TOWNSHIP OF HAVELOCK-BELMONT-METHUEN

To: The Mayor and Members of Council

Prepared By: Emma Drake and Darryl Tighe, Township Planning Consultants

Meeting Date: September 16, 2019

Subject: Boathouses and Jack Lake At-Capacity Status

PURPOSE AND EFFECT:

The purpose and effect of this report is to present for Council's consideration, information as it pertains to the at-capacity status of Jack Lake. This report also includes an overview of the current regulatory provisions for on-land boathouses within the Township and seeks the direction of Council in addressing the at-capacity status of Jack Lake and the regulation of on-land boathouses in the Township's planning documents.

RECOMMENDATION:

1. That Council direct Staff to proceed with draft Official Plan and Zoning By-law Amendments to address on-land boathouses and the at-capacity designation of Jack Lake for presentation and discussion with Council; and

2. That the balance of this report be received.

BACKGROUND:

On August 12, 2019, a proposed Zoning By-law Amendment was brought forward for the consideration of Council which included provisions for both second dwelling units and marine facilities.

In specific respect of marine facilities, the By-law as presented at that time included provisions to regulate those facilities, specifically boathouses, located on-land. In-water boathouses are prohibited in the Township.

As proposed in the August 12th by-law, the regulations for on-land boathouses included minimum side lot line setbacks; together with regulations on the maximum height and size of a boathouse. The regulations included in the by-law at that time were intended to provide consistency with the current regulations enforced by Crowe Valley Conservation Authority (CVCA).

During consideration of the proposed amendment, several oral and written submissions were received in respect of the proposed boathouse provisions. Specifically, public comments raised issue with the permission of on-land boathouses. Several comments were also made with specific regard to Jack Lake, and the at-capacity status of Sharpe's Bay.

As a result of the discussion at the public meeting, a decision on the proposed Zoning By-law Amendment was deferred.

This report is therefore being brought forward to provide Council with further comments regarding the issues raised and request the direction of Council as it pertains to addressing boathouses and the at-capacity lake status in the Township's planning documents.

DISCUSSION:

Boathouses:

Under the provisions of the Township's Comprehensive Zoning By-law, a boathouse is considered to be a marine facility. Provisions regulating marine facilities, and therefore boathouses, are found in Section 4.22 of the Zoning By-law.

As per Section 4.22.1 – Marine Facilities on Water, on-water boathouses are prohibited throughout the Township.

However, at present, marine facilities located on land may be permitted within the water yard, provided that a minimum 3.0 metre (10 foot) setback to the side lot line is provided. On-land boathouses are also regulated by the provisions for accessory buildings, which serve to regulate the height and size of any on-land boathouses. In the 'Seasonal Residential (SR) Zone', an on-land boathouse is limited to 4.5 metres (15 feet) in height; and generally, the combined area of all accessory buildings shall not exceed 75% of the total floor area of the main building.

As the size of dwellings within the 'Seasonal Residential (SR) Zone' increases, the potential building size for on-land boathouses therefore also increases, as the only regulation for the size of a boathouse is in relation to the size of the main building.

In the proposed new Comprehensive Zoning By-law (No. 2012-55), regulations for on-land boathouses were introduced. Under these provisions, on-land boathouses would continue to be permitted; however, provisions were included to strictly regulate the width and size of any on-land boathouse. However, as By-law No. 2012-55 remains under appeal, these provisions are not in effect; and there continues to be no strict regulation of on-land boathouses.

Council may therefore wish to proceed with a Zoning By-law Amendment which would address permission and regulation of on-land boathouses within the Township.

At-Capacity Lake Status:

In 2006, the Ministry of Natural Resources and Forestry (MNRF) delisted Jack Lake as a Lake Trout lake. However, in proceeding years, netting programs conducted by the Ministry collected Lake Trout from Jake Lake, specifically from the Sharpe's Bay area. As a result of the programs, the portion of Jake Lake recognized as Sharpe's Bay was relisted as a Lake Trout lake by the Ministry in 2015.

Following the listing of Sharpe's Bay, MNRF, in conjunction with the Ministry of Environment and Climate Change (MOECC) conducted a capacity assessment for Sharpe's Bay, including an assessment of oxygen and phosphorous levels, which are critical indicators of water quality.

As noted in the capacity assessment, included in Appendix A to this report, interpretation of the water quality data collected concluded that Sharpe's Bay is considered 'at capacity'. Further, the report references the Lakeshore Capacity Assessment Handbook (LCAH) which recommends that where a waterbody is considered at-capacity, no new municipal land use planning approvals for new or more intense development within 300 metres of the waterbody should be considered.

Notice of the at-capacity designation of Sharpe's Bay was provided to the Township by MOECC in August of 2017. However, to date, amendments have not been completed to the Township's Official Plan and Comprehensive Zoning By-law which reflect the updated designation.

More recently, additional email correspondence has also since been received from MOECC regarding the at-capacity status of Sharpe's Bay (Appendix B).

Staff would therefore recommend that Council direct that draft Official Plan and Zoning By-law Amendments be prepared for further review and discussion which reflect the at-capacity designation; together with any further direction from Council.

COMMENTS:

All of which is submitted for Council's consideration and hopeful assistance.

Submitted by:

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Appendix A: Ministry of the Environment and Climate Change – August 16, 2017 Correspondence
Appendix B: Ministry of the Environment and Climate Change – July 31, 2019 Correspondence

Ministry of the Environment and Climate Change

P.O. Box 22032
Kingston, Ontario
K7M 8S5
613/549-4000 or 1-800/267-0974
Fax: 613/548-6908

Ministère de l'Environnement et de l'Action en matière de changement climatique

C.P. 22032
Kingston (Ontario)
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By Email

August 16, 2017

The County of Peterborough
County Court House
Peterborough, Ontario
K9H 3M3

Attention: Brian Weir, Peterborough County, Director of Planning
Email – bweir@ptbocounty.ca

Dear Mr. Weir

Re: Jacks Lake Status and Development Capacity Designation

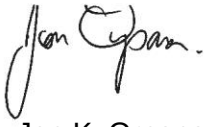
The Ministry of Natural Resources and Forestry (MNRF) in conjunction with the Ministry of Environment and Climate Change (MOECC) have undertaken monitoring and water quality sampling on Jacks Lake in the Townships of North Kawartha and Havelock-Belmont and Methuen, in the County of Peterborough.

The basin known locally as Sharpe's Bay has been identified to contain a population of lake trout and subsequent water quality sampling by MOECC has deemed this bay to be at capacity for development. In addition to this letter you also may refer to the supporting report and map that include the details regarding this decision.

It is the expectation that any planning applications that are received going forward will reflect the new capacity designation and as such the appropriate lake capacity development policies found in your respective County Official Plan and lower tier Official Plans would apply.

If you have any questions you may feel free to contact me at my coordinates below.

Regards,



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LAKESHORE CAPACITY ASSESSMENT: JACK LAKE – SHARPE'S BAY

Introduction

Jack Lake

Jack Lake is located on the edge of the Precambrian Shield approximately 5 kilometers southeast of the village of Apsley, Ontario. The lake lies within the Townships of Havelock-Belmont-Methuen and North Kawartha, in the County of Peterborough (geographic Townships of Methuen and Burleigh).

The lake is 1,237 hectares in size and contains numerous islands and channels that separate the lake into four discrete basins (**Figure 1**). Jack Lake's catchment is primarily forest and tributary streams, along with wetlands, agricultural lands and cleared areas. Approximately one third of the lake's shoreline is Crown Land (**Figure 2**).

Jack Lake lies in the Kawartha Lakes tertiary watershed and is a headwater lake. Redmond Creek and Apsley Creek are the main inflows to the lake, but the lake is also fed by many other small creeks, ponds and wetlands. The lake's outflow is Jacks Creek that flows southward to Stony Lake, part of the Trent River System.

In 2006, the Ministry of Natural Resources and Forestry (MNRF) delisted Jack Lake as a Natural Lake Trout Lake as it was believed the species population had been extirpated. Netting programs in 2008 and 2009 collected Lake Trout of different sizes and ages from several shoals in Sharpe's Bay; the largest and deepest of the four lake basins (Jack Lake Association Fisheries Committee 2013). As a result, Sharpe's Bay of Jack Lake was relisted as a Lake Trout lake in 2015 (OMNRF 2015).

Besides Lake Trout, Jack Lake also supports a variety of native cold, cool, and warm water species such as Brown Bullhead, Lake Herring, Muskellunge, Pumpkinseed, Smallmouth Bass and Yellow Perch. A number of species have also been introduced over the years including Black Crappie, Bluegille, Largemouth Bass, Rock Bass and Walleye (Jack Lake Association Fisheries Committee 2013).

Development and Lake Trout

Lake Trout typically occupy deep, cold, well oxygenated lakes. As the thermocline deepens during the summer months, Lake Trout will generally move to deeper waters, making use of warmer, shallower areas during nocturnal foraging. Studies have shown that the survival, growth and reproduction of Lake Trout are impaired in lakes where the dissolved oxygen concentration drops below 7 mg/L (Evans 2005, Evans 2007).

The amount of dissolved oxygen in the water column is influenced by temperature, wind and ice conditions, and lake morphometry. Dissolved oxygen concentrations decrease with depth through the hypolimnion because with thermal stratification, the hypolimnion is effectively isolated from atmospheric and epilimnetic oxygen supplies. The isolation persists from the time that stratification is established in the spring and summer until the fall turnover, when stratification breaks down and mixing resumes. Oxygen depletion in

the hypolimnion due to algal decomposition results in a loss of well oxygenated cold water habitat that is vital to the growth and survival of Lake Trout (OMOE et al. 2010).

Phosphorus is a limiting nutrient that controls the growth of aquatic plants and algae (Wetzel 2001). When the supply of phosphorus is high (>0.02 mg/L), it may promote excess growth of algae and aquatic plants. Throughout the growing season, algae and plant matter die, decompose, and settle to the bottom of lakes, consuming oxygen in the hypolimnion. A major source of anthropogenic phosphorus to inland lakes is from septic systems (OMOE et al. 2010). Additional sources of phosphorus to lake environments include stormwater runoff, agricultural runoff, fertilizers, shoreline clearing and associated soil erosion. By implementing controls on shoreline development, the degree of phosphorus enrichment and resulting impacts to sensitive lake systems can be mitigated.

To help protect lakes from excessive phosphorus loading and resulting oxygen depletion, the Ontario Ministry of the Environment and Climate Change (MOECC) uses several tools to assess the capacity of a lake to support development. This is collectively known as Lakeshore Capacity Assessment.

Lakeshore Capacity Assessment

Lakeshore Capacity Assessment is used as a planning tool to establish shoreline development limits on Precambrian Shield lakes in order to control phosphorus loading to inland lake environments. The goals of lakeshore capacity assessment are to help maintain the quality of water in recreational inland lakes and to protect cold water fish habitat by keeping changes in the nutrient status of inland lakes within acceptable limits. Phosphorus and dissolved oxygen are commonly used indicators of water quality.

Dissolved Oxygen

The Provincial Water Quality Objectives (PWQO) set acceptable concentrations of dissolved oxygen (DO) for lakes in Ontario (OMOE 1994). For cold water biota, acceptable DO concentrations are between 5 and 8 mg/L (depending on water temperature). For warm water biota, the acceptable DO concentrations are between 4 and 7 mg/L, depending on temperature. For waters where sensitive biological communities such as Lake Trout exist, or where additional physical or chemical stressors are operating, more stringent criteria may be required.

In Ontario, 7 mg/L (expressed as a Mean Volume Weighted Hypolimnetic Dissolved Oxygen concentration (MVWHDO)) has been adopted as the water quality criterion to protect Lake Trout lakes. This is reflected in the Lakeshore Capacity Assessment Handbook (LCAH) (OMOE et al. 2010), which is used to inform development decisions on lakes situated on the Precambrian Shield. Specifically, the LCAH recommends:

> "There will be no new municipal land use planning approvals for new or more intense residential, commercial or industrial development within 300m of lake trout lakes where the mean volume-weighted hypolimnetic dissolved oxygen has been measured to be at or below 7 mg/L. This recommendation also applies to lakes where water quality modeling has

> determined that the development of existing vacant lots, with development approvals, would reduce the MVWHDO to 7 mg/L or less. The preservation of an average of at least 7 mg/L dissolved oxygen in the hypolimnion of Ontario's Lake Trout lakes will help to sustain the province's Lake Trout resources".

For the purpose of managing Lake Trout populations, MNRF recommends that a lake or basin of a lake be classified as 'at capacity' when the MVWHDO value is less than or equal to 7.0 mg/L (OMNR 2009). This value must represent the average of at least 3 dissolved oxygen profiles taken during the target period (August 15-September 15) of separate years.

For lakes that have MVWHDO values above 7.0 mg/L, the Lakeshore Capacity Model (LCM) can be used to predict how much development the lake can support without causing the MVWHDO to drop below the criteria. The LCM takes into account phosphorus in atmospheric deposition, natural inputs from the watershed, and anthropogenic inputs associated with development. The results of the LCM are used to predict the resulting MVWHDO through the use of a steady state model for hypolimnetic dissolved oxygen (Molot et al. 1992).

Phosphorus

Historically, management decisions relating to phosphorus have relied on an Interim Provincial Water Quality Objective (PWQO) (OMOE 1994). The Interim PWQO states:

> "To avoid nuisance algae growth in lakes, average total phosphorus concentrations over the ice-free period should not exceed 20 μg/L. A high level of protection against aesthetic deterioration will be provided by a total phosphorus concentration of < 10 μg/L. This applies to all lakes naturally below this value."

A new PWQO establishes lake-specific objectives for lakes on the Precambrian Shield based on the background phosphorus concentration of the lake (OMOE et al. 2010). The Lakeshore Capacity Model is used to determine the natural (pre-development) background concentration of total phosphorus (TP). The objective is then established as the natural background concentration of phosphorus plus 50%, to a maximum of 20 μg/L. When the phosphorus concentrations in a lake exceed this value, the lake may be considered to be 'at capacity' with respect to phosphorus load.

Where the measured TP concentration within a lake is less than the natural background concentration plus 50%, the Lakeshore Capacity Model can be used to predict how much new development the lake can sustain without causing TP concentrations to exceed the objective.

This report presents an assessment of the potential development capacity of Sharpe's Bay based on the lake's dissolved oxygen regime. A discussion of supplementary water quality information is also provided.

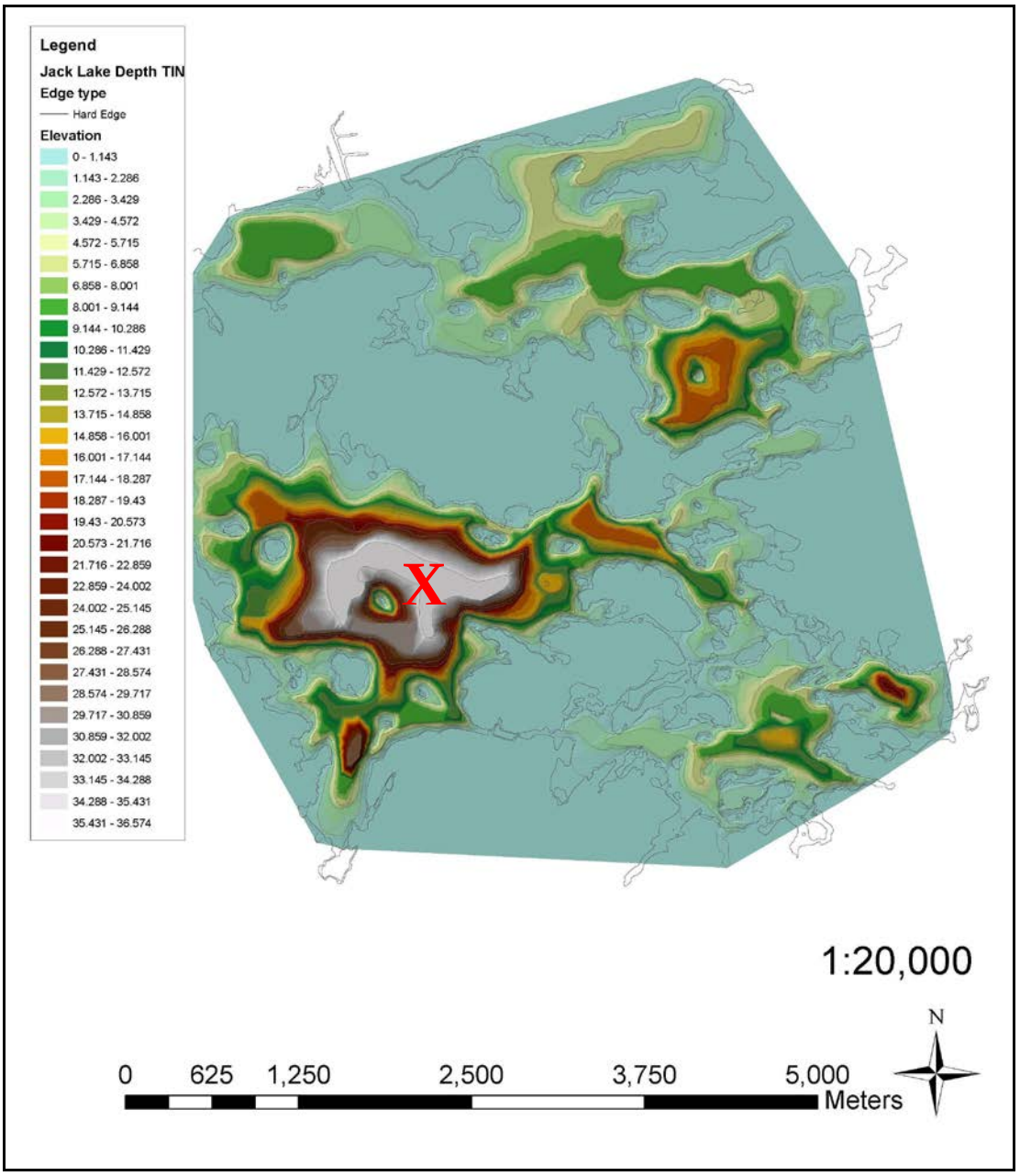

Figure 1. Bathymetry of Jack Lake (in metres), Townships of Havelock-Belmont-Methuen and North Kawartha in the County of Peterborough. Sharpe's Bay is identified by a red 'x'.

LOCATION

County	Peterborough
Geographic Township	Methuen, Burleigh
Watershed	Kawartha Lakes
Zone	17T
Easting	733539
Northing	4952417

MORPHOMETRY

Surface Area (ha)	1237
Catchment Area (ha)	8160
Shoreline Length (km)	132
Maximum Depth (m)	51
Total Volume (m^3)	1.01×10^8
Shoreline Crown Land (%)	35

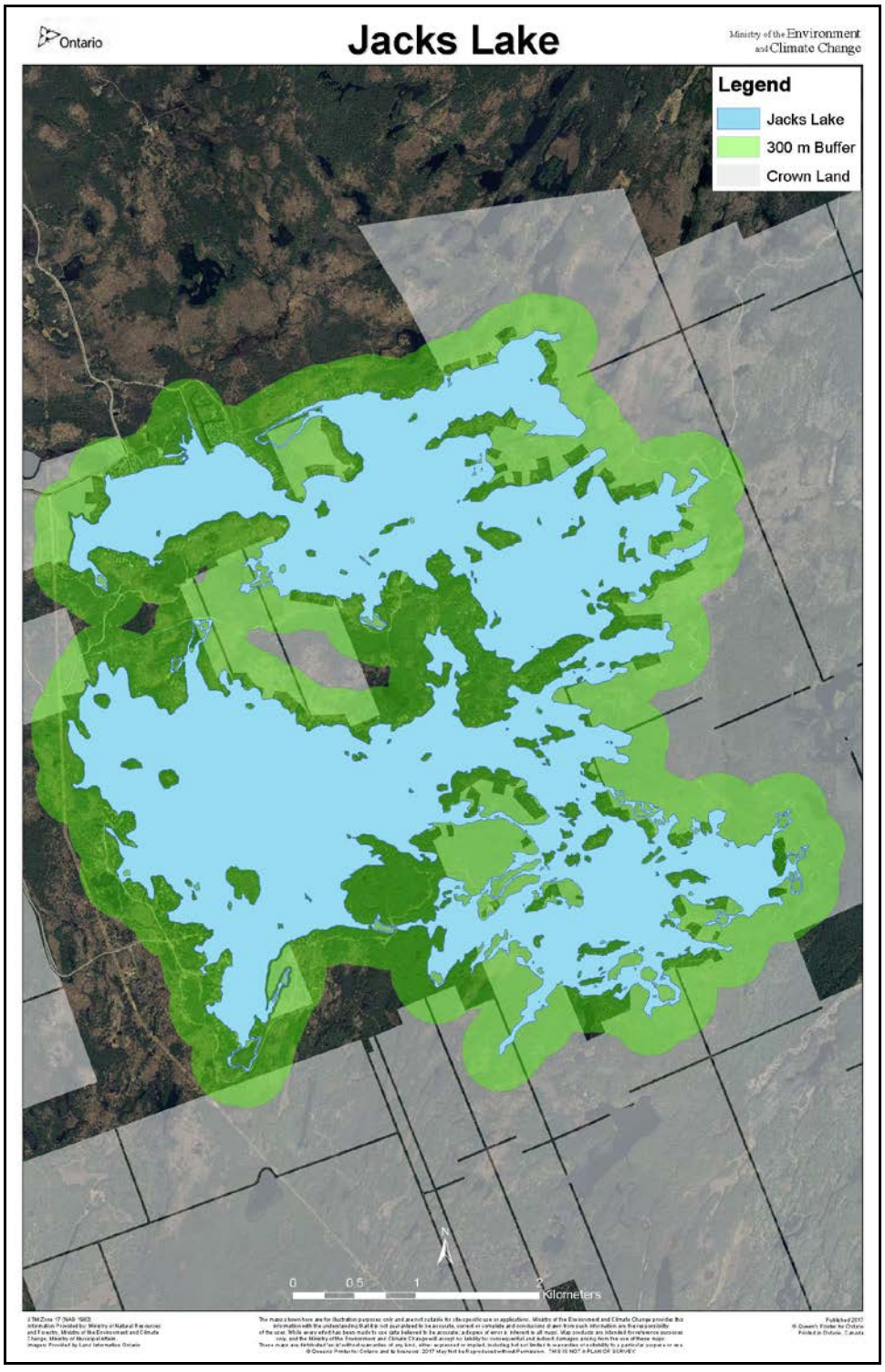

Figure 2. Jack Lake, Townships of Havelock-Belmont-Methuen and North Kawartha in Peterborough County (geographic Townships of Methuen and Burleigh). The green highlighted area represents a 300 meter buffer along the shoreline and grey areas are Crown land.

Methods

Data

The most recent water quality information for Sharpe's Bay was collected by volunteers of the Lake Partner Program (LPP) and the MOECC. The MOECC water quality data includes water chemistry and Secchi depth measurements (**Appendix 1**) and dissolved oxygen and temperature data (**Appendix 2**).

For the purposes of this Lakeshore Capacity Assessment, only the most recent data were used to characterize the lake. These data are the most relevant to current conditions and were obtained using more reliable and consistent field and laboratory methods compared to earlier data. This assessment used three years of fall dissolved oxygen data.

Mean Volume Weighted Hypolimnetic Dissolved Oxygen Calculation

The DO regime for Sharpe's Bay was characterized based on DO and temperature profiles collected during or near the standard sampling window (August 15 through September 15) between 2010 and 2012.

Recent profiles (temperature and DO) were collected using a YSI meter that was calibrated prior to each field survey. Measurements of DO and temperature were collected at one meter intervals through the water column. The upper limit of the hypolimnion was identified as the depth at which the temperature change was less than 1°C per meter. Where this occurred between depth intervals, the shallower of the two depths was treated as the top of the hypolimnion.

The oxygen content for a given one meter frustum (stratum) was determined by multiplying the DO concentration by the known volume of water in that frustum. The MVWHDO was determined by summing the values for each stratum and dividing by the total volume of the hypolimnion. Calculations were done using the following formula (OMNR 2009):

$$MVWHDO = \sum_{s=1}^{n} V_s * DO_s ,$$

where:
MVWHDO is Mean Volume Weighted Hypolimnetic Dissolved Oxygen (mg/L);
V_s is the volume fraction of stratum s;
DO_s is the dissolved oxygen concentration (mg/L) in stratum s; and
n is the number of strata in the hypolimnion.

Results and Discussion

Phosphorus and Water Clarity

Recent spring phosphorus data from Sharpe's Bay includes 2006-2013 and 2015-2016 samples from the LPP. The LPP uses a low level phosphorus method with duplicate samples to quantify phosphorus concentrations.

This recent spring phosphorus data indicates that Sharpe's Bay is oligotrophic (<10 µg phosphorous per litre). Spring turnover total phosphorus concentrations (TP_{SO}) in the euphotic zone range from 4.8 to 8.9 µg/L. There were 10 TP_{SO} measurements used to determine the average spring turnover phosphorus concentration of 7.2 µg/L (**Table 1**). All samples represent an average of duplicates except for the May 2008 sample that omits a bad split duplicate.

Table 1. Summary of Spring Turnover Total Phosphorus (TPso) Concentrations (µg/L) in Sharpe's Bay (2006-2013, 2015-2016).

Date	TPso (µg/L)
29-Apr-06	8.3
13-May-07	8
19-May-08	7.8
18-May-09	8.9
16-May-10	6.4
29-May-11	8.1
21-May-12	4.8
20-May-13	6.9
17-May-15	6.9
23-May-16	5.8
Average	**7.2**

Secchi depth is a measure of water clarity. This can be influenced by zooplankton biomass, algae biomass, turbidity, dissolved organic carbon, and suspended particulate matter. The average Secchi depth measured by the LPP is 6.3 meters (2005-2016), indicating excellent water clarity in Sharpe's Bay.

Alkalinity, pH and Hardness

Total alkalinity in Sharpe's Bay is moderately high and ranged from 60.2 to 65.6 mg/L. This indicates the lake has high levels of calcium carbonate ions and is therefore not sensitive to acidification. The range in pH in the euphotic zone was 8.0 to 8.4.

The hardness level of a waterbody is a function of the concentration of the various dissolved salts (most commonly calcium and magnesium ions) and is usually associated with the surficial geology in the watershed. In Sharpe's Bay, the water is moderately hard, ranging from 67 to 77 mg/L. High calcium concentrations in Jack Lake (23.8 to 27.7 mg/L) likely contribute to the high alkalinity values (**Appendix 1**).

Dissolved Organic Carbon

Lakes with high dissolved organic carbon (DOC) concentrations may have naturally high background phosphorus concentrations (OMOE et al. 2010). High levels of DOC may occur naturally in lakes with large areas of wetlands in their catchments. In Sharpe's Bay, DOC concentrations are moderate and ranged from 4.6 to 5.4 mg/L in the euphotic zone (**Appendix 1**).

Nitrogen (Ammonia, Nitrate, Nitrite, Total Kjeldahl Nitrogen)

In surface waters, nitrogen may exist as nitrate, nitrite, ammonia or ammonium. The chemical form of nitrogen, which varies with oxygen concentration and pH, has a strong influence on the level of toxicity to fish. Both un-ionized ammonia (NH_3), and to a lesser extent nitrate, are known to be toxic to aquatic life. Un-ionized ammonia may accumulate to toxic levels in the hypolimnion under low oxygen conditions.

In Sharpe's Bay, total ammonia concentrations were low. Total ammonia ranged from 0.002 mg/L to 0.024 mg/L in the euphotic zone and 0.002 to 0.072 mg/L at a meter off bottom (MOB) (**Appendix 1**). Under the conditions observed in the hypolimnion (temperature <15 ^{o}C and pH <8.5), this equates to a maximum of 0.006 mg/L of un-ionized ammonia. The Canadian Water Quality Guideline for un-ionized ammonia is 0.019 mg/L and the PWQO for un-ionized ammonia is 0.020 mg/L. Both water quality criteria are established for the protection of aquatic life (CCME 2010, OMOE 1994).

Similarly, nitrate concentrations were relatively low in Sharpe's Bay (0.007 mg/L to 0.056 mg/L euphotic, 0.126 to 0.770 mg/L MOB) (**Appendix 1**). This is well below the Canadian Water Quality Guideline of 3.00 mg/L nitrate-nitrogen (CCME 2012). Nitrite concentrations in Sharpe's Bay range from 0.001 to 0.004 mg/L in surface samples and 0.001 to 0.019 mg/L in the MOB sample (**Appendix 1**). There is no PWQO for either nitrate or nitrite.

Dissolved Oxygen and Temperature

Seven dissolved oxygen and temperature profiles were available for Sharpe's Bay. Profiles were collected near or within the sampling window of August 15th to September 15th (**Figure 3**).

Sharpe's Bay thermally stratifies. The August dissolved oxygen profiles display a positive heterograde pattern, while the September profiles display a clinograde pattern. The top of the hypolimnion ranges between 10 to 12 meters. Oxygen concentrations in the hypolimnion indicate the lake bottom is oxic. Raw dissolved oxygen and temperature data can be found in **Appendix 2**.

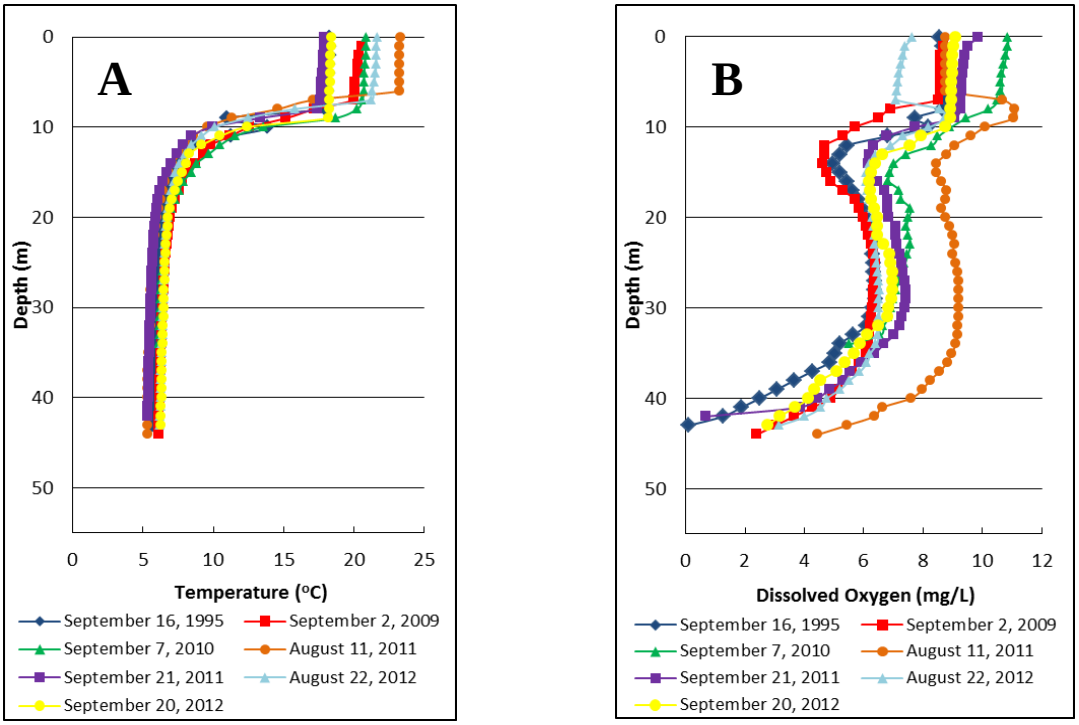

Figure 3. Temperature (A) and dissolved oxygen (B) profiles collected from the deepest point in Sharpe's Bay (1995, 2009, 2010, 2011, 2012).

MVWHDO

Three of the six dissolved oxygen and temperature profiles were examined for Sharpe's Bay. The 1995 and 2009 profiles were not considered because they were largely incomplete; a majority of the profiles were interpolated and/or extrapolated (**Appendix 2**). The August 2011 and 2012 profiles were not included as only one profile per year can be included in the MVWHDO calculation, and use of the September profiles result in a more conservative MVWHDO value.

As shown in Table 2, the MVWHDO was below 7 mg/L for each profile examined and the average MVWHDO for Sharpe's Bay is 6.63 mg/L. Based on the observed MVWHDO, Lakeshore Capacity Modelling is not required to assess the capacity status of Sharpe's Bay since measured values do not currently meet the provincial objective of 7.0 mg/L.

Table 2. Summary of Mean Volume Weighted Hypolimnetic Dissolved Oxygen for Sharpe's Bay (2010, 2011, 2012).

Date	MVWHDO (mg/L)
September 7, 2010	6.97
September 21, 2011	6.51
September 20, 2012	6.42
Average	**6.63**

Sharpe's Bay Development Capacity Summary

Sharpe's Bay of Jack Lake is managed by the MNRF as a naturally reproducing Lake Trout basin. Water quality data collected by the MOECC show that MVWHDO values are consistently below the 7 mg/L criterion, within a long-term average of 6.63 mg/L. Based on this information, Sharpe's Bay is considered to be 'at capacity'.

Given this finding, municipal land use planning approvals and Crown Land disposition decisions around Sharpe's Bay should not result in a net increase in phosphorus loading to the lake, impacts to habitat, or reductions to lakeshore carrying capacity.

References

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Appendix 1. Water Chemistry Summary for Sharpe's Bay from the MOECC Lake Monitoring Program (2008, 2010-2012).

Parameter	16-Jul-08		28-Jul-10		7-Sep-10		11-Aug-11		20-Sep-11		22-Aug-12	
	EUP	MOB	EUP	MOB	EUP	MOB	EUP	MOB	EUP	MOB	EUP	MOB
Secchi Disk (m)	3.2		4.8		5.5		N/A		4.5		5.0	
Total Phosphorus	0.006	0.029	0.006	0.026	0.008	0.011	0.006	0.029	0.007	0.030	0.002	0.011
Ammonia- Nitrogen	0.002	0.035	0.022	0.021	0.009	0.016	0.024	0.072	0.002	0.002	0.018	0.017
Nitrite-Nitrogen	0.002	0.002	0.004	0.005	0.001	0.002	0.004	0.019	0.001	0.002	0.001	0.001
Nitrate- Nitrogen	0.007	0.212	0.056	0.184	0.040	0.198	0.049	0.770	0.010	0.126	0.024	0.171
Total Kjeldahl Nitrogen	0.32	0.33	0.28	0.28	0.34	0.35	0.28	0.29	0.37	0.26	0.32	0.26
Dissolved Organic Carbon	5.4	4.6	4.9	4.4	4.6	4.3	5.0	4.6	5.0	4.3	4.6	4.0
Dissolved Inorganic Carbon	13.6	14.7	14.5	15.0	14.4	14.8	14.2	14.8	14.5	15.2	14.4	15.1
pH	8.37	7.69	8.23	7.73	8.03	7.77	8.11	7.80	8.11	8.01	8.09	7.60
Total Alkalinity	63.4	65.6	61.2	60.2	61.2	62.0	62.7	65.5	61.1	62.5	63.0	62.8
Conductivity (uS/cm)	150	156	150	153	148	151	148	153	149	153	151	152
Calcium	24	25	25.5	23.8	23.9	25.4	24.7	25.1	26.1	27.7	24.2	25.1
Magnesium	1.72	1.76	1.72	1.76	1.72	1.72	1.94	1.92	1.92	1.91	1.85	1.80
Hardness	66.8	69.6	70.6	66.6	66.6	70.4	70.0	71.0	73.0	77.0	68.0	70.0
Total Suspended Solids	2.1	1.7	1.8	1.3	1.7	1.1	1.2	1.0	1.5	0.5	0.7	5.0
Total Dissolved Solids	99	101	98	99	96	98	96	99	97	99	98	99

Notes:

All units in mg/L unless otherwise stated

EUP = Euphotic Zone

MOB = Meter Off Bottom

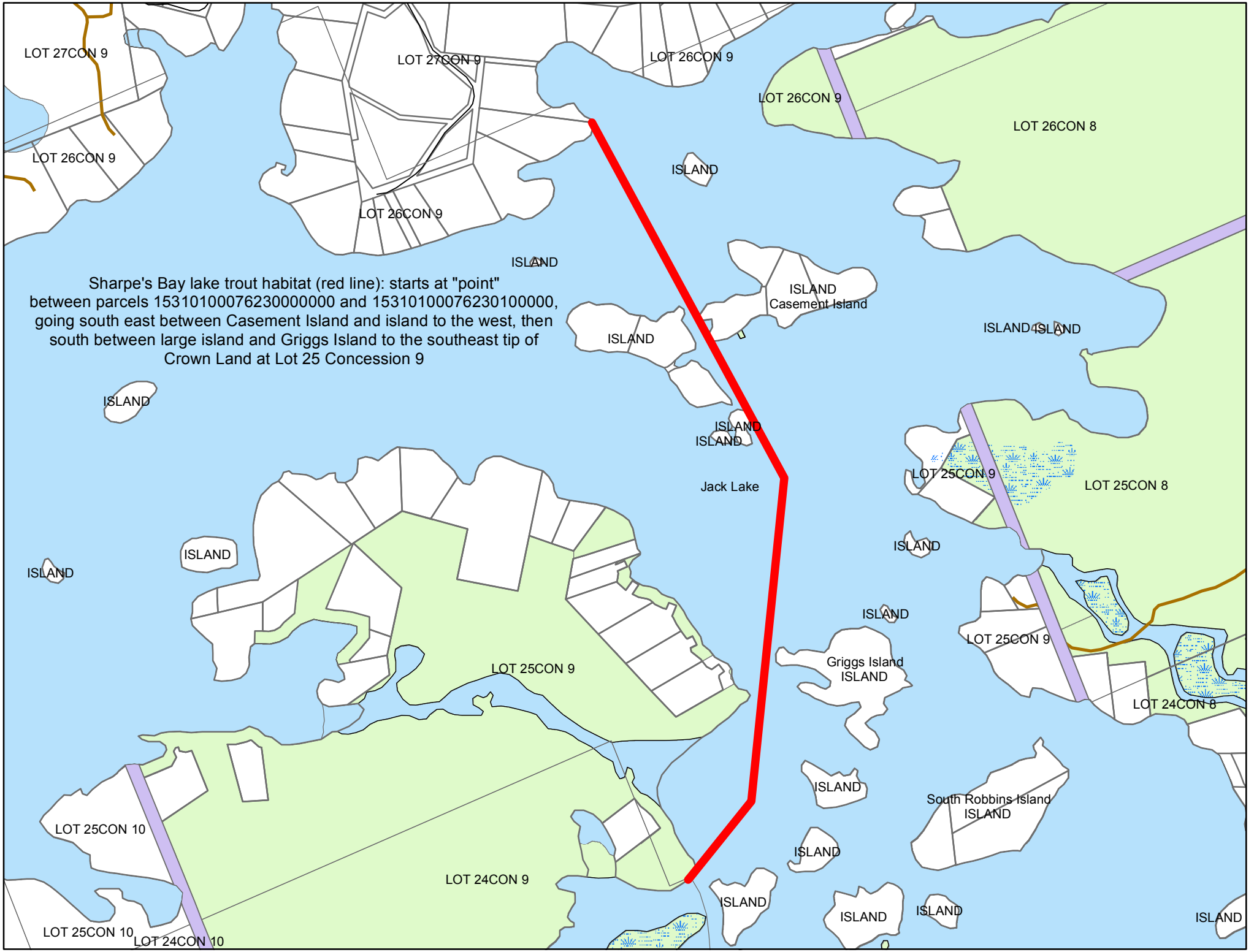
Appendix 2. Summary of Dissolved Oxygen and Temperature Data from Sharpe's Bay in 2009-2012.

Depth	September 16 1995		September 2 2009		September 7 2010		August 11 2011		September 21 2011		August 22 2012		September 20 2012	
	Temp (°C)	DO (mg/L)	Temp (°C)	DO (mg/L)	Temp (°C)	DO (mg/L)	Temp (°C)	DO (mg/L)	Temp (°C)	DO (mg/L)	Temp (°C)	DO (mg/L)	Temp (°C)	DO (mg/L)
0.1	18.30	8.56			20.90	10.86	23.32	8.75	17.88	9.84	21.64	7.67	18.4	9.11
1	18.30	8.64	20.60	8.70	20.87	10.86	23.29	8.76	17.89	9.51	21.63	7.41	18.39	9.04
2	*18.26*	*8.68*	20.40	8.60	20.84	10.80	23.29	8.75	17.83	9.39	21.61	7.36	18.36	9.01
3	*18.23*	*8.72*	20.30	8.60	20.78	10.75	23.28	8.75	17.81	9.36	21.58	7.29	18.34	9
4	*18.19*	*8.76*	20.30	8.60	20.74	10.67	23.28	8.75	17.76	9.34	21.55	7.22	18.32	8.98
5	*18.15*	*8.80*	20.10	8.60	20.73	10.65	23.27	8.74	17.7	9.31	21.45	7.18	18.31	8.97
6	18.10	8.85	20.10	8.60	20.73	10.65	23.23	8.76	17.68	9.29	21.3	7.15	18.3	8.96
7	*18.05*	*8.76*	20.00	8.50	20.61	10.54	17.11	10.68	17.65	9.27	21.22	7.12	18.27	8.95
8	18.00	8.66	17.20	6.90	20.23	10.24	14.61	11.09	17.42	9.26	15.79	8.57	18.26	8.93
9	11.00	7.73	15.20	6.50	18.69	9.47	11.35	11.06	13.35	9.05	12.46	8.74	18.21	8.91
10	13.90	8.16	12.60	5.70	13.59	8.94	9.59	10.1	9.93	7.73	10.14	8.21	12.4	8.77
11	*11.25*	*6.81*	11.20	5.30	11.56	8.53	8.59	9.61	8.43	6.78	9.18	7.35	10.5	7.94
12	8.60	5.45	9.80	4.70	10.49	8.30	8.01	9.05	7.89	6.32	8.43	6.94	9.18	7.57
13	*8.05*	*5.20*	9.30	4.70	9.67	7.44	7.61	8.78	7.4	6.2	7.98	6.42	8.29	6.62
14	7.50	4.94	8.70	4.60	8.82	7.05	7.1	8.43	6.98	6.16	7.56	6.21	8.06	6.39
15	*7.25*	*5.18*	*8.25*	*4.75*	8.41	6.90	6.87	8.43	6.72	6.27	7.32	6.13	7.77	6.24
16	7.00	5.42	7.80	4.90	7.87	6.85	6.59	8.61	6.42	6.45	7.19	6.12	7.52	6.18
17	*6.85*	*5.62*	*7.55*	*5.30*	7.56	7.22	6.4	8.78	6.2	6.71	7.03	6.14	7.27	6.21
18	6.70	5.81	7.30	5.70	7.27	7.27	6.26	8.74	6.09	6.8	6.9	6.22	7.06	6.26
19	*6.55*	*5.95*	*7.10*	*5.85*	7.02	7.58	6.14	8.63	6.01	6.81	6.79	6.33	6.91	6.36
20	6.40	6.09	6.90	6.00	6.79	7.52	6.02	8.76	5.94	6.85	6.7	6.33	6.81	6.45
21	*6.30*	*6.25*	*6.84*	*6.08*	6.73	7.44	5.91	8.88	5.83	7.08	6.65	6.36	6.77	6.46
22	6.20	6.41	*6.78*	*6.16*	*6.67*	*7.51*	5.85	9	5.79	7.07	6.62	6.38	6.71	6.46
23	*6.15*	*6.36*	*6.72*	*6.24*	6.60	7.58	5.77	9.05	5.75	7.11	6.59	6.41	6.67	6.67
24	6.10	6.30	*6.66*	*6.32*	6.54	7.49	5.73	8.99	5.71	7.2	6.57	6.44	6.62	6.86
25	*6.07*	*6.32*	6.60	6.40	6.46	7.40	5.68	9.11	5.68	7.28	6.55	6.47	6.6	6.91
26	*6.03*	*6.34*	*6.56*	*6.38*	6.40	7.24	5.65	9.16	5.65	7.33	6.53	6.51	6.56	6.96
27	6.00	6.36	*6.52*	*6.36*	*6.36*	*7.17*	5.61	9.19	5.62	7.37	6.51	6.54	6.54	6.97
28	*6.00*	*6.37*	*6.48*	*6.34*	6.31	7.10	5.59	9.2	5.6	7.41	6.47	6.55	6.52	6.96
29	6.00	6.38	*6.44*	*6.32*	6.29	7.02	5.57	9.21	5.58	7.41	6.46	6.53	6.5	6.94
30	*5.97*	*6.28*	6.40	6.30	6.25	6.94	5.55	9.21	5.54	7.39	6.44	6.53	6.48	6.84
31	*5.93*	*6.18*	*6.38*	*6.26*	6.23	6.85	5.53	9.19	5.52	7.3	6.42	6.52	6.46	6.81
32	5.90	6.08	*6.36*	*6.22*	6.21	6.67	5.52	9.17	5.51	7.21	6.41	6.51	6.45	6.5
33	*5.85*	*5.64*	*6.34*	*6.18*	6.18	6.57	5.48	9.15	5.49	7.02	6.39	6.5	6.45	6.12
34	5.80	5.19	*6.32*	*6.14*	6.16	5.55	5.45	9.11	5.47	6.68	6.35	6.44	6.42	5.88
35	*5.80*	*5.03*	6.30	6.10			5.42	8.96	5.46	6.37	6.34	6.23	6.37	5.66
36	5.80	4.87	*6.28*	*5.86*			5.39	8.82	5.44	5.92	6.33	6.12	6.35	5.37
37	*5.80*	*4.27*	*6.26*	*5.62*			5.37	8.56	5.43	5.53	6.31	5.89	6.35	5.08
38	5.80	3.67	*6.24*	*5.38*			5.37	8.23	5.43	5.3	6.3	5.53	6.33	4.55
39	*5.80*	*3.09*	*6.22*	*5.14*			5.37	7.98	5.41	4.85	6.29	5.22	6.32	4.33
40	5.8	2.5	6.20	4.90			5.35	7.59	5.4	4.46	6.28	4.77	6.32	4.15
41	*5.75*	*1.88*	*6.18*	*4.28*			5.34	6.64	5.37	3.85	6.26	4.57	6.29	3.68
42	5.7	1.26	*6.15*	*3.65*			5.33	6.35	5.34	0.69	6.24	4.05	6.28	3.17
43	5.7	0.11	*6.13*	*3.03*			5.32	5.43			6.22	3.17	6.26	2.76
44			6.10	2.40			5.31	4.46						

Note:

All units in mg/L unless otherwise stated

Red text indicates interpolated values


LOT 27CON 9
LOT 27CON 9
LOT 26CON 9
LOT 26CON 9
LOT 26CON 8
LOT 26CON 9
ISLAND
LOT 26CON 9
ISLAND
Sharpe's Bay lake trout habitat (red line): starts at "point" between parcels 15310100076230000000 and 15310100076230100000, going south east between Casement Island and island to the west, then south between large island and Griggs Island to the southeast tip of Crown Land at Lot 25 Concession 9
ISLAND
Casement Island
ISLAND
ISLAND
ISLAND
ISLAND
ISLAND
ISLAND
Jack Lake
LOT 25CON 9
LOT 25CON 8
ISLAND
ISLAND
ISLAND
LOT 25CON 9
Griggs Island
ISLAND
LOT 24CON 8
LOT 25CON 9
ISLAND
South Robbins Island
ISLAND
LOT 25CON 10
ISLAND
LOT 24CON 9
ISLAND
ISLAND
ISLAND
LOT 25CON 10
LOT 24CON 10

From: noreply@hbmtwp.ca <noreply@hbmtwp.ca> On Behalf Of Jon Orpana, 613 548 6918
Sent: July 31, 2019 10:52 AM
To: Sonia Aaltonen <SAaltonen@hbmtwp.ca>
Subject: JACK LAKE – SHARPE'S BAY

Hello,

It has come to our attention that you are undergoing an update to your Official Plan. The Jack's Lake Cottage Association is of the understanding that you have not yet updated the status of Sharpe's Bay to an "at capacity lake trout lake" per the correspondence attached on August 16th, 2017 from this ministry to both the County of Peterborough and both lower tier municipalities. Again, we formally ask that you make the appropriate changes to your Official Plan recognising the sensitive nature of these lakes and related habitat that supports lake trout in the south part of its range. In addition as with other municipalities that we notify of such changes that any planning applications that are considered going forward from the date of notification must consider the new status of Sharpe's Bay, Jacks Lake.

Thank you in advance.

Jon Orpana,
Environmental Planner / Environmental Assessment Coordinator Ontario Ministry of the Environment, Conservation and Parks
1259 Gardiners Road, Unit 3
Kingston, Ontario
K7P 3J6

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