LAKE COUNTY, ILLINOIS

2013 ISLAND LAKE SUMMARY REPORT

PREPARED BY THE ENVIRONMENTAL SERVICES

LAKE COUNTY HEALTH DEPARTMENT

POPULATION HEALTH ENVIRONMENTAL SERVICES

Island Lake

Island Lake is located partially in Lake County and partially in McHenry County. The lake originated as a gravel pit and was damned in the early 1930's. The lake is dominated by a residential shoreline and is managed by the Village of Island Lake.

Mutton Creek enters the Island Lake from the north and the water exits the lake over a spillway on the southwest end where it flows through a marsh area before entering the Fox River.

Island Lake has a surface area of 84.8 acres with a mean and maximum depths of 5.3 feet and 9.8 feet respectively. It is used by residents for swimming, fishing, boating, and aesthetics, with many beaches around the perimeter of the lake. Gas motors up to 10 hp are permitted on the lake and a boat launch is located on East Way Park. Water quality parameters, such as nutrients, suspended solids, oxygen, temperature, water clarity were measured from May-September 2013. The plant community was assessed in July when most of the plants are likely to be present.

In general the water quality in Island Lake is poor. Total phosphorus in Island Lake averaged 0.121 mg/L which is a 22% increase

ENVIRONMENTAL SERVICES WATER QUALITY SPECIALISTS

Gerard Urbanozo
gurbanozo@lakecountyil.gov

Kelly Deem
kdeem@lakecountyil.gov

Kathy Paap
kpaap@lakecountyil.gov

INSIDE THIS ISSUE:

Lake Facts:

Major Watershed: Fox River

Sub-Watershed: Mutton Creek.

Location: T 44N, R 9, S 20, 21

Surface Area: 84.80 acres

Shoreline Length: 4.92 miles

Maximum Depth: 9.8 ft

Average Depth: 5.3 ft

Lake Volume: 433.30 acres

Watershed Area: 6172.7 acres

Lake Type: Impoundment

Management Entity: Village of Island Lake

Current Uses: Swimming fishing, boating, and sailing

Access: Private

from the 2003 concentration of 0.099 mg/L and significantly higher than the Illinois Environmental Protection Agency impairment rate of 0.050 mg/L.

Nitrogen is the other nutrient critical for algal growth. The average Total Kjeldahl nitrogen (TKN) concentration for Island was 2.35 mg/L, which was higher than the county median of 1.170 mg/L and slightly lower than the 2003 concentration (2.100 mg/L). A total nitrogen to total phosphorus (TN:TP) ratio of 20:1 indicates that phosphorus was the nutrient limiting aquatic plant and algae growth in Island Lake. By using phosphorous as an indicator, the trophic state index (TSIp) ranked Island Lake as hypereuthrophic with a TSIp value of 73.3. This means that the lake has excessive nutrients which can result in excessive algae growth. The 2013 average total suspended solids (TSS) concentration for Island Lake was 13.3 mg/L, which was higher than the county median and a 10.7% decrease from the 2003 average of 14.9 mg/L.

Water clarity was measured by Secchi depth, with the lowest reading in August (0.91 ft) and the highest was in June (4.05 ft). The average Secchi depth for the season was 2.32 ft, which was shallower than the county median (2.95 ft). The conductivity of Island Lake was 0.6798 mS/cm which is higher than the county median (0.7875 mS/cm). This was a 19% decrease from the 2003 average (0.8376 mS/cm). The chloride concentration in Island Lake in 2013 was 85 mg/L which was lower than the county median of 145 mg/L.

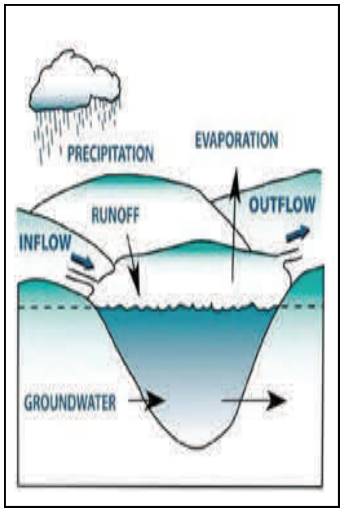
Island Lake does not have a diverse and healthy plant community, Chara and Duckweed were the only aquatic plant species observed covering 26% of the lake. Chara is an algae.

A large carp population is likely maintaining the high turbidity, that prevents plant growth. Reducing the carp population would lead to an increase in water clarity and aquatic plant density.

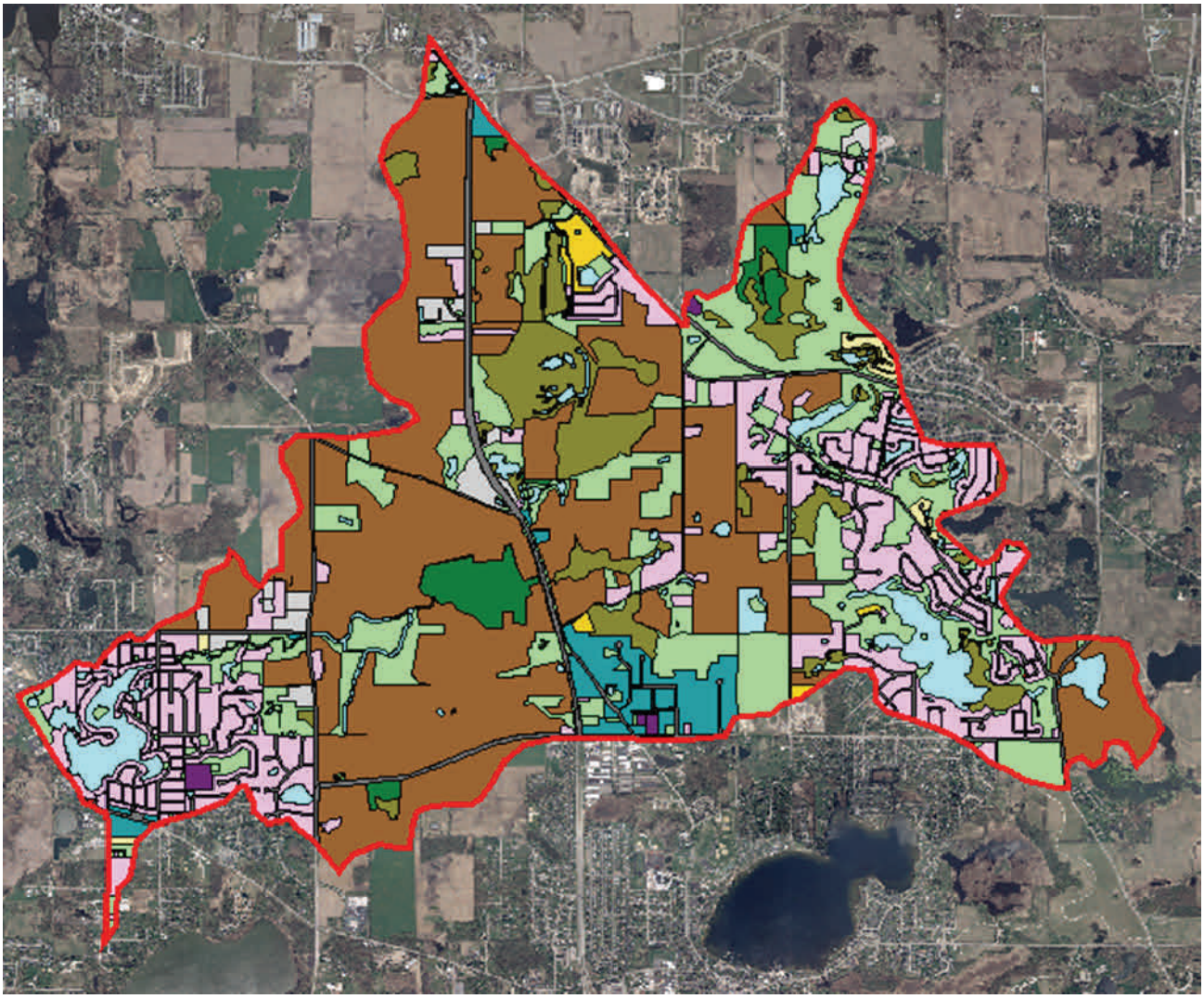
The shoreline around Island Lake is made up mostly of armored seawall. Vertical seawalls reflect wave energy rather than absorbing it like a riprap or natural shoreline. This action increases turbidity and may make it difficult for aquatic plants to establish.

ISLAND LAKE WATERSHED

The lake is located in the Mutton Creek sub basin, within the Fox River watershed. A watershed is a drainage basin where water from rain or snow melt drains into a body of water, such as a river, lake, reservoir, wetland or storm drain. This watershed covers 6172.7 acres of which 1070 acres are residential areas. The source of a lakes water supply is very important in determining its water quality and choosing management practices to protect the lake. Island Lake receives water from Mutton Creek from the north side. Mutton Creek watershed includes Drummond Lake, Napa Suwe, Monahan Lake, Golden Oaks Farm Lake, Lake Betty and Woodland Lake. The watershed to lake surface area ratio of 73:1 is extremely large and which contributes to a higher nutrient and sediment load. The retention time, the time it takes for water entering a lake to flow out again was calculated to be approximately 26.05 days. The two major sources of runoff for Island Lake were agriculture (37.1%), public and private open space (19.4%), and single family (15.8%). The impervious surfaces (parking lots, roads, buildings, compacted soil) do not allow rain to infiltrate into the ground. Land management practices of the large amount of residential area in the water shed impacts the lake. The developed area in the Island Lake watershed is 47.1%. Controlling water that runs from the land's surface into the lake is important for drainage lakes.



Island Lake Watershed



- Water
- Disturbed Land
- Transportation
- Agricultural
- Government and Institutional
- Wetlands
- Utility and Waste Facilities
- Single Family
- Office
- Retail/Commercial
- Industrial
- Multi Family
- Forest and Grassland
- Public and Private Open Space

ISLAND LAKE WATERSHED

The Mutton Creek watershed drains into Island lake through Mutton Creek . It also receives water from several storm drains around the lake. A majority of the watershed is located on the north east side of which a majority is agricultural, open space, and residential. The water flows out of Island Lake and into Mutton Creek over a spillway. The creek flows through a wetland and into the Fox River. Island Lake has a retention time of 49.39 days.

WATER QUALITY

Turbid waters become warmer as suspended particles absorb heat from sunlight, causing oxygen levels to fall. (Warm water holds less oxygen than cooler water.) Photosynthesis decreases with lesser light, resulting in even lower oxygen levels.

VOLUNTEER LAKE MONITOR PROGRAM

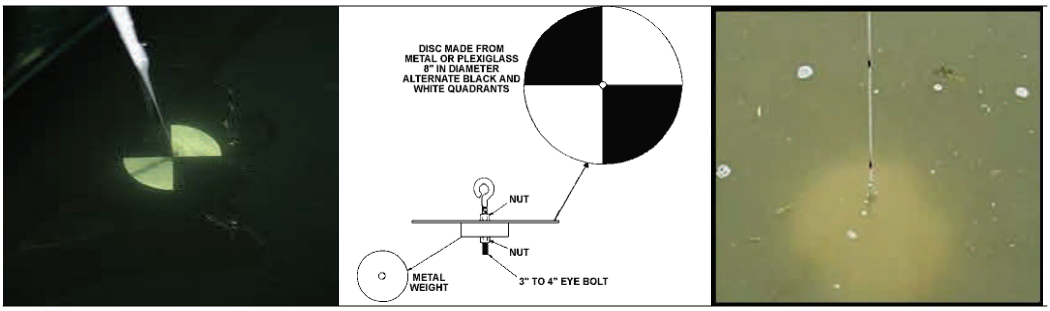
Volunteers measure water clarity using the Secchi disk twice a month May through October. In 2013 there were **42 lakes** participating in Lake County.

If you would like more information please contact:

Kelly Deem
(847) 377-8009
kdeem@lakecountyil.gov

www.epa.state.il.us/water/vlmp/index.html

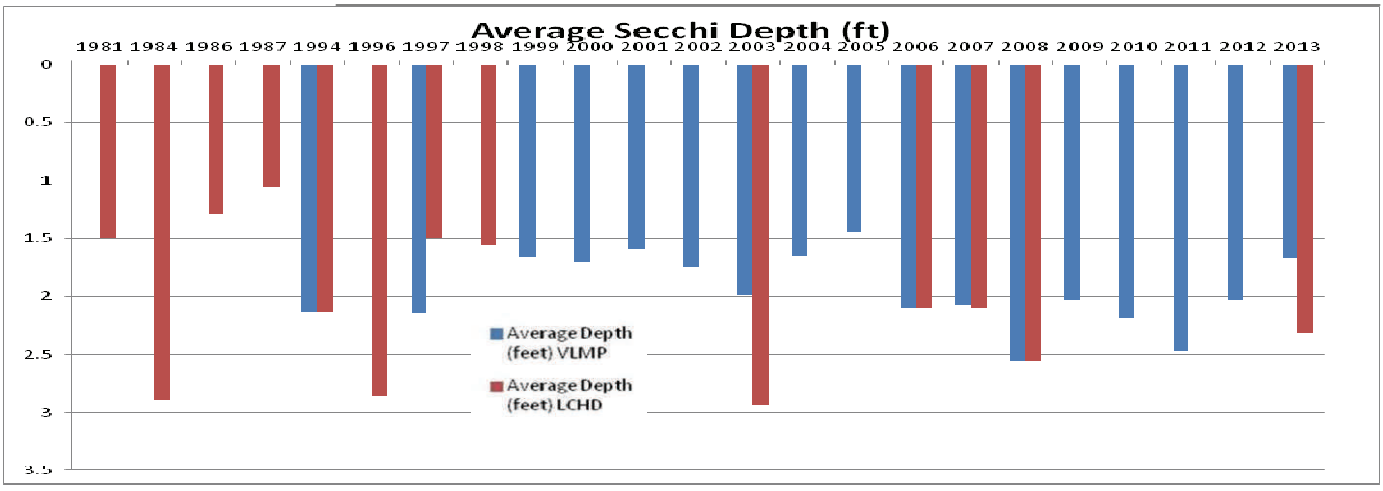
Water clarity is an indicator of water quality related to chemical and physical properties. Measurements taken with a Sechhi disk indicate the light penetration into a body of water. Algae, microscopic animals, water color, eroded soil, and resuspension of bottom sediment are factors that interfere with light penetration and reduce water transparency. If light penetration is reduced significantly, macrophyte growth may be decreased which would in turn impact the organisms dependent upon them for food and cover. The 2013 average clarity for Island Lake was 2.32 feet; this was a 20% increase in the lakes transparency since 2003 (2.90 feet) and the water clarity was below the county median of 3.00 feet. The average Secchi depth for Island Lake did not change substantially since 2003 and has averaged 1.95 feet since 1981.



VLMP —WATER QUALITY

Additional water clarity measurements were taken in Island Lake through participation in the Illinois Environmental Protection Agency's (IEPA) Volunteer Lake Monitoring Program (VLMP). Island Lake has participated in the program since 1981. Participation in the VLMP program has provided Island Lake with annual baseline data that can be used to determine long term water quality trends and support current lake management decision making. The shallowest average VLMP reading was in 1987 and the deepest was in 2003 at 1.05 feet and 2.93 feet respectively. The volunteers on Island Lake have provided data that is vital for the management of this lake. The LCHD-ES would like to thank them for their efforts and recommend continued involvement in the future.

SECCHI DISK AVERAGES FROM VLMP AND LCHD RECORDS FOR ISLAND LAKE



TOTAL SUSPENDED SOLIDS

Another measure of water clarity is turbidity, which is caused by particles of matter rather than the dissolved organic compounds. Suspended particles dissipate light, which may limit the depthplants can grow. The total suspended solid (TSS) parameter (turbidity) is composed of nonvolatile suspended compounds (NVSS), non-organic clay or sediment materials, and volatile suspended solids (TVS) (algae and other organic matter).

Seasonal Secchi readings changes are affected by algal growth. The absence of algae in early spring usually provides deeper clarity but as the water warms clarity decreases with more algae present in the water. The 2013 TSS concentrations in Island Lake averaged 13.3 mg/L which was above the county median of 8.6 mg/L and 10.7% lower than the 2003 average concentration of 14.9 mg/L. The calculated nonvolatile suspended solids (NVSS) was 10.42 mg/L. This means that the majority of the TSS concentration in 2013 can be contributed to sediment particles. This means that the increase in turbidity could be caused by sediments that become suspended in the water column.

Island Lake's high TSS values are typical of lakes that have low clarity (Secchi disk depth), high phosphorus levels and experience an increase occurrence of algae blooms. The Secchi depths in 2013 were at its shallowest in August (0.91 feet) and the deepest was in June (4.05 feet). The June reading corresponded with the lowest TSS concentration (4.8 mg/L). The August NVSS was 17.21 mg/l, which means that 75% of the suspended solids in the water is made up of sediments.

There were no significant changes in the water level that would contribute to the sediments during the summer of 2013. Island Lake's high NVSS can be attributed to the lack of aquatic plants and high carp population.

TSS
Total Suspended Solids

TSS are particles of algae or sediment suspended in the water column.

TVS
Total Volatile Solids

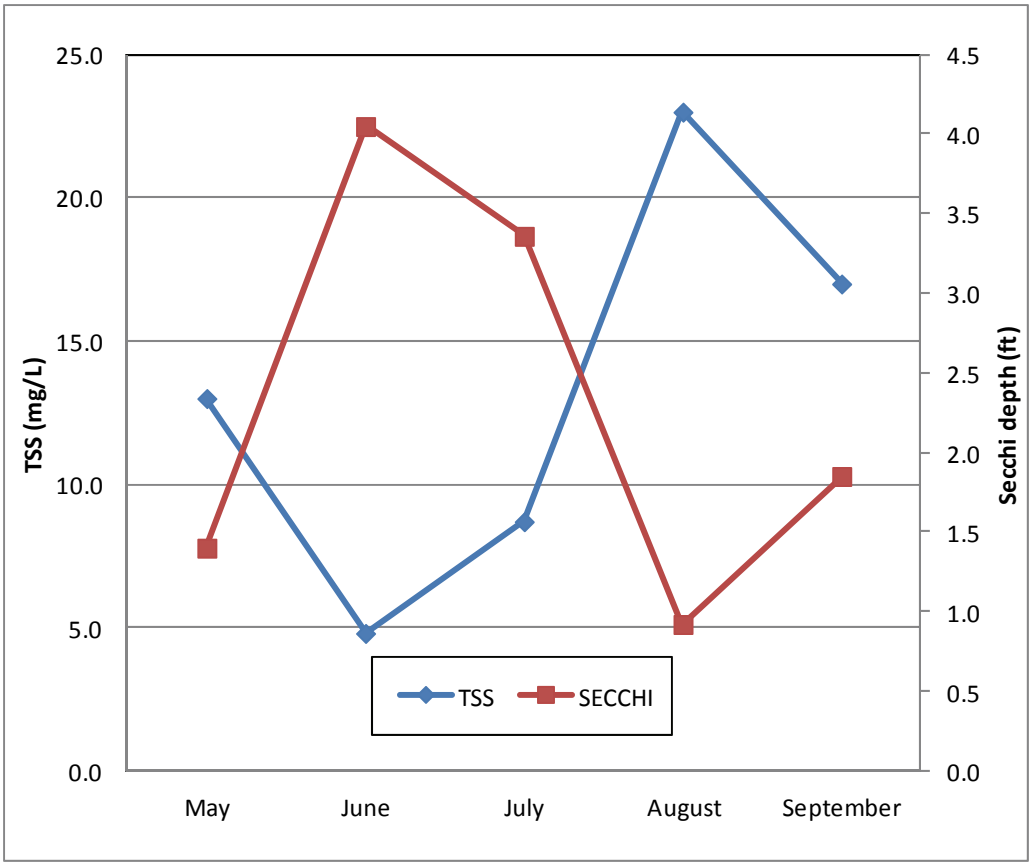
TVS represents the fraction of total solids that are organic in nature, such as algae cells

NVSS
Non-Volatile Suspended Solids

NVSS represents the non-organic clay and sediments that are suspended in the water column.

TDS
Total Dissolved Solids

TDS are the amount of dissolved substance such as salts or minerals in the water after evaporation.



DATE (2013)	TSS	SECCHI
May	13.0	1.40
June	4.8	4.05
July	8.7	3.36
August	23.0	0.92
September	17	1.85

WHAT HAS BEEN DONE TO REDUCE PHOSPHORUS LEVELS IN ISLAND LAKE

July 2010- The State of Illinois passed a law to reduce the amount of phosphorus content in dishwashing and laundry detergents.

July 2010- The State of Illinois passed another law restricting the use of lawn fertilizers containing phosphorus by

Storm drains lead to the nearest lake, river, pond or wetland. They do not go to a treatment plant.

Salts dissolve and move downhill or into the nearest storm drain with storm-water and snowmelt runoff to the nearest lake, river or pond. They do not settle out; they remain in the water cycle virtually forever.

NUTRIENTS

Organisms need nutrients to live or grow are typically taken in from the environment. In a lake the primary nutrients needed for aquatic plant and algal growth are phosphorus and nitrogen. In most lakes, including Island Lake, phosphorus is the limiting nutrient, which means everything that plants and algae need to grow is available in excess: sunlight, warm temperature, and nitrogen.

Phosphorus has a direct effect on the amount of plant and algal growth in lakes. The 2013 average total phosphorus epilimnion (near surface sample) concentration in Island Lake was 0.121 mg/L, this was an 22% increase from the 2003 concentration (0.099 mg/L). Lakes with concentrations exceeding 0.05 mg/L can support high densities of algae and aquatic plants, which can reduce water clarity and dissolved oxygen levels and are considered impaired by the IEPA.

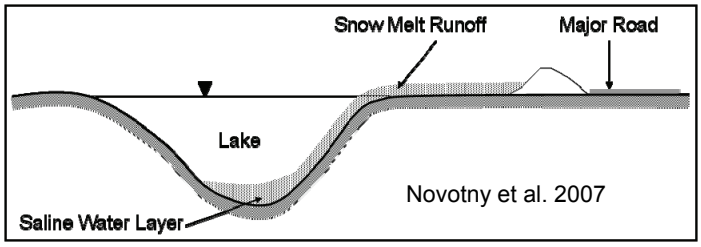
Phosphorus originates from a variety of sources, many of which are related to human activities which include: human and animal waste, soil erosion, detergents, septic systems, common carp, and runoff from farmland and lawns.

Nitrogen is the other nutrient critical for algal growth. Total Kjeldahl nitrogen is a measure of organic nitrogen, and is typically bound up in algal and plant cells. The average 2013 TKN for Island Lake was 2.35 mg/L, a 12% increase from the 2003 concentration (2.10mg/L). If inorganic nitrogen concentrations exceed 0.3 mg/L in spring, sufficient nitrogen is available to support summer algae blooms. However, low nitrogen levels do not guarantee less algae blooms.

CONDUCTIVITY AND CHLORIDE

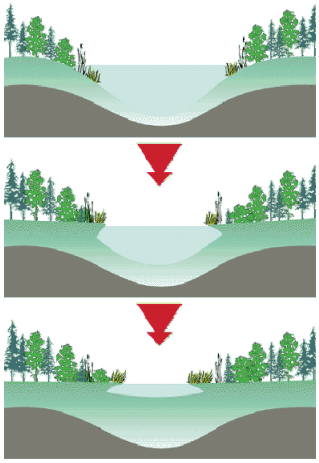
Conductivity is a measure of a waters ability to conduct electricity, measured by the water's ionic activity and content. The higher the concentration of (dissolved) ions the higher the conductivity becomes.

Conductivity readings, which are influenced by chloride concentrations, have been increasing throughout the past decade in Lake County. Lakes with residential and/or urban land uses in their watershed often have higher conductivity readings and higher Cl^- concentrations because of the use of road salts. Storm water run-off from impervious surfaces such as roads and parking lots can deliver high concentrations of Cl^- to nearby water bodies. Road salt used in the winter road maintenance consists of the following ions: sodium chloride, calcium chloride, potassium chloride, magnesium chloride, or ferrocyanides which are detected when chlorides are analyzed. The 2013 average conductivity for Island Lake 0.6798 mS/cm. This parameter was below the county median of 0.7875 mS/cm and which is a 19% decrease from the 2003 value of 0.8376 mS/cm. These values are influenced by the winter road maintenance of Route 176, Route 12 and the surrounding residential areas. The United States Environmental Protection Agency has determined that chloride concentrations higher than 230 mg/L can disrupt aquatic systems and prolonged exposure can harm 10% of aquatic species. Island Lake's Cl- was 85 mg/L. Chlorides tend to accumulate within a watershed as these ions do not break down and are not utilized by plants or animals. High chloride concentrations may make it difficult for many of our native species to survive. However, many of our invasive species, such as Eurasian watermilfoil, Cattail and Common Reed, are tolerant to high chloride concentrations.

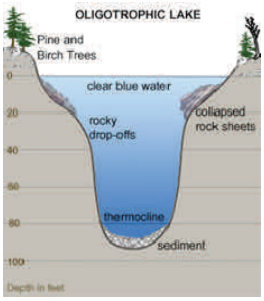


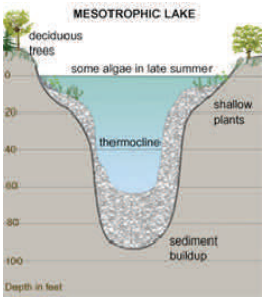
TROPHIC STATE INDEX

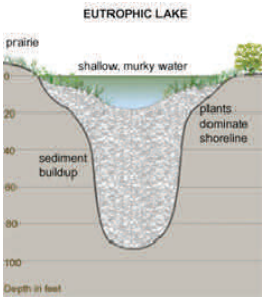
Another way to look at phosphorus levels and how they affect lake productivity is to use a Trophic State Index (TSI) based on phosphorus (TSIp). TSIp values are commonly used to classify and compare lake productivity levels (trophic state). A lakes response to additional phosphorus is an accelerated rate of eutrophication. Eutrophication is a natural process where lakes become increasingly enriched with nutrients. Lakes start out with clear water and few aquatic plants and over time become more enriched with nutrients and vegetation until the lake becomes a wetland. This process takes thousands of years to take place. However, human activities on a lake or in the watershed accelerate this process by resulting in rapid soil erosion and heavy phosphorus inputs. This accelerated aging process on a lake is refered to as cultural eutrophication. The TSIp index classifies the lake into one of four categories: oligotrophic (nutrient-poor, biologically unproductive), mesotrophic (intermediate nutrient availability and biological productivity), and eutrophic (nutrient rich, highly productive), or hypereutrophic (extremely nutrient-rich, productive). In 2013, Island Lake was hypereutrophic with a TSIp Value of 73.30, placing it 129th out of 175 lakes in the county. Lake Carina was 1stwith a TSIP Value at 37.35.



"When human activities accelerate lake eutrophication, it is referred to as cultural eutrophication. Cultural eutrophication may result from shoreline erosion, agricultural and urban runoff, wastewater discharges or septic seepage, and other non-point source pollution sources."







Source: RMB Environmental

LAKE LEVEL

The water level was taken at a specific point at the dam. The water level was obtained by measuring down to the water surface. The lake level was at its lowest in September when the lake surface water was measured at 39.00" which is 11.04" lower than the May level. The lake water level continued to drop from May to September but maintained a summer pool level around 33". Island Lake has a large watershed that covers 6132 acres, which helps replenish water lost through evaporation during the summer. It is recommended that a staff gauge be installed in the future and readings be taken weekly or bi-weekly if possible. This will give lake managers a much better idea of lake level fluctuations relative to rainfall events and can aid in future decisions regarding lake level. Staff gauge is a great tool for measuring water level in lakes, rivers, reservoirs. The data collected can be compiled to help understand the natural fluctuations of the lake. Large fluctuations in lake level can lead to shoreline erosion.

2013	Level (in)	Seasonal Change	Monthly change (in)
May	27.96		
June	31.92	3.96	-3.96
July	33.12	5.16	-1.20
August	33.00	5.04	+0.12
September	39.00	11.04	-6.00

PERMANENT STAFF GAGE AT THIRD LAKE

SWIMMING BEACH MONITORING

South Shore Beach

Island Lake

All licensed inland beaches are tested bi-weekly from May to September by the Lake County Health Department's Environment Services Department. The water samples are tested for E. coli bacteria, which are found in the intestines of humans and almost all warm-blooded animals. While not all strains of E. coli are the same, certain strains can make humans sick if ingested in high enough concentrations. The presence of E. coli in swimming areas means that other disease causing bacteria maybe present as well. If water samples come back high for E. coli (>235 E. coli/100 ml), LCHD informs the management body for the bathing beach that the beach is closed and a sign is posted indicating the beach closure. There are multiple reasons for high E. coli counts. Sewage runoffs from septic fields, storm drains, fecal contamination from waterfowl, dogs and cats, surface run-off from poorly drained areas adjacent to the beach, and high concentrations from nearby creeks. During the summer of 2013, South Shore, Park Drive, and Briar Court exceeded the maximum allowable limit for E. coli. On multiple occasions. During the summer, poor water circulation and waterfowl in the swimming area may contribute to the high bacterial counts. Island Lake has a resident goose population. The presence of geese can contribute to the nutrients in the lake. Methods should be taken to control and discourage the geese congregating around the lake. It is recommend that signs "Do Not Feed Waterfowl" be installed.

HOW TO PREVENT ILLNESS AND BEACH CLOSURE

- Don't swim when you have diarrhea. If you are sick, do NOT swim. You can spread germs in the water.
- Take a shower prior to entering the beach area.
- Children who are not toilet trained should wear tight fitting rubber or plastic pants.
- Pick up garbage around the beach area.
- Avoid swimming during algae blooms.
- Do not ingest the water while swimming.
- Keep pets, ducks and geese out of the beach area.
- Identify sources of pollution (ex: failing septic systems, stagnant standing water near the beaches, creeks and storm drains).

PROTECT YOUR WATERS

- Remove all plants, mud, fish, or animals before transporting equipment.
- Eliminate all water from equipment before transporting equipment.
- Dry anything that comes in contact with water (boat, trailers, equipment, clothing, etc.).
- Remove all mud and dirt since it might contain aquatic hitchhikers.
- Never release plants, fish or animals into a body of water unless they came out of that body of water.
- Do not release bait into the waters you are fishing.
- Do not release aquarium fish or aquatic pets in to the lake.

Blue-green Algae

Algae are important to the freshwater ecosystems, and most species of algae are not harmful. Algae blooms are often caused by blue-green algae, or "cyanobacteria", which are similar to bacteria in structure but utilize photosynthesis to grow. They have no nucleus and lack the photosynthetic pigments found in algae. They usually are too small to be seen individually, but can form visible colonies that can cover large areas of lakes. Certain species of blue-green algae can produce toxins that could pose a health risk to people and animals when they are exposed to them in large enough quantities.

Island Lake has poor water clarity, high phosphorus concentrations, and seasonal algal bloom. Algal blooms may be kept under control by reducing nutrients and sediments entering the lake from the watershed. Blooms can last for an extended period of time, which prevents sunlight from reaching underwater plants and algae that are important to the ecosystem.

The water can appear blue-green, bright green, brown, or red and may look like paint floating on the water. Not all blue-green algae produce harmful toxins. The three types of cyanobacteria that are often associated with Harmful Algal Bloom (HAB) are the Anabaena, Aphanizomenon, and Microcystis. The presence of these cyanobacteria does not generally mean that the toxins are present in the water. The presence of toxins can only be verified through a sample analyzed in the lab. Poisoning has caused the death of cows, dogs, and other animals. Most human cases occurred when people swim or ski in affected recreational water bodies during a bloom.

If you suspect that you are experiencing symptoms related to exposure to blue-green algae such as stomach cramps, diarrhea, vomiting, headache, fever, muscle weakness, or difficulty breathing contact your doctor or the poison control center. For more information or to report a blue-green algae bloom, contact the Lake County Health Department Environmental Services (847) 377-8030.

For More Information On Blue-green algae:
www.epa.state.il.us/water/surface-water/blue-green-algae.html

To report blue-green algae bloom:
Lake County Health Department
847-377-8030

Anabaena Sp.

Microcystis Sp.

Aphanizomenon Sp.

Floristic Quality index

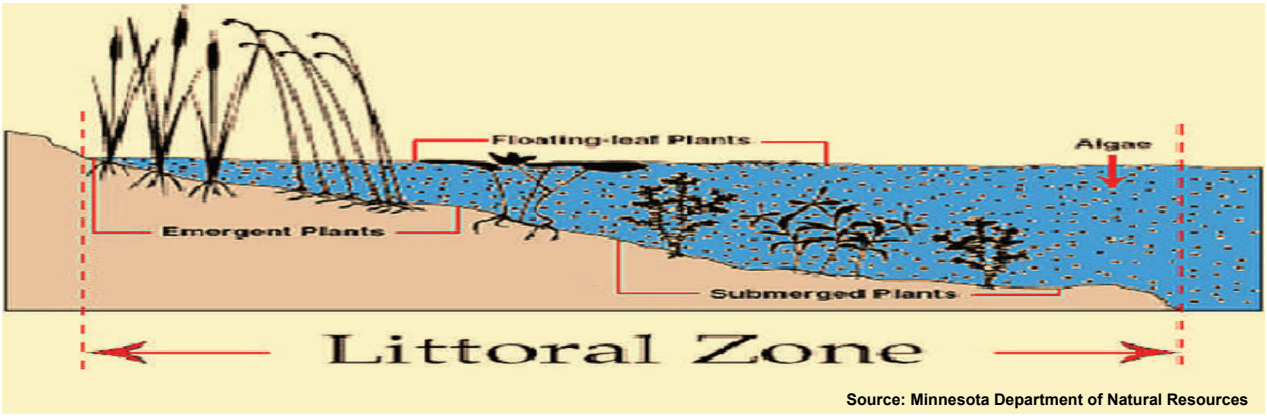
Lake county Average FQI = 13.8

Island Lake FQI = 5.0

Rank = 146 /162

Aquatic Plants Species Observed = 1

Floristic quality index (FQI; Swink and Wilhelm 1994) is an assessment tool designed to evaluate the closeness that the flora of an area is to that of undisturbed conditions. It can be used to: 1) identify natural areas, 2) compare the quality of different sites or different locations within a single site, 3) monitor long-term floristic trends, and 4) monitor habitat restoration efforts. Each aquatic plant in a lake is assigned a number between 1 and 10 (10 indicating the plant species most sensitive to disturbance). This is done for every floating and submersed plant species found in the lake. These numbers are averaged and multiplied by the square root of the number of species present to calculate an FQI. A high FQI number indicates that there are a large number of sensitive, high quality plant species present in the lake. Non-native species were counted in the FQI calculations for Lake County lakes. In 2013, Island had an FQI of 5 ranking 146 out of 162 in Lake County. The median FQI of lakes that we have studied from 2000-2013 is 12.5. Cedar Lake is 1st with an FQI of 38.0.



Source: Minnesota Department of Natural Resources

In many lakes macrophytes contribute to the aesthetically pleasing appearance of the setting and are enjoyable in their own right. But even more important, they are an essential element in the life systems of most lakes. They perform a number of useful functions in maintaining the food chain of life in the lake.

- Macrophyte leaves and stems provide a habitat or home for small attached plants and animals. Some are microscopic in size and some are larger. These attached organisms are valuable as food for animals higher in the food chain, such as fish and birds.
- Many types of small organisms live in the sediment. There are insects that spend the immature stages of life in the sediments, leaving when they become adults. Decomposing plant life provides part of the food supply for these sediment dwelling organisms and the emerging insects, in turn, are food for fish.
- The submerged portions of macrophytes provide shelter and cover for small or young fish from larger fish that would feed on them.
- Types of plants that extend above the water can provide cover for waterfowl and their young, and many plants can serve directly as food for certain types of waterfowl.
- Aquatic plants provide many water quality benefits such as sediment stabilization and competition with algae for available nutrients.

Excerpt: Department of Ecology, Washington state

Aquatic Plants

Aquatic plant mapping survey provides information based on the species, density and distribution of plant communities in a particular lake. An aquatic plant sampling was conducted on Island Lake on July 2013. There were 95 points generated based on a computer grid system with points 60 meters apart. Aquatic plants occurred at 25 of the sites (26% total lake coverage) that included Chara and Duckweed. Duckweed was found in 25% and the macro algae Chara was present at 1% of the sampled locations. There were 9 plants observed 2003 that were not sampled in 2013 (Arrowhead, Curlyleaf Pondweed, Duckweed, Eurasian Watermilfoil, Sago Pondweed, Spatterdock, Swamp Smartweed, Watermeal, and Water Stargrass). The diversity and extent of plant populations can be influenced by a variety of factors. Water clarity and depth are the major limiting factors in determining the maximum depth at which aquatic plants will grow. When light level in the water column falls below 1% of the surface light level, plants can no longer grow. The 1% light level in Island Lake ranged from 6-7 ft. suggests that there was enough light penetration for aquatic plants to grow. The algae Chara was found at 4 ft. at only one sampling point. Aquatic plants play an important role in the lakes ecosystem by providing habitat for fish and shelter for aquatic organism. Plants provide oxygen, reduce nutrients such as phosphorus to prevent algae bloom, and help stabilize sediment. A native plant community tends to be diverse and usually does not impede lake activities such as boating, swimming and fishing. Non-native plants often crowd out native plants by growing earlier in the year or by forming canopies that block sunlight.

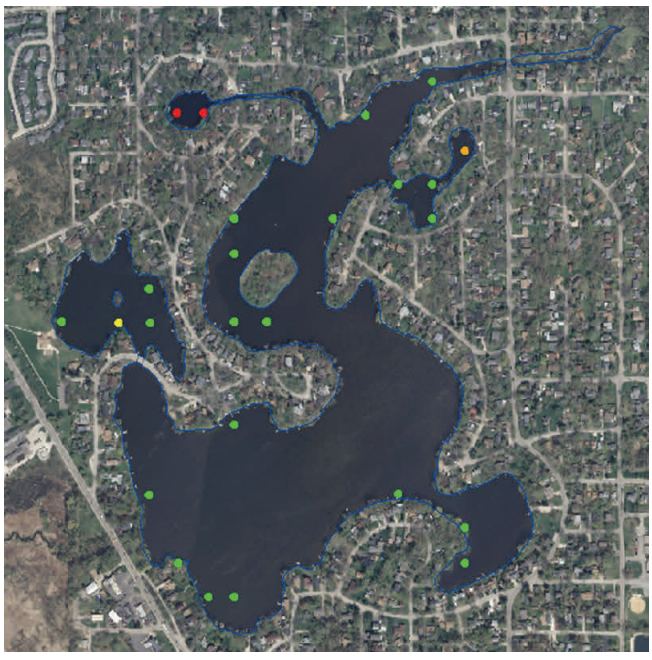
Vertical seawalls reflect wave energy, which can cause scouring of the lake bottom, preventing aquatic plants from establishing near shore. Re-facing a vertical seawall with stone, or native plants planted in front of the seawall helps absorb wave energy and stabilize lake sediment.

In 2013, Island Lake was treated for Curlyleaf Pondweed and Eurasian Watermilfoil. The treatment consisted of 110 gallons of Aquathol K for 27.4 acres of Curlyleaf Pondweed and 15 gallons of DMA IV, liquid 2,4-D for 3.75 acres of Eurasian Watermilfoil.

Plant Density	Chara	Duckweed
Absent	94	71
Present	0	21
Common	0	0
Abundant	0	1
Dominant	1	2
% Plant Occurrence	1.1	25.3

Rake Density (coverage)	# of Sites	% of Sites
No Plants	68	72
>0-10%	21	22
10-40%	0	0
40-60%	1	1
60-90%	1	1
>90%	2	2
Total Sites with Plants	25	26
Total # of Sites	95	100

Aquatic plant map for July 2012



LCHD Staff identifying plants during sampling.

Eurasian Watermilfoil
Scientific name:
Myriophyllum spicatum
Origin:
Europe and Asia
Characteristics:
Found in less than 20 feet of water.
May form surface mats in shallow water.
Spreads rapidly, crowding out native species by blocking out sunlight.
Often confused with the native Northern Watermilfoil which has 5-10 pairs of rigid leaflets per

CURLY LEAF PONDWEED

Scientific name:

Potamogeton crispus

Common name: Curly cabbage, crisp pondweed.

Origin: Eurasia, Africa, Australia

Characteristics: Grows rapidly after ice out. Turion producer. Plants die off by June.

HERBICIDE 2,4-D

Aquatic herbicide 2,4-D can be applied to the water in either a liquid or pellet form. 2,4-D is a relatively fast-acting, systemic, selective herbicide used for the control of Eurasian watermilfoil and other broad-leaved species. Both the granular and liquid formulations can be effective for spot treatment of Eurasian watermilfoil. 2,4-D has been shown to be selective to Eurasian watermilfoil when used at the labeled rate, leaving many native aquatic species relatively unaffected. 2,4-D herbicides will affect only affect dicots, broad leafed plants like Eurasian watermilfoil. Most native aquatic plants in our lakes are monocots. Proper planning should be taken when applying herbicides. If large quantities of aquatic plants are killed, their decomposition can reduce the amount of dissolved oxygen that can lead to fish kill. Rain, wind direction, boating activity, and water temperature may affect the effectiveness of the applied chemical.

Before EWM Treatment

After EWM Treatment

ENDOTHALL—AQUATHOL K

Endothall is the common name of the active ingredient endothal acid. The two types of endothall available are: dipotassium salt (Aquathol K) and monoamine salts (Hydrothal 191). Aquathol K is a contact herbicide that prevents plants from making the proteins they need. It can be applied to the water in either a liquid or pellet form. It is effective against invasive plants such as Curlyleaf Pondweed and Eurasian Watermilfoil. Aquathol K is a contact herbicide and should be applied as early as possible after the target plants appear and are actively growing. When treating for Curlyleaf Pondweed, Aquathol K should be applied in early spring when Curlyleaf are present but before the native plants emerge. This minimizes accidental treatment of native plants. Aquatholl K dissipates quickly and does not bioaccumulate in fish and hydrosoil. Proper planning should be taken when applying herbicides. If large quantities of aquatic plants are killed, their decomposition can reduce the amount of dissolved oxygen that can lead to fish kill. Rain, wind direction, boating activity, and water temperature may affect the effectiveness of the applied chemical.

Pesticide permit requirements for pesticide application

A National Pesticide Elimination System (NPDES) permit is required when pesticides are applied to, over or near the waters of the State. This permit applies to all public waters that have an outflow to the State waters. A Notice of Intent (NOI) must be filled and submitted electronically to the Illinois Environmental Protection Agency (IEPA) at least 14 days prior to any application of pesticides.

FOR FULL DETAILS OF THE RULE SEE: HTTP: / / WWW.EPA.STATE.IL.US/WATER/PERMITS/PESTICIDE/INDEX.HTML

- When is a NPDES permit needed?

Prior to any pesticide application made directly to, over or near waters of the state.

- Who should obtain NPDES permit coverage?

The individual pond owner who will apply the herbicide. If the pond owner hires a contract applicator either the contract applicator or the pond owner could apply for NPDES coverage.

- How do I apply for NPDES permit coverage?

File a Notice of Intent (NOI) with the IEPA. The form can be printed from the site listed above. Don't forget the 14 day public notice period and the information regarding the approval and notification process listed above, so plan ahead

- What does the permit cost?

Currently there is no fee however fees may be introduced at a later date.

- How long is the permit good for?

Five years from the date of issuance but not from the date of coverage.

- Is anything else needed besides the permit?

An Adverse Incident Report is needed if there are any adverse impacts related to the application such as spills or accidental overdosing. The incident must be reported to the Illinois Emergency Management Agency immediately and the report must follow within 15 days.

A Pesticide Discharge Management Plan (PDMP) is required if the annual threshold of 80 acres is past and if you do not meet any of the additional exemptions within the permit. The threshold is determined not only by the size of the pond or lake but by the number of treatments. For example, if a 10 acre pond is treated 9 times with different herbicides within a one-year period, it would be counted as 90 treatment acres and the 80 acre threshold limit would have been passed. This would trigger the need for a PDMP. If treated with the same herbicide 9 times, the additional treatments would not count toward the threshold.

- Additional things to remember

You are allowed to apply only a pesticide that is labeled for aquatic use. The General NPDES permit only applies to pesticide applications that will be made directly to or over waters of the State or at water's edge. Pesticide applications to dry ditches which discharge into waters of the State may also require General NPDES permit coverage.

You must file an updated NOI to modify your NPDES permit coverage to add additional use patterns or treatment areas at least 14 days prior to beginning the pesticide applications. The General NPDES permit coverage is good for 5 years from the issuance date on the permit.

Excerpt : Illinois Department of Natural Resources

CARP (CYPRINUS CARPIO)

Family: Cyprinidae (Minnows or carps)

Order: Cypriniformes (carps)

Class: Actinopterygii (ray-finned fishes)

Carp are considered to be one of the most damaging invasive fish species. Originally introduced to the Midwest waters in the 1800's as a food fish, carp can now be found in 48 States. In the U.S., the common carp is more abundant in manmade impoundments, lakes, and turbid sluggish streams and less abundant in clear waters or streams with a high gradient (Pflieger 1975; Trautman 1981; Ross 2001; Boschung and Mayden 2004). They are also highly tolerant of poor water quality.

The common carp has a dark copper-gold back with sides that are lighter, a yellowish belly and olive fins. They have 2 pairs of short barbells on their upper lip and their dorsal and anal fins have a leading spine that are serrated.

They spawn from early spring to late summer in water ranging from 15 – 28 C and prefer freshly flooded vegetation as spawning substrate. They prefer to spawn in shallow weedy areas in groups consisting of one female and several males. A single female can produce up to 100,000-500,000 which hatch in 5-8 days. The spawning ritual involves a lot of thrashing in shallow water contributing to turbidity problems.

They are omnivorous and feed over soft bottom substrate where they suck up silt and filter out crustaceans, insect larvae and other desirable food items. Carp are very active when feeding and can be observed around shallow areas where they uproot plants which increases turbidity and nutrient concentrations. Increase in nutrients causes algal blooms and reduction in light penetration that impacts aquatic plants.

There are several ways to control the carp population in a lake. The use of Rotenone (piscicide) may be used to eradicate carp from a lake. However, it may be expensive because you may have to treat the entire lake and feeder creeks to prevent carp from repopulating the lake. Rotenone is approved for use as a piscicide by the USEPA and can only be applied by a n IDNR fisheries biologist. It is also biodegradable and there is no bioaccumulation. Warm -blooded mammals have low toxicity because they have natural enzymes that would break down the toxin. Treating the entire system would eradicate carp and allow aquatic plants to become established. Unfortunately, the concentration required to remove carp are high enough to kill native fish species. Native fish species can be restocked 30-50 days after treatment. Assess current fish population to ensure that there are enough predator fish such as bass, catfish and northern pike to help control the carp population. The removal of carp would certainly increase lake clarity and possibly allow for the growth of aquatic plants. This will help increase the DO levels and reduce TP and TSS concentrations.

The spawning ritual involves a lot of thrashing in shallow water contributing to turbidity problems.

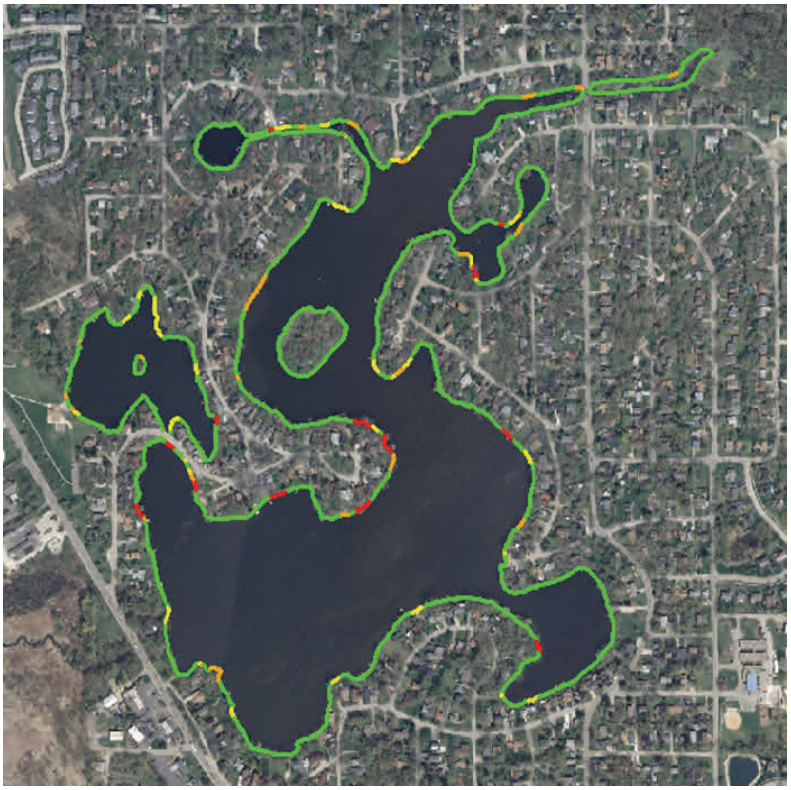
Shoreline erosion

Erosion is a natural process primarily caused by water which results in the loss of material from the shoreline. Disturbed shorelines caused by human activity such as clearing of vegetation and beach rocks, and increasing runoff will accelerate erosion. Rain and melting snow and wave action are the main causes of erosion. Rain can loosen soil and wash it down gradient towards the lake. A shoreline assessment was conducted at Island Lake on Sept. 23, 2013. Based on the 2013 assessment, there was an increase in shoreline erosion with approximately 15.5% of the shoreline having some degree of erosion. Overall, 84.5% of the shoreline had no erosion, 6.8% had slight erosion, 5.2% had moderate, and 3.5% had severe erosion which is up from the previous assessment. In 2003, Island Lake had only 2.3% erosion along its shores. Creating a native plant buffer helps prevent soil erosion as well as filter out pollutants and unwanted nutrients from entering the lake. Native plants can be planted along the shoreline since plant roots hold the soil particles in place so they are not easily washed away during a rain event, melting snow or wave action. Loose rocks and gravel placed on top of a filter fabric prevents soil from washing away before newly planted seed and vegetation has a chance to grow. Eroded materials cause turbidity, sedimentation, nutrients, and pollutants to enter a lake. Shore line buffer zone planted with native vegetation not only reduces runoff by increasing water infiltration into the ground, it also offers food and habitat for wildlife. Less runoff means less nutrients, sediments and other pollutants entering the lakes and streams. Excess nutrients are the primary cause of algal blooms and increased aquatic plant growth. Once in the lake, sediments, nutrients and pollutants are harder and more expensive to remove.

"Vegetative buffer zones can play a key role in limiting negative water quality impacts from developed shoreland property"

EROSION	2013	2003
None	84.5	97.3
Slight	6.8	1
Moderate	5.2	0.8
Severe	3.5	0.5
Total %	100	100

Plants help stabilize the shoreline from being washed away during a rain event or wind and wave action.



LakeCounty
Health Department and
Community Health Center

ENVIRONMENTAL SERVICES

Senior Biologist: Mike Adam

madam@lakecountyil.gov

Population Health Services
500 W. Winchester Road

Phone: 847-377-8030
Fax: 847-984-5622

For more information visit us at:

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.

LAKE RECOMMENDATIONS

Island Lake's water quality had declined since 2003 with an increase in total phosphorus (TP) and decrease in water clarity. The total suspended solids (TSS) decreased only slightly. There was also a decrease in plant density and diversity. Island Lake, management is administered by the Lake Management Committee in cooperation with the Village of Island Lake.

To improve the overall quality of Island Lake, ES (Environmental Services) has the following recommendations:

- **Encourage homeowners to incorporate native plants in their landscaping through rain gardens or shoreline filter strips**
- **Stone refacing of vertical seawalls.**
- **Create an aquatic plant management program that would restore plant diversity and density**
- **Continue Participation in Volunteer Lake Monitoring Program**
- **Participate in the Clean Waters Clean Boats Program**
- **Install a staff gage to monitor lake level fluctuations**
- **Assess current fish population**
- **Reduce or eradicate common carp**
- **Help reduce Cl^- by supporting wise use of road salt in the watershed**