Lake County, Illinois

2013 Woodland Lake Summary Report

Prepared by the Environmental Services

LAKE COUNTY HEALTH DEPARTMENT

Population Health Environmental Services

Woodland Lake

Woodland Lake, also known as Highland Lake, is a private lake in unincorporated Wauconda Township. It is part of the Mutton Creek drainage of the Fox River. The exact origin of Woodland Lake is unknown, although a 1972 report by the Illinois Department of Natural Resources (IDNR) indicated that it originated as a dredged marsh.

Woodland Lake has a surface area of 7.7 acres with a mean of 3.75 and maximum depths of 7.5 feet. It is used by residents for swimming, fishing, and aesthetics. Gas motors are not permitted on the lake. 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.

Total phosphorus in Woodland Lake averaged 0.084 mg/L which is a 16% decrease from the 2004 concentration of 0.099 mg/L and 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

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Lake Facts:

Major Watershed: Fox River

Sub-Watershed: Mutton Creek sub basin.

Location: T 44N, R9E, S 21

Surface Area: 7.7 acres

Shoreline Length: 0.48 miles

Maximum Depth: 7.5 ft

Average Depth: 3.75 ft

Lake Volume: 28.9 acre-feet

Watershed Area: 55 acres

Lake Type: Dredged

Management Entity: Association

Current Uses: Swimming fishing, and aesthetics.

Access: Private

nitrogen (TKN) concentration for Woodland was 1.54 mg/L, which was higher than the county median of 1.17 mg/L and higher than the 2004 concentration by 14.9% (1.34 mg/L). A total nitrogen to total phosphorus (TN:TP) ratio of 18:1 indicates that phosphorus was the nutrient limiting aquatic plant and algae growth in Woodland Lake

By using phosphorous as an indicator, the trophic state index (TSIp) ranked Woodland Lake as euthrophic with a TSIp value of 68.0. This means that the lake has high nutrients resulting high plant densities and large fish populations. The 2013 average total suspended solids (TSS) concentration for Woodland Lake was 13.3 mg/L, which was higher than the county median and a 10.7% decrease from the 2004 average of 14.9 mg/L. Water clarity was measured by Secchi depth, with the lowest reading in (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 (2.95ft).

The conductivity of Woodland Lake was 0.5072 mS/cm which is lower than the county median (0.7875 mS/cm). This was a 36% increase from the 2004 average (0.4530 mS/cm). The chloride concentration in Woodland Lake in 2013 was 96 mg/L which was lower the county median of 145 mg/L.

Woodland Lake does not have a diverse plant community, with no aquatic plant species found at the sampling locations. The lake was chemically treated prior to our sampling. Woodland has a history of having very few aquatic plants. In 2004, only three aquatic plant species (curlyleaf pondweed, leafy pondweed, and watermeal) were found. Past Herbicide treatments have caused poor water clarity that prohibits plant growth. No carp was observed during the sampling season.

WOODLAND LAKE WATERSHED

The lake is located in the Mutton Creek sub basin, within the Fox River watershed. A watershed is the area of land that drains into a lake or stream. A body of water is affected by practices within the entire watershed. Although phosphorus is applied to lawns that are not on a lake or stream, the phosphorus is carried into the waterbody via runoff throughout the watershed.

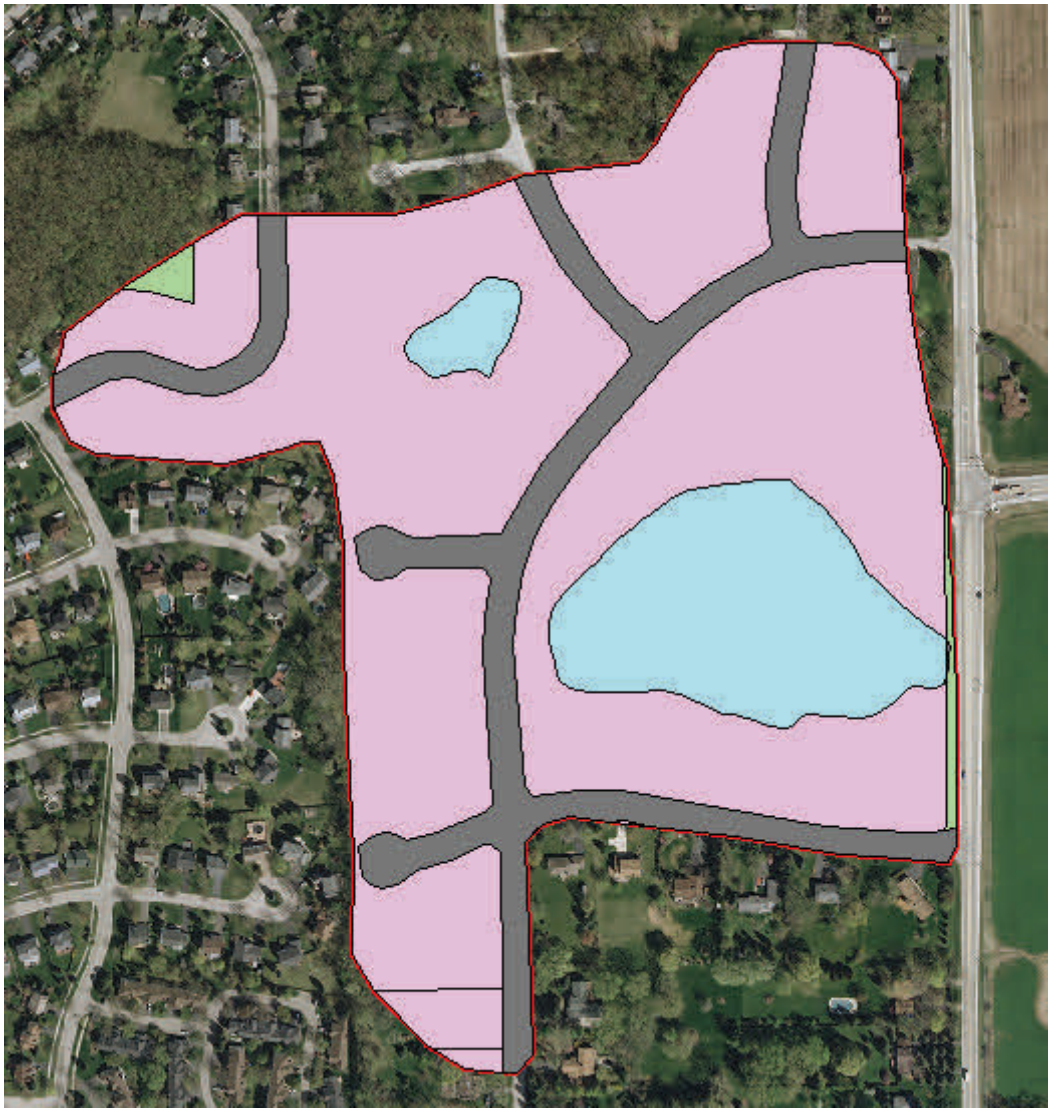
Woodland Lake watershed covers 55 acres of which 38.18 acres are residential areas. The source of a lakes water supply is very important in determining its water quality and choosing management practices to protect the lake.

Woodland Lake has a small watershed and receives water from the surrounding subdivision. There are two inlets to the lake, two 12" culverts located at the west end of the lake that drain a residential area and a small creek that enters the lake along the northern shoreline. This creek drains a one acre detention pond located approximately 640 feet northwest of the lake. The lake's outlet is a small ditch on the southeastern end of the lake. Water leaves the lake and flows overland northeast into Mutton Creek, then west into Island Lake and eventually into the Fox River.

The watershed to lake surface area ratio of 7:1 is small and should not contribute 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 267 days. The major land use in the Woodland Lake watershed (based on 2012 land use maps) is single family (69.6%), followed by transportation (15.1%), water (14.4%), public and private open space (0.9%). The impervious surfaces (parking lots, roads, buildings, compacted soil) do not allow rain to infiltrate into the ground.

Land management practices of the residential area in the water shed has the biggest impact the lake. Controlling water that runs from the land's surface into the lake is important for drainage lakes. A native plant buffer strip along the shoreline will stabilize the soil with its deep root structure and help filter runoff from lawns by trapping nutrients, pollutants, and sediment that would otherwise drain into the lake.

Woodland Lake Watershed



2013 Land use in the Woodland Lake Lake

- 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

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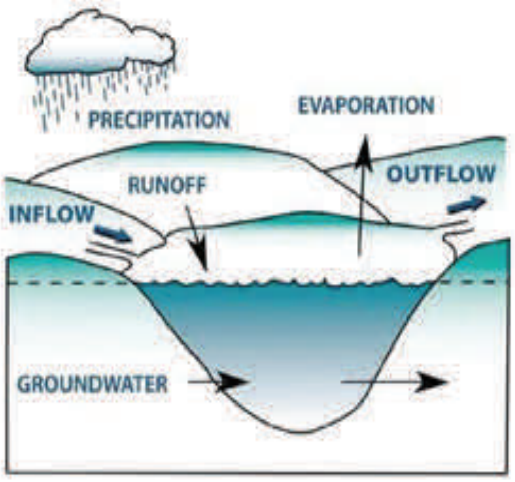


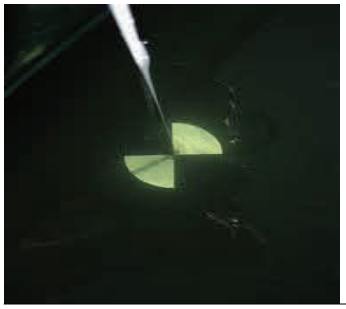
WOODLAND LAKE WATERSHED

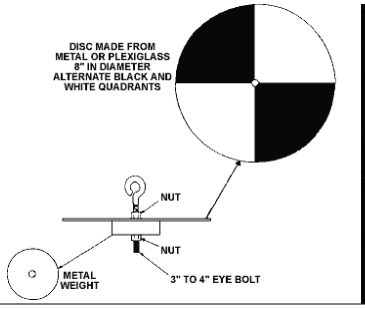
Woodland Lake's watershed is small, approximately 55 acres, and has a watershed to lake ratio of 7:1. There are two inlets to the lake, two 12" culverts located at the west end of the lake that drain a residential area and a small creek that enters the lake along the northern shoreline. This creek drains a one-acre detention pond located approximately 640 feet north west of the lake. The lake's outlet is a small ditch on the southeastern end of the lake. Water leaves the lake and flows overland north east into Mutton creek, then west into Island Lake and eventually into the Fox River. The retention time for Woodland Lake is 267 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.

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 Woodland Lake was 2.28 feet; this was a 33% increase in the lakes transparency since 2004 (1.72 feet) and the water clarity was below the county median of 3.0 feet. The deepest Secchi reading occurred in May (3.0 feet) and the shallowest was in August (1.65 feet).





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) 377-8030
kdeem@lakecountyil.gov

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

VLMP —WATER QUALITY

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. Participation in the Illinois Environmental Protection Agency's (IEPA) Volunteer Lake Monitoring Program (VLMP) would provide Woodland Lake a historical VLMP data that can be used to determine long term water quality trends and support current lake management decision making.

PERMANENT STAFF GAGE AT THIRD LAKE

LAKE LEVEL

Woodland has a small watershed that covers only 55 acres, which helps replenish water lost through evaporation during the summer. It is recommended that a staff gauge is installed and readings are 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. A 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. Dramatic water level fluctuation can increase shoreline erosion, especially if the fluctuations occur over short periods of time. The water level Woodland Lake did not fluctuate more than 0.74 feet between May and September. Erosion occurs when water levels drop and newly exposed soil, which may not support emergent plant growth, is subjected to wave action.

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 depth plants 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 low density of algae in spring usually provides deeper clarity but as the water warms clarity decreases with more algae present in the water.

The 2013 TSS concentrations in Woodland Lake averaged 13.0 mg/L which was above the county median of 8.0 mg/L and 39% lower than the 2004 average concentration of 21.2 mg/L. In order to determine if the TSS was primarily organic or inorganic, we calculated the NVSS concentration, which indicated the inorganic portion in TSS. The calculated NVSS was 21.6% (2.81 mg/L) of the TSS. The majority of the TSS concentration in 2013 can be attributed to organic particles. This means that the increase in turbidity could be caused by algae rather than sediments. External sources of sediment are probably minimal since the lake has a small watershed and no major inlets flowing into the lake.

There are very little amount of aquatic plants in the lake that would use the available phosphorus therefore algae blooms occur during the summer months. Woodland Lake's high TSS values are typically correlated with lakes that have low clarity (Secchi disk depth) which is typical of lakes that have poor water quality.

The shallowest Secchi recorded depth in 2013 occurred in August (1.65 feet) and the deepest in May (3.00 feet) corresponds with the lowest 2013 TSS concentration of 7.2 mg/L and the highest concentration of 20.0 mg/L.

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

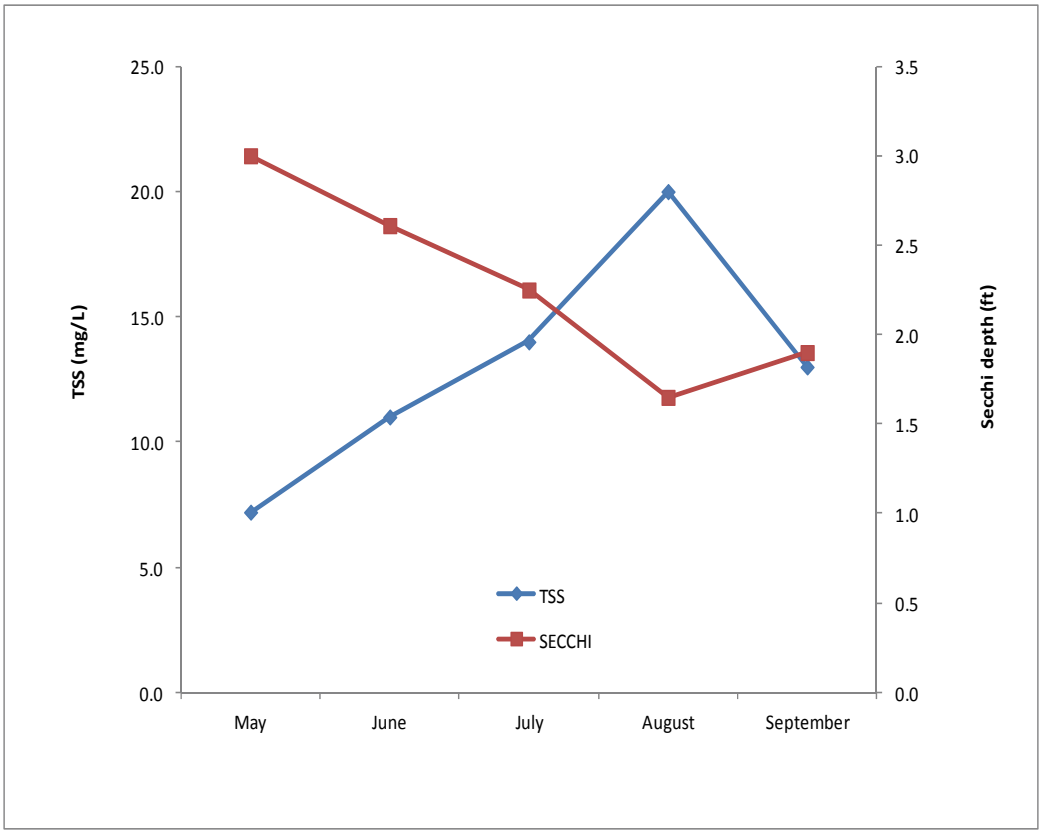
Non-Volatile Suspended Solids

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	7.2	3.00
June	11.0	2.61
July	14.0	2.25
August	20.0	1.65
September	13	1.90

WHAT HAS BEEN DONE TO REDUCE PHOSPHORUS LEVELS IN WOODLAND 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

NUTRIENTS

Organisms need nutrients to live or grow and are typically taken in from its environment. In a lake the primary nutrients needed for aquatic plant and algal growth are phosphorus and nitrogen. In most lakes, including Woodland 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 Woodland Lake was 0.084 mg/L, this was a 15% decrease from the 2004 concentration (0.099 mg/L). Lakes with concentrations exceeding 0.050 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, which are related to human activities which include: human and animal waste, soil erosion, detergents, septic systems, common carp, and runoff from farmland. It is recommended that homeowners use a no-phosphorus fertilizer on their lawns to prevent additional phosphorus runoff into the lake. 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 Woodland Lake was 1.54 mg/L, this was a 15% increase from the 2004 concentration (1.34 mg/L).

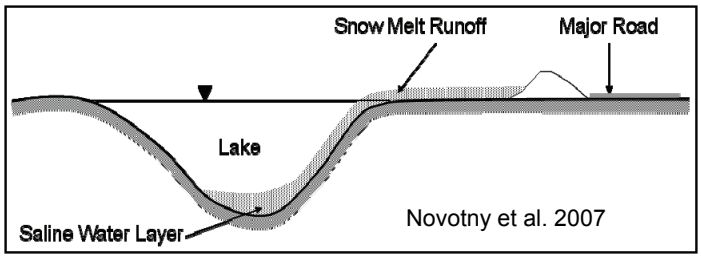
CONDUCTIVITY AND CHLORIDE

Conductivity is a measure of a waters ability to conduct electricity, which is a measure of 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 Woodland Lake 0.5072 mS/cm. This parameter was below the county median of 0.7875 mS/cm and which is a 18% decrease from the 2004 value of 0.4530 mS/cm.

These values are influenced by the winter road maintenance of 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. Woodland Lake's Cl- was 96 mg/L, which is 34%lower than the county median of 145 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.

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.



Bathymetric maps

Bathymetric maps provide Lake managers with an accurate Lake volume that can be used for herbicide application and help anglers find potential fishing spots.

Bathymetric maps, also known as depth contour maps, display the shape and depth of a lake. They are valuable tools for lake managers because they provide information about the surface area and volume of the lake at certain depths. This information can then be used to determine how much of the lake loses dissolved oxygen in the summer, how much of the lake bottom can be inhabited by plants, and is essential in the application of whole-lake herbicide treatments, harvesting activities and alum treatments of your lake. Other common uses for the map include sedimentation control, fish stocking, and habitat management. The LCHD-ES collects field data using Biosonics equipment along with a Trimble GPS unit with sub-foot accuracy. Once collected, the data will be analyzed and imported into ArcGIS for further analysis. In ArcGIS, the contours are drawn and the lake volume is calculated. The Lake County-ES has created bathymetric maps for many of the larger lakes in the county. The LCHD-ES recommends the creation of a bathymetric map for all lakes larger than six acres and can provide the names of several companies that can be hired to do the work. If you are interested in the creation of a bathymetric map of your lake, please contact the LCHD-ES at (847) 377-8030.

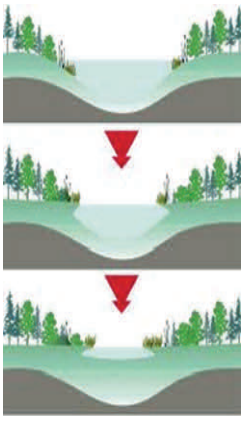
Protect Your waters

STOP AQUATIC HITCHHIKERS!™

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

- 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.

Trophic State Index



Eutrophication Process

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. Lake 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 that supply lakes with additional phosphorus that drives Eutrophication is speeding up this process significantly.

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, Woodland Lake was mesotrophic with a TSIp Value of 68.0, placing it 92nd out of 175 lakes in the county. Lake Carina was 1st at 37.35.

Aquatic plants

LCHD Staff identifying plants during sampling.

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 Woodland Lake on July 2013. There were 8 points generated based on a computer grid system with points 60 meters apart. There were no aquatic plants observed at the sampling points.

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. In July, there was 4% light level at 6 ft. which is more than enough light penetration for aquatic plants to grow.

Curlyleaf pondweed was treated with Sonar AS (2 quarts) and two weeks after that filamentous algae was treated with 40lbs of copper sulfate. 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.

Aquatic vegetation provides important wildlife habitat and food sources. Additionally, aquatic plants provide many water quality benefits such as sediment stabilization and competition with algae for available nutrients.

The Illinois Department of Natural Resources recommends 25-40% aquatic plant coverage to maintain ideal gamefish habitat conditions. Establishing native aquatic plants should be implemented in the aquatic management plan for this lake .

Anabaena Sp.

Blue-green Algae

Microcystis Sp.

Aphanizomenon Sp.

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.

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.

Floristic Quality Index

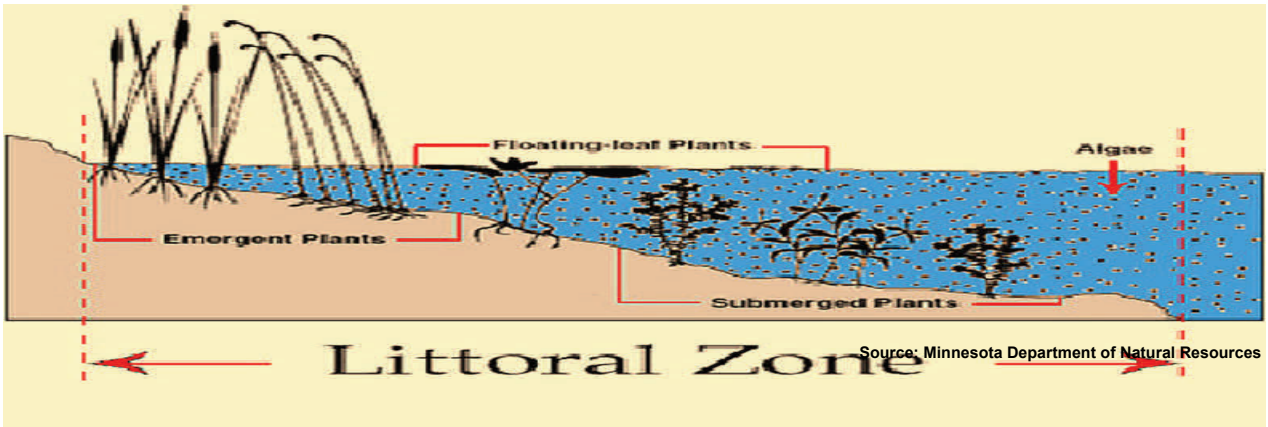
Lake County Average FQI = 13.8

Woodland Lake FQI = 0

Rank = 162/162

Aquatic Plants Species Observed 0

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, Woodland had an FQI of 0, ranking 162 out of 162 in Lake County. The median FQI of lakes that we have studied from 2000-2013 is 12.5.



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

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.

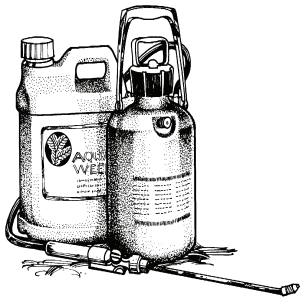
- How long is the permit good for?

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

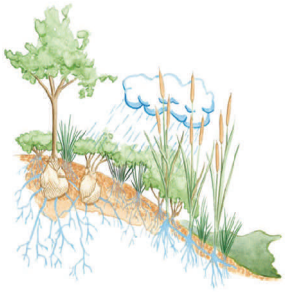
You are allowed to apply only a pesticide that is labeled for aquatic use. The General NPDES permit only applies to pesticide applications that will be made directly to or over waters of the State or at water's edge. Pesticide applications to dry ditches which discharge into waters of the State may also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

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 Woodland Lake on Sept. 18, 2013. Based on the 2013 assessment, there was an increase in shoreline erosion with approximately 30% of the shoreline having some degree of erosion. Overall, 70% of the shoreline had no erosion, 20% had slight erosion, 9.5% had moderate, and no severe erosion. In 2004, Woodland Lake had only 11% of the shoreline with erosion along its shores. Creating a buffer helps prevent soil erosion as well as filter out pollutants and unwanted nutrients from entering the lake. 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 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"

Shoreline erosion Map

EROSION	2013	2004
None	70.1	88.8
Slight	20.4	10
Moderate	9.5	1.2
Severe	0	0
Total %	100	100

LakeCounty
Health Department and
Community Health Center

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.

LAKE RECOMMENDATIONS

Woodland Lake's water quality had improved since 2004 with decreases in total phosphorus (TP) and total nitrogen (TN) which means that there are fewer nutrients available for algae-blooms to occur. The total suspended solids (TSS) decreased significantly. The increase in shoreline erosion and the absence of native aquatic plants should be addressed in future management plans.

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

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