

Lake Capacity and Management Study for Black Sturgeon Lake, City of Kenora



Prepared for
City of Kenora

Submitted by
Gartner Lee Limited
Kelli Saunders Environmental Management

October, 2007

Lake Capacity and Management Study for Black Sturgeon Lake, City of Kenora

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City of Kenora

October, 2007

Reference: **GLL 70-294**

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- 5 City of Kenora**
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Gartner Lee Limited

October 9, 2007

Mr. Jeffrey Port, MCIP, RPP
City Planner
60 Fourteenth Street. North, 2nd Floor
Kenora, ON P9N 4M9

Dear Mr. Port:

Re: GLL 70-294 –Black Sturgeon Lake Capacity and Management Study

We are pleased to submit to you our final report ***“Lake Capacity and Management Study for Black Sturgeon Lake, City of Kenora”***. This report is submitted jointly by Kelli Saunders Environmental Management and Gartner Lee Limited.

The ***Lake Capacity and Management Study for Black Sturgeon Lake, City of Kenora*** incorporates two detailed reports. The first report ***“Background Conditions Report”*** represents the first phase of the study, and describes the environmental, socio-economic and planning environments of Black Sturgeon Lake. The information gathered in this report was used to inform technical studies related to lake capacity and to guide the development of a management plan for Black Sturgeon Lake. This forms the second report, ***“Technical Studies and Management Plan”***. It was our intention that this final portion of the report would reflect not only the results of the lake capacity modelling component, but the less tangible and very real concerns and issues voiced by the public and the City of Kenora. We are confident that this final report fulfills that goal and that it will be a useful tool when the City of Kenora sits down to consider implementing the recommendations held within.



It has been a pleasure to work with yourself, the Advisory Committee and local residents of Black Sturgeon Lake to complete this study.

Yours very truly,
GARTNER LEE LIMITED

Tammy L. Karst-Riddoch, Ph.D.
Aquatic Scientist

Neil J. Hutchinson, Ph.D.
Senior Aquatic Scientist, Principal

KELLI SAUNDERS ENVIRONMENTAL MANAGEMENT

Kelli E. Saunders, M.Sc.
Environmental Consultant

TKR:NJH:KES:tkr
Attach.

Lake Capacity and Management Study for Black Sturgeon Lake, City of Kenora: Background Conditions Report



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City of Kenora

Submitted by
Gartner Lee Limited

October, 2007

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Reference: **GLL 70-294**



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- B. Advisory Committee Comments and Responses on the Draft Background Conditions Report (June, 2007) for the Lake Capacity and Management Study for Black Sturgeon Lake, City of Kenora.
- C. List of Contacts Made for Background Conditions Report
- D. Summary of Small Fish Collections, MNR Shoreline Survey 1988
- E. Procedure for all Persons Wanting to Install a Private Dock, Boathouse, Boat Launch or Other Marine Structure within the Limits of the City of Kenora

1. Introduction

The Black Sturgeon Lakes are a chain of two major lake basins (commonly referred to as the Lower and Upper Black Sturgeon lakes) joined by the Black Sturgeon River. The Lower Lake (informal name) lies entirely within the limits of the City of Kenora. In February 2007, the City of Kenora retained Kelli Saunders Environmental Management and Gartner Lee Limited to conduct a lake management study for the Lower Lake. Specifically, the City requested that research be undertaken on the water quality, natural resource values and aesthetic properties of Black Sturgeon Lake and that this information be linked with an analysis of historical development patterns, current land use, projected growth in the watershed and the effectiveness of existing planning tools to produce a management strategy for the long term sustainability of development on the lake.

The lake management study is focussed on Lower Black Sturgeon Lake, as this area is under the direct management and planning control of the City of Kenora. We have however, included any available information on water quality and land use activities for Upper Black Sturgeon Lake as well as relevant data for the entire watershed (e.g., topography and geology) in order to develop management strategies that consider the lake within its watershed.

The need for a management strategy for Lower Black Sturgeon Lake arises from concerns related to ongoing and incremental shoreline development and several large and recent proposals for substantial (~20 lot) shoreline developments. Although there are no known immediate threats to water quality in the lake, the pace of development and proximity of the lake to the City of Kenora have raised concerns as to the sustainability of the lake experience. The City of Kenora therefore requested completion of a lake management study to a) guide future development in an orderly fashion, and b) ensure that future development is managed to prevent detrimental impacts to water quality, fish and wildlife and their habitat, other aspects of the natural environment and the human amenity values associated with recreation at Black Sturgeon Lake.

The study will proceed in several phases:

1. a summary of existing natural conditions and the planning environment in a background conditions report;
2. confirmation of existing conditions and public expectations in a public meeting, including the documentation of social considerations, community interests and desires for Black Sturgeon Lake and the City of Kenora;
3. technical studies and development of a draft lake management plan;
4. presentation of the draft management plan to a second public meeting; and
5. final report.

This “Background Conditions” report summarizes the available information on the physical, biological, chemical and socio-economic characteristics of the lake and its watershed, as well as the regulatory environment within which planning decisions are made. While it is felt that the vast majority of available information had been identified through data collection and discussions with long-time residents, resource agencies, regulatory authorities and others, this report has also incorporated the observations of field visits in May and July 2007 and has considered the feedback received from members of the public at the July 12, 2007 public meeting (public comments have been provided in Appendix A) and the Black Sturgeon Lake Management Study Advisory Committee (Appendix B). The end result is a comprehensive, up-to-date baseline conditions report that provides a starting point from which to determine any stresses on the lake environment and future management needs. Equally important, the process of developing this report to date has drawn upon the knowledge of those most closely tied to the lake and has provided them an opportunity to help shape a document that best reflects the vision they have for Black Sturgeon in the future.

2. Overview of Available Data Sources

A considerable amount of data exists for the Black Sturgeon Lakes and their watershed, though much of the field work done on this lake is quite dated. The Ontario Ministry of Natural Resources (MNR) provided digital and hardcopy information on bathymetry (lower lake only), shoreline features (sediments, vegetation), natural values (fish and wildlife habitat, nesting and feeding sites, culturally significant sites) and other land uses (shoreline development, pits and quarries, waste disposal sites, snowmobile and canoeing trails, traplines, baitfish and leech blocks). The Ontario Ministry of the Environment (MOE) provided historic water quality data and information on the status of waste disposal sites. Additional water quality data (total phosphorus concentrations and Secchi depths) were obtained from the MOE’s Lake Partner Program database. The Ontario Ministry of Northern Development and Mines (MNDM) provided digital mapping of mineral values, mine hazards and mineral exploration locations. The City of Kenora provided all pertinent GIS layers from its database in order to obtain information from the Official Plan (e.g., zoning designations, property ownership, sensitive features). Various agencies have been contacted for watershed-based information including bedrock geology¹, topography and land cover². A number of individuals were contacted and interviewed by Kelli Saunders in order to develop a chronology of historical events on Black Sturgeon Lake and these are listed in Appendix C.

1. *Based on the 1:1,000,000 scale ‘Bedrock Geology of Ontario’, Ontario Geological Survey, 2000, ERLIS Data Set 6 ISBN 0-7778-9209-6.*

2. *Based on the Ontario Land Cover Database, Spectranalysis (2004)*

3. History of Development on Black Sturgeon Lake

The landscape around Black Sturgeon Lake has seen some changes over the years. Table 1 illustrates the progression of the most prominent events, based on the recollections of long-time residents and files reviewed in Ministry of Natural Resources and Ministry of the Environment offices.

The lands around Black Sturgeon Lake; in the early 1900s were occupied mainly by family farms and a modest number of fishing camps. In the early 1900s, cabins dotted the landscape as people involved in spotting the Grand Trunk Railway set up stopover camps and trapping cabins. Over the course of the first half of the 20th century, the popularity of tourist resorts increased and at one point (1951), 15 commercial tourist outfitters were operating. By the late 1960s, this number had dropped to a half dozen camps and, presently, there are only two on lower Black Sturgeon and one on upper Black Sturgeon (Beauty Bay golf course and campground/leased cottages).

The division of the large pieces of farmland for year-round and seasonal residential lots did not occur until the late 1970s and, since that time, Black Sturgeon Lake has seen an influx of road accessible residential subdivisions with an increasing number of permanent relative to seasonal residences. As can be seen on Table 2, although only approximate, the popularity of this lake for residential development has increased substantially over the years, with the pressure being on lower Black Sturgeon where patented land is much more common.

In the 1930s, Jaffray Mellick Township was bustling with busy farms, forestry operations supplying wood to the local mill, coal and aggregate mining and commercial fishing and trapping (E. Alcock, pers. comm., 2007). At that time, many of the dairy products purchased in the area were from local farms in the township. As early as the 1960s, disputes between commercial fishermen and resort owners over resources were occurring on Black Sturgeon Lake. A commercial fishing license was first granted in 1952, but by the late 1980s, the Ministry of Natural Resources started buying out these licenses in order to help reduce the harvest pressures on the sport fishery. The Black Sturgeon commercial fishing license was reissued to Dalles First Nation in 1987, which consists of a target quota for lake whitefish.

Logging was quite popular from the 1920s through the 1950s on the lands surrounding upper Black Sturgeon to feed the numerous sawmills in the area, including Keewatin Lumber.

Table 1. Chronology of Development on Black Sturgeon Lakes

Date	Event/Development	Location
1893	Survey of Jaffray township	
1903	Survey of Mellick township	
1903	Arrival of James family (James Rd. named after them) to spot Grand Trunk Railway	Traplins and cabins in Silver Lake and Daniels Lake area
1900	First two cottages built on Northeast Bay	Northeast Bay, Upper Black Sturgeon Lake
1908	Incorporation of Jaffray Mellick Township	
1930s	Farmland common, forestry big business (farmers sold wood to mill); coal and aggregate mining popular; commercial fishing and trapping popular	Jaffray Mellick township
1940s	Black Sturgeon Camp developed	North shore of Lower Black Sturgeon Lake
1947	Blasting of falls between Silver Lake and Black Sturgeon to allow logs to flow	Upper Black Sturgeon
1951	15 commercial tourist outfitters exist	Upper and Lower Black Sturgeon Lakes
1952	First commercial fishing license issued	Upper and Lower Black Sturgeon Lakes
1950s/1960s	Essex Rd. bridge span reduced significantly	Near where Upper Black Sturgeon Lake enters river
Early 1960s	Pierson homestead surveyed out	Southwest end Lower Black Sturgeon Lake
1960s	Hidden Trail Resort developed	North shore of river near where Upper Black Sturgeon Lake empties
1963-1965	Black Sturgeon South Property first divided, cottages built (2)	Southwest end Lower Black Sturgeon Lake
1967	Heated disputes recorded between resort owners and commercial fishermen over allocation of harvest	Upper Black Sturgeon Lake
1960s/1970s	6-7 tourist resorts in operation	Scattered throughout lakes
1970s	Trans Canada Pipeline (TCPL) built through JM township	South of lake, near bypass
1970s	Black Sturgeon River Camp/Moon Camp closed and later subdivided	Snow Drive, Lower Black Sturgeon Lake
1970s	Jaffray Mellick Township population ~1700	
1970s	Dalles First Nation members leave reserve due to excess flooding from Kenora Pulp and Paper Mill dam at Whitedog Rapids on Winnipeg River	
1976	14 lots subdivision plus 1 block	Wyder Road
1980s	Jaffray Mellick Township population ~4500	
1981	37 lot subdivision and several blocks	Black Sturgeon Lakes Estates
Mid 1980s	Private commercial fishing license sold to MNR and reissued as whitefish only license to Dalles First Nation (1987 – catch quota on Lower Black Sturgeon Lake)	
1985	East Mellick Rd. bridge span reduced significantly	Near where river empties into lower Black Sturgeon
1982	69 lot development	Peterson Road
1986	Land sold to developer	Lawton Road
1987-1988	Farmland (at least two active cattle farms)	Lower and Upper Black Sturgeon Lakes
1988	Township of Jaffray Mellick becomes a Town	
1988	Black Sturgeon Estates Assoc. voice concern to MNR/MOE on future of fisheries on Black Sturgeon Lake	
1989	28 lot subdivision and various blocks	James Road
1989	20 lot subdivision and a block	Lawton Rd (end of Ritchie Road)
1995	12 lot subdivision plus 1 block (sold as lot addition)	Worona Road
Late 1980s/early 1990s	Logging	1. South of Hunting Lake and north of Black Sturgeon River outflow (poplar) 2. Crown Land block east of Dalles FN, west of Reddit Road, south of Black Sturgeon R.
2004-2007	Subdivision applications – 17 new lots approved	Lower Black Sturgeon Lake

Table 2. Approximate Numbers of Shoreline Properties

Year	Upper Black Sturgeon			Lower Black Sturgeon			Data Source
	# Cottages	# Homes	# Resorts	# Cottages	# Homes	# Resorts	
1967	10	n/a	2	n/a	n/a	n/a	Dept. Lands and Forests lake survey 1967
1970	n/a	n/a	n/a	54	n/a	2	Dept. Lands and Forests Lake Survey, 1970
1973	20	n/a	2	n/a	n/a	n/a	Dept. Lands and Forests Lake Survey, 1973
1987	33	42	1 (8 cabins)	165	42	2 (8 cabins each)	MOE, 1987
1988	58		3	63		2	MNR, 1988
1999	125		n/a	n/a		n/a	MNR, 1999
2007	95 (inc. 25 shoreline leased lots at Beauty Bay)		1	215		2 (14 cabins)	Field count, Saunders, 2007; City of Kenora GIS

4. Current Conditions

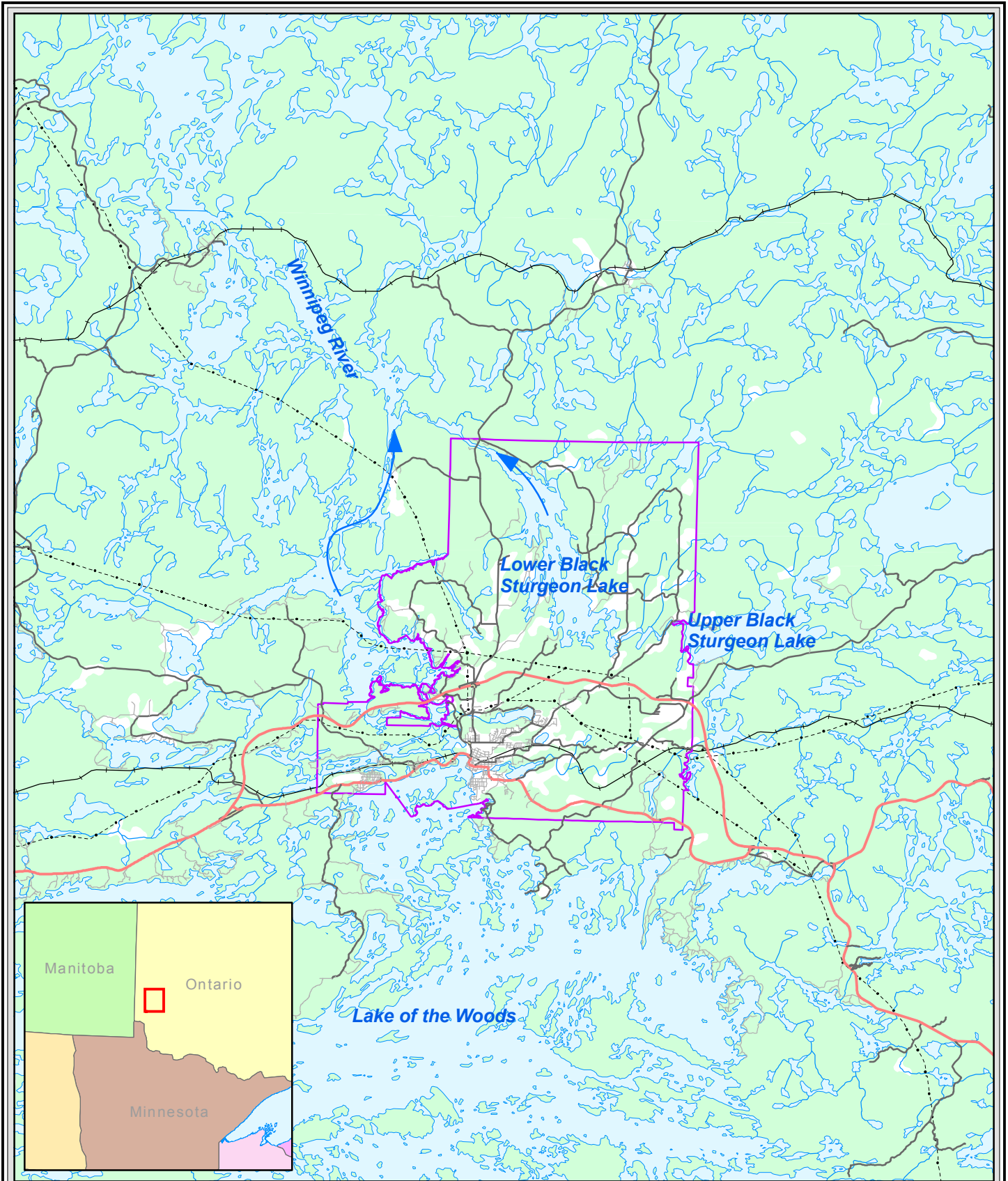
4.1 The Lake System

4.1.1 General Lake and Watershed Description

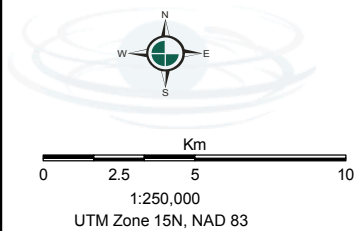
Lower Black Sturgeon Lake (informal name) (50°18' N, 94°00' W) is located within the Kenora City limits and is one of two major lake basins that form the larger Black Sturgeon Lakes complex (Figure 1). The second basin is commonly referred to as Upper Black Sturgeon Lake. The Upper lake lies 3 km upstream and drains to the south end of the Lower lake via the Black Sturgeon River, which forms the primary inlet to the Lower Lake. There is one outlet located at the north end of Lower Black Sturgeon Lake that drains to the Black Sturgeon River, which empties to the Winnipeg River at Black Sturgeon Rapids.

Lower Black Sturgeon Lake drains an area of 730.63 km². The drainage basin is underlain by Precambrian Shield bedrock with a preponderance of granitic, gneissic and metavolcanic rocks (Figure 2). Bedrock characterized by foliated and gneissic and quartz-rich suites dominates in the immediate catchments of the Lower lake. Topography of the drainage basin is rugged, reaching highest elevations in headwater regions to the north and east (maximum elevation = 427 mASL) (Figure 3). The Lower lake lies at an elevation of 316 m at the west end of the watershed and is surrounded by several low-lying areas (minimum elevation = 299 mASL).





Figure 4 illustrates land cover classes in the drainage basin as determined from the Ontario Land Cover Database (Spectranalysis, 2004). This database provides a classification of 27 broad land cover types across Ontario based on a digital analysis of spectral reflectance data from Landsat-7 images recorded between 1999 and 2002. Land cover in the Black Sturgeon Lakes' catchments is primarily forested with a mix of coniferous (33%), mixed (21%), deciduous (1%) and sparse (33%) forest types. Wetlands represent only 1% of the land cover, but these are concentrated in low-lying areas in the western part of the drainage basin near the Lower lake. Approximately 7% of the watershed area includes depleted forests resulting from logging and mining activities, with an additional 1% cleared for settlement. Settlement areas are localized within the Kenora City limits in the southwest part of the drainage basin.



Basemapping from National Topographic Database



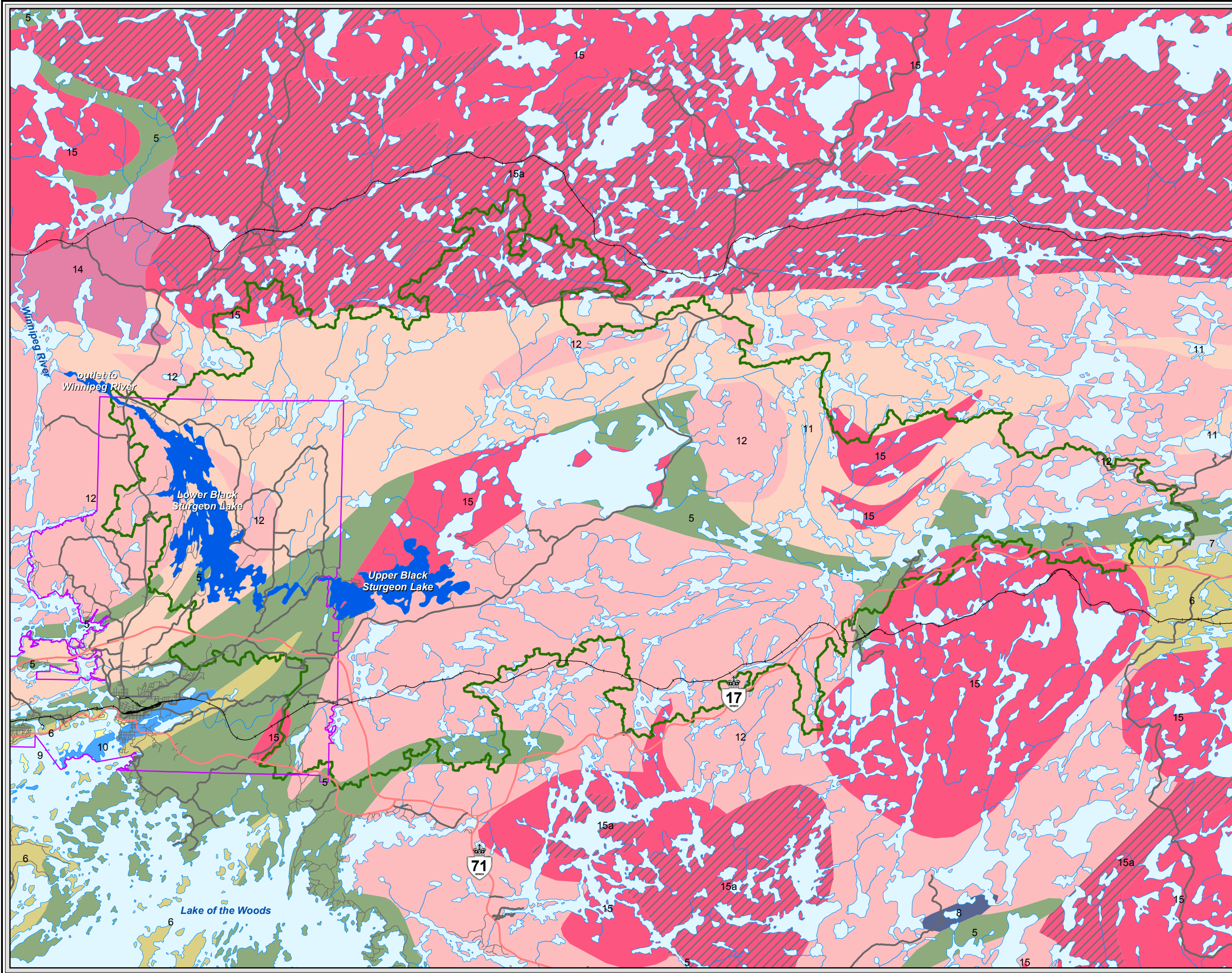
Legend

-  Kenora City Limit
-  Transmission Lines
-  Railway
-  Flow Direction

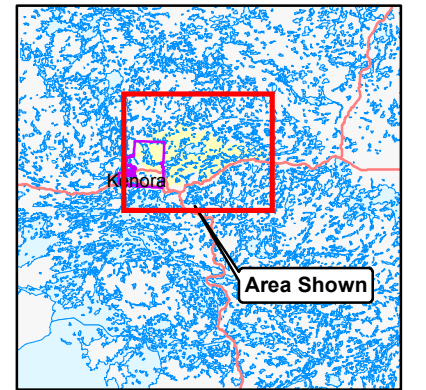
Black Sturgeon Lakes
Management Study

Location

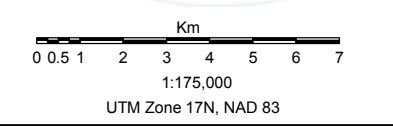
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- Legend**
- Kenora City Limit
 - Watershed
 - Bedrock Geology**
 - 15 Massive granodiorite to granite
 - 15a Potassium feldspar megacrystic units
 - 14-Diorite-monzodiorite-granodiorite suite
 - 12 Foliated tonalite suite
 - 11 Gneissic tonalite suite
 - 10 Mafic and ultramafic rocks
 - 9 Coarse clastic metasedimentary rocks
 - 8 Migmatized supracrustal rocks
 - 7 Metasedimentary rocks
 - 6 Felsic to intermediate metavolcanic rocks
 - 5 Mafic to intermediate metavolcanic rocks



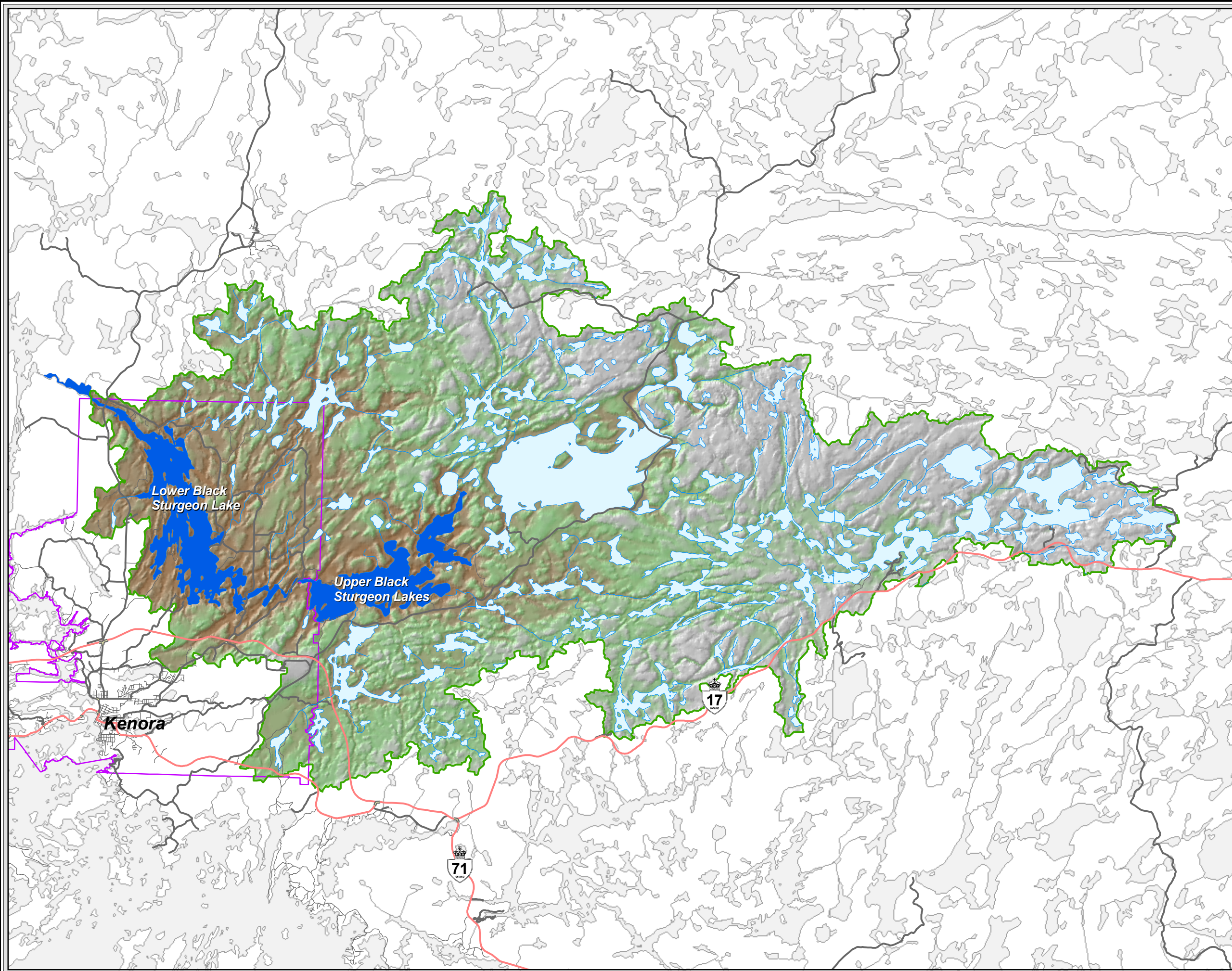
Basemapping from Ontario Ministry of Natural Resources



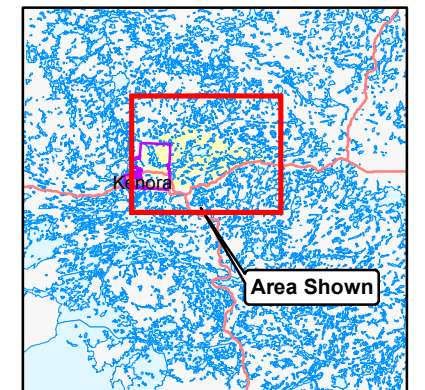
Black Sturgeon Lakes Management Study

Bedrock Geology

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- Legend**
- Kenora City Limit
 - Watershed
- Elevation**
- 475 mASL
 - 310 mASL



Basemapping from Ontario Ministry of Natural Resources



0 0.5 1 2 3 4 5 6 7 8
Km

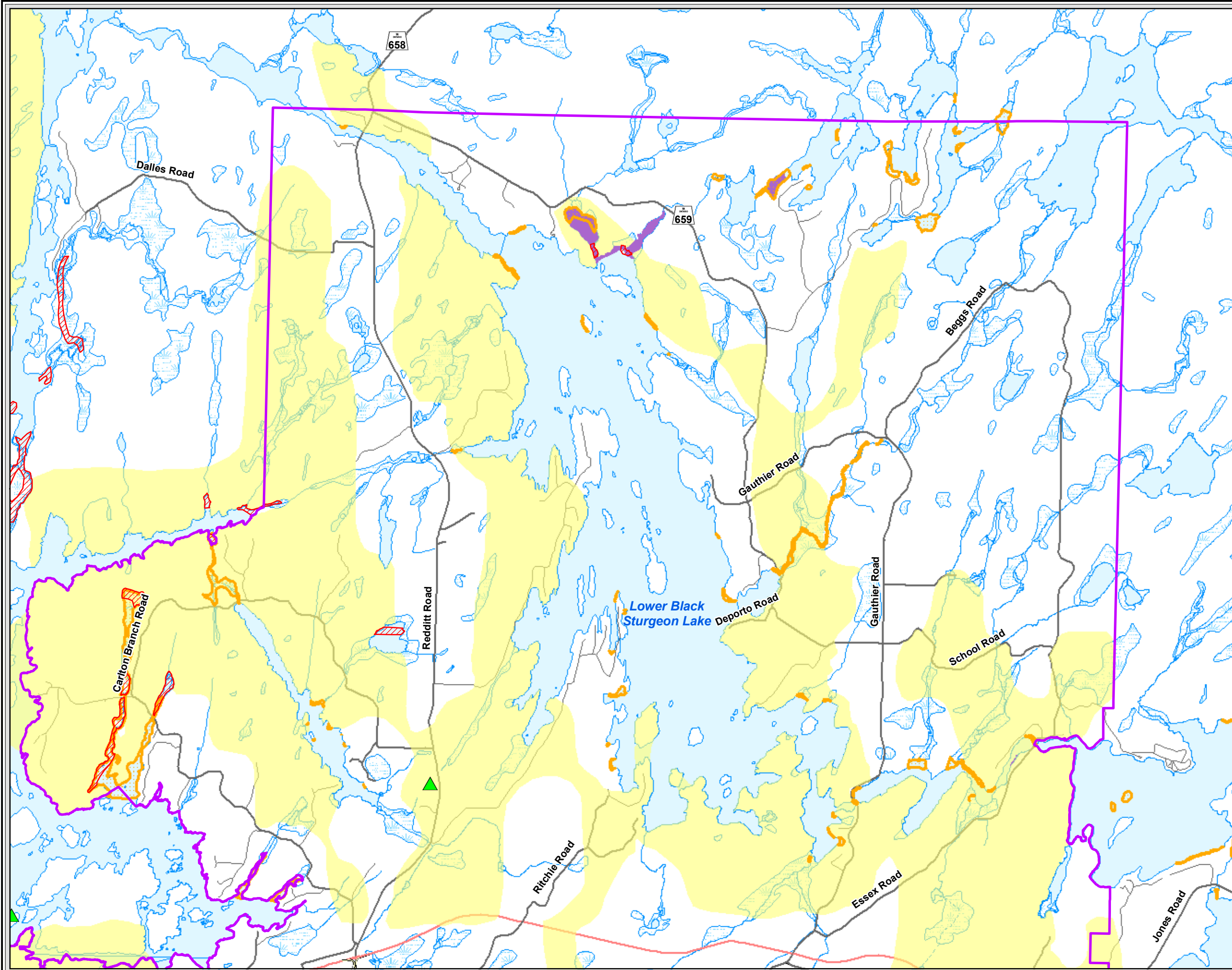
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UTM Zone 17N, NAD 83

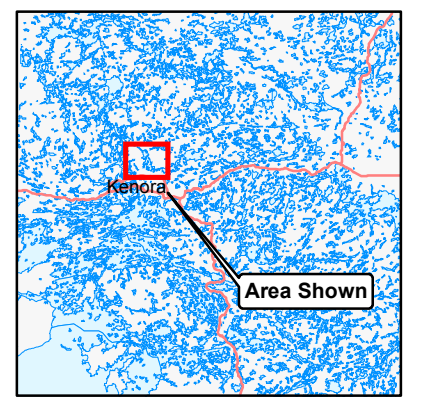
Black Sturgeon Lakes
Capacity Study

Topography

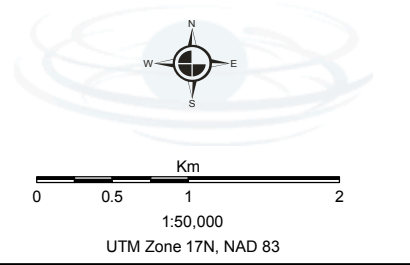
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- Legend**
- Kenora City Limit
 - Spawning Area
 - Fish Nursery Areas
 - Wildlife Nursery Areas
 - Wintering Areas
 - Nesting Site
 - WildRiceStands



Basemapping from Ontario Ministry of Natural Resources



Black Sturgeon Lakes Management Study

Natural Values Features

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The surface area of the Lower lake is 16.60 km², and it has a perimeter of 76.3 km with an additional 41.5 km of island shoreline. The main channel of the lake is oriented north-south, and is relatively deep with a maximum depth of ~30 m. There are several shallower side arms and bays (Figure 5) such that the average depth of the lake is only 12 m. Littoral areas³ that support rooted aquatic plants comprise approximately 33.4% of the total surface area of the lake. The total lake volume calculated as the mean depth multiplied by the surface area is 195,587,230 m³. Based on 1988 data collected by the MNR, water levels fluctuated by 0.51 m that year and the lake flushes approximately 0.39 times per year resulting in a relatively short water residence time of 2.56 years.

Water level fluctuations can vary significantly in any given year⁴, but local residents indicate that average fluctuation tends to be around 4 ft.

A detailed shoreline survey of the Lower Lake was conducted by the MNR in 1988 and showed that there are 16 inlet streams to the Lower Lake in addition to the primary inlet from Black Sturgeon River (Figure 6). At the time of the survey, however, most of the streams were either dry, or had non-measurable flows, with the exception of Deacon Creek with a flow of 0.08 m³/s. Flows in the Black Sturgeon River were recorded as “DGM” (“Discharge too Great to Measure”) at both the inlet and outlet. Most of the natural shoreline is characterized by exposed bedrock with abundant boulders (diameter >10”) and rubble (diameter between 3 and 10”), with mud or muck substrates limited to sheltered bay areas.

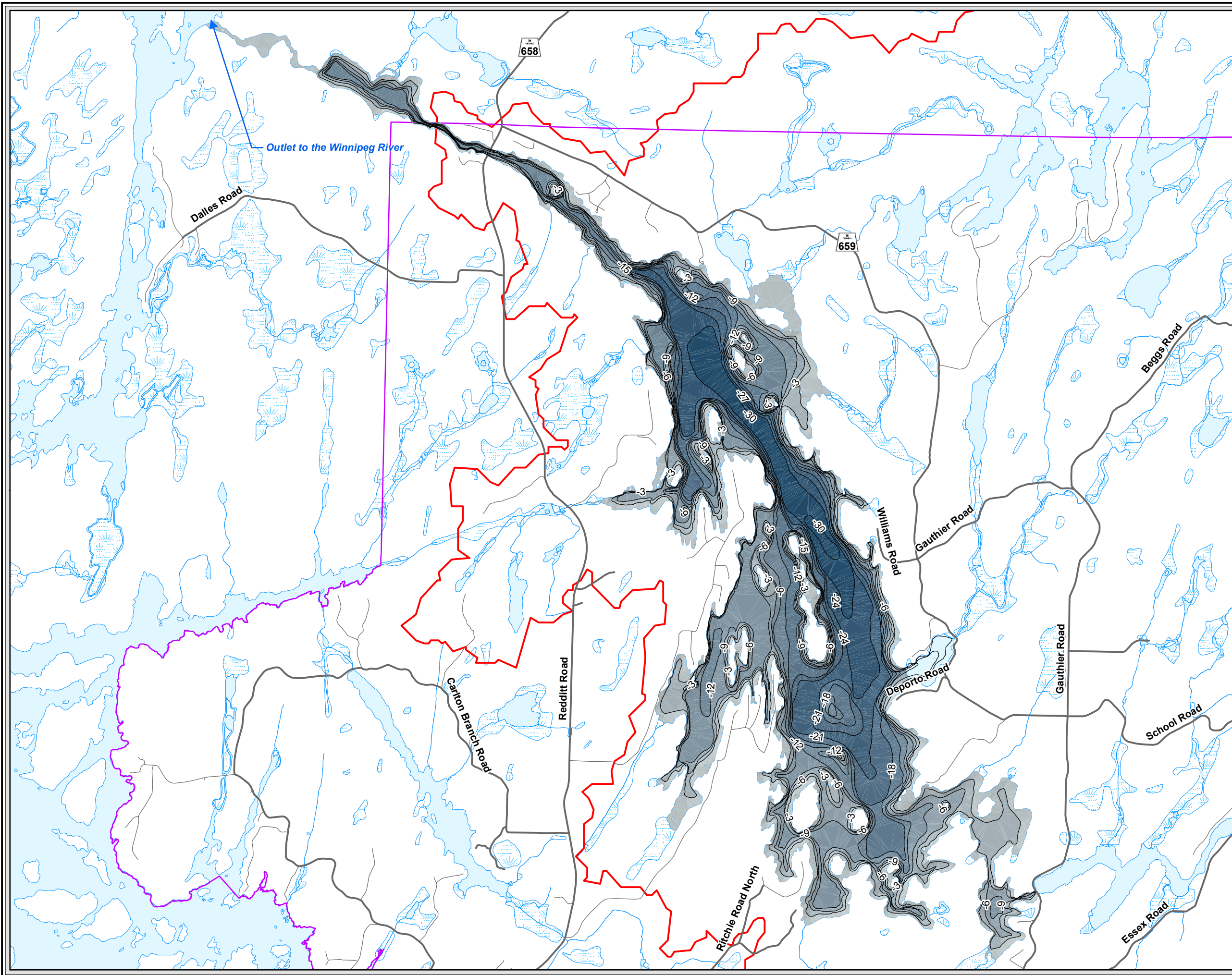
4.1.2 Water Quality Characteristics

Water quality data for Lower Black Sturgeon Lake were obtained from the MOE (Thunder Bay Regional Office), the MOE’s Lake Partner Program (website http://www.ene.gov.on.ca/envision/water/lake_partner/index.htm) and water quality analyses that formed part of the 1988 Shoreline Survey conducted by the MNR (stations shown on Figure 6).

Lower Black Sturgeon Lake is characterized as dystrophic, which is a common feature of lakes in the Boreal ecozone of northwestern Ontario. Dystrophic lakes, often called ‘brown-water lakes’, have high concentrations of humic organic matter because they receive most of their organic supply from terrestrial and/or wetland plant sources in the watershed as well as from littoral vegetation. Although dystrophic lakes are not nutrient limited, their productivity is reduced because the brown water inhibits light penetration, and hence photosynthetic production. The general water chemistry of Lower Black Sturgeon Lake is reflective of soft water and dystrophic conditions. Based on the most recent available water quality data from the MOE in May 2001 and 2007 (Table 3), the lake is circumneutral (pH = 7.40) with low alkalinity (18.1 mg/L CaCO₃) and conductivity (51 µS/cm). Waters are coloured (30.0 TCU) with high dissolved organic carbon (DOC) concentrations (8.2 mg/L) contributing to the relatively low water clarity observed in the lake, as indicated by a shallow mean Secchi depth of 3.1 m (1997-2006, Table 4).

-
3. *Littoral areas are those nearshore areas, which are shallow enough that sunlight penetrates to the lake bottom such that rooted plants can grow. They are sunlit, warm and highly productive, and represent very important areas of fish habitat.*
 4. *At the Public Meeting (July 12, 2007), residents noted that water levels in Lower Black Sturgeon Lake were the highest observed in the past ~30 years.*

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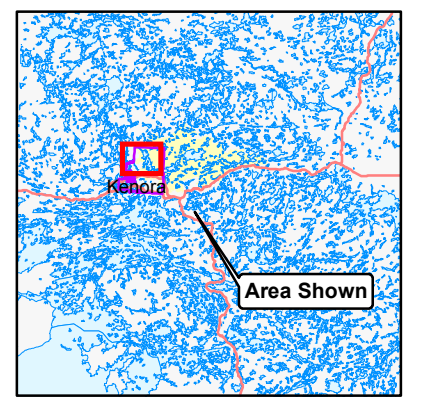


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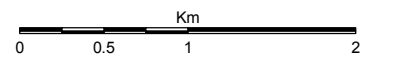
- Kenora City Limit
- Watershed

Depth (m)

- 27 - 31
- 24 - 27
- 21 - 24
- 18 - 21
- 15 - 18
- 12 - 15
- 9 - 12
- 6 - 9
- 3 - 6
- 0 - 3



Basemapping from Ontario Ministry of Natural Resources



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UTM Zone 17N, NAD 83

Black Sturgeon Lakes
Management Study

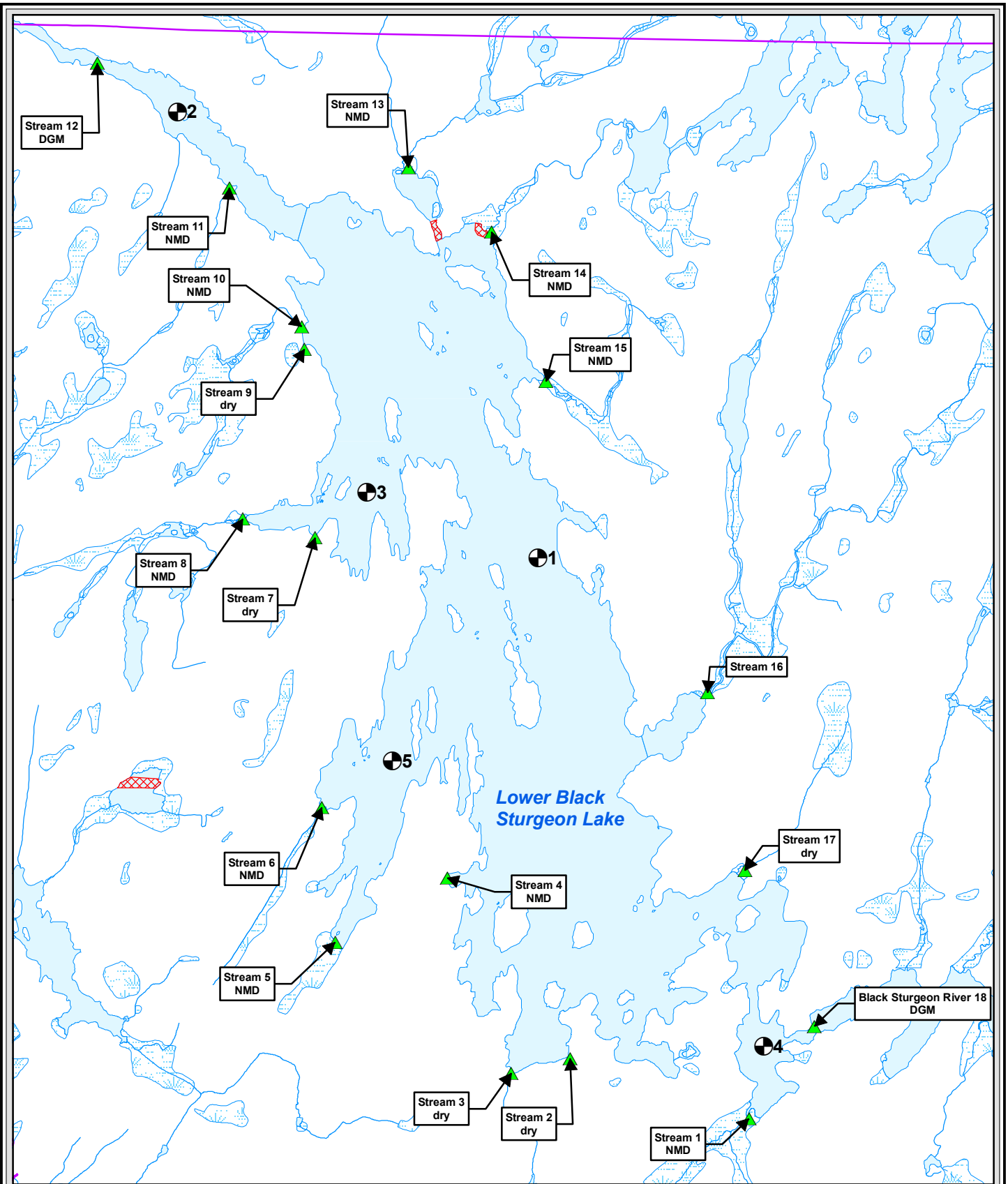
Lake Bathymetry

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Project 70294

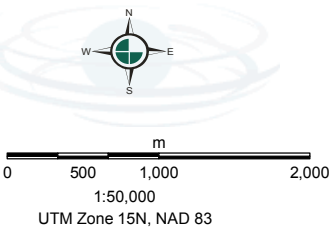


Figure 5





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Basemapping from National Topographic Database
Stream Gauge Sites from OMNR, 1988



Legend

-  Kenora City Limit
-  Lake Inlets*
-  Lake Sampling Sites
-  Wild Rice Stands

* NMD = No Measurable Discharge
DGM = Discharge too Great to be Measured

Black Sturgeon Lakes
Management Study

**Lake Inlets and
Wild Rice Locations**

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Figure 6

Table 3. Selected Water Quality Parameters for Lower Black Sturgeon Lake, May 2001 and 2007. Analyses Were Performed at the MOE Central Laboratory (LIMS Program Data)

Parameter	Units	May 2001				May 2007			Mean
		Station 1	Station 2	Station 3	Mean	Northwest Bay	South West Bay	Mean	
Conductivity	µS/cm	47	47	47		54	56	55	51
pH		7.27	7.22	7.19	7.23	7.55	7.58	7.57	7.40
Alkalinity	mg/L CaCO ₃	16.5	17.5	16.5	16.8	19.3	19.6	19.5	18.1
True Colour	TCU	38.2	39.2	38.8	38.7	21.2	21.5	21.4	30.0
Turbidity	FTU	1.92	1.54	1.38	1.61				1.61
Total Phosphorus	µg/L	16	14	14	15	17	15	16	15
Total Kjeldahl Nitrogen	mg/L	0.46	0.44	0.4	0.43	0.43	0.38	0.41	0.42
Dissolved Organic Carbon	mg/L	9.0	9.0	8.9	9.0	7.5	7.5	7.5	8.2
Dissolved Inorganic Carbon	mg/L	3.6	3.8	3.8	3.7	3.8	3.9	3.9	3.8
Reactive Silicate	mg/L	0.80	0.86	0.88	0.85	0.02	0.02	0.02	0.43

Table 4. Mean Open-Water Secchi Depth (m) for Lower Black Sturgeon Lake, 1997-2006 (data from the MOE Lake Partner Program)

Site ID	Site Description	1997	1999	2000	2001	2002	2003	2004	2005	2006	Mean
2	Lower L., S end, deep spot		3.6	2.6	2.4	2.7	4.1	3.3	3.1		3.1
3	Lower L., E end, deep spot	3.0	3.3	2.2	3.0						2.9
4	Lower L., off Lot 37					2.7	3.5	2.7	2.6	3.3	3.0
7	Lower L., deep spot						4.0	3.2	2.8	3.6	3.4
Mean		3.0	3.5	2.4	2.7	2.7	3.9	3.1	2.8	3.5	3.1

Note: The number of measurements within each given year and individual sampling dates are not known.

As with most dystrophic lakes, Lower Black Sturgeon Lake is moderately productive because it receives high natural phosphorus loads associated with the inputs of organic matter from terrestrial, wetland and/or littoral vegetation. Phosphorus is a plant nutrient that most often limits algal growth in lakes situated on the Precambrian Shield, and is therefore commonly used as an indication of algal productivity. Total phosphorus concentrations measured at various locations throughout the lake since 1997 under MOE's Lake Partner Program are variable and range from 8 µg/L (1997) to 26 µg/L in 2006 near lot 37, with a mean concentration of 15 µg/L (Table 5 and Figure 7).

Phosphorus data are generally available only for a single sampling date per location in any given year, and samples were collected at various times over the growing season.

Table 5. Total Phosphorus Concentrations (µg/L) for Lower Black Sturgeon Lake, 1997-2007 (Data from the MOE LIMS and Lake Partner Programs)

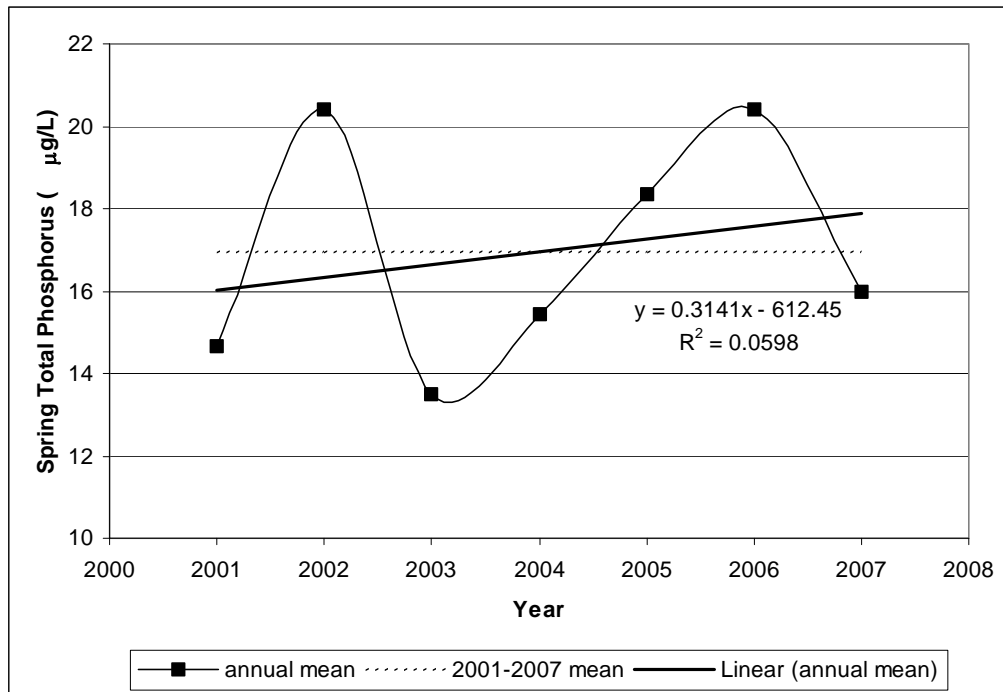
Year	Site ID and Description						Mean
	2 South end, deep spot	3 Lower L.	4 Off Lot 37	8 Deep spot	Northwest Bay	Southwest Bay	
1997		8					8
1998		10					10
1999 ^a	14	11					13
2000	18	14					16
2001 ^b	15	15					15
2002	21		20				20
2003	15		13				14
2004	13		18	20			17
2005	20		19	22			20
2006			26	15			20
2007 ^b					17	15	16
Mean	16.4	11.6	19.1	19.1	16.7	15.3	15.4

Notes: Values represent a single measurement within each year unless otherwise indicated.

^amean values (n=6 for Site 3; n=4 for Site 2)

^bmean values (n=2)

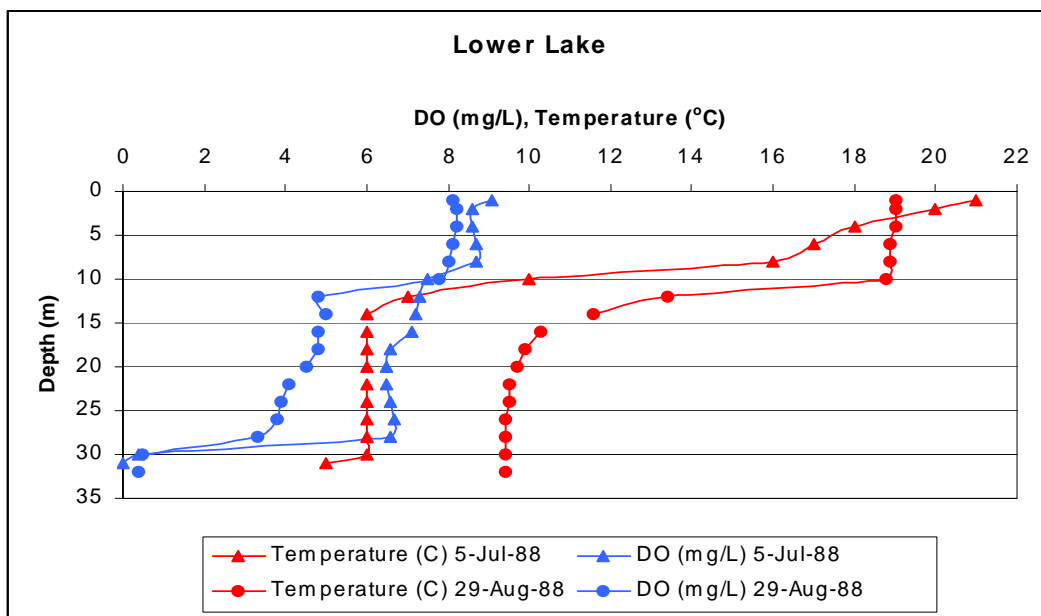
Figure 7. Mean Spring Total Phosphorus Concentrations for Lower Black Sturgeon Lake (1997-2007)



Total phosphorus concentrations can vary considerably in different locations within the lake and over the course of the year due to natural in-lake processes, contributing to the wide range of observed concentrations. Data from samples taken in the spring when the water column was mixed (2001-2007) are much less variable and concentrations ranged from 14 to 20 µg/L with a mean of 17 µg/L. There was no significant trend in spring total phosphorus concentrations from 2001 to 2007 (regression: $r^2 = 0.06$, $n = 17$, $F = 1.104$, $p = 0.304$). In an earlier water quality study by the MOE in 1988 at a single location in the lower lake, spring total phosphorus concentration was 10 µg/L. It should be noted, however, that analytical techniques and associated detection limits for phosphorus concentrations in water have improved considerably since 1988 and so this value is not readily comparable to those collected in more recent surveys since 1997. The present-day spring concentration of 17 µg/L is typical for a lake with a DOC concentration of 8 mg/L and does not suggest any phosphorus enrichment.

Temperature and dissolved oxygen (DO) profile data are available from surveys conducted in 1988 by the MNR (Figure 8). Water temperature profiles indicate that the lake undergoes thermal stratification during the summer. In early summer (July 5th) the water column is weakly stratified with the warmer, less dense surface water layer (epilimnion) approximately 8 m deep. The colder, denser bottom water layer (hypolimnion) included waters below approximately 10 m with rapidly decreasing temperatures in the middle layer (metalimnion) between 8 and 10 m (metalimnion). With continued warming over the summer, stratification strengthened and the epilimnion deepened to a depth of ~10 m. The hypolimnion included waters below ~12 m by late summer (August 29th) with temperatures of 10°C at the lake bottom.

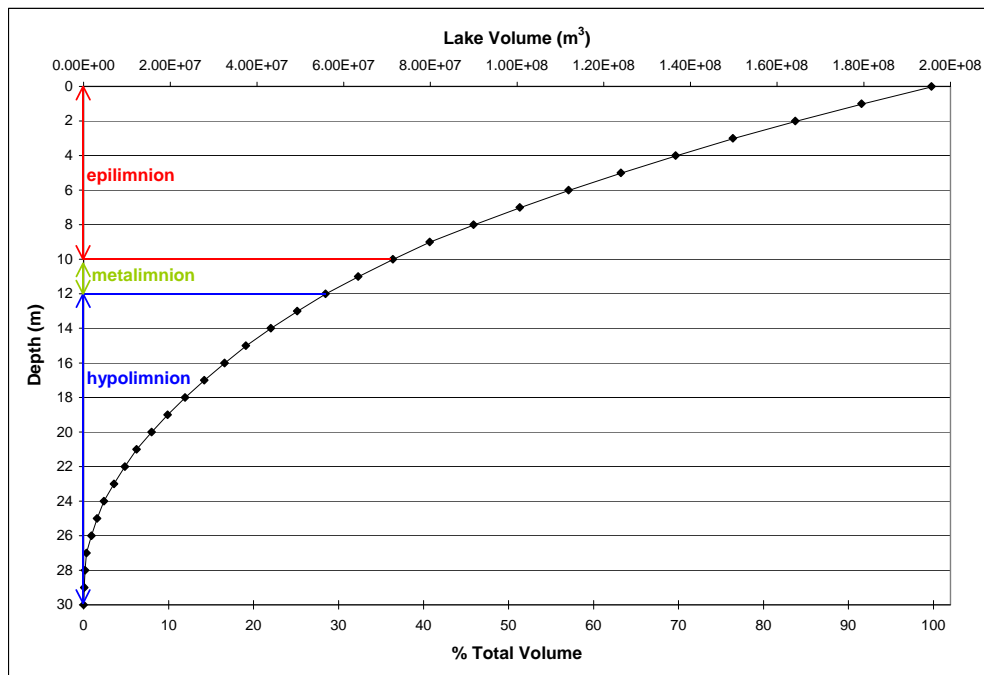
Figure 8. Temperature and Dissolved Oxygen Profiles for Lower Black Sturgeon Lake, 1988



Surface waters of the epilimnion were well-oxygenated throughout the summer because they readily mix and are in contact with oxygen from the atmosphere. Dissolved Oxygen (DO) concentrations therefore exceeded 7.5 mg/L throughout the summer (Figure 8). Dissolved oxygen concentrations were ~ 6.0 mg/L throughout the hypolimnion at the start of the summer. As summer progressed, however, dissolved oxygen concentrations declined rapidly with depth, reaching low levels (4 to 5 mg/L) in the hypolimnion to a depth of ~29 m, and extremely low levels (<0.05) from ~29 m to the sediment water interface at 32 m. Oxygen depletion in hypolimnetic waters is a natural feature of many lakes as oxygen is consumed by the decay of organic matter produced in overlying waters of the epilimnion. Oxygen continues to be depleted in the hypolimnion over the growing season because this dense stable layer is prevented from mixing with oxygenated surface waters.

The degree of hypolimnetic oxygen depletion depends on the amount of organic matter being decomposed and the volume of hypolimnion (and hence mass of oxygen) available for decomposition. These two factors are dependent on lake bathymetry – the ratio of productive volume in the lake to that of the assimilative volume. Productive volume is approximated as the warm and sunlit epilimnetic waters and assimilative volume as the hypolimnion. These volumes can be shown by calculating a hypsometric curve, which summarizes the lake bathymetry as the volume of water at each depth in the lake. For Lower Black Sturgeon Lake, the epilimnion (0 to ~10 m), where organic production occurs, makes up more than 60% of the volume of water in the lake (Figure 9). Only 30% of the lake volume is contained in the hypolimnion for assimilation of that production. The lake therefore tends to “morphometric anoxia” or natural conditions of low hypolimnetic oxygen by virtue of the shape of its basin. This makes the lake sensitive to inputs of organic matter. The “dystrophic” nature of the lake also means that levels of organic matter are high.

Figure 9. Hypsometric Curve for Lower Black Sturgeon Lake Showing Approximate Depths of the Epilimnion, Metalimnion and Hypolimnion in Late Summer (based on August 1988 data)



Under anoxic conditions, phosphorus that is bound in the sediments can become mobile and released into the overlying waters (i.e., internal phosphorus loading) in a form that is readily used by phytoplankton. Despite potential anoxia in deep waters below 29 m, there is no evidence of internal phosphorus loading in Lower Black Sturgeon Lake, based on comparison of phosphorus concentrations in surface and bottom waters (1 m from the sediment surface) collected in the August 1988 water quality survey (Table 6). Phosphorus concentrations were similar in surface (13 µg/L) and bottom (9 µg/L) waters and phosphate concentrations were detected in only trace amounts. If internal phosphorus loading due to anoxia occurs, elevated phosphorus concentrations would be expected in the bottom waters. For example, internal phosphorus loading was evident in Upper Black Sturgeon Lake and the Northeast Bay of the Upper Lake in 1988, both of which exhibit anoxic conditions in bottom waters (Figure 10). Total phosphorus (unfiltered) concentrations in bottom waters ranged from 75 to 100 µg/L, whereas surface water concentrations were only 13 µg/L. Phosphate was below analytical detection limits in the surface waters, but reached high concentrations of 56 and 84 µg/L in the bottom waters. The potential for internal loading due to anoxia is greater in the Upper Lake because it is shallower (mean depth = 7.2 m) than the Lower Lake. As such, a greater proportion of water is likely contained in the epilimnion relative to the hypolimnion with less available oxygen to assimilate organic matter produced in the overlying waters.

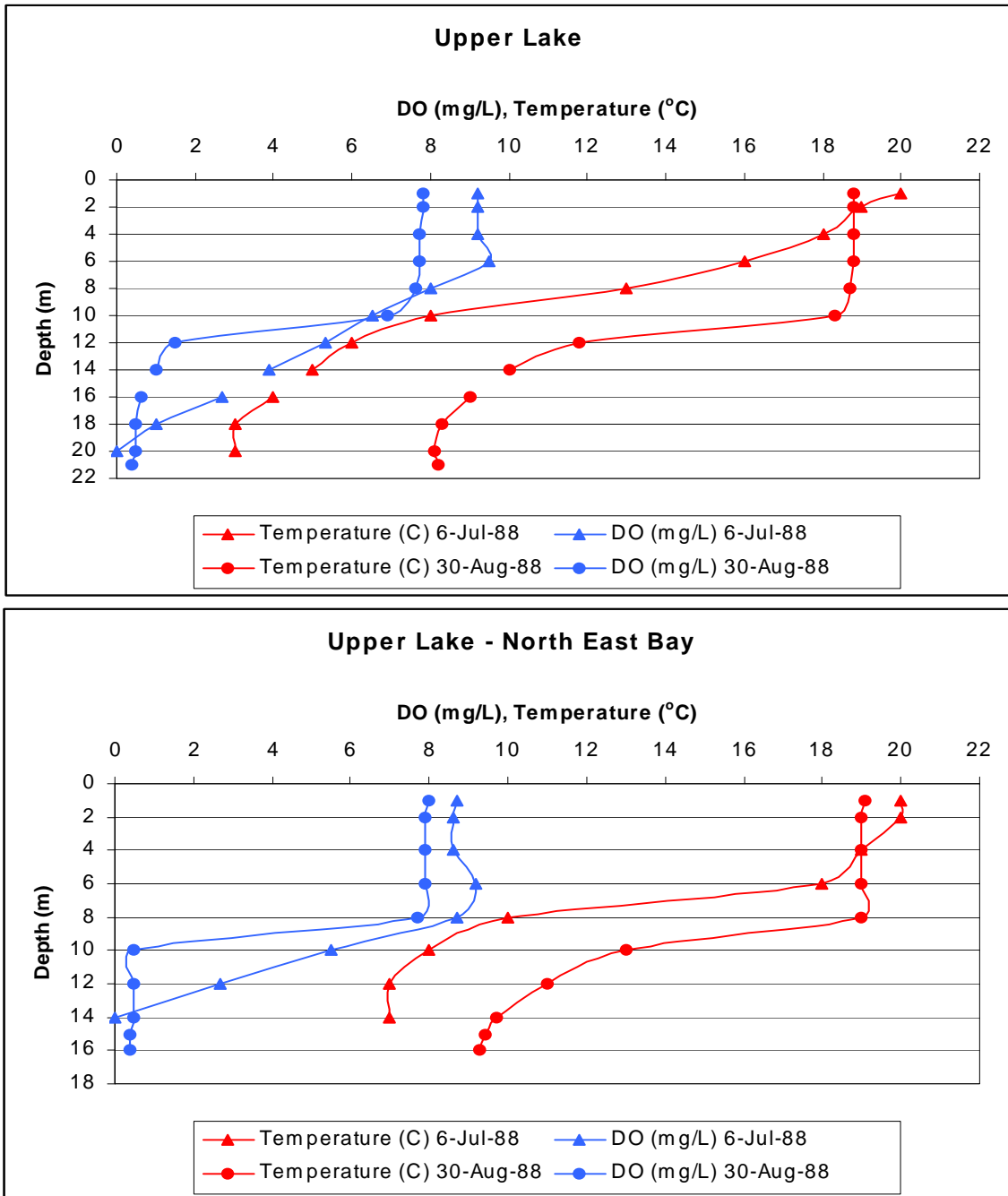
Table 6. Nutrient Concentrations (mg/L) in Top and Bottom (1 m from lake bottom) Waters in Black Sturgeon Lakes, August 1988

Test Description	Lower Lake Top	Lower Lake Bottom	Upper Lake Top	Upper Lake Bottom	Northeast Bay Top	Northeast Bay Bottom
Phosphorus, total unfiltered	0.013	0.009	0.013	0.075	0.013	0.1
Phosphates, Reactive	0.001	.001 <T	.001 <W	0.056	.001 <W	0.084
Nitrogen, total Kjeldahl unfiltered	0.54	0.32	0.45	0.36	0.47	0.01
Ammonium, total reactive	0.16	.01 <T	0.07	.02 <T	0.05	0.08
Nitrates, total reactive	.005 <T	0.05	.005 <W	0.06	.005 <W	.005 <W
Nitrite, reactive	.002 <T	.001 <T	.001 <T	.004 <T	.001 <T	.003 <T

Note: <T is a measurable but trace amount, <W is below analytical detection limits.

Low concentrations of dissolved oxygen also limit habitat for fish and other aquatic organisms. The Provincial Water Quality Objectives (PWQO) of the Ontario Ministry of the Environment (MOE, 1999) provide a temperature-dependent range of dissolved oxygen for the long term protection of aquatic life. Black Sturgeon Lake supports a mixed cold-water (lake whitefish) and warm water (walleye/pike/bass) fish community. The PWQO require dissolved oxygen concentrations exceeding 6 mg/L and 5 mg/L for water temperatures of 10°C that support cold and warm water fish communities, respectively. Upper Black Sturgeon Lake does not meet the PWQO for Dissolved Oxygen during the stratification period (Figure 9). Lower Black Sturgeon Lake meets the PWQO for warm- and cold-water fish communities in early summer (July, Figure 8), but not by late summer (August, Figure 8). Therefore, fish movement and habitat availability may be restricted for both warm- and cold-water fish species in deep waters of the lower lake in late summer.

Figure 10. Temperature and Dissolved Oxygen Profiles for Upper Black Sturgeon Lake (main basin and Northeast Bay), 1988



4.1.2.1 Conclusions

Lower Black Sturgeon Lake is a soft water lake that is coloured by the enriched concentrations of dissolved organic carbon added to it from wetlands and organic matter in its watershed. As a result, water clarity is relatively low (Secchi depth ~ 3.1m). Although organic matter has enriched the phosphorus concentrations in the lake to an average spring value of 17 µg/L, the dark colour of the water reduces light penetration into the lake such that it is termed “dystrophic”, such that productivity is lower than expected on the basis of phosphorus concentrations. The shape of the lake basin itself and its relatively shallow nature produce oxygen concentrations that are low and the bottom layers of the lake are anoxic (without oxygen) in the deepest sections of the lake by the end of the summer. Although data are limited, there is no indication that human disturbance has degraded water quality.

4.1.3 Biological Characteristics

4.1.3.1 Aquatic Vegetation

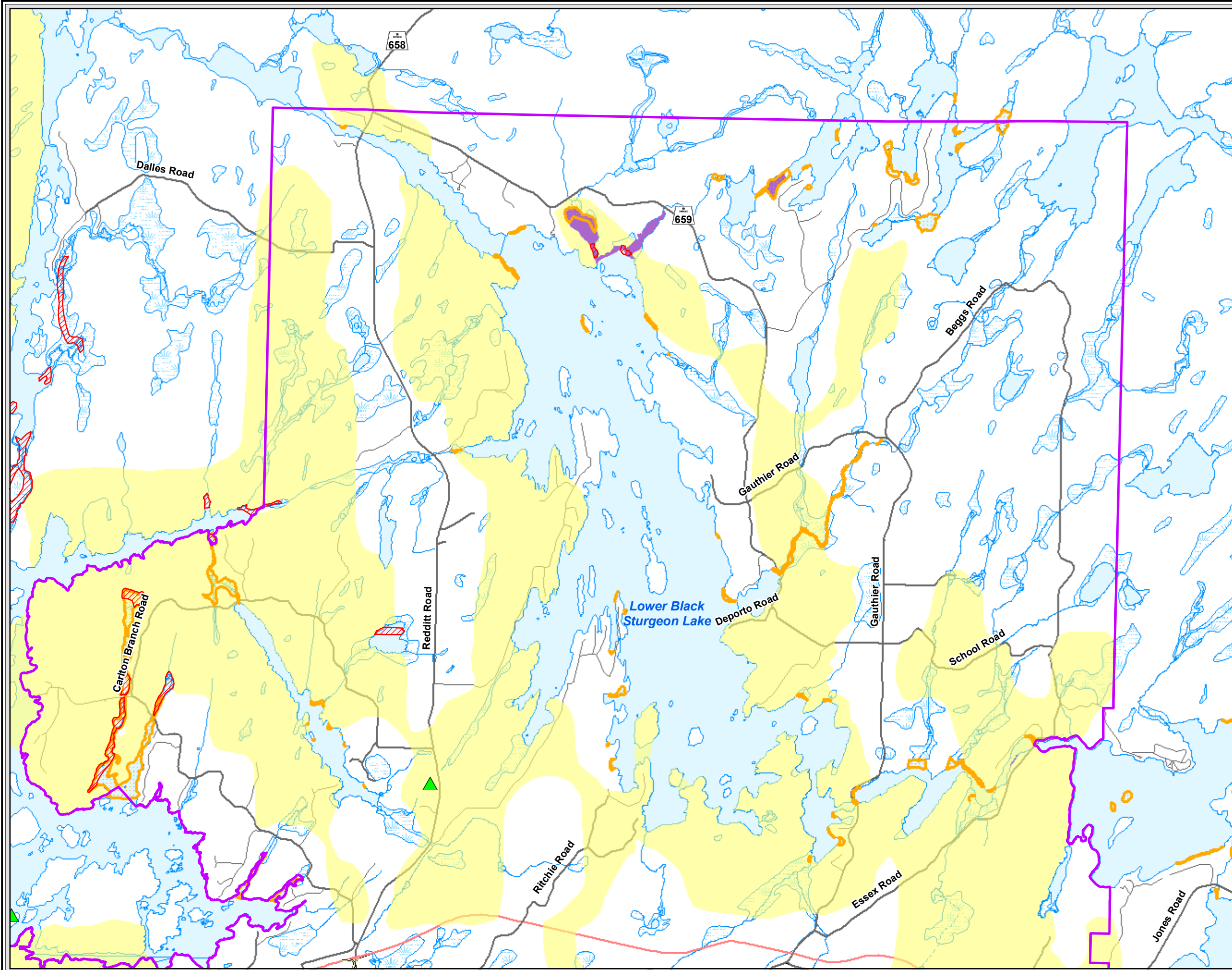
Aquatic vegetation is moderately dense in most sheltered coves and behind islands, and in bays of the Lower Lake, with the densest stands observed in Rice Bay (MNR 1988 Shoreline Survey).

Based on the MNR 1988 Shoreline Survey, common plant types include pondweed, pond lilies, burreed, cattail, and several submergent types (*Sagittaria sp.* and milfoil). Wild rice was observed at several locations, two of which are included in the Natural Values mapping (in Rice Bay and at the mouth of Schnarr Creek (MNR stream 14, Figure 6; Figure 11)). Other stands were noted in a small bay on the east side of the lake near Williams Road and on the west side of the lake near the inlet from MNR stream 8 (Figure 6).

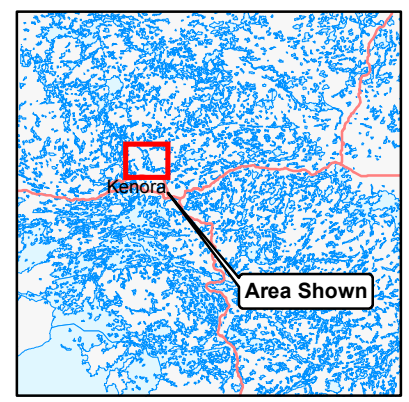
4.1.3.2 Wildlife

Sitings of various forms of wildlife during the 1988 MNR field survey of the Black Sturgeon lake area indicated that deer, ducks, cormorants, eagles, blue heron, beaver, American bittern, loons, snapping turtles, midland painted turtle, leopard frog and wood frog, moose and wolf were common. Black bear and red fox are common in the area and den sitings have been made in the Black Sturgeon area (MNR values mapping, 2007). An inspection of MNR Kenora District values mapping indicated that bald eagle nesting sites are common on Lower Black Sturgeon Lake. As can be seen on Figure 11, there are no wildlife nursery areas on Lower Black Sturgeon Lake, but deer wintering areas are very common. According to the MNR's Natural Heritage Information Centre, there are a number of sites on Lower Black Sturgeon Lake where a vulnerable, threatened or endangered species is known to exist (see Figure 12). In each case, the species has been ranked as “Apparently Secure” which means it is uncommon but not rare, but there is some cause for long-term concern due to declines or other factors.

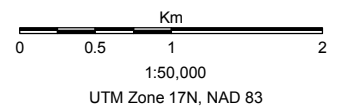
There are no known moose aquatic feeding areas on the Lower lake, but they are quite common at the far eastern end of the Upper lake, in the bay where the Little Black Sturgeon River flows into the lake and to the south and east of there. There are a number of bird nesting and/or feeding areas in this portion of the lake and up into Northeast Bay.



- Legend**
- Kenora City Limit
 - Spawning Area
 - Fish Nursery Areas
 - Wildlife Nursery Areas
 - Wintering Areas
 - Nesting Site
 - WildRiceStands



Basemapping from Ontario Ministry of Natural Resources



1:50,000
UTM Zone 17N, NAD 83

Black Sturgeon Lakes
Management Study

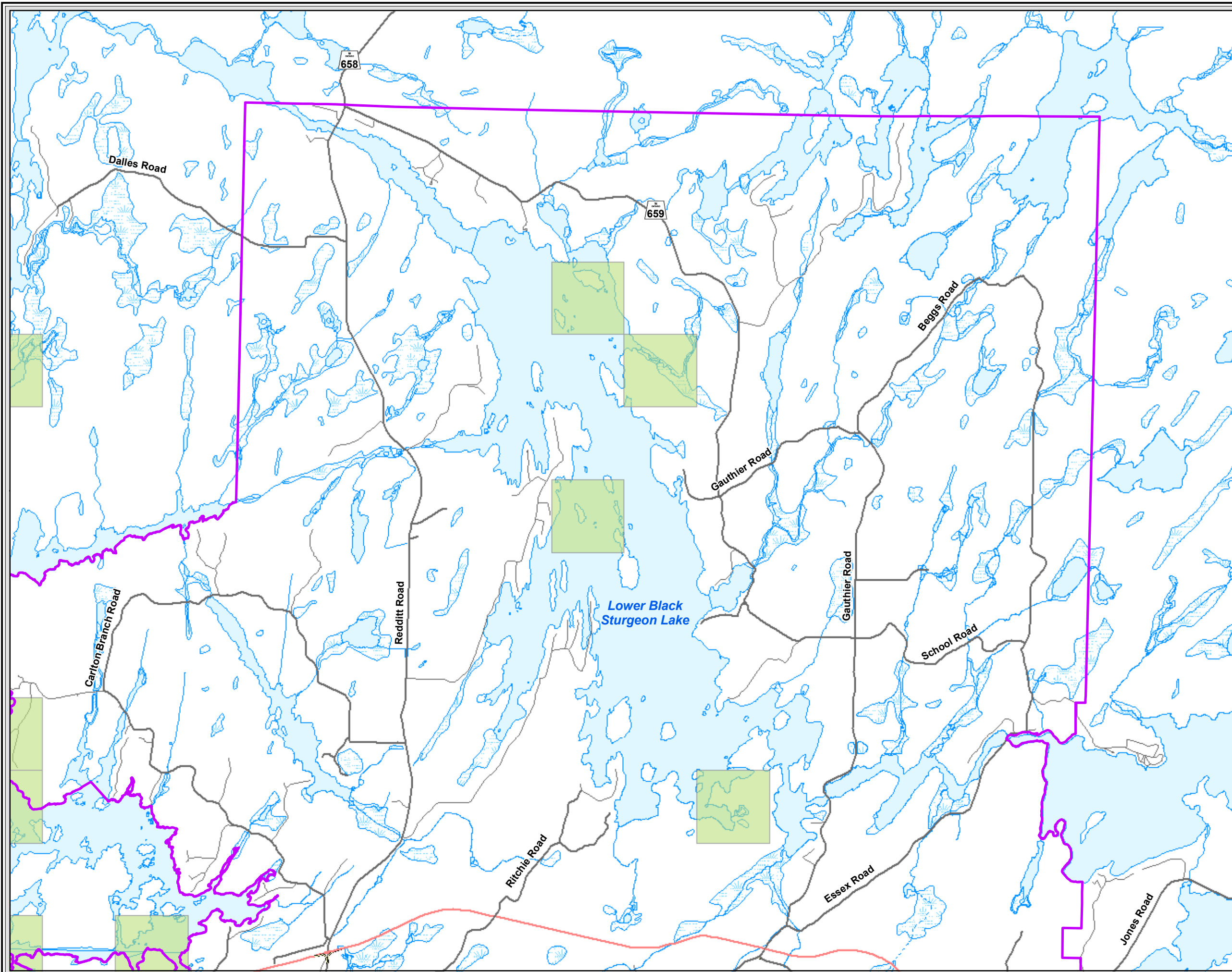
Natural Values Features

August 2007
Project 70294



Figure 11

Map Document: (N:\Projects\2007\70294\2007\Final\GIS\Spatial\Map\Report\MXDs\70294\Figure 12\TE.mxd) 7/31/2007 10:59:08 AM



Legend

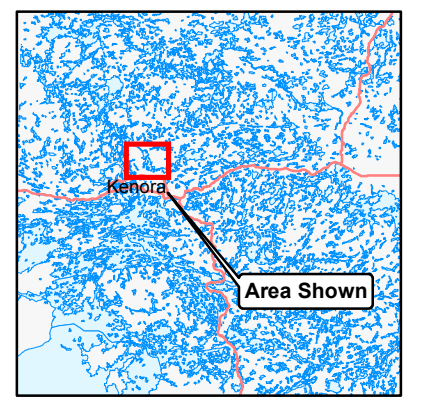
Kenora City Limit

Vulnerable, Threatened and Endangered Species

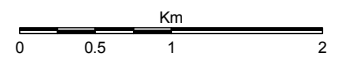
S Rank

S4B*

A rank of S4 indicates a common and apparently secure population, usually with more than 100 occurrences in the province. The "B" suffix indicates a breeding population.



Basemapping from Ontario Ministry of Natural Resources



1:50,000
UTM Zone 17N, NAD 83

Black Sturgeon Lakes Management Study
Vulnerable, Threatened and Endangered Species

August 2007
Project 70294



Figure 12

4.1.3.3 Fish

In 1951, a biological survey of the Black Sturgeon lakes was conducted to better understand the condition and composition of the fish populations and to determine the advisability of establishing a limited commercial fishery on the lakes (Chidley, 1951). At that time, it was found that the whitefish, burbot and northern pike populations were quite large in both lakes and angling pressure was not considered too heavy for the size of the lake. The recommendations in that report were that a limited commercial gill net license be granted to a fisherman for both lakes. As mentioned earlier, a license to commercially fish for whitefish with allowance for a limited incidental catch of walleye and northern pike was granted in 1952, with fishing to occur in alternate lakes each year. By 1982, the license was limited to an annual harvest of 1,500 lbs (682 kg) of walleye and 2,500 lbs (1,136 kg) of northern pike. In the late 1980s, the Ministry of Natural Resources bought out the commercial fishing license on Black Sturgeon and a license was reissued to the Dalles First Nation for whitefish only, with a catch quota for both lakes together of 20,000 lbs (9,088 kg).

This remains the quota for whitefish on Upper and Lower Black Sturgeon Lakes, though subsistence and recreational fishing (for northern pike, walleye and whitefish) does occur on both of the Black Sturgeon Lakes and the Winnipeg River. According to MNR, the commercial fishery on Black Sturgeon has not been active since 2005, partly due to poor market conditions for whitefish (pers. comm., J. McNulty, MNR Senior Fish and Wildlife Technician, 2007).

The sport fishery on the Black Sturgeon lakes has traditionally focused on walleye, northern pike, smallmouth bass, brown bullhead, yellow perch, black crappie and muskellunge (Cedarwall, 1983). During a creel survey conducted in the summer of 1982, the majority of estimated angler harvest came from Lower Black Sturgeon Lake, with a major portion of the estimated harvest comprised of northern pike and walleye. The creel survey revealed that 76% of the anglers were non-resident anglers and that fishing quality (expressed by catch per unit effort or CUE) was poor and, in fact, the lowest documented CUE for walleye for a lake in the Kenora District at that time. While the estimated angler harvest of walleye, northern pike and smallmouth bass was less than the lake's "theoretical" potential fish yield, the allowable commercial fish harvest at the time brought the lake into an overharvest situation for those species (Cedarwall, 1983). While the low CUE recorded in the mid-1980s may have been attributed to the combination of angler harvest and commercial fishing, local residents have indicated a more recent rebound in the bass and walleye fishery (see Appendix A).

Walleye and northern pike habitat is scattered throughout both the upper and lower lakes, with black crappie spawning areas on the Upper lake and whitefish spawning areas on the Lower lake. Deacon Creek is a known corridor for walleye movement. Figure 11 indicates known fish spawning and nursery habitat as identified on MNR's Natural Resource Value Information System (NRVIS). For the most part, this corresponds closely to the fish habitat mapping in the City of Kenora Official Plan and the natural values mapping at the local MNR office, both of which indicate the main habitat to be that of northern pike or walleye. However, there are minor discrepancies amongst the three databases and it would be a worthwhile exercise to reconcile these data to ensure the City is using the most up to date information. While fish surveys have not been conducted on Black

Sturgeon in quite some time, small fish collection surveys were done on both lakes in 1988 and the results of these are shown in Appendix D. Through a variety of fish sampling techniques (dip net, minnow trap, seine nets and the use of rotenone), over twenty stations were sampled on each lake (locations not provided in field notes) and species recorded, along with the site descriptions. On Upper Black Sturgeon, the most common species caught were yellow perch, smallmouth bass and Johnny darter while on Lower Black Sturgeon, the most common species were Iowa darter, blacknose shiner, yellow perch, pumpkinseed, bluntnose minnow and black crappie.

The spawning habitat requirements for the main fish species on the lakes, based on Scott and Crossman (1998) are presented in Table 7.

Table 7. Spawning Habitat Requirements for the Main Fish Species in Black Sturgeon Lakes (from Scott and Crossman, 1998)

Species	Spawning Habitat Requirements
Yellow perch <i>Perca flavescens</i> Mitchill	Spawn in spring when water temperatures are between 8.9 and 22 °C, migrate to shoreward into shallows of lakes and often to tributary rivers. Spawning occurs near rooted vegetation, submerged brush or fallen trees, but at times over sand or gravel.
Smallmouth bass <i>Micropterus dolomieu</i> Lacépède	Nest building and spawning occurs in late spring and early summer in water between 12.8 and 20.0°C at depths ranging from 61 to 610 cm. Males build nests on sandy, gravel, or rocky substrates usually under the protection of rocks, logs, or more rarely, dense vegetation.
Johnny darter <i>Etheostoma nigrum</i> Rafinesque	Spawn in the spring by the cleared underside of a rock.
Iowa darter <i>Etheostoma exile</i> Girard	Spawn in spring, usually in shallow water of lakes or pondlike expansions in rivers near undercut banks. Spawning is on organic debris covering muddy substrate
Blacknose shiner <i>Notropis heterolepis</i> Eigenmann and Eigenmann	Spawn in spring or summer over sandy bottoms
Pumpkinseed <i>Lepomis gibbosus</i> Linnaeus	Spawning usually begins in late spring and can continue into late summer. Spawn in water depth of 152-305 mm near shores of ponds lakes or slow moving streams. Nest building begins when waters reach about 20°C in shallow depressions in areas of submerged aquatic vegetation over clay, sand gravel or rock substrate.
Black Crappie <i>Pomoxis nigromaculatus</i> Lesueur	Spawn in late spring and early summer when water temperatures reach 19 to 20°C. Males clear shallow depressions in sand, gravel or mud in water that is 2.5 to 6.1 cm deep, and where there is some vegetation.
Lake Whitefish <i>Coregonus clupeaformis</i> Mitchill	Spawning usually occurs in fall in shallow waters (<7.6 m deep) over a hard or stoney bottom or sometimes sand
Northern pike <i>Esox lucius</i> Linnaeus	Spawn in spring after ice melt when water temperatures are between 4.4 and 11.1°C on heavily vegetated floodplains of rivers, marshes and bays of larger lakes.
Largemouth bass <i>Micropterus salmoides</i> Lacépède	Spawning occurs from late spring to mid-summer. Males build nests when water temperatures reach at least 15.6°C usually in areas with soft mud amongst reeds, bulrushes or water lilies at water depths ranging between 30.5 and 122.0 cm.

Table 7. Spawning Habitat Requirements for the Main Fish Species in Black Sturgeon Lakes (from Scott and Crossman, 1998)

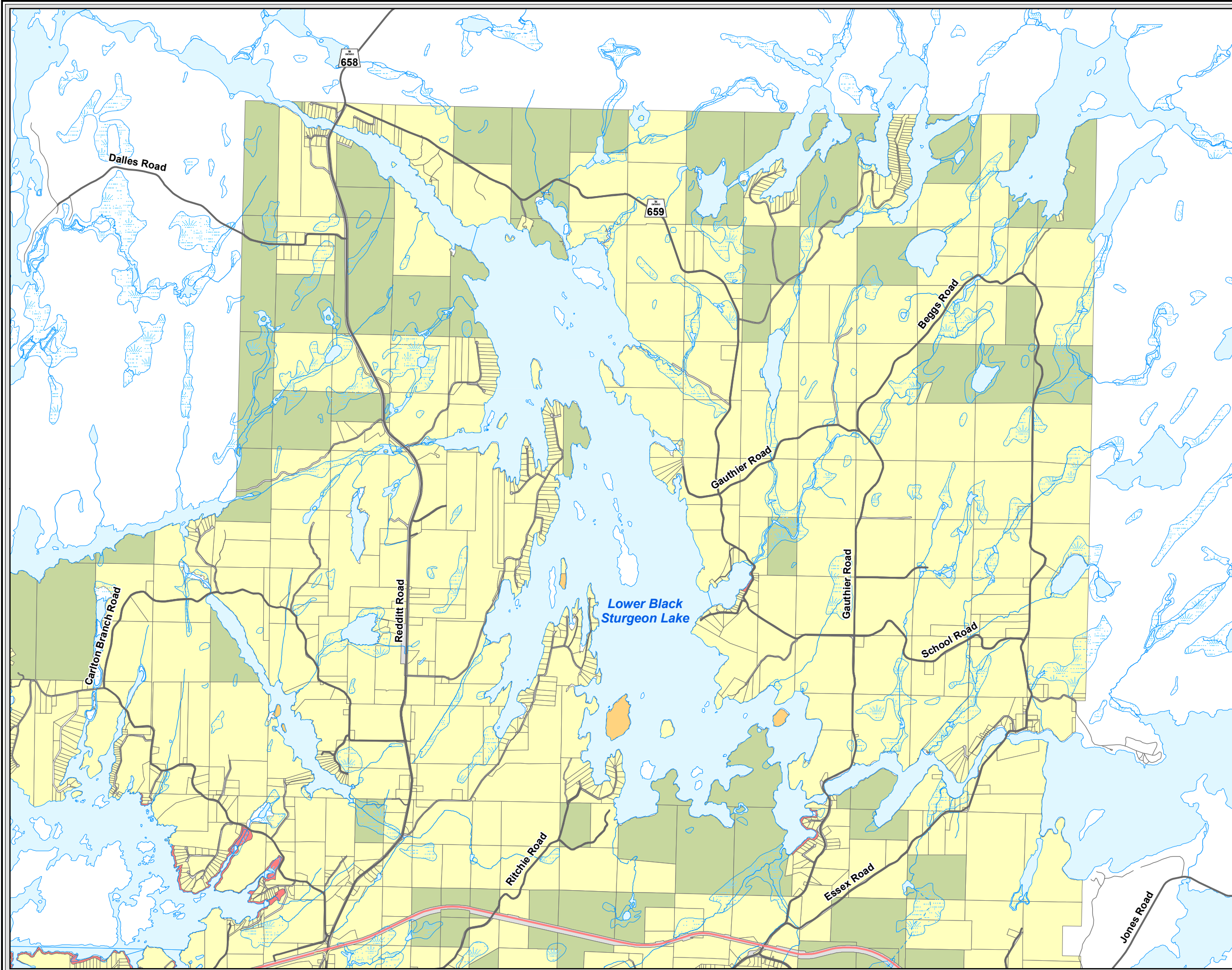
Species	Spawning Habitat Requirements
Walleye <i>Stizostedion vitreum</i> Mitchill	Spawning in spring or early summer at water temperatures of usually 6.7 to 8.9 °C. Occurs in rocky areas in white water below impassable falls and dams in rivers, or boulder to coarse-gravel shoals of lakes. Fish often move to tributaries once they have become ice free, but while the lake is still ice covered.
Brown bullhead <i>Ictalurus nebulosus</i> Lesueur	Spawn in late spring and summer when water temperature reaches 21°C on mud or sand among the roots of aquatic vegetation usually near protective cover (e.g., stump, rock) usually around the shores of lakes or in coves, bays or creek mouths.
Muskellunge <i>Esox masquinongy</i> Mitchill	Spawn in early spring soon after ice melt when water temperature is 9.4 to 15°C, with an optimum temperature of 12.8°C. Spawning takes place in water that is 12-20 inches deep in heavily vegetated and flooded areas.
Bluntnose minnow <i>Pimephales notatus</i> Rafinesque	Spawns in spring in 6 inches to 3 feet of water in a hollow created under flat stones or other hard objects (e.g., logs, bricks, boards, etc.).

4.1.4 Socio-Economic Characteristics

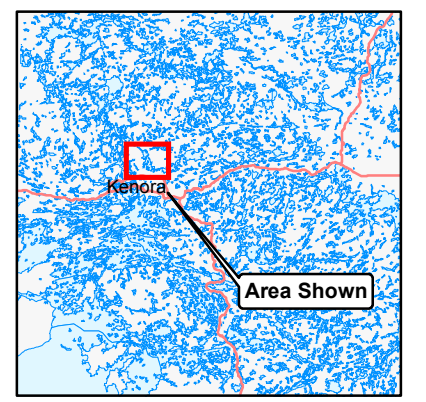
4.1.4.1 Land Uses

The lands around the lower Black Sturgeon lakes are within the former Town of Jaffray-Melick, which functioned primarily as a residential community with rural attributes and significant shoreline residential/cottage development. There is a mix of low-density residential development, waterfront residential and very limited farm, tourist commercial and resource-based operations. While the majority of land within the watershed is undeveloped, there are significant pockets of residential areas on Black Sturgeon Lake and other lakes in the watershed, including Deacon Lake, Grassy Lake, Schnarr Lake, and Austin Lake.

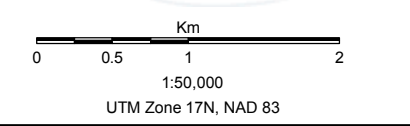
The two basic land use classifications are patent land (privately held) and Crown Land. Crown Lands around lower Black Sturgeon are shown on Figure 13; the majority of the land surrounding upper Black Sturgeon is Crown-owned. The vast majority of the patent lands around Lower Black Sturgeon Lake are zoned Rural (R) (see Figure 14) and the subdivisions are all zoned Rural Residential (RR), with small, infrequent pockets of Open Space (OS) and Tourist Commercial (TC) interspersed (Figure 14). There are a few areas zoned Extractive Industrial (MX) along the Ritchie Road, Essex Road, Beggs Road and Coker Road. A number of environmentally sensitive areas have been designated Environmental Protection (EP), based on features identified by the Ministry of Natural Resources, such as fish spawning areas or significant wildlife habitat. These include Deacon Creek, two of the islands on lower Black Sturgeon, most of the inflows to the lower lake, and portions of land abutting the Lawton Drive subdivision and the peninsula at Pinecone Drive. There is one location zoned Local Commercial (LC) at Redditt Rd. and Haney Drive, on the north side of Black Sturgeon River. Permitted uses within each of these zoning designations are provided in Table 8. The Dalles (Ochiichagwe’Babigo’Ining) First Nation abuts the City boundary on the west.



- Legend**
- Property Ownership**
- Reserve Land
 - Crown Land
 - Patent Land
 - Transportation
 - Island



Basemapping from Ontario Ministry of Natural Resources

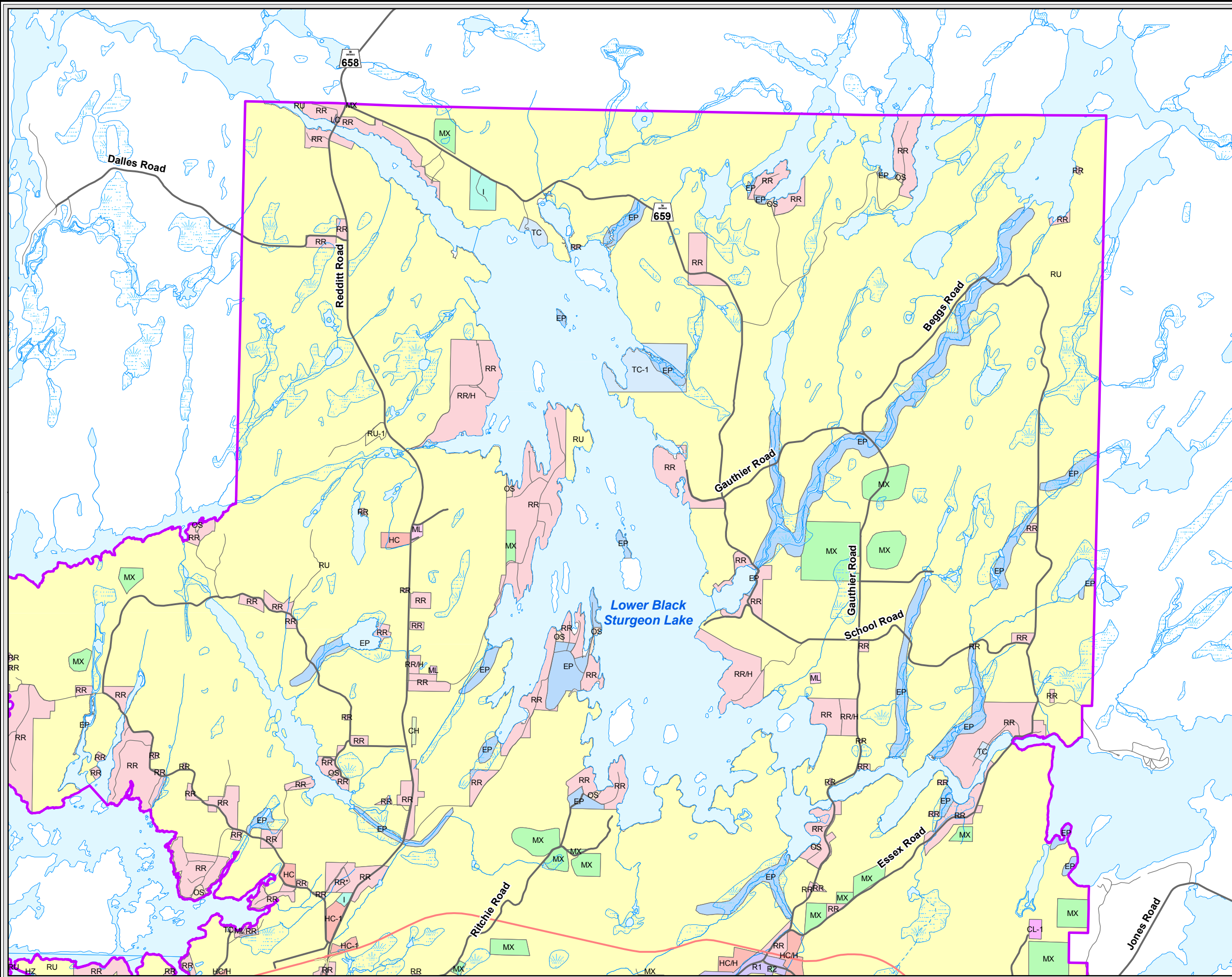


Black Sturgeon Lakes
Management Study

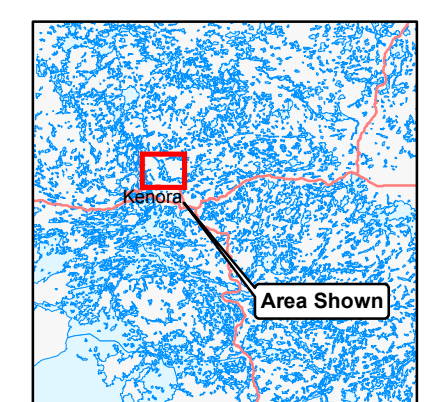
Property Ownership

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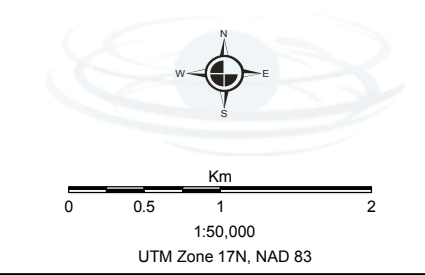




- Legend**
- Kenora City Limit
 - Zoning Designation**
 - CH
 - CL-1
 - EP
 - HC; HC-1; HC/H
 - I
 - LC
 - ML
 - MX
 - OS
 - OS/HZ
 - R1
 - R2
 - RR/H; RR; RR*
 - RU; RU-1
 - TC; TC-1



Basemapping from Ontario Ministry of Natural Resources



Black Sturgeon Lakes Management Study

Zoning

August 2007
Project 70294



Figure 14

Table 8. Permitted Uses in Zoned Areas within the City of Kenora

Zoning Designation	Permitted Uses
Local Commercial Zone	<ul style="list-style-type: none"> • 1 accessory dwelling unit • Bakery • Business support service • Convenience retail store • Daytime child care service • Eating and drinking establishment • Health service • Household repair service • Indoor participant recreation service • Laundromat • Minor impact utility service • Personal service shop • Pharmacy • Pet grooming/supply facility • Professional, financial and office support services • Studio
Open Space	<ul style="list-style-type: none"> • Indoor participant recreation service • Outdoor participant recreation service • Community recreation service • Public park • Interpretive or cultural exhibit • Wildlife and conservative reserve • Minor impact utility service • Golf course • Non-accessory parking • Boat launch
Environmental Protection Zone	<ul style="list-style-type: none"> • Wildlife and conservation reserve
Tourist Commercial Zone	<ul style="list-style-type: none"> • 1 accessory dwelling unit • Amusement establishment • Convenience retail store • Eating and drinking establishment • Gas bar • Marina • Minor impact utility service • Motel • Outdoor amusement establishment • Outdoor participant recreation establishment • Personal service shop • Tourist lodge and cabins • Tourist campground • Vehicle rentals

Registered traplines, bait fish blocks and leech blocks are located on the Crown lands around the lakes.

Snowmobiling, canoeing and boating are popular recreational activities throughout the region. Local snowmobilers are known to use Deacon Creek in the winter. The local Sunset Trail Riders Association maintains the groomed “ReddittTrail” for snowmobilers, which runs along the south edge of Upper Black Sturgeon Lake and across the full length of Lower Black Sturgeon Lake. There is an historic canoe route linked to the early fur trade on both Lower and Upper Black Sturgeon lakes. Even prior to the Hudson Bay Company fur trade, local First Nation fur traders used the lakes, and once the Hudson Bay Company came into existence, the lakes were used as a

transport route to reach the larger trading centres on the English River and north. Fur traders would travel from the Winnipeg River through Black Sturgeon lake and either head through Drewry Lake, Morgan Lake and into Willard Lake to reach larger river systems or head through Silver Lake and continue north (pers. comm. L. Anderson, MNR, 2007).

Possible cultural sites were cited in 1988 MNR field note files on Lower Black Sturgeon Lake near Worona Bay Road, but these do not show up on the most recent values mapping in the MNR Kenora office. On Upper Black Sturgeon Lake, values mapping indicates three cultural sites at the far eastern end of the lake where artifacts have been found along with indications of ancient campsites. It is thought that these artifacts belonged to the people of the Laurel culture - AmerIndians who had moved into northwestern Ontario from the south and east to utilize the network of waterways in the area for commerce prior to 1000 BC (www.borealforest.org). They discovered and used these waterways well before the fur trade was functioning on the same waterbodies.

Lower Black Sturgeon Lake

The lower portion of Black Sturgeon Lake, the portion of the river connecting it to upper Black Sturgeon Lake and a portion of the Black Sturgeon River at the outflow are completely within the municipal boundaries of the City of Kenora. The majority of shorelands on lower Black Sturgeon Lake are privately owned, with a few remaining pieces still owned by the Crown, including a number of the islands on the lake (see Figure 13).

Shoreline Development

Within City limits, there are approximately 250 houses within 200m of the shoreline and 215 of these are within 100m of the shoreline (City of Kenora GIS database, 2004). Since 2004, seventeen new lots have been approved and twenty-four more are awaiting approval. MNR base mapping data for 1999 showed that there were 180 houses within 200m of the shoreline.

Shoreline development over the time period from 1999 to 2004 is therefore estimated as 70 built structures or ~ 14 lot severances each year. Applications (24) and approvals (17) since 2004 amount to 41 additional lots or ~ 10 per year. Public perceptions of increased development activity on the lake are therefore substantiated by recent data on lot severances.

Commercial properties include Black Sturgeon Camp on the north shore of lower Black Sturgeon Lake and Hidden Trails Resort on the Black Sturgeon River between the upper and lower lakes. Black Sturgeon Camp was built in the 1940s and currently consists of 8 rental cabins. Some of these cabins have their own septic field; others drain to a holding tank, which is pumped regularly. The site has contemplated installing a sewage lagoon/spray irrigation system and received authorization from the Ministry of the Environment to do so in 2001. However, it has not yet been built. The Certificate of Approval issued by MOE does not authorize the direct discharge of sewage into the water course, but the discharge of sewage through irrigation into the bush (pers. comm., R. Boivin, MOE, 2007).

Hidden Trails Resort is approximately 40 years old and consists of 6 cabins and 17 campground sites. The cabins share a septic system that has been approved by the Northwestern Health Unit (NWHU).

While there were several more tourist camps in operation over time, many of these have closed down and some have been converted to residential subdivisions. Based on information acquired at this time, there were 15 known tourist camps at one point on both lakes, but currently there are only 2 located on the Lower lake.

On Lower Black Sturgeon Lake, there is one public boat launch on the northwest shore at Thatcher Road (lot 12, Concession 6, former Mellick Township) and it is used regularly. There are no formal public boat launches anywhere else on the lower lake or the river, but the boat launch at Black Sturgeon Camp is available for use for a fee and there is an unofficial launch at the end of James Rd.

Upper Black Sturgeon Lake

The majority of the upper portion of Black Sturgeon Lake and the Black Sturgeon River inflow from Silver Lake are located within the Township of Pettypiece, directly east of the City of Kenora boundaries, though a portion of the south end of the lake is in Haycock Township. The majority of shorelands on upper Black Sturgeon Lake are Crown-owned. There are currently no Crown lots for sale on Upper Black Sturgeon Lake and this is consistent with Provincial Policy.

Shoreline Development

Any developed land in this portion of the lake is mainly residential, with one commercial property, Beauty Bay Golf Course and campground, built in the early 1970s. Beauty Bay Golf Course and Campground consists of an eighteen-hole course, with a clubhouse and an estimated 100 visitors per day. The owner leases cottages seasonally on the property and there are currently approximately 120 tenants holding long-term leases. Of the 120 leased properties on the Beauty Bay property, approximately 25 of these are at the shoreline. The leased cabins and mobile homes use a combination of septic systems, greywater systems and outhouses for sewage treatment. There is a boat launch located at Beauty Bay (available for a fee), but no formal public boat launches on the upper lake.

According to the most recent available MNR data (1999), there were 155 houses on Upper Black Sturgeon Lake within 200m of the shoreline, 125 of which were within the first 100m. A field count of developed properties on upper Black Sturgeon Lake on May 14, 2007 revealed that there are approximately 95 cottages/homes visible from the shoreline. The difference between the MNR data and the field site counts are likely due to the fact that the field counts include only homes visible from the shoreline (and does not include backlots) and estimates of cottage numbers for Beauty Bay following discussions with the owner.

4.1.4.2 Logging

Logging in the upper Black Sturgeon area was occurring as early as the 1920s, with logs being run from Silver Lake through the falls into Black Sturgeon. Logging in the late 1980s and early 1990s was limited to a block south of Hunting Lake and north of the Black Sturgeon River, which was logged for poplar to supply the Barwick OSP (Oriented Strand Particleboard) mill market in northwestern Ontario. Around the same time, a block of Crown land bordered by Dalles First Nation on the west, Redditt Road on the east and the Black Sturgeon River on the north was logged. Given the amount of patented land in the area and the lack of a market for mixed hardwood historically, logging activity was quite minimal up to the year 2000 (pers. comm., B. Altman, Retired MNR Forester, 2007).

The Black Sturgeon Lake area falls within the Kenora Forest Management Unit and mapping viewed at the MNR office in Kenora indicated that a number of blocks were approved for the period 1996-2006, though none were slated around the shores of lower Black Sturgeon Lake. On upper Black Sturgeon Lake, cuts have occurred near the outflow from Crystal Bay to Northeast Bay and east of Island Lake. Future cut areas include the north end of Silver Lake, the north side of Crystal Bay and the south side of upper Black Sturgeon Lake.

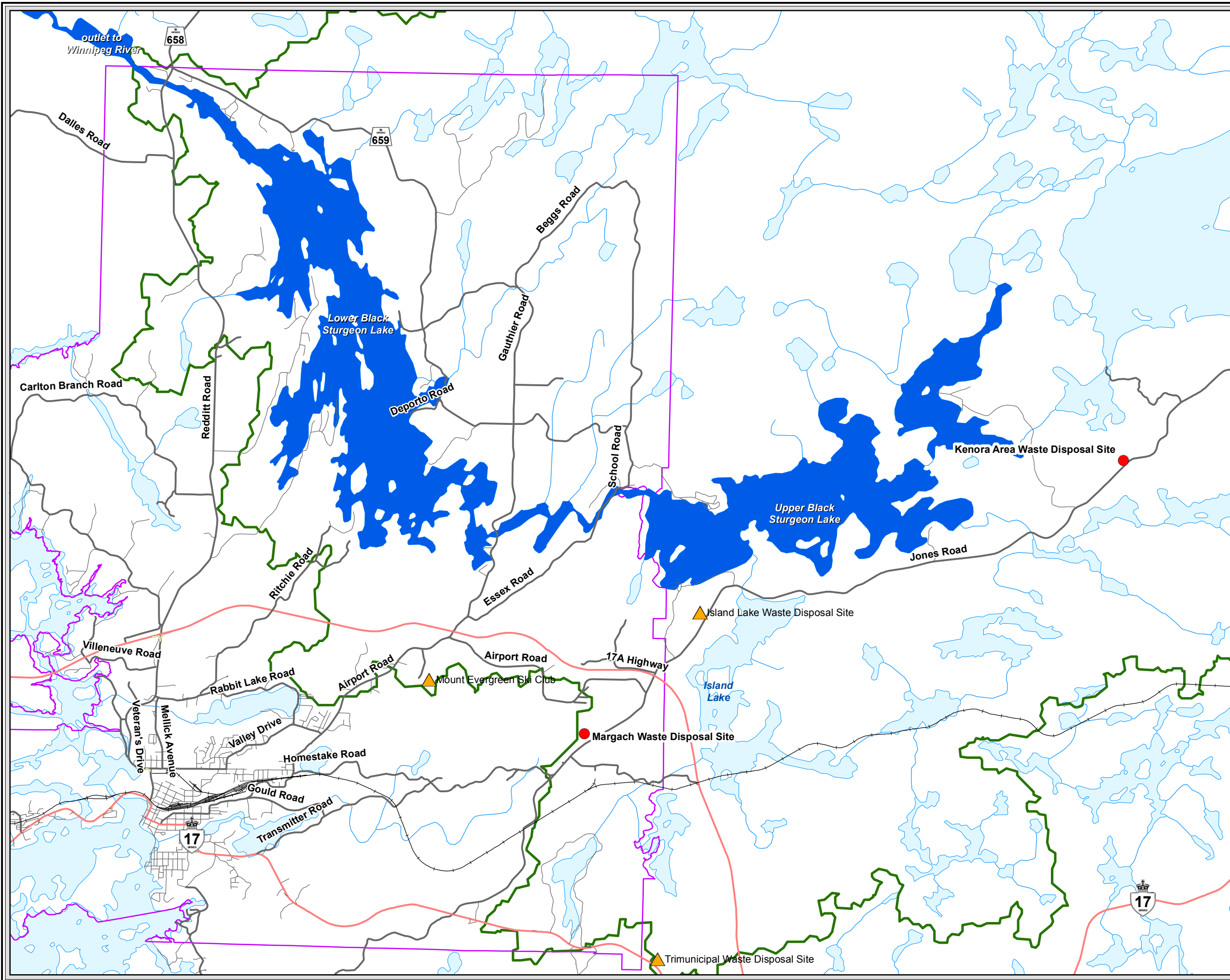
When logging is conducted, the guidelines used for determining the required treed buffer zone at a shoreline for the protection of fish habitat are based on the "Timber Management Guidelines for the Protection of Fish Habitat" (MNR, 1988). The size of the treed buffer zone next to lakes and rivers depends on slope. The steeper the slope, the larger the buffer:

- 0 to 15% slope30 m buffer
- 16 to 30% slope50 m buffer
- 31 to 45% slope70 m buffer
- 46 to 60% slope90 m buffer

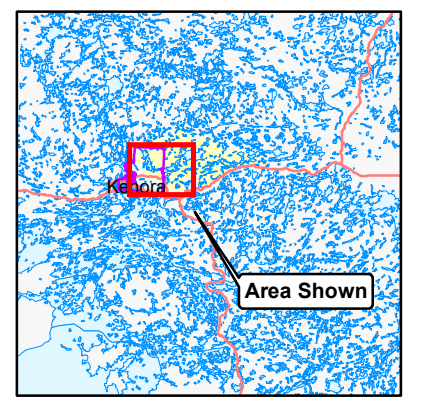
4.1.4.3 Waste Disposal

Within the Black Sturgeon watershed, there is one active waste disposal site (landfill) for solid non-hazardous waste, and three closed landfill sites, as shown on Figure 15 (pers. Comm., R. Boivin, MOE, 2007).

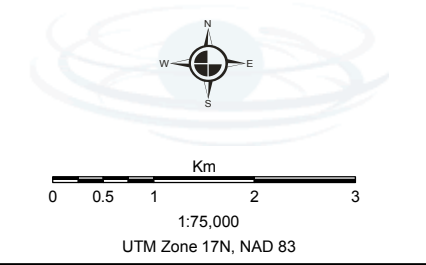
Map Document (N:\Projects\2007\70294\2007\Final\GIS\Spatial\MXD\Report\MXDs\70294\Figure 15\Waste Disposal.mxd)
7/31/2007 1:33:57 PM



- Legend**
- Kenora City Limit
 - Watershed
 - Active Waste Site
 - Closed Waste Site



Basemapping from Ontario Ministry of Natural Resources



Black Sturgeon Lakes
Management Study

Waste Disposal Sites in the Black Sturgeon Lakes Watershed

August 2007
Project 70294



Figure 15

The now closed Tri-municipal Waste Disposal Site operated from 1991 until 2000 and was located along Highway 17 east of town (see Figure 15, A7068504). During its operation, this site received all types of solid non-hazardous waste. The first potential discharge point for surface or groundwater from this site is Breakneck Creek. The watershed flows from Breakneck Creek to Breakneck Lake, Hilly Creek, Island Lake, Island Creek, then to Upper Black Sturgeon Lake. Surface water quality monitoring was conducted as part of the Certificate of Approval requirements for this site. The Ministry of the Environment has indicated that, based on the monitoring data, this closed waste disposal site is not having an off-site impact (pers. comm., R. Boivin, MOE, 2007).

The East Hawk Lake Waste Disposal site (owned by MNR) was closed in 2003 and ultimately drains into Silver Lake. The Gordon Lake Waste Disposal Site (owned by MNR) was closed in 1992 and drains into Medicine Lake and, eventually, Silver Lake.

The currently operating Kenora Area Waste Disposal Site on Jones Road (see Figure 15) has a forty-year capacity. Surface and groundwater leaving the site discharges to a series of wetlands, which flow into Morgan Lake, Drewry Lake and Little Black Sturgeon River to Upper Black Sturgeon Lake. The current site configuration was approved on April 10, 2000 to receive domestic, commercial, non-hazardous solid industrial and institutional waste, processed organic sewage sludge, water treatment sludge, non-pathological agricultural and biomedical waste, and grit and screenings from street cleaning and catch basin clean-outs. Currently the majority of waste going to the site consists of demolition debris, processed organic waste (sludges from the sewage treatment plant), low-level contaminated soil and wood waste.

There is some public concern that the area known as the “saddle” (see Figure 15) may allow for the migration of contaminants from the landfill site into Crystal Bay. Ongoing monitoring of surface and groundwater quality is conducted under the conditions of the Certificate of Approval for this site, (see Figure 15) and the Ministry of the Environment has indicated that, based on this monitoring data, there is no indication that this site is having an off-site impact (pers. comm., via email, Ray Boivin, 2007).

Residential properties around the lake have a mix of on-site septic systems and combination greywater pits/composting toilets (pers. comm., D. Vergunst, NWHU, 2007). Generally speaking, the properties on Ritchie Road at the south end of Lower Black Sturgeon Lake, many of which are seasonal, have a mix of treatment systems; the homes along Peterson Road, James Road and Worona Road on the west shore are mainly septic systems; the north end of lower Black Sturgeon (e.g., Coker Road, Campbell Road, Canfield Road) are older, established and generally permanent residential areas, mainly with septic fields. On Upper Black Sturgeon Lake, the Beauty Bay golf course, campground and leased properties have a mixture of septic systems and greywater pit/compost toilet systems. Because all of the cottages and other facilities are contained on one property and the majority of the property is outside City boundaries, the regulatory authority for any waste management system functioning within the property limits of Beauty Bay is the Ministry of the Environment (which requires permits for flows exceeding 10,000 L/day). On all individual residential lots on the lake within the City of Kenora jurisdiction, the regulatory authority for waste management systems is the Northwestern Health Unit.

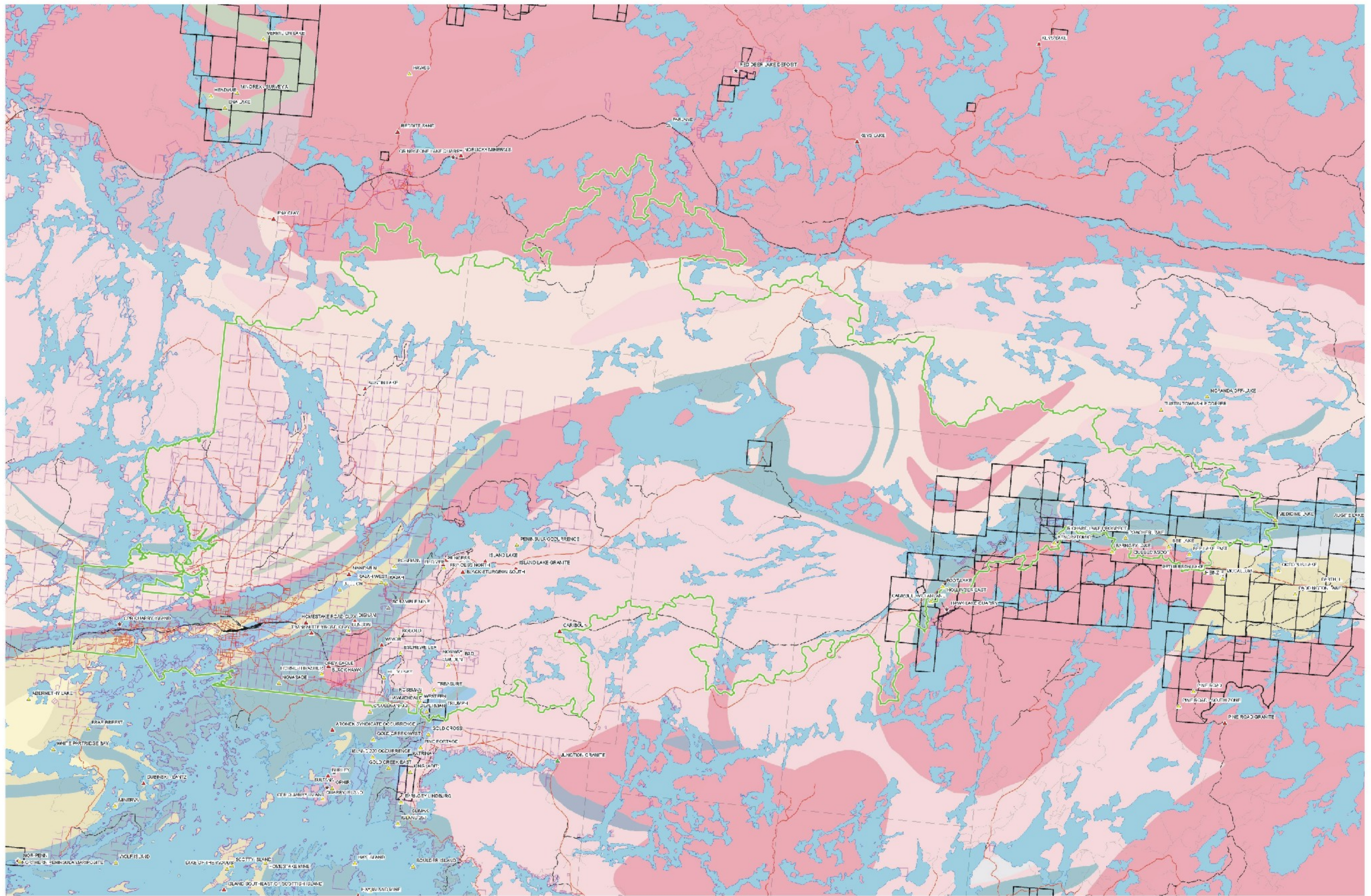
There is one hauled sewage disposal site (drying beds) within the Black Sturgeon watershed, owned by Kenora District Septic Tank Cleaning. It is located on Jones Road in Haycock Township, south of Upper Black Sturgeon Lake.

4.1.4.4 Mining

Figures 16, 17 and 18 indicate mineral occurrences within the watershed (Figure 16), abandoned mine hazards and locations of documented mineral exploration occurrences. On Figure 16, there are various symbols for point values; the equilateral triangles are mineral occurrences and prospects from MNDM's Mineral Deposits Inventory (MDI) with their respective names. There is one star symbol that represents a past-producing mine and/or quarry. While there are many locations in the study area locally known as 'mines' (i.e., Scramble, Wimor, Eschweiller, Treasure, etc.) none actually meet the criteria for a mine as laid out in the MDI. The black rectangular polygons represent staked mining claims and these indicate ground, which is currently staked and may or may not be receiving mineral exploration at this time.

There are very few claims in the western portion of the study area as of June 19, 2007 (Figure 17). There are only three claims in the Hilly Lake – Storm Bay Road area and these are likely over known gold occurrences east of Hilly Lake. There is one staked claim on the east end of Silver Lake, which would likely be related to the granite potential there (pers. Comm., P. Hinz, MNDM, 2007). Moving east, there are a large number of claims in MacNicol and Tustin townships. The large block of claims is probably related to uranium exploration (pers. Comm., P. Hinz, MNDM, 2007). In addition, there are a large number of mineral exploration occurrences in these two areas (near Hilly Lake and in MacNicol and Tustin townships) (Figure 18).

There are 16 known abandoned mines in the Black Sturgeon Lakes' watershed according to the MNDM's Abandoned Mines Information System (AMIS) database (Figure 17). All of the sites are located south of Black Sturgeon Lakes in the Hilly Lake area.



This map was produced by the BLMN, 10000 100m, 1:250,000 scale, using the UTM projection, UTM Zone 18N, datum of 1983, and the NAD83 datum. The map is a derivative of the 1:250,000 scale map of the Black Sturgeon Lake area, which was produced by the BLMN in 1997. The map is a derivative of the 1:250,000 scale map of the Black Sturgeon Lake area, which was produced by the BLMN in 1997. The map is a derivative of the 1:250,000 scale map of the Black Sturgeon Lake area, which was produced by the BLMN in 1997.

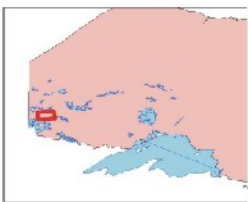
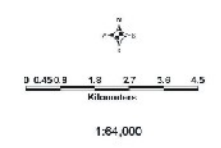
Mineral Deposit Inventory (MDI)

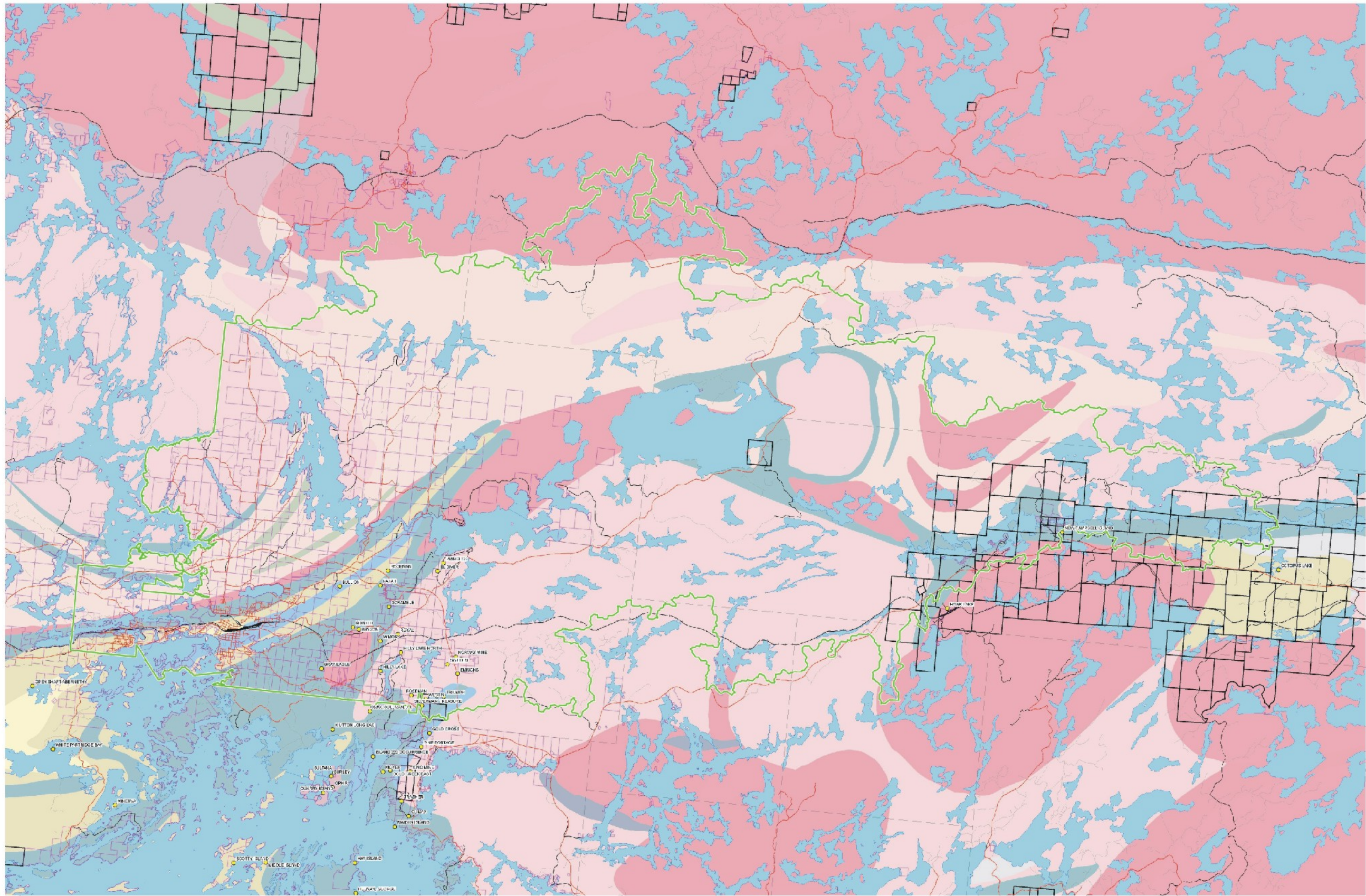
- ★ Producing Mine
- ★ Fast Producing Mine w/o Reserves
- ★ Fast Producing Mine w/ Reserves
- ▲ Developed Prospect w/ Reserves
- ▲ Developed Prospect w/o Reserves
- ▲ Prospect
- ▲ Occurrence
- ▲ Discretionary Occurrence

Legend

- R/W way
- Primary Road
- Secondary Road
- Tertiary Road
- Study Area
- Locals and Parents - as of June 1907
- Etc-etc Claims - as of June 1907
- Township
- Lake

Figure 16. Black Sturgeon Lake Mineral Values with 1:250,000 Geology

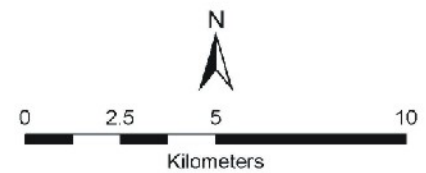




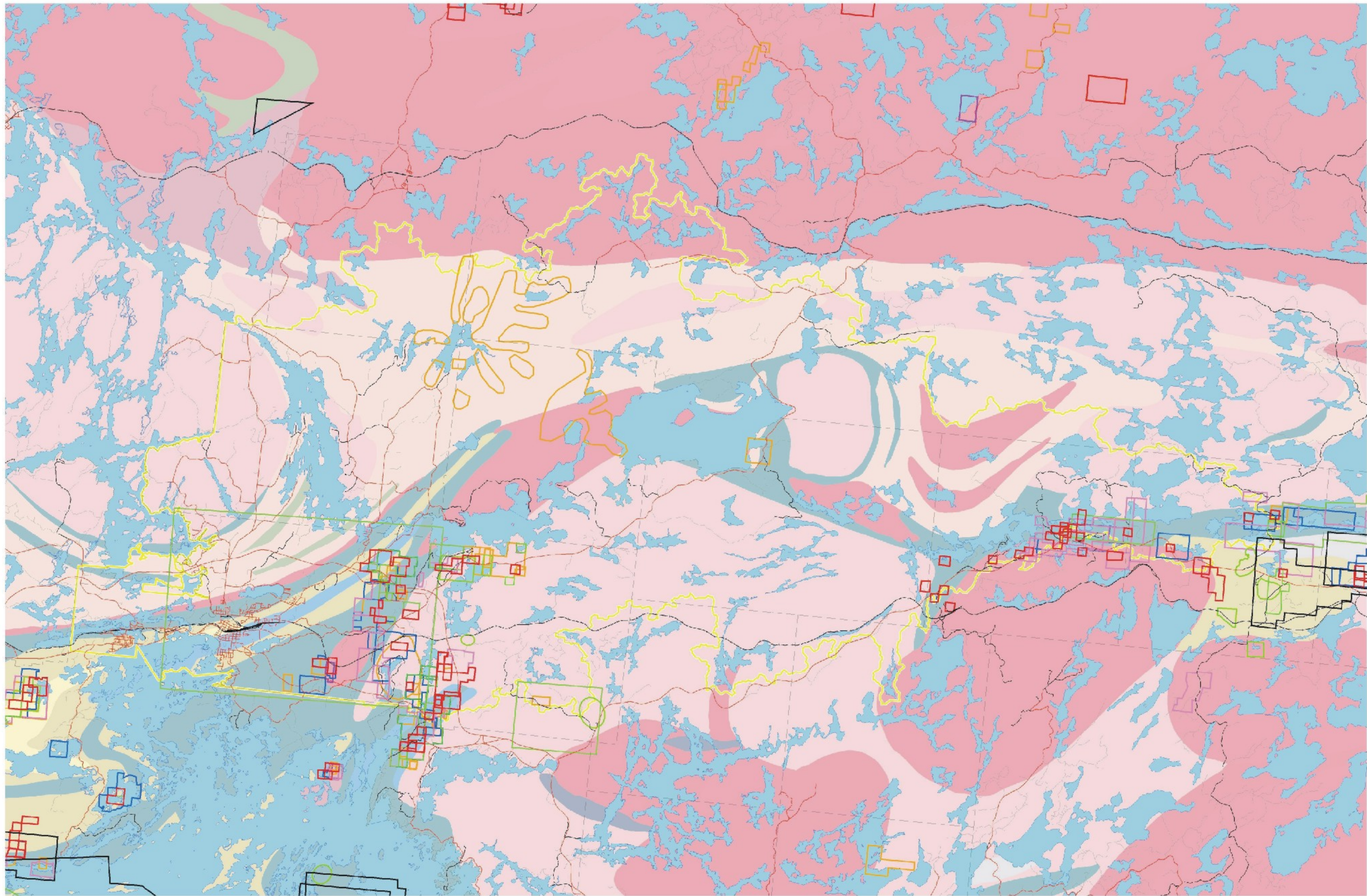
Legend

- AMIS Site
- Railway
- Primary Road
- Secondary Road
- Tertiary Road
- Study Area
- Township
- Leases and Patents - as at June 19/07
- Staked Claims - as at June 19/07
- Lake

Figure 17. Black Sturgeon Lake AMIS Values with 1:250,000 Geology



This map was produced by the AMIS (2007) project. It is a derivative of the AMIS (2007) project. The AMIS (2007) project is a joint project of the Ontario Ministry of Natural Resources and Forestry and the Ontario Ministry of Environment and Energy. The AMIS (2007) project is a joint project of the Ontario Ministry of Natural Resources and Forestry and the Ontario Ministry of Environment and Energy. The AMIS (2007) project is a joint project of the Ontario Ministry of Natural Resources and Forestry and the Ontario Ministry of Environment and Energy.



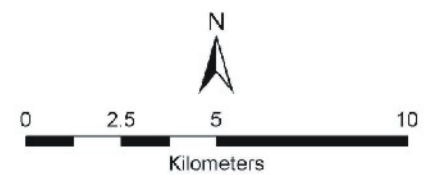
AFRI Legend

- physic
- other
- grogeo
- geolog
- geochem
- diamdr
- airgeo

Legend

- Railway
- Primary Road
- Secondary Road
- Tertiary Road
- Study Area
- Township
- Lake

Figure 18. Black Sturgeon Lake Mineral Exploration Occurrences with 1:250,000 Geology



This map was prepared by the Ministry of Natural Resources Canada (MNR) for the Black Sturgeon Lake Mineral Exploration Occurrences. The map is based on data provided to MNR by the MNR and is not intended for navigation.

This map is the property of the Ministry of Natural Resources Canada (MNR) and is not to be used for any other purpose without the written consent of the Minister of Natural Resources Canada.

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4.2 Regulatory Environment

The Black Sturgeon Lakes straddle the eastern border of the City of Kenora jurisdiction, which means that regulations pertaining to land development are, for the most part, handled by the City of Kenora for Lower Black Sturgeon Lake and by resource agencies and the Ministry of Municipal Affairs and Housing for Upper Black Sturgeon Lake. This lake management study is focused, however, on Lower Black Sturgeon Lake and so our discussion will focus on policies of the City of Kenora.

The City has a Planning Advisory Committee, the Kenora Planning Advisory Committee (PAC), which is composed of seven members of the public who own property within the City, and are appointed by Council for a four-year term. The PAC is authorized by the Planning Act to grant minor variances to the provisions of the Zoning By-law and to permit extensions, enlargements or variations of existing non-conforming uses. Council has also delegated the authority to the PAC to process applications for land division through consent, subdivision and condominium applications.

For lands within the City limits, the Official Plan, the Comprehensive Zoning By-law 160-2004 and building permits are the three primary tools the City has available to assist with decision-making in the review of development proposals. Through the Municipal Plan and Review Process, the City solicits comments from the Ministry of the Environment, the Ministry of Natural Resources and the Department of Fisheries and Oceans for expert advice on resource and environmental issues. Regard is given to these comments when making decisions regarding the potential impacts of development on resources and the environment. In this way, the regulations and legislation enforceable by the various resource agencies (e.g., Environmental Assessment Act, Public Lands Act) may be triggered by this Plan Input and Review Process. Where this process determines that there may be sensitive resources, the City can request that the proponent conduct an Environmental Impact Study (EIS) to ensure that impacts are avoided or mitigated adequately. This consultation process also provides for the streamlining of certain development proposals, such as docks, and has made obtaining authorization from the relevant agency more direct for the proponent (see “Procedure for all Persons Wanting to Install a Private Dock, Boathouse, Boat Launch or Other Marine Structure within the Limits of the City of Kenora” in Appendix E.

Outside of the City boundaries, which is considered “unorganized territory”, any application for a severance or subdivision proposal on private land must be made to the Ministry of Municipal Affairs and Housing. In some cases, unorganized townships can be subject to Minister’s Zoning Orders or Zoning by-laws and therefore, “Letters of Conformity” or “Zoning Conformity Permits” would be required in these townships, prior to any development or construction taking place.

Works proposed on Crown Land in these unorganized areas, such as docks or boathouses, are subject to Ministry of Natural Resources work permits or Occupational Authority requirements under the Public Lands Act. The Ministry of Transportation may also need to be consulted with respect to permits required if development is proposed on or near a highway.

Building permits are not issued in unorganized territory, as there is no municipal authority to do so. However, the *Building Code Act, 1992* is applicable to all lands, whether in municipalities or in unincorporated areas. This applies to all buildings, whether or not a permit has been issued or applied for, and also where a person is exempt from the requirement to obtain a permit (i.e., for the construction of buildings other than sewage system, in unorganized territory). Septic system approvals would need to be obtained from the local Northwestern Health Unit.

4.2.1 City of Kenora Official Plan

The first Official Plan for the City of Kenora was adopted March 8, 2004 and approved by the Minister of Municipal Affairs and Housing on July 14, 2005. The Official Plan must be consistent with the Province of Ontario's Provincial Policy Statement (PPS, 2005) to ensure that matters of Provincial interest are embedded in the local planning documents.

The current Official Plan consists of a set of policies, land use and other schedules and amendments, adopted and finalized pursuant to *The Planning Act*. The purpose of the policies are:

- a) to provide a planning policy framework for decision-making by the City council and its Committees and other public bodies;
- b) to serve as a guide for the public and business community regarding the growth and development of the City; and
- c) to provide local context for the application of Provincial planning policies.

The Official Plan states that the policies have been established to guide the physical development of the City while having regard to relevant social, economic and environmental matters. The Plan has general development policies for most land use types, assigns allowable uses to certain land use designations and describes the vehicles to implement policies (e.g., zoning by-laws, site plan control, public meetings, environmental impact assessments, etc.).

4.2.1.1 *Applicable Objectives, Policies and By-laws*

Objectives

Section 2.0 of the Official Plan lists a set of Objectives, which are meant to outline the main goals of the Official Plan and to set the tone for the need for such a planning document. Objective 2.2 states that the Official Plan has the ability to “*limit residential growth in the Rural Area, where lot size and configuration can support private water supply and sanitary sewage systems and the development would be compatible with the character of the land use in the surrounding area.*” Objective 2.7 recognizes the overall importance of protecting sensitive areas when making planning decisions by protecting and preserving hazard lands, sensitive areas, areas of historical significance and important natural resources such as fish and wildlife habitat areas, wetlands and minerals and aggregates. These objectives are consistent with the need to manage land use on Black Sturgeon Lake.

Policies

The Official Plan's section on General Development Policies provides guidance when considering proposals for development, Official Plan Amendments, Zoning By-law Amendments, Consents, Subdivision, or any other form of development requiring approval from the City and the potential impact this development may have. Two of the General Development Policies would be highly relevant when considering future development on Black Sturgeon:

Surface and Groundwater Quality Protection

In order to protect surface and groundwater quality, Policy 3.3 – Surface and Groundwater Quality Policy requires that:

- a) on-site septic disposal systems should be located at least 30 m from a watercourse or water body;
- b) the natural shoreline vegetation will be retained within 15 m of significant fish and wildlife habitat (e.g., spawning sites, waterfowl staging areas), through the Zoning By-law;
- c) the natural shoreline vegetation will be encouraged to be preserved within 3 m of all other watercourses and water bodies;
- d) development should not be permitted where potential would exist for contamination of aquifers and groundwater supplies; and
- e) where development would result in a significant increase in stormwater runoff, the municipality shall require the proponent to complete stormwater management works that will ensure that off-site surface water quality and quantity is not adversely affected by the development.

These requirements are consistent with development of sound management policies for Black Sturgeon Lake.

Private Sewage Disposal and Water Systems

Policy 3.4 – Private Sewage Disposal and Water Systems indicates that:

- a) *no development shall be permitted unless it can be shown to the satisfaction of the City that there is an adequate water supply, availability of on-site sewage disposal system and public road access to service the development,*
- b) *no development shall be permitted unless Council is satisfied that the development will not have an adverse impact on neighbouring wells and sewage disposal systems, and*
- c) *in considering impact on groundwater quality and quantity, the City shall consider the cumulative impacts of development on the sustainability of groundwater resources.*

These requirements are consistent with development of sound management policies for Black Sturgeon Lake.

The City of Kenora Official Plan has established Land Use Designations for all of the lands within its boundaries (see Figure 19). Section 4 of the Official Plan deals with Land Use Designations and Section 4.6 pertains specifically to Rural Areas. Those most relevant to this study include:

“4.6.1 – In Rural Areas, new residential lots shall only be created in areas where the municipality and school boards are presently providing services. New residential lots shall be large enough to sustain private sewage and water systems. The Zoning By-law will specify a minimum frontage and lot size” (discussed below):

“4.6.2 – Development shall not be located in areas that would adversely affect existing agricultural operations.”

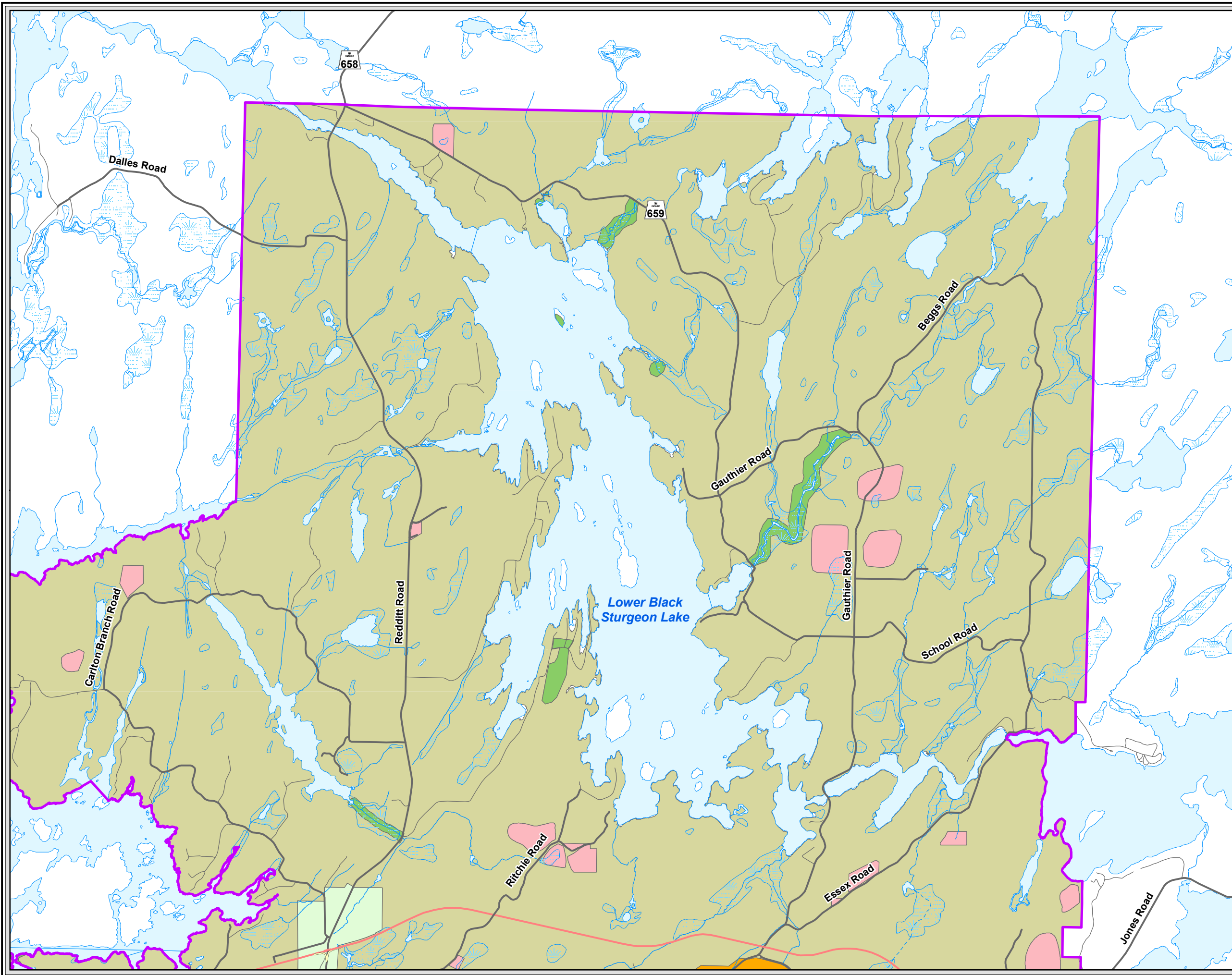
“4.6.3 – Development shall have regard for identified fish and wildlife values and associated provincial policies.”

“4.6.7 – Tourist commercial uses may be permitted in the Rural designation and shall include the full range of commercial facilities that principally serve the tourist trade. Such uses as lodging facilities, campgrounds and resorts, recreation facilities, bed and breakfast establishments, farm vacation establishments, golf courses, parks and facilities related to boat traffic such as marinas, docks and other services.”

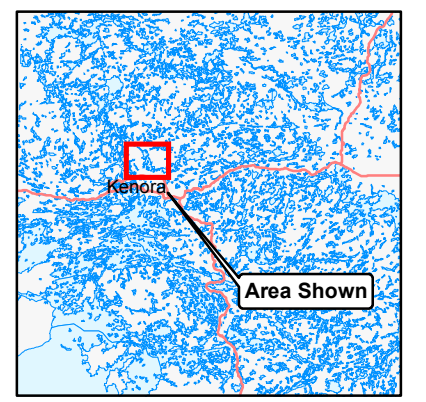
These requirements are consistent with development of sound management policies for Black Sturgeon Lake.

Section 4.7 of the Official Plan deals with Resource Conservation and Protection and states that, when potential development may have an impact on, or be impacted by, one of the land designations or values described in this section, the City of Kenora will refer to the appropriate agency for comment. Within the City, there are a number of classes of “Sensitive Areas” (see Figure 19) – these are recognized as fragile and in need of protection and include areas with historical and cultural significance, Provincially Significant wetlands and natural areas, such as fish and wildlife habitat. This policy states that *“proposed development in or near identified Sensitive Areas will be given consideration after taking into account the resource value, the associated Provincial policy and the proposed methods by which any detrimental impacts to the original, sensitive use may be overcome.”* In addition, “development and site alteration will not be permitted within the habitat of endangered and threatened species” and any development that is proposed within significant wetlands, wildlife and fish habitat is subject to Policy 4.7.5 (explained below).

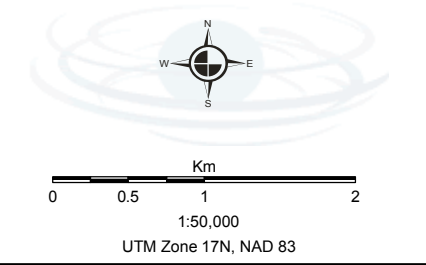
These requirements are consistent with development of sound management policies for Black Sturgeon Lake, although a recommendation has been made with regard to the mapping of Resource Conservation and Protection areas in Section 6 of this report.



- Legend**
- Kenora City Limit
- Official Plan**
- Land Use Designation**
- Commercial Development
 - Industrial
 - Residential Development
 - Rural
 - Sensitive



Basemapping from Ontario Ministry of Natural Resources



Black Sturgeon Lakes
Management Study

**Official Plan Land Use
Designation**

August 2007
Project 70294

Section 4.7.1 – Open Space

Within the Resource Conservation and Protection section, lands designated as Open Space or Natural Areas have been described as providing opportunities for public access and recreation and may also represent lands that are environmentally sensitive. The Official Plan states that the City will continue to acquire waterfront areas for public open space uses wherever possible, allowing for parking, trails, launching and docking facilities. It also states that open space uses and recreational facilities shall be designed to meet the needs of residents of the City as well as tourists, while preserving the environmental features and functions of those areas. Within this designation, the City discourages development if the area has been identified as wetland, floodplain, and sensitive, Provincially Significant Wetland or a habitat area. Where development is proposed within these areas, the City requires the proponent to submit a report outlining the potential environmental impacts and any mitigation measures necessary to reduce or eliminate them.

These requirements are consistent with development of sound management policies for Black Sturgeon Lake.

Section 4.7.2 - Aggregate and Mineral Resources

There are some areas within the City limits that are known to have high aggregate or mineral resource potential and this land use designation indicates that any new or expanding aggregate or mineral extraction operation should be well removed from residential areas and should not negatively affect existing adjacent uses or values (Figure 11).

This requirement is consistent with development of sound management policies for Black Sturgeon Lake but is an area of potential conflict between lake residents and aggregate developers.

Section 4.7.3 – Fish, Wildlife and Endangered and Threatened Species

The City of Kenora, in its policy on the protection of fish and wildlife habitat, supports the management of these resources and recognizes the mandate of the Ministry of Natural Resources and the Department of Fisheries and Oceans to protect and preserve habitat on Crown and private land. With regard to significant fish habitat (shown on Figure 11) or as determined under the Plan Input and Review Process, development is not permitted within 120 m of the habitat area without an Environmental Impact Assessment in order to identify potential impacts and proposed mitigation measures.

Similarly, the designation of sensitive areas on the basis of known wildlife habitat was a result of consultation between the City and the Ministry of Natural Resources during the development of the Official Plan, and includes areas of important waterfowl habitat and deer winter habitat. The City has indicated that no development may occur within 120 m of the waterfowl habitat designation without an Environmental Impact Assessment; development within areas designated as winter

habitat for white tailed deer is to be limited to low density, rural residential and should consist of large acreages and frontages that encourage dispersed residential use. A plan of subdivision, however, may require an EIA. In the case of endangered and threatened species, while these areas are not mapped in the Official Plan, consultation with the Ministry of Natural Resources that reveals this habitat exists within or close to a proposed development would require further investigation and an EIA.

These requirements are consistent with development of sound management policies for Black Sturgeon Lake.

Section 4.7.4 – Nesting Areas

The City of Kenora recognizes the importance of protecting heronries, osprey and bald eagle nests and the locations of known nests are shown on Figure 11. The Official Plan indicates that:

- a) *no heavy development/construction activities should take place within 200 m of a heronry between April 1 and August 15 (sensitive breeding season);*
- b) *no development of any kind resulting in activities such as pedestrian traffic, ATV use or any other activity will be permitted within 400 m of a heronry between April 1 and August 15;*
- c) *MNR policies regarding permitted activities within 300 m of a heronry during the non-nesting season (August 16 – March 31) are supported;*
- d) *no development that would result in any disruptive activity will be permitted within 100 m of an active bald eagle nest;*
- e) *no heavy development activities will be permitted within 200m of an active bald eagle nest between February 15 and June 30;*
- f) *no development activity will take place within a 200m radius of an osprey nest;*
- g) *no development will take place within 800m of an osprey nest between April 15 and September 1, inclusive;*
- h) *the policies of the MNR regarding activities permitted within 800m of an active osprey or bald eagle nest during nesting and non-nesting periods are supported.*

These requirements are consistent with development of sound management policies for Black Sturgeon Lake, although a recommendation regarding this section has been made in Section 6 of this report.

Section 4.7.5 – Significant Wetlands: Wetlands, Wildlife and Fish Habitat

This policy states that development is prohibited within areas identified as significant wetlands, wildlife and fish habitat. Within 120m of these areas, development proposals require an Environmental Impact Assessment to be submitted by the proponent.

These requirements are consistent with development of sound management policies for Black Sturgeon Lake.

Section 4.7.6 – Docks and Shoreline Development

Policies within this section pertain to all navigable water bodies and watercourses within the City of Kenora and focus on the protection of the aquatic environment. Section 4.7.6.2 states that docks, waterfront and marina structures on property abutting water shall:

- a) *be subject to the policies of the Ministry of Natural Resources, the Canadian Coast guard, Fisheries and Oceans and the City of Kenora and where such structures are to be on Crown Land covered by water, the comments of adjacent land owners;*
- b) *be designed, constructed and maintained in a manner which contributes to the amenity of the City;*
- c) *be constructed and placed so as to minimize the impact on natural vegetation and topography and shall not have a negative impact on fishery habitat; and*
- d) *be constructed to meet the requirements of Ontario Regulation 310 under The Environmental Protection Act, in the case of marinas.*

These requirements are consistent with development of sound management policies for Black Sturgeon Lake.

This section states: “Wherever possible, septic systems servicing shoreline areas shall be located at least 30 m from the high water mark of the abutting water body. All residential lots should be large enough to ensure that sewage systems shall not be within 30 m of a water body.” In addition, Section 4.7.6.6 states that “Where new development occurs adjacent to any navigable waterway within the City of Kenora, a 3m natural vegetation area will be required adjacent to the shoreline to minimize the impact of development on water quality in the water body.

These requirements are consistent with development of sound management policies for Black Sturgeon Lake.

In Section 4.7.6.8, the Official Plan states that construction is not permitted within Hazard Lands (defined as all lands within 15m of the top-of-bank of any watercourse or water body for slopes equal to or greater than 1:1 and all lands within 15m horizontal distance of the 1:100 year flooding elevation along any watercourse or water body for slopes less than 1:1), except for docks, boat lifts and boat ramps.

These requirements are consistent with development of sound management policies for Black Sturgeon Lake.

Section 4.7.7 deals with Archaeological and Cultural Heritage Sites and there are only a few of these known on Black Sturgeon Lake. Where a proponent wishes to develop within this land use designation, a level One Archaeological Assessment in accordance with the requirements of the Ministry of Citizenship, Culture and Recreation is required to determine the nature and extent of the resources at the site. The end result could be recommendations for in situ preservation or an archaeological heritage impact assessment.

This requirement is consistent with development of sound management policies for Black Sturgeon Lake.

Section 4.7.9 addresses development near waste disposal sites and indicates that development on or near any past, existing or planned sites requires approval from the Ministry of the Environment due to the potential for unstable soils, methane gas and toxic leachates. Development within 500m of these sites requires submission of technical studies to ensure that potential hazards are addressed and adequate mitigation is considered.

These requirements are consistent with development of sound management policies for Black Sturgeon Lake.

Land Division

Within the Official Plan, guidance is provided as to the conditions upon which land severances may be approved as they pertain to environmental protection issues. A “consent” may be granted when a plan of subdivision is not required for the orderly development of the land. A “plan of subdivision” is required where more than three new lots are to be created on a land holding as recorded in the records of the Land Registry Office on the 9th of April, 1985 or where it is necessary to ensure that surrounding lands are developed in a proper and orderly fashion. The policies most applicable to the Black Sturgeon Lake management project are as follows:

- a) *Where appropriate, comments will be requested from the Ministry of Natural Resources, the Ministry of Environment and/or its agent, the Northwestern Health Unit and any other agency deemed appropriate as to the suitability of the site for sewage disposal and water supply;*
- b) *Consents will not be granted for a parcel of land in the Sensitive and Hazard areas which is subject to flooding unless sufficient non-hazardous land forms part of the severance to permit all buildings for human occupation to be located outside the Sensitive areas;*
- c) *There shall be no new development on any of Austin Lake, Schnarr Lake, or Grassy Lake without the availability of municipal sewer and water services (as these lakes, as well as Alcock Lake, Hilly Lake and Laurenson Lake within the vicinity, have been designated by MOE as “at or over capacity”);*

- d) *Land development that will create waterfront lots shall be designed (in the case of registered plans of subdivision and condominium) and considered (in the case of consents) so as to provide for access to the water by owners of present or possible future back lots (lots on the side of the road away from the water); and*
- e) *Regarding municipal services, new development shall consider the impacts of stormwater on lands and waters downstream via stormwater management planning as a condition of development approval.*

These requirements are consistent with development of sound management policies for Black Sturgeon Lake; although a recommendation related to back lot development has been made in Section 6 of this report.

Implementation

The City implements its planning policies through its Zoning By-law, Site Plan Control, Public Meetings, Maintenance and Occupancy By-Law, Potential Contaminated Site Controls, Plan Review and Environmental Impact Assessments (EIA). Where an EIA is required, it is stated that the assessment must be conducted by an individual with appropriate environmental qualifications and must include at least:

- a) a description of the existing natural environment, including natural features and ecological functions, that may be affected by the proposed development;
- b) a description of the potential impacts of the proposed development on the natural features and the ecological functions for which the area is identified;
- c) suggested development alternatives that would avoid these impacts or, if impacts cannot be avoided, recommended mitigation measures, including proposed implementation methods; and
- d) recommended monitoring activities.

The Official Plan states that no planning approval will be granted until an EIA has been completed to the satisfaction of City Council and other agencies with environmental expertise may be consulted to review the EIA.

These requirements are consistent with development of sound management policies for Black Sturgeon Lake, although a recommendation regarding the content and requirements for EIAs has been made in Section 6 of this report.

Comprehensive Zoning By-Law

A zoning by-law is a document approved by City Council, which defines the permitted uses and development standards for specific areas or “zones”. The zoning by-law is a precise document, which must be in conformity with the municipality’s Official Plan, which is the more general policy-planning document of the City.

Zoning by-laws provide municipalities with a way to co-ordinate land uses, protect areas by preventing incompatible uses and establish appropriate standards for development. A typical zone contains a list of uses permitted in that zone and the regulations related to lot size, setbacks, building height and building size. The zoning by-law also contains general provisions, which relate to all areas. Typically these regulations contain standards for accessory buildings, building close to hazards such as flood zones or railway tracks and the provision of parking.

A new comprehensive zoning by-law for the City of Kenora, as a whole, was approved December 13, 2004 under Section 34 of the *Planning Act*.

The rural and rural residential zoning allows for minimum two-acre housing lots sizes, a minimum 150 foot shoreline frontage and minimum shoreline set backs for buildings (20 m) and septic fields (30 m).

Areas zoned “Environmental Protection” are deemed as such based on historic or natural significance. Permitted uses are limited to wildlife and conservation reserve and development proposals within this zone require an EIS.

There are only a few occasions where an area has been zoned with a “hold” on it – for example “RR/H”. In this case, a proponent has requested that the intent of a parcel zoned Rural be changed to Rural Residential, but Council has indicated that more information is required before a decision can be made and, therefore, put a “hold” designation on that parcel.

These requirements are consistent with development of sound management policies for Black Sturgeon Lake, although a recommendation regarding a review of lot sizes has been made in Section 6 of this report.

Building Permits

The Building By-law No. 100-2005 prescribes the process for obtaining building permits and applies to all properties within the City of Kenora. Building permits are a provincially legislated requirement to ensure the safety, health and welfare of all building users. Penalties are provided for in the Building By-law in the event that projects are started without a permit.

A building permit is required to construct a new building or structure, move in a factory-built building, to relocate an existing building, to demolish, alter or add to an existing structure and to change the use of an existing building. Change of use includes converting a single dwelling to multiple dwelling, converting residential to commercial or institutional use, altering the type or nature of assembly, residential, commercial or industrial use, etc.

A building permit is also required to install, add to or alter a plumbing piping system or to install or alter any gas, oil or solid fuel-burning appliance. All construction must comply with the Ontario Building Code, the City of Kenora Zoning by-law and other applicable laws.

If a proponent is not supplied with municipal sewer and water and plans to install a piped water system from a well or surface water body such as a lake or river, a septic system permit must be obtained from the Northwestern Health Unit before a building permit can be issued. If there are plans to construct, renovate or alter a building in a manner that will not comply with the Zoning By-law, an amendment to the proposal to conform or apply for a Minor Variance or a Zoning Amendment is required.

These requirements are consistent with development of sound management policies for Black Sturgeon Lake. We note, however, the emergence of the “Development Permit System” in portions of the Province. This system allows Building Permits to be linked to other land use modifications for a specific property – such that, for example, approval of plans for enlarging a house or adding a deck may be linked to requirements to make improvements to other aspects of the property (i.e., shoreline naturalization or removal of accessory structures). We recommend further discussions with the City of Kenora Planning Department to clarify the Development Permit System and its applicability for Black Sturgeon Lake.

In summary, nearly all planning elements are in place within the City of Kenora Official Plan to provide for the development of sound management policies for Black Sturgeon Lake. We note, however, that there are no planning elements that address:

- a) the issue of capacity, no matter how defined;
- b) a long-term vision for the development of Black Sturgeon Lake; or
- c) planning strategies to address social crowding, or recreational use of the lake,

and these have been noted as recommendations in Section 6 of this report.

Development of a Lake Management Plan is therefore a timely and warranted initiative and “capacity”, recreational and social elements will be addressed in the public meetings and subsequent phases of the Black Sturgeon Lake management Study.

5. Public Consultation

As part of the development of the Background Conditions report, comments and feedback were solicited from both the Advisory Committee for this project and the public. A public information meeting was held July 12, 2007 to present an overview of the findings of this report and to gather input from residents of Black Sturgeon Lakes on a number of issues including their vision of the lake in the future, what they consider to be balanced development or the potential capacity of the lake, and what their concerns are. In addition, the public were asked to take a look at the mapping for the project and add/change values and make comments based on their local knowledge. All comments heard at the public meeting were summarized and are presented in Appendix A, which includes a map illustrating local knowledge of potential natural values and/or mapping details for consideration. Where relevant and where determined to enhance the clarity of the document, comments have been incorporated into this final version of the Background Conditions Report. However, the majority of the comments were focused on suggestions and concerns regarding future development and management of the lake and these were considered in the next phase of the project.

6. Data Gaps and Recommendations

As a result of the review of available information on Black Sturgeon Lakes, it is apparent that there are data gaps, however, current data are sufficient to move forward with the next phase of the study. However, in order to establish a more current picture of Black Sturgeon Lakes for future use by the City of Kenora, especially with regard to water quality conditions and natural values, there are several recommendations that have been made for future consideration and these have been outlined below. In addition, a review of the regulatory environment has been done and preliminary recommendations made. More detailed recommendations will emerge in the next phase of the study in order to provide the City with a “toolbox” with which to consider changes to their planning strategies and the Official Plan.

6.1 Water Quality Characteristics

Our review concludes that, aside from the MOE “Lake Partner Program” data for total phosphorus and Secchi Depth, there are no recent water quality data for the lake. We provide the following specific recommendations.

Recommendation 1: General Water Chemistry

General water quality surveys have been conducted for Lower Black Sturgeon Lake in 1988, 2001 and 2007. It is recommended that water samples be collected and similarly analyzed every five years for a full suite of water chemistry variables including alkalinity, pH, conductivity, nutrients (phosphorus, nitrogen, dissolved organic carbon), major ions and trace metals.

Recommendation 2: Lake Productivity

While total phosphorus concentrations continue to be monitored under the Lake Partner Program, no other measures of algal productivity (e.g., chlorophyll *a*, algal biomass) have been measured, with the exception of a single chlorophyll *a* measurement collected in 1981 (MOE, APIOS monitoring, sampling date unknown) and on three occasions in May 1988 (May, July and August). In addition, there has not been a comprehensive monitoring program to assess patterns in lake productivity during the open water season. We therefore recommend that a monitoring program be established to determine measures of lake productivity (including total phosphorus and chlorophyll *a* concentrations) over the course of the open water season.

This would include:

- a) sampling of chlorophyll “a” and total phosphorus as “euphotic zone composite samples⁵” on three week intervals during the open water season, sampling phosphorus at 1 m above bottom at three week intervals from late June to fall turnover, and
- b) sampling the algal community as a euphotic zone composite once in late July and once in late August.

Recommendation 3: Temperature and Dissolved Oxygen

Temperature and dissolved oxygen profile data have not been collected since 1988. We recommend that temperature and dissolved oxygen water column measurements be taken at three week intervals (i.e., in conjunction with the water quality sampling) over the open water season to assess recent thermal and oxygen dynamics in Lower Black Sturgeon Lake.

5. A “Euphotic zone composite” sample includes water at all depths between the surface and a depth corresponding to twice the Secchi depth. This represents the volume of the lake that receives sufficient sunlight for algal production. It can be taken by a) lowering an open tube (i.e., a hose through the water column to twice the Secchi depth, capping it and removing, or b) lowering a weighted, narrow mouthed open bottle through the water column to the Secchi depth – water will flow into the bottle as it is lowered, thus including water from each depth.

Recommendation 4: Bacteria

The late Mr. Jack Young, a previous property owner on the lake, had reported that he had water samples tested for coliforms in the 1990s and again in more recent years (Start Up Meeting, April 2007). He noted that counts had increased over that time frame and expressed concern about potential contamination from failing septics. Details of Mr. Young's testing were not available at the time of the meeting and to date, bacterial monitoring has not been conducted for the lake by a regulatory agency. We recommend that a bacterial monitoring program be implemented for *Escherichia coli* (*E. coli*), an indicator of fecal contamination. This can be done by submitting samples to a conventional laboratory, or through the use of "coli plates", a commercially available bacterial enumeration method that can be used by volunteers to sample many sites for much lower costs.

6.2 Natural Values Mapping

Recommendation 5: Values Mapping Reconciliation

As noted earlier, there are minor discrepancies amongst the three databases reviewed for natural values (MNR's NRVIS database, MNR Kenora values mapping and City of Kenora Official Plan mapping of natural values) and it would be a worthwhile exercise to reconcile these data to ensure the City is using the most up to date information on fish habitat, wild rice, wildlife habitat and nesting area locations. In addition, there were several public sightings of natural values not presently mapped (see Appendix A) that should be investigated for incorporation into the mapping. Given the importance that sensitive areas have been given within the Official Plan, it is critical that the mapping used for planning purposes is as up to date as possible. The City of Kenora GIS database mapping of Land Use Designations considered "sensitive" should reflect the updated fish and wildlife habitat features mapped within the Official Plan. Obtaining these data could be achieved by a joint meeting of DFO (who have indicated that site visits have been conducted recently), MNR and the City. Not only should a comparison of existing mapping be done, but it would be extremely beneficial to have a re-survey of the shoreline for known fish habitat.

Recommendation 6: Nesting Values

Nesting site locations and protection policies should be updated in the OP.

6.3 Regulatory Environment

Recommendation 7: Backlots

There is a need for further discussion within the Official Plan regarding the development of back lots and provision of public water access for back lot development.

Recommendation 8: EIAs

There is a potential need to elaborate on the content of and requirements for EIAs.

Recommendation 9: Lot Frontage Requirements

The 150' minimum lot frontage may need to be reviewed to assess whether it is generally applicable for all areas of the lake, and to assess how well it protects all resource values.

Recommendation 10: Development Permit System

Consideration of the emergence of the "Development Permit System" in portions of the Province needs to be made. This system allows Building Permits to be linked to other land use modifications for a specific property – such that, for example, approval of plans for enlarging a house or adding a deck may be linked to requirements to make improvements to other aspects of the property (i.e., shoreline naturalization or removal of accessory structures). We recommend further discussions with the City of Kenora Planning Department to clarify the Development Permit System and its applicability for lower Black Sturgeon Lake.

Recommendation 11: Planning Element

There are currently no planning elements within the Official Plan that address:

- a) the issue of capacity, no matter how defined,
- b) a long-term vision for the development of Black Sturgeon Lake, or
- c) planning strategies to address social crowding, or recreational use of the lake.

These should be addressed in the City's Official Plan.

7. Conclusions

The “**Background Conditions Report**” provides a detailed synthesis of the natural environment, historic land use and recreational patterns, public interests, and the present regulatory/planning environment for Black Sturgeon Lake. This information guided the development of the “**Technical Studies and Management Plan**” for Black Sturgeon Lake, enabling the formulation of land use planning policies to ensure that development and recreational growth can occur without jeopardizing the natural and social environments that serve as the main focus and economic stimulus of the area. The resulting management plan includes policies to promote sustainable economic growth, designation of land uses to minimize conflict between the environment and economic growth, designation of protected areas with clear rationale for the designation, clear study requirements to support development applications and by-laws to ensure that development protects the natural heritage values.

8. References

Cederwall, K., 1983:

Summary of a Summer Creel Census on Black Sturgeon Lake, Kenora District, 1982.

Chidley, 1951:

Reference unavailable.

Ministry of Natural Resources, 1988:

Timber Management Guidelines for the Protection of Fish Habitat. Fisheries Branch, April 1988. 15 pp.

Scott, W.W. and E.J. Crossman, 1998:

Freshwater Fishes of Canada. Galt House Publications Ltd., Oakville. 965 pp.

Appendix A

Summary of Public Comments from Public Meeting, July 12, 2007

Appendix A

Summary of Public Comments from Public Meeting, July 12, 2007

General Comments:

- Degree of threat of development on recreational/lake lifestyle
- Discussion with long-time locals important
- Islands – previous J & M council study suggested islands be taken over by City, instead of MNR
- Consider aboriginal and economic issues/implications in report (consider social and economic pressures that are driving development) – are additional studies required? Jeff Port indicated that the City does have an economic plan addressing some of these issues
- Land is taxed according to highest use (consider tax incentives to leave land vacant; consider promoting managed forest plan to provide tax break to landowner through MNR)
- Noise pollution re blasting of bedrock during development/road construction – can noise/hazard be managed?

When asked “What do you like about Black Sturgeon?”

- Lack of boat traffic (consider limiting horsepower; avoid accidents and conflict with canoes/kayaks)
- Community atmosphere (non-transient neighbourhoods)
- Quiet
- Views of natural shoreline
- Non-competitive
- Can leave doors unlocked and offer refuge to those stranded in winter
- Wildlife (ermine, otters, eagles, etc.)
- Lack of public access

Comments Regarding Water Quality and Quantity:

- Given dated water quality information, there is a need for a full water quality monitoring program to update data
- Water quality problems associated with water level fluctuations – consider regulating outflow
- When water levels low, water quality changes (smell, taste)
- Current flow is highest in last 30 years
- Drinking water quality sampling – set up a citizen monitoring program to monitor bacteria – some data should exist with Northwestern Health Unit
- Damming effects of reduced bridge spans and deterioration of Essex Rd. bridge
- High water effects – 1998 and 2007

- Not only would we like to see some control over unnecessary shoreline development, but monitoring, and enforcement of proper septic operation is long overdue. It is particularly distressing to know that even when someone's faulty field is reported, it seems no one is prepared to take any action on it, especially when it is reported to the authorities
- The resources should be in place for a proper and thorough inspection/ testing process, and the appropriate agency should have full enforcement authority, up to and including doing the necessary work and billing the landowner for such work.
- Properly used holding tanks would reduce the risk of contaminants leeching into lakes from septic fields built on land ill suited for a field. May I suggest permitting holding tanks but each land owner must maintain a log book to show when it was pumped, and by who, all signed and dated by the person who pumped the tank. As a cross reference each company that is permitted to pump tanks in the city must also maintain a log book showing whose tank they pumped, the date, the quantity etc, and it must be signed by the landowner for whom the pumping was done. These books would be inspected from time to time, and if they did not match, or were showing figures that did not seem to represent expected usage, legal action would follow. This sewage should not be dumped in some field, as is currently done for septic tanks, but should be disposed of in the city system. The city currently ignores its environmental responsibility for sewage disposal for landowners who are not hooked up to the city sewage system, and that seems reckless and inappropriate in this day and age.

Comments Regarding Fish:

- Great fishing 25-30 years ago, bass and walleye fishing improving
- No one has taken part in CFWIP on Black Sturgeon
- Commercial fishing by Dalles F.N. (whitefish) – can MNR monitor that only whitefish are caught?
- Development near fish spawning an issue – current road access disrupting habitat at Dead Baby Bay (Christina Bay); application for development has been submitted but City has requested a biologist look at this situation (DFO, MNR) as northern pike spawning has been identified locally

Comments Regarding Access:

- More boat launches exist than in report (informal, unknown and undeveloped)
- Regarding recreational properties – how are decisions made?
- Public access to lake – not desired by several residents
- Beaches on lake are not tested
- Don't put public access through settled subdivisions (disturbing) – consider unsettled areas

Comments Regarding Possible Site Plan Control Options:

- Installation of low water appliances
- Use of dark sky lighting

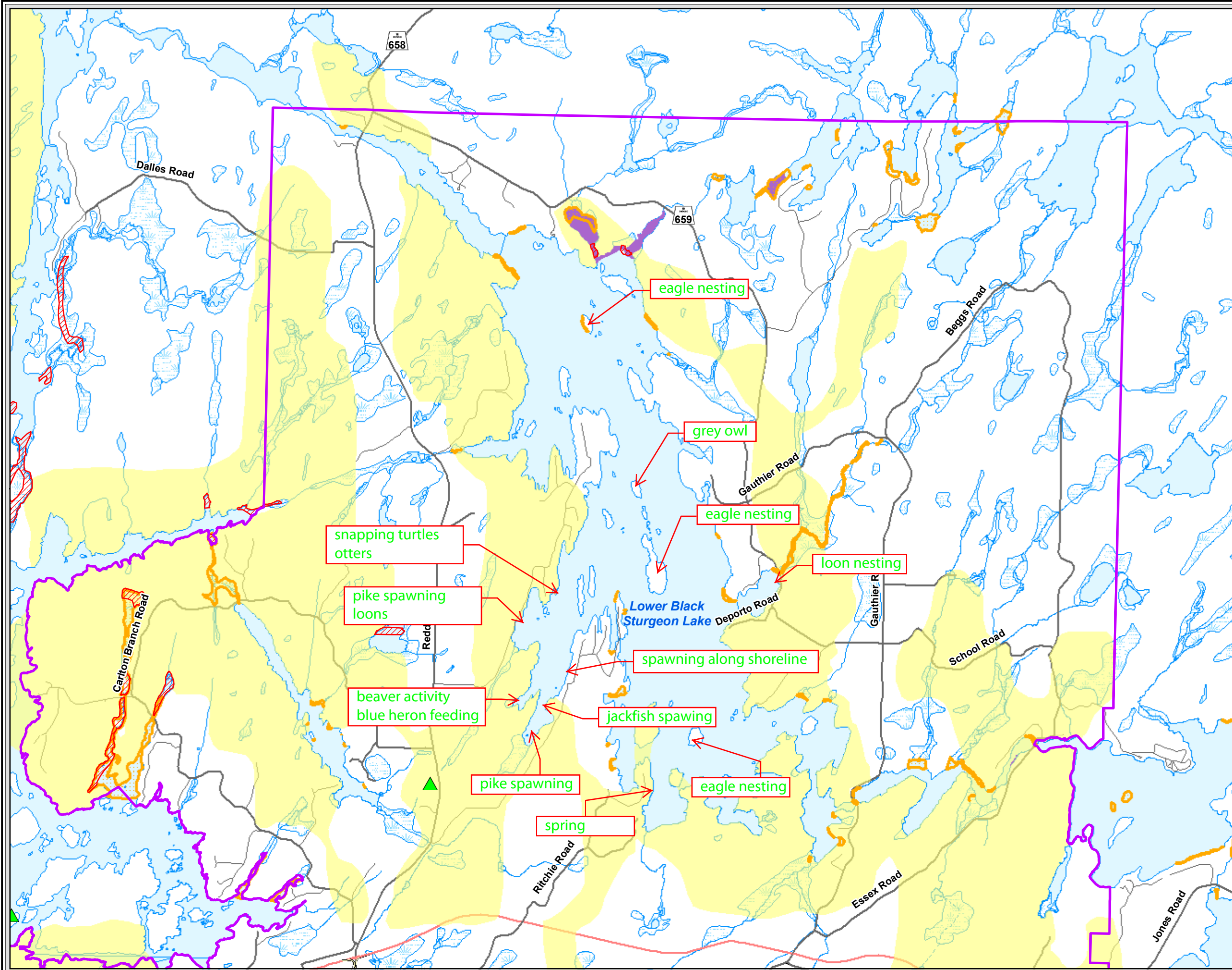
- Minimum lot size
- Should consideration be given to malls, playgrounds, golf courses, fractional/time shares
- Allow for more space between septic systems
- Concern for development in bays (reduced water flow, increased algae) – consider different controls for bays
- Noise pollution and wave activity/erosion in bays – investigate ways to deal with this, i.e., neighbourhood watch
- Lack of greenspace within existing subdivision developments – need more
- Include recommendations of “Docktalk” in report
- Septic system maintenance not monitored (once certificate issued, nothing further done; would like to see 5 year reinspection)
- Make recommendation to ban pesticide use
- Keep subdivisions small to promote “community atmosphere”
- Light pollution – consider “dark sky policy”
- Minimum frontage widths on the water front should probably be increased. However care must be taken as to not increase the frontage excessively as this would drive the costs of individual lots to levels that will not be affordable to a lot of people. Large increases in lot frontage could also make some smaller developments impractical financial wise
- Waterfront lots must also have sufficient depth to allow for adequate set backs from the water for people to have screening (vegetation, trees etc) along the waterfront. There must also be sufficient room for septic fields and still leave enough area for people to have their privacy.
- Our current setbacks only address buildings and septic fields; consider two property lines, an outer boundary, and an inner. An owner could do as he/she pleased, within the inner boundary line, but could not disturb, in any way, shape or form, the land between the inner and outer line. No lawn, no levelling, no septic ... nothing.
- Serious consideration should be given to minimum frontage and minimum overall lot size. City sized lots on lakefront property are totally inappropriate when it comes to either environmental concerns or basic quality of life. There should be no consideration given to reducing any such restrictions, and perhaps consideration should be given to increasing these figures if there are sound reasons for doing so.

Comments Regarding Public Input:

- Concern that no one from City Council attended public meeting
- Provide disposition table (public comments during meeting) in final report
- Suggestion to meet with Advisory Committee in early August to discuss public comments
- Place public meeting presentation on City website

Comments Regarding Modelling:

- Consider high flow water years



Legend

- Kenora City Limit
- Spawning Area
- Fish Nursery Areas
- Wildlife Nursery Areas
- Wintering Areas
- Nesting Site
- WildRiceStands
- Public Sighting

Basemapping from Ontario Ministry of Natural Resources

0 0.5 1 2 Km
1:50,000
UTM Zone 17N, NAD 83

Black Sturgeon Lakes Management Study

Natural Values Features and Public Sightings

Appendix B

Advisory Committee Comments and Responses on the Draft Background Conditions Report (June, 2007) for the Lake Capacity and Management Study for Black Sturgeon Lake, City of Kenora.

Comment	Action to be Taken
<p>Water quality information used for the study is based on 1988 data. Most waterfront development has occurred since 1990 and more recently many properties have been converted to or built as year round residences. A new water quality sample has to be completed before any conclusions can be made.</p>	<p>See recommendations 1, 2, 3 and 4 in report. Also, we note that total phosphorus concentration and Secchi depth data are available from the MOE Lake Partner Program from 2001 to 2006 and have been included in the analysis.</p>
<p>Different guidelines must be established for the development of waterfront properties in bays where opposing shorelines can double the impact on water quality in these restricted areas. There current exists areas of development where no green spacing exists between developments. This has resulted in a situation where, when completed 67 properties will share the same bay area for recreation and water source. The 50 meter minimum lot size for normal shorelines should not apply for bays. The existing minimums for any waterfront property should be increased to 65 meters.</p>	<p>Will be a recommendation in the final report.</p>
<p>This study should make a recommendation on what level of waterfront development Lower Black Sturgeon can safely tolerate before water quality and recreational lifestyle becomes an issue.</p>	<p>This is the goal of the study and will be discussed further in final report.</p>
<p>This study should recommend that the City of Kenora immediately begin a program of regular water quality sampling on B.S. Most if not all residences depend on lake water as their primary source of water for cooking, washing and even filtered drinking water. Beaches within the City of Kenora are regularly tested for water quality and as taxpayers we believe we should be offered the same service for developed areas on Black Sturgeon</p>	<p>Regarding water sampling program – see recommendations 1, 2, 3 and 4 in report. Regarding beach testing – will be considered in final report following discussion with City.</p>
<p>Presently there is only one public boat launch facility on Lower Black Sturgeon and access to it is very difficult due to poor road conditions. This limits casual boating on the lake. If easier access is made available in the future increased boat traffic from the Kenora area (only 15kms away) will have a dramatic impact on the existing recreational use, and fish stocks on the lake. This should be factored into the final report.</p>	<p>Will be considered in final report as it relates to balanced access</p>
<p>I have a concern with the data being used in that most of it is from 1988. I would like to request more recent information to be provided to us for the purpose of this study from what ever Ministry or Organization that would be authorized to provide it. I think that without current data the study would not truly reflect the condition of the lake and therefore defeat the purpose of our study and be a waste of our tax dollars.</p>	<p>All available data has been accessed; see recommendations 1, 2, 3 and 4 in report</p>
<p>The lake levels have fluctuated so much in the past 22 years (since the bridge was shortened on East Melick Rd). I did not see much information on this fact recorded in the study. Although the affected area is the Black Sturgeon River and Upper Black Sturgeon I feel it is very relevant to the fish, marsh, swamp lands and vegetation.</p>	<p>Reference to bridge alterations as well as natural water fluctuations made in Table 1and Section 4.1.1; additional recommendations will be</p>

<p>A personal preference of mine is to see clearly articulated (maybe even bolded, highlighted, italicized) <u>purposes, goals, and/or objectives</u>. This is especially useful when soliciting public input as is so important with this particular project. The reason being, when you inevitably get the comments from the public that are out of scope, it is easy to point to the statements which clearly lay out what you are doing.</p> <p>For this background conditions report this would be most appropriately articulated by the last sentence of section 1 which states: “...a <i>comprehensive, up-to-date baseline conditions report that provides a starting point from which to determine any stresses on the lake environment and future management needs.</i>” This should be more clearly highlighted.</p> <p>However, the same also needs to be done for the overall project. This may have been done but I don’t recall seeing it. Personally I would like to see a statement something along the lines of (assuming that I understand the work being done) “<i>The goal of this project is to develop a realistic strategy which will direct growth and development on Lower Black Sturgeon Lake consistent with the social, economic, and environmental desires of the City of Kenora.</i>” To achieve that goal is see a number of objectives or steps. Stealing most from the existing document, these could be something along the lines of:</p> <ol style="list-style-type: none"> 1. document research and background information on the water quality, natural resource values, and aesthetic properties of black sturgeon lake 2. document the social considerations, community interests, and desires for Black Sturgeon Lake and the City of Kenora (<u>note: I would think that the overall objectives of greater City are also important – not just residents on Black Sturgeon</u>) 3. link this above information with an analysis of historical development patterns, current land use, projected growth in the watershed and the effectiveness of existing planning tools. 4. develop an effective management strategy (for the tools available to the municipality – OP, ZBL, other?) to achieve the long term sustainability of development on the lake – (note I am not sure that development in a finite area can be sustainable, rather I would argue there are capacities – but that debate can be saved for a later date) 5. document how the strategies will achieve the community interests and desires for Black Sturgeon Lake. 	<p>considered in final report.</p> <p>Purpose and goals are discussed in introduction of report.</p> <p>Has been elaborated on in report.</p> <p>The goals of the overall project and those specific to the Background Conditions Report have been stated in the Introduction. Section 5 describes the next steps/phases of the project that will be taken to complete the study.</p>
<p>I would recommend that the Draft Lake Management Plan be circulated to the technical advisory committee for review well in advance of any further public meetings. This way, comments and corrections can be made to the draft document in advance of the public seeing the document. Considering the comments provided this may</p>	<p>This project has very tight timeframes to complete the various phases that are required to meet the ultimate</p>

<p>have been a more appropriate approach with the background conditions report.</p>	<p>deadline for the final report (end of September 2007). We have committed to completing the draft final report by August 17th. This will provide 1 week for the technical committee to review the report prior to the next public meeting on August 25th.</p>
<p>For the Lake Management Plan I would suggest a section or table dedicated to the interests of the community and agencies, what mechanisms are in place to consider these interests (essentially section 4.2. in the bkgd report), and what is being proposed as an additional step in the management plan (c/w with a map of any changes to the that in the OP and ZBL).</p>	<p>Will be incorporated into final report.</p>
<p>Page 3, second paragraph - A commercial fishing licence was first granted in 1952, but by the late 1980's, the OMNR started buying-out these licenses in order to help reduce the harvest pressure on the sport fishery. The Black Sturgeon commercial fishing license was reissued to Dalles First Nation in 1987, which consists of a target quota for lake whitefish.</p>	<p>Report has been revised.</p>
<p>Page 6, 4th paragraph. DO concentrations relative to fish habitat and PWQO is briefly discussed. However, no comments/discussion made with respect to how the DO levels are affected, or how the low levels during the stratification period impact fish communities. They may want to further discuss how temp and DO can restrict fish movement and habitat availability? Thermal Optimal Habitat Area..</p>	<p>Factors affecting DO are presented in Section 4.1.2, par. 6 and 7. A sentence has been added regarding restricted movement and reduced habitat availability due to low DO in late summer.</p>
<p>Page 9, 4.1.3.3, second paragraph.</p> <ul style="list-style-type: none"> ▪ Pers. Comm.. J. McNulty, MNR Senior Fish and Wildlife Technician 	<p>Report has been revised.</p>
<p>Page 10, top paragraph</p> <p>When speaking about the commercial fishery, the author seems to attribute the overharvest situation to the commercial fishery. I would try and reword this information so that it does not point blame on only one resource user. I would recommend deleting the last line of this paragraph. Without looking at the harvest reports, I am not sure whether or not the commercial quotas were being over-harvested. Even if the commercial harvest was above the quota, this is not a conclusion that we draw with such little information on the fishery. The sentence infers a lot about the commercial fishery (by-catch of sport species, unsustainable harvest, and predicated</p>	<p>Information taken from Cederwall (1983) MNR creel survey. Report revised as: "While the low CUE recorded in the mid-1980s may have been attributed to the combination of angler harvest and commercial fishing, local residents have indicated a more recent rebound in the bass and</p>

yield).	walleye fishery (see Appendix A)"
<p>Page 10, 2nd paragraph</p> <p>They indicate that spawning habitat is not available to species; however, this information is available in our NRVIS system if required.</p> <p>They also indicate that the fish habitat data used may not be up-to-date. I'm sure we can provide them with the most current data available. (Something to talk to Marvin about??)</p>	<p>Fish habitat of any kind is important to map, regardless of species. Wording in report has been revised.</p> <p>Not so much that it's not up to date as that there are discrepancies between the three sources.- see Recommendation 5.</p>
<p>How important is the fishery to users of Black Sturgeon Lakes? How much of the usage should be dictated by property owners/public? How will these values be considered in the final report/product? No real status of the fishery resource has been supplied (lack of data), if this is something that the public is concerned about, maybe an assessment project should be suggested.....OMNR, city?</p>	<p>MNR indicated most angling done by visitors/seasonal residents (July 11 meeting), not permanent residents; but no current, formal data on importance to users available. Seemed to have importance at public meeting, as comment was made that fishery seems to be rebounding. Will be considered in final report.</p>
<p>Page 20, section 2.7.4</p> <p>The descriptions of nesting areas and relative protection measures are not up to date in the Official Plan. There are quite a few changes to be made. Kelli could contact me and we could make the changes for the purpose of this report.....however, the city plan will also need to be updated this was taken from the OP</p>	<p>NRVIS data does not provide nesting areas for vulnerable, threatened or endangered species (only in format shown in Figure 12); while values mapping in Kenora District office shows these, they cannot be shown on public maps. See recommendation 6.</p>
<p>Page 37-38, Table 7</p> <ul style="list-style-type: none"> ▪ The spawning habitat requirements for yellow perch are listed twice. ▪ Largemouth bass are not listed and are a prevalent species in the lake ▪ There is no reference made as to where the spawning habitat information was taken from. ▪ Latin names for fish species should also be listed. ▪ Muskellunge (second sentence)...Spawning takes place in water that..... ▪ More detailed descriptions could be included.....??? 	<p>Revisions made in report</p>
<p>Appendix B_ Summary of Small fish collections, 1988</p>	<p>Data has been taken directly from</p>

<ul style="list-style-type: none"> ▪ 2nd column should read <u>Species Code</u>, not just <u>Code</u> ▪ I am not sure what the 5th column is referring to (Size Range). There is no measurement value supplied. ▪ Info should have a source reference ▪ Site locations are identified, but no map is supplied to link to locations on the lake. 	MNR field notes verbatim; source referred to in report; no locations provided
The final report should make recommendations on how to fill data gaps...what further research/assessment needs to be completed. How will the resource be monitored in the future....water quality/fish values?	See recommendations section; further recommendations will follow in final report.
I feel like there should be some discussion about lake capacity (examples) and how development can be expected to impact a lake system.....is there a timeframe where these impact show up in a lake system and begin to impact fisheries/water quality?	Will be addressed in final report.
After reading the entire document, I am still unsure as to the purpose of the current report and what the next draft will contain. I agree that there needs to be a list of objectives, potential products/results/implications of this exercise, a description of the model used...etc.	This is contained in the Introduction and Next Steps section of the report.
<p>Page 4 discusses a water level fluctuation of 0.51 m in 1988. This year there was a 1.5 meter difference. Suggest more data. I also know that water was high in June of 1999.</p> <p>Page 6 second paragraph second last sentence should start with This</p> <p>Page 14 third paragraph talks about sediment basin clean-outs. Is this Catch basins?</p> <p>Page 21 Should there be a section title after the fourth paragraph? i.e. Section 4.7.6.6</p> <p>Lake Bathymetry is Figure 1 but there is already Figure 1 Location. Also the colour codes appear to be in reverse.</p> <p>Page 33 Date in second last line has one too many 8s</p>	<p>Data unavailable, but reference has been made to this in report.</p> <p>Report has been amended.</p> <p>Report has been amended.</p> <p>Report has been amended.</p> <p>Figure numbers and placement in the document have been corrected. Report has been amended.</p> <p>Report has been amended</p>
Pg 15 – 4.2 Reg. Env., 2 nd paragraph – describes the PAC- need to change “three-year” term to term of Council (term of Council is now 4 years so this avoids having to spell out the length of the term)	Report has been amended

<p>Do other municipalities regularly confer with DFO through Municipal Plan Review? ???</p>	<p>Most often the proponent gets DFO involved independently to have the fisheries act approval in process at the same time as the municipal approval. In some cases the municipality may ask the DFO to attend a site visit to determine the scope of work or degree of involvement of the DFO. However, once it has been established that the DFO is to be involved it is a separate process (a federal process) that does not involve the municipality.</p>
<p>I like the note that the frontage minimum may have to be reviewed in specific areas especially</p>	<p>Also supported by members of public and advisory committee and will be considered in the plan.</p>
<p>Mapping – East Melick Rd. is incorrectly labeled Gauthier Road from the southern area, at the Essex Road junction - it is correct where it shows it running e/w just north of Deacon Creek</p>	<p>Report has been amended</p>
<p>It appears that there is very little information available as summarized in the report other than a reference to the MNR survey done in 1988 and a figure showing some known spawning and nursery areas. Of note there is little information on habitat values on inlet streams.</p> <p>Recently I have been involved in reviewing a proposed road development for the Scurfield Subdivision on Black Sturgeon and I identified 2 areas that provide nursery and spawning habitat for northern pike that are not identified in the values map. This would suggest that a survey would be desirable to better identify these habitat values.</p> <p>In my opinion in order to protect fish and fish habitat we need to identify sensitive areas particularly associated with inlet streams. These areas often have spawning and nursery habitat values and are sensitive to water crossings associated with municipal/private access roads and other development activities.</p>	<p>We have summarized all available information that we are aware of. To our knowledge, no habitat values have been documented for the inlet streams.</p> <p>Recommendation 6 identifies the need for reconciliation of values mapping between the City and MNR, and includes a recommendation for an updated survey.</p> <p>Consideration of fish and fish habitat associated with inlet streams will be considered in the development of the management plan in the final report.</p>
<p>I am in favour of the concept of differentiated standards for development on the lake dependent on the different</p>	<p>Will be considered in final report.</p>

<p>sensitivities of the shorelines, soil conditions, wetlands, greenspaces etc. One set of conditions will not be appropriate as the shoreline is quite varied. This was discussed at the meeting and I think it is a worthwhile consideration for the final report.</p>	
<p>The water quality data needs to be updated from its present twenty year old database. This appears to be one of the recommendations in the report.</p>	<p>See recommendations 1, 2, 3 and 4 in report.</p>
<p>I definitely recommend a timetable of regular septic inspections of waterfront properties. This should include any type of sewage management such as holding tanks, grey water systems and outhouses as well as septic fields. This may meet with some opposition but the bottom line is meeting the standards to protect the long term health of the lake.</p>	<p>Will be considered in final report.</p>
<p>With regards to the aspects of the draft report that noted further examination was warranted I am in favour of:</p> <ul style="list-style-type: none"> * more detailed EIA requirements before approvals * a policy regulating the extent of back lot development; personally I am opposed to back lot development. * the increase in minimum lot sizes and frontages especially with regard to a tiered development standard as I previously alluded to. For example no development on steep rocky shorelines or wetlands as well as remaining uninhabited islands; four acre lots up to ten and fifteen acre parcels depending on terrain; green spaces set aside etc. * tightening of controls of tourist commercial/recreational expansion and development to prevent our lake from becoming an overcrowded playground as opposed to a rural residential space. 	<p>Will be considered in final report.</p>
<p>Persuant to the public meeting I would also like to mention the following concerns:</p>	
<ul style="list-style-type: none"> * the examination of specific guidelines in preparation for the inevitable applications for a variance to any new development standards for the lake. 	<p>Will be considered in final report</p>
<ul style="list-style-type: none"> * the reiteration at the meeting by residents of their concerns regarding back lots and whether they should even be allowed and under what criteria. 	<p>Will be considered in final report</p>
<ul style="list-style-type: none"> * the concern about the upstream watershed specifically with regard to the City of Kenora Landfill at Silver Lake, septic systems on upper Black Sturgeon and making the Crown aware of issues on upper Black Sturgeon that may affect the lower lake long term health. 	<p>Will be considered in final report</p>
<ul style="list-style-type: none"> * the future of the islands specifically that they remain uninhabited and just who is the best overseer to guarantee this if a guarantee is possible. 	<p>Will be considered in final report</p>

<p>* regulations governing the use or not of pesticides.</p>	<p>Will be considered in final report.</p>
<p>* the issue of the range of disturbances allowed to transform properties once approval has been given for their development; for example blasting (which has been occurring this past spring and summer in a new development on the lake with no schedule being forwarded to residents, possible foundation damage occurring and occasional blasting without the use of protective mats creating a dangerous situation.)</p>	<p>Will be considered in final report – concern also noted in Appendix A.</p>

Appendix C

List of Contacts Made for Background Conditions Report

Appendix C

List of Contacts Made for Background Conditions Report

Name	Agency	Reason for Contact	Information received
Barry Corbett, Biologist	Ministry of Natural Resources	Fisheries information	yes
Lori Skitt, Biologist	Ministry of Natural Resources	Fisheries information	yes
Doug Vergunst	Northwestern Health Unit	On-site sewage system overview	yes
Kevin Robertson Chief Building Officer	City of Kenora	Building permits	n/a
Mrs. Peters, Owner Hidden Trails Resort	Hidden Trails Resort	Resort history, details	yes
Owner/greens keeper	Beauty Bay Golf Course/Campground	History and information on leased properties; information on maintenance schedule	yes
Carl Snow, Owner Black Sturgeon Camps	Black Sturgeon Camps	Resort history, lake history	yes
Marco Vogrig, Engineer	City of Kenora	Landfill monitoring mapping	yes
Bonnie Hoffman, Technician	City of Kenora	GIS layers	yes
Barry Henry, Chief	Dalles First Nation	History, commercial fishing	Message left
Albert Jamieson	Dalles First Nation	History, commercial fishing	yes
Mike Dawe, Forester	Ministry of Natural Resources	Logging history	yes
Voicemail	Hydro One	Permanent vs seasonal count	Message left
Jeff Port, City Planner	City of Kenora	Planning tools, regulatory environment	yes
Bernie Altman, Retired Forester	Formerly with Ministry of Natural Resources	Logging history	yes
Peter Hinz, Geologist	Ministry of Northern Development and Mines, Thunder Bay	Account of mining, geology, history	yes
Darcy Cuthbert	Black Sturgeon Resident	History of Development	yes
Roy Boivin, Senior Environmental Officer	Ministry of the Environment	Landfill history/status	yes
Stephen Duda, Planner	Ministry of Natural Resources	Historic files, mapping	yes
Jim Sutton, Surface Water Specialist	Ministry of the Environment	Water Quality data, historic	yes
Lil Anderson, Resource Technician	Ministry of Natural Resources	Natural values mapping	yes
Kevin Keith, Senior Lands Specialist	Ministry of Natural Resources	Crown land management, landfill information	yes
Tara Rickaby, Planning Assistant	City of Kenora	Development applications since 2004, Official Plan	yes
Jim McNulty, Fisheries Assessment Unit	Ministry of Natural Resources	Commercial fishing license	yes
Clark Anderson	Black Sturgeon Resident	History of development	yes
Roy Houston	Black Sturgeon Resident	History of Development	yes

Appendix D

Summary of Small Fish Collections, MNR Shoreline Survey 1988

Appendix D

Summary of Small Fish Collections, MNR Shoreline Survey 1988

Site	Species Code	Species	#	Size Range	Site Description
1	381	Mottled sculpin	4	51-81	<ul style="list-style-type: none"> ■ rock, rubble, boulder shoal ■ calm, hot sunny weather ■ very little vegetation ■ Rotenone was used ■ tadpole madtom, log perch and smallmouth bass were positively identified also
	338	Iowa darter	2	46-50	
	331	Yellow perch	1	46	
	311	Rock bass	1	21	
2	313	Pumpkinseed	4	42-65	<ul style="list-style-type: none"> ■ minnow trap ■ densely weeded small bay ■ detritus, muck bottom ■ dense cover ■ possible nursery area for small pike and smallmouth bass
	316	Smallmouth bass	2	39-55	
3	338	Iowa darter	6	34-53	<ul style="list-style-type: none"> ■ Rotenone ■ minnows were seen in to Toronto for species verification ■ rock, rubble, boulder area
	341	Johnny darter	5	31-52	
	381	Sculpin (mottled)	1	64	
	208	Bluntnose minnow	1	31	
4	?	Shiner (sand or mimic)	40	28-31	<ul style="list-style-type: none"> ■ sent in for verification of species ■ off rock shoreline with sand/silt muck bottom ■ sparse aquatic vegetation ■ seine
	200	Blacknose shiner	400	31-42	
5	236	Tadpole madtom	1	63	<ul style="list-style-type: none"> ■ minnow trap ■ densely weeded bay ■ near entrance of perennial inlet
	311	Pumpkinseed	7	64-76	
	331	Yellow perch	12	75-115	
6	311	Rock bass	3	35-62	<ul style="list-style-type: none"> ■ minnow trap ■ rubble boulder shoreline ■ warm sunny day; cool night ■ no aquatic vegetation
	313	Pumpkinseed	4	52-61	
7	331	Yellow perch	5	66-95	<ul style="list-style-type: none"> ■ minnow trap ■ near rock cliff ■ boulder, sand, muck bottom ■ sparse aquatic vegetation - pondweed
8	316	Smallmouth bass	1	57	<ul style="list-style-type: none"> ■ sand, gravel beach between 2 rock shorelines ■ seine ■ at base of open field
9	200	Blacknose shiner	1	33	<ul style="list-style-type: none"> ■ found floating at surface in sandy area
4	331	Yellow perch	7	58-121	<ul style="list-style-type: none"> ■ minnow trap ■ weedy bay with moderate aquatic vegetation
	313	Pumpkinseed	5	36-39	
10	236	Tadpole madtom	2	88-96	<ul style="list-style-type: none"> ■ minnow trap left for several days ■ rubble, boulder bay with moderate aquatic vegetation
	331	Yellow perch	1	92	
11	331	Yellow perch	10	81-110	<ul style="list-style-type: none"> ■ minnow trap ■ weed mouth of Deacon Creek ■ evidence of moose feeding

					<ul style="list-style-type: none"> ■ horsetails, long leaved floaters and pondweed present ■ muck bottom
12	331	Yellow perch	9	61-90	<ul style="list-style-type: none"> ■ seine
	313	Pumpkinseed	14	28-35	<ul style="list-style-type: none"> ■ rock shoreline with muck bottom further out ■ quiet shore out of the wind ■ partly cloudy
13	311	Rock bass	1	45	<ul style="list-style-type: none"> ■ seine ■ rubble, rock point ■ cloudy, rainy
14	311	Rock bass	1	63	<ul style="list-style-type: none"> ■ minnow trap ■ deep set (~6 m) off area of numerous small islands
15	331	Yellow perch	1	84	<ul style="list-style-type: none"> ■ minnow trap ■ rubble boulder area ■ sparse aquatic vegetation
16	208	Bluntnose minnow	15	33-38	<ul style="list-style-type: none"> ■ seine and minnow trap
	?	Minnows unknown	8		<ul style="list-style-type: none"> ■ off rock point ■ very dense aquatic vegetation ■ minnows sent in for verification
17	331	Yellow perch	5	51-53	<ul style="list-style-type: none"> ■ seine
	341	Johnny darter	1	56	<ul style="list-style-type: none"> ■ sent in since Johnny Darters have not been recorded previously in this lake ■ black spot on perch ■ sunny, warm ■ moderate aquatic vegetation
18	319	Black crappie	43	68-80	<ul style="list-style-type: none"> ■ seine
	331	Yellow perch	2	63-65	<ul style="list-style-type: none"> ■ possible crappie nursery area
	316	Smallmouth bass	1	59	<ul style="list-style-type: none"> ■ sand beach with lots of algal growth and sparse aquatic vegetation ■ lots of detritus cover (logs, branches, etc.)
19	131	Northern pike	1	155	<ul style="list-style-type: none"> ■ seine
	331	Yellow perch	13	75-109	<ul style="list-style-type: none"> ■ part of sample sent in for verification of shiner/minnow species
	319	Black crappie	9	59-77	<ul style="list-style-type: none"> ■ muck, detritus bottom
	199	Black chin shiner	17	35-43	<ul style="list-style-type: none"> ■ dense cover
	208	Bluntnose minnow	2		<ul style="list-style-type: none"> ■ extremely weedy bay
20	311	Rock bass	1	37	<ul style="list-style-type: none"> ■ minnow trap and seine
	331	Yellow perch	1	65	<ul style="list-style-type: none"> ■ densely weeded bay
	208	Bluntnose minnow	24	27-65	<ul style="list-style-type: none"> ■ sunny, cool
21	331	Yellow perch	3	60-95	<ul style="list-style-type: none"> ■ seine
	313	Pumpkinseed	1	74	<ul style="list-style-type: none"> ■ rock point between 2 weedy bays
	311	Rock bass	1	39	<ul style="list-style-type: none"> ■ shiners/minnows sent in with sample #17 for identification
	?	Shiners/minnows	150		<ul style="list-style-type: none"> ■ fairly dense aquatic vegetation

Appendix E

Procedure for all Persons Wanting to Install a Private Dock, Boathouse, Boat Launch or Other Marine Structure within the Limits of the City of Kenora

Appendix E

Procedure for all Persons Wanting to Install a Private Dock, Boathouse, Boat Launch or Other Marine Structure within the Limits of the City of Kenora

Procedure for all Persons wanting to install a Private Dock, Boathouse, Boat Launch or other Marine Structure within the Limits of the City of Kenora

Before you can install a marine structure there is a requirement to make application to Fisheries and Oceans Canada for approval. (See address below).

If the marine structure is to be attached to your own property, you must apply for a Building Permit from the City Building Inspection Department, (see address below), and attach the letter of authorization from Oceans and Fisheries Canada. Where a dock or boathouse will be on cribs that exceed a total of 15 square metres, including any existing cribs, then additional approval from the Ministry of Natural Resources is required before the Building Permit can be issued, (see address below). The fee for the Building Permit is calculated as per Schedule "A" to BY-LAW 100-2005.

If the marine structure is to be attached to public property, i.e. the 66 foot shore or road allowance, then an application for an Encroachment Permit must be made and approved before a Building Permit application can be made. You must apply for a Building Permit from the City Building Inspection Department, (see address below), and attach the letter of authorization from Oceans and Fisheries Canada and the approved Encroachment Permit. If the dock will be on cribs that exceed a total of 15 square metres, including any existing cribs, then additional approval from the Ministry of Natural Resources is required before the Building Permit can be issued, (see address below). The fee for the Building Permit is calculated as per Schedule "A" to BY-LAW 100-2005.

Fisheries and Oceans Canada, contact: Earl Jessop

Telephone: 807-468-6441 ext.28; Facsimile: 807-468-6973

E-Mail: jessope@dfo-mpo.gc.ca

Fisheries and Oceans Canada / P. O. Box 649, Kenora, Ontario P9N 3X6

Ministry of Natural Resources, Contact: Kevin Keith

Telephone: 807-468-2558; Facsimile: 807-468-2736

E-Mail: Kevin.keith@mnr.gov.on.ca

Ministry of Natural Resources / P. O. Box 5060, Kenora, Ontario P9N 3X9

City of Kenora Building Inspection Department, Contact: Kevin Robertson

Telephone: 807-467-2022; Facsimile: 807-467-2246

E-Mail: krobertson@kenora.ca

City of Kenora Building Inspection / 60 Fourteenth St. N, Kenora, Ontario P9N 4M9

Lake Capacity and Management Study for Black Sturgeon Lake, City of Kenora: Technical Synthesis and Management Plan



Prepared for
City of Kenora

Submitted by
Gartner Lee Limited
Kelli Saunders Environmental Management

October, 2007

Lake Capacity and Management Study for Black Sturgeon Lake, City of Kenora: Technical Synthesis and Management Plan

Prepared for
City of Kenora

October, 2007

Reference: **GLL 70-294**

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Appendices

- A. Summary of Public Comments from Public Meeting, August 25, 2007
- B. Advisory Committee Comments and Responses on the Draft Report, August 2007

1. Introduction

On August 1, 2007, Kelli Saunders Environmental Management and Gartner Lee Limited submitted the final Phase 1 report for the Black Sturgeon Lake Capacity and Management Study. This report **“Lake Capacity and Management Study for Black Sturgeon Lake, City of Kenora: Background Conditions Report”** contained:

- Mapping and text documentation of the existing conditions of Black Sturgeon Lake and its watershed,
- A summary of the public meeting held on July 12, 2007 in Kenora to gain public input into existing conditions and stakeholder expectations for the study,
- Responses to public comments made by the study team,
- Responses to review comments from the City of Kenora Technical Advisory Committee to the study, and
- Recommendations for follow up work and for consideration in formulating the lake management plan.

The Black Sturgeon Lake study is a two-phased study, with Phase 2 intended to provide technical analysis, guidance and recommendations for consideration by the City of Kenora. The Phase 2 study is to draw on the experience and expertise of the consulting team and guidance from other jurisdictions to inform development of the management plan.

This report is the final Phase 2 report and presents the analyses and a table of recommendations for the Lake Management Plan. It informed a second public meeting (on August 25, 2007 in Kenora) and a presentation to the Technical Advisory Committee. The Phase 2 report has been finalized on the basis of these reviews (see public and advisory committee comment in Appendices A and B, respectively), combined with the Phase 1 report, and issued as a final report to the City of Kenora under one cover. The detailed final recommendations will provide the City with a “toolbox” with which to consider changes to their planning strategies and the Official Plan to allow the orderly and progressive management of Black Sturgeon Lake.

2. Summary of Phase 1 Recommendations

Our Phase 1 review of available information on Black Sturgeon Lakes concluded that, although there are data gaps, existing information was sufficient to move forward with the next phase of the study. Several recommendations were made, however, in order to establish a more current picture of Black Sturgeon Lakes for future use by the City of Kenora, especially with regard to water quality conditions and natural values. These recommendations, and their status, are reproduced below.

2.1 Water Quality Characteristics

Our review concluded that, aside from the MOE “Lake Partner Program” data for total phosphorus and Secchi Depth, there was no recent water quality data for the lake. We provided the following specific recommendations.

Recommendation 1: General Water Chemistry

The last general water quality survey was conducted in 2001 and included only minimal water quality parameters. A more comprehensive water chemistry analysis has not been conducted since 1988. It is therefore recommended that water samples be collected and analyzed for a full suite of water chemistry variables including alkalinity, pH, conductivity, nutrients (phosphorus, nitrogen, dissolved organic carbon), major ions and trace metals.

Status – In August of 2007, the City of Kenora received results of a comprehensive water quality sampling event that occurred in May of 2007 by MOE Thunder Bay. The results will be incorporated into the final study report. We recommend that the comprehensive water quality sampling be repeated at five-year intervals during May, when the lake is turning over. This recommendation is presented in Table 3 in Section 6 of this report.

Recommendation 2: Lake Productivity

While total phosphorus concentrations continue to be monitored under the Lake Partner Program, no other measures of algal productivity (e.g., chlorophyll *a*, algal biomass) have been measured, with the exception of a single chlorophyll *a* measurement collected in 1981 (MOE, APIOS monitoring, sampling date unknown) and on three occasions in May 1988 (May, July and August). In addition, there has not been a comprehensive monitoring program to assess patterns in lake productivity during the open water season. We therefore recommended that a monitoring program be established to determine measures of lake productivity (including total phosphorus and chlorophyll *a* concentrations) over the course of the open water season.

Status – We recommend:

- a) sampling of chlorophyll *a* and total phosphorus as “euphotic zone composite samples” on three week intervals during the open water season for two consecutive years and that the sampling be repeated every three years;

- b) Sampling phosphorus at 1 m above bottom at three week intervals from late June to fall turnover for two consecutive years and that this be repeated every third year thereafter, and
- c) sampling the algal community composition as a euphotic zone composite once in late July and once in late August every three years to check for changes in the algal community, with particular reference to blue green algae (cyanobacteria).

This recommendation is presented in Table 3 in Section 6 of this report.

Recommendation 3: Temperature and Dissolved Oxygen

Temperature and dissolved oxygen profile data have not been collected since 1988. We recommend that temperature and dissolved oxygen water profiles be taken at three week intervals (i.e., in conjunction with the water quality sampling) over the open water season to assess recent thermal and oxygen dynamics in Lower Black Sturgeon Lake for one year and that a profile of oxygen and temperature be taken at the end of summer (within 2 weeks either side of Labour Day) every three years

Status - This recommendation is presented in Table 3 in Section 6 of this report.

Recommendation 4: Bacteria

We recommend that a bacterial monitoring program be implemented for *Escherichia coli* (*E. coli*), an indicator of fecal contamination. This can be done by submitting samples to a conventional laboratory, or through the use of “coli plates”, a commercially available bacterial enumeration method that can be used by volunteers to sample many sites for much lower costs.

We do not recommend that the City undertake this program. The residents raised it as a concern and the City does not own property or maintain a public beach on the lake. We recommend that the residents undertake such a program to track changes over time as bacterial densities are a result of either natural factors or faulty waste water management by lake residents and are not under the control of the City.

Status - During the advisory committee meeting, it was discussed that the beach on James Road is, in fact, a public beach and is utilized by the public for swimming and boat launching. It is recommended that the City include the James Road beach in their regular weekly monitoring of

beaches, but that a citizens' monitoring program be undertaken for the remainder of the lake. This recommendation is presented in Table 3 in Section 6 of this report.

2.2 Natural Values Mapping

Recommendation 5: Values Mapping Reconciliation

As noted in the Phase 1 report, there are minor discrepancies amongst the three databases reviewed for natural features, and it would be a worthwhile exercise to reconcile these data to ensure the City is using the most up to date information on fish habitat, wild rice, wildlife habitat and nesting area locations. Given the importance that sensitive areas have been given within the Official Plan, it is critical that the mapping used for planning purposes is as up to date as possible. The City of Kenora GIS database mapping of Land Use Designations considered "sensitive" should reflect the updated fish and wildlife habitat features mapped within the Official Plan. Obtaining these data could be achieved by a joint meeting of DFO (who have indicated that site visits have been conducted recently), MNR and the City. Not only should a comparison of existing mapping be done, but it would be extremely beneficial to have a re-survey of the shoreline for known fish habitat.

Status - This recommendation is presented in Table 3 in Section 6 of this report.

Recommendation 6: Nesting Values

Nesting site locations and protection policies should be updated in the OP.

Status - This recommendation is presented in Table 3 in Section 6 of this report.

2.3 Regulatory Environment

Recommendation 7: Backlots

There is a need for further discussion within the Official Plan regarding the development of back lots and provision of public water access for back lot development.

Status - We have not provided any explicit recommendations on back lot development beyond:

- a) noting that there is no shortage of waterfront on Black Sturgeon Lake (which should minimize demand for back lot development),
- b) providing a recommendation that the minimum frontage of any back lots be 200' along a public road, and
- c) recommending that back lots form the subject of focussed discussion before finalizing this report. This discussion should include the issue of communal docking space on the lake. More detailed recommendations are provided in Table 3 following discussions with the public and advisory committee.

Recommendation 8: EISs

There is a potential need to elaborate on the content of and requirements for EISs submitted in support of development applications.

Status

Section 4 of this report provides a discussion of detailed EIS requirements and recommendations are presented in Table 3 in Section 6 of the report.

Recommendation 9: Lot Frontage Requirements

The 150' minimum lot frontage may need to be reviewed to assess whether it is generally applicable for all areas of the lake, and to assess how well it protects all resource values.

Status - We recommend that minimum lot frontage be increased to 200' to provide a better social buffer and help maintain naturalized areas on the lake.

We further recommend that minimum lot size be increased to 400' in embayments to reduce crowding in congested areas.

These recommendations are presented in Table 3 in Section 6 of this report.

Recommendation 10: Development Permit System

Consideration of the emergence of the "Development Permit System" in portions of the Province needs to be made. This system allows Building Permits to be linked to other land use modifications for a specific property such that, for example, approval of plans for enlarging a house or adding a

deck may be linked to requirements to make improvements to other aspects of the property (i.e., shoreline naturalization or removal of accessory structures).

Status - We recommend further discussions with the City of Kenora Planning Department to clarify the Development Permit System and its applicability for lower Black Sturgeon Lake. Section 4 of this report contains a discussion of the Development Permit System.

Recommendation 11: Planning Elements

There are currently no planning elements within the Official Plan that address:

- a) the issue of capacity, no matter how defined,
- b) a long-term vision for the development of Black Sturgeon Lake, or
- c) planning strategies to address social crowding, or recreational use of the lake.

These should be addressed in the City's Official Plan.

Status - The public meeting provided elements of a long-term vision for the lake that is reflected in the Phase 1 report and the recommendations brought forward herein.

These are discussed in various sections of this report and recommendations are made in Table 3 in Section 6.

3. Water Quality Modelling and Capacity Estimates

The issue of “capacity”, how much development is enough, drives many discussions of lake management and informed the City’s decision to embark on this planning exercise. Over the years, attempts have been made to define lakeshore capacity on the basis of water quality (i.e. allow development until water quality is threatened (“pollute up to a limit”)), boating density, wildlife habitat, social factors or fishing pressure. In the 1980s the Ontario government embarked on the Ontario “Lakeshore Capacity Study” with the intent of combining many factors into a single computer model determining capacity limits for recreational lakes (Dowling *et al.*, 1986). In the end, the only component that was implemented was the water quality component or “trophic status” model (Dillon *et al.*, 1986). No single implementation strategy was devised and different MOE regions across the Province implement different variants of the model. In 1988 the MOE began an

exercise to standardize the model for application across the province. Although some progress has been made and components published (i.e., Hutchinson *et al.*, 1991, Dillon *et al.* 1994, Hutchinson, 2002, Paterson *et al.*, 2005), the MOE has not yet prepared a policy on shoreline development for public review.

3.1 Boating Density

In the intervening years, many studies of “boating capacity” have been done. These generally consist of surveys documenting usage of a water body by boat type and size and recommendations on how many boats of each size can be accommodated on a water body. These are based on assumptions regarding the amount of surface area needed by boats of varying size (i.e., canoes need less space than small runabouts which need less space than high horsepower boats and water skiers etc). In practice, boating capacities have not been implemented in Ontario or been successful elsewhere. There are three main reasons for this. First is that the right of public access to water means that capacities are difficult to enforce. Second is that there is no way to control the size of boat an individual may wish to use on a lake. Third, is that the average size and horsepower of boats has increased in one generation and such changes cannot be regulated. Finally, the issue of “how much” has elements of risk management (a well managed large boat is safer and less intrusive than a poorly managed small boat), social preferences (no one likes jet-skis except their users) and perception (individuals have differing ideas of what constitutes crowding). We also note that current levels of boating use were not identified as a major issue at the public meeting. These reasons advise against use of boating density as a capacity factor in Black Sturgeon Lake.

3.2 Water Quality Models

Water quality is consistently identified as a prime requirement for recreational lakes and this is the case at Black Sturgeon Lake. The primary water quality concern in Ontario’s cottage country is nutrient enrichment. Excessive phosphorus input promotes the growth of algae, causing a loss of water clarity. The lake user sees this as “greener” water of less clarity and lower aesthetic appeal or as surface blooms of nuisance algal growth that may include toxic blue green algae (cyanobacteria) as has emerged as a problem in Lake of the Woods in the past 20 years. Upon death, algae settle to the bottom of the lake, where their decomposition consumes oxygen, reducing the amount of cold, oxygen-rich habitat available for sensitive aquatic life such as lake trout (*Salvelinus namaycush*) and potentially triggering remineralization of sediment-bound phosphorus.

Residential or cottage development on a shoreline increases the input of phosphorus to a lake. Domestic septic systems are a significant component of the loading, but clearing of the shoreline, fertilizer application and increased erosion are also important.

Water quality (trophic status) models are developed and used to quantify sources of phosphorus to a lake from all sources and to calibrate the loadings to concentrations measured in the lake. Shoreline development levels (or other source terms) can then be manipulated using the model and the response of the lake accurately estimated. When lake response is coupled to a water quality objective (i.e., an upper limit of phosphorus concentration) the modelling exercise can be used to set development capacities – or the limits to shoreline development that are necessary to protect water quality.

These capacities are not necessarily robust. They depend on the assumptions used in the model and the quality of the data used to estimate loadings. The capacity approach does not explicitly acknowledge or accept that management and mitigation actions, Best Management Practices, can reduce the apparent response of the lake and hence increase the “capacity” if capacity is defined only in terms of phosphorus loading.

Nevertheless, water quality based capacity limits can usefully inform lake management activities. Models can be used to assess lake sensitivity to phosphorus loading and lake response to existing development (i.e., by comparing modelled estimates to measurements of water quality). They can be used by accepting conservative assumptions regarding their inputs (i.e. that all septic system phosphorus will migrate to the lake), modelling this as a “worst case” scenario and assessing a) the implications of the results and b) the likelihood that the real world system will behave according to the assumptions.

3.3 Water Quality Model for Black Sturgeon Lake

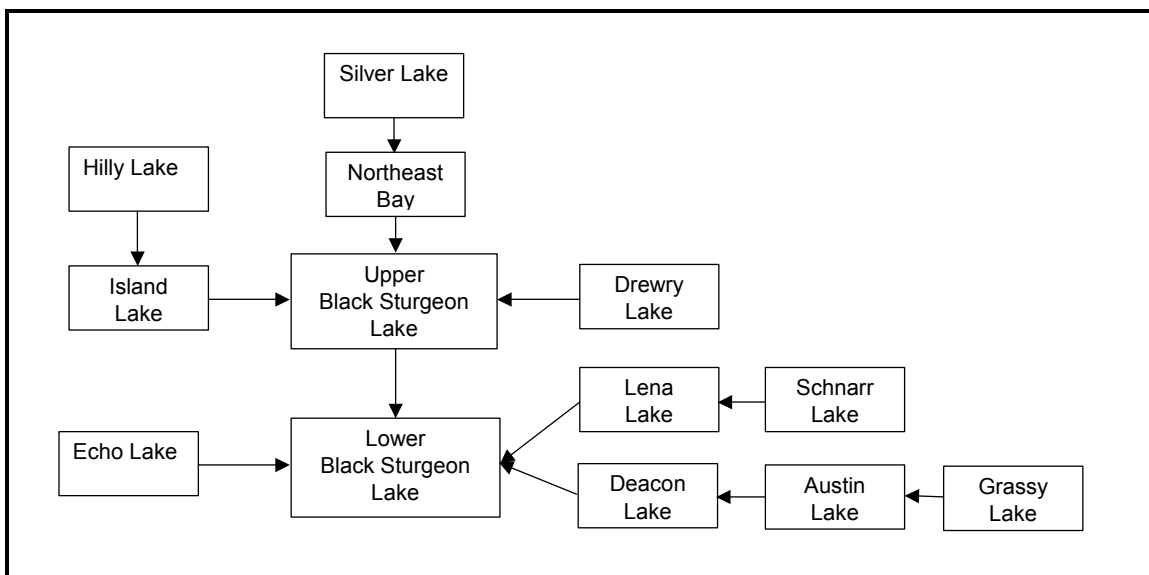
A water quality model was developed to predict the potential responses of total phosphorus concentrations in Black Sturgeon Lake to development on its shoreline. The model is a variant of the original Lakeshore Capacity Study Trophic Status Model that was developed by the Ontario Ministry of the Environment (Dillon *et al.* 1986). The model was substantially reworked and updated in 2002 (Hutchinson, 2002) and again in 2005 (Paterson *et al.*, 2005). The model works by estimating hydrologic and phosphorus loading from natural (watershed runoff and atmospheric deposition) and human (septic systems and land disturbance) sources and linking them together with an understanding of lake dynamics to predict total phosphorus concentrations in lakes. The model was originally calibrated using values for South–Central Ontario. For Black Sturgeon Lake, however, we obtained local data on runoff and phosphorus loading from the long-term watershed monitoring programs at the Federal Government’s “Experimental Lakes Area” outside of Kenora (Mike Turner, pers. comm., May 2007). The model is formulated in spreadsheet format so that it can be easily modified to accommodate local conditions and so that a variety of development scenarios can be run.

Black Sturgeon Lake is at the bottom of a large watershed and receives hydrologic and nutrient loadings from all upstream sources. Each lake in the watershed assimilates some of the phosphorus load from its watershed (phosphorus is retained in the sediments). A complete watershed model is complex as it includes all lakes >10 ha in size and provides explicit calculations

of phosphorus retention in each lake. In general, a complete model is useful for heavily developed watersheds where human phosphorus sources can be substantial and should therefore be accounted for. The upper reaches of the Black Sturgeon Lake watershed are not heavily developed, however, and consist mostly of Crown Land.

The Black Sturgeon Lake watershed model was therefore set up in a partial watershed context. Hydrologic and phosphorus loadings were included for all known sources in the watershed but the model included only 12 of the larger (>29 ha) upstream lakes. This approach produced an accurate model that could be used to derive various water quality scenarios. Figure 1 shows the Black Sturgeon Lake Watershed Model schematic.

Figure 1. Schematic of Black Sturgeon Lake Watershed Model



3.3.1 Model Scenarios

The model was run in a variety of scenarios to test the sensitivity of Black Sturgeon Lake to nutrient (phosphorus) input from shoreline development. These included:

- Prediction of “background” or “pre-development” phosphorus concentrations,
- Prediction of present – day phosphorus concentrations,
- Testing model sensitivity to “high runoff” and “low runoff” years (as was requested at the July public meeting),
- Testing the potential influence of watershed soils to attenuate human phosphorus loading,
- Testing lake response to seasonal vs. permanent shoreline occupation, and
- Testing several future development scenarios including:

- Development of all available shoreline into 200' (61m) lots,
- Excluding islands from future development,
- Allowing a total lot density of 1 lot/4 acres (1.6 ha) of lake surface.

In all cases the model was tested against two water quality targets. That is, shoreline development was added to the model until total phosphorus concentrations increased to one of two targets:

- The Provincial Water Quality Objective (PWQO) of 20 µg/L of total phosphorus that is maintained by the Ontario Ministry of the Environment (MOE, 1999). The 20-µg/L threshold is generally accepted threshold for water quality, above which the likelihood of stimulating nuisance algal blooms is increased.
- “Background + 50%” – This water quality target allows phosphorus concentrations to increase to values 50% above the values predicted by the model in the absence of human inputs. The use of “Background + 50%” as a water quality objective was first proposed by Hutchinson *et al.* (1991), was adopted by Environment Canada as a trigger for management investigation (Environment Canada, 2004), is used by the District Municipality of Muskoka as a trigger for lake management investigations (Hutchinson, 2001, District of Muskoka, 2005) and has been proposed for use as a new water quality objective by the MOE for a number of years, although is not officially adopted or published as such.

3.3.2 Modelled “Background” Water Quality

The water quality model predicted a “background” total phosphorus concentration of 16.29 µg/L for Black Sturgeon Lake (see below). This was done by subtracting all shoreline development, so that the watershed model predicted phosphorus concentrations with only the loading from the atmosphere and runoff from the watershed. The corresponding “Background + 50%” water quality objective would therefore be 24.44 µg/L. This value exceeds the 20-µg/L objective for algal bloom protection and so the lower of the two (20 µg/L) was used as a protective water quality objective for the modeling exercises.

3.3.3 Soils and Attenuation

The most significant potential human source of phosphorus to recreational lakes is septic systems for development around the shoreline. The Black Sturgeon Lake model includes phosphorus contribution from septic systems as well as a contribution for the area cleared for each shoreline lot. The Ontario Lakeshore Capacity Study Models (Dillon *et al.*, 1986) assume that all septic system phosphorus generated within 300 m of the shoreline will ultimately migrate to the lake. This assumption may be considered reasonable as a conservative approach but has never been tested directly. More recent models assume some attenuation of septic phosphorus with distance from the lake (Hutchinson, 2002, Paterson *et al.*, 2005), but there is no clear guidance on how much phosphorus is attenuated by soils.

In a natural system and in the absence of data or mechanistic understanding, a precautionary approach, such as the one incorporated into the original lakeshore capacity models, is recommended. The precautionary approach assumes that all phosphorus will ultimately migrate to the lake, regardless of evidence to the contrary, but is useful as a “worst case” scenario of lake response.

Since the publication of the original models, however, direct monitoring studies and mechanistic understanding of soil and phosphate interactions have provided evidence that conflict with the original assumptions. Mechanistic evidence (Stumm and Morgan, 1970; Jenkins *et al.*, 1971; Isenbeck-Schroter *et al.*, 1993) and direct observations made in septic systems (Willman *et al.*, 1981; Zanini *et al.*, 1997; Robertson *et al.*, 1998; Robertson, 2003) all show strong adsorption of phosphate on charged soil surfaces and mineralization of phosphate with iron (Fe) and aluminum (Al) in soil. The mineralization reactions, in particular, appear to be favoured in acidic and mineral rich groundwater in Precambrian Shield settings (Robertson *et al.*, 1998; Robertson, 2003), such that over 90% of septic phosphorus may be immobilized. The mineralization reactions appear to be permanent (Isenbeck-Schroter *et al.*, 1993). Recent studies conclude that most septic phosphorus may be stable within 0.5 m of the tile drains in a septic field (Robertson *et al.*, 1998, Robertson, 2003).

Trophic status modelling also supports the mechanistic and geochemical evidence. Dillon *et al.* (1994), for example, reported that only 26% of the potential loading of phosphorus from septic systems around Harp Lake, Muskoka, could be accounted for in the measured phosphorus budget of the lake. The authors attributed the variance between measured and modelled estimates of phosphorus to retention of septic phosphorus in thick tills in the catchment of Harp Lake.

The role of soils in phosphorus attenuation should therefore be considered as part of any water quality modeling exercise. Much of the Black Sturgeon Lake watershed is characterized by thin or no soils over bedrock but this description is in no way universal. Areas of former farmland along the Black Sturgeon Lake shoreline provide evidence of pockets and areas of thicker soils. Even in areas of thin soils, however, tile fields are often, by necessity, built on imported fill and so some attenuation is possible. A continuum of natural soil between the tile bed and the lake is required, however, before significant levels of phosphorus retention can be assured and so phosphorus attenuation may be minimal for areas with little or no soil.

The Black Sturgeon Lake model was therefore run in two scenarios to provide a range of responses:

- One scenario “No Attenuation”, assumed that all septic system phosphorus moved to the lake.
- A second scenario “Attenuation” assumed that 26% of the septic system phosphorus moved to the lake, in line with the findings of Dillon *et al.* (1994).

Results from both scenarios are presented, but the final conclusions assume no attenuation, as a conservative approach that maximizes protection of water quality in Black Sturgeon Lake.

3.3.4 Model Accuracy

The model provided a very good fit of predicted total phosphorus concentrations to recent measured values (Table 1 and Figure 2). The model predicted a pre-development “background” phosphorus concentration of 16.29 µg/L and present-day (May 2007) mean phosphorus concentrations of 17.7 – 18.3 µg/L assuming attenuation and no attenuation of septic system phosphorus. Shoreline development has therefore increased phosphorus concentrations in the lake by a potential of 9-12% from pre-development background values.

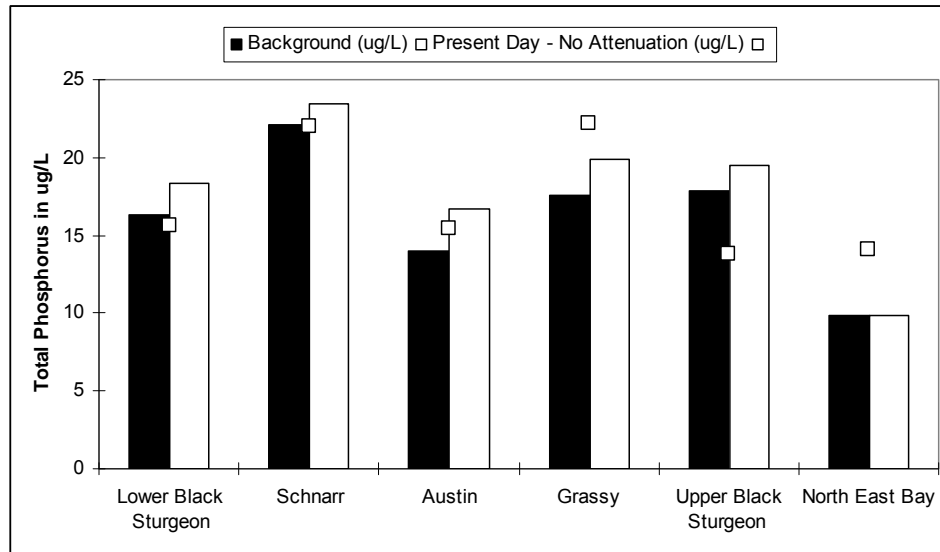
The mean spring-overturn phosphorus concentration (2001-2007) was 17 µg/L, which corresponds to an ice-free mean value of 15.64 µg/L¹. The model over predicted background phosphorus concentrations (16.3 µg/L vs. the measured present-day mean of 15.6 µg/L) suggesting further calibration would be useful. It is more typical that the model over-predicts present-day phosphorus concentrations, because of permanent attenuation or delayed migration of septic phosphorus by soils. The model accuracy of 13%-17% is considered acceptable (Hutchinson *et al.*, 2001).

Table 1. Results and Accuracy of Black Sturgeon Lake Watershed Model

	Background (ug/L)	Present Day - No Attenuation		Present Day - Attenuation		Measured (ug/L)
		(ug/L)	% Error	(ug/L)	% Error	
Lower Black Sturgeon	16.29	18.31	17.1	17.74	13.4	15.64
Schnarr	22.13	23.46	6.6	22.57	2.6	22.00
Austin	13.96	16.75	8.5	15.28	-1.1	15.44
Grassy	17.54	19.92	-10.2	18.33	-17.4	22.18
Upper Black Sturgeon	17.90	19.54	41.5	18.85	36.5	13.81
North East Bay	9.82	9.83	-30.0	9.83	-30.0	14.05
Hilly	9.93	16.61	52.9	13.82	27.2	10.86

¹ The model predicts the average phosphorus concentration over the entire ice-free period of a year. Total phosphorus concentrations are most reliably measured during the period of spring lake overturn, when phosphorus concentrations are higher as a result of the spring freshet loading. Mean spring overturn measurements in Black Sturgeon Lake were 17 µg/L. This can be converted to the ice-free mean value of 15.6 µg/L using the equation $Tp_{if} = (Tp_{so} * 0.8) + 2.04$ (Dillon *et al.*, 1986).

Figure 2. Results and Accuracy of Black Sturgeon Lake Watershed Model



Upper Black Sturgeon Lake and its North East Bay did not model accurately because error exceeded 30%. This may reflect the resolution of the partial watershed model, the need for more detailed modeling effort or the need for more water quality data for comparison. These errors, although potentially significant, were disregarded as the purpose of the exercise was to model Lower Black Sturgeon Lake.

3.3.5 High and Low Runoff Years

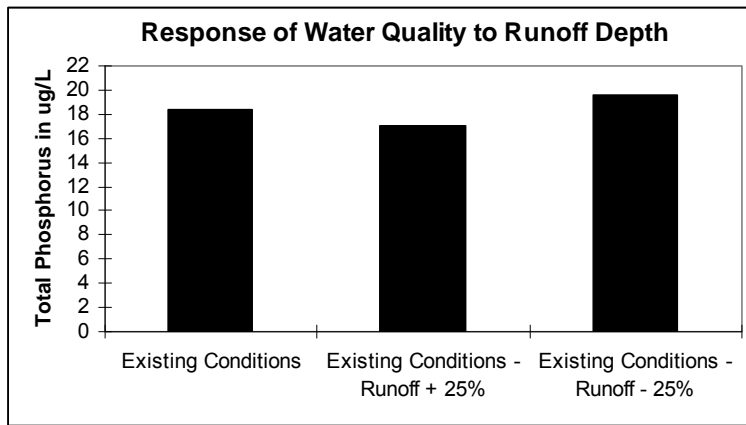
Steady state, mass-balance water quality models, of the type used here, estimate water quality over the long term, in which the lake and its watershed are in equilibrium with a steady loading of water and nutrients. They are not intended to estimate short term or inter-annual changes in water quality, as these are influenced by numerous factors for which measurements are either not available or the mechanisms of response are not well understood.

At the July public meeting for Black Sturgeon Lake, residents expressed opinions that water quality in the lake varied between high water and low water years and asked that the modeling exercise consider that. The model does not function on the basis of lake volume but the key predictive parameter is “Depth of runoff” or the amount of water loaded to the lake surface from its watershed in a given year. Depth of runoff would increase in a high water year and would decrease in a drought year, and water quality would respond predictably.

The present-day model was therefore run using the long-term mean runoff +/- 25% to estimate lake response to wet and dry years. Figure 2 shows that the predicted phosphorus concentrations for “Existing Conditions” would increase by 6.6%, from 18.4 to 19.6 µg/L, in a dry year (average runoff minus 25%) and would decrease by 7.4 %, from 18.4 to 17.1 µg/L, in a wet year (average runoff

plus 25%). These changes are within the 5.5 µg/L range of mean annual phosphorus concentrations observed from 2001 to 2007. Phosphorus concentrations are expected to decrease in wet years because higher runoff would result in greater discharge rates from the lake and hence lower in-lake retention of phosphorus.

Figure 3. Effect of Wet and Dry Years on Modelled Total Phosphorus Concentrations in Black Sturgeon Lake



3.3.6 Seasonal and Permanent Residences on Black Sturgeon Lake

The amount of phosphorus generated by a shoreline residence will depend on the usage of that residence – the number of people using it - and the amount of time they spend there. It is obvious that permanent occupancy will generate more phosphorus contribution to a septic system and hence more potential for phosphorus to migrate to the lake. Data on usage of shoreline residences at Black Sturgeon Lake are not available and so the standard MOE estimates (Paterson *et al.*, 2005) were used. These equate to 2.55 capita years per year for permanent residences and 1.27 capita years per year for “extended seasonal” usage. Extended seasonal usage was used as the default for current conditions to reflect the proximity of the lake to the City of Kenora and resultant higher usage over the year.

The lake was modeled to estimate the potential changes to water quality over the long term if all 215 shoreline residences on the lake and all 45 back lot residences were converted to year round (permanent) occupancy. Although this is not considered likely at present, it was considered as a potential outcome, as there is nothing in place that would prevent residents from living there year round.

Conversion from “Extended Seasonal” to “Permanent” occupancy would increase total phosphorus concentrations from 18.4 to 19.2 µg/L, or by 16.2% from the “background” value of 16.3 µg/L. Water quality in the lake would therefore remain below the 20 µg/L cap of the PWQO and below the management guideline of “Background + 50%”.

Conclusion – Conversion of all residences on Black Sturgeon Lake from seasonal to permanent occupancy would not threaten water quality (total phosphorus concentrations) in the lake.

3.3.7 Limits to Development – Water Quality Based

The model was used to predict the maximum numbers of shoreline residences that could be placed on Black Sturgeon Lake without threatening water quality. Residences were added until the model predicted a total phosphorus concentration of 20 µg/L – the PWQO. This exercise did not consider any other factor such as whether or not there is space on the shoreline to accommodate that many lots. The objective was to see what the lake could sustain without threatening water quality. The model was run assuming no attenuation of septic system phosphorus by soils as a “worst case” estimate of lake outcome. The model was run initially assuming that lots were used as cottages (“extended seasonal” use) and then again assuming all lots are occupied year round (permanent use). Water quality based limits to development were:

- 165 additional permanent lots
- 543 additional cottage lots

Conclusion – Substantial additional development of Black Sturgeon Lake is possible without threatening water quality. Development up to the 20 µg/L PWQO limit would allow total development of 370 permanent homes or 758 seasonal use cottages on the lake.

It is noted that this conclusion is based on the very conservative assumption that all septic system phosphorus will migrate to the lake. In reality, some phosphorus will be retained by soils in the tile fields and the catchment, such that the actual development capacity could be considerably higher.

3.3.8 Limits to Development – Perimeter Based

Although development limits are set to protect water quality in recreational lakes, water quality may not be the most sensitive limit to development. In practice, the physical amount of shoreline available for building may limit shoreline development. Shoreline may be limited by wetlands or other natural areas that preclude development, by the presence of Crown Land that cannot be subdivided without a change in legislation, and by the amount of shoreline that current owners wish to maintain intact. After considering these factors, the number of developable lots will be controlled by the minimum frontage dictated by the City of Kenora. Calculations were based on a recommended 200’ (61m) lot size.

The limits to development imposed by the amount of available shoreline on Lower Black Sturgeon Lake were therefore modeled to assess whether water quality or the amount of shoreline would limit future development. The amount of available shoreline lots was determined by:

- measuring the total length of shoreline between the Hwy. 658 bridge at the downstream end of the lake and the Pelletier Bridge at the lake inlet,

- subtracting those portions of shoreline held as Crown Land, and
- dividing the remaining perimeter by 61 m to calculate the maximum number of available lots.

This analysis is conservative and will overestimate the amount of development lots as it did not account for wetland or natural areas, for steep slopes that could preclude development or for larger lot sizes that could be recommended for bays, inlets or islands.

The analysis was run for several scenarios:

- Development of the main basin shoreline and all available island shoreline as lots for “extended seasonal” usage.
- Development of the main basin shoreline as permanent lots and all available island shoreline as lots for “extended seasonal” usage, based on the assumption that islands would not be developed as year round residences.
- No island development and extended seasonal usage on the main basin shoreline.
- No island development and permanent usage on the main basin shoreline.

Table 2 shows that development of all available shoreline, for extended seasonal or permanent use, would cause water quality in Lower Black Sturgeon Lake to increase to beyond 20 µg/L, exceeding the PWQO and increasing the risk of nuisance algal blooms in the lake. Development of all shoreline as permanent homes, and islands as seasonal homes, would also cause total phosphorus concentrations to increase by 51% above background, triggering the need to assess management actions to reduce nutrient loading to the lake.

Table 2. Predicted Response of Water Quality to Development of All Available Shoreline

	Number of Lots	Total Phosphorus Concentration (ug/L)	Percentage Increase from Background
Full Perimeter Main Basin + Islands - Extended Seasonal	1294	21.7	33.1
Full Perimeter Main Basin Extended Seasonal / No Islands	943	20.6	26.3
Full Perimeter - Main Basin Permanent / Islands Seasonal	1294	24.6	50.9
Full Perimeter - Main Basin Permanent / No Islands	943	23.5	44.4

Conclusion – Development of all available shoreline in Black Sturgeon Lake would threaten water quality. Full development would cause total phosphorus concentrations to exceed the 20 µg/L PWQO.

It is noted that this conclusion is based on the very conservative assumption that all septic system phosphorus will migrate to the lake. In reality, some phosphorus will be retained by soils in the tile fields and the catchment, such that water quality would be protected.

3.3.9 Limits to Development – Recreational or Surface-Area Based

Several Ontario municipalities have adopted a “recreational” filter for limiting shoreline development, or for triggering the need for a more detailed assessment. In these cases, they have assumed that each lake residence will require a surface area of 4 acres (or 1.6 ha) as a “social” or “recreational” filter. This would limit physical interaction of residents on the water, reduce crowding and increase water safety by ensuring space for each boater.

Lower Black Sturgeon Lake has a surface area of 1573 ha, allowing for a total of 971 shoreline residences at a density of 1 lot/1.6 ha. Development of this many lots is unlikely, as it exceeds the maximum number of 61m lots available unless islands are included. Thus surface area is a more sensitive determinant of development capacity than is the amount of available shoreline. Development of 971 lots would, however, threaten water quality as total phosphorus concentrations would exceed the PWQO of 20 µg/L. Development of 971 lots on Lower Black Sturgeon Lake would:

- Increase total phosphorus concentrations to 20.7 µg/L if the lots were developed as extended seasonal usage
- Increase total phosphorus concentrations to 23.7 µg/L if the lots were developed as permanent usage

Conclusion – Development of Black Sturgeon Lake to maintain 1 lot for each 1.6 ha of lake surface area would threaten water quality. This scale of development would cause total phosphorus concentrations to exceed the 20 µg/L PWQO. It is noted that this conclusion is based on the very conservative assumption that all septic system phosphorus will migrate to the lake. In reality, some phosphorus will be retained by soils in the tile fields and the catchment, such that water quality would be protected.

3.3.10 Maximum Development Scenario #1 – Protect Island Lots

Islands result in a pleasant scenic vista on lakes. They break up the expanse of water and block views of opposing shorelines. If they remain undeveloped, they serve as “visual oases” on the lake scape. At the July Public Meeting, residents voiced a concern that islands remain undeveloped. We therefore modeled a scenario in which all available (non-Crown) shoreline on the lake basin was developed as 61m lots, but that each of 19 islands >2ha in size, remained undeveloped (We note that private ownership does confer the right to build a dwelling on any lot and so we assumed 1 extended seasonal usage dwelling for each of 19 islands on the lake). Islands held by the Crown could be used for camping and so “extended seasonal” usage for all islands was retained as a conservative scenario for water quality assessment. We therefore modeled the response of the lake assuming extended seasonal and permanent usage of all available lots on the main basin.

This development scenario would not protect water quality in Black Sturgeon Lake. Total phosphorus concentrations would increase to:

- 20.6 µg/L for extended seasonal use
- 22.1 µg/L for permanent usage.

Conclusion – Development of Black Sturgeon Lake to maximize use of the available shoreline would threaten water quality. This scale of development would cause total phosphorus concentrations to exceed the 20 µg/L PWQO. It is noted that this conclusion is based on the very conservative assumption that all septic system phosphorus will migrate to the lake. In reality, some phosphorus will be retained by soils in the tile fields and the catchment, such that water quality would be protected.

Conclusion - Planning limits to shoreline development must therefore be imposed to protect water quality in the lake.

3.3.11 Maximum Development Scenario #2 – Protect Water Quality

The previous scenarios established that neither surface area nor available shoreline will limit the potential amount of shoreline development on Black Sturgeon Lake. We therefore ran a “Most Protective/Maximum Development” scenario.

In this, we assumed that each island would retain one “extended seasonal” usage lot and that all development in the main basin of the lake would ultimately be used on a permanent basins (this is a conservative assumption). The model was then run to assess how many shoreline lots could be developed before the total phosphorus concentrations exceeded 20 µg/L. This would maximize the economic return to all parties and would maintain water quality within the limits of the MOE PWQO.

Conclusion – Black Sturgeon Lake can sustain a total of 19 extended seasonal island lots and 380 shoreline lots occupied on a permanent basis and maintain water quality within the PWQO limit. This allows development of 19 island lots and 165 shoreline lots in addition to the 215 existing shoreline lots. Any development plans for the lake should proceed with this understanding of this conservative maximum development capacity. As before, this conclusion is based on the very conservative assumption that all septic system phosphorus will migrate to the lake. In reality, some phosphorus will be retained by soils in the tile fields and the catchment, such that water quality would be protected. In addition, this scenario does not assume any additional management actions that will reduce the impact of each lot.

3.4 Summary

A conservative water quality model was used to determine the “worst case” response of Black Sturgeon Lake to future shoreline development. It showed that an additional 165 lots can be developed without

threatening water quality. This means that development activities can proceed with no immediate threats to water quality in the lake. The conservative nature of the model, however, means that it is unlikely that the lake will respond as predicted. It will most likely show a smaller response to development than predicted, meaning that water quality will be better than expected.

The model was run assuming 200' (61m) maximum lot frontages for future lots. Other sections of this report recommend larger frontages (400') in bays. This would reduce the overall amount of development, further protecting water quality.

The model was run assuming that all shoreline areas that were not Crown Land could be developed. Other sections of this report recommend that no development occur in sensitive natural areas or large setbacks from natural sensitivities. This would reduce the overall amount of development, further protecting water quality.

The model was run assuming that all septic system phosphorus would migrate to the lake. The report also describes, however, recent scientific studies showing that this assumption is unlikely to be accurate and that substantial amounts of phosphorus would be retained in native and imported spoils used in septic systems. This would reduce the overall impact of development, further protecting water quality or, conversely, increasing development capacity.

The model was run assuming that shoreline development could not be managed to protect water quality. Other sections of the report, however, describe innovative programs implemented by the District Municipality of Muskoka, which require the use of Best Management Practices to protect water quality. These would reduce the overall impact of development, further protecting water quality or, conversely, increasing development capacity.

We therefore recommend that:

- the capacity figures described herein be used on an interim basis for 20 years,
- the City of Kenora ensure that water quality in Black Sturgeon Lake is well monitored,
- the City of Kenora implement the recommendations regarding lake stewardship and development requirements presented herein to protect water quality, and
- the City revisit the capacity calculations in 20 years to determine if they need to be revised. The 20 year time frame provides the necessary stability for the Official Plan policies and is in line with the experience of the District of Muskoka and the Province of Ontario (MOE), which implemented lake capacity planning in the late 1970s and early 1980s and revised their program twenty years later as better science and understanding emerged. We note that a review may be necessary prior to 20 years if the level of development has already reached or is approaching the recommended 165.

See also Section 4.2.3.

4. Planning Tools

This section of the report presents a review of planning tools and considerations to address the management of Black Sturgeon Lake. It is not considered comprehensive or exhaustive but does represent a summary of useful planning approaches summarized on the basis of the authors' experiences in other jurisdictions managing similar lake development issues as those identified for Black Sturgeon Lake. This discussion forms the basis of recommendations made in Table 3 in Section 6 of this report.

4.1 Environmental Impact Studies and Assessments

Municipal Official Plan policies routinely prescribe requirements for environmental impact studies (EIS) or assessments (EIA) to support development applications near sensitive environmental features such as wetlands or the habitat of Species at Risk. In the past, such studies may have been required in support of applications for plans of subdivision or commercial developments.

Increasingly, the lake environment, particularly the nearshore area, is considered sensitive to human disturbance. This applies to natural heritage features such as songbird or fish habitat, as well as to aspects of the built landscape, such as views and the built form. Both natural and human heritage features can be recognized in OP policies and can be protected by planning instruments that require environmental impact studies or assessments as a condition of planning application. These can then be translated into conditions of approval that will assure shoreline naturalization, for example, built form requirements or requirements to protect the dark sky. Such policies assure that the site is well understood prior to disturbance, and developed in a manner that will protect water quality, terrestrial features, and features of human interest in the long term. As such, municipalities in lake country are increasingly requesting that some form of EIS accompany applications for severance of shoreline lots.

4.2 City of Kenora Policies

The City of Kenora's Official Plan, Section 8.7, outlines the requirements for an Environmental Impact Assessment, should a proposed development warrant the need for such a study. While this section of the Official Plan is important, it would benefit from additional detail outlining study requirements and qualifications of the researcher. In order to ensure that the right information is collected for the EIA and that it is sufficient to make a decision on a development proposal, it is recommended that further detail be provided to the public within the OP so that it is clear what the City requires.

Environmental Impact Assessments should be carried out by professionals who can be qualified by the Ontario Municipal Board as expert witnesses on these matters, if required, on the basis of education and experience in one or more of the following disciplines: natural science, terrestrial, fisheries or wetland ecology, soils science, hydrogeology.

The *Natural Heritage Reference Manual* (OMNR, 1999) sets out guidelines to assist a planning authority in determining the circumstances under which an EIS (or EIA) is required in support of a development application. The need for an EIS is triggered by the proximity of the proposed development to the natural heritage feature, referred to as "adjacent lands". There are no known provincially or regionally significant wetlands or Areas of Natural and Scientific Interest (ANSIs) around Lower Black Sturgeon Lake, but locally significant wetlands do exist. For shoreline development proposals, the following "adjacent land" zones are already in place in the Official Plan and are considered adequate for planning purposes and environmental protection if they are adequately enforced in the application process:

Locally Significant Wetlands	=> 120 m
Critical Habitat of Endangered & Threatened Species	=> 120 m
Significant Wildlife Habitat	=> 120 m
Fish Habitat.....	=> 120 m

Given the local importance of wild rice, it is recommended that wild rice stands be protected along with other sensitive natural features. Known stands were mapped as part of the Background Conditions mapping exercise (Natural Features map) and should be updated on a regular basis as other features are updated. **We recommend a requirement for an EIS for any development proposed within 120 m of a wild rice stand.**

Proponents seeking to develop within the "adjacent land" zones are required to undertake an EIS if any portion of the proposed development falls within any of the "adjacent land" areas identified above. Where a development proposal is put forward, Figure 11 from the Phase 1 report (reproduced here as Figure 4) should be consulted to determine, at a first cut, if the development has the potential to affect a mapped natural heritage feature and therefore requires an EIS.

The features depicted on Figure 4 represent the best and most up-to-date spatial information available at the time this study was prepared and may have changed over time. The Kenora District MNR should therefore be consulted to confirm and/or update the status and boundaries of the features as part of the planning process.

The overall objective of the EIS will be to identify and assess the potential impacts of specific development proposals on the function, attributes and linkages of shoreline natural heritage systems, to demonstrate compliance with applicable municipal, provincial, and federal planning policy and to identify and specify appropriate Best Management Practices to mitigate and reduce any potential effect of a proposed development on natural heritage features.

An EIS can take the form of either a full site study or a scoped study. City planning staff should assist proponents in identifying the key technical issues to be addressed and the appropriate scope and level of effort required in the preparation of an EIS. These exact requirements will vary depending on the scale of the proposed development scenario, the significance and sensitivity of

the nearby natural heritage feature(s), and the anticipated magnitude, duration and spatial extent of predicted impacts (direct, indirect and cumulative).

It is recommended that, prior to preparing an EIS, an initial assessment be undertaken between the proponent, the municipality and any relevant approval/commenting agency (e.g., MNR, DFO, MOE) to review the proposal, determine the applicable environmental regulations and policies, and to provide direction as to the scope of the necessary technical studies. It is our understanding that there is considerable interaction between these agencies already when it comes to development proposals and that this type of working relationship is well established in Kenora.

4.2.1 Scoped EIS

In cases where the development constitutes a relatively minor undertaking (such as construction on a single residential lot) or one that barely encroaches within the adjacent lands zone, municipal planning staff can exercise some discretion and request that the proponent prepare a scoped EIS. This typically involves a simple checklist approach that only addresses the key issues identified at the initial assessment stage.

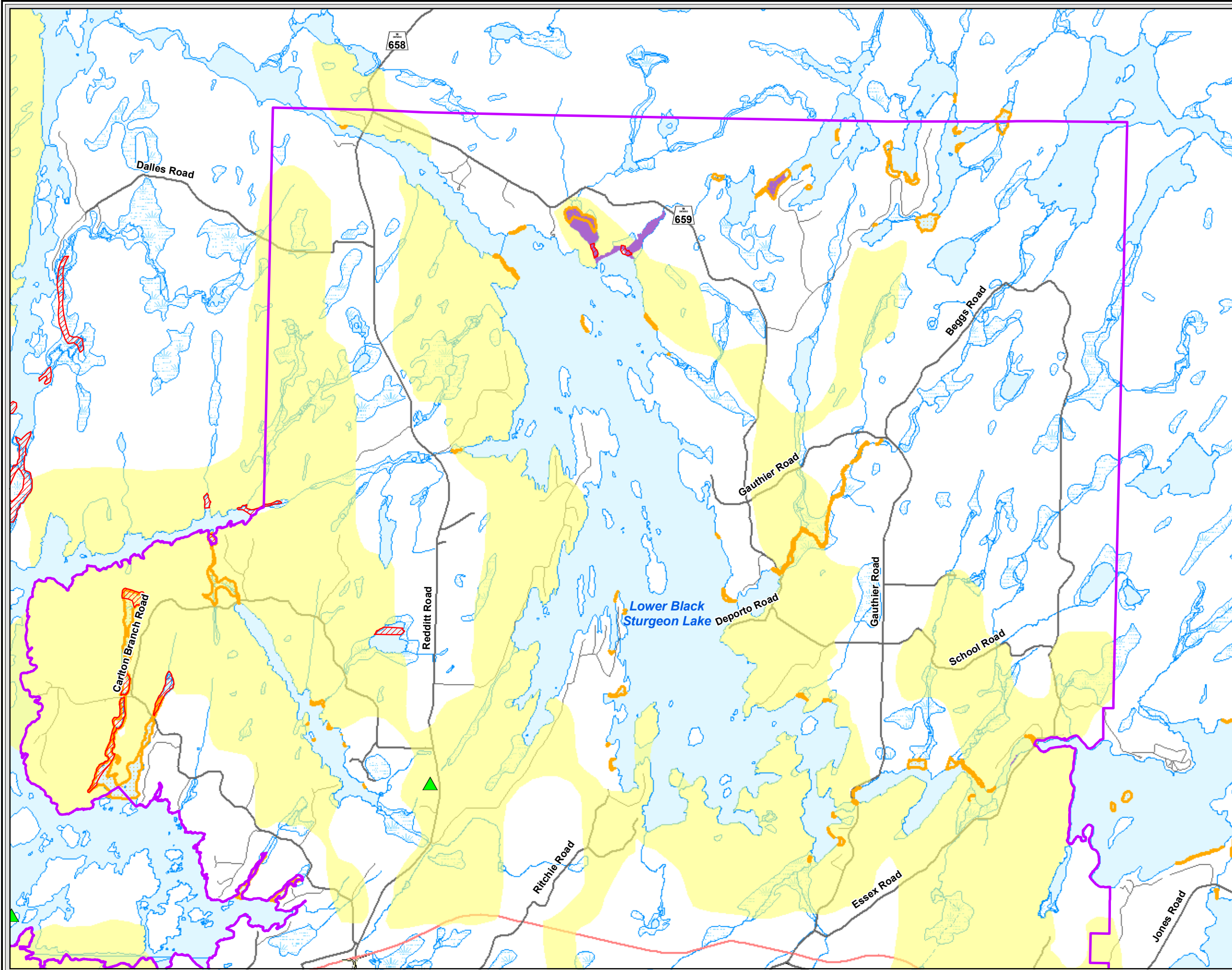
4.2.2 Full Site EIS

For more complex proposals, such as plans of subdivisions, and resort/recreational developments (e.g., marinas), a full site EIS is the appropriate mechanism for demonstrating that development can meet the test of municipal and provincial natural heritage policies. Components of a full site EIS typically include consideration of the following:

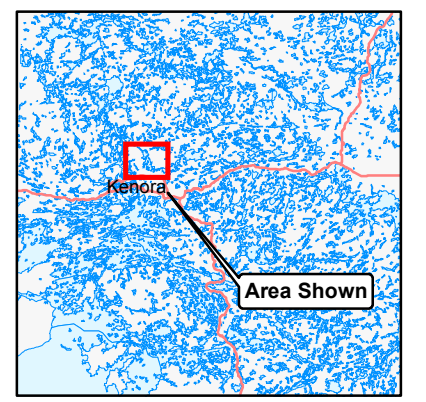
- a) a detailed description of the natural heritage attributes of the study area, including terrain setting; soils; geology; groundwater and surface water resources; vegetation communities; fish and wildlife communities and habitat; and delineation of the precise boundaries of the natural heritage feature(s);
- b) a characterization of the existing ecological, hydrological, and hydrogeological functions performed by the significant feature(s);
- c) a detailed description of the proposed development, including building type and density, servicing (sewage disposal, water supply) and infrastructure (roads, stormwater management, etc.);
- d) a prediction as to potential impacts (direct, indirect and cumulative) of the development on the natural and physical environment;
- e) the identification and evaluation of measures/options to avoid, reduce or otherwise mitigate impacts to meet the standard of no loss of feature and function; and
- f) the selection of a preferred mitigation/rehabilitation strategy.
- g) a summary of predicted net effects after the application of mitigation compared to overall environmental targets and standards; and

- h) an evaluation of the need for and the elements of a monitoring program to assess the effectiveness of the preferred mitigation/rehabilitation strategy.

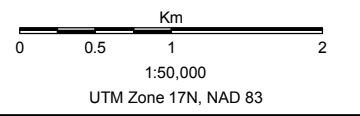
Additional guidance regarding the specific technical requirements of an EIS and the approach that should be taken for the preparation of an EIS within the context of a typical municipal planning process are discussed further in the *Natural Heritage Reference Manual* (OMNR 1999). For further guidance on water quality impact assessments specifically, reference can be made to the Lake System Health Program of the District Municipality of Muskoka, as detailed below.



- Legend**
- Kenora City Limit
 - Spawning Area
 - Fish Nursery Areas
 - Wildlife Nursery Areas
 - Wintering Areas
 - Nesting Site
 - WildRiceStands



Basemapping from Ontario Ministry of Natural Resources



Black Sturgeon Lakes Management Study

Natural Values Features

August 2007
Project 70294



Figure 4

4.2.3 Development Permit System

The Development Permit System (DPS) (Ontario Regulation 608/06), which came into effect January 1, 2007, is a new land use planning tool available to all local Ontario municipalities. It provides an alternative approval system, which facilitates and streamlines development, promotes community building and enhances environmental protection.

The DPS helps strengthen a community's vision for its future by contributing to strategic, integrated and long-term planning, and providing certainty, transparency and accountability on the form of future development for an area. The DPS combines the zoning, site plan and minor variance processes into one application and approval process. The DPS can provide distinct advantages to municipalities as compared to other planning tools. Specifically, the DPS (www.mah.gov.on.ca):

- streamlines approvals
- provides for faster approval timelines (45 vs. 120 days)
- focuses third party appeals at the front end of the process, similar to site plan appeals
- provides a more flexible approvals process, which can reduce the need for minor variances
- provides for a broader range of conditions of approval not available through other planning tools
- allows decisions on development permit applications to be delegated to a municipal employee or a committee appointed by Council (i.e. Kenora Planning Advisory Committee)
- enables municipalities to incorporate their site alteration and tree-cutting bylaws into the DPS
- combines land use and physical design considerations into one process

4.2.3.1 *Enhanced Environmental Protection*

The DPS enables municipalities to better protect the environment and public health and safety. In the case of Black Sturgeon, the DPS may be the vehicle by which the City of Kenora can more effectively enforce the site controls that target the long-term vision for this lake, those being preservation of the natural environment and its aesthetic qualities, protection of the water quality and natural habitats and the avoidance of social overcrowding.

4.2.3.2 *Conditions of Approval*

Municipalities have the ability to impose a range of conditions on the issuance of a development permit, provided that these conditions meet prescribed criteria. For example, conditions could include those related to vegetation removal and site alteration, as well as ongoing monitoring requirements to ensure public health and safety and protection of the natural environment. On Black Sturgeon Lake where water quality, aesthetic values and natural features are important to the community, conditions may be established that target minimum shoreline development (e.g. 25% of shoreline only) to preserve natural shoreline features and promote a buffer zone; setbacks that accommodate both vegetative buffers and adequate septic setback; and, conditions

related to regular servicing (with records) of septic system/holding tank/greywater pit/outhouse inspections and pump outs.

4.2.3.3 Discretionary Uses

In addition to permitted uses, a development permit bylaw may also identify “discretionary uses” which can be permitted (without a bylaw amendment) subject to meeting specified criteria. For example, discretionary uses can identify the required conditions for appropriate development in environmentally sensitive areas, if in fact development is approved in these areas at all.

4.2.3.4 Definition of Development

The expanded traditional definition of “development”, as stated in the DPS, includes site alteration and the removal of vegetation in its wording – this enables municipalities to better protect water and the environment through, for example, conditions related to vegetation removal. It is of particular importance in an environment like Black Sturgeon Lake where the protection of the natural shoreline, vegetated slopes and overall waterfront character are of prime importance.

Example: Township of Lake of Bays

The Township of Lake of Bays was the first township to adopt the DPS system as they felt it provided the opportunity to achieve the much-desired balance between private property rights and the broader public interest. It is similar to traditional zoning by-laws in that it includes both general provisions which apply across the entire area to which the By-law applies, as well as specific provisions for each Development Permit Area (zone). It differs from a zoning by-law in that it incorporates new tools that have been made available through the Regulation (see above).

The Township has stipulated that a development permit is required by a property owner if they propose to undertake site alteration or vegetation removal within the shoreline “yard”, in or on a sensitive area such as a wetland or steep slope or where a proposal does not comply with the standards of the by-law, or includes a discretionary use. The township’s definition of “shoreline yard” is:

“The shoreline yard is the required setback from the shoreline. The required shoreline yard is generally 30 m (100 ft) except for certain lakes, where it is 20 m (66 ft).”

The by-law and supporting resources as well as a public information brochure on the DPS is available at www.lakeofbays.on.ca/dev_permit_bl.htm.

4.2.4 Site Plan Control

The City of Kenora, through its Official Plan, has designated the entire city as a Site Plan Control Area and indicates that it can use this mechanism to ensure that development in the City is attractive and compatible with adjacent uses. It specifically refers to development at the entrances to the City, but does not provide details on other areas of the City, what types of controls are implemented and for what reasons.

The City of North Bay designated certain portions of land along the shoreline of Trout Lake that are not serviced by city sewer and water services, and all lands with frontage on a watercourse flowing into Trout Lake as the “Trout Lake Site Plan Control Area” (see By-Law No. 220-90 at www.city.north-bay.on.ca/cityhall/bylaws). Within this area, the City has stated:

No person shall commence any development on any land within the Trout Lake Site Plan Control Area prior to approval by the Council...

No person shall alter or remove any existing ground cover in anticipation of development on lands within the Trout Lake Site Plan Control Area prior to approval by the council...

As a condition of approval of an agreement under this by-law, the owner of the lands shall provide to the satisfaction of and at no expense to the City, plans and drawing to identify the following matters:

- location of natural flora and fauna, shrubs, trees and other ground over;
- sanitary sewage facilities;
- location of all buildings and structures to be erected and showing the location of all facilities and works thereon;
- facilities to provide access to and from the land, including driveways or parking areas and the surfacing thereof;
- provision for the disposal of waste water, storm water and surface water;
- any change in elevation or contour of the land;
- enclosures of the storage of garbage or other waste material;
- easements to be conveyed to the City for the construction maintenance or improvement of watercourses, ditches or other land drainage works

The by-law also states that, where land within the Site Plan Control Area does not have a depth to accommodate a setback of 30 m from the water’s edge to the septic system due to natural constraints, then the owner must file a Site Evaluation Report prepared by a soils analyst or other consultant with demonstrated competence in soils analysis, to identify shoreline protection equivalent to 30 m depth of existing vegetation.

4.2.5 Water Quality EIS

Given the importance placed on water quality by residents of Black Sturgeon Lake and the City’s interest in preserving water quality within its jurisdiction, the example of the District Municipality of Muskoka is offered as an excellent starting point for rewording and enhancing the current section of the OP to protect water quality. The District of Muskoka upgraded its recreational water quality program and formalized the changes as the “Lake System Health” (LSH) program in Official Plan Amendment 32 (OPA 32) in June of 2007. The changes provide a progressive, innovative and protective approach to water quality protection. The technical input to the revision was completed

by Gartner Lee Limited, (Gartner Lee Limited, 2005), presented at an international conference on “Water Sensitive Planning” in 2002 and published as a book chapter in 2005 (Hutchinson 2005).

The following summary is taken from the District’s website.²

“Where development is proposed, the following changes in approach are recommended:

- 1. Development of vacant lots and changes to existing development will be required to meet new requirements such as site plan approvals in order to ensure shoreline buffers are in place and stormwater is mitigated.*
- 2. As in the past, new lot creation will only be permitted where there will be no negative impact on water quality. The difference is how this key principle will be implemented through the requirement for a lot specific assessment and development controls.*
- 3. The evaluation of how and where development can occur must take into account the new knowledge of watersheds and site considerations, including that where soil exists in Muskoka it generally retains phosphorus.*
- 4. Where a lake has surpassed an acceptable threshold for phosphorus and where soil exists, it may be possible to allow development provided strict development requirements are imposed. Those requirements depend on the sensitivity of the lake and include stormwater management, proving soil conditions, installing an enhanced septic system that has the demonstrated ability to retain phosphorus and on site monitoring. An Area Municipality may choose not to permit additional lot creation where a lake has exceeded the acceptable threshold for phosphorus.”*

The specific requirements for lot creation are contained in the document ‘Lake System Health Implementation Strategy’ (June, 2007³). It contains the following requirements:

- a lot specific assessment that demonstrates that there will be no net increase in phosphorus loading to the lake. The lot assessment should focus on phosphorus inputs from increases in overland flow and provide an analysis of such factors as soils, drainage, terrain and vegetation.
- on-site stormwater and construction mitigation
- on-site phosphorus management, including, limits to shoreline use areas, increased setbacks for structures (buildings and septic systems), limited path construction, and limits to hardened surfaces.
- retention of vegetation, especially along the shoreline, or revegetation of the shoreline, where necessary.

The Terms of Reference for Lake System Health studies is a prescriptive list of measurements, analyses and documentation of conditions on a development site that might promote or mitigate

² <http://www.muskoka.on.ca/planningeconomic/lake%20system%20health%20Discussion%20paper.pdf>

³ See the following web link to Lake System Health Implementation guidance

<http://www.muskoka.on.ca/planningeconomic/lake%20system%20health%20Implementation%20Strategy.pdf>

impacts of a septic system and storm water management on water quality. They include documentation of vegetation patterns, depths, types and chemistry of soils and watercourses between the building envelope (including the septic envelope) and the lakeshore. They include requirements to document and preserve shoreline vegetation and a vegetated natural buffer along the shoreline. The program also requires documentation of the locations of buildings, pathways, parking areas, septic beds and docks and analysis of means to reduce their impact. The document stipulates that the assessment should be carried out by a professional who can be qualified by the Ontario Municipal Board. In practice, this could include a specialist in soils or hydrogeology, a qualified engineer with relevant experience, a limnologist or natural scientist.

The Lake System Health Program is intended as a program that can be implemented by municipal planning staff. Check sheets have been developed to guide review of these applications and the accompanying assessments by planning staff. In practice, however, the system is implemented as follows:

- LSH requirements are made available to applicants
- Applicants hire a qualified professional firm to prepare the WQIA
- Municipality selects a qualified professional firm to conduct a peer review (at the expense of the applicant)
- Applicant submits the LSH assessment to the municipality who forwards it to peer reviewer
- Municipality forwards completed review to proponent with their assessment of conditions to issue the severance.

The District of Muskoka implemented the Lake System Health Program as an alternative to its past program of setting lake “capacities”. The capacity approach set a prescribed limit to the amount of shoreline development allowed for each lake, under the assumption that all phosphorus added to a septic system would migrate to the lake. This assumption is neither robust nor defensible and does not address the need to set planning requirements to minimize the impacts of any development. Instead, the Lake System Health Program assesses the sensitivity of a lake to phosphorus loading from shoreline development and prescribes planning measures to reduce the impact of development.

Section 3.0 of this report describes the water quality modelling exercise that was completed for Black Sturgeon Lake. The modeling followed the assumption that all septic phosphorus could migrate to the lake as a conservative starting point for the lake because:

- The lake has a moderate level of existing development,
- There is no long term record of water quality in the lake, and
- A complete, whole watershed modeling and calibration exercise was not undertaken.

Although the modeling exercise produced a water quality-based “capacity” estimate, we still recommend that the City of Kenora implement a variant of the Lake System Health Program and

ensure that a site specific development plan address means to minimize the impact of any future development. Over time, water quality data will be collected and used to determine whether or not the lake is responding to ongoing development. Should water quality deteriorate then it would be reasonable for the City to enforce capacities for the lake. If, as is more likely, the lake does not respond to shoreline development, then the capacity approach can be revisited and a program such as Lake System Health can be used instead.

The capacity approach is consistent with MOE expectations and implementation of site-specific management requirements (as in Lake System Health) provides a much higher level of protection than MOE currently require.

We therefore recommend that the City:

- **Implement the capacity limits developed in Section 3.0,**
- **Implement site specific assessments to reduce impacts from storm water and septic systems, and encourage naturalized vegetation, in line with the recommendation made above, for all future severance applications on Black Sturgeon Lake,**
- **Review water quality data at five year intervals to assess lake response to development, and**
- **Revisit the merits of the capacity approach in twenty years time.**

See also Section 3.

4.3 Septic System Maintenance

Septic systems are the preferred means of sanitary service for lakes outside of the City of Kenora's sanitary sewage system. The MOE, as part of their lakeshore capacity approach, identified 4 lakes within the City boundary as being "at capacity" and stated that no new development can be approved unless it is served by the City sewer system. The City of Kenora will not, therefore, allow new development on Hilly Lake, Austin Lake, Schnarr Lake and Grassy Lake (all of which are within the Black Sturgeon watershed) without the availability of municipal sewer and water services. The assumptions and shortcomings of the "capacity" approach were described in Section 3. We did not review the basis for the MOE classification as part of this study, and note that a system such as the "Lake System Health" program described in Section 4.2 may provide equivalent or superior protection of water quality.

Nevertheless, our modeling exercise shows that there is substantial "capacity" remaining on Black Sturgeon Lake. As such, development on the lake can continue to be served by septic systems. This report recommends that the City take measures to safeguard water quality as the lake develops. These measures go beyond the capacity approach to reduce the impact of future development on the lake.

This section of the report reviews approaches to septic system management from other jurisdictions and makes recommendations to guide the City of Kenora and development in Black Sturgeon Lake.

The City of Kenora in its Official Plan and Comprehensive Zoning By-law, makes no reference to the need for ongoing septic system maintenance requirements or reinspections. The Official Plan does state in Section 3.4 – Private Sewage Disposal and Water Systems that:

“development will not occur unless it can be shown to the satisfaction of the City that there is an adequate water supply, availability of an on-site sewage disposal system and public road access to service the development.”

In addition, this section states:

“In considering impacts on ground water quality and quantity, the City shall consider the cumulative impacts of development on the sustainability of groundwater resources.”

The City cannot issue a Building Permit (including a “change of use” building permit) without a septic system permit issued by the Northwestern Health Unit (NWHU). The NWHU is legislated under the Ontario Building Code Act, S.O. 1992 through the Ministry of Municipal Affairs and Housing to deliver the Part 8 Private Sewage Disposal Program. Part 8 refers to the section of the Building Code Act concerning sewage systems. Assigned responsibilities of the NWHU include:

- Issuing permits and performing inspections for sewage systems according to the Building Code Act. This responsibility includes permits for all private residences and commercial operations with a maximum daily flow rate of 10,000 litres per day or less.
- Inspecting newly severed lots and land development sites and providing information to the Ministry of Municipal Affairs and Housing on the suitability for sewage disposal/treatment.
- Performing inspections for consents, subdivisions, minor variances, and other zoning-related issues.
- Investigating complaints concerning malfunctioning sewage systems. Systems found to be in violation of legislation are corrected through the permit process.
- Conducting file searches and lot inspections as requested.

The NWHU mandate does not, however, include any requirement for inspection of existing septic systems, and does not apparently provide for mandatory follow up of complaints regarding systems that are perceived to be failing.

It is recommended that the City work with NWHU to incorporate a mechanism by which it becomes mandatory for owners of any kind of sewage disposal system, especially when located adjacent to

a waterbody, be responsible for regularly pumping and maintaining their system and ensuring the system is of adequate size and ability to treat the waste it receives. In addition, a mechanism to provide for a) routine inspections of existing septic systems and b) mandatory inspection upon land transfer would address ongoing maintenance and upgrade of systems. In addition, there needs to be effective record-keeping of pump-outs at each residence. As noted below in the City of North Bay example, a simple form with a receipt proving the pump out occurred could be submitted to the City or the NWHU and a database maintained for each property. Consideration could also be given to having certified pumpers keep a log of properties they have pumped with a date and any deficiencies noted. There are a number of avenues the City can explore in order to achieve this pump out regulation and examples of potential by-law wording have been provided from other jurisdictions, below.

Pump Out By-law Example: City of North Bay

The City of North Bay draws its drinking water from Trout Lake, a large lake with excellent water quality located within the City, which supports over 500 shoreline residences and a variety of commercial operations. Most of this development is serviced by private septic systems and so the City is justifiably concerned that they provide effective waste treatment.

As of September 1, 1992, the City of North Bay has enforced By-Law 203-92 that requires that all septic tanks within the Trout Lake watershed be pumped out every two years. Subject to the owner filing satisfactory evidence, the Director of Engineering and Environmental Services can extend the time for pump outs for seasonal occupancy (12 weeks per year or less) by a further two years. The affected area includes all parcels of land that front on Trout Lake or abut its tributaries. Proof of pump out must be filed with the Director of Financial Services within one month of the end of the two-year cycle and is required to be in the form of a true copy of a receipt from a certified pumper (to be delivered to the City within 10 days of the pump out). In so doing, the property owner is issued a certificate of compliance (\$20 fee) and is entered into the City's database of all persons who have provided satisfactory evidence of the pump-out required under this by-law. A sample compliance form, used by the City of North Bay, has been provided in Appendix X.

The City of Kenora should consider enacting a similar by-law. Frequent pump out assures that solids do not build up and move from the septic tank and foul the tile field. The pump out also provides the opportunity for the pumper to document any problems with the system so that the City or NWHU can follow up. We also note the following additional provisions set out in the North Bay By-law 203-92:

“No person shall dispose of the liquid or solid material pumped out of any private sewage disposal system septic tank except in a municipal sanitary sewer without the prior written consent of the Director of Engineering and Environmental Services.”

“No person shall cause or permit the pump-out of a private sewage disposal system by anyone other than a person holding a Class 7 license issued by the MOE for pump-out contractors”.

“The Director of Engineering and Environmental Services or his authorized agents may enter upon lands subject to this by-law for the purpose of inspecting septic tanks of private sewage disposal system and taking such measurements, samples and photographs as may be necessary”.

Septic System Reinspections – Case Studies

Reinspection has long been discussed as a viable option for keeping up to speed on the condition of aging systems, although there is no mandatory requirement for this and insufficient resources at the local level to conduct reinspections. There are cases where lake associations and collectives of property owners have joined together with a common concern for the health of their lake and have initiated their own reinspection program, calling in the local authorities and financing the program themselves. The following case studies provide examples of this:

Case #1 – The Experience of the Township of the Archipelago (as presented by Ted Thompson, Environmental Inspector, Twp. Of Archipelago, Feb. 2000)

In the summer of 1999 the Township of the Archipelago, in the District of Parry Sound, commenced a program to re-inspect all existing septic systems in the Archipelago (over 3,100) in order to bring unsafe systems into compliance with the Ontario Building Code (OBC). This program was conducted using current staff and two students hired for each summer to be trained and certified pursuant to the OBC. A notice of the re-inspection program was included with the January tax notices of that year.

Cottage associations provided assistance supplying a boat and driver for visits to islands and water access properties. The budget for 1999 was \$12,000 (or \$30 per property) prorated over the entire township.

Systems regarded as high risk, that is, where certificates of approval were given over 20 years ago, or not found, were inspected first. Moderate-risk properties were those that had been approved between 10-20 years ago and low-risk systems were those less than 10 years old. Information from the property roll was pre-recorded and a visual inspection was conducted to assess whether the system was unsafe or not unsafe. If a system was found unsafe, a deficiency letter was sent to the owner. An Order to Remedy an Unsafe Building could be issued. Staff followed up to ensure that the deficiency was remedied. If a system was found to be not unsafe, a sticker was placed on the dwelling. (Note the wording, “not unsafe” versus “approved”).

The results for the first year of this program were 397 inspections. Thirty-eight percent of these were awarded stickers indicating there was no indication of an unsafe condition. The remaining 62% received a letter indicating some level of deficiency. While this number appears quite high it must be remembered that the systems surveyed in 1999 represented the ones most likely to have problems. In addition, deficiency letters were sent if there was inadequate information on file.

Ninety-five percent of those receiving a deficiency letter have responded to the township and a number of cases have been resolved.

While expenditures for the program were above budget, revenues from new permits issued as a result of re-inspections has also been higher than anticipated, hence the program is revenue generating.

Case #2 – Ingolf (near Kenora)

Approximately five years ago at the Ingolf (west of Kenora in unincorporated territory) Campers Association annual meeting, 95% of members who attended voted to invite the Northwestern Health Unit to do a comprehensive inspection of their 300 properties on Long Pine and Macara Lakes.

The Northwestern Health Unit responded to the request by writing directly to each property owner in the area who responded favourably to the Ingolf Camper's Association request to survey the sewage systems around both lakes. Information pamphlets, a survey form, and a guide to install a new system were included with the letter. Since that time, progress has been made depending on the availability of resources at the NWHU with approximately 10% of the properties inspected within the first two years. In the summer of 2007, a student employed by the NWHU made visits to several properties and reported back to the NWHU on those requiring follow up. Many upgrades to systems have been made to date as a result of the program (pers. Comm., B. Bategelli, 2007).

Case #3 – Town of Gravenhurst

A number of municipalities in the District Municipality of Muskoka conducted re-inspections in 2000, one of which was the Town of Gravenhurst. In the spring of 2000, the Town Council authorized a septic re-inspection program with a target of 400 reinspections for the season. The program was conducted with the intention of targeting private sewage systems that may be causing pollution or pollution caused through the absence of a sewage system.

Through the course of the summer months, 514 properties were inspected. As a result, 89 letters were sent regarding various problem areas. Initially, twenty-seven of the 89 property owners that received a letter made various improvements or produced the required documentation outlined in the letter. Twenty-eight letters were also distributed to property owners specifically on the issue of tree-vegetation growth over the septic bed. Students were hired and trained to conduct the initial site inspections and the Town's building inspectors conducted the follow-up abatement. Properties were selected for the inspection process with the aid of the Town's GIS program and the accumulation of information pertaining to previous sewage system records.

These case studies show that septic reinspection programs can be effective in documenting the status of septic systems.

5. Education and Stewardship

Waterfront property owners place a high value on the quality and health of their lake. The consequences of degrading shoreline health and lake water quality are serious and impact all stakeholders involved: these include risks to human health, the loss of recreational and economic (property) value, and ecosystem impairment. While the establishment and implementation of by-laws can be effective tools in the management of shoreline development, there is great benefit in ensuring that property owners have access to good environmental stewardship information that they can readily and easily implement on their own property.

Stewardship is about the voluntary conservation of natural resources, wildlife, and fish habitat by landowners and concerned citizens (Federation of Ontario Cottagers' Associations, 2006). Voluntary stewardship is essential to the protection of sensitive aquatic ecosystems adjacent to privately owned land - and can also be more economical and effective than management by government regulation and enforcement alone. Helping people care voluntarily for their land (and shorelines) is fundamental for any conservation strategy aimed to protect the environment in its entirety (Duynstee, 1997 in FOCA, 2007).

In order for stewardship to be effective ecologically and meaningful socially, the right information needs to be available to citizens. There are several mechanisms the City of Kenora could adopt to make this information readily accessible to existing and new homeowners as well as developers. Over the past three years, the Federation of Ontario Cottagers' Associations (FOCA) "Docktalk" program has been delivered to cottage associations, lake groups and individual property owners within the Lake of the Woods region upon request (through the Lake of the Woods District Property Owners Association). During the summer of 2007, in fact, two Docktalk workshops were conducted on lower Black Sturgeon – for the Black Sturgeon Lake Estates Association Annual General Meeting on July 1 and for a Worona Road gathering on July 21. Through informal workshops, residents had the opportunity to learn about 'best management practices' regarding shoreline naturalization and the importance of buffer zones, erosion control, septic system maintenance, reduction of phosphates and toxins reaching the lake, water conservation and wildlife habitat enhancement. Specific site plan controls, by-law requirements, conditions of approval details and many stewardship options can be discussed in this type of environment and materials provided to residents for further information.

The City of Kenora could feature a section on their website dedicated to stewardship initiatives, with links to fact sheets, resource agency publications, and local contacts for resources such as native plants at nurseries, stores where phosphate free products are available, etc. The City could also consider running informative workshops on these topics for real estate agents and developers so the information can be translated even prior to a landowner taking ownership. Finally, the City could partner with FOCA to present "Docktalk" at regular intervals to ensure that the message is disseminated.

6. Summary and Recommendations

The recommendations made above, and recommendations made in response to comments received at the July 12, 2007 and August 25, 2007 public meetings have been summarized in Table 3. Table 3 therefore represents a synthesis of the Black Sturgeon Lake Management Plan and Recommendations. It presents Goals and Objectives for a variety of categories of interest and for each, lays out the issue, existing status of management initiatives, makes recommendations to address the issue and provides guidance on implementation mechanisms. Finally, Table 3 forms our recommendations to the City of Kenora and provided the foundation for review and discussion of the draft report and compilation of the complete final report.

Table 3. Issue Identification, Recommendations and Implementation Strategies for Black Sturgeon Lake – City of Kenora

Issue or Objective	Current Mechanism to Address Issue or Achieve Objective	Recommendation for Action	Implementation
<p>1. WATER QUALITY</p> <p>Issues: Nutrient loading sources, need for current database, bacterial contamination, socio-economic and health linkages with water quality</p> <p>Goals:</p> <ul style="list-style-type: none"> ■ Protect the water quality of Black Sturgeon Lake; ■ Develop better understanding of water quality condition; ■ Educate public on how to protect water quality; and ■ Officially recognize water quality in planning 			
<p>1.1 Recognize water quality more prominently in the OP and planning mechanisms used by the City</p>	<ul style="list-style-type: none"> ■ OP states: "Preservation of water quality is a significant consideration in reviewing any development proposal adjacent to a watercourse or lake." (Section 3.3) and sets setbacks for on-site septic disposal systems, retention of shoreline vegetation within 15 m of significant fish and wildlife habitat and retention of natural shoreline vegetation adjacent to waterbodies. It also states that stormwater management works are required where development would result in a significant increase in stormwater runoff. 	<ul style="list-style-type: none"> ■ Strengthen wording in Section 2.0- Objectives, which currently recognize the need to protect natural heritage features, sensitive/hazard lands, wetlands, minerals and aggregates, but makes no specific reference to water quality 	<ul style="list-style-type: none"> ■ A statement recognizing the value of water quality and supporting its protection should be included in the overall goals of the official plan as well as a specific section that deals with water quality or environmental policies. Consider the following objectives/goals: <ul style="list-style-type: none"> a) To maintain a high level of water quality b) Water quality recognized as an environmental limit to development c) Water quality is a paramount concern, it is the keystone resource that all others are connected to d) Encourage development to be

Issue or Objective	Current Mechanism to Address Issue or Achieve Objective	Recommendation for Action	Implementation
			sensitive to the protection of water quality through natural shorelines, increased setbacks, and new abatement technology e) Encourage shoreline stewardship f) Encourage septic inspection program and communal treatment of effluent
1.2 Update and monitor water quality of Black Sturgeon Lake	<ul style="list-style-type: none"> ■ Lake Partner Program collects Total Phosphorus data each year (4 stations) ■ No formal monitoring program exists (MOE collects data irregularly; study team have incorporated 2007 MOE survey data into report) 	<ul style="list-style-type: none"> ■ Collect water samples at spring overturn and analyze for a full suite of water chemistry variables including alkalinity, pH, conductivity, nutrients (phosphorus, nitrogen, dissolved organic carbon), major ions and trace metals at five year intervals to track general chemistry of the lake ■ Establish monitoring program to determine measures of lake productivity (including total phosphorus and chlorophyll a concentrations) over the course of the open water season. This would include: <ul style="list-style-type: none"> a) sampling of chlorophyll “a” and total phosphorus as “euphotic zone composite samples” on three week intervals during the open water season for two consecutive years and then repeat every three years b) sampling phosphorus at one metre above bottom at three week 	<ul style="list-style-type: none"> ■ Establish monitoring program ■ Encourage landowners to take part in MOE’s Lake Partner Program ■ Coordinate with MOE to sample on regular basis ■ Establish a citizen monitoring program for water clarity, spring phosphorus and bacterial monitoring ■ Train or retrain local expertise to conduct other aspects of water quality monitoring and to produce the necessary reports ■ Provide updates via newsletters, City website

Issue or Objective	Current Mechanism to Address Issue or Achieve Objective	Recommendation for Action	Implementation
		<p>intervals from late June to fall turnover for two consecutive years and then repeat every three years,</p> <p>c) sampling the algal community as a euphotic zone composite once in late July and once in late August every three years to check for changes in algal community - especially nuisance blue-green algae (cyanobacteria).</p> <p>d) Take temperature and dissolved oxygen water column measurements at three week intervals (i.e., in conjunction with the water quality sampling) over the open water season to assess recent thermal and oxygen dynamics in Lower Black Sturgeon Lake for one year and then take a profile of oxygen and temperature at end of summer (within 2 weeks either side of Labour Day) every three years</p> <p>e) Implement a bacterial monitoring program for Escherichia coli (E. coli), an indicator of fecal contamination. This can be done by submitting samples to a conventional laboratory, or through the use of "coli plates", a commercially available bacterial enumeration method that can be used by volunteers to sample many sites for much lower costs (City to</p>	

Issue or Objective	Current Mechanism to Address Issue or Achieve Objective	Recommendation for Action	Implementation
		add James Road beach to regular beach bacterial monitoring program) f) Keep community informed about the results of the water quality monitoring by placing results on the City web site	
1.3 Reduce or eliminate sources of water quality impairment	<ul style="list-style-type: none"> ■ OP Section 3.3 – Surface and Groundwater Quality: sets recommendations for buffer zones, shoreline vegetation, septic setbacks, setbacks near significant habitats, stormwater management works where necessary, all in the name of water quality protection 	<ul style="list-style-type: none"> ■ Encourage the inspection, maintenance and improvement of on-site sewage disposal systems (all types) ■ Promote awareness of threats to water quality through education and good stewardship practices ■ Establish a by-law that shoreline property owners not serviced by City system must pump their on-site sewage system every 3-5 years, maintain a logbook and provide proof of service to City/NWHU ■ Be aware of potential upstream impacts 	<ul style="list-style-type: none"> ■ City to work cooperatively with NWHU to implement a septic system inspection program for the entire lake and to ensure that compliance and follow-up for problematic septic systems is undertaken ■ Consider enforcing regular pump outs, replacing marginal/defective systems ■ Initiate new pump out by-law (see information, Section 4.3 of report) ■ Provide citizens with stewardship information via City website, at City Hall, partnering with program delivery agencies (e.g. how often to pump septic, who to call for septic maintenance, use of phosphate free products and where to buy them) ■ City should work cooperatively with NWHU to ensure that all residents understand that all potable water supplies are

Issue or Objective	Current Mechanism to Address Issue or Achieve Objective	Recommendation for Action	Implementation
			susceptible to surface water contamination and should be tested regularly and treated <ul style="list-style-type: none"> ■ Hold discussions with MOE regarding septic approvals outside of City limits, as they relate to downstream impacts
	<ul style="list-style-type: none"> ■ OP states “stormwater management plans shall be required as a condition of development approval within the City for any large scale urban plan of subdivision within the City” (Section 6.3) 	<ul style="list-style-type: none"> ■ Consider requiring stormwater management plan for any plan of subdivision ■ Encourage naturalization of all lots and “soft” approaches to stormwater management ■ Include stormwater management practices in any review for new severances 	<ul style="list-style-type: none"> ■ Revise OP policies ■ Work with recommendations for education and stewardship programs.
	<ul style="list-style-type: none"> ■ City of Kenora will not allow new development on Hilly Lake, Austin Lake, Schnarr Lake, Grassy Lake (all within Black Sturgeon watershed) without the availability of municipal sewer and water services 	<ul style="list-style-type: none"> ■ No action required 	<ul style="list-style-type: none"> ■ No action required; addresses issue of nutrient transport from lakes in upstream watershed
1.4 Reduce/eliminate use of pesticides and fertilizers on shoreline lots	<ul style="list-style-type: none"> ■ Integrated Pest Management promoted by Northwestern Health Unit 	<ul style="list-style-type: none"> ■ City should consider implementing a new bylaw outlawing use of fertilizers, herbicides or pesticides on waterfront properties given known nutrient loading associated with these products (contributes to algal growth and low dissolved oxygen conditions), possible health effects 	<ul style="list-style-type: none"> ■ Initiate new by-law (for example, see Township of Georgian Bay By-Law 2007-21) ■ promote user education program (e.g. Dock Talk)
<p>2. WATER QUANTITY</p> <p>Issues: Fluctuating water levels may impact water quality, property and ecosystem</p> <p>Goal:</p>			

Issue or Objective	Current Mechanism to Address Issue or Achieve Objective	Recommendation for Action	Implementation
Understand water level changes and impacts and work within the established hydrologic regime			
2.1 Promote understanding of naturally fluctuating water levels	<ul style="list-style-type: none"> ■ City of Kenora Public Works Dept. responds to public requests/inquiries ■ Hazard land delineations in OP prevent building in flood hazard areas 	<ul style="list-style-type: none"> ■ Based on public and agency comment, Black Sturgeon Lake fluctuates, on average, 4ft – need to educate public on natural water level fluctuations as a result of precipitation patterns and potential impact on water quality ■ Water quality model estimates effects of wet and dry years on water quality 	<ul style="list-style-type: none"> ■ Provide factsheets on City website and at City Hall on natural water level fluctuations; responsible mitigation measures for homeowners and encouraging homeowners to make appropriate development choices that respect natural water fluctuations
2.1 Investigate opportunities for reducing impact of changed bridge spans (East Mellick Rd. and Essex Rd. bridges)	<ul style="list-style-type: none"> ■ No mechanism in place – this issue emerged during the public meeting in July 	<ul style="list-style-type: none"> ■ Increase bridge span and restore natural channel when bridge in need of repair/replacement 	<ul style="list-style-type: none"> ■ City of Kenora Public Works Department
3. LOT SIZES Issue: Current lot sizes may be inadequate to avoid future social overcrowding and ecosystem health Goal: Ensure lot sizes respect future vision for Black Sturgeon and ecosystem sensitivities			
3.1 Establish sufficient lot depths to accommodate vegetative buffer and promote buffer maintenance	<ul style="list-style-type: none"> ■ OP states “the natural shoreline vegetation will be encouraged to be preserved within 3 m of all watercourses”(Section 3.3) 	<ul style="list-style-type: none"> ■ Develop minimum lot sizes for development within RR zone, specifying minimum depths,, built structures no closer than 20 m from shore to provide a minimum 20 m buffer of natural vegetation. ■ Maintain 30m septic setback. ■ Establish a requirement to minimize disturbed shoreline area to 25% of total frontage 	<ul style="list-style-type: none"> ■ Revise bylaw for RR zone and OP Section 3.3 ■ Provide new homeowners with information on importance of buffers, native species to plant and where to buy them (collaborate with local nurseries, real estate agents, developers) ■ Communicate with

Issue or Objective	Current Mechanism to Address Issue or Achieve Objective	Recommendation for Action	Implementation
			developers regarding minimizing clearing within buffer zone ■ Consider Development Permit System (see Section 4.2.3 in report) and enforce controls
3.2 Establish sufficient lot depths to accommodate septic systems	<ul style="list-style-type: none"> ■ Ontario Building Code requires that all unserviced lots accommodate a septic system ■ OP states “on-site septic disposal systems should be located at least 30 m from a watercourse or waterbody”(Section 3.3) and also states “all residential lots should be large enough to ensure that sewage systems shall not be within 30 m of a waterbody” (Section 4.7.6.3) 	<ul style="list-style-type: none"> ■ None required 	<ul style="list-style-type: none"> ■ None required
3.3 Consider alternative development guidelines in bays	<ul style="list-style-type: none"> ■ No current consideration for development in bays ■ Bays with environmental sensitivities are vulnerable to development pressure ■ Bays without environmental sensitivities are vulnerable to increased boat traffic and congestion, but are good “small” development areas because they are out of view 	<ul style="list-style-type: none"> ■ Where sensitive, natural features have been identified in bays, allow NO development (see Figure 4); this includes bays with wild rice stands or significant natural sensitivities ■ Where sensitive natural features have not been identified, increase minimum lot sizes within bays to 400 ft (122m) to maintain a higher proportion of natural shoreline and reduce social and recreational crowding ■ Maintain requirement for naturalized shorelines on 75% of frontage in bays ■ Restrict development in narrow bays to shoreline residential – no commercial development which might increase traffic 	<ul style="list-style-type: none"> ■ Consider revising Bylaw and implementing Development Permit System with requirements for minimum lot sizes, shoreline preservation and maintenance of natural vegetation. ■ Provide homeowners with information on good stewardship practices (e.g. Docktalk) ■ New marinas, waterfront landings or other docking facilities should not be located in a narrow bay that is predominantly residential.

Issue or Objective	Current Mechanism to Address Issue or Achieve Objective	Recommendation for Action	Implementation
3.4 Control amount and type of backlot development	<ul style="list-style-type: none"> ■ OP states “land development that will create waterfront lots shall be designed and considered so as to provide for access to the water by owners of present or possible future backlots” (Section 5.9) ■ Development of backlots increases pressures on Black Sturgeon Lake and generates demand for boat access/mooring ■ We also note that there is substantial capacity for additional shoreline development without the need for back lot development 	<ul style="list-style-type: none"> ■ Do not build public launch ramps in bays ■ Increase minimum lot size on back lots to 200 m ■ Develop a mechanism and fair allocation to limit communal docking opportunities on the lake 	<ul style="list-style-type: none"> ■ Zoning by-law and OP rewording, for example: ■ Backlot consists of individual dwellings within the waterfront designation, separated from the waterbody by a legally separate development parcel. Generally defined as the second tier of development adjacent to the first tier of shoreline lots. ■ Frontage – 200 m on a public road ■ Area – 2 ha ■ Only a single tier of development is permitted between the shoreline and the public road (where it passes through the Waterfront) ■ Access to waterway by right of way is not permitted for backlot development
<p>4. FISH AND WILDLIFE HEALTH</p> <p>Issue: Loss of habitat to development, poor angling, competition for resource</p> <p>Goal: Understand Black Sturgeon fishery better – especially role of commercial fishery, ensure habitat is known and mapped and protected as part of development decisions</p>			
4.1 Importance of fishery/status of	<ul style="list-style-type: none"> ■ Unknown how important fishery is to public; fishery resource information lacking, no 	<ul style="list-style-type: none"> ■ Creel survey to establish usage and harvest of fish from Black Sturgeon Lake 	<ul style="list-style-type: none"> ■ Recommend that MNR complete the necessary

Issue or Objective	Current Mechanism to Address Issue or Achieve Objective	Recommendation for Action	Implementation
fishery needs to be better understood	recent creel surveys or fish population health assessment	(MNR) This should include summer and winter fisheries <ul style="list-style-type: none"> ■ Spring or fall index netting program by MNR ■ Keep citizens informed of results of study and provide options to anglers to reduce impact of overharvesting (e.g., promoting catch and release, posting educational signs re spawning areas, promote harvesting alternative species, etc.) 	studies and develop a fish management plan for the lake
4.2 Ensure fish and wildlife habitat is protected	<ul style="list-style-type: none"> ■ Canada Fisheries Act ■ Provincial Policy Statement ■ Municipal Plan Input and Review Process (can trigger EIA) ■ OP states “development shall have regard for identified fish and wildlife values and associated provincial policies” (Section 4.6.3) ■ OP states “where development is proposed within the vicinity of an environmental feature (e.g. within 120 m of a significant fish habitat, waterfowl habitat, endangered or threatened species), the proponent shall provide the City with a report (EIS) outlining the potential environmental impacts and any mitigation measures that may be necessary to reduce or eliminate adverse environmental impact; proponents are encouraged to meet with MNR to assist in determining these measures” (Sections 4.7.1.4, 4.7.3) ■ OP outlines policies for the protection of 	<ul style="list-style-type: none"> ■ No land disturbance within 20m of identified spawning area in lake ■ All docks and in-water structures adjacent to spawning areas meet DFO requirements for habitat protection ■ All new lots to be surveyed for fish habitat and natural features (e.g. wildlife habitat) ■ Provide info on fisheries resources in inlet streams (for use when road crossings proposed) ■ Update OP to include latest nesting habitat mapping and policies regarding nesting habitat protection ■ Clarify requirements of an EIS in OP (see below) ■ Reconcile differences in mapped resources between OP and MNR district office mapping 	<ul style="list-style-type: none"> ■ Update O.P. database via annual meetings with DFO and MNR ■ Zoning Bylaws ■ Establish a mechanism whereby DFO/MNR update City when habitat/features discovered so as to update OP database ■ Encourage good shoreline stewardship through distribution of information to new and established homeowners (avoiding aquatic pesticides, reducing weed removal, maintaining shoreline vegetation, both onshore and nearshore, invasive species prevention) ■ Update OP with more specific EIS requirements (see Section 4.1 in report)

Issue or Objective	Current Mechanism to Address Issue or Achieve Objective	Recommendation for Action	Implementation
	heronries, bald eagle nests and osprey nests ■ Values mapping in Kenora District MNR is available		■ Include a mechanism (such as site plan control or a subdivider's agreements) in winter deer habitat to minimize and control the removal of vegetation for buildings, site alteration or accessory activities such as landscaping ■ Encourage citizen involvement in provincial monitoring programs (e.g. Ontario Breeding Bird Atlas, Christmas Bird Count, Loon Watch, etc.) ■ Inform citizens of Ontario Managed Forest Tax Incentive Program (MFTIP): voluntary program available to landowners who own four hectares or more of forest land, and who agree to prepare and follow a Managed Forest Plan for their property.
5. SHORELINE NATURALIZATION/PRESERVATION			
Issue:			
Maintaining natural shoreline vegetation, promoting re-naturalization of altered shorelines, protecting wetlands			
Goal:			
Restore and maintain healthy nearshore/onshore around lake; preserve natural viewsapes, recognize important role of wetlands			
5.1 Promote re-naturalization of altered shorelines by	■ OP states “the natural shoreline vegetation will be encouraged to be preserved within 3 m of all watercourses”(Section 3.3)	■ Set goal for <25% disturbance of shoreline, maintain all naturalized areas within 20m of lake shore – all structures	■ Municipal Bylaw and Development Permit System with requirements for

Issue or Objective	Current Mechanism to Address Issue or Achieve Objective	Recommendation for Action	Implementation
all property owners		to be set back 20m and septic systems 30m.	shoreline preservation and maintenance of natural vegetation (see Section x in report) <ul style="list-style-type: none"> ■ User education program (Docktalk) ■ Condition of approval for subdivision development regarding minimal clearing at shore (communicate with developers) ■ Consider incentives to homeowners/recognition for maintaining or restoring buffer
5.2 Maintain undeveloped perspective (viewscape) and reduce social crowding (maintain vegetation and open spaces)	<ul style="list-style-type: none"> ■ Zoning by-law for Rural Residential zone states that minimum lot size is 2 acres with 150 ft. frontage ■ OP states “Open space uses and recreational facilities shall be designed to meet the needs of residents of the city as well as tourists, while preserving the environmental features and functions of those areas” (Section 4.7.1.2) ■ OP states “the City of Kenora shall prepare an Urban Forestry Plan to ensure that forests located within any open space designations are well managed” (Section 4.7.1.5) 	<ul style="list-style-type: none"> ■ Set goal for <25% disturbance of shoreline, maintain all naturalized areas within 20m of lake shore – all structures to be set back 20m and septic systems 30m. ■ Increase minimum lot size to 200’ (61m) ■ Establish larger lots in non-sensitive bays (400’/122m) ■ New subdivision proposals should include certain proportion of open space per number of lots ■ Allow only one lot of record on any island to preserve viewscapes 	<ul style="list-style-type: none"> ■ The City of Kenora should initiate discussions with lake users and staff to develop planning controls that minimize the visual encroachment of shoreline development on the lake social environment. These can include by-laws regulating building size, boathouses, redevelopment, second tier development etc. The recently implemented “Waterfront Density By-law” of the Township of Muskoka Lakes is recommended for consideration in this regard. ■ User education program

Issue or Objective	Current Mechanism to Address Issue or Achieve Objective	Recommendation for Action	Implementation
			(Docktalk) <ul style="list-style-type: none"> ■ Amend OP to limit island development ■ Condition of approval ■ For subdivision development regarding minimal clearing at shore (communicate with developers)
5.3 Ensure wetlands are protected	<ul style="list-style-type: none"> ■ Although the PPS only requires protection of wetlands that are of “Provincial Significance”, the municipality should consider the input of community groups to ensure that the locally and regionally important wetlands are incorporated in the Official Plan. ■ OP states “Development shall not be permitted in areas identified as significant wetlands,...Where development occurs within 120 m of these areas, the development should be designed to ensure that there are no negative impacts on the adjacent sensitive areas (EIA required)” (Section 4.7.5) 	<ul style="list-style-type: none"> ■ Identify all wetland areas on OP mapping and place in a “wetland designation” ■ Wetlands can be identified through the interpretation of air photographs and confirmed by site visits by a qualified ecologist. ■ Place more emphasis on locally significant wetlands in OP ■ <i>New wetland sites and areas (not on OP mapping) should be identified during development applications, inventories or evaluations and treated as are mapped wetlands, once evaluated</i> 	<ul style="list-style-type: none"> ■ Reword OP to refer to locally significant wetlands, not just provincially significant and consider wording: ■ “Limited development, compatible with wetland areas, may be permitted where the integrity of the wetland resource can be preserved and the suitability of the lot is confirmed by a site evaluation report.” ■ Ensure these are all zoned “Environmental Protection” ■ Consider adding section into EIA requirements that indicates wetland function may not be altered by the development and study must prove it to be true.
<p>6. PUBLIC ACCESS</p> <p>Issue: Impact of increased access on fishery, congestion and boat traffic</p> <p>Goal: To find a balance between public access and current lack of congestion</p>			

Issue or Objective	Current Mechanism to Address Issue or Achieve Objective	Recommendation for Action	Implementation
6.1 Control Public Access	<ul style="list-style-type: none"> ■ OP states “The City will continue to acquire waterfront areas for public open space uses wherever possible. Parking, trails, launching and docking facilities will generally be developed as funding permits” (Section 4.7.1.1) ■ Lake is Crown land and open to all members of the public 	<ul style="list-style-type: none"> ■ Avoid putting access points through built up areas or embayments where extra traffic will have a greater social impact ■ Ensure that any public access does not create a nuisance by providing outhouses, garbage disposal and low impact parking areas ■ Discuss fishery status with MNR before initiating mechanisms to enhance access to lake 	<ul style="list-style-type: none"> ■ Consider adding to policy wording such as: <ul style="list-style-type: none"> a) Public land leading to, or at the water should be retained, enhanced or encouraged in accordance with the following: <ul style="list-style-type: none"> ■ Only public land in area ■ Property is large enough and appropriate for public use ■ Conflicts with abutting properties can be mitigated ■ No negative impact on water quality or natural area b) Water corridors, routes and associated portages should be preserved. c) Retain all road allowances leading to water, unless there is no possible future use or access due to physical or terrain constraints.
7. REGULATORY ENVIRONMENT Issue:			

Issue or Objective	Current Mechanism to Address Issue or Achieve Objective	Recommendation for Action	Implementation
Comprehensiveness of EIA requirements, future potential variances to new guidelines Goal: To ensure wording in Official Plan captures the vision for Black Sturgeon and clearly recognizes the need for environmental protection			
7.1 Expand/clarify EIA requirements in OP	<ul style="list-style-type: none"> ■ Current EIA requirements are outlined in OP Section 8.7 	<ul style="list-style-type: none"> ■ Update and expand on EIS requirements for development at Black Sturgeon Lake ■ Natural Heritage information is required to inform future severances 	<ul style="list-style-type: none"> ■ Revise OP Section 8.7 (See Section 4.1 of report)
7.2 Need to establish guidelines regarding future applications for variance to new development policies	<ul style="list-style-type: none"> ■ None as yet 	<ul style="list-style-type: none"> ■ Need clear guidance and better exchange of information to build public trust 	
7.3 Need to address environmental concerns during redevelopment	<ul style="list-style-type: none"> ■ None as yet 	<ul style="list-style-type: none"> ■ develop a Development Permit System that is stimulated by any request for a building permit 	<ul style="list-style-type: none"> ■ City planning staff review requirements and merits ■ Revise OP

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Appendix A

Summary of Public Comments from Public Meeting, August 25, 2007

**Summary of Public Comments from
Second Public Information Session
Black Sturgeon Lake Capacity and Management Study:
Technical Synthesis and Management Plan
August 25, 2007 in Kenora, Ontario**

General Support for:

- Regular septic system inspections
- 75% natural shoreline
- 200 and 400 ft. lot sizes
- Control of back lot development to one layer, with minimum 300 ft. frontage and 5 acre minimum (last one received mixed reviews)

Regarding Historic Data:

- background history of Black Sturgeon Lake should have involved more of the long time residents of the lower lake. There are a number of senior citizens that live and have lived on this lake most, if not, all their lives.

Regarding development on Upper Lake:

- This report makes significant recommendations as to lot size and density of development relative to the lower lake. If control over development is to maintain the lake water quality at acceptable levels there also has to be some type of control on the upper lake. When the City accepts the recommendations of the report will they also put pressure on the provincial government for orderly development of that portion of the upper lake that is outside the jurisdiction of the City of Kenora?

Regarding Measurements:

- All our references in development appear to be in the metric system which has been accepted Canada wide. Therefore I would think that measurements should be shown primarily in metric eg. 200 feet /61 metres – frontage of lots, should be 60 metres.

Regarding Lot Size:

- concerns in increasing the lot size to 60 metre frontage. Increasing the lot size from 45 to 60 metres could make the difference between a development being financially viable or not. Major cost items are fixed with the number of lots obviously a controlling factor.
- A 10 lot subdivision under the current rule of 45 metre frontage would be 450 metres in length. Using 50 metre frontage, the same 450 metres is now 9 lots, and with 60 metre frontage we are now at 7.5 lots, a loss of 2.5 lots or 25%. In order to make this project viable do we now increase our lot price by 25%?
- Regarding backlots, 2 ha lots with 90 metres of frontage would be of sufficient size.
- “layers” of backlots not supported

Regarding Implementation:

- Concern over whether recommendations will be implemented – it was mentioned that advisory committee could consider working together with the City to implement recommendations

- With regard to pace of development of additional 165 lots – ensure it is a recommendation that is slow/stable and perhaps consider linking the pace to the requirement for a 20-year review of policies – review may need to be sooner if 165 lots are developed before 20 years

Miscellaneous Comments:

- James Rd. beach – there is also a boat launch used by public
- Concern over water quantity (availability for drinking water) with more development
- Consider an inventory of types and condition of sewage systems on Black Sturgeon
- City should consider reviewing EP zoning and ensure that when mapping is updated, EP zones are also updated
- Issue around lack of access for those on islands (e.g. place to park car on mainland)
- Impacts of road salt on water quality (monitoring proposed for lake would detect this; construction work needs to account for this; salt not typically used)
- Condominiums concentrate development – does this type of development preserve the “character” of the lake – discussion around fact that in RR zone, height restriction is 10 m

Appendix B

Advisory Committee Comments and Responses on the Draft Report, August 2007

Advisory Committee Comments and Responses on the Draft Report, August 2007

Comment	Action to be Taken
<p>High degree of confidence in the lakeshore capacity estimates and the recommendations provided. In particular:</p> <ul style="list-style-type: none"> a) The authors are highly qualified b) Region-specific data (from ELA) were used to calibrate the lakeshore capacity model used c) Worst-case estimates of phosphorous losses to the lake from septic fields is consistent with MOE's "precautionary principle" d) On-going lake quality monitoring and assessment will provide feedback as to whether the lake is responding to development as the model predicts e) A mechanism for inspections and maintenance of septic fields is provided f) Tools are provided for ongoing education and stewardship for property owners 	No action required
<p>Page 17 - island lots, are any of the 19 crown land? Page 20 - 4.2 second paragraph refers "a professional", replace with "professionals" as one professional may not have experience in all disciplines Page 21 - refers to Figure 3 in two paragraphs. Should this be Figure 4? Page 27 - last paragraph of 4.2.4 typo sols should be soils.</p>	Report amended
<p>With respect to the limiting of development to 165 lots for the Lower Black Sturgeon basin, I had a look, using Goggle Earth, at the shoreline and when you subtract the existing lots (including the 16 on Breckenburer Rd), plus the Crown land and swamp or marshy areas the remaining available shoreline can only accommodate an additional 180 200ft lots and 25 400ft bay lots. I arrived at these numbers after travelling all the shoreline to identify unusable areas and then measuring the useable shoreline on Goggle Earth.</p>	No action required – in line with recommendations in report.
<p>There was some discussion as to what was an embayment and I would suggest any two facing shorelines less than 1000 ft.</p>	To be determined by City and advisory committee
<p>I am definitely in favour of and support:</p> <ul style="list-style-type: none"> ■ changing minimum lakefront lot frontages to 200 feet from the existing 150 feet ■ changing minimum lakefront lot frontages in tight embayments to 400 feet ■ a plan to examine existing septic/sewer/grey water systems to ensure they meet approvals ■ a plan for regular inspections of all septic/sewer/grey water systems on the lake ■ a development permit system as long as the parameters are clear ahead of time to avoid subjective governance of these permits ■ the islands that are now Crown Land to remain as Crown Land ■ the islands that are patented land to be restricted to 	No action required – in line with recommendations of report

<p>one residence</p> <ul style="list-style-type: none"> ■ 5 acre minimum lot size for backlots and if tiers are part of an application that they be restricted to one tier ■ no water access guarantee for backlots ■ a recommendation to the city planning committee to consider and regulate the pace of any future development on the lake ■ the designation as soon as possible of environmentally sensitive areas of the lakeshore as EP zoning to prevent them from being part of any future application for subdivision (as was the case in Lot 18 of the Moncrief/Bruckenburger Rd. application) ■ a 75% maintenance of the shoreline lots in a natural state ■ height/size restrictions on monster buildings along the shoreline ■ the designation of certain stretches of shoreline to be maintained as green space ■ regular water quality sampling ■ a pesticide restriction bylaw for waterfront properties ■ restriction of further commercial fishing on Black Sturgeon 	
<p>I do have reservations about 165 lots that your study has said the lake can accommodate. I think with EP zoning, green space allocation, rocky shorelines, bays, larger lot sizes that the lake would be healthier in the long run with fewer lots.</p>	<p>This is a worst case scenario number and doesn't account for those limitations mentioned, so number likely will be lower.</p>