Keeyask Generation Project

Aquatic Effects Monitoring Plan

Juvenile Lake Sturgeon Population Monitoring Report

AEMP-2015-03

Manitoba Hydro

Keeyask

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KEEYASK GENERATION PROJECT

AQUATIC EFFECTS MONITORING REPORT

Report #AEMP–2015–03

Juvenile Lake Sturgeon Population Monitoring, Fall 2014: Year 1 Construction

Prepared for

Manitoba Hydro

By

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SUMMARY

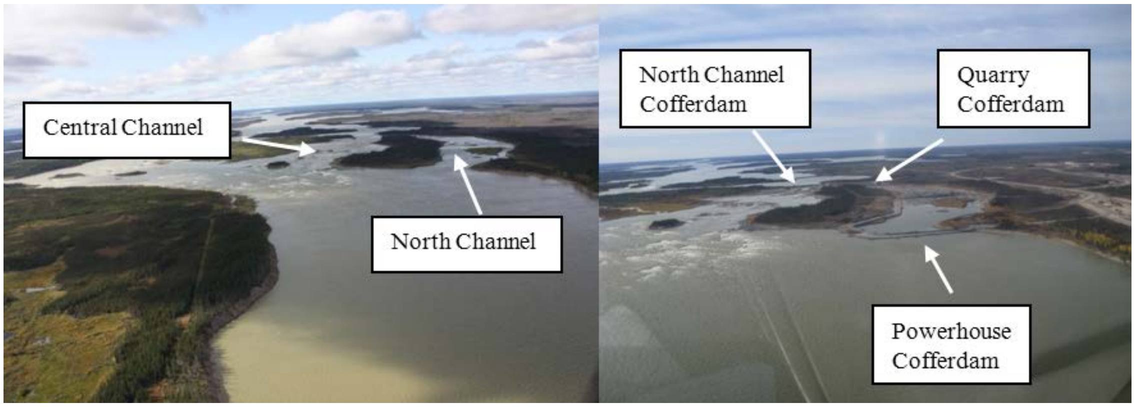
BACKGROUND

Construction of the Keeyask Generating Station (GS) at Gull Rapids began in July 2014. Before the government issued a licence to construct the generating station, the Keeyask Hydropower Limited Partnership (KHLP) was required to prepare a plan to monitor the effects of the generating station on the aquatic environment. Monitoring results will help the KHLP, government regulators, members of local First Nation communities, and the general public understand how construction and operation of the generating station will affect the environment, and whether or not more needs to be done to reduce harmful effects.

Lake Sturgeon is one of the key species for monitoring because they are important to local people, the population is already not doing well, and the generating station will alter or destroy important habitat. The plan to monitor sturgeon includes several different types of studies:

- Measurement of the number of adults;
- Measurement of the number and growth of juveniles (in particular fish up to ten years of age);
- Recording of spawning (egg-laying); and
- Studies of movement to record use of different kinds of habitat and longer migrations.

This report presents results of juvenile Lake Sturgeon population monitoring conducted during fall, 2014. Data from juvenile populations in the Keeyask Study Area have been collected intermittently since 2008. During mid-July to October 2014, flow in the north and central channels of Gull Rapids was blocked by the construction of cofferdams, which are temporary dams that create dry conditions where the powerhouse and permanent dams will be built. Therefore, this is the first time juvenile monitoring has occurred since construction started.



Gull Rapids before (left), and after (right), construction of cofferdams blocked the north and central channels of Gull Rapids.

WHY IS THE STUDY BEING DONE?

Monitoring results will help the KHLP understand if sturgeon can grow and reproduce both upstream and downstream of the GS, and if the sturgeon stocking program is working during and after GS construction. The KHLP's goal is to ensure that self-sustaining populations of sturgeon are present in the region in the future. Monitoring will tell the KHLP how well their plan is working or if other things need to be done to help sturgeon populations recover.

WHAT WAS DONE?

Sampling was done in the Burntwood River, in Gull Lake, and in Stephens Lake in the fall of 2014. Gill nets were used to catch juvenile (1 to 10 years old) sturgeon. The gill nets were set in deep water because that is the habitat that juveniles live in. When a sturgeon was caught it was measured and weighed. Small tags called PIT tags and Floy-tags were used to mark the fish so that if they are caught again, the amount they grew and the distance they moved can be determined. An aging structure, which tells you how old the fish is, was collected to tell us the year that the fish was born.

WHAT WAS FOUND?

In the Burntwood River, sturgeon of many different sizes were caught, suggesting that some sturgeon are successfully reproducing each year. No fish born in 2014 (called young-of-the-year [YOY]) were captured, but YOY fish are small and hard to catch. Two sturgeon that were stocked into the Burntwood River in spring 2014, when they were 1 year old, were caught. One was recaptured in the Burntwood River 4 km upstream of where it was released, and the other one was caught in Gull Lake, 97 km downstream of where it was released. One fish had grown 54 mm and the other 68 mm in length since they were released in the spring.

In Gull and Stephens Lakes, many sturgeon were caught that were born in 2008. However, not many that were born in other years were caught. Growth and condition of the sturgeon caught in 2014 were similar to those that were captured from earlier studies 2008 – 2012.

WHAT DOES IT MEAN?

More studies are needed over the next several years to see how the construction of the GS might affect sturgeon reproduction and growth, and to see if the stocking program will work.

WHAT WILL BE DONE NEXT?

Monitoring will continue each fall for the next 24 years. As more data are collected, any trends in reproduction or changes in growth will be seen.

ACKNOWLEDGEMENTS

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The collection of biological samples described in this report was authorized by Manitoba Conservation and Water Stewardship, Fisheries Branch, under terms of the Scientific Collection Permit # 18-14.

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1.0 INTRODUCTION

Construction of the Keeyask Generation Project (the Project), a 695-megawatt hydroelectric generating station and associated facilities, began in July 2014. The Project is located at Gull Rapids on the lower Nelson River in northern Manitoba where Gull Lake flows into Stephens Lake, 35 km upstream of the existing Kettle Generating Station (Figure 1).

The *Keeyask Generation Project: Response to EIS Guidelines*, completed in June 2012, provides a summary of predicted effects and planned mitigation for the Project. Technical supporting information for the aquatic environment, including a description of the environmental setting, effects and mitigation, and a summary of proposed monitoring and follow-up programs is provided in the *Keeyask Generation Project Environmental Impact Statement: Aquatic Environment Supporting Volume* (AE SV). As part of the licencing process for the Project, an Aquatic Effects Monitoring Plan (AEMP) was developed detailing the monitoring activities of various components of the aquatic environment including the focus of this report, specifically monitoring juvenile Lake Sturgeon populations, for the construction and operation phases of the Project.

The study area included in the sturgeon components of the AEMP is the reach of the Nelson River from the Kelsey GS to the Kettle GS, as well as water bodies immediately adjacent to the Nelson River (Figure 1).

The Lake Sturgeon component includes four monitoring activities:

- Adult population monitoring;
- Juvenile population monitoring;
- Spawn monitoring; and
- Movement monitoring.

Juvenile population monitoring is a key component of the overall Lake Sturgeon monitoring program because it provides data on recruitment to the population. This information is important because the Keeyask Project is predicted to affect sturgeon recruitment by destroying spawning habitat at Gull Rapids and altering spawning habitat at Birthday Rapids. If the juvenile segment of the population were not monitored, effects of the Project on recruitment would not be known for 20 to 25 years. By this time, it may be too late to mitigate impacts of the Project on the population. Data collected during juvenile population monitoring will be used to assess cohort strength, identify changes in condition factor, determine whether natural reproduction is occurring, determine the need for young-of-the-year (YOY) habitat creation and assess the effectiveness of the stocking program.

The primary focus of the juvenile monitoring program will be on sturgeon ranging from one to ten years of age. Fish that correspond to these size/age classes are readily captured in multimesh gillnets (1 – 6 inch mesh) set in deep water habitats, can be reliably aged (unlike older sturgeon) to identify year-class, and provide a rapid indication of the success of spawning and YOY survival, the two life history stages for which the greatest uncertainty exists for the Keeyask Project. Further, a standardized sampling methodology has been developed for juvenile sturgeon in Boreal Shield rivers using data sets collected from several populations in the Hudson Bay drainage basin (McDougall et al. 2014a). Use of this standardized methodology during Keeyask monitoring will enable comparisons of cohort strength, abundance, growth and condition to other sturgeon populations. Several studies conducted since 2008 have increased the understanding of YOY and juvenile sturgeon abundance, habitat use, condition, growth, year-class strength and factors influencing year-class strength in the Upper Split Lake area (*i.e.*, the Burntwood River and the Nelson River between the Kelsey GS and Split Lake), in Gull Lake and in Stephens Lake (MacDonald 2009; Michaluk and MacDonald 2010; Henderson et al. 2011; Henderson and Pisiak 2012; Henderson et al. 2013). These and other recent studies conducted in large riverine systems, indicate that juvenile habitat is essentially defined by the presence of deep-water, with spatial distribution patterns likely being driven by coarse-scale spawning site selection and patterns of larval drift (Barth 2011; Barth et al. 2011; McDougall et al. 2011a).

Aside from habitat, juvenile studies in the Keeyask study area revealed biological differences in aspects such as cohort distributions and overall growth between locations within the study area. Data collected from juvenile sturgeon in the Burntwood River in 2011 and 2012 revealed a broad age-class distribution, indicating that recruitment has occurred somewhat consistently in this river over the previous 10 years (Henderson and Pisiak 2012; Henderson et al. 2013). Conversely, in both Gull and Stephens lakes, age-class distributions were more sparse, indicating more erratic recruitment patterns, with only one cohort (2008) dominating the catches in consecutive years (Henderson et al. 2011; Henderson and Pisiak 2012; Henderson et al. 2013). In addition, overall growth of Burntwood River Lake Sturgeon is slower than conspecifics captured in Gull and Stephens lakes (Henderson et al. 2013).

Stocking Lake Sturgeon in the Keeyask Study Area occurred for the first time in 2014, at two locations, the Burntwood River and in the Nelson River between Birthday Rapids and Gull Rapids. Fish stocked in the Burntwood River were progeny of adults captured in spawning condition near First Rapids during spring, 2013. After being raised at the Grand Rapids Hatchery for one year, 300 yearlings were released into the Burntwood River at four locations between First Rapids and Split Lake on 30 and 31 May, 2014. An additional 295 yearlings from the same stock were released at the same sites on 2 October, 2014. In addition, 152,926 larval sturgeon were released downstream of Birthday Rapids on 29 July, 2014, and in late September, 4,656 three month old sturgeon (fingerlings) were released at three different locations in Gull Lake.

This report presents results from the first year of juvenile population monitoring conducted in the Burntwood River, Gull Lake, and in Stephens Lake. Results will assist in assessing impacts of construction on the juvenile segment of the population and determine the success of the stocking program. Juvenile monitoring is being conducted to address many key questions, as initially described in the AEMP:

- Does recruitment of wild sturgeon occur upstream and/or downstream of the GS during construction?
- Does recruitment of wild sturgeon occur upstream and/or downstream of the GS during operation?
- Does spawning habitat need to be created/modified (if recruitment of wild fish is not observed)?
- What is the survival rate of stocked sturgeon?
- What is the proportion of hatchery-reared to wild recruits within a cohort (i.e., how successful is the stocking program)?
- Is there a biologically meaningful (and statistically significant) change in condition factor and growth of juvenile sturgeon during construction or operation?
- Do stocking rates need to be adjusted?
- Where in the reservoir and in Stephens Lake will YOY rearing habitat be located, and will the distribution of YOY and juveniles change following reservoir creation?
- Does additional YOY habitat need to be created in the reservoir or in Stephens Lake?

Construction of the Keeyask GS began in mid-July 2014, and altered flows in the north and central channels of Gull Rapids (Figure 2). Given that construction began only two months prior to this study, many of the questions listed above are outside the scope of this report, as they relate to the juvenile populations after construction of the GS.

Monitoring data will be collected annually for the next 24 years.

2.0 THE KEEYASK STUDY SETTING

Juvenile population monitoring was conducted at three locations: 1) the Burntwood River between First Rapids and Split Lake; 2) in the Nelson River between Birthday Rapids and Gull Rapids; and 3) in Stephens Lake.

The Burntwood River flows in a north-easterly direction from First Rapids for approximately 35 km prior to emptying into the western arm of Split Lake (Figure 1). Under most flow conditions, First Rapids appears to be a natural barrier to upstream fish passage. Hard substrates predominate in the main channel, while loose fine sediments and associated macrophyte growth occur in many off-current areas. The hydrology of the Burntwood River has been affected by the Churchill River Diversion (CRD). Outflow from the Burntwood River to Split Lake prior to CRD was estimated at 90.0 m^3/s at First Rapids, and increased nearly 10-fold following diversion to 849.0 m^3/s.

Birthday Rapids is located approximately 10 km downstream of Clark Lake and 30 km upstream of Gull Rapids (Figure 1). The drop in elevation from the upstream to downstream side of Birthday Rapids is approximately 2 m. The 14 km reach of the Nelson River between Birthday Rapids and Gull Lake is characterized as a large somewhat uniform channel with medium to high water velocities. There are a few large bays with reduced water velocity and a number of small tributaries that drain into the Nelson River.

Gull Lake is a section of the Nelson River where the river widens, with moderate to low water velocity. Gull Lake is herein defined as the reach of the Nelson River beginning approximately 17 km upstream of Gull Rapids and 14 km downstream of Birthday Rapids, where the river widens to the north into a bay around a large point of land (Figure 1), and extending to the downstream end of Caribou Island, approximately 3 km upstream of Gull Rapids. Gull Lake has three distinct basins, the first extending from the upstream end of the lake downstream approximately 6 km to a large island; the second extending from the large island to Morris Point (a constriction in the river immediately upstream of Caribou Island); and the third extending from Morris Point to the downstream end of Caribou Island.

Gull Rapids is located approximately 3 km downstream of Caribou Island on the Nelson River (Figure 1). Two large islands and several small islands occur within the rapids, prior to the river narrowing. The rapids are approximately 2 km in length, and the river elevation drops approximately 11 m along its length.

Just below Gull Rapids, the Nelson River enters Stephens Lake. Stephens Lake was formed in 1971 by construction of the Kettle GS. Between Gull Rapids and Stephens Lake there is an approximately 6 km long reach of the Nelson River that, although affected by water regulation at the Kettle GS, remains riverine habitat with moderate velocity. Construction of the Kettle GS flooded Moose Nose Lake (north arm) and several other small lakes that previously drained into the Nelson River, as well as the old channels of the Nelson River that now lie within the southern portion of the lake. Major tributaries of Stephens Lake include the North and South Moswakot rivers that enter the north arm of the lake. Looking Back Creek is a second order stream that drains into the north arm of Stephens Lake (Figure 1). Kettle GS is located approximately 40 km downstream of Gull Rapids.

3.0 METHODS

3.1 GILLNETTING

Gillnetting was conducted in the Burntwood River between First Rapids and Split Lake, between Birthday Rapids and Gull Rapids (referred to as Gull Lake for the remainder of the report), and in the upper 6 km of Stephens Lake. A standardized juvenile Lake Sturgeon gillnetting methodology developed specifically for Boreal Shield rivers was used to sample each location (McDougall et al. 2014a). Gill nets were composed of twisted nylon and five multi-mesh panels of: 1, 2, 3, 5, and 6-inch stretched mesh (25, 51, 76, 127, and 152 mm). Each mesh panel was 25 yards (22.9 m) long and 2.7 yards (2.5 m) deep. Mesh sizes were staggered in the order of 1, 5, 2, 6, and 3-inch to better capture small and large juveniles across the length of each gang.

Gill nets were set in deep (6 – 20 m) water habitats since YOY and juvenile Lake Sturgeon have been found to prefer these areas in the Winnipeg and Nelson Rivers (Barth et al. 2009; 2011; Michaluk and MacDonald 2010; McDougall et al. 2013a; Henderson et al. 2014). Each gill net set was given a unique identification number, and net locations were recorded using a Garmin Etrex GPS receiver (Garmin International Inc., Olathe, KS). Water depth at each end of the net was measured using a PiranhaMax Series 150 Portable Sonar (Humminbird, Eufaula, AL) and water temperature was measured daily using a hand-held thermometer (± 0.5 °C). The orientation of each gill net was dependent on water velocity. In low (0.20 – 0.49 m/s) or moderate (0.50 – 1.49 m/s) water velocities nets were set parallel to flow, and in standing (0.00 – 0.19 m/s) velocities set perpendicular to flow. Gill nets were checked approximately every 24 hours, weather permitting.

3.2 BIOLOGICAL SAMPLING

All fish captured were counted by species, location, and mesh size. Lake Sturgeon were measured for fork length (FL), total length (± 1 mm), and weight (± 5 g using a digital scale, or nearest 25 g for fish > 4000 g).

The first fin ray of the left pectoral fin was removed immediately adjacent to the articulation from each Lake Sturgeon captured for the first time measuring <800 mm fork length for age analysis. All collected fin rays were placed in individually numbered envelopes, air dried, and brought back to the North/South Consultants Inc. laboratory for subsequent ageing (Section 3.4).

Small fin clips (1-2 cm^2) from the left pelvic fin were also removed from each Lake Sturgeon and preserved in 95% biological grade ethanol for genetic analysis.

3.3 TAGGING

Lake Sturgeon >300 mm FL were marked with individually numbered external Floy-GD-94 T-bar anchor tags (FT) (Floy-tag Inc., Seattle, WA). Floy-tags were inserted into the base of the dorsal fin using a Dennison Mark II tagging gun (Avery Dennison Corporation, Pasadena, CA).

Uniquely numbered Passive Integrated Transponder (PIT) tags from Oregon RFID (Oregon RDIF Ltd., Portland, Oregon) were also used to mark Lake Sturgeon. Those measuring >250 mm received 12 mm HDX tags (12.0 mm x 2.12 mm, 0.1 g) and those measuring <250 mm received 8 mm FDX-B tags (8.0 mm x 1.4 mm, 0.027 g). Each Lake Sturgeon was scanned for an existing PIT tag using an Agrident APR 350 Reader (Agrident Ltd. Steinkippenstrasse, Germany). For each untagged fish, a PIT tag was injected under the third dorsal scute using an Oregon RFID tag injector needle, dipped in Polysporin® to minimize the risk of infection (photos 1-3). Tags were injected parallel to the horizontal axis of the fish, into muscle tissue (not the body cavity). Following implantation or upon recapture, the tag data was logged, and the last six digits of the PIT tag manually recorded. Injector needles were sterilized between uses in boiling water.

3.4 AGEING ANALYSIS

Lake Sturgeon fin rays were hardened in an epoxy resin (Cold Cure™) and two 0.7 mm fin sections were cut distally within 5 mm of the articulation using a Struers Minitom™ (Struers Inc. Cleveland, Ohio) low speed sectioning saw. Fin sections were mounted on glass slides using Cytoseal-60™ (Thermo Scientific, Waltham, Massachusetts) and viewed at five times magnification under a compound microscope. Annuli (growth rings) were counted by three experienced readers (independently), without prior knowledge of fish length or weight, or ages assigned by other readers. If readers assigned different ages to a fish, either the modal age or the median age was chosen.

3.5 DATA ANALYSIS

Mean FL (mm), weight (g), and condition factor (K) were calculated for all Lake Sturgeon by location. Condition factor was calculated based on the following equation (after Fulton 1911, in Ricker 1975):

$$K = W \times 10^5 / FL^3$$

Where: W = weight (g): and

FL = fork length (mm).

Length-frequency distributions were plotted in 50 mm length class intervals (*e.g.*, 300 – 349 mm) and length-weight regression equations were derived using least squares analysis on logarithmic transformations of fork lengths and weights according to the following relationship:

$\ln(W) = \ln(a) + \ln(L)*b$

where: W = weight (g);

L = fork length (mm);

A = Y-intercept;

b = slope of the regression line; and

were presented as:

$W = a(L)^b$

To determine if growth and condition of juvenile sturgeon were affected by construction, mean length-at-age and mean condition factor-at-age were compared using t-Tests among fish captured pre-project (i.e., 2008 – 2012) to those captured in 2014 (statistical comparisons only conducted where sample sizes were > 8 individuals). The significance level was set at 0.05 (5%).

Cohort frequency distributions were plotted for each location.

Gillnetting hours (*i.e.*, effort) was calculated as the number of sampling hours per 100 m of net set using the following equation:

Effort (hours) = set duration × (net length/100 m)

Catch-per-unit-effort (CPUE) was calculated and expressed as the number of fish captured in 100 m of net per 24 hour period using the following formula:

CPUE = ∑ # Lake Sturgeon / ∑ Effort × 24 h

where ∑ = sum of the number of fish or effort at all sites.

CPUE was calculated by geographical zone for each study location and study year.

4.0 RESULTS

4.1 BURNTWOOD RIVER

Eleven fish species (n = 205) were captured at 28 gillnetting sites in the Burntwood River, and one site in Split Lake, from 8 to 16 September, 2014 (tables 1 and 2; Figure 3). Lake Sturgeon (n = 42; 20.5%) were the third most abundant species captured (Table 3). Gill net site data and biological and tagging information for all Lake Sturgeon captured is provided in appendices A1-1 and A2-1. Water temperature of the Burntwood River decreased from 12.0°C to 10.0°C over the course of the study (Appendix A1-1).

Forty-one juvenile and one adult Lake Sturgeon were captured in 733.5 gillnet hours, producing an overall CPUE of 1.37 Lake Sturgeon/100 m net/24 h (Table 4). Gill nets were set in all three zones of the Burntwood River below First Rapids and one net was set in Split Lake (SPL-A) (Figure 3). CPUE values by zone were as follows:

- 2.30 Lake Sturgeon/100 m/24 h in Zone BWR-A (n = 8 sites);
- 0.33 Lake Sturgeon /100 m/24 h in Zone BWR-B (n = 6 sites);
- 1.35 Lake Sturgeon /100 m/24 in Zone BWR-C (n = 14 sites); and
- 0.00 Lake Sturgeon /100 m/24 h in Zone SPL-A (n = 1 site) (Table 4).

CPUE values for Burntwood River catches since 2011 are presented in Table 5.

4.1.1 YEAR-CLASS STRENGTH

Cohort analyses from the Burntwood River catch were not presented because ageing structures could not be interpreted with confidence. Structures were collected > 1.5 cm from the fin articulation and recent (in-house) aging experience suggests that annuli may be missed and fish under-aged, if fin-ray sections are not collected 0.5 mm – 1.5 cm from the fin articulation.

4.1.2 GROWTH AND CONDITION

Captured Lake Sturgeon had a:

- Mean FL of 428 mm (n = 42; StDev = 153; range: 215 – 807 mm);
- Mean weight of 835 g (n = 40; StDev = 922; range: 50 – 4,100 g); and
- Mean condition factor of 0.71 (n = 40; StDev = 0.19; range: 0.34 – 1.35) (Table 6).

Lake Sturgeon in the 450-499 mm fork length interval were the most frequently captured (16.7%), followed by the 200-249 mm and 300-349 mm intervals at 14.3% each (Figure 4). The length-weight regression for all Lake Sturgeon captured in the Burntwood River since 2011 is provided in Table 7.

4.1.3 RECAPTURES

Two previously tagged juvenile Lake Sturgeon were recaptured in the Burntwood River:

- One fish (FT# 101455), initially captured in Zone BWR-A in 2012, was recaptured 0.8 km from its original capture site (Table 8); and
- The second recaptured fish (PIT# 982 000362432311) was progeny of fish spawned at the Burntwood River spawn camp in 2013 (Table 8). This fish was reared in the Grand Rapids Hatchery through its first winter, and subsequently released into the Burntwood River as a one-year old on 31 May, 2014 at stocking site #3 (Figure 5). It was recaptured 3.8 km upstream of its release location (Table 8).

4.2 GULL LAKE

Fourteen fish species (n = 407) were captured at 30 gillnetting sites from 8 to 16 September, 2014 (tables 1 and 2; Figure 6). Lake Sturgeon (n = 112; 27.5%) were the second most abundant species captured (Table 3). Gill net site data and biological and tagging information for all Lake Sturgeon captured is provided in appendices A1-2 and A2-2. Water temperature in Gull Lake decreased from 15.5°C to 11.5°C over the course of the study (Appendix A2-1). Gull Lake water levels were unavailable prior to 11 September, but the average daily water level between 11 and 16 September was 155.6 m (Manitoba Hydro, unpublished data).

In total, 108 juvenile and four adult Lake Sturgeon were captured in 765.1 gillnet hours, producing an overall CPUE of 3.51 Lake Sturgeon/100 m net/24 h (Table 4). Gill nets were set in all three Gull Lake zones, as well as the first zone upstream of Gull Lake (i.e., BR-D) (Figure 6). CPUE values by zone, from upstream to downstream were as follows:

- 1.85 Lake Sturgeon / 100 m/24 h in Zone BR-D (n = 3 sites);
- 2.59 Lake Sturgeon /100 m/24 h in Zone GL-A (n = 7 sites);
- 4.18 Lake Sturgeon /100 m/24 h in Zone GL-B (n = 11 sites); and
- 3.77 Lake Sturgeon /100 m/24 h in Zone GL-C (n = 9 sites) (Table 4).

CPUE values for Gull Lake catches prior to 2014 are presented in Table 5.

4.2.1 YEAR-CLASS STRENGTH

Aged Lake Sturgeon (n = 96) ranged from 1 to 13-years old (2001 – 2013 cohorts), with 6-year old fish (*i.e.*, 2008 cohort) dominating the catch (n = 58; 60.4%) (Figure 7). The 2008 cohort has dominated the Gull Lake catch every sampling year since 2009 (Figure 7). Cohort frequency distributions for all zones sampled below Birthday Rapids in 2014 are provided in Figure 8.

4.2.2 GROWTH AND CONDITION

Captured Lake Sturgeon had a:

- Mean fork length of 533 mm (n = 112; StDev = 140; range: 225 – 946 mm);
- Mean weight of 1,286 g (n = 110; StDev = 997; range: 50 – 5,750 g); and
- Mean condition factor of 0.72 (n = 110; StDev = 0.12; range: 0.38 – 1.20) (Table 6).

Lake Sturgeon in the 500 - 549 mm length interval were captured most frequently, and represented 26.8% of the total catch (Figure 4). The length-weight regression for Lake Sturgeon captured in Gull Lake between 2008 and 2014 is provided in Table 7.

Comparison of mean FL-at-age for the age-1 and age-6 cohorts (the only cohorts for which sample sizes were > 10) captured pre-project (2008 – 2012 data combined), to the 2014 catch, found no significant differences (p = 0.10 and 0.39, respectively (Table 9). Condition-at-age for the 6-year-old cohort was also not significantly different from pre-project (p = 0.94). Qualitatively, the 2014 data were within the ranges observed pre-project for both FL-at-age and condition-at-age for each cohort.

4.2.3 RECAPTURES

Seventeen Lake Sturgeon tagged in previous years, were recaptured in Gull Lake:

- One was tagged in each of 2008, 2010, and 2013;
- Four were tagged in 2012;
- Five were tagged in 2011; and
- Five were originally tagged in 2014 during spring adult Lake Sturgeon studies (Table 8).

Recaptured fish moved varying distances from their original capture locations:

- Seven fish were recaptured < 1.0 km from their last capture location;
- Nine fish were recaptured between 1.0 and 7.0 km from their previous capture location; and

- One fish was reared in the Grand Rapids Hatchery over the winter (PIT# 982 000362432272), and stocked as a one-year old in the Burntwood River on 31 May, 2014 at site #4 (Table 8; Figure 5).
    - This fish was recaptured 97 km downstream in Gull Lake (Zone GL-B) on 12 September, 2014.

4.3 STEPHENS LAKE

Twelve species (n = 275) were captured at 9 gillnetting sites (34 net sets total) in upper Stephens Lake from 18 to 28 September, 2014 (tables 1 and 2; Figure 9). Lake Sturgeon (n = 47; 17.1%) were the second most abundant species captured (Table 3). Gill net site data, and biological and tagging information for all Lake Sturgeon captured in Stephens Lake, is provided in appendices A1-3 and A2-3. Water temperature fluctuated between 9.0°C and 10.5°C during the study (Appendix A1-3).

In total, 47 juvenile Lake Sturgeon were captured in 920.7 gillnet hours, producing an overall CPUE of 1.23 Lake Sturgeon/100 m net/24 h (Table 4). Gill nets were set in both zones located within the upper 6 km of Stephens Lake (Figure 9). CPUE values by zone were as follows:

- 2.20 Lake Sturgeon / 100 m/24 h in Zone STL-A (n = 3 sites); and
- 0.63 Lake Sturgeon /100 m/24 h in Zone STL-B (n = 6 sites) (Table 4).

CPUE values for Stephens Lake catches prior to 2014 are presented in Table 5.

4.3.1 YEAR-CLASS STRENGTH

Aged juvenile Lake Sturgeon (n = 46) ranged from 3 – 11 years, with 6-year old fish (*i.e.*, 2008 cohort) representing 54.3% of the aged fish (Figure 10). The 2008 cohort has dominated juvenile catches in Stephens Lake since 2010. Cohort frequency distributions for the two Stephens Lakes zones are provided in Figure 11.

4.3.2 GROWTH AND CONDITION

Captured Lake Sturgeon had a:

- Mean fork length of 593 mm (n = 47; StDev: 101; range: 373-796);
- Mean weight of 1,757 g (n = 1,757; StDev: 932; range: 350 – 4,900 g); and
- Mean condition factor of 0.77 (n = 47; StDev: 0.12; range: 0.62 – 1.36) (Table 6).

The length-weight regression for Lake Sturgeon captured in Stephens Lake between 2008 and 2014 is provided in Table 7.

The majority of the fish captured corresponded to the 550 – 599 mm and 600 – 649 mm length class intervals which combined represented 51.1% of the total catch (Figure 4). Although sample sizes were not large enough to facilitate statistical comparison, fork length-at-age and condition factor-at-age from the 2014 catch were within the ranges observed in the same cohorts pre-project (2008 – 2012) (Table 10).

4.3.3 RECAPTURES

Eight juvenile Lake Sturgeon tagged in previous years were recaptured in Stephens Lake:

- Three were originally tagged in 2010, 1 of these was also captured in 2012;
- Four were tagged in 2012; and
- One was tagged in 2013 (Table 8).

Recaptured fish moved varying distances from their original capture locations:

- Six were caught ≤1.3 km from their original capture location; and
- Two fish moved 3.0 km from Zone STL-B into Zone STL-A (Table 8).

5.0 DISCUSSION

Juvenile Lake Sturgeon population monitoring, a program planned to occur annually during fall for the next 24 years, was conducted for the first time since construction of the Keeyask GS began in July, 2014. The study design was based upon a standardized sampling methodology developed specifically for sampling 250 – 800 mm long (corresponding to 1 – 10 year old sturgeon in Gull and Stephens lakes) Lake Sturgeon in Boreal Shield rivers (McDougall et al. 2014a). This methodology has now been used to sample juveniles from many populations in Manitoba, and, as such, data (including CPUE, growth, cohort strength) from several systems are available for comparative purposes. Moving forward, the use of this approach on an annual basis in the Keeyask Area will provide a reliable means of assessing recruitment as well as determining the success of the stocking program.

Nine key questions were outlined in the AEMP (provided in the introduction of this report) which related to juvenile Lake Sturgeon population monitoring in the Keeyask Study Area. Seven of these questions were beyond the scope of this report since the questions relate to operation of the GS (operation monitoring is scheduled to begin in 2019), or the effectiveness of the stocking program (fish were stocked into the Keeyask Study Area for the first time in 2014). Therefore, only two of the questions are being considered:

- Will recruitment of wild sturgeon occur upstream and/or downstream of the GS during construction?
- Is there a biologically meaningful (and statistically significant) change in condition factor and growth of juvenile sturgeon during construction?

Construction of the Keeyask GS began on 15 July, 2014, a full month after spawning was suspected to occur in either the Burntwood River or in this reach of the Nelson River (North/South Consultants, unpublished data). Therefore, egg deposition was not affected by construction-related activities. Although young-of-the-year (YOY) Lake Sturgeon were not captured in any of the three study areas during fall, 2014, this does not mean that recruitment did not occur in 2014. In general, YOY sturgeon are underrepresented when using the gillnetting sampling protocol described herein, likely because they are only susceptible to capture in the 1- or 2-inch mesh, and because they are generally less mobile (Benson et al. 2005; Caroffino et al. 2009; Barth 2011; McDougall et al. 2014a). Continued monitoring is needed to determine the relative strength of the 2014 cohort.

No change in growth rate and/or condition of juvenile sturgeon captured from 2008 – 2012 compared to those captured in 2014 was observed. However, given that construction of the GS began in July, it is unlikely that construction related impacts would be observable in the population after only a two month long period.

The following discussion relates to future interpretation of recruitment monitoring results in relation to the two questions above, and additional AEMP questions (listed in the introduction of the report) under consideration. Since 2006, the understanding of juvenile Lake Sturgeon ecology in the Hudson Bay Drainage has improved markedly. Juveniles are known to prefer deep water habitats (Barth et al. 2009), or, similarly, to actively avoid shallow water habitats (McDougall et al. 2014b). In an acoustic telemetry study on Stephens Lake, results suggested that juveniles rarely utilized depths < 10 m and consistently remained bottom oriented (McDougall et al. 2013b). The avoidance of shallow water habitat may be one mechanism driving the occupation of small home ranges and well described "restricted movement patterns" where juveniles remain within distinct basins separated by habitat transitions (i.e., rapids, falls) (Barth et al. 2011; McDougall et al. 2013a; Lacho et al. 2014). Juveniles are known to be generalists, feeding on both drifting and benthic invertebrates (Barth et al. 2013). Based on a synthesis of information from populations in the Hudson Bay drainage, recruitment has been described as erratic, and the relative importance of factors that drive recruitment remain largely unknown. This is a key consideration for juvenile population monitoring in relation to construction and operation of the Keeyask GS and a more thorough discussion of factors driving recruitment in the Keeyask Area is provided below.

In the Burntwood River, the 2014 juvenile sturgeon catch was composed of a variety of size (age) classes (Figure 4). These results are similar to previous juvenile sturgeon studies in this area where many cohorts are represented in the catch (Henderson et al. 2013). Densities of juveniles in the Burntwood River (1.37 Lake Sturgeon/100 m net/24 h in 2014) appear to be similar to other populations in the study area (Gull Lake 3.51; Stephens Lake 1.23; 2014 data), but lower relative to other populations in Manitoba (i.e., Winnipeg River - Slave Falls, Great Falls and Pine Falls reservoirs CPUE = 9.1 – 22.1) (McDougall et al. 2014a). This result, however, should be interpreted with caution because sampling with gill nets in the Burntwood River may be less effective relative to other water bodies given the high quantity of debris (i.e., sticks and roots) in the river, and relatively high water velocities, both of which are known to reduce gillnet efficacy. Further, the quantity of deep water thalweg habitat (although not directly quantified through habitat mapping), known to be preferred by juvenile Lake Sturgeon, is abundant in the Burntwood River between First Rapids and Split Lake, and may work to reduce density/CPUE. With annual monitoring scheduled for the next 24 years, the understanding of juvenile abundance in this river will improve.

Lake Sturgeon stocking occurred for the first time in the Burntwood River in 2014, when 595 yearlings, all marked with PIT tags, were stocked into the Burntwood River, n = 300 during spring and n = 295 during fall (Note: only the fish stocked during spring were susceptible to capture during this study because the fall stocking event occurred after sampling was completed). Of the 300 individuals stocked during spring, two were recaptured. One was recaptured in the Burntwood River 3.8 km upstream of where it was released, while the other was recaptured in Gull Lake, 97 km downstream of its release location. The capture of a stocked Burntwood River fish in Gull Lake is noteworthy, as genetics results from Gull Lake indicate that few fish of Burntwood River origin reside in Gull Lake as either adults or juveniles (Gosselin et al. 2014). Given the small number of stocked fish recaptured, it is too early to make any conclusions regarding stocking success.

In Gull and Stephens lakes, CPUE values from this and previous studies (2008 – 2012) suggest that juvenile densities are low to moderate. However, cohort-frequency data indicate that the catch in both Gull and Stephens lakes is dominated by the 2008 year class which has composed >40% of the catch in both lakes since 2010 (Henderson et al. 2011; Henderson and Pisiak 2012; Henderson et al. 2013). These data indicate that recruitment to this/these populations is erratic as only one strong year class has been observed over an 11-year period from 2002 to 2012. Erratic recruitment, however, is also found in healthy sturgeon populations, but the frequency of strong year classes is greater than what has been observed in the Keeyask Area. Data collected from the “healthy” Slave Falls reservoir, using the same standardized gillnetting method used in this study, indicates that strong year-classes occurred six times more frequently relative to those in Gull and Stephens lakes (McDougall et al. 2014a). Based on results of the 2014 study, 1-year old sturgeon (2013 cohort) in Gull Lake composed 10% of the catch. Considering that the strong 2008 cohort represented 20% of the total catch in 2009 at age-1, then it is possible that the 2013 year-class in Gull Lake could be relatively strong. Interestingly, the 2013 cohort was not captured in Stephens Lake. Additional years of data are needed to confirm the strength of the 2013 cohort and its spatial distribution.

Insight into factors influencing recruitment to depressed sturgeon population can be gained through an examination of the data collected from Gull and Stephens lakes since 2008. Similarities among the cohort frequency distributions, and the dominance of the 2008 cohort in both Gull and Stephens lakes, suggests that either the abiotic factors influencing recruitment are similar in both locations, or that recruitment in Stephens Lake is driven by spawning success farther upstream (i.e., fish from similar cohorts in Gull and Stephens lakes are full or half siblings). A high resolution SNP genetics analysis of the strong 2008 cohort indicates a high degree of interrelatedness among fish from both sides of Gull Rapids and further, that 50% of this strong year-class may have been produced by as few as 8 females (Gosselin unpublished). Although additional data analysis are required (and are being conducted), these results suggest that sturgeon recruitment in Stephens Lake is at least partially due to spawning success farther upstream and that recruitment in depressed populations may be driven by the success of only a few females.

Given the numerous juvenile Lake Sturgeon inventories that have been conducted in Manitoba since 2006, the understanding of Lake Sturgeon recruitment patterns is improving. McDougall et al. (2014a) suggested that consistent annual recruitment is likely not typical of healthy Lake Sturgeon populations, and due to inherent biological characteristics, it is unrealistic to expect consistent annual recruitment in this species. In support of this statement, both Nilo et al. (1997) and Dumont et al. (2011) reported 5 to 7 fold differences in cohort strength between years in Quebec rivers. Questions have been raised as to why the 2008 year-class was so strong in both Gull and Stephens lakes. In the scientific literature, many authors have related year-class strength to environmental variables like water temperature and flow (Kohlhorst et al. 1991; Nilo et al. 1997; Adams et al. 2006; Dumont et al. 2011). In Gull and Stephens lakes in 2008, flow was considered normal, while water temperatures increased rapidly following ice-out (Henderson et al. 2013). As genetic results indicate, recruitment in depressed populations may be dependent on the success of the few male and female fish that spawn in a given year. Therefore, it is conceivable that even under ideal environmental conditions that recruitment in depressed populations may be minimal if few fish spawn that year. This makes it difficult/impossible to draw conclusions about abiotic factors that may influence recruitment in depressed populations because a considerable proportion of the variability will likely be attributed to the numbers of spawners and not abiotic factors.

After juvenile Lake Sturgeon data were collected from Gull and Stephens lakes in 2010, and it was confirmed that the 2008 year-class was strong, it was predicted that the next strong year-class would follow in 2013 (North/South Consultants, unpublished). This prediction was based on an assumed female spawning periodicity of 5 years. Juvenile monitoring results from 2014 appear to support this prediction as 10% of the Gull Lake catch was composed of the 2013 cohort. Although this result could be attributed to chance, genetic samples from the 2013 cohort are being compared with the 2008 cohort to determine if the same females produced both the 2008 and 2013 year-classes.

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TABLES

Table 1: Start and completion dates of gillnetting surveys conducted in the Keeyask Study Area during fall, 2014.

Location	Start Date	Completion Date	# Sites[1]
Burntwood River	08-Sep-14	16-Sep-14	28
Gull Lake	08-Sep-14	16-Sep-14	30
Stephens Lake	18-Sep-14	28-Sep-14	9

1. Multiple nets were set at each site in Stephens Lake (34 net sets total)

Table 2: List of fish species captured, including common and scientific names and abbreviations, during gillnetting surveys conducted in the Keeyask Study Area during fall, 2014. An 'X' signifies species presence in the catch.

Common Name	Scientific Name	Abbreviation	Burntwood River	Gull Lake	Stephens Lake
Burbot	*Lota lota*	BURB	X	X	X
Cisco	*Coregonus artedi*	CISC			X
Emerald Shiner	*Notropis atherinoides*	EMSH			X
Flathead Chub	*Platygobio gracilis*	FLCH		X	
Lake Sturgeon	*Acipenser fulvescens*	LKST	X	X	X
Lake Whitefish	*Coregonus clupeaformis*	LKWH	X	X	X
Longnose Sucker	*Catostomus catostomus*	LNSC	X	X	X
Mooneye	*Hiodon tergisus*	MOON	X		
Northern Pike	*Esox lucius*	NRPK	X	X	
Rainbow Smelt	*Osmerus mordax*	RNSM		X	X
Sauger	*Sander canadensis*	SAUG	X	X	X
Shorthead Redhorse	*Moxostoma macrolepidotum*	SHRD	X	X	X
Slimy Sculpin	*Cottus cognatus*	SLSC		X	X
Spottail Shiner	*Notropis hudsonius*	SPSH		X	
Trout-perch	*Percopsis omiscomaycus*	TRPR	X	X	
Walleye	*Sander vitreus*	WALL	X	X	X
White Sucker	*Catostomus commersoni*	WHSC	X	X	X

Table 3: Number and frequency of occurrence (%), by species and sampling location, of fish captured in gillnets (1 – 6-inch mesh) set in the Keeyask Study Area during fall, 2014

Species	Burntwood River		Gull Lake		Stephens Lake		Total	Total
	n	%	n	%	N	%	n	%
Burbot	14	6.8	4	1.0	28	10.2	46	5.2
Cisco	0	-	0	0.0	1	0.4	1	0.1
Emerald Shiner	0	-	0	0.0	1	0.4	1	0.1
Flathead Chub	0	-	1	0.2	0	-	1	0.1
Lake Sturgeon	***42***	***20.5***	***112***	***27.5***	***47***	***17.1***	***201***	***22.7***
Lake Whitefish	17	8.3	1	0.2	2	0.7	20	2.3
Longnose Sucker	43	21.0	136	33.4	89	32.4	268	30.2
Mooneye	1	0.5	0	0.0	0	-	1	0.1
Northern Pike	3	1.5	6	1.5	0	-	9	1.0
Rainbow Smelt	0	-	1	0.2	2	0.7	3	0.3
Sauger	18	8.8	15	3.7	46	16.7	79	8.9
Shorthead Redhorse	1	0.5	11	2.7	1	0.4	13	1.5
Slimy Sculpin	0	-	1	0.2	1	0.4	2	0.2
Spottail Shiner	0	-	1	0.2	0	-	1	0.1
Trout-perch	5	2.4	17	4.2	0	-	22	2.5
Walleye	46	22.4	62	15.2	10	3.6	118	13.3
White Sucker	15	7.3	39	9.6	47	17.1	101	11.4
Total	**205**	**100.0**	**407**	**100.0**	**275**	**100.0**	**887**	**100.0**

Table 4: Lake Sturgeon catch-per-unit-effort (CPUE; #fish/100 m net/24 h) by zone, for gillnets set in the Keeyask Study Area during fall, 2014.

Location	Zone	# Sites[1]	Effort (gillnet hours)	# of Lake Sturgeon	CPUE (#Fish/100m/24h)
Burntwood River	BWR-A	8	208.94	20	2.30
	BWR-B	6	143.71	2	0.33
	BWR-C	14	354.84	20	1.35
	SPL-A	1	26.04	0	0.00
Total		28	733.53	42	1.37
Gull Lake	BR-D	3	64.83	5	1.85
	GL-A	7	166.99	18	2.59
	GL-B	11	304.53	53	4.18
	GL-C	9	228.75	36	3.77
Total		30	765.11	112	3.51
Stephens Lake	STL-A	3	348.63	32	2.20
	STL-B	6	572.01	15	0.63
Total		9	920.65	47	1.23

1. Multiple nets were set at each site in Stephens Lake (34 sets total); STL-A (n = 13); STL-B (n = 21)

Table 5: Lake Sturgeon catch-per-unit-effort (CPUE; #fish/100 m net/24 h) for gillnets set in the Keeyask Study Area between 2007 and 2014.

Location	Season	Year	Start Date	Completion Date	Mesh Size	# Sites	Effort (gillnet hours)[1]	Total # Lake Sturgeon[2]	CPUE (#LKST/100m/24h)
Burntwood River	Spring	2011	17-Jun	27-Jun	1.5" - 5"	10	322	55	4.10
	Fall	2012	29-Aug	08-Sep	1" - 6"	37	767	33	1.03
		2014	08-Sep	16-Sep	1" - 6"	28	734	42	1.37
Kelsey GS Area	Spring	2011	16-Jun	22-Jun	1.5" - 5"	3	116	1	0.21
Gull Lake (BR-GR)[3]	Fall	2007	28-Sep	03-Oct	8 mm - 5"	26	165	0	0.00
		2008	12-Sep	27-Sep	1.5" - 8"	15	3072	126	0.98
		2010	21-Sep	29-Sep	1" - 5"	27	851	69	1.95
		2011	18-Sep	24-Sep	1" - 5"	25	662	121	4.39
		2012	29-Aug	09-Sep	1" - 6"	30	745	101	3.25
		2014	08-Sep	16-Sep	1" - 6"	30	765	112	3.51
Stephens Lake	Spring	2010	29-May	07-Jun	1" - 5"	15	288	5	0.42
	Fall	2007	19-Sep	23-Sep	2" - 5"	15	48	0	0.00
		2008	11-Sep	18-Sep	3.75" - 8"	12	295	8	0.65
		2009	14-Sep	20-Sep	1.5" - 5"	18	634	23	0.87
		2010	22-Sep	29-Sep	1" - 5"	18	611	32	1.26
		2011	21-Sep	01-Oct	1" - 5"	30	974	37	0.91
		2012	11-Sep	23-Sep	1" - 6"	19	1193	87	1.75
		2014	18-Sep	28-Sep	1" - 6"	9[4]	921	47	1.23

1. Gillnet set durations were standardized to 100 m of net and then summed to calculate the total gillnet hours for each study
2. Does not include Lake Sturgeon recaptured more than once in the same study
3. (BR-GR) = Birthday Rapids to Gull Rapids which includes Gull Lake; referred to as Gull Lake in text

Table 5: Lake Sturgeon catch-per-unit-effort (CPUE; #fish/100 m net/24 h) for gillnets set in the Keeyask Study Area between 2007 and 2014.

Location	Season	Year	Start Date	Completion Date	Mesh Size	# Sites	Effort (gillnet hours)[1]	Total # Lake Sturgeon[2]	CPUE (#LKST/100m/24h)

4. Multiple nets were set at each site (34 net sets in total)

Table 6: Mean length, weight, and condition factor (K) of Lake Sturgeon captured during fisheries investigations conducted in the Keeyask Study Area during fall, 2014.

Waterbody	Fork Length (mm)				Weight (g)				K			
	n[1]	Mean	SD[2]	Range	n	Mean	SD	Range	n	Mean	SD	Range
Burntwood River	42	428	153	215-807	40	835	922	50-4100	40	0.71	0.19	0.34-1.35
Gull Lake	112	533	140	225-946	110	1286	997	50-5750	110	0.72	0.12	0.38-1.20
Stephens Lake	47	593	101	373-796	47	1757	932	350-4900	47	0.77	0.12	0.62-1.36

1. Number of fish measured
2. Standard deviation

Table 7: Length-weight regression equations for Lake Sturgeon captured during gillnetting studies conducted in the Keeyask Study Area between 2008 and 2014.

Location	n[1]	Regression Equation	$(R^2)^3$
Burntwood River[2]	123	$W = -13.0(L)^{3.2}$	0.96
Gull Lake	453	$W = -12.7(L)^{3.1}$	0.98
Stephens Lake	215	$W = -12.3(L)^{3.1}$	0.96

1. Number of fish measured
2. Juvenile Lake Sturgeon gillnetting was not conducted in the Burntwood River until 2011.
3. R^2 = coefficient of determination; measures the proportion of variability in fish weight explained by fork length; a value closer to 1 indicates a stronger relationship between weight and fork length

Table 8: Original capture date and biological data for fish recaptured in gill nets set in the Keeyask Study Area during fall, 2014.

Location	Floy-tag #	PIT-tag #	Zone	Date	Fork Length (mm)	Total Length (mm)	Weight (g)	Age	Distance (km)	Days Between Capture
Burntwood River	101455	900 226000628066	BWR-A	12-Sep-14	403	460	400	-	0.8	740
			BWR-A	02-Sep-12	264	304	100	1		
			Growth		**139**	**156**	**300**			
	-	982 000362432311	BWR-A	12-Sep-14	309	354	100	-	3.8	104
			BWR-A	31-May-14	255	295	103	1		
			Growth		**54**	**59**	**-3**			
Gull Lake	75285	900 226000629285	GL-B	13-Sep-14	946	1050	-	-	4.2	2267
			GL-C	29-Jun-08	722	823	2722	-		
			Growth		**224**	**227**	**-**			
	75876	900 226000629435	GL-C	14-Sep-14	588	658	1400	NR[1]	3.0	1086
			GL-C	24-Sep-11	429	484	550	3		
			Growth		**159**	**174**	**850**			
	75877/90262	900 226000629252	GL-B	14-Sep-14	581	651	1225	-	2.3	1086
			GL-C	24-Sep-11	429	480	475	3		
			Growth		**152**	**171**	**750**			
	94009	900 226000629334	GL-B	11-Sep-14	783	875	3350	11	0.9	1549
	-	-	GL-B	15-Jun-10	590	660	1500	-	-	-
			Growth		**193**	**215**	**1850**			
	94857	900 226000629338	GL-C	15-Sep-14	582	665	1500	-	0.3	1089
			GL-C	22-Sep-11	400	461	475	3		
			Growth		**182**	**204**	**1025**			
	94862	900 226000629387	GL-B	12-Sep-14	515	595	925	-	5.3	1086
			GL-C	22-Sep-11	412	474	475	3		
			Growth		**103**	**121**	**450**			
	94893	900 226000629374	GL-C	13-Sept-14	600	673	1600	-	0.8	1086
			GL-C	23-Sep-11	405	461	475	3		
			Growth		**195**	**212**	**1125**			

Table 8: Original capture date and biological data for fish recaptured in gill nets set in the Keeyask Study Area during fall, 2014.

Location	Floy-tag #	PIT-tag #	Zone	Date	Fork Length (mm)	Total Length (mm)	Weight (g)	Age	Distance (km)	Days Between Capture
	100103	900 226000629378	GL-C	14-Sep-14	676	798	2050	-	0.1	745
			GL-C	30-Aug-12	560	645	1150	5		
			Growth		**116**	**153**	**900**			
	100127	900 226000629446	GL-B	11-Sep-14	526	605	950	-	0.5	736
			GL-B	05-Sep-12	470	538	750	4		
			Growth		**56**	**67**	**200**			
	100145	900 226000629409	GL-A	16-Sep-14	615	690	1625	-	1.7	737
			GL-A	09-Sep-12	495	516	750	4		
			Growth		**120**	**174**	**875**			
	100410	900 226000629483	GL-C	14-Sep-14	795	917	4250	-	1.0	833
			GL-C	03-Jun-12	712	804	2800	-		
			Growth		**83**	**113**	**1450**			
	103120	900 226000629262	GL-C	14-Sep-14	508	590	925	6	2.2	382
			GL-C	28-Aug-13	475	553	725	-		
			Growth		**33**	**37**	**200**			
	105103	900 043000103825	GL-B	11-Sep-14	633	707	1700	8	0.1	70
			GL-B	03-Jul-14	631	690	1850	-		
			Growth		**2**	**17**	**-150**			
	105121	900 226000629122	GL-B	12-Sep-14	552	630	1075	-	1.2	70
			GL-B	04-Jul-14	507	564	850	-		
			Growth		**45**	**66**	**225**			
	105478	900 043000103845	GL-A	16-Sep-14	649	739	2400	8	7.0	90
			GL-C	18-Jun-14	625	708	2100	-		
			Growth		**24**	**31**	**300**			
	-	900 043000103826	GL-B	12-Sep-14	591	685	1425	6	0.1	72
			GL-B	02-Jul-14	560	650	1400	-		
			Growth		**31**	**35**	**25**			

Table 8: Original capture date and biological data for fish recaptured in gill nets set in the Keeyask Study Area during fall, 2014.

Location	Floy-tag #	PIT-tag #	Zone	Date	Fork Length (mm)	Total Length (mm)	Weight (g)	Age	Distance (km)	Days Between Capture
	-	982 000362432272	GL-B	12-Sep-14	272	313	150	-	97.0	104
			BRW-C	31-May-14	204	234	46	1		
			Growth		**68**	**79**	**104**			
Stephens Lake	88767	900 226000629444	STL-A	26-Sep-14	623	701	1650	7	0.1	743
	-	-	STL-A	13-Sep-12	501	564	575	-	2.8	718
	-	-	STL-B	26-Sep-10	364	403	310	3		
			Growth		**122**	**137**	**1075**			
	94227	900 226000629298	STL-B	22-Sep-14	500	644	1700	6	0.5	1456
	-	-	STL-B	27-Sep-10	342	387	290	2		
			Growth		**158**	**257**	**1410**			
	94237	900 226000629344	STL-B	22-Sep-14	682	762	2750	8	1.3	1456
	-	-	STL-B	27-Sep-10	411	476	460	4		
			Growth		**271**	**286**	**2290**			
	100141	900 226000629296	STL-B	24-Sep-14	628	706	2000	6	0.5	732
	-	-	STL-B	22-Sep-12	494	571	925	4		
			Growth		**134**	**135**	**1075**			
	100159	900 226000629376	STL-A	21-Sep-14	621	696	1525	6	3.0	728
	-	-	STL-B	23-Sep-12	492	556	875	-		
			Growth		**129**	**140**	**650**			
	103246 [2]	900 226000629470	STL-A	19-Sep-14	618	684	1975	5	0.2	363
	-	-	STL-A	21-Sep-13	558	634	1350	-	-	-
			Growth		**60**	**50**	**625**			
	103602	900 226000629290	STL-A	19-Sep-14	648	712	1900	6	0.2	736
	-	-	STL-A	13-Sep-12	505	585	750	4		
			Growth		**143**	**127**	**1150**			
	103610	900 226000629253	STL-A	27-Sep-14	626	704	1825	6	3.0	742
	-	-	STL-B	15-Sep-12	514	580	650	4		

Table 8: Original capture date and biological data for fish recaptured in gill nets set in the Keeyask Study Area during fall, 2014.

Location	Floy-tag #	PIT-tag #	Zone	Date	Fork Length (mm)	Total Length (mm)	Weight (g)	Age	Distance (km)	Days Between Capture
			Growth		**112**	**124**	**1175**			

1. NR = Not readable. The same (left) fin ray was collected during original capture in 2011 and again in 2014, and was therefore not readable (i.e., crystalline)
2. Acoustically tagged in 2013 (Tag #32669). See Hrenchuk et al. 2013.

Table 9: Mean length-at-age and condition-at-age by cohort for juvenile Lake Sturgeon captured in Gull Lake during baseline studies (2008 – 2012) and during the 2014 study (construction). A t-test was run to compare length-at-age and condition-at-age by cohort where samples sizes were > 8.

Age	Sampling Period[1]	Fork Length (mm)						Condition Factor (K)					
		n	Min	Max	Mean	SD	p-Value[2]	n	Min	Max	Mean	SD	p-Value
0	Baseline	14	128	168	155.5	12.829		2	0.54	0.63	0.5849	0.07	
	Construction	0	-	-	-	-		-	-	-	-	-	
1	Baseline	8	244	275	258	11.526	0.10	7	0.45	0.76	0.6437	0.11	
	Construction	10	225	282	246	15.818		10	0.38	1.2	0.7286	0.24	
2	Baseline	32	292	420	345.5	33.081		24	0.48	1.03	0.6745	0.12	
	Construction	3	292	343	315.33	25.775		3	0.7	0.75	0.7314	0.02	
3	Baseline	102	301	525	401.03	33.104		102	0.42	0.97	0.6764	0.09	
	Construction	7	399	450	422.86	18.47		7	0.53	0.75	0.6673	0.07	
4	Baseline	68	344	541	453.1	35.288		68	0.46	1.16	0.6471	0.1	
	Construction	4	433	485	460.25	21.469		4	0.66	0.74	0.6985	0.04	
5	Baseline	14	455	597	534.64	43.268		14	0.55	0.8	0.6784	0.07	
	Construction	3	470	547	503	39.661		3	0.64	1.13	0.92	0.25	
6	Baseline	17	466	645	570.47	41.423	0.39	17	0.57	0.78	0.6993	0.05	0.94
	Construction	58	448	722	558.57	52.256		58	0.58	0.86	0.7006	0.07	
7	Baseline	10	572	681	634	29.624		10	0.66	0.83	0.7408	0.06	
	Construction	2	504	590	547	60.811		2	0.66	0.9	0.7824	0.17	
8	Baseline	7	609	738	653.57	42.696		7	0.66	0.99	0.7673	0.11	
	Construction	6	633	679	655.5	15.043		6	0.67	1.16	0.8521	0.17	
9	Baseline	2	610	730	670	84.853		2	0.62	0.81	0.7133	0.14	
	Construction	1	703	703	703	-		1	0.76	0.76	0.7627	-	
10	Baseline	1	780	780	780	-		-	-	-	-	-	
	Construction	0	-	-	-	-		-	-	-	-	-	
11	Baseline	0	-	-	-	-		-	-	-	-	-	
	Construction	1	783	783	783	-		1	0.7	0.7	0.6978	-	
12	Baseline	2	760	770	765	7.0711		2	0.71	0.8	0.7546	0.06	
	Construction	0	-	-	-	-		-	-	-	-	-	
13	Baseline	0	-	-	-	-		-	-	-	-	-	

Table 9: Mean length-at-age and condition-at-age by cohort for juvenile Lake Sturgeon captured in Gull Lake during baseline studies (2008 – 2012) and during the 2014 study (construction). A t-test was run to compare length-at-age and condition-at-age by cohort where samples sizes were > 8.

Age	Sampling Period[1]	Fork Length (mm)						Condition Factor (K)					
		n	Min	Max	Mean	SD	p-Value[2]	n	Min	Max	Mean	SD	p-Value
	Construction	1	743	743	743	-		1	0.11	0.11	0.1097	-	

1. Baseline sampling is all sampling conducted prior to construction (2008-2012); construction sampling is all data collected during the construction phase
2. Based on a minimum sample size of 8.

Table 10: Mean length-at-age and condition-at-age by cohort for juvenile Lake Sturgeon captured in Stephens Lake during baseline studies (2008 – 2012) and during the 2014 study (construction). Statistical comparisons were not performed because sample sizes were not > 8 for any cohort.

Age	Sampling Period[1]	Fork Length (mm)						Condition Factor (K)					
		n	Min	Max	Mean	SD	p-Value[2]	n	Min	Max	Mean	SD	p-Value
0	Baseline	1	168	168	168	-		-	-	-	-	-	
	Construction	-	-	-	-	-		-	-	-	-	-	
1	Baseline	4	221	251	238.25	14.728		1	0.47	0.47	0.474	-	
	Construction	-	-	-	-	-		-	-	-	-	-	
2	Baseline	18	331	433	351.556	23.769		18	0.4	0.8	0.684	0.1	
	Construction	-	-	-	-	-		-	-	-	-	-	
3	Baseline	37	307	492	408.676	44.291		37	0.44	1.03	0.775	0.1	
	Construction	5	374	453	423	30.725		5	0.65	0.79	0.707	0.1	
4	Baseline	59	385	602	489	39.046		57	0.41	0.99	0.726	0.1	
	Construction	4	373	485	441	47.805		4	0.67	0.88	0.74	0.1	
5	Baseline	6	490	648	566.5	50.671		5	0.74	0.85	0.778	0	
	Construction	1	618	618	618	-		1	0.84	0.84	0.837	-	
6	Baseline	7	540	640	593.286	40.974		7	0.7	0.94	0.802	0.1	
	Construction	25	500	671	603.88	40.23		25	0.62	1.36	0.769	0.1	
7	Baseline	5	570	676	641.6	41.44		4	0.71	0.93	0.818	0.1	
	Construction	4	544	654	604.75	46.529		4	0.68	0.88	0.733	0.1	
8	Baseline	3	679	711	700	18.193		2	0.73	0.73	0.731	0	
	Construction	5	669	775	724.4	42.459		5	0.71	0.81	0.769	0	
9	Baseline	1	770	770	770	-		-	-	-	-	-	
	Construction	-	-	-	-	-		-	-	-	-	-	
10	Baseline	-	-	-	-	-		-	-	-	-	-	
	Construction	1	754	754	754	-		1	0.95	0.95	0.951	-	
11	Baseline	-	-	-	-	-		-	-	-	-	-	
	Construction	1	796	796	796	-		1	0.97	0.97	0.972	-	

Table 10: Mean length-at-age and condition-at-age by cohort for juvenile Lake Sturgeon captured in Stephens Lake during baseline studies (2008 – 2012) and during the 2014 study (construction). Statistical comparisons were not performed because sample sizes were not > 8 for any cohort.

Age	Sampling Period[1]	Fork Length (mm)						Condition Factor (K)					
		n	Min	Max	Mean	SD	p-Value[2]	n	Min	Max	Mean	SD	p-Value

1. Baseline sampling is all sampling conducted prior to construction (2008-2012); construction sampling is all data collected during the construction phase
2. Based on a minimum sample size of 8.

FIGURES

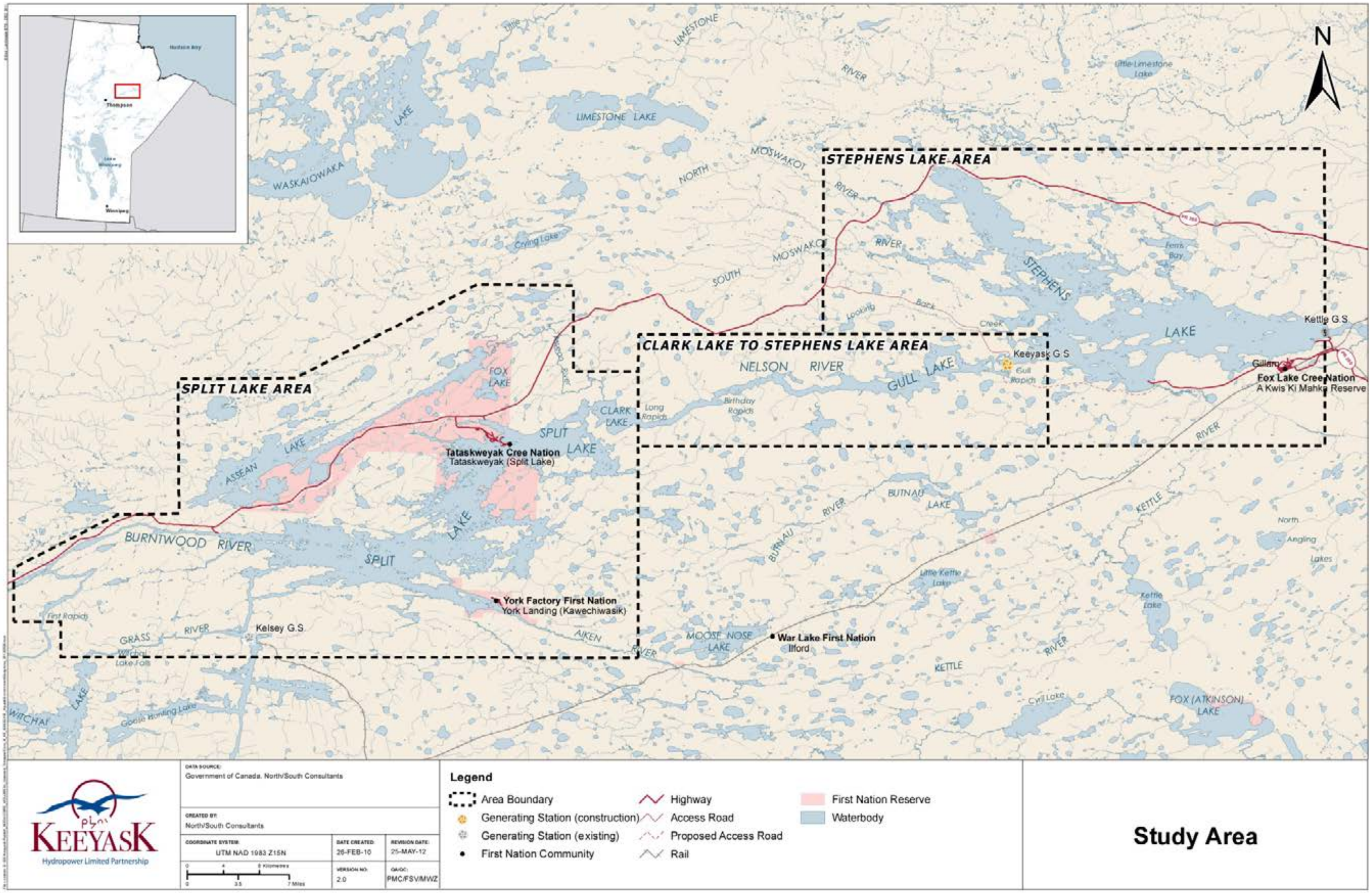

Figure 1: Map of the Keeyask Study Area showing hydroelectric development.

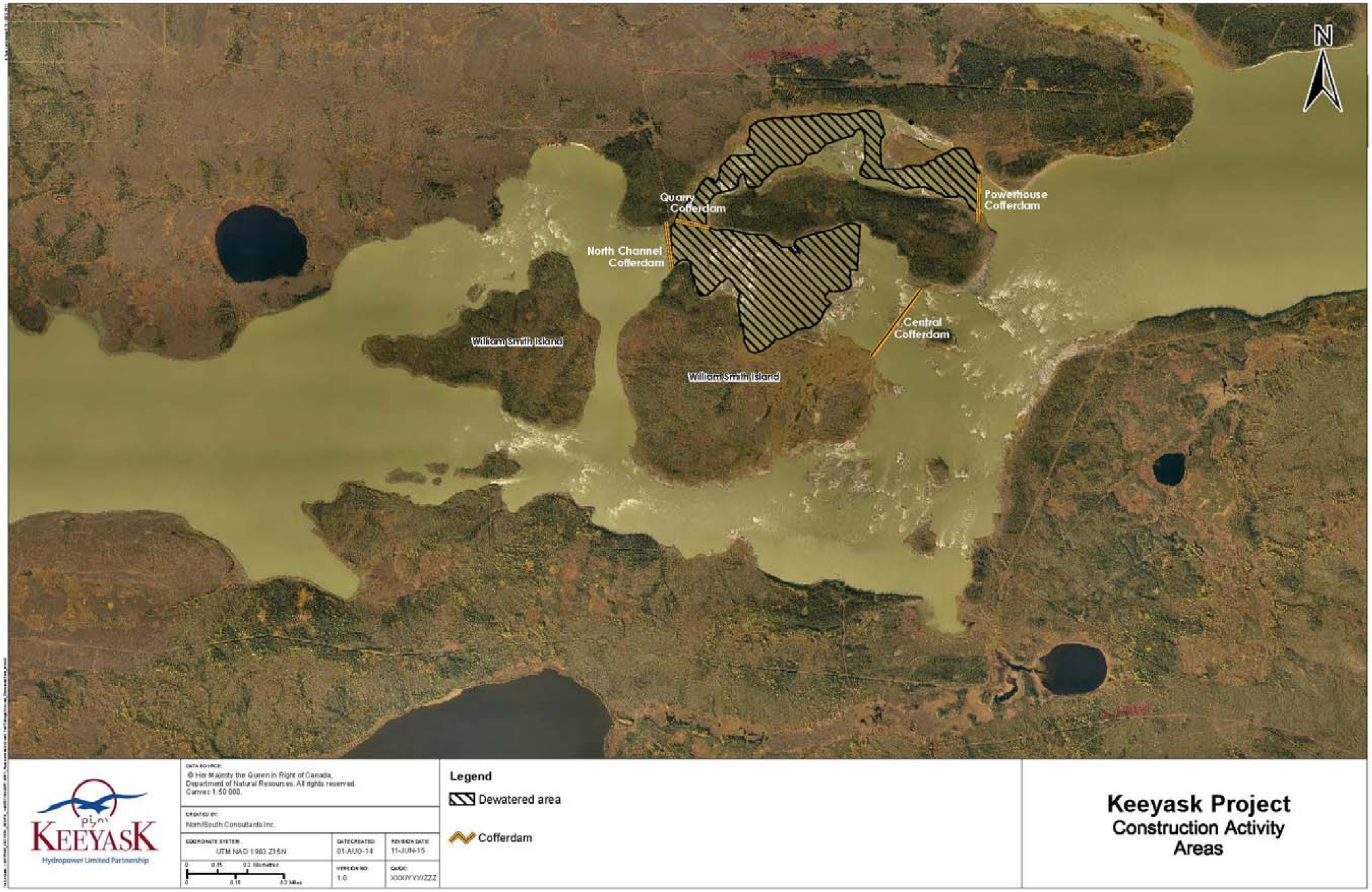

Figure 2: Locations of construction activities within the north and central channels of Gull Lake, July to October, 2014.

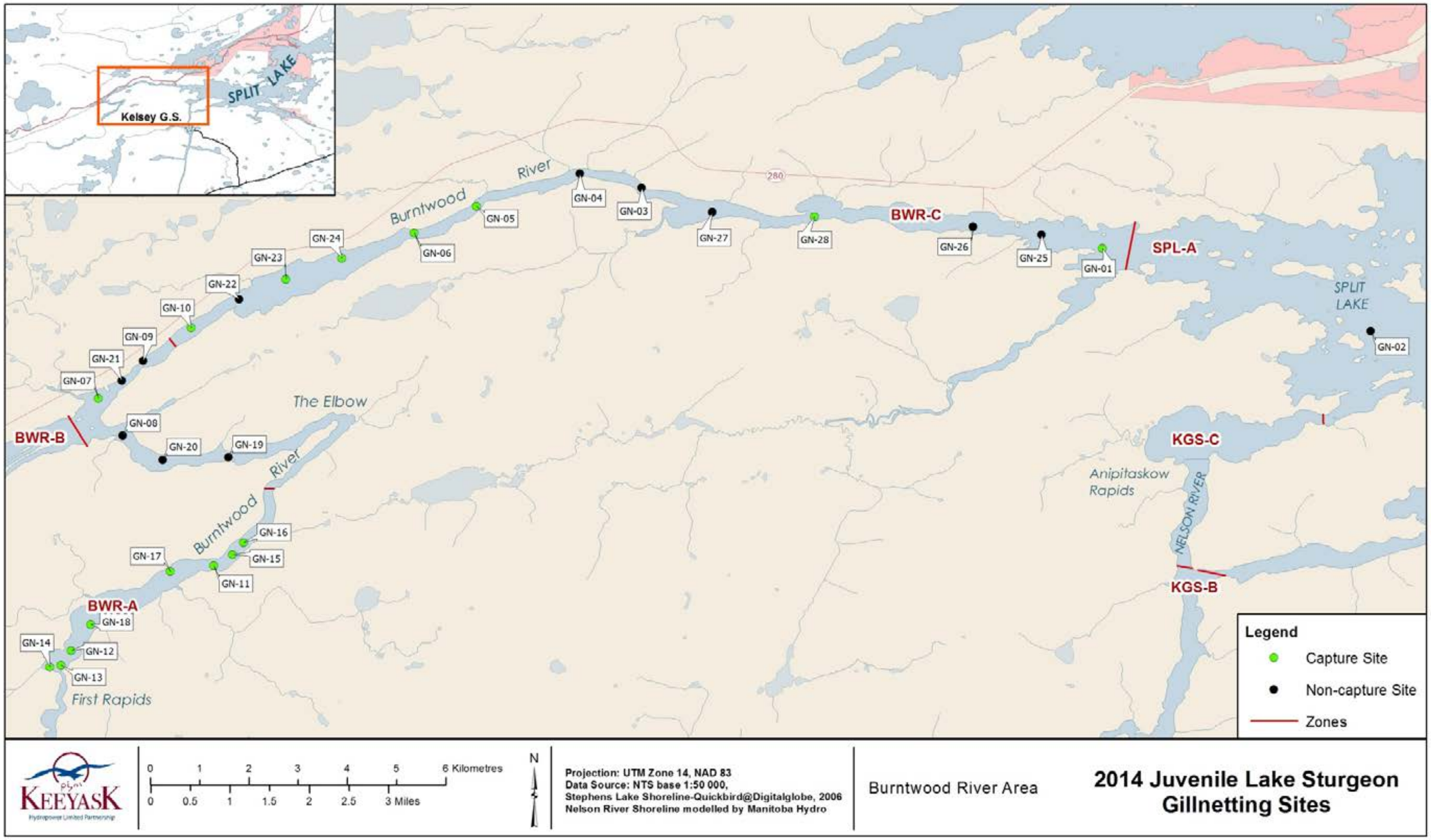

Figure 3: Location of sites fished with gillnets in the Burntwood River during fall, 2014.

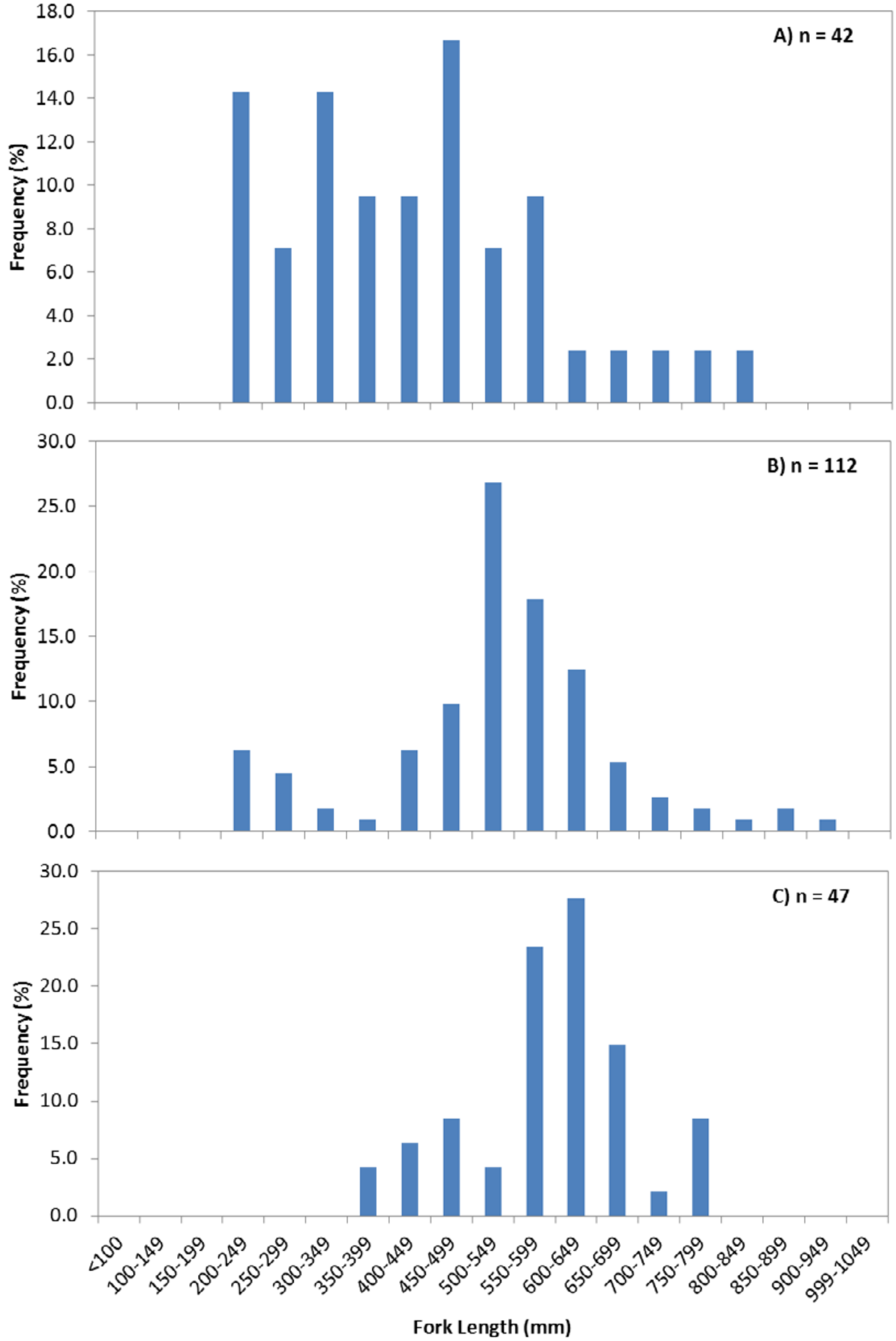

Figure 4: Length-frequency distributions for Lake Sturgeon captured in gillnets set in: A) the Burntwood River, B) Gull Lake, and C) Stephens Lake during fall, 2014.

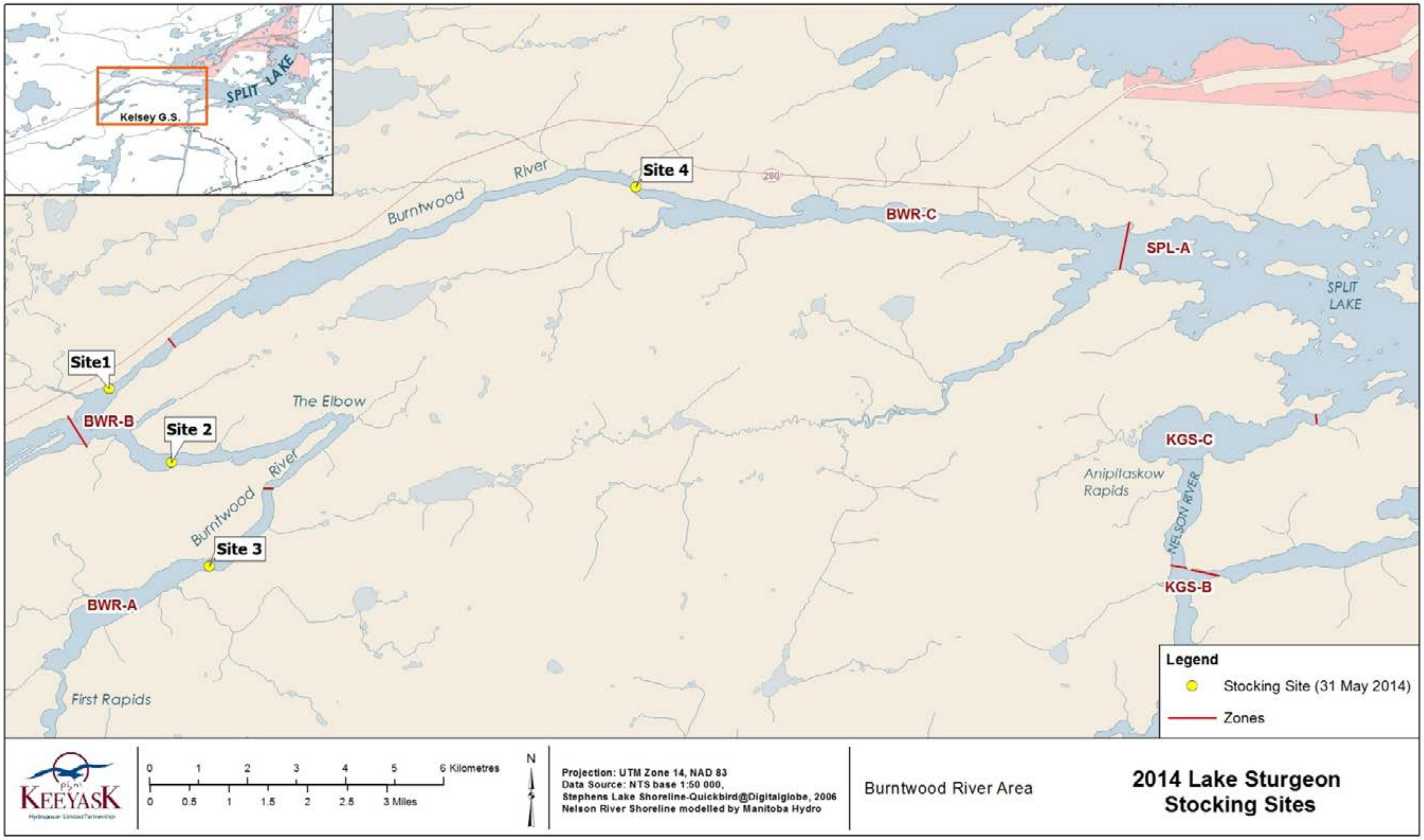

Figure 5: Locations where Burntwood River yearling sturgeon from the Grand Rapids Hatchery were stocked in spring, 2014.

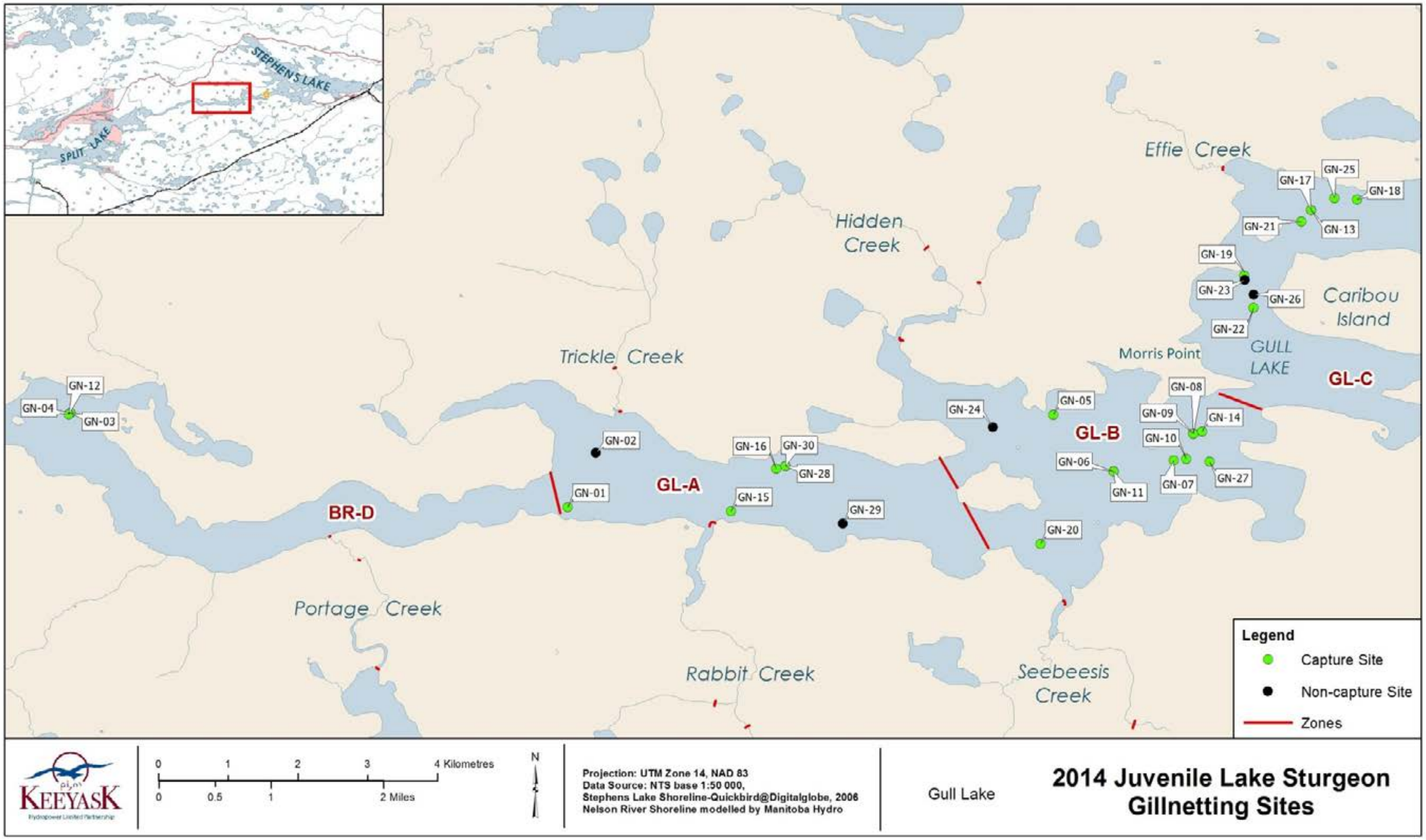

Figure 6: Location of sites fished with gillnets in Gull Lake during fall, 2014.

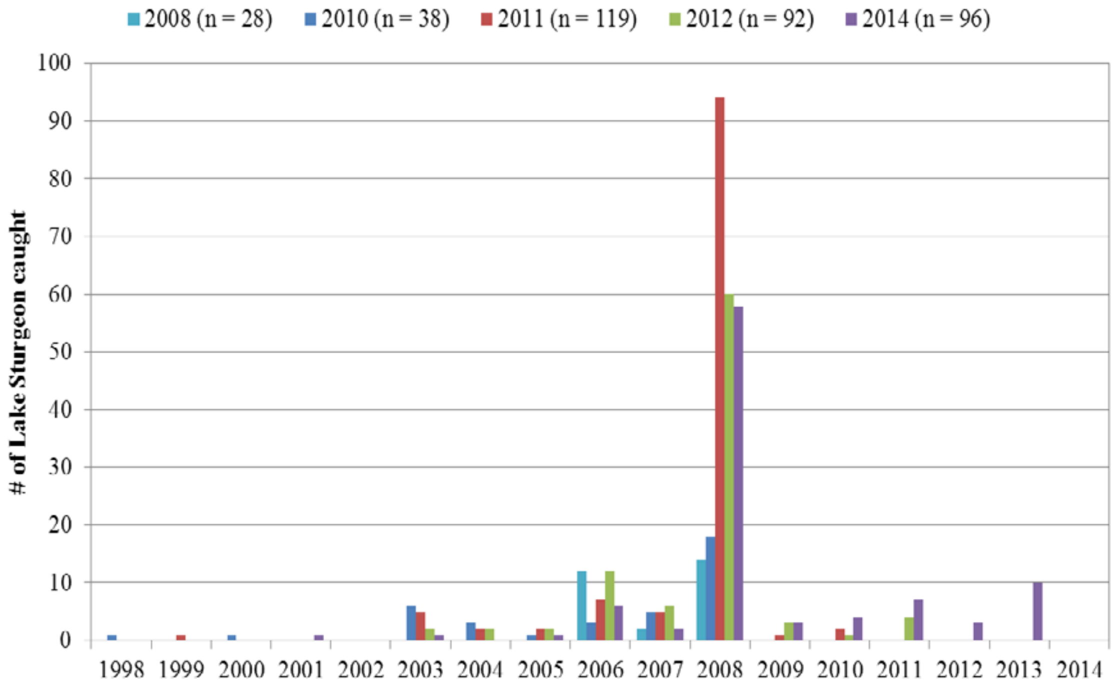

Figure 7: **Cohort frequency distributions for all aged Lake Sturgeon captured in Gull Lake since 2008.**

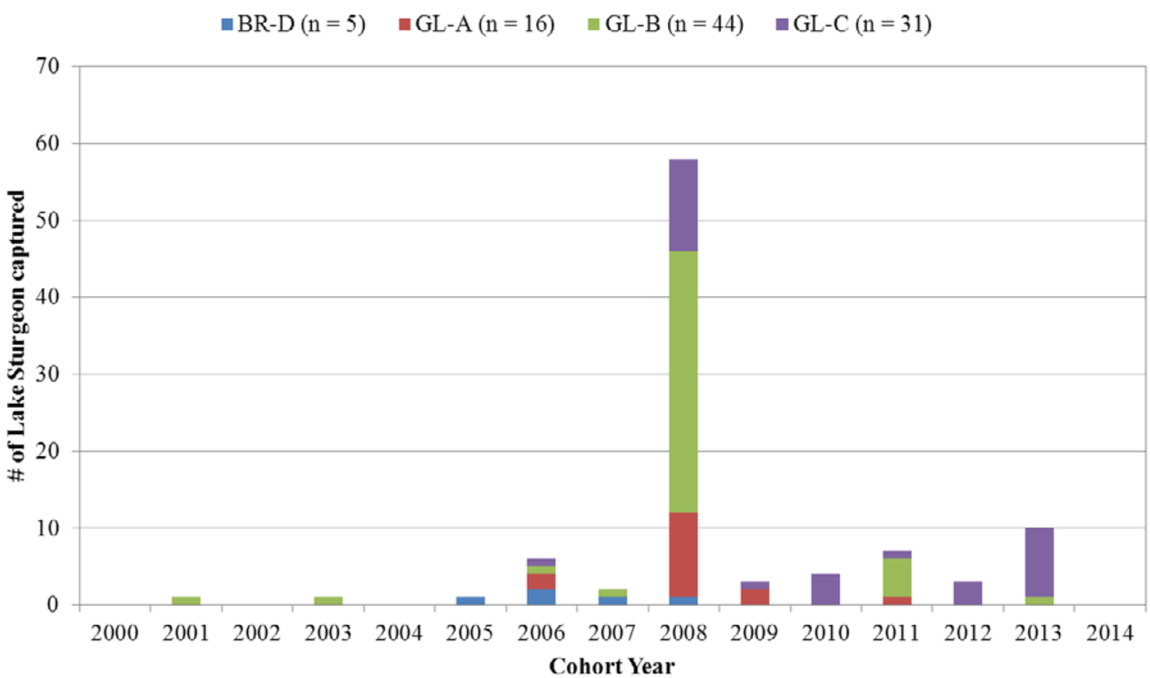

Figure 8: **Cohort frequency distributions by zone, for all aged Lake Sturgeon captured in Gull Lake during fall, 2014.**

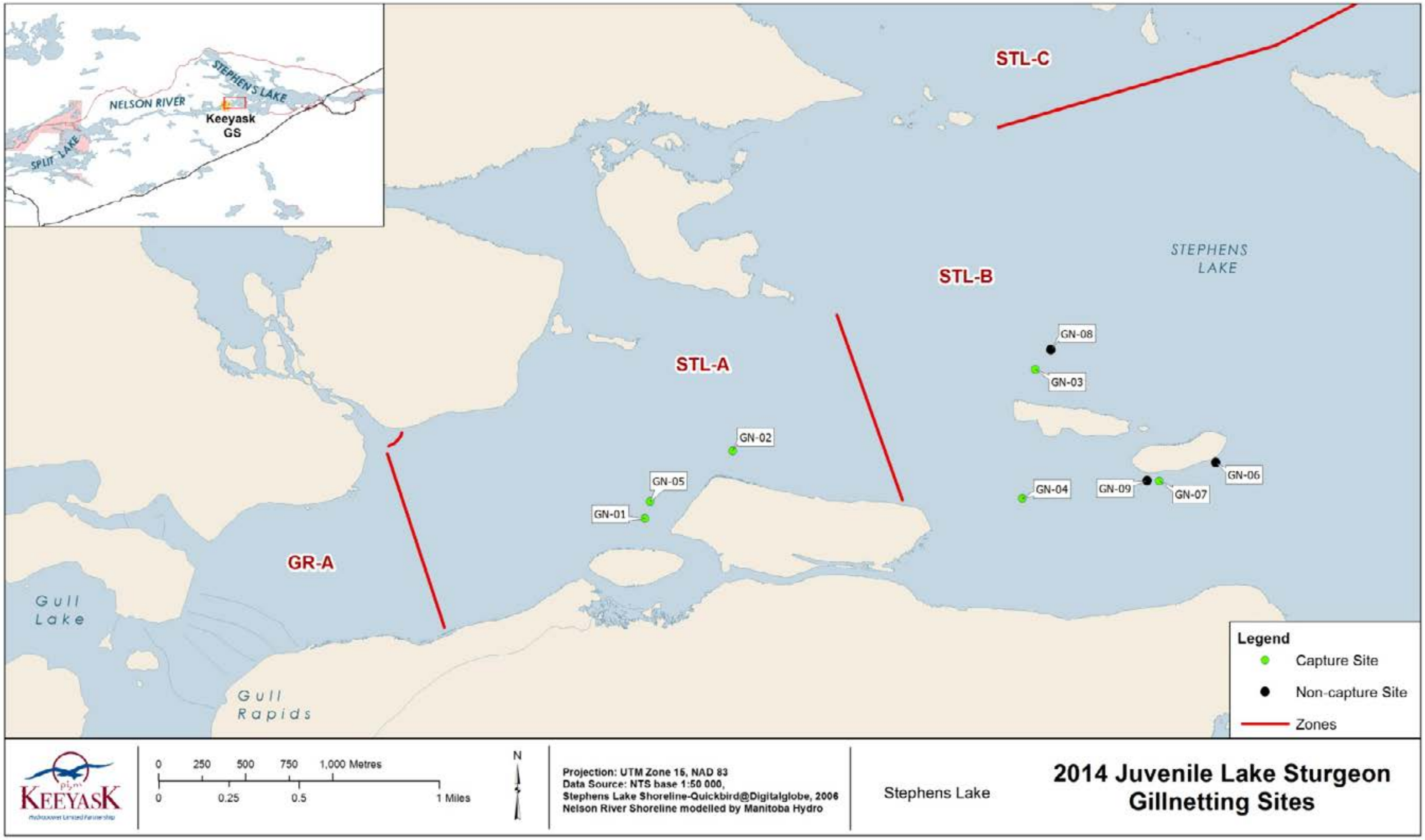

Figure 9: Location of sites fished with gillnets in Stephens Lake during fall, 2014.

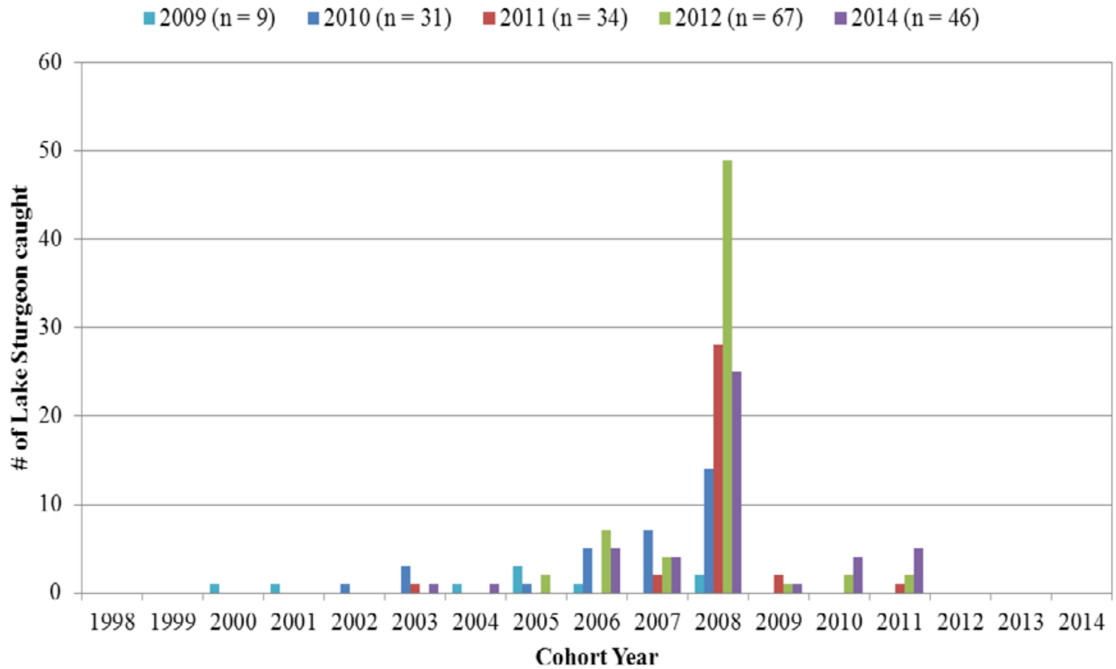

Figure 10: **Cohort frequency distributions for all aged Lake Sturgeon captured in Stephens Lake since 2009.**

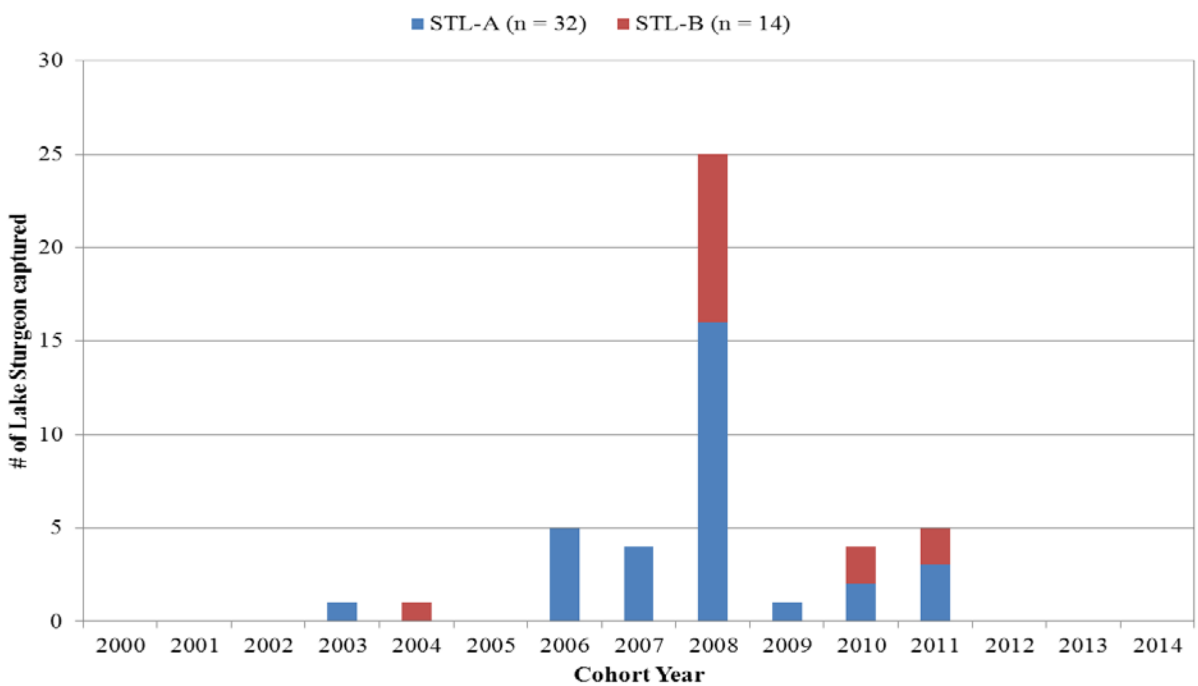

Figure 11: **Cohort frequency distributions by zone, for all aged Lake Sturgeon captured in Stephens Lake during fall, 2014.**

PHOTOS

Photo 1: **PIT tag is applied under the third dorsal scute using an injector needle dipped in Polysporin®.**

Photo 2: **PIT tag is injected into the muscle tissue, parallel to the horizontal axis of the fish.**

Photo 3: **Injection site following tag application**

APPENDIX 1: LOCATION AND SITE SPECIFIC PHYSICAL MEASUREMENTS COLLECTED AT GILLNETTING SITES SET IN THE KEEYASK STUDY AREA

Table A1- 1: Location and site-specific physical measurements collected at gillnetting sites during juvenile Lake Sturgeon investigations conducted in the Burntwood River during fall, 2014.

Site	UTM Location Easting	Northing	Set Date	Set Time	Set Water Temp (°C)	Pull Date	Pull Time	Pull Water Temp (°C)	Duration (dec.hrs)	Water Depth (m) Start	End
GN-01	650834	6224097	08-Sep-14	14:52	12.0	09-Sep-14	13:15	12.0	22.38	10.0	10.0
GN-02	656413	6222894	08-Sep-14	15:45	12.0	09-Sep-14	14:32	12.0	22.78	5.0	5.0
GN-03	641395	6224523	09-Sep-14	10:23	12.0	10-Sep-14	9:22	11.0	22.98	16.0	18.0
GN-04	640125	6224698	09-Sep-14	10:57	12.0	10-Sep-14	10:14	11.0	23.28	13.0	14.0
GN-05	638090	6223849	09-Sep-14	11:30	12.0	10-Sep-14	10:50	11.0	23.33	10.0	14.0
GN-06	636874	6223199	09-Sep-14	12:27	12.0	10-Sep-14	12:07	11.0	23.67	12.0	15.0
GN-07	630778	6219283	10-Sep-14	13:15	11.0	11-Sep-14	10:08	11.0	20.88	13.0	14.0
GN-08	631331	6218564	10-Sep-14	13:35	11.0	11-Sep-14	10:40	11.0	21.08	13.0	17.0
GN-09	631618	6220124	10-Sep-14	13:52	11.0	11-Sep-14	9:34	11.0	19.70	13.0	12.0
GN-10	632529	6220887	10-Sep-14	14:02	11.0	11-Sep-14	9:06	11.0	19.07	13.0	15.0
GN-11	633407	6216083	11-Sep-14	13:40	12.0	12-Sep-14	11:24	11.0	21.73	15.0	15.0
GN-12	630673	6214111	11-Sep-14	14:05	12.0	12-Sep-14	12:03	11.0	21.97	10.0	10.0
GN-13	630489	6213788	11-Sep-14	14:28	12.0	12-Sep-14	13:56	11.0	23.47	10.0	11.0
GN-14	630268	6213734	11-Sep-14	14:58	12.0	12-Sep-14	14:47	11.0	23.82	17.0	6.0
GN-15	633769	6216347	12-Sep-14	10:59	11.0	13-Sep-14	9:44	11.0	22.75	15.0	12.0
GN-16	633972	6216604	12-Sep-14	11:15	11.0	13-Sep-14	9:26	11.0	22.18	16.0	13.0
GN-17	632541	6215893	13-Sep-14	11:32	11.0	14-Sep-14	11:11	10.5	23.65	11.0	11.0
GN-18	631023	6214669	13-Sep-14	11:07	11.0	14-Sep-14	10:21	10.5	23.23	13.0	10.0
GN-19	633510	6218315	13-Sep-14	14:14	11.0	14-Sep-14	11:47	10.5	21.55	14.0	12.0
GN-20	632185	6218146	13-Sep-14	14:45	11.0	14-Sep-14	12:06	10.5	21.35	11.0	11.0
GN-21	631216	6219681	14-Sep-14	13:18	11.0	15-Sep-14	10:28	10.5	21.17	14.0	14.0
GN-22	633449	6221544	14-Sep-14	13:30	11.0	15-Sep-14	11:10	10.5	21.67	15.0	12.0
GN-23	634361	6222034	14-Sep-14	13:38	11.0	15-Sep-14	11:44	10.5	22.10	13.0	13.0
GN-24	635454	6222564	14-Sep-14	14:30	11.0	15-Sep-14	12:35	10.5	22.08	12.0	10.0
GN-25	649573	6224273	15-Sep-14	9:27	10.0	16-Sep-14	10:30	10.0	25.05	12.0	12.0
GN-26	648176	6224313	15-Sep-14	9:57	10.0	16-Sep-14	10:03	10.0	24.10	12.0	13.0

Table A1- 1: Location and site-specific physical measurements collected at gillnetting sites during juvenile Lake Sturgeon investigations conducted in the Burntwood River during fall, 2014.

	UTM Location				Set			Pull		Water Depth (m)	
Site	Easting	Northing	Set Date	Set Time	Water Temp (°C)	Pull Date	Pull Time	Water Temp (°C)	Duration (dec.hrs)	Start	End
GN-27	642872	6224151	15-Sep-14	13:59	10.0	16-Sep-14	8:52	10.0	18.88	13.0	12.0
GN-28	644943	6224242	15-Sep-14	14:14	10.0	16-Sep-14	9:18	10.0	19.07	12.0	13.0

Table A1- 2: Location and site-specific physical measurements collected at gillnetting sites during juvenile Lake Sturgeon investigations conducted in Gull Lake during fall, 2014.

Site	UTM Location		Set Date	Set Time	Set Water Temp (°C)	Pull Date	Pull Time	Pull Water Temp (°C)	Duration (dec.hrs)	Water Depth (m)	
	Easting	Northing								Start	End
GN-01	345466	6243777	08-Sep-14	16:17	15.5	09-Sep-14	10:06	15.0	17.82	10.0	10.0
GN-02	345873	6244557	08-Sep-14	16:30	15.5	09-Sep-14	10:50	15.0	18.33	9.0	9.2
GN-03	338336	6245126	08-Sep-14	17:02	15.5	09-Sep-14	9:30	15.0	16.47	12.0	12.0
GN-04	338336	6245126	09-Sep-14	9:40	15.0	10-Sep-14	9:20	14.0	23.67	12.0	12.0
GN-05	352435	6245103	10-Sep-14	11:11	14.0	11-Sep-14	14:50	13.5	27.65	9.2	7.2
GN-06	353296	6244291	10-Sep-14	11:21	14.0	11-Sep-14	13:00	13.5	25.65	12.0	10.0
GN-07	354160	6244449	10-Sep-14	11:32	14.0	11-Sep-14	11:40	13.5	24.13	16.0	16.0
GN-08	354440	6244826	10-Sep-14	11:47	14.0	11-Sep-14	10:00	13.5	22.22	13.0	15.0
GN-09	354440	6244826	11-Sep-14	11:24	13.5	12-Sep-14	16:05	13.5	28.68	13.0	15.0
GN-10	354339	6244467	11-Sep-14	12:40	13.5	12-Sep-14	14:01	13.5	25.35	13.0	13.0
GN-11	353296	6244291	11-Sep-14	14:36	13.5	12-Sep-14	12:40	13.5	22.07	12.0	10.0
GN-12	338314	6245109	11-Sep-14	16:55	13.5	12-Sep-14	9:30	13.5	16.58	11.0	8.5
GN-13	356128	6248041	12-Sep-14	15:24	13.5	13-Sep-14	13:41	13.0	22.28	12.0	14.0
GN-14	354564	6244861	12-Sep-14	15:35	13.5	13-Sep-14	15:15	13.0	23.67	18.0	22.0
GN-15	347811	6243717	12-Sep-14	16:40	13.5	13-Sep-14	16:43	13.0	24.05	15.0	14.0
GN-16	348456	6244327	12-Sep-14	17:10	13.5	13-Sep-14	17:05	13.0	23.92	14.0	15.0
GN-17	356128	6248041	13-Sep-14	13:52	13.0	14-Sep-14	10:46	12.5	20.90	12.0	14.0
GN-18	356785	6248196	13-Sep-14	14:43	13.0	14-Sep-14	10:00	12.5	19.28	15.0	13.0
GN-19	355168	6247105	13-Sep-14	15:00	13.0	14-Sep-14	11:40	12.5	20.67	10.0	13.0
GN-20	352250	6243247	13-Sep-14	16:32	13.0	14-Sep-14	12:55	12.5	20.38	7.5	9.9
GN-21	355987	6247878	14-Sep-14	11:27	12.5	15-Sep-14	10:29	12.0	23.03	11.0	12.0
GN-22	355300	6246636	14-Sep-14	11:35	12.5	15-Sep-14	11:24	12.0	23.82	12.0	11.0
GN-23	355183	6247036	14-Sep-14	12:43	12.5	15-Sep-14	12:40	12.0	23.95	13.0	10.0
GN-24	351571	6244921	14-Sep-14	14:18	12.5	15-Sep-14	14:18	12.0	24.00	10.0	9.8
GN-25	356463	6248214	15-Sep-14	11:14	12.0	16-Sep-14	10:44	11.5	23.50	11.0	14.0
GN-26	355309	6246831	15-Sep-14	12:35	12.0	16-Sep-14	11:17	11.5	22.70	9.0	12.0

Table A1- 2: Location and site-specific physical measurements collected at gillnetting sites during juvenile Lake Sturgeon investigations conducted in Gull Lake during fall, 2014.

Site	UTM Location Easting	UTM Location Northing	Set Date	Set Time	Set Water Temp (°C)	Pull Date	Pull Time	Pull Water Temp (°C)	Duration (dec.hrs)	Water Depth (m) Start	Water Depth (m) End
GN-27	354671	6244426	15-Sep-14	13:42	12.0	16-Sep-14	12:20	11.5	22.63	11.0	13.0
GN-28	348589	6244363	15-Sep-14	15:29	12.0	16-Sep-14	14:27	11.5	22.97	14.0	15.0
GN-29	349415	6243542	16-Sep-14	13:18	11.5	17-Sep-14	9:48	11.5	20.50	10.0	10.0
GN-30	348589	6244363	16-Sep-14	15:30	11.5	17-Sep-14	10:01	11.5	18.52	14.0	15.0

Table A1- 3: Location and site-specific physical measurements collected at gillnetting sites during juvenile Lake Sturgeon investigations conducted in Stephens Lake during fall, 2014.

	UTM Location				Set			Pull		Water Depth (m)	
			Set	Set	Water	Pull	Pull	Water	Duration		
Site[1]	Easting	Northing	Date	Time	Temp (°C)	Date	Time	Temp (°C)	(dec.hrs)	Start	End
GN-01	366548	6247262	18-Sep-14	12:10	10.0	19-Sep-14	11:00	10.0	22.83	15.4	18.0
	366548	6247262	19-Sep-14	11:00	10.0	20-Sep-14	10:01	10.0	23.02	15.4	18.0
GN-02	367052	6247651	18-Sep-14	12:15	10.0	19-Sep-14	11:37	10.0	23.37	14.8	16.6
	367052	6247651	19-Sep-14	11:37	10.0	20-Sep-14	10:35	10.0	22.97	14.8	16.6
	367052	6247651	20-Sep-14	10:35	10.0	21-Sep-14	10:20	10.0	23.75	14.8	16.6
GN-03	368788	6248118	18-Sep-14	12:26	10.0	19-Sep-14	12:15	10.0	23.82	13.8	13.8
	368788	6248118	19-Sep-14	12:15	10.0	20-Sep-14	11:05	10.0	22.83	13.8	13.8
	368788	6248118	20-Sep-14	11:05	10.0	21-Sep-14	11:50	10.0	24.75	13.8	13.8
	368788	6248118	21-Sep-14	11:50	10.0	22-Sep-14	10:57	9.0	23.12	13.8	13.8
	368788	6248118	22-Sep-14	10:57	10.0	23-Sep-14	9:30	10.5	22.55	13.8	13.8
	368788	6248118	23-Sep-14	9:30	10.0	24-Sep-14	10:05	10.5	24.58	13.8	13.8
	368788	6248118	24-Sep-14	10:05	10.0	25-Sep-14	10:55	10.0	24.83	13.8	13.8
	368788	6248118	25-Sep-14	10:55	10.0	26-Sep-14	10:55	10.0	24.00	13.8	13.8
	368788	6248118	26-Sep-14	10:55	10.0	27-Sep-14	10:20	10.0	23.42	13.8	13.8
GN-04	368714	6247379	18-Sep-14	12:40	10.0	19-Sep-14	13:10	10.0	24.50	16.4	14.7
	368714	6247379	19-Sep-14	13:10	10.0	20-Sep-14	11:40	10.0	22.50	16.4	14.7
	368714	6247379	20-Sep-14	11:40	10.0	21-Sep-14	10:55	10.0	23.25	16.4	14.7
GN-05	366577	6247360	20-Sep-14	12:15	10.0	21-Sep-14	9:41	10.0	21.43	17.0	18.5
	366577	6247360	21-Sep-14	9:41	10.0	22-Sep-14	9:27	9.0	23.77	17.0	18.5
	366577	6247360	22-Sep-14	9:27	10.0	23-Sep-14	11:15	10.5	25.80	17.0	18.5
	366577	6247360	23-Sep-14	11:15	10.0	24-Sep-14	9:31	10.5	22.27	17.0	18.5
	366577	6247360	24-Sep-14	9:31	10.0	25-Sep-14	10:10	10.0	24.65	17.0	18.5
	366577	6247360	25-Sep-14	10:10	10.0	26-Sep-14	9:33	10.0	23.38	17.0	18.5
	366577	6247360	26-Sep-14	9:33	10.0	27-Sep-14	9:13	10.0	23.67	17.0	18.5
	366577	6247360	27-Sep-14	9:13	10.0	28-Sep-14	9:20	-	24.12	17.0	18.5
GN-06	369825	6247582	21-Sep-14	11:20	10.0	22-Sep-14	11:12	9.0	23.87	13.3	14.6

Table A1- 3: Location and site-specific physical measurements collected at gillnetting sites during juvenile Lake Sturgeon investigations conducted in Stephens Lake during fall, 2014.

	UTM Location				Set			Pull		Water Depth (m)	
Site[1]	Easting	Northing	Set Date	Set Time	Water Temp (°C)	Pull Date	Pull Time	Water Temp (°C)	Duration (dec.hrs)	Start	End
	369825	6247582	22-Sep-14	11:12	10.0	23-Sep-14	12:05	10.5	24.88	13.3	14.6
GN-07	369500	6247478	23-Sep-14	12:25	10.5	24-Sep-14	10:54	10.5	22.48	13.0	16.2
	369500	6247478	24-Sep-14	10:54	10.5	25-Sep-14	12:00	10.0	25.10	13.0	16.2
	369500	6247478	25-Sep-14	12:00	10.5	26-Sep-14	11:48	10.0	23.80	13.0	16.2
GN-08	368879	6248230	24-Sep-14	8:54	10.5	25-Sep-14	11:20	10.0	26.43	13.9	13.9
	368879	6248230	25-Sep-14	11:20	10.5	26-Sep-14	11:16	10.0	23.93	13.9	13.9
GN-09	369430	6247478	26-Sep-14	12:02	10.0	27-Sep-14	10:56	10.0	22.90	9.4	15.1
	369430	6247478	27-Sep-14	10:56	10.0	28-Sep-14	9:50	-	22.90	9.4	15.1

1. Multiple gill nets were set at each site

APPENDIX 2: BIOLOGICAL AND TAG INFORMATION FOR LAKE STURGEON CAPTURED IN THE KEEYASK STUDY AREA

Table A2- 1. Biological and tag information for Lake Sturgeon captured in the Burntwood River during fall, 2014.

Location	Site	Zone	Date	Floy-tag #	PIT-tag #	Fork Length (mm)	Total Length (mm)	Weight (g)	Age
Burntwood River	GN-01	BWR-C	09-Sep-14	-	900 043000103450	215	248	100	-
Burntwood River	GN-01	BWR-C	09-Sep-14	100371	900 226000628152	298	359	250	-
Burntwood River	GN-05	BWR-C	10-Sep-14	100372	900 226000628079	489	550	800	-
Burntwood River	GN-05	BWR-C	10-Sep-14	100375	900 226000628237	365	405	800	-
Burntwood River	GN-05	BWR-C	10-Sep-14	56726	900 226000628102	494	575	950	-
Burntwood River	GN-06	BWR-C	10-Sep-14	56727	900 226000628131	579	662	1400	-
Burntwood River	GN-06	BWR-C	10-Sep-14	56728	900 226000628190	521	595	1100	-
Burntwood River	GN-06	BWR-C	10-Sep-14	56730	900 226000628132	683	772	2650	-
Burntwood River	GN-10	BWR-C	11-Sep-14	56732	900 226000628116	465	530	825	-
Burntwood River	GN-10	BWR-C	11-Sep-14	56733	900 226000628235	444	508	700	-
Burntwood River	GN-07	BWR-B	11-Sep-14	56735	900 226000628057	301	345	300	-
Burntwood River	GN-07	BWR-B	11-Sep-14	56736	900 226000628224	770	847	3450	-
Burntwood River	GN-11	BWR-A	12-Sep-14	56737	900 226000628008	339	440	525	-
Burntwood River	GN-12	BWR-A	12-Sep-14	101455	900 226000628066	403	460	400	-
Burntwood River	GN-12	BWR-A	12-Sep-14	56738	900 226000628029	321	360	150	-
Burntwood River	GN-12	BWR-A	12-Sep-14	56739	900 226000628073	711	795	2500	-
Burntwood River	GN-13	BWR-A	12-Sep-14	56740	900 226000628078	391	447	425	-
Burntwood River	GN-13	BWR-A	12-Sep-14	56742	900 226000628148	566	643	1325	-
Burntwood River	GN-13	BWR-A	12-Sep-14	-	982 000362432311	309	354	100	-
Burntwood River	GN-13	BWR-A	12-Sep-14	56743	900 226000628118	472	539	650	-
Burntwood River	GN-13	BWR-A	12-Sep-14	56744	900 226000628089	556	633	1220	-
Burntwood River	GN-14	BWR-A	12-Sep-14	56745	900 226000628032	468	532	725	-
Burntwood River	GN-16	BWR-A	13-Sep-14	56747	900 226000628065	321	365	175	-
Burntwood River	GN-15	BWR-A	13-Sep-14	56748	900 226000628203	363	410	350	-
Burntwood River	GN-15	BWR-A	13-Sep-14	56749	900 226000628109	565	638	1250	-
Burntwood River	GN-15	BWR-A	13-Sep-14	-	900 043000103413	251	286	-	-
Burntwood River	GN-15	BWR-A	13-Sep-14	101026	900 226000628164	468	542	600	-
Burntwood River	GN-15	BWR-A	13-Sep-14	101027	900 226000628146	424	491	600	-
Burntwood River	GN-18	BWR-A	14-Sep-14	101029	900 226000628175	369	416	300	-
Burntwood River	GN-18	BWR-A	14-Sep-14	-	900 226000628046	307	350	250	-
Burntwood River	GN-18	BWR-A	14-Sep-14	101032	900 226000628142	501	563	650	-
Burntwood River	GN-17	BWR-A	14-Sep-14	101033	900 226000628076	500	568	1000	-
Burntwood River	GN-23	BWR-C	15-Sep-14	101034	900 226000628139	604	689	1800	-
Burntwood River	GN-23	BWR-C	15-Sep-14	101035	900 226000628220	442	504	600	-
Burntwood River	GN-23	BWR-C	15-Sep-14	101036	900 226000628179	807	904	4100	-
Burntwood River	GN-24	BWR-C	15-Sep-14	-	900 043000103491	238	270	100	-
Burntwood River	GN-24	BWR-C	15-Sep-14	-	900 043000103475	265	298	150	-
Burntwood River	GN-24	BWR-C	15-Sep-14	-	900 043000103470	240	280	50	-

Table A2- 1. Biological and tag information for Lake Sturgeon captured in the Burntwood River during fall, 2014.

Location	Site	Zone	Date	Floy-tag #	PIT-tag #	Fork Length (mm)	Total Length (mm)	Weight (g)	Age
Burntwood River	GN-28	BWR-C	16-Sep-14	101037	900 226000628153	489	565	700	-
Burntwood River	GN-28	BWR-C	16-Sep-14	-	900 043000103448	221	248	50	-
Burntwood River	GN-28	BWR-C	16-Sep-14	-	900 043000103459	239	270	75	-
Burntwood River	GN-28	BWR-C	16-Sep-14	-	900 043000103404	220	245	50	-

Table A2- 2: Biological and tag information for Lake Sturgeon captured in Gull Lake during fall, 2014.

Location	Site	Zone	Date	Floy-tag #	PIT-tag #	Fork Length (mm)	Total Length (mm)	Weight (g)	Age
Gull Lake	GN-03	BR-D	09-Sep-14	103475	900 043000103679	661	746	3350	8
Gull Lake	GN-03	BR-D	09-Sep-14	103474	900 043000103670	655	741	2500	8
Gull Lake	GN-01	GL-A	09-Sep-14	103471	900 226000629379	832	904	4500	-
Gull Lake	GN-04	BR-D	10-Sep-14	103470	900 226000629484	629	725	2150	6
Gull Lake	GN-04	BR-D	10-Sep-14	103469	900 226000629412	703	802	2650	9
Gull Lake	GN-08	GL-B	11-Sep-14	94009	900 226000629334	783	875	3350	11
Gull Lake	GN-08	GL-B	11-Sep-14	103468	900 226000629256	425	485	575	3
Gull Lake	GN-08	GL-B	11-Sep-14	103467	900 226000629366	465	536	750	6
Gull Lake	GN-08	GL-B	11-Sep-14	103466	900 226000629306	530	602	925	6
Gull Lake	GN-08	GL-B	11-Sep-14	103465	900 226000629350	443	515	600	3
Gull Lake	GN-08	GL-B	11-Sep-14	100127	900 226000629446	526	605	950	-
Gull Lake	GN-08	GL-B	11-Sep-14	103464	900 226000629335	536	615	1050	6
Gull Lake	GN-08	GL-B	11-Sep-14	103463	900 226000629452	399	457	425	3
Gull Lake	GN-08	GL-B	11-Sep-14	103462	900 226000629459	448	575	700	6
Gull Lake	GN-07	GL-B	11-Sep-14	103461	900 226000629263	613	693	1400	6
Gull Lake	GN-07	GL-B	11-Sep-14	103460	900 226000629475	535	603	1000	6
Gull Lake	GN-07	GL-B	11-Sep-14	103459	900 226000629359	562	645	1150	6
Gull Lake	GN-07	GL-B	11-Sep-14	103458	900 226000629430	545	616	1000	6
Gull Lake	GN-07	GL-B	11-Sep-14	103457	900 226000629457	858	N/A	5450	-
Gull Lake	GN-06	GL-B	11-Sep-14	103456	900 226000629385	875	987	5750	-
Gull Lake	GN-06	GL-B	11-Sep-14	103455	900 226000629305	722	805	3100	6
Gull Lake	GN-06	GL-B	11-Sep-14	103454	900 226000629462	660	735	1950	6
Gull Lake	GN-06	GL-B	11-Sep-14	103453	900 226000629271	526	580	900	6
Gull Lake	GN-06	GL-B	11-Sep-14	105103	900 043000103825	633	707	1700	8
Gull Lake	GN-06	GL-B	11-Sep-14	103452	900 226000629327	476	545	775	6
Gull Lake	GN-06	GL-B	11-Sep-14	103451	900 226000629416	564	645	1150	6
Gull Lake	GN-06	GL-B	11-Sep-14	82826	900 226000629332	545	623	1250	-
Gull Lake	GN-06	GL-B	11-Sep-14	82827	900 226000629310	594	687	1500	6
Gull Lake	GN-06	GL-B	11-Sep-14	82828	900 226000629354	525	596	1000	6
Gull Lake	GN-06	GL-B	11-Sep-14	82829	900 226000629496	604	683	1550	6
Gull Lake	GN-05	GL-B	11-Sep-14	82830	900 226000629415	743	841	450	13
Gull Lake	GN-12	BR-D	12-Sep-14	82831	900 226000629451	590	685	1850	7
Gull Lake	GN-11	GL-B	12-Sep-14	-	900 043000103826	591	685	1425	6
Gull Lake	GN-11	GL-B	12-Sep-14	82832	900 226000629259	645	745	2150	6
Gull Lake	GN-11	GL-B	12-Sep-14	82833	900 226000629417	565	655	1400	6
Gull Lake	GN-11	GL-B	12-Sep-14	94862	900 226000629387	515	595	925	-
Gull Lake	GN-11	GL-B	12-Sep-14	-	982 000362432272	272	313	150	-
Gull Lake	GN-10	GL-B	12-Sep-14	82834	900 226000629392	566	643	1075	6
Gull Lake	GN-10	GL-B	12-Sep-14	82835	900 226000629349	542	630	1050	6

Table A2- 2: Biological and tag information for Lake Sturgeon captured in Gull Lake during fall, 2014.

Location	Site	Zone	Date	Floy-tag #	PIT-tag #	Fork Length (mm)	Total Length (mm)	Weight (g)	Age
Gull Lake	GN-09	GL-B	12-Sep-14	82836	900 226000629352	519	590	925	6
Gull Lake	GN-09	GL-B	12-Sep-14	-	900 226000629404	450	512	600	3
Gull Lake	GN-09	GL-B	12-Sep-14	105121	900 226000629122	552	630	1075	-
Gull Lake	GN-09	GL-B	12-Sep-14	-	900 043000103614	250	286	150	1
Gull Lake	GN-13	GL-C	13-Sep-14	-	900 043000103617	262	299	125	1
Gull Lake	GN-13	GL-C	13-Sep-14	82839	900 226000629466	458	524	650	4
Gull Lake	GN-13	GL-C	13-Sep-14	94893	900 226000629374	600	673	1600	-
Gull Lake	GN-13	GL-C	13-Sep-14	-	900 043000103674	242	272	100	1
Gull Lake	GN-13	GL-C	13-Sep-14	82837	900 226000629345	615	690	1600	6
Gull Lake	GN-13	GL-C	13-Sep-14	82838	900 226000629321	605	655	1500	6
Gull Lake	GN-13	GL-C	13-Sep-14	82850	900 226000629428	485	545	750	4
Gull Lake	GN-13	GL-C	13-Sep-14	-	900 043000103664	292	334	175	2
Gull Lake	GN-13	GL-C	13-Sep-14	-	900 043000103649	240	269	75	1
Gull Lake	GN-14	GL-B	13-Sep-14	75285	900 226000629285	946	1050	-	-
Gull Lake	GN-14	GL-B	13-Sep-14	82841	900 226000629380	548	608	1075	6
Gull Lake	GN-14	GL-B	13-Sep-14	82842	900 226000629358	498	573	925	6
Gull Lake	GN-14	GL-B	13-Sep-14	82844	900 043000103632	500	561	725	6
Gull Lake	GN-14	GL-B	13-Sep-14	82845	900 226000629317	422	479	400	3
Gull Lake	GN-15	GL-A	13-Sep-14	82846	900 226000629397	588	685	1550	6
Gull Lake	GN-16	GL-A	13-Sep-14	82847	900 226000629314	597	676	1500	6
Gull Lake	GN-16	GL-A	13-Sep-14	82848	900 226000629396	529	605	1000	6
Gull Lake	GN-16	GL-A	13-Sep-14	90251	900 226000629441	539	605	1100	6
Gull Lake	GN-16	GL-A	13-Sep-14	90252	900 226000629464	509	586	975	6
Gull Lake	GN-16	GL-A	13-Sep-14	90253	900 226000629476	407	472	450	3
Gull Lake	GN-18	GL-C	14-Sep-14	100103	900 226000629378	676	798	2050	-
Gull Lake	GN-18	GL-C	14-Sep-14	90255	900 226000629282	532	609	1100	6
Gull Lake	GN-18	GL-C	14-Sep-14	-	900 043000103660	244	285	175	1
Gull Lake	GN-18	GL-C	14-Sep-14	-	900 043000103668	237	271	50	1
Gull Lake	GN-17	GL-C	14-Sep-14	100410	900 226000629483	795	917	4250	-
Gull Lake	GN-17	GL-C	14-Sep-14	90256	900 226000629353	618	700	1500	6
Gull Lake	GN-17	GL-C	14-Sep-14	-	900 043000103659	282	321	150	1
Gull Lake	GN-17	GL-C	14-Sep-14	-	900 043000103651	241	278	75	1
Gull Lake	GN-19	GL-C	14-Sep-14	103120	900 226000629262	508	590	925	6
Gull Lake	GN-19	GL-C	14-Sep-14	75876	900 226000629435	588	658	1400	-
Gull Lake	GN-19	GL-C	14-Sep-14	90257	900 226000629486	594	668	1575	6
Gull Lake	GN-19	GL-C	14-Sep-14	90258	900 226000629367	433	492	600	4
Gull Lake	GN-19	GL-C	14-Sep-14	90260	900 226000629474	465	542	725	4
Gull Lake	GN-19	GL-C	14-Sep-14	90261	900 226000629433	414	461	500	3

Table A2- 2: Biological and tag information for Lake Sturgeon captured in Gull Lake during fall, 2014.

Location	Site	Zone	Date	Floy-tag #	PIT-tag #	Fork Length (mm)	Total Length (mm)	Weight (g)	Age
Gull Lake	GN-20	GL-B	14-Sep-14	75877/90262	900 226000629252	581	651	1225	-
Gull Lake	GN-20	GL-B	14-Sep-14	90263	900 226000629297	637	727	2075	6
Gull Lake	GN-20	GL-B	14-Sep-14	90264	900 226000629422	552	634	1300	6
Gull Lake	GN-20	GL-B	14-Sep-14	90265	900 226000629261	502	566	1075	6
Gull Lake	GN-21	GL-C	15-Sep-14	-	900 043000103673	225	255	75	1
Gull Lake	GN-22	GL-C	15-Sep-14	94857	900 226000629338	582	665	1500	-
Gull Lake	GN-22	GL-C	15-Sep-14	90266	900 226000629309	589	670	1525	6
Gull Lake	GN-22	GL-C	15-Sep-14	90268	900 226000629283	569	658	1250	6
Gull Lake	GN-22	GL-C	15-Sep-14	90269	900 226000629270	515	610	900	6
Gull Lake	GN-22	GL-C	15-Sep-14	90270	900 226000629408	470	544	1175	5
Gull Lake	GN-22	GL-C	15-Sep-14	90271	900 226000629437	494	579	750	6
Gull Lake	GN-22	GL-C	15-Sep-14	-	900 043000103684	237	271	125	1
Gull Lake	GN-25	GL-C	16-Sep-14	90272	900 226000629389	679	771	2275	8
Gull Lake	GN-25	GL-C	16-Sep-14	90273	900 226000629340	542	625	1275	6
Gull Lake	GN-25	GL-C	16-Sep-14	90274	900 226000629272	586	674	1700	6
Gull Lake	GN-25	GL-C	16-Sep-14	-	900 043000103618	311	356	225	2
Gull Lake	GN-25	GL-C	16-Sep-14	-	900 043000103672	343	392	300	2
Gull Lake	GN-27	GL-B	16-Sep-14	90275	900 226000629300	537	606	1025	6
Gull Lake	GN-27	GL-B	16-Sep-14	89976	900 226000629461	504	590	850	7
Gull Lake	GN-27	GL-B	16-Sep-14	89979	900 226000629453	573	651	1350	6
Gull Lake	GN-27	GL-B	16-Sep-14	89981	900 226000629312	499	586	850	6
Gull Lake	GN-27	GL-B	16-Sep-14	89982	900 226000629281	630	710	1650	6
Gull Lake	GN-27	GL-B	16-Sep-14	89983	900 226000629326	504	566	825	6
Gull Lake	GN-27	GL-B	16-Sep-14	89984	900 226000629313	548	629	1150	6
Gull Lake	GN-28	GL-A	16-Sep-14	89986	900 226000629399	547	642	1050	5
Gull Lake	GN-28	GL-A	16-Sep-14	89987	900 226000629405	546	622	1000	6
Gull Lake	GN-28	GL-A	16-Sep-14	89988	900 226000629293	549	631	1100	6
Gull Lake	GN-28	GL-A	16-Sep-14	89989	900 226000629473	636	723	1775	6
Gull Lake	GN-28	GL-A	16-Sep-14	89990	900 226000629382	492	555	1175	5
Gull Lake	GN-28	GL-A	16-Sep-14	100145	900 226000629409	615	690	1625	-
Gull Lake	GN-28	GL-A	16-Sep-14	105478	900 043000103845	649	739	2400	8
Gull Lake	GN-28	GL-A	16-Sep-14	89991	900 226000629490	534	610	1100	6
Gull Lake	GN-28	GL-A	16-Sep-14	89992	900 226000629251	656	732	2225	8
Gull Lake	GN-28	GL-A	16-Sep-14	89993	900 226000629413	583	671	1325	6
Gull Lake	GN-30	GL-A	17-Sep-14	89994	900 226000629455	530	596	1025	6

Table A2- 3: Biological and tag information for Lake Sturgeon captured in Stephens Lake during fall, 2014.

Location	Site	Zone	Date	Floy-tag #	PIT-tag #	Fork Length (mm)	Total Length (mm)	Weight (g)	Age
Stephens Lake	GN-03	STL-A	19-Sep-14	101040	900 226000629322	641	731	2100	6
Stephens Lake	GN-03	STL-A	19-Sep-14	103246	900 226000629470	618	684	1975	5
Stephens Lake	GN-04	STL-A	19-Sep-14	103602	900 226000629290	648	712	1900	6
Stephens Lake	GN-04	STL-A	19-Sep-14	101041	900 226000629381	671	743	2050	6
Stephens Lake	GN-05	STL-B	19-Sep-14	101042	900 226000629370	578	645	1750	6
Stephens Lake	GN-05	STL-B	19-Sep-14	101043	900 226000629291	564	635	1375	6
Stephens Lake	GN-05	STL-B	19-Sep-14	101044	900 226000629449	453	505	625	3
Stephens Lake	GN-06	STL-B	19-Sep-14	101045	900 226000629284	655	712	1950	6
Stephens Lake	GN-04	STL-A	20-Sep-14	101046	900 226000629390	544	601	1100	7
Stephens Lake	GN-05	STL-B	20-Sep-14	101047	900 226000629288	373	433	350	4
Stephens Lake	GN-08	STL-A	21-Sep-14	101048	900 226000629351	562	629	1300	6
Stephens Lake	GN-08	STL-A	21-Sep-14	101049	900 226000629429	485	545	800	4
Stephens Lake	GN-08	STL-A	21-Sep-14	101050	900 226000629489	604	685	1375	6
Stephens Lake	GN-08	STL-A	21-Sep-14	88498	900 226000629308	626	712	1875	6
Stephens Lake	GN-08	STL-A	21-Sep-14	100159	900 226000629376	621	696	1525	6
Stephens Lake	GN-08	STL-A	21-Sep-14	88497	900 226000629478	451	520	650	4
Stephens Lake	GN-08	STL-A	22-Sep-14	88496	900 226000629304	588	671	1525	6
Stephens Lake	GN-08	STL-A	22-Sep-14	88495	900 226000629336	374	431	375	3
Stephens Lake	GN-08	STL-A	22-Sep-14	88494	900 226000629287	418	482	575	3
Stephens Lake	GN-05	STL-B	22-Sep-14	94227	900 226000629298	500	644	1700	6
Stephens Lake	GN-05	STL-B	22-Sep-14	94237	900 226000629344	682	762	2750	7
Stephens Lake	GN-05	STL-B	23-Sep-14	88493	900 226000629418	455	513	825	4
Stephens Lake	GN-05	STL-B	23-Sep-14	88492	900 226000629276	622	711	1575	6
Stephens Lake	GN-08	STL-A	23-Sep-14	88491	900 226000629391	654	726	2450	7
Stephens Lake	GN-08	STL-A	23-Sep-14	88490	900 226000629424	796	866	4900	11
Stephens Lake	GN-08	STL-A	23-Sep-14	88489	900 226000629410	724	800	3000	8
Stephens Lake	GN-08	STL-A	23-Sep-14	88488	900 226000629267	614	689	1900	6
Stephens Lake	GN-08	STL-A	23-Sep-14	88487	900 226000629402	581	660	1600	6
Stephens Lake	GN-08	STL-A	24-Sep-14	88486	900 226000629393	426	496	500	3
Stephens Lake	GN-08	STL-A	24-Sep-14	88485	900 226000629388	638	723	2375	6
Stephens Lake	GN-05	STL-B	24-Sep-14	100141	900 226000629296	628	706	2000	6
Stephens Lake	GN-14	STL-B	24-Sep-14	88484	Tag # not scanned	444	508	625	3
Stephens Lake	GN-14	STL-B	24-Sep-14	88483	900 226000629357	754	842	4075	10
Stephens Lake	GN-08	STL-A	25-Sep-14	88482	900 226000629384	755	850	3050	8
Stephens Lake	GN-08	STL-A	25-Sep-14	88481	900 226000629398	662	761	2025	6
Stephens Lake	GN-08	STL-A	25-Sep-14	-	-	598	676	1475	7
Stephens Lake	GN-08	STL-A	25-Sep-14	88480	900 226000629394	575	663	1225	6
Stephens Lake	GN-08	STL-A	25-Sep-14	88479	900 226000629337	551	632	1250	6
Stephens Lake	GN-05	STL-B	25-Sep-14	88478	900 226000629439	591	652	1500	6
Stephens Lake	GN-08	STL-A	26-Sep-14	88767	900 226000629444	623	701	1650	7

Table A2- 2: Biological and tag information for Lake Sturgeon captured in Gull Lake during fall, 2014.

Location	Site	Zone	Date	Floy-tag #	PIT-tag #	Fork Length (mm)	Total Length (mm)	Weight (g)	Age
Stephens Lake	GN-08	STL-A	26-Sep-14	88477	900 226000629330	699	767	2750	8
Stephens Lake	GN-08	STL-A	27-Sep-14	79253	900 226000629373	561	650	1325	6
Stephens Lake	GN-08	STL-A	27-Sep-14	79254	900 226000629456	669	754	2300	8
Stephens Lake	GN-08	STL-A	27-Sep-14	103610	900 226000629253	626	704	1825	6
Stephens Lake	GN-08	STL-A	27-Sep-14	79255	900 226000629499	775	874	3600	8
Stephens Lake	GN-05	STL-B	27-Sep-14	79256	900 226000629431	585	663	1450	6
Stephens Lake	GN-05	STL-B	27-Sep-14	79257	900 226000629375	605	680	1700	6