172	0.119	41	NA	4.1	394	125	NA	0.6457	7.32[a]	0.16

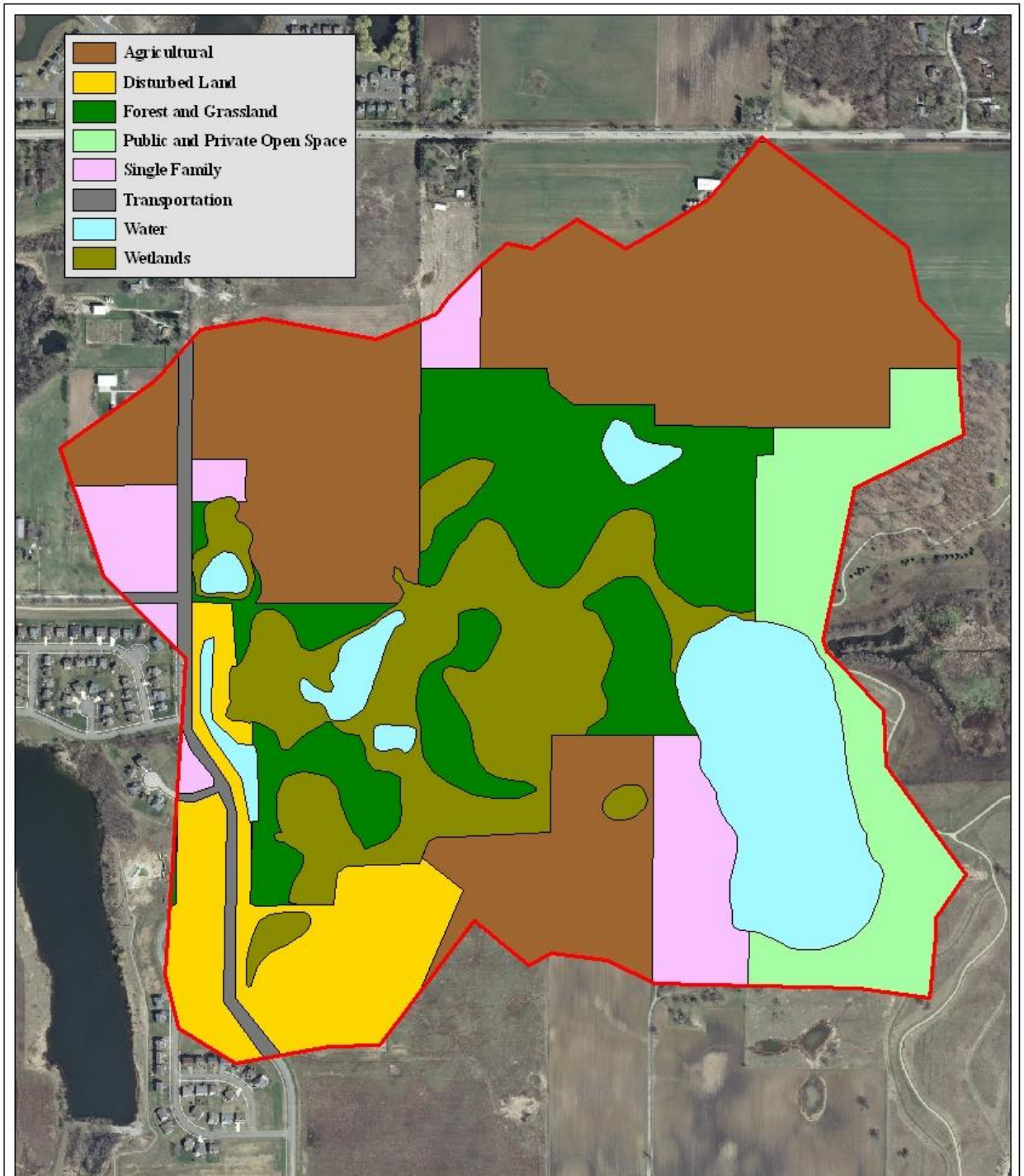
Glossary

ALK = Alkalinity, mg/L $CaCO_3$
TKN = Total Kjeldahl nitrogen, mg/L
NH_3-N = Ammonia nitrogen, mg/L
NO_2+NO_3-N = Nitrate + Nitrite nitrogen, mg/L
NO_3-N = Nitrate nitrogen, mg/L
TP = Total phosphorus, mg/L
SRP = Soluble reactive phosphorus, mg/L
Cl^- = Chloride, mg/L
TDS = Total dissolved solids, mg/L
TSS = Total suspended solids, mg/L
TS = Total solids, mg/L
TVS = Total volatile solids, mg/L
SECCHI = Secchi disk depth, ft.
COND = Conductivity, milliSiemens/cm
DO = Dissolved oxygen, mg/L

a = Does not include May due to bad pH probe
k = Denotes that the actual value is known to be less than the value presented.
NA= Not applicable
* = Prior to 2006 only Nitrate - nitrogen was analyzed

Approximate watershed delineation for Timber Lake (N), 2010

Approximate land use within the Timber Lake (N) watershed, 2010


Agricultural
Disturbed Land
Forest and Grassland
Public and Private Open Space
Single Family
Transportation
Water
Wetlands

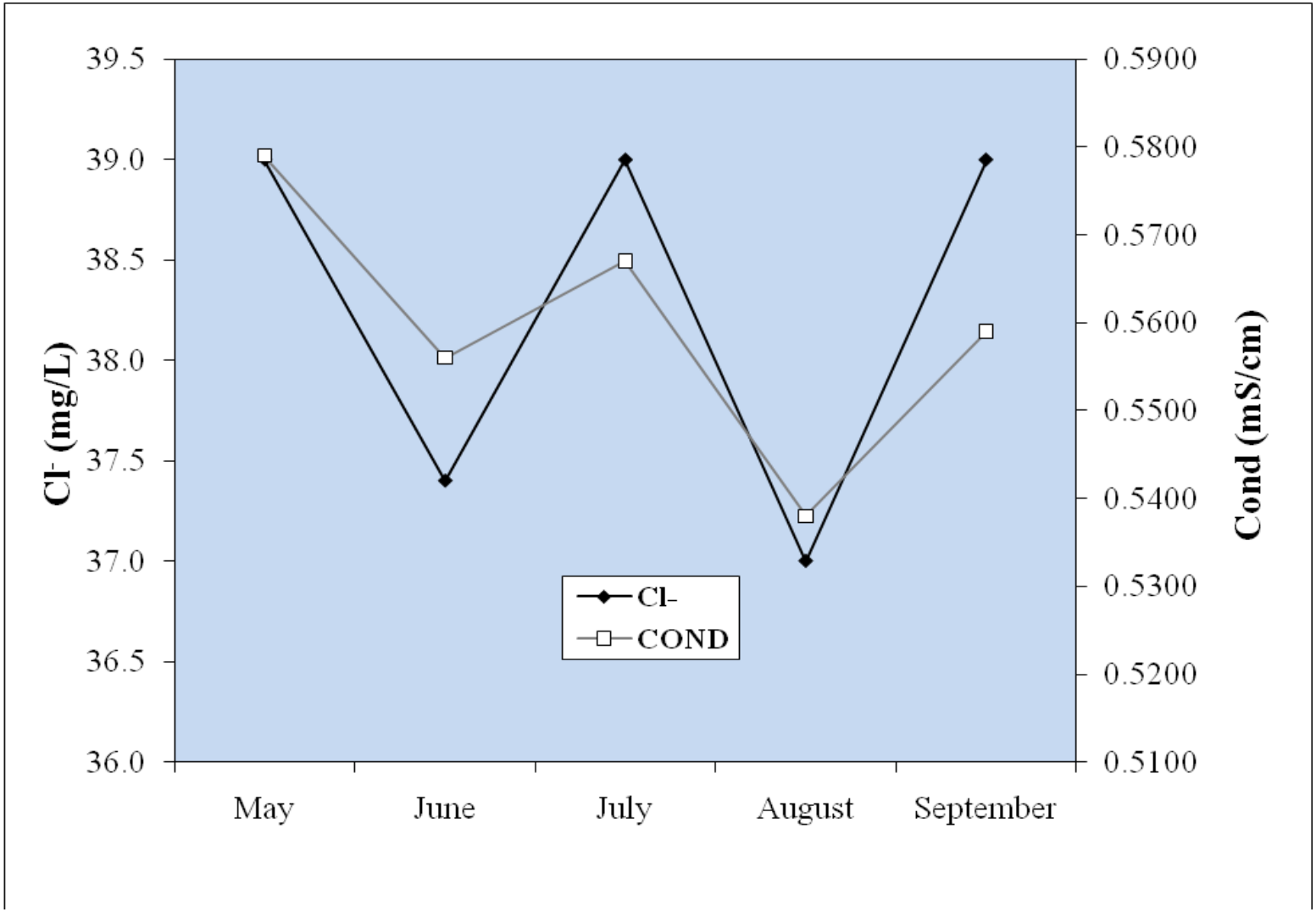
Approximate land uses and retention time for Timber Lake (N), 2010

Land Use	Acreage	% of Total
Agricultural	136.57	33.1%
Disturbed Land	36.52	8.9%
Forest and Grassland	65.76	16.0%
Public and Private Open Space	37.03	9.0%
Single Family	27.29	6.6%
Transportation	7.26	1.8%
Water	42.40	10.3%
Wetlands	59.24	14.4%
Total Acres	**412.07**	**100.0%**

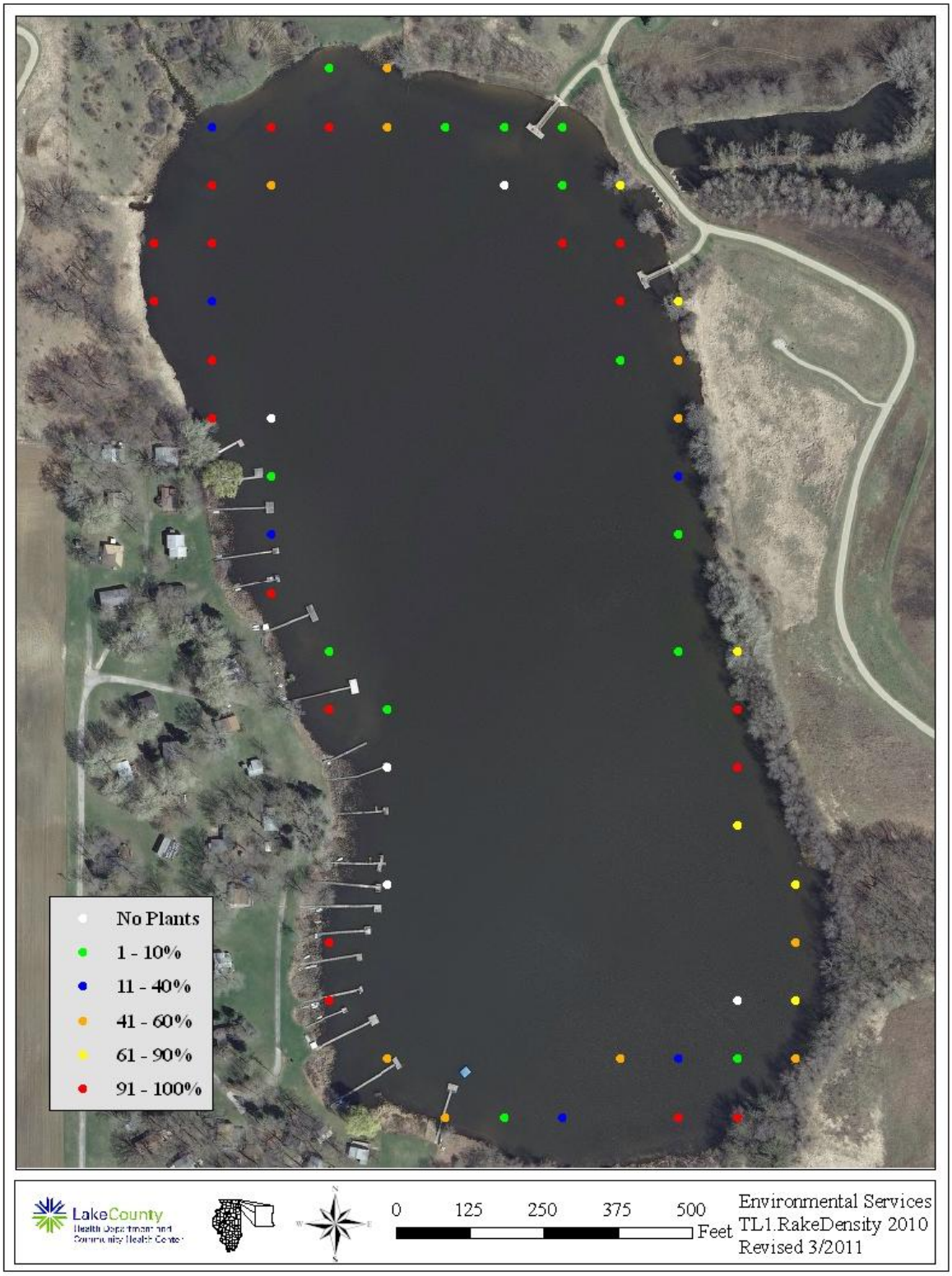
Land Use	Acreage	Runoff Coeff.	Estimated Runoff, acft.	% Total of Estimated Runoff
Agricultural	136.57	0.05	18.8	19.6%
Disturbed Land	36.52	0.05	5.0	5.2%
Forest and Grassland	65.76	0.05	9.0	9.4%
Public and Private Open Space	37.03	0.15	15.3	16.0%
Single Family	27.29	0.30	22.5	23.5%
Transportation	7.26	0.85	17.0	17.7%
Water	42.40	0.00	0.0	0.0%
Wetlands	59.24	0.05	8.1	8.5%
TOTAL	**412.07**		**95.7**	**100.0%**

Lake volume	**547.09**	**acre-feet**
Retention Time (years)= lake volume/runoff	**5.71**	**years**
	2085.58	**days**

Chloride (Cl^-) concentration vs. conductivity for Timber Lake (N), 2010



Aquatic plant sampling grid that illustrates plant density on Timber Lake, July 2010.



Aquatic plant species found at the 148 sampling sites on Timber Lake (N), July 2010
Maximum depth that plants were found was 10.5 feet

Plant Density	American Pondweed	Common Bladderwort	Chara	Coontail	Curlyleaf Pondweed	Duckweed	Eurasian Watermilfoil	Flatstem Pondweed
Absent	36	48	54	34	50	50	13	55
Present	17	3	1	12	9	6	15	2
Common	4	6	1	3	0	3	13	2
Abundant	2	2	1	3	0	0	7	0
Dominant	0	0	2	7	0	0	11	0
% Plant Occurrence	39.0%	18.6%	8.5%	42.4%	15.3%	15.3%	78.0%	6.8%

Plant Density	Floatingleaf Pondweed	Illinois Pondweed	Sago Pondweed	Slender Naiad	Spatterdock	Spiny Naiad	Vallisneria	White Water Lily
Absent	58	50	30	58	52	56	52	17
Present	1	6	17	1	2	1	5	16
Common	0	3	9	0	3	2	2	10
Abundant	0	0	3	0	2	0	0	13
Dominant	0	0	0	0	0	0	0	3
% Plant Occurrence	1.7%	15.3%	49.2%	1.7%	11.9%	5.1%	11.9%	71.2%

Distribution of rake density across all sampling points

Rake Density (Coverage)	# of Sites	%
No plants	5	8.5
>0 to 10%	13	22.0
>10 to 40%	6	10.2
>40 to 60%	10	16.9
>60 to 90%	6	10.2
>90%	19	32.2
Total Sites with Plants	54	91.5
Total # of Sites	59	100.0

Lake County average Floristic Quality Index (FQI) ranking 2000-2010.

RANK	LAKE NAME	FQI (w/A)	FQI (native)
1	Cedar Lake	38.0	40.0
2	Cranberry Lake	34.4	34.4
3	West Loon Lake	34.3	35.7
4	East Loon Lake	33.6	35.0
5	Little Silver	31.6	29.6
6	Deep Lake	31.2	29.7
7	Round Lake Marsh North	29.9	29.1
8	Bangs Lake	29.8	32.0
9	Sullivan Lake	28.5	26.9
10	Independence Grove	27.5	24.6
11	Lake Zurich	27.1	24.3
12	Sterling Lake	26.9	24.5
13	Sun Lake	26.1	24.3
14	Round Lake	25.9	23.5
15	Druce Lake	25.2	22.8
16	Honey Lake	25.1	23.3
17	Schreiber Lake	24.8	23.9
18	Fourth Lake	24.8	23.0
19	Lake of the Hollow	24.8	23.0
20	Lakewood Marsh	24.7	23.8
21	Redwing Slough	24.0	25.8
22	Deer Lake	23.5	24.4
23	Butler Lake	23.1	21.4
24	Third Lake	23	24.7
25	Duck Lake	22.9	21.1
26	Countryside Glen Lake	22.8	21.9
27	Cross Lake	22.4	24.2
28	McGreal Lake	22.1	20.2
29	Wooster Lake	21.9	23.6
30	Davis Lake	21.4	21.4
31	Broberg Marsh	21.4	20.5
32	Fish Lake	21.2	19.3
33	Redhead Lake	21.2	19.3
34	Turner Lake	21.2	18.6
35	Timber Lake (North)	20.9	23.4
36	Lake Kathryn	20.7	19.6
37	ADID 203	20.5	20.5
38	Lake Miltmore	20.3	18.4
39	Salem Lake	20.2	18.5
40	Gray's Lake	19.8	16.9
41	Old Oak Lake	19.1	18.0
42	Highland Lake	18.9	16.7
43	Forest Lake	18.0	19.0
44	Lake Helen	18.0	18.0
45	Potomac Lake	17.8	17.8
46	Bresen Lake	17.8	16.6
47	Hendrick Lake	17.7	17.7
48	Lake Barrington	17.7	16.7
49	Windward Lake	17.6	16.3
50	Diamond Lake	17.4	16.3
51	Owens Lake	17.3	16.3
52	Osprey Lake	17.3	15.5
53	Long Lake	17.2	19.0
54	Lake Tranquility (S1)	17.0	15.0

Lake County average Floristic Quality Index (FQI) ranking 2000-2010.

Rank	LAKE NAME	FQI (w/A)	FQI (native)
55	McDonald Lake 1	16.7	17.7
56	Island Lake	16.6	14.7
57	Lake Fairview	16.3	15.2
58	Grand Avenue Marsh	16.3	14.3
59	Lake Nippersink	16.3	14.3
60	Taylor Lake	16.3	14.3
61	White Lake	16.0	17.0
62	Dog Training Pond	15.9	14.7
63	Dog Bone Lake	15.7	15.7
64	Seven Acre Lake	15.5	17.0
65	Ames Pit	15.5	13.4
66	Heron Pond	15.1	15.1
67	Dugdale Lake	15.1	14.0
68	Eagle Lake (S1)	15.1	14.0
69	Mary Lee Lake	15.1	13.1
70	Old School Lake	15.1	13.1
71	Hastings Lake	15.0	17.0
72	North Churchill Lake	15.0	15.0
73	Bishop Lake	15.0	13.4
74	Sand Lake	14.8	12.5
75	Countryside Lake	14.7	14.7
76	Timber Lake (South)	14.7	12.7
77	Buffalo Creek Reservoir	14.3	13.1
78	Lake Carina	14.3	12.1
79	Lake Leo	14.3	12.1
80	Lambs Farm Lake	14.3	12.1
81	Crooked Lake	14.0	16.0
82	Longview Meadow Lake	13.9	13.9
83	Dunn's Lake	13.9	12.7
84	Summerhill Estates Lake	13.9	12.7
85	Lake Napa Suwe	13.9	11.7
86	Lake Minear	13.9	11.0
87	Stockholm Lake	13.5	12.1
88	Antioch Lake	13.4	11.3
89	Hook Lake	13.4	11.3
90	Lake Charles	13.4	11.3
91	Rivershire Pond 2	13.3	11.5
92	Flint Lake	13.0	11.8
93	Harvey Lake	13.0	11.8
94	McDonald Lake 2	12.5	12.5
95	Stone Quarry Lake	12.5	12.5
96	Lake Naomi	12.5	11.2
97	Pulaski Pond	12.5	11.2
98	Pond-A-Rudy	12.1	12.1
99	Loch Lomond	12.1	9.4
100	Grassy Lake	12.0	12.0
101	Lake Matthews	12.0	12.0
102	Nielsen Pond	12.0	10.7
103	Werhane Lake	12.0	9.8
104	Lake Lakeland Estates	11.5	10.0
105	Redwing Marsh	11.0	11.0
106	Tower Lake	11.0	11.0
107	West Meadow Lake	11.0	11.0
108	Big Bear Lake	11.0	9.5
109	Little Bear Lake	11.0	9.5
110	Fischer Lake	11.0	9.0
111	Grandwood Park Lake	11.0	9.0
112	Lake Holloway	10.6	10.6

Lake County average Floristic Quality Index (FQI) ranking 2000-2010.

Rank	LAKE NAME	FQI (w/A)	FQI (native)
113	Lake Fairfield	10.4	9.0
114	Lake Louise	10.4	9.0
115	College Trail Lake	10.0	10.0
116	Gages Lake	10.0	5.8
117	Valley Lake	9.9	9.9
118	Woodland Lake	9.9	8.1
119	Lake Christa	9.8	8.5
120	Lake Farmington	9.8	8.5
121	Lucy Lake	9.8	8.5
122	Columbus Park Lake	9.2	9.2
123	Sylvan Lake	9.2	9.2
124	Waterford Lake	9.2	9.2
125	Banana Pond	9.2	7.5
126	Leisure Lake	9.0	6.4
127	Albert Lake	8.7	7.5
128	Fairfield Marsh	8.7	7.5
129	Lake Eleanor	8.7	7.5
130	Ozaukee Lake	8.7	6.7
131	East Meadow Lake	8.5	8.5
132	South Churchill Lake	8.5	8.5
133	Lake Forest Pond	8.5	6.9
134	Peterson Pond	8.5	6.0
135	Bittersweet Golf Course #13	8.1	8.1
136	Lake Linden	8.0	8.0
137	Patski Pond	7.1	7.1
138	Rasmussen Lake	7.1	7.1
139	Slocum Lake	7.1	5.8
140	IMC Lake	7.1	5.0
141	Lucky Lake	7.0	7.0
142	Deer Lake Meadow Lake	6.4	5.2
143	ADID 127	5.0	5.0
144	Liberty Lake	5.0	5.0
145	Oak Hills Lake	5.0	5.0
146	Slough Lake	5.0	5.0
147	Sand Pond (IDNR)	5.0	3.5
148	Half Day Pit	5.0	2.9
149	Lochanora Lake	5.0	2.5
150	Echo Lake	0.0	0.0
151	Hidden Lake	0.0	0.0
152	North Tower Lake	0.0	0.0
153	St. Mary's Lake	0.0	0.0
154	Willow Lake	0.0	0.0
	Mean	**15.3**	**14.4**
	Median	**14.3**	**12.9**

Lake County average TSI phosphorus (TSIp) ranking 2000-2010.

RANK	LAKE NAME	TP AVE	TSIp
1	Lake Carina	0.0100	37.35
2	Sterling Lake	0.0100	37.35
3	Indpendence Grove	0.0130	41.14
4	Lake Zurich	0.0135	41.68
5	West Loon Lake	0.0140	42.21
6	Cedar Lake	0.0150	43.20
7	Windward Lake	0.0160	44.13
8	Sand Pond (IDNR)	0.0165	44.57
9	Fourth Lake	0.0180	45.83
10	Pulaski Pond	0.0180	45.83
11	Banana Pond	0.0200	47.35
12	Lake Kathryn	0.0200	47.35
13	Lake Minear	0.0200	47.35
14	Highland Lake	0.0202	47.49
15	Timber Lake (North)	0.0210	48.05
16	Cross Lake	0.0220	48.72
17	Dog Training Pond	0.0220	48.72
18	Sun Lake	0.0220	48.72
19	Deep Lake	0.0230	49.36
20	Lake of the Hollow	0.0230	49.36
21	Round Lake	0.0230	49.36
22	Stone Quarry Lake	0.0230	49.36
23	Druce Lake	0.0240	49.98
24	Bangs Lake	0.0250	50.57
25	Little Silver Lake	0.0250	50.57
26	Lake Leo	0.0260	51.13
27	Dugdale Lake	0.0270	51.68
28	Peterson Pond	0.0270	51.68
29	Lake Miltmore	0.0280	52.20
30	Gray's Lake	0.0300	53.20
31	Lake Fairfield	0.0300	53.20
32	Lake Catherine	0.0310	53.67
33	Lambs Farm Lake	0.0310	53.67
34	Old School Lake	0.0310	53.67
35	Sand Lake	0.0320	54.13
36	Third Lake	0.0320	54.13
37	Gages Lake	0.0340	55.00
38	Hendrick Lake	0.0340	55.00
39	Honey Lake	0.0340	55.00
40	Cranberry Lake	0.0360	55.82
41	Diamond Lake	0.0370	56.22
42	Sullivan Lake	0.0370	56.22
43	Channel Lake	0.0380	56.60
44	Ames Pit	0.0390	56.98
45	Schreiber Lake	0.0400	57.34
46	Waterford Lake	0.0400	57.34

Lake County average TSI phosphorus (TSIp) ranking 2000-2010.

RANK	LAKE NAME	TP AVE	TSIp
47	Hook Lake	0.0410	57.70
48	Duck Lake	0.0430	58.39
49	Nielsen Pond	0.0450	59.04
50	Seven Acre Lake	0.0460	59.36
51	Turner Lake	0.0460	59.36
52	Willow Lake	0.0460	59.36
53	East Meadow Lake	0.0480	59.97
54	Lucky Lake	0.0480	59.97
55	Old Oak Lake	0.0490	60.27
56	College Trail Lake	0.0500	60.56
57	East Loon Lake	0.0520	61.13
58	Hastings Lake	0.0520	61.13
59	Lake Lakeland Estates	0.0520	61.13
60	Butler Lake	0.0530	61.40
61	West Meadow Lake	0.0530	61.40
62	Little Bear Lake	0.0550	61.94
63	Lucy Lake	0.0550	61.94
64	Lake Linden	0.0570	62.45
65	Lake Napa Suwe	0.0570	62.45
66	Lake Charles	0.0580	62.70
67	Lake Christa	0.0580	62.70
68	Owens Lake	0.0580	62.70
69	Lake Naomi	0.0620	63.66
70	Lake Tranquility (S1)	0.0620	63.66
71	Liberty Lake	0.0630	63.89
72	Werhane Lake	0.0630	63.89
73	Countryside Glen Lake	0.0640	64.12
74	Davis Lake	0.0650	64.34
75	Lake Fairview	0.0650	64.34
76	Leisure Lake	0.0650	64.34
77	Wooster Lake	0.0650	64.34
78	Tower Lake	0.0660	64.56
79	St. Mary's Lake	0.0670	64.78
80	Mary Lee Lake	0.0680	65.00
81	Crooked Lake	0.0700	65.41
82	Lake Helen	0.0720	65.82
83	ADID 203	0.0730	66.02
84	Bluff Lake	0.0730	66.02
85	Spring Lake	0.0730	66.02
86	Harvey Lake	0.0770	66.79
87	Broberg Marsh	0.0780	66.97
88	Sylvan Lake	0.0790	67.16
89	Big Bear Lake	0.0810	67.52
90	Redwing Slough	0.0822	67.73
91	Petite Lake	0.0830	67.87
92	Lake Marie	0.0850	68.21

Lake County average TSI phosphorus (TSIp) ranking 2000-2010.

RANK	LAKE NAME	TP AVE	TSIp
93	Potomac Lake	0.0850	68.21
94	Timber Lake (South)	0.0850	68.21
95	White Lake	0.0862	68.42
96	Grand Ave Marsh	0.0870	68.55
97	North Churchill Lake	0.0870	68.55
98	Grandwood Park Lake	0.0880	68.71
99	McDonald Lake 1	0.0880	68.71
100	North Tower Lake	0.0880	68.71
101	Rivershire Pond 2	0.0900	69.04
102	South Churchill Lake	0.0900	69.04
103	McGreal Lake	0.0910	69.20
104	Deer Lake	0.0940	69.66
105	Dunn's Lake	0.0950	69.82
106	Eagle Lake (S1)	0.0950	69.82
107	International Mine and Chemical Lake	0.0950	69.82
108	Valley Lake	0.0950	69.82
109	Countryside Lake	0.0960	69.97
110	Fish Lake	0.0960	69.97
111	Lochanora Lake	0.0960	69.97
112	Long Lake	0.0970	70.12
113	Island Lake	0.0990	70.41
114	Woodland Lake	0.0990	70.41
115	Nippersink Lake	0.1000	70.56
116	Forest Lake	0.1020	70.84
117	Longview Meadow Lake	0.1020	70.84
118	Lake Barrington	0.1050	71.26
119	Lake Forest Pond	0.1070	71.53
120	Bittersweet Golf Course #13	0.1100	71.93
121	Fox Lake	0.1100	71.93
122	Osprey Lake	0.1110	72.06
123	Bresen Lake	0.1130	72.32
124	Round Lake Marsh North	0.1130	72.32
125	Deer Lake Meadow Lake	0.1160	72.70
126	Taylor Lake	0.1180	72.94
127	Columbus Park Lake	0.1230	73.54
128	Lake Nipperink	0.1240	73.66
129	Echo Lake	0.1250	73.77
130	Grass Lake	0.1290	74.23
131	Lake Holloway	0.1320	74.56
132	Redhead Lake	0.1410	75.51
133	Antioch Lake	0.1450	75.91
134	Slocum Lake	0.1500	76.40
135	Lakewood Marsh	0.1510	76.50
136	Pond-A-Rudy	0.1510	76.50
137	Lake Matthews	0.1520	76.59
138	Buffalo Creek Reservoir	0.1550	76.88

Lake County average TSI phosphorus (TSIp) ranking 2000-2010.

RANK	LAKE NAME	TP AVE	TSIp
139	Pistakee Lake	0.1590	77.24
140	Grassy Lake	0.1610	77.42
141	Salem Lake	0.1650	77.78
142	Half Day Pit	0.1690	78.12
143	Lake Eleanor	0.1810	79.11
144	Lake Farmington	0.1850	79.43
145	Lake Louise	0.1850	79.43
146	ADID 127	0.1890	79.74
147	Patski Pond	0.1970	80.33
148	Dog Bone Lake	0.1990	80.48
149	Summerhill Estates Lake	0.1990	80.48
150	Redwing Marsh	0.2070	81.05
151	Stockholm Lake	0.2082	81.13
152	Bishop Lake	0.2160	81.66
153	Ozaukee Lake	0.2200	81.93
154	Hidden Lake	0.2240	82.19
155	McDonald Lake 2	0.2250	82.25
156	Fischer Lake	0.2280	82.44
157	Oak Hills Lake	0.2790	85.35
158	Loch Lomond	0.2950	86.16
159	Heron Pond	0.2990	86.35
160	Fairfield Marsh	0.3260	87.60
161	ADID 182	0.3280	87.69
162	Slough Lake	0.3860	90.03
163	Flint Lake Outlet	0.5000	93.76
164	Rasmussen Lake	0.5030	93.85
165	Albert Lake, Site II, outflow	1.1894	106.26

2000 - 2010 Water Quality Parameters, Statistics Summary

	ALKoxic <=3ft00-2010	
Average	**165**	
Median	**160**	
Minimum	**65**	**IMC**
Maximum	**330**	**Flint Lake**
STD	**42**	
n =	**812**	

	ALKanoxic 2000-2010	
Average	**201**	
Median	**192**	
Minimum	**103**	**Heron Pond**
Maximum	**470**	**Lake Marie**
STD	**52**	
n =	**249**	

	Condoxic <=3ft00-2010	
Average	**0.8629**	
Median	**0.7800**	
Minimum	**0.2260**	**Schreiber Lake**
Maximum	**6.8920**	**IMC**
STD	**0.5215**	
n =	**812**	

	Condanoxic 2000-2010	
Average	**1.0125**	
Median	**0.8678**	
Minimum	**0.3210**	**Lake Kathyrn, Schreiber Lake**
Maximum	**7.4080**	**IMC**
STD	**0.7821**	
n =	**248**	

	NO3-N, Nitrate+Nitrite,oxic <=3ft00-2010	
Average	**0.489**	
Median	**0.160**	
Minimum	**<0.05**	***ND**
Maximum	**9.670**	**South Churchill Lake**
STD	**1.054**	
n =	**812**	

*ND = Many lakes had non-detects (74.5%)
Only compare lakes with detectable concentrations to the statistics above
Beginning in 2006, Nitrate+Nitrite was measured.

	NH3-Nanoxic 2000-2010	
Average	**2.132**	
Median	**1.360**	
Minimum	**<0.1**	***ND**
Maximum	**18.400**	**Taylor Lake**
STD	**2.345**	
n =	**249**	

*ND = 20.1% Non-detects from 32 different lakes

	pHoxic <=3ft00-2010	
Average	**8.37**	
Median	**8.36**	
Minimum	**7.07**	**Bittersweet #13**
Maximum	**10.40**	**Summerhill Estates**
STD	**0.46**	
n =	**810**	

	pHanoxic 2000-2010	
Average	**7.33**	
Median	**7.30**	
Minimum	**6.24**	**Banana Pond**
Maximum	**9.16**	**White Lake**
STD	**0.43**	
n =	**248**	

	All Secchi 2000-2010	
Average	**4.33**	
Median	**2.95**	
Minimum	**0.25**	**McDonald Lake 2/Ozaukee Lake**
Maximum	**23.50**	**West Loon Lake**
STD	**3.66**	
n =	**758**	

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2000 - 2010 Water Quality Parameters, Statistics Summary (continued)

	TKNoxic <=3ft00-2010	
Average	**1.399**	
Median	**1.180**	
Minimum	**<0.1**	***ND**
Maximum	**10.300**	**Fairfield Marsh**
STD	**0.819**	
n =	**812**	

*ND = 3.8% Non-detects from 15 different lakes

	TKNanoxic 2000-2010	
Average	**2.866**	
Median	**2.130**	
Minimum	**<0.5**	***ND**
Maximum	**21.000**	**Taylor Lake**
STD	**2.302**	
n =	**249**	

*ND = 3.2% Non-detects from 4 different lakes

	TPoxic <=3ft00-2010	
Average	**0.099**	
Median	**0.065**	
Minimum	**<0.01**	***ND**
Maximum	**3.880**	**Albert Lake**
STD	**0.169**	
n =	**812**	

*ND = 2.2% Non-detects from 7 different lakes

	TPanoxic 2000-2010	
Average	**0.305**	
Median	**0.174**	
Minimum	**0.012**	**Independence Grove**
Maximum	**3.800**	**Taylor Lake**
STD	**0.394**	
n =	**249**	

	TSSall <=3ft00-2010	
Average	**15.6**	
Median	**8.1**	
Minimum	**<0.1**	***ND**
Maximum	**165.0**	**Fairfield Marsh**
STD	**20.8**	
n =	**812**	

*ND = 1.7% Non-detects from 10 different lakes

	TVSoxic <=3ft00-2010	
Average	**127.6**	
Median	**123.0**	
Minimum	**34.0**	**Pulaski Pond**
Maximum	**298.0**	**Fairfield Marsh**
STD	**39.7**	
n =	**767**	

No 2002 IEPA Chain Lakes

	TDSoxic <=3ft00-2004	
Average	**470**	
Median	**454**	
Minimum	**150**	**Lake Kathryn, White**
Maximum	**1340**	**IMC**
STD	**169**	
n =	**745**	

No 2002 IEPA Chain Lakes.

	CLanoxic <=3ft00-2010	
Average	**193**	
Median	**111**	
Minimum	**3.5**	**Schreiber Lake**
Maximum	**2390**	**IMC**
STD	**324**	
n =	**162**	

	CLoxic <=3ft00-2010	
Average	**181**	
Median	**142**	
Minimum	**2.7**	**Schreiber Lake**
Maximum	**2760**	**IMC**
STD	**220**	
n =	**552**	

Anoxic conditions are defined <=1 mg/l D.O.
pH Units are equal to the -Log of [H] ion activity
Conductivity units are in MilliSiemens/cm
Secchi Disk depth units are in feet
All others are in mg/L

Minimums and maximums are based on data from all lakes from 2000-2010 (n=1357).

Average, median and STD are based on data from the most recent water quality sampling year for each lake.

LCHD Environmental Services ~ 01/20/2011

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