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**DIAGNOSTIC/FEASIBILITY STUDY
AND PHASE II MONITORING
SUMMARY REPORT
1993, 1994, 1998, 1999, 2000
of
THIRD LAKE**

Lake County, Illinois

Prepared by the

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in cooperation with the

**VILLAGE OF THIRD LAKE
LAKE COUNTY FOREST PRESERVE DISTRICT
ILLINOIS ENVIRONMENTAL PROTECTION AGENCY
UNITED STATES ENVIRONMENTAL PROTECTION AGENCY**

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LAKE IDENTIFICATION AND LOCATION

Lake Name: Third Lake

State: Illinois

County: Lake

Nearest Municipality: Village of Third Lake

Latitude/Longitude: 42° 22' 15" / 88° 00' 50"

USEPA Region: Five

USEPA Major Basin Name: Upper Mississippi **Code:** 07

USEPA Minor Basin Name: Des Plaines River **Code:** 13

Major Tributaries: Avon-Fremont Drainage Ditch (Mill Creek), Druce Lake outlet

Receiving Water Body: Mill Creek, Des Plaines River

Applicable Water Quality Standards: State of Illinois Rules and Regulations; Title 35: Environmental Protection, Subtitle C: Water Pollution, Chapter I: Pollution Control Board, Part 302, Subpart B: General Use Water Quality Standards; Illinois Department of Public Health, Title 77, Chapter 1, Subchapter n, Section 820.500, e, 2., Endangered Species Consultation.

Surface Area^a: 155.45 acres (62.9 ha)

Shoreline Length^a: 1.98 miles (3.17 kilometers)

Maximum Depth^a: 70 feet (21.3 m)

Mean Depth^a: 20.5 feet (6.24 m)

Storage Capacity^a: 3187.5 acre-feet (3.9 x 10⁶ m³)

Average Retention Time: 0.25 years

Lake Type: Glacial, dammed spillway with sluice gate, c.1980

Watershed Area: 8,200 acres (3,319.8 ha)

^a at a water elevation of 766.2 feet above mean sea level

BRIEF HISTORY OF THIRD LAKE

Third Lake is a glacial, kettle lake formed over 12,000 years ago and is located in Lake County, Illinois. Third Lake was also known as Chittenden Lake, named after John Chittenden who lived on the north shore of Third Lake in the late 1800's. By 1834, permanent settlers had begun to arrive in Lake County. From 18,257 persons in 1860, the Lake County population has increased to 605,116 in 1998 increasing the pressure on the lakes from both a developmental and recreational perspective. On a map in a book written by C.F. Johnson (1896), Third Lake had rushes almost entirely circling the lake, wild rice growing at the Avon-Fremont Drainage Ditch inlet, a sandy, plant free bottom on the east shore and lily pads at the outlet. Only the sandy shore of the east shoreline remains today.

Third Lake is primarily owned and managed by the Village of Third Lake. The Village owns approximately two-thirds or 100+ acres of the lake bottom. The Lake County Forest Preserve District and multiple private owners along the Mariner's Cove subdivision and West Shore subdivision own the remainder of the lake bottom.

Third Lake is the deepest lake in Lake County and was said to have had good water quality prior to the 1950's. Residents who lived on the lake in the 1920's and 30's stated that Third Lake had crystal clear water, excellent fishing, a sandy bottom and minimal plants and algae. Around 1952, the Grayslake sewage treatment plant had become overwhelmed by an increase in sewage wastes, of which, the overflow was discharged into the Avon-Fremont drainage ditch, the main inlet into Third Lake. By the late 1950's, dense colonial algae blooms were a yearly occurrence. In the 1960's it was noted that algae was the main cause for turbidity. Septic systems and agricultural runoff, also may have contributed to the high concentrations of nutrients in the lake. In the late 1970's, the Grayslake sewage treatment and industrial effluent overflow was discontinued as the North Shore Sanitary District sewage treatment plant began treating this waste. Also, almost all houses on Third Lake changed from septic to sewer. By the late 1980's, heavy development and urbanization occurred within the watershed, potentially adding large quantities of sediment due to construction site runoff. As of 2001, only two Third Lake lakeshore homes have septic tanks, as the rest have connected to sanitary sewer.

The Grayslake sewage treatment plant operated from 1917 to late 1978 and discharged effluent to Third Lake. The plant was allowed to discharge a maximum of 1.1 million gallons per day (MGD) as stipulated by the Illinois Environmental Protection Agency discharge permit in the final years of operation. In 1978, the plant had a monthly average discharge ranging from 0.4 MGD to 0.94 MGD. With an average effluent total phosphorus concentration of 5 mg/l (conservative estimate), the plant may have contributed 3 to 7 tons of phosphorus on an annual basis to Third Lake in 1978. Over the 52 years of operation, Third Lake may have received in excess of 400 tons of phosphorus from the sewage treatment plant. This phosphorus loading calculation is conservative as it does not take into account higher concentrations of phosphorus discharged during storm overflows.

Recreational use and aesthetics of Third Lake have been significantly impaired by large accumulations of algal biomass, aquatic macrophytes in the late 1980's and suspended sediment as a result of the Avon-Fremont Drainage Ditch inflow. Prior to 1997, Third Lake was impaired by an estimated 21,000 cubic yards of algal biomass, low dissolved oxygen conditions, turbid water, a degraded fishery, shoreline erosion and excessive nutrient and sediment loading.

In 1997, the Village of Third Lake began an ambitious program to rehabilitate Third Lake. The first phase of the rehabilitation program was to remove the estimated 21,000 cubic yards of algal biomass (*Aphanothece pallida*) utilizing a hydraulic dredge with a suction head. The algal biomass was pumped to the 11-acre constructed dewatering basin on nearby Forest Preserve agricultural land and the water returned to Third Lake. Due to a variety of hydraulic dredging equipment issues, the algal removal process took over a year and a half to complete. Dredging was finalized in the fall of 1999. An estimated 89.8% or 21,085 cubic yards of the original biomass was removed from the lake based on prior algal measurements. Many shoreline residents who previously had large accumulations of algae on their shorelines now had either none or minimal quantities of algae remaining. Many also noted that the lake bottom was sand, which was previously covered by algae. After successful dewatering, the basin will be removed in the Spring of 2001 with the algal biomass plowed under and utilized as a soil conditioner.

In April of 1999, the second phase of the Third Lake rehabilitation program began with the installation of two layered aerators to improve dissolved oxygen conditions. This was the first installation of this technology in the State of Illinois. Based on several years of historical data, only 33% of the lake volume had sufficient oxygen concentrations to support aquatic life such as fish by mid-summer prior to layered aeration. The layered aeration system only operates from May through September when oxygen demand in the lake is highest. In 1999 the layered aeration system operated 22% better than designed with 89% of the volume having a dissolved oxygen concentration greater than 1 mg/l. In order to increase dissolved oxygen levels from the first year of operation, adjustments were made in 2000 to decrease the amount of lake volume that was oxygenated. In 2000 the layered aeration system maintained an oxygen concentration above 1 mg/l for 83% of the total volume of the lake.

In December of 2000 a sediment thickness study of approximately 2 acres near the Third Lake spillway was conducted to determine the feasibility of dredging accumulated sediments within that area.

As of 2001, turbid water and excessive nutrient and sediment loads entering from the Avon-Fremont Drainage ditch still negatively impact Third Lake. Correction of these problems will require large capital expenditures to construct watershed controls to reduce various sources of non-point source pollution. Third Lake has an extremely large watershed of 8200 acres draining into 155 acres (53:1 ratio). Lakes with a watershed to lake ratio greater than 40:1 are very difficult to manage due to large watershed inputs.

SUMMARY OF CURRENT AND HISTORICAL LAKE USES

Public access to Third Lake is available through the Lake County Forest Preserve District property on the southwest shore and through Village of Third Lake easements and property. Forest Preserve property has approximately 1250 feet of shoreline with approximately 10 acres of lakefront property. The Forest Preserve owns approximately 1,200 acres of undeveloped property (currently farmed) to the north and west ends of the lake. This property, known as the Rollins Savanna, is one of the largest Forest Preserve holdings in Lake County.

**Table 1:
Description of Public Access Points**

Name	Responsible Party	Type	Land Area (Acres)	Lake Frontage (Acres)	Lake Frontage
Sunshine Subdivision Boat Launch	Village of Third Lake	Boat Launch	1/8	Approx. 20 feet	Launching ramp (1) boats, less < 2 ft. draft No parking*
Mariner's Cove Subdivision Boat Launch	Village of Third Lake	Boat Launch	1/3	Approx. 30 feet	Launching ramp (1) boats, less < 2 ft. draft No parking*
Lake County Forest Preserve District Park	Lake County Forest Preserve District	Park	10+	1250 feet	Currently undeveloped park area, no facilities, No parking
Village of Third Lake Easements	Village of Third Lake	Path	<1	Approx. 20 feet	Three public paths to lake, free access No parking

*Resident key fee for launch of \$6 per year, Non-resident \$25 fee for a 3-day pass plus \$150 refundable key deposit

Current Lake Uses

In 1994, the Lake County Health Department and the Village of Third Lake sent a user survey to over 400 households in the Village and 243 were returned. Since the user population has not changed significantly since 1994, Table 2 illustrates the current major recreational activities and the percentage of people who participate in those activities on Third Lake. Nature observance was the primary lake use and fishing came in a close second. But only 16% of the residents ranked fishing as good or excellent.

Residents stated (43%) that the most important value of Third Lake is the recreational opportunities it could provide and 75% believed that the lake was very important for the quality of life in the community. Community concern for Third Lake is great as the

majority of individuals completing the survey (78%) are Third Lake non-shoreline property owners.

Third Lake may provide minimal flood control as the spillway is equipped with a sluice gate. Once the sluice gate is closed, the lake increases in water elevation by 2.25 feet and an estimated 300 acre-feet can be stored prior to outflow over the spillway. This equates to approximately 9 days of average inflow storage in the spring. Historically, Third Lake has not been used for this purpose and the sluice gate has been opened and closed on a calendar basis for the purpose of protecting piers and shorelines from ice damage. This drawdown procedure has been discontinued in 2000/2001 as ice damage continues to occur even when the drawdown took place. Also, other negative impacts and unintended results to aquatic life may occur as a result of the drawdown. Therefore, the sluice gate is only effective at lowering or raising the lake level by 2.25 feet depending on whether it is opened or closed.

**Table 2:
Current Recreational Uses^a**

Recreational Activity	Percent Participating
Nature observance	57%
Fishing	52%
Swimming	47%
Motor boating	37%
Ice skating	37%
Water skiing	26%
Canoeing	22%
Row boating	20%
Ice fishing	19%

^abased on the 1994 LCHD/Village of Third Lake resident survey

Historical Lake Uses

Angling on Third Lake was described in C.F. Johnson's, 1876 book on "Angling in the Lakes of Northern Illinois." Fishing has been the dominant recreational activity on Third Lake and these opportunities have been degraded since the early 1950's. As early as 1960, algal blooms were noted as one of the major sources of turbidity in Third Lake. In September of 1973, the Illinois Department of Conservation (IDOC) conducted a fisheries assessment and found that the population was dominated by stunted yellow bass, carp and poor reproduction of bluegills. The IDOC stated that "there should be a

sustained effort to eliminate the source of pollution that is entering Third Lake via the Avon-Fremont Drainage Ditch...as the habitat and water quality is favoring carp, e.g. high turbidities, excess organic material entering the lake (IDOC correspondence to Richard Ramlow, 1974)." In the early 1980's there was an absence of plant life with only curlyleaf and sago pondweed present. By 1985, water milfoil was present in enough population that herbicide treatment was in process of being conducted, but hand harvesting of approximately 30 acres was completed instead. In the 1990's an increase in powerboating and the advent of jet ski's and wave runners are becoming more prevalent.

Third Lake has mainly been utilized for recreational purposes, but has been considered for other uses such as hydroelectric power. In 1981, the power generation potential of Third Lake was calculated at 7050 kilowatt hours/year or 2.16 horsepower by the Illinois Institute of Natural Resources based on an average flow of 23 cfs and an average head of 1 foot.

LIMNOLOGICAL DATA – WATER QUALITY

Water quality data has been collected at the deep hole location from May through September in 1993, 1998, 1999 and 2000. Samples were collected at a depth of 3 feet, and generally at 30 and 60 feet. See Appendix A for water sampling methods used for collection and analysis. See table 6 for the Third Lake water quality data 1993-2000.

Third Lake water quality is directly linked to precipitation events and the quality of the resulting runoff. This is due to the very large watershed (8200 acres) that drains into Third Lake. This is very evident when you compare 1999 Third Lake water quality data (a dry year with minimal runoff) to 1993 and 2000 (very wet years with excessive runoff). For example, the Secchi disk clarity of the water in August 1999 was 6.2 feet, whereas in August 2000 it was only 2.8 feet. The reason for the clarity reduction was an increase in suspended solids such as clay and algae particles. In August 1999 the total suspended solid concentration was 3.4 mg/l compared to 13 mg/l in August 2000. The main difference between the two years was the quantity of precipitation and runoff. Lakes such as Third Lake, that have a high watershed to lake area ratio (>40:1) are very difficult to manage.

Water quality did however improve in 1999 and 2000 in the mid-depth (metalimnion) layer of the lake due to the operation of the layered aeration system. In fact, the water quality was better in this layer compared to the upper zone (epilimnion) as a very strong temperature gradient separated the two. Dissolved oxygen (D.O.) concentrations that were previously anoxic below a depth of 12 feet (<1 mg/l to 0 mg/l) in 1993 and 1998 were well above 2 mg/l in 1999 and 2000 in the mid-depth layer. Total phosphorus and total suspended solid concentrations were 2 to 3 times lower in the mid-depth layer compared to the near surface water due to the separation of the two layers at the thermocline. In 1999, over 89% of the lake volume had a D.O. concentration greater than

1 mg/l. Adjustments were made in 2000 to reduce the volume to 83%oxic to increase the D.O. in the mid-depth layer.

Third Lake continues to have high concentrations of nitrate-nitrogen from May through July, in some cases ten times higher than the Lake County, IL near surface lake average of 0.2 mg/l. The majority of the nitrate-nitrogen is entering the lake from the Avon-Fremont Drainage ditch during spring and early summer runoff. Third Lake total phosphorus concentrations in 2000 were below the Lake County, IL near surface lake average of 0.066 mg/l, but still had sufficient concentrations to support nuisance algae populations. In July and August, Third Lake had a green-algae bloom that was visually evident. Third Lake also continues to have higher than average total dissolved solids and conductivity, due to high concentrations of chlorides as a result of winter road salt applications. Third Lake has below average Secchi disk clarity and average total suspended solid concentrations when compared to other lakes in the Lake County. Third Lake is a eutrophic (nutrient enriched) lake and will continue to be if nutrient and sediment delivery continues from the watershed.

Since nitrogen concentrations are very high in Third Lake, the limiting growth nutrient is phosphorus. The average total nitrogen to average total phosphorus ratio for May through September 2000 is almost 69:1, indicative of a lake severely limited by phosphorus. This is good from a management perspective as phosphorus is easier to control than nitrogen. Therefore, watershed controls to reduce phosphorus will benefit Third Lake as the layered aeration system is preventing internally released phosphorus from mixing until fall turnover.

LIMNOLOGICAL DATA – AQUATIC PLANT ASSESSMENT

Aquatic plant species presence and distribution in Third Lake were assessed monthly from May through September 2000 (see Appendix A for methods). Nearly 400 sampling sites (399 total) were analyzed during this time period. Thirteen aquatic plant species, one macro-algae, and several emergent shoreline plants were found (see Table 4, below). The average plant sample depth was 4.6 feet. Plants were found growing to a maximum depth of 12 feet.

In 2000, an exotic species known as Eurasian Water milfoil (EWM) dominated the lake. EWM was found at 40% of the sampling sites from May through September and was found growing in all water depths up to 12 feet. EWM was found at 50% of the sampling sites in June, but declined to 36% in July as water clarity and subsequent light penetration was reduced due to large June precipitation events. Sago pondweed had an 18% seasonal occurrence, followed by Spiny naiad (11%) and Leafy pondweed (10%). EWM and Spiny naiad are exotic species, whereas Sago and Leafy pondweed are natives. Largeleaf and Illinois pondweed, which are very beneficial native species, had 5% and 4% seasonal occurrence respectively. Largeleaf pondweed was found at 13% of the sites in June and declined in the latter months due to the poor clarity.

Plants were collected at a maximum depth of 12 feet in 2000. This was due to very clear water that had occurred in May 2000 (7.7 foot Secchi Disk, 1% light level >10 feet). Based on the 1993 bathymetric map, approximately 60% of the Third Lake surface area is 12 feet or less. Theoretically, Third Lake could have 60% plant coverage if substrate conditions would allow. Sandy areas provide poor substrate for plant growth as well as extremely organic areas. This is true in Third Lake on the east side and near shore areas where the substrate is hard and sandy. Very little, if any, plant growth occurred in these areas. Integrated Lakes Management (1988) estimated that 35% of Third Lake had plant coverage and that Eurasian water milfoil covered an estimated 10% of the lakes surface. Due to poor water clarity in 1993, an estimated 1% of the lake had plant coverage. Increases in clarity in 1994 and 1995 resulted in 5% and 20% coverage respectively, but in highly variable densities. Eurasian water milfoil was present during these years but in very few locations. In 2000, the ring of Eurasian water milfoil that was noted in 1988 had returned and was found growing mainly in the 6 to 12 foot depth zone. This zone represents approximately 12% coverage. Although, as clarity decreased so did the amount of plant growth in the deeper water. By August 2000, total plant coverage is estimated at less than 20%.

Curlyleaf pondweed, an exotic species, had been previously found in the 1980's, but in 2000 none was collected.

Table 4. Obligate hydrophytic plants recorded at Third Lake, May – September 2000.	
Submersed	
Illinois Pondweed	<i>Potamogeton illinoensis</i>
Largeleaf Pondweed	<i>Potamogeton amplifolius</i>
Leafy Pondweed	<i>Potamogeton foliosus</i>
Longleaf Pondweed	<i>Potamogeton</i>
Sago Pondweed	<i>Potamogeton pectinatus</i>
Small Pondweed	<i>Potamogeton pusillus</i>
Horned Pondweed	<i>Zannichellia palustris</i>
Slender Naiad	<i>Najas flexilis</i>
Spiny Naiad	<i>Najas marina</i>
Eurasian Water Milfoil	<i>Myriophyllum spicatum</i>
Northern Water Milfoil	<i>Myriophyllum sibiricum</i>
Macro Algae	
Chara/Nitella	<i>Chara/Nitella</i>
Rooted Floaters	
White Water Lily	<i>Nymphaea fuberosa</i>
Free-Floaters	
Small Duckweed	<i>Lemna minor</i>

Emergent Shoreline Plants

Broad-leaved Plants

Common Arrowhead	<i>Sagittaria latifolia</i>
Grass-leaved Arrowhead	<i>Sagittaria graminea</i>
Purple Loosestrife	<i>Lythrum salicaria</i>

Grasses/Bulrush

Common Cattail	<i>Typha latifolia</i>
Hardstem Bulrush	<i>Scirpus acutus</i>
Softstem Bulrush	<i>Scirpus validus</i>
Reed Canary Grass	<i>Phalaris arundinacea</i>

Trees/Shrubs

Buckthorn	<i>Rhamnus</i> sp.
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LIMNOLOGICAL DATA – SHORELINE ASSESSMENT

A shoreline assessment was conducted in May 2000 to determine the condition of the lake shoreline (see Appendix A for methods). Of particular interest was the condition of the shoreline at the water/land interface. Over 100 sites were analyzed along the approximately two mile shoreline. Third Lake is approximately 64% developed, 36% undeveloped.

Sixty percent (60%) of the undeveloped shoreline is primarily wetland vegetation (i.e., cattails). These cattail stands are found near the spillway and the east side of the lake between Sunshine and Mariner's Cove subdivisions. Sporadic cattail stands were found intermixed with developed shorelines where homeowner's had allowed them to grow. Shrub vegetation was found at 38% of the undeveloped sites with only 1% containing woodland vegetation.

Developed shoreline had either mowed lawn to the edge (26% or 1750 feet), some form of unmowed buffer strip (24% or 1630 feet), concrete or metal seawalls (24% or 1632 feet) or rip rap (rock) (22% or 1443 feet). Interestingly, only 3% of the developed shoreline had a sand beach. The lack of beaches may be due to the algal accumulations that inhibited swimming prior to dredging.

Shoreline erosion on undeveloped shorelines was either none (60%) or slight (40%) as of May 2000. Developed shoreline had 53% with no erosion, 43% with slight erosion and 4% with moderate erosion. All sites that had moderate erosion had mowed lawns directly to the edge.

Purple loosestrife or buckthorn was found at 22% of the analyzed sites. These exotic species can quickly invade and dominate the shoreline if not managed. Only 1.5% of the analyzed sites had evidence of beaver activity and only 2% had tree deadfall that provides habitat for aquatic organisms such as fish.

From a human use perspective, 78 lots with at least one recreational structure was noted (i.e., fishing piers, boat piers, etc.) in lake or at the shoreline edge. Many people also used the lake for irrigation water for lawn watering or had sump pumps discharging directly to the lake. Over 100 watercraft (motorboats, jetski's, canoes, paddleboats, etc.) were already on the lake by early May.

LIMNOLOGICAL DATA – WILDLIFE ASSESSMENT

Fifty-six species of wildlife, primarily birds, were found around Third Lake from May - September 2000 (see table 5). Wildlife habitat around Third Lake was variable. Good habitat was found on the undeveloped sections of the eastern and southwestern shorelines, and along the northwest section of the lake near the spillway. Numerous birds were found in the trees and shrubs along the undeveloped southwestern shore. Although a significant portion of the shoreline of Third Lake consists of developed lots with landscaped yards, various wildlife species were noted in these areas. While the manicured lawns on the lake do not provide good habitat, many of the lots had a mature tree canopy at the shoreline, which harbored numerous wildlife species.

Notable absences from Third Lake were reptiles. While reptiles like turtles probably live in the lake, time constraints prohibited a comprehensive census. However, limited habitat for these animals was found around the lake. Poor water clarity, boat traffic, and minimal structural habitat (i.e., deadfall or large rocks) may be responsible for their absence.

Two birds (common tern and northern harrier), classified in Illinois as endangered species, were found around Third Lake. Common terns are typically found near larger bodies of water (like Third Lake), so their presence was not surprising. Northern harriers are birds of prey of open land. Likely the harrier seen at Third Lake was traveling to or from an open field. Northern harrier populations are of particular concern due to the dramatic reduction of open land in Illinois in recent years. It is unknown if either species were breeding around or near Third Lake. None of the wildlife species noted are listed as federally threatened or endangered.

Improvements to the wildlife habitat on Third Lake may include the placement of artificial nesting structures (i.e., bird and bat boxes), leaving deadfall and creating buffer strips along shorelines, and boating restrictions.

Table 5. Wildlife species observed at Third Lake, May – September 2000.

Birds

Double-Crested Cormorant	<i>Phalacrocorax auritus</i>
Mute Swan	<i>Cygnus olor</i>
Canada Goose	<i>Branta canadensis</i>
Mallard	<i>Anas platyrhynchos</i>
Ring-billed Gull	<i>Larus delawarensis</i>
Common Tern*	<i>Sterna hirundo</i>
Great Egret	<i>Casmerodius albus</i>
Great Blue Heron	<i>Ardea herodias</i>
Green Heron	<i>Butorides striatus</i>
Spotted Sandpiper	<i>Actitis macularia</i>
Red-tailed Hawk	<i>Buteo jamaicensis</i>
Cooper's Hawk	<i>Accipter cooperii</i>
Northern Harrier*	<i>Circus cyaneus</i>
Mourning Dove	<i>Zenaida macroura</i>
Belted Kingfisher	<i>Megaceryle alcyon</i>
Common Flicker	<i>Colaptes auratus</i>
Red-bellied Woodpecker	<i>Melanerpes carolinus</i>
Downy Woodpecker	<i>Picoides pubescens</i>
Eastern Phoebe	<i>Sayornis phoebe</i>
Eastern Pewee	<i>Contopus virens</i>
Great Crested Flycatcher	<i>Myiarchus crinitus</i>
Cliff Swallow	<i>Petrochelidon pyrrhonota</i>
Barn Swallow	<i>Hirundo rustica</i>
Tree Swallow	<i>Iridoprocne bicolor</i>
Bank Swallow	<i>Riparia riparia</i>
American Crow	<i>Corvus brachyrhynchos</i>
Blue Jay	<i>Cyanocitta cristata</i>
Black-Capped Chickadee	<i>Poecile atricapillus</i>
White-Breasted Nuthatch	<i>Sitta carolinensis</i>
House Wren	<i>Troglodytes aedon</i>
Marsh Wren	<i>Cistothorus palustris</i>
Catbird	<i>Dumetella carolinensis</i>
American Robin	<i>Turdus migratorius</i>
Cedar Waxwing	<i>Bombycilla cedrorum</i>
Red-eyed Vireo	<i>Vireo olivaceus</i>
Warbling Vireo	<i>Vireo gilvus</i>
Yellow Warbler	<i>Dendroica petechia</i>
Common Yellowthroat	<i>Geothlypis trichas</i>
Red-winged Blackbird	<i>Agelaius phoeniceus</i>
Brown-headed Cowbird	<i>Molothrus ater</i>

Common Grackle
Starling
Northern Oriole
House Sparrow
Northern Cardinal
House Finch
American Goldfinch
Indigo Bunting
Chipping Sparrow
Song Sparrow

Quiscalus quiscula
Sturnus vulgaris
Icterus galbula
Passer domesticus
Cardinalis cardinalis
Carpodacus mexicanus
Carduelis tristis
Passerina cyanea
Spizella passerina
Melospiza melodia

Mammals

Gray Squirrel
Eastern Chipmunk
Muskrat

Sciurus carolinensis
Tamias striatus
Ondatra zibethicus

Amphibians

Green Frog
Bull Frog
American Toad

Rana clamitans melanota
Rana catesbeiana
Bufo americanus

Reptiles

None noted

Insects

Cicadas
Dragonfly
Damselfly
Sulphur Butterfly
Monarch Butterfly

*Endangered in Illinois

+Threatened in Illinois

EXISTING LAKE QUALITY PROBLEMS

**POTENTIAL OBJECTIVES FOR THIRD LAKE MANAGEMENT
PLAN
ALTERNATIVE FOR ACHIEVING THE LAKE MANAGEMENT
PLAN OBJECTIVES**