Keeyask Generation Project

Aquatic Effects Monitoring Plan

Adult Lake Sturgeon Population Monitoring Report

AEMP-2015-06

Manitoba Hydro

KEEYASK

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KEEYASK GENERATION PROJECT

AQUATIC EFFECTS MONITORING REPORT

Report #AEMP–2015–06

Adult Lake Sturgeon Population and Spawn Monitoring in the Keeyask area and Stephens Lake, 2014

Prepared for

Manitoba Hydro

By

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SUMMARY

BACKGROUND

Construction of the Keeyask Generation Project (Project) at Gull Rapids began in July 2014. The Project includes a hydroelectric generating station (GS), roads, work areas, borrow pits (to get gravel/clay/sand used to build the Project), concrete manufacturing, waste material disposal areas, a 2000 person construction camp, and water and sewage treatment plants. Before the government issued a licence to construct the Project, the owner, who is the Keeyask Hydropower Limited Partnership (KHLP), needed to prepare a plan to monitor the effects of the Project on the aquatic environment, including fish and water quality. This monitoring work will take place over many years to make sure it is clear if the Project does or does not have an effect on the aquatic environment. The 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. It will also tell us whether 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 change or destroy important habitat. The plan to monitor sturgeon includes several types of studies:

- Estimating the number of adults;
- Estimating the number and growth of juveniles (in particular fish up to ten years old);
- Identifying spawning locations and numbers of spawning fish; and
- Movement studies to record seasonal habitat use and long distance movements over generating stations or rapids.

This report describes results of adult population and spawn monitoring conducted in the Nelson River between Clark Lake and the Kettle GS during spring 2014. Similar studies have been conducted during several years between 2001 and 2014 (2001-2006, 2008, 2010-2012) in this area. Sampling was conducted during June and July in two areas: i) the reach of the Nelson River between Clark Lake and Gull Rapids (the Keeyask area); and, ii) Stephens Lake. Sampling was conducted just prior to the start of construction of the Keeyask GS, and as such, marks the last year of baseline data collection.

WHY IS THE STUDY BEING DONE?

This study is being done to answer two main questions:

How many adult Lake Sturgeon live in the area around the Keeyask GS? This question is important so we can know how the population is doing both before and after the

construction of the GS. We will also be able to see if the number of Lake Sturgeon in the area changes after Keeyask is built.

Where do these fish spawn and in what numbers? This question is important because the dam might cause changes to spawning habitat by changing factors such as flow and substrate, which are important in determining where Lake Sturgeon lay their eggs.

WHAT WAS DONE?

Sampling was done in the Keeyask area and in Stephens Lake. Gill nets were used to catch adult (over 10-year old) sturgeon. Nets were set in the spring, with some nets set near spawning areas, to learn about how many sturgeon may be spawning in the current year. When a fish was caught it was measured and weighed. If the fish was not already tagged, then two different tags were applied, an external (Floy) tag and a small (PIT) tag. If the captured fish had already been tagged, then the tag numbers were recorded before the fish was released. Tagging and recapturing fish makes it possible to estimate how many sturgeon are in the population. Three of the fish that were caught (two males and one female) were used as parents for a stocking program (described further in the Lake Sturgeon stocking report). Eleven other fish were tagged with larger internal tags that give off a signal so their movements could be monitored (described further in the Lake Sturgeon movement report).

WHAT WAS FOUND?

In the Keeyask area, 239 Lake Sturgeon were caught. One hundred thirty-one of these were classified as adults (>10 years old) because they measured longer than 800 mm, and 21 were classified as fish that would have spawned in the current year. Seventy of the fish had been caught in a previous year, including one that was first caught 40 km upstream in Clark Lake, and another that was first caught at the mouth of the Grass River, 90 km upstream. Overall, the condition factor of captured fish was similar to other years. The 2014 population of adult Lake Sturgeon in this area was estimated at 596 fish, which is similar to numbers estimated for the past 4 population estimates, extending back to 2006.

Nine adult sturgeon were caught in Stephens Lake over 3 days of sampling. The sampling was conducted in order to catch enough adult sturgeon in this area to apply seven acoustic tags. All nine were caught close to Gull Rapids, and two were identified as spawning males. Four of these fish had been caught before, and one was first caught upstream of Gull Rapids.

WHAT DOES IT MEAN?

Because this is the final year of data collection before the beginning of Keeyask construction, continued study over the next several years will show how construction of the generating station might affect adult Lake Sturgeon spawning, population size,

mortality, and condition.

WHAT WILL BE DONE NEXT?

Monitoring will continue on a biennial basis each spring over the next 24 years. As more data are collected, trends in reproduction or changes in abundance 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 (GS) 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 GS (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, fish community, specifically adult Lake Sturgeon population and spawn monitoring, 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 waterbodies 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.

Data collected during the field program described in this report address both the adult population monitoring and spawn monitoring activities, as well as providing information relevant to the movement studies. The key questions set out in the AEMP for adult population monitoring are as follows:

- Is there a biologically relevant (and statistically significant) change in the rate of population growth for the Upper Split Lake area population, and the Keeyask area population?
- Is there a biologically relevant (and statistically significant) change in survival for the Upper Split Lake area population, and the Keeyask area population?
- Is mortality during passage through the GS (via turbines or spillway or due to impingement on the trashracks) significantly affecting the Lake Sturgeon population?

- Is the relative abundance/CPUE of adult Lake Sturgeon in Stephens Lake changing?
- Is there a biologically relevant (and statistically observable) change in the condition factor of Lake Sturgeon?
- Over the long term, is there a measureable effect on population growth due to stocking?
- Over the long term, are Lake Sturgeon populations in all three areas (Upper Split Lake, Keeyask area, and Stephens Lake) considered sustainable based on the size of the adult population and the population viability analysis?

Given that 2014 data collection occurred prior to the start of construction, most of the questions listed above are not addressed in this report. However, the questions in relation to population growth and survival are addressed as these parameters may vary even in the absence of any effects of the Project.

The key questions related to spawn monitoring are as follows:

- Are spawning adults present in the Keeyask reservoir and Stephens Lake?
- Where (on a coarse-scale) do Lake Sturgeon spawn in the post-Project environment?
- Will contingency measures be needed to create conditions suitable and attractive for spawning sturgeon at Birthday Rapids?
- Will Lake Sturgeon in Stephens Lake be attracted to, and spawn on, the tailrace spawning structure or below the spillway?; and
- Will modifications to the spawning structure downstream of the Keeyask GS be required?

The current study provides the last year of baseline data for the presence of spawning sturgeon at Birthday and Gull Rapids. As such, the questions listed above will be answered in future years when the construction and operation of the Project may affect sturgeon spawning.

Movement monitoring, as described in the AEMP, is based on both mark/recapture methods (this report) and acoustic telemetry. Key questions that are addressed by mark/recapture methods are as follows:

- Will disturbances associated with construction alter coarse-scale movement/habitat use upstream and/or downstream of the construction site;
- Will the frequency of long-distance movements (and subsequent downstream emigration/entrainment) by sub-adult and adult Lake Sturgeon increase during construction and operation of the Project?
- Are fish moving downstream past the GS and, if so, is there an indication that they have survived passage?

As with the spawn studies, this report presents the last year of pre-construction data collection. Questions listed above will be addressed in subsequent reports when effects related to the

construction and operation of the generating station may be observed.

Baseline studies focusing on adult Lake Sturgeon in the Keeyask Study Area began in 2001 and have continued through 2014. Studies have been conducted in four areas, including: a) the Nelson River downstream of the Kelsey GS; b) the Burntwood River between First Rapids and Split Lake (including the Odei River); (note: areas a) and b) collectively referred to as the Upper Split Lake area); c) the Nelson River between Clark Lake and Gull Rapids; and d) Stephens Lake. Multiple years of data have been collected in each of the aforementioned areas with the study objectives remaining relatively similar among years (Barth and Mochnacz 2004; Barth 2005; Barth and Murray 2005; Barth and Ambrose 2006; Barth and MacDonald 2008; MacDonald 2008; MacDonald 2009; Michaluk and MacDonald 2010; MacDonald and Barth 2011; Hrenchuk and McDougall 2012; Hrenchuk 2013; Groening et al. 2014). These studies have identified sturgeon spawning areas and determined the relative importance of spawning sites in the Keeyask Study Area. Further, abundance estimates, based on mark-recapture data, have been derived for adult Lake Sturgeon populations in the Upper Split Lake area and in the Nelson River between Clark Lake and Gull Rapids. The last population estimate was updated in 2012 (Nelson and Barth 2012) and this report provides the estimate current to 2014.

2.0 THE KEEYASK STUDY SETTING

The study area encompasses an approximately 95 km long reach of the Nelson River from Clark Lake to the upstream end of the Long Spruce GS forebay. This section of river offers a diversity of physical habitat conditions, including a variety of substrate types, and variable water depths (ranging from 0 to 30 m) and velocities.

Clark Lake is located immediately downstream of Split Lake, and approximately 42 km upstream of Gull Rapids (Figure 1). Current is restricted to the main section of the lake, with off-current bays outside the main channel. The Assean River is the only major tributary to Clark Lake, and flows into the north side. Downstream from the outlet of Clark Lake, the Nelson River narrows and water velocity increases for a 3 km stretch, known as Long Rapids. For the next 7 km, the river widens, and water velocity decreases.

Birthday Rapids is located approximately 10 km downstream of Clark Lake and 30 km upstream of Gull Rapids (figures 1 and 2). 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 (figures 1 and 2), 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 (Figure 2).

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 2 km 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 (figures 1 and 3). Kettle GS is located approximately 40 km downstream of Gull Rapids.

3.0 METHODS

3.1 GILLNETTING

Large mesh gill nets were used to capture adult (>800 mm fork length) Lake Sturgeon in two areas of the Nelson River: between Clark Lake and Gull Rapids (the Keeyask area), and in Stephens Lake (Figure 1). Gill nets were set between 3 June and 9 July, 2014 upstream of Gull Rapids. Nets were set in Stephens Lake from 10 to 13 June, 2014, solely to capture seven adult Lake Sturgeon for the application of acoustic tags. Gillnet gangs consisted of two or four 25 yd (22.9 m) long, 2.7 yd (2.5 m) deep panels of a combination of 8, 9, 10, and 12" (203, 229, 254, and 305 mm) twisted nylon stretched mesh. Two-panel gangs included 8 and 10" or 9 and 12" mesh, and four-panel gangs included one panel of each mesh size. Equal numbers of all mesh sizes were set in order to maintain a consistent and quantifiable effort. Gill nets were checked approximately every 24 hours, weather permitting. At each gillnetting site, UTM coordinates were taken using a hand-held GPS unit (Garmin Limited, Olathe, Kansas).

Water temperature was measured daily at each sampling location using a hand-held thermometer (± 0.5°C). A HOBO Water Temperature Pro data logger (± 0.2°C) was also used to log water temperature at a 6 hour interval. The logger was set approximately 1 m off the substrate in the Nelson River mainstem within Gull Lake. The study area was divided into geographical zones to facilitate data analysis.

3.2 LAKE STURGEON SAMPLING

Lake Sturgeon captured in gill nets were measured for fork length (FL) and total length (TL; ± 1 mm), weighed (with a hand-held or pan scale ± 1 lb; converted to g for data analysis), and externally marked with individually numbered plastic Floy-GD-94 T-bar anchor tags (Floy-tags). Floy-tags were inserted between the basal pterygiophores of the dorsal fin using a Dennison Mark II tagging gun. Lake Sturgeon were also tagged with individually numbered Passive Integrated Transponder (PIT) tags (Oregon RFID Ltd., Portland Oregon).PIT tags were injected under the third dorsal scute using Oregon RFID tag injector needles, dipped in Polysporin® to minimize the risk of infection. Tags were injected into muscle tissue (not the body cavity), parallel to the horizontal axis of the fish. Following implantation, the fish was scanned using an Agrident APR 350 Reader (Agrident Ltd., Steinkippenstrasse, Germany).

Aging structures were collected at random from Lake Sturgeon measuring < 800 mm FL. The first fin ray of the left pectoral fin was removed immediately adjacent to the articulation. 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. 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 ray 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.

Acoustic transmitters were applied to 11 of the fish captured, four upstream of Gull Rapids, and seven in Stephens Lake. Information on the implantation procedure, tracking methods, and movements of these and other fish tagged with acoustic transmitters in this area since 2011 can be found in Hrenchuk and Barth (2015).

Sex and maturity were determined for individual adult Lake Sturgeon by applying pressure to the ventral surface of the fish to express gametes. If no gametes were expelled, sex and maturity codes were not assigned. The following sexual maturity codes were used:

Females (F)		Males (M)	
2 –	maturing to spawn (pre-spawn)	7 –	maturing to spawn (pre-spawn)
3 –	ripe	8 –	ripe
4 –	spent (post-spawn)	9 –	spent (post-spawn)
11 –	unknown	11 –	unknown

Species other than Lake Sturgeon were measured for FL (TL for Burbot and Freshwater Drum), weighed, and released.

3.3 DATA ANALYSIS

Mean FL (mm), weight (g), and condition factor (K) were calculated for all first-time captures including recaptured fish tagged in a previous year. Condition factor was calculated for individual fish based on the following equation (after Fulton 1911, in Ricker 1975):

$$K = W/(L^3/10^5)$$

Where:

W = round weight (g); and

L = fork length (mm)

A length-frequency distribution for Lake Sturgeon was plotted in 50 mm length intervals (e.g., 1,000-1,049 mm).

A length-weight relationship was calculated using least squares regression analysis on logarithmic transformations of fork lengths and round weights according to the following relationship:

$$Log_{10}(W) = Log_{10}(a) + b*Log_{10}(L)$$

Where:

W = round weight (g);

L = fork length (mm);

a = Y-intercept; and

b = slope of the regression line

Catch-per-unit-effort (CPUE) was calculated and expressed as the number of Lake Sturgeon captured in 45.7 m (50 yd) of net per 24 hour period using the following formula:

CPUE = Σ # Lake Sturgeon/Σ gillnetting hours x 24 h/ length of gill net used x 45.7 m

Where:

Σ = sum of the number of fish or gillnetting hours at all sites.

Set durations of all nets were standardized to 45.7 m net sets.

Lake Sturgeon that were tagged in a previous year and recaptured in 2014 were included in all analyses; however, current-year recaptures were excluded.

3.4 POPULATION ESTIMATION

Mark-recapture data collected over five- to six-week sampling periods during the spring of 10 different years (1995 2001, 2002, 2003, 2004, 2006, 2008, 2010, 2012, and 2014) were used to derive adult Lake Sturgeon population estimates for the Keeyask area. Data for the period 2001-2014 were collected by Manitoba Hydro as part of environmental studies related to the Keeyask Generation Project. Lake Sturgeon were tagged in 1995 in Gull Lake by Manitoba Fisheries Branch and the Split Lake Resource Management Board.

Only Lake Sturgeon larger than 800 mm (FL), and therefore reasoned to be adults, were included in the analysis. This length was selected as it was the length of the smallest mature Lake Sturgeon captured in this reach of the Nelson River.

Tag returns from resource users were also included in the dataset to provide information on harvested Lake Sturgeon and to ensure that the individual harvested was removed from the tagged population. Between 2001 and 2012, 29 tags were returned to North/South resulting from Lake Sturgeon harvest in the Clark Lake to Gull Rapids reach (Nelson and Barth 2012).

There were no tag returns in 2013 and 2014, although harvest of sturgeon is known to have continued.

Data were analysed using the program MARK (White and Burnham 1999), which is an industry standard for the analysis of data from marked populations. Program MARK uses the cumulative pattern of 0's and 1's to generate a probability distribution of tag recaptures which form the basis of population estimation, while values of -1 allow the fish capture history up to the known date of death to be included. The POPAN (Arnason and Schwarz 2002) Jolly-Seber Model, as implemented within the program MARK, was used to estimate the annual abundance of adult Lake Sturgeon.

Specific model parameterizations were as follows:

- Model fit was best using three time periods corresponding to i) 1995 to 2001, ii) 2001 to 2004, and iii) 2004-2014. Survival rate for each time period was constant; and
- Two recapture rates were estimated and varied among years; 1995, 2006, 2008, and 2010 (p_1) had lower recapture rates compared with 2001-2004, and 2014 (p_2).

To assess the long term trend in abundance, a Pradel Lambda variant of the Jolly-Seber model was run to estimate population growth (Pradel 1996). The Lambda parameter provides a measure of population growth between years, with values <1 indicating population decline, a value of 1 indicating equilibrium, and values >1 indicating population growth.

4.0 RESULTS

A total of 440 fish, comprised of eight species, were captured in large mesh gill nets set in the Nelson River in the Keeyask area, and in Stephens Lake in spring, 2014 (Table 1). A total of 239 Lake Sturgeon were captured in 17,897 gillnet hours, representing both the highest number of fish captured, and the greatest amount of fishing effort expended since mark-recapture studies began in this study area in 1995. Nine adult sturgeon were captured in Stephens Lake during three days of sampling. Tag and biological data for first-time Lake Sturgeon captures are presented in Appendix A1-1 and data from recaptured Lake Sturgeon are presented in Appendix A2-1.

4.1 KEEYASK AREA

4.1.1 RELATIVE ABUNDANCE / CPUE

Sixty-two sites were fished with gillnets between 3 June (8°C) and 9 July (18°C), 2014, resulting in the capture of 431 fish (Figure 2). Eight fish species were captured (Table 1), with the catch being composed mainly of Lake Sturgeon (55% of fish captured) and Northern Pike (30%). Two hundred thirty-nine Lake Sturgeon were captured in 17,897 gillnet hours, resulting in an overall CPUE of 0.32 LKST/45.7 m net/24 h, ranging from 0.0 – 1.6 LKST/45.7 m net/24 h by site. Gillnetting effort was highest in zone BR-D at 6,789 gillnet hours and in the middle basin of Gull Lake (zone GL-B) at 6,643 gillnet hours. CPUE was greatest in the lower basin of Gull Lake (zone GL-C) (Table 2; Figure 2). Overall CPUE by zone was as follows:

- BR-D = 0.17 LKST/45.7 m net/24 h;
- GL-A = 0.22 LKST/45.7 m net/24 h;
- GL-B = 0.44 LKST/45.7 m net/24 h; and
- GL-C = 0.53 LKST/45.7 m net/24 h.

The first Lake Sturgeon was captured on 5 June, 2014, when the water temperature measured 9°C (Figure 4). The catch peaked on 7 July, 2014 (n = 20) when the water temperature measured 18°C (Figure 4).

4.1.2 BIOLOGICAL METRICS

Captured Lake Sturgeon had a mean FL of 838 mm (range: 449 – 1,640 mm) and a mean weight of 6,111 g (range: 650 – 29,710 g) (Table 4). The length-frequency distribution is

illustrated in Figure 5 and the length-weight regression equation is given in Figure 6.

One hundred eight of the 239 captured Lake Sturgeon (45%) measured less than 800 mm FL, and were therefore classified as juveniles. Fifty-six of these fish were aged, and ages ranged from four to 11 years (appendices A1-1 and A2-1). The majority of aged fish were six (n = 23; 41%) or eight (n = 12; 21%) years of age. The majority of Lake Sturgeon captured in the middle and lower basins of Gull Lake, zones GL-B (n = 65; 53%) and GL-C (n = 33; 69%), respectively, were classified as juveniles. The majority captured zones BR-D (n = 46; 96%) and GL-A (n = 13; 62%) were of adult size.

Sex and maturity were determined for 21 Lake Sturgeon, including four pre-spawn and two spent females, and eight pre-spawn, five ripe, and two spent males (Table 5). All of these fish were capture in zones BR-D or GL-A. Three mature fish (Floy-tag #105423 [female], #105422 [male], and #80255 [male]) were used as broodstock for a stocking program initiated in this area in 2014. Details on gamete collection, larval rearing, and stocking can be found in Klassen (2015).

4.1.3 MOVEMENTS

Floy-tags were applied to all 169 newly captured Lake Sturgeon. The remaining 70 (29% of the total catch) were tagged in a previous year (Appendix A2-1). Sixty-seven fish were originally tagged and recaptured in Keeyask area between 2002 and 2012 (Appendix A2-1). Thirty-two of these (46%) were recaptured in the same zone in which they were initially tagged. Two fish were recaptured in Gull Lake but originally tagged in upstream locations, while another was originally tagged in Stephens Lake:

- Lake Sturgeon Floy-tag #74302 was originally tagged in Split Lake immediately upstream of Clark Lake (Figure 1) in 2005 (Appendix A2-1; Barth and MacDonald 2008). It was recaptured in Gull Lake (zone GL-B) approximately 40 km downstream of its original tagging location.
- Lake Sturgeon Floy-tag #76852 was originally tagged in the Grass River (Figure 1) in 2007 (Appendix A2-1; MacDonald 2009). It was recaptured approximately 90 km downstream of its original tagging location in the riverine portion of the Nelson River downstream of Birthday Rapids (zone BR-D).
- Lake Sturgeon Floy-tag #81832 was originally tagged in Stephens Lake in 2006 (Appendix A2-1; MacDonald 2008). It was first recaptured in Gull Lake in 2010 (zone GR-A). It was recaptured in 2014 in zone BR-D and was identified as a pre-spawn female (Appendix A2-1).

Four captured Lake Sturgeon were tagged with acoustic transmitters adding to the 30 tagged fish monitored in this area since 2011 (see Hrenchuk and Barth 2015).

4.1.4 POPULATION ESTIMATION

The 2014 population estimate for the Keeyask Area was 596 individuals (range: 431 – 946), which was within the 95% confidence limits of the previous three estimates (Figure 7, Appendix A3-1). The population lambda (growth rate) in 2014 had confidence intervals that included one, indicating that the population was stable (Figure 7). Annual survival rate was estimated to be 0.89 (Appendix A3-1).

4.2 STEPHENS LAKE

4.2.1 RELATIVE ABUNDANCE / CPUE

Five sites were fished with large mesh gill nets in upper Stephens Lake from 10 – 13 June, 2014, when the water temperature measured 11°C (Table 1; Figure 3). A total of nine Lake Sturgeon were captured (Figure 4). Acoustic transmitters were applied to seven of the nine fish captured. Movements of these fish were monitored throughout the open-water period and are described in Hrenchuk and Barth (2015).

These nine Lake Sturgeon were captured in 476 gillnet hours, resulting in an overall CPUE of 0.45 LKST/45.7 m net/24 h (Table 2). Fish were captured both in zones GR-A (n = 8) and STL-A (n = 1) (Figure 3).

4.2.2 BIOLOGICAL METRICS

Captured Lake Sturgeon had a mean FL of 941 mm (range: 810 – 1,150 mm) and a mean weight of 6,854 g (range: 4,082 – 13,608 g) (Table 4). The length-frequency distribution is illustrated in Figure 7.

All captured Lake Sturgeon were of adult size, and sex and maturity was determined for three fish (ripe males) including a single fish (Floy-tag #74411) that had been previously identified as a pre-spawn male when captured in 2011 (Appendix A2-1).

4.2.3 MOVEMENTS

Four of the nine (44%) captured fish had been previously tagged. Three were originally tagged in Stephens Lake in 2001, 2010, and 2011. The remaining fish (Floy-tag #86136) was originally tagged in Gull Lake in 2008 (Appendix A2-1).

5.0 DISCUSSION

A major objective of this ongoing study is to monitor the trajectory of the Lake Sturgeon population in the Keeyask Area (the future Keeyask reservoir) and Stephens Lake, during the construction and operation phases of the Keeyask Project. In addition, data collected during future studies will indicate whether changes in adult size and condition are occurring due to the project, whether fish are continuing to spawn in habitats used pre-Project, and whether coarse scale movement patterns have been altered. Adult Lake Sturgeon have now been monitored in the Keeyask area (Clark Lake to Gull Rapids [CL – GR]) and in Stephens Lake for 10-years (including 2014) prior to construction. The discussion below provides the main observations gathered from the 10 years of baseline data.

Overall, 1,048 Lake Sturgeon have been captured during spring spawning studies in the Keeyask area since 2001 (911 between CL and GR; 137 in Stephens Lake). The 2014 population estimate for the Keeyask area was 596 individuals, which was within the 95% confidence intervals of the previous four estimates dating back to 2006, indicating no significant change. The growth rate, lambda, in 2014 had confidence intervals that included one, indicating that the population was stable, similar to 2012. Annual population growth since 2006 has ranged from above to below one, but overall has averaged at or slightly above one, indicating a stable population. Annual survival rate was estimated to be 0.89; the best fit of the population model determined the same survival rate for 2004-2014 (95% confidence interval, 0.85-0.92%). It should be noted that the lack of tag returns from domestic harvesters in recent years is potentially a confounding factor. Given that harvest is occurring, and that a high proportion of the adult fish are marked (*i.e.*, 43% of adult Lake Sturgeon captured in 2014 were previously marked), it is likely that the actual number of fish is lower than the estimate, as unreported harvest of tagged fish leads to an overestimation of abundance. A population estimate could not be generated for Stephens Lake because of consistently low capture rates. Future monitoring of the Lake Sturgeon population in Stephens Lake will be conducted during spring on a biennial basis starting in 2016. Although numbers of fish may be initially too low to generate a population estimate, inter-annual comparisons of total numbers captured and CPUE will be used to determine whether the population is increasing.

Population estimates are derived using mark-recapture data, and mark-recapture data also provide information on fish movement. Overall, 300 Lake Sturgeon have been recaptured in the Keeyask area since tagging began in 2001. The majority of these fish were tagged and recaptured in the same general area (*i.e.* those originally tagged in Stephens Lake were recaptured in Stephens Lake, and those originally tagged in the Keeyask area were recaptured in the Keeyask area). Since 2001, a total of 12 fish have been recaptured either in the Keeyask area or Stephens Lake that were originally tagged in a different area. In the Keeyask area, two fish were originally tagged in Stephens Lake, one in Split Lake, and one in the Kelsey GS area (2% of total recaptures). Of the eight fish recaptured in Stephens Lake, all were originally

tagged in the Keeyask area (16% of all recaptures). The finding that adult sturgeon are more likely to be recaptured near the location that they were originally tagged suggests that long distance movements between reaches of this study area are rare. This observation is supported by results of an ongoing long-term adult Lake Sturgeon acoustic telemetry study initiated in the Keeyask area and Stephens Lake in 2011 (Hrenchuk and Barth 2015). A more fulsome discussion of adult Lake Sturgeon movements is provided in Hrenchuk and Barth (2015).

Data collected during these spring mark-recapture studies also provide information on numbers of spawning fish and locations of spawning areas. Spawning fish have represented 12% (n = 115) of fish captured since 2001 between CL and GR, with the majority of the spawning fish being captured in the vicinity of Birthday Rapids or at the upstream end of Gull Lake. In Stephens Lake, 15% of the fish captured during spring (n = 22) were classified as current-year spawners with all captures occurring in the immediate vicinity of Gull Rapids. Current-year spawning sturgeon have been observed in seven of 10 years in Stephens Lake and each year in the Keeyask area.

Construction of the Keeyask GS began on 15 July, 2014, a month after spawning occurred, and one week after the conclusion of this study. Therefore, the data in this report represent the final pre-construction monitoring data. Monitoring studies will continue in this area on a biennial basis for the next 24 years.

Key questions related to Lake Sturgeon monitoring relevant prior to the start of construction are addressed below:

- Is there a biologically relevant (and statistically significant) change in the rate of population growth for the Upper Split Lake area population, and the Keeyask area population?

Both the 2012 and 2014 estimate for the rate of population growth (lambda) had confidence limits that included one, which indicates a stable population. Furthermore, population growth since 2006 has varied around one, with no consistent periods either above or below one.

- Is there a biologically relevant (and statistically significant) change in survival for the Upper Split Lake area population, and the Keeyask area population?

Model results for 2014 indicate a consistent survival rate of 0.89 since 2004.

- Is the relative abundance/CPUE of adult Lake Sturgeon in Stephens Lake changing?

Starting in 2016, adult Lake Sturgeon population monitoring will be conducted over a six week during spring similar to that conducted in the Keeyask area. In the future, these data sets will be used to address this question.

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TABLES

Table 1: Number of fish, by species, captured during adult Lake Sturgeon population monitoring in the Keeaysk area (3 June – 9 July) and in Stephens Lake (10 – 13 June) during spring, 2014.

Common Name	Scientific Name	Abbreviation	Nelson River (BR - GR)	Stephens Lake	Total
Common Carp	*Cyprinus carpio*	CMCR	2	-	2
Lake Sturgeon	*Acipenser fulvescens*	LKST	239	9	248
Lake Whitefish	*Coregonus clupeaformis*	LKWH	6	-	6
Longnose Sucker	*Catostomus catostomus*	LNSC	1	-	1
Northern Pike	*Esox lucius*	NRPK	128	-	128
Sauger	*Sander canadensis*	SAUG	1	-	1
Walleye	*Sander vitreus*	WALL	52	-	52
White Sucker	*Catostomus commersonii*	WHSC	2	-	2

Table 2: Adult Lake sturgeon catch-per-unit-effort (CPUE; # LKST/ 45.7 m net/24 h) values observed during mark/recapture studies in the Keeyask area and Stephens Lake from 2001 – 2014.

Location	Year	# Sites	Total Lake Sturgeon[1]	Total Gillnet Hours	Total CPUE
Nelson River (CL-GR)[2]	2001	37	60	4538	0.32
	2002	19	59	4918	0.29
	2003	30	85	7565	0.27
	2004	17	51	6907	0.18
	2006	22	150	12587	0.29
	2008	16	52	9960	0.13
	2010	18	65	9128	0.17
	2011	38	34	5895	0.12
	2012	42	116	11332	0.25
	2014	62	239	17897	0.32
Stephens Lake[3]	2001*	18	24	6254	0.09
	2002*	15	4	3250	0.03
	2003	29	24	9638	0.06
	2004*	8	5	4638	0.03
	2005	72	7	12303	0.01
	2006	40	14	8926	0.04
	2010*	37	17	4898	0.08
	2011*	49	18	4410	0.06
	2012*	23	15	3555	0.10[4]
	2014*	5	9	476	0.45[4]

1. Does not include fish recaptured in the same waterbody in the season/year in which they were tagged.
2. Nelson River from Clark Lake (CL) to Gull Rapids (GR).
3. * Indicates studies where gillnetting was conducted primarily in the reach of Stephens Lake extending 6 km downstream of Gull Rapids
4. CPUE value reflects study objective (fish capture for acoustic tagging) and may not be comparable to studies conducted during previous years.

Table 3: Number and catch-per-unit-effort (CPUE; # LKST/ 45.7 m net/24 h) values, by zone, observed during adult Lake Sturgeon population monitoring in the Keeyask area, spring, 2014.

Location	Zone	# Sites	Total # Lake Sturgeon[1]	Total Gillnet Hours	Total CPUE
Nelson River (CL-GR)	BR-D	24	48	6789	0.17
	GL-A	9	21	2306	0.22
	GL-B	21	122	6643	0.44
	GL-C	8	48	2159	0.53

1. Does not include fish recaptured in the same waterbody in the season/year in which they were tagged

Table 4: Mean fork length (mm), weight (g), and relative condition factor (K) of Lake Sturgeon captured during adult Lake Sturgeon population monitoring in the Keeyask area and Stephens Lake, from 2001 – 2014.

Location	Year	Fork Length (mm)				Weight (g)				K		
		n[3]	Mean	Std[4]	Range	n	Mean	Std	Range	n	Mean	Range
Nelson River (CL-GR)[1]	2001	79	1022	148	739-1355	78	9984	5059	3500-24000	78	0.88	0.64-1.26
	2002	67	1055	149	680-1415	66	12198	6367	2722-34020	66	0.97	0.73-1.44
	2003	92	1067	148	700-1540	87	11949	6681	3000-54431	87	0.94	0.67-1.49
	2004	51	1149	152	870-1468	51	14115	6747	5443-31298	51	0.87	0.67-1.10
	2006	150	1003	217	300-1550	146	10343	7071	1134-43091	146	0.86	0.61-1.44
	2008	92	1057	223	648-1551	50	12186	8207	2268-40823	50	0.87	0.66-1.09
	2010	65	901	267	443-1390	65	8056	6977	500-29937	65	0.83	0.57-1.11
	2011	34	1090	219	664-1610	34	13209	9052	2268-43092	34	0.89	0.61-1.19
	2012	116	844	284	330-1620	116	7536	8214	200-37648	116	0.85	0.51-1.23
	2014	239	838	229	449-1640	238	6111	5873	650-29710	238	0.82	0.38-1.39
Stephens Lake[2]	2001*	24	1077	181	792-1447	24	13148	9499	4400-40000	24	0.94	0.71-1.56
	2002*	4	1045	51	1001-1100	4	10888	2995	8050-15000	4	0.94	0.80-1.13

	2003	24	1018	206	555-1340	23	11212	7205	1700-26000	23	0.90	0.61-1.20
	2004*	5	1180	112	1025-1324	4	15347	4577	9450-20412	4	0.97	0.72-1.32
	2005	7	922	130	763-1100	7	8701	4989	3636-15455	7	1.00	0.82-1.44
	2006	14	1144	162	902-1421	13	13224	6071	5897-24948	13	0.86	0.73-1.03
	2010*	17	1028	162	730-1349	16	9993	5272	3200-24040	16	0.83	0.65-0.98
	2011	18	890	255	362-1208	12	9053	3984	1082-16556	12	0.87	0.76-0.99
	2012*	15	896	144	645-1176	11	7468	3113	3901-14969	11	0.92	0.74-1.07
	2014*	9	941	115	810-1150	9	6854	3374	4082-13608	9	0.77	0.66-1.01

1. Nelson River from Clark Lake (CL) to Gull Rapids (GR).
2. * Indicates studies where gillnetting was conducted primarily in the reach of Stephens Lake extending 6 km downstream of Gull Rapids.
3. Number of fish measured.
4. Standard deviation

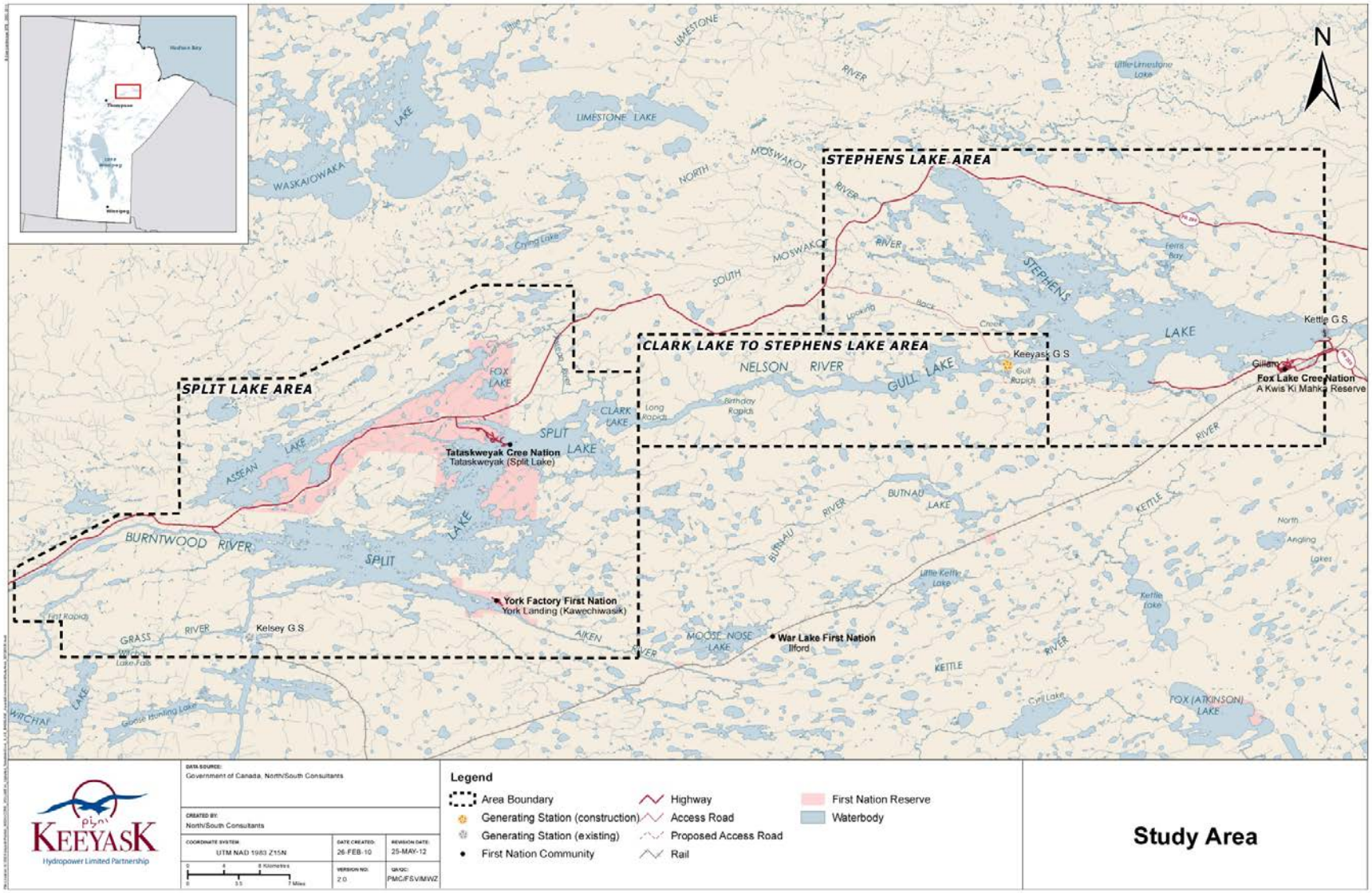
Table 5: Sex and maturity data for Lake Sturgeon captured in the Keeyask area and Stephens Lake during adult population monitoring, spring, 2001-2014.

Location	Year	Sex and Maturity[2]						# of Spawners	Unknown Maturity	Total
		Male			Female					
		7	8	9	2	3	4			
Nelson River (CL-GR)[1]	2001	5	10	1	3	-	-	19	41	60
	2002	8	1	5	-	-	-	14	46	60
	2003	3	-	-	1	-	-	4	89	93
	2004	3	2	-	-	-	-	5	46	51
	2006	13	3	-	-	-	-	16	134	150
	2008	1	1	1	-	-	-	3	49	52
	2010	5	3	-	-	-	-	8	57	65
	2011	6	4	1	1	1	2	15	19	34
	2012	1	4	2	-	-	-	7	109	116
	2014	8	7	2	4	-	3	24(21)*	227	248
Stephens Lake	2001	5	-	-	3	-	-	8	16	24
	2002	3	-	-	-	-	-	3	1	4
	2003	2	-	-	1	-	-	3	21	24
	2004	-	-	-	-	-	-	-	5	5
	2005	-	-	-	-	-	-	-	7	7
	2006	-	1	-	-	-	-	1	15	16
	2010	-	-	-	-	-	-	-	17	17
	2011	1	-	-	-	-	-	1	29	30
	2012	3	1	-	-	-	-	4	11	15
	2014	-	2	-	-	-	-	2	7	9

1. Nelson River from Clark Lake (CL) to Gull Rapids (GR).
2. Refer to Section 3.2 for maturity codes.

*Maturity status columns include recaptures of fish whose maturity status progressed between captures (e.g., would include recaptures of fish initially captured in maturing condition and recaptured in ripe or spent condition). Number in brackets indicates the total number of individual spawners captured.

FIGURES


N
STEPHENS LAKE AREA
CLARK LAKE TO STEPHENS LAKE AREA
SPLIT LAKE AREA
Tataskweyak Cree Nation
Tataskweyak (Split Lake)
York Factory First Nation
York Landing (Kawechiwasik)
War Lake First Nation
Ilford
Keeyask G.S
Kettle G.S
Kelsey G.S
Fox Lake Cree Nation
A Kwis Ki Mahka Reserve
LIMESTONE LAKE
NELSON RIVER
GULL LAKE
SPLIT LAKE
CLARK LAKE
FOX LAKE
BURNTWOOD RIVER
GRASS RIVER
MOOSE NOSE LAKE
BUTNAU LAKE
KETTLE RIVER
FOX (ATKINSON) LAKE
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Revision Date: 25-MAY-12
Version No: 2.0
QA/QC: PMC/FS/VM/WZ
Legend
Area Boundary
Generating Station (construction)
Generating Station (existing)
First Nation Community
Highway
Access Road
Proposed Access Road
Rail
First Nation Reserve
Waterbody
Study Area

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

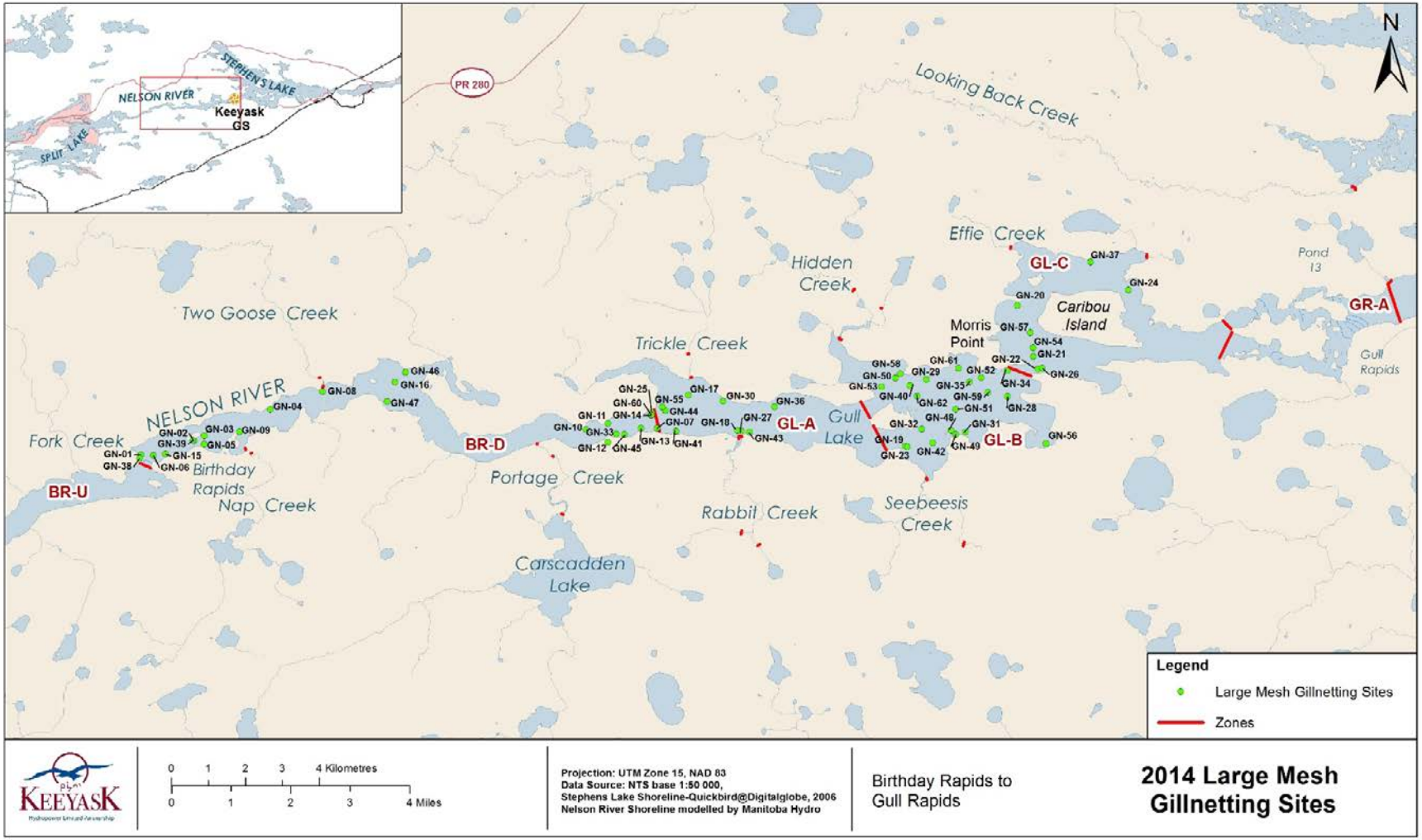

Figure 2: Sites fished with large mesh gill net gangs in the Nelson River between Birthday Rapids and Gull Rapids during spring, 2014.

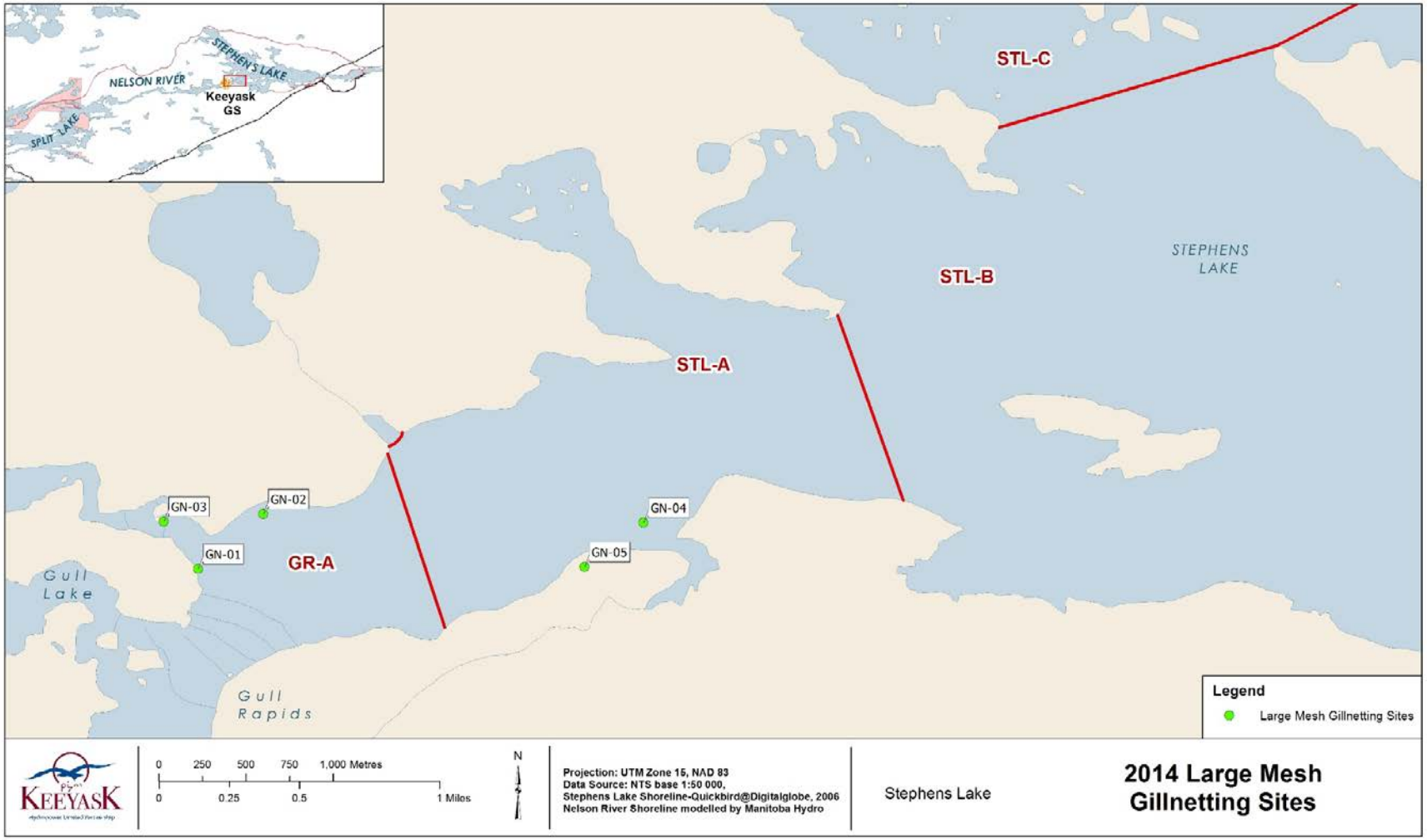

Figure 3: Sites fished with large mesh gill net gangs in Stephens Lake during spring, 2014.

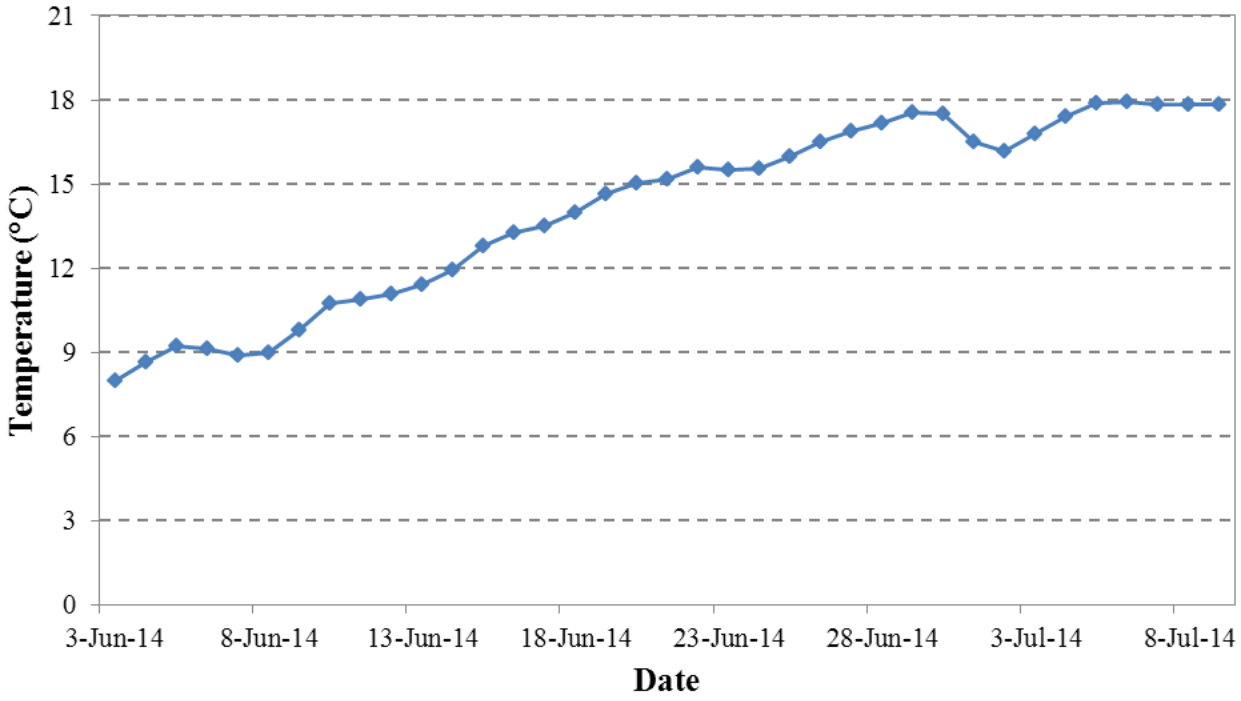

Figure 4: Mean daily water temperature in the Nelson River mainstem, as measured in Gull Lake, 3 June – 9 July, 2014.

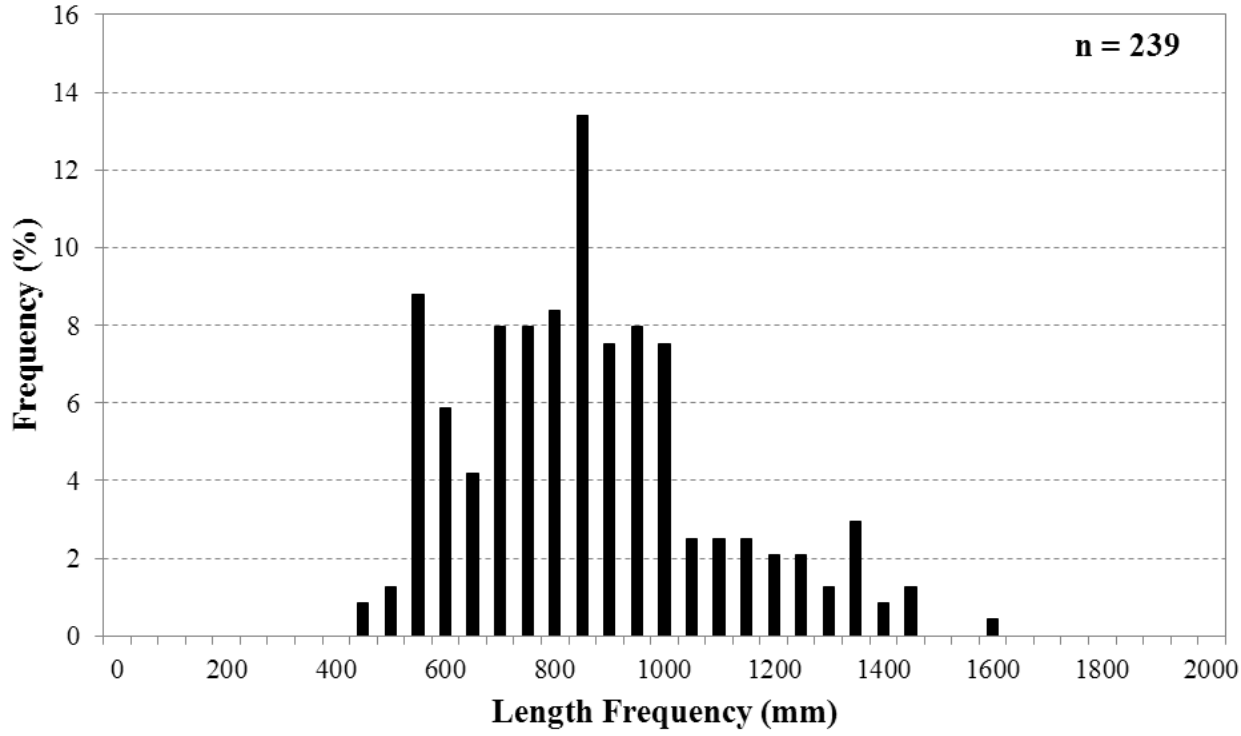

Figure 5: Length-frequency distribution for Lake Sturgeon captured in large mesh gill

nets set in the Keeyask area during spring, 2014.

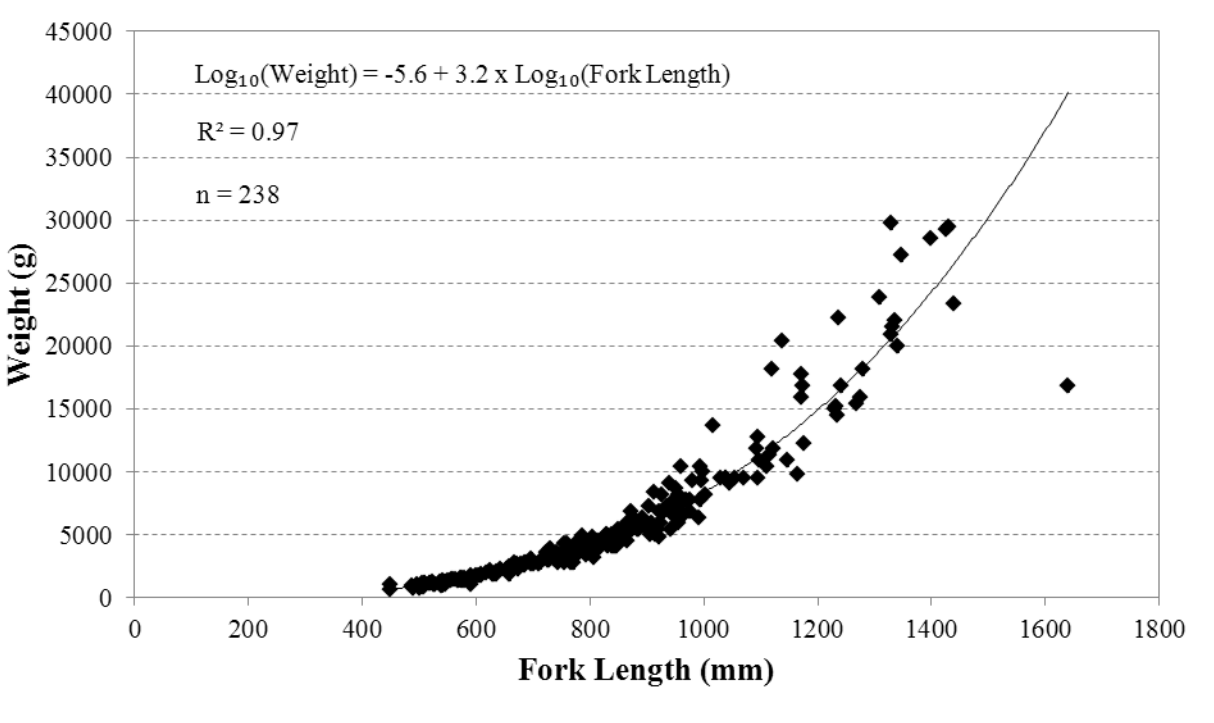

Figure 6: Length-weight regression for Lake Sturgeon captured in large mesh gill nets set in the Keeyask area during spring, 2014.

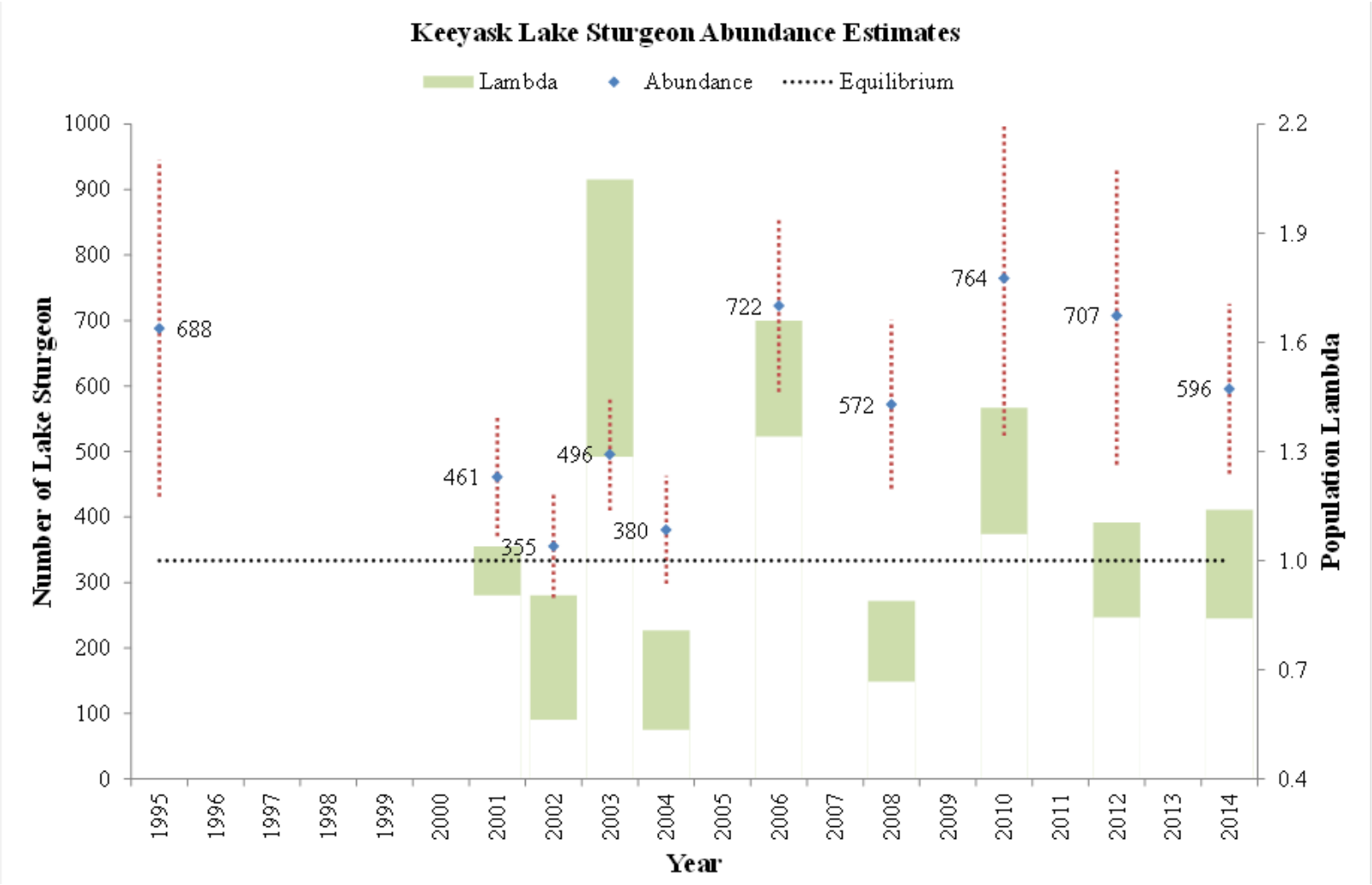

Figure 7. **Adult Lake Sturgeon abundance estimates between 1995 and 2014 for the Keeyask area showing the estimate (blue dot and text) and the upper and lower 95% confidence intervals (dotted lines). The 95% confidence intervals surrounding the population lambda (growth rate) are presented relative to 1 (equilibrium, dotted horizontal line) as green boxes.**

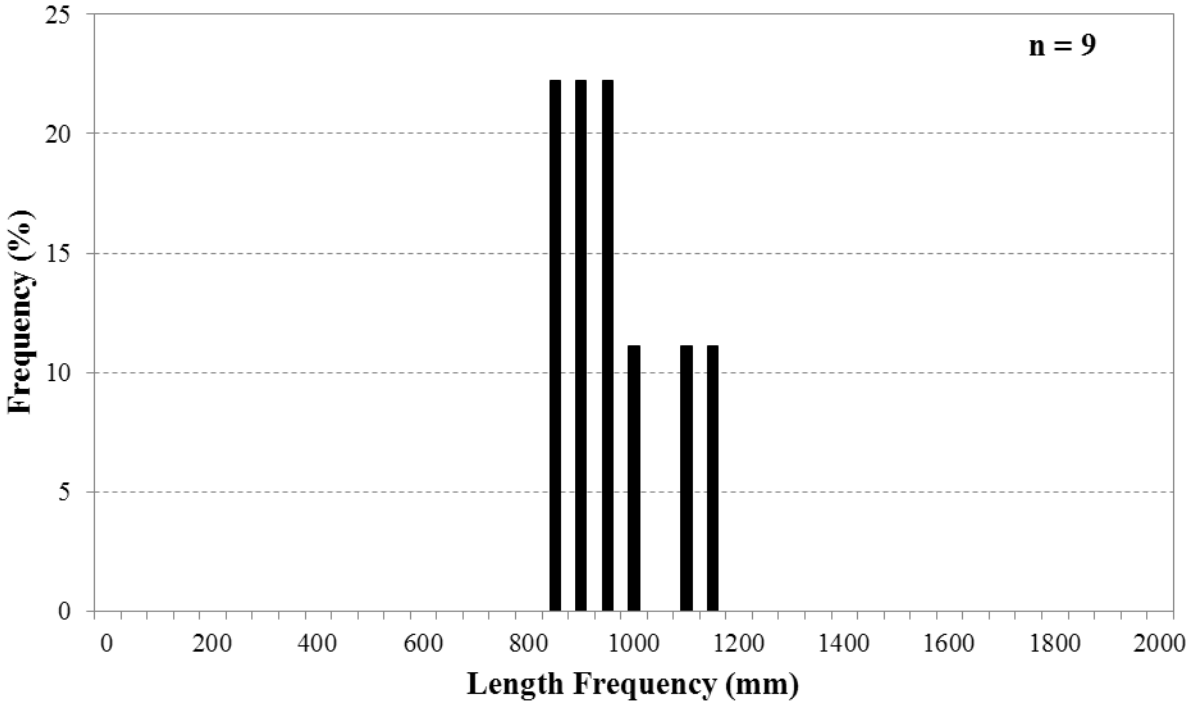

Figure 8: Length-frequency distribution for Lake Sturgeon captured in large mesh gill nets set in Stephens Lake during spring, 2014.

APPENDICES

APPENDIX 1:
TAGGING AND BIOLOGICAL INFORMATION FOR LAKE STURGEON CAPTURED IN THE KEEYASK AREA AND GULL RAPIDS AND IN STEPHENS LAKE IN SPRING, 2014

Table A1- 1: Tagging and biological information, by waterbody, for Lake Sturgeon marked with Floy-tags and PIT tags in the Keeyask area and in Stephens Lake during spring, 2014.

Location[1]	Zone	Date	Prefix	Floy-tag	PIT Tag	Fork Length (mm)	Total Length (mm)	Weight (g)	Sex[2]	Maturity[3]	Age
Nelson River (BR - GR)	GL-A	25-Jun-14	NSC	91376	900 226000629127	783	896	3629	-	-	-
Nelson River (BR - GR)	GL-A	25-Jun-14	NSC	91377	900 226000629155	849	956	4536	-	-	-
Nelson River (BR - GR)	GL-C	26-Jun-14	NSC	91378	900 226000629111	591	669	1050	-	-	8
Nelson River (BR - GR)	GL-B	26-Jun-14	NSC	91379	900 226000629189	609	692	1850	-	-	8
Nelson River (BR - GR)	GL-B	26-Jun-14	NSC	91380	900 226000629006	909	1024	5897	-	-	-
Nelson River (BR - GR)	BR-D	26-Jun-14	NSC	91381	900 226000629178	847	938	4082	-	-	-
Nelson River (BR - GR)	GL-B	27-Jun-14	NSC	91382	900 226000629160	842	940	4536	-	-	-
Nelson River (BR - GR)	BR-D	26-Jun-14	NSC	91383	900 226000629177	895	1003	5897	-	-	-
Nelson River (BR - GR)	GL-B	27-Jun-14	NSC	91384	900 226000629210	758	855	3500	-	-	-
Nelson River (BR - GR)	GL-B	27-Jun-14	NSC	91385	900 226000629243	791	905	4536	-	-	-
Nelson River (BR - GR)	GL-B	27-Jun-14	NSC	91386	900 226000629233	661	751	2000	-	-	8
Nelson River (BR - GR)	GL-B	27-Jun-14	NSC	91387	900 226000629222	660	734	2000	-	-	11
Nelson River (BR - GR)	GL-A	27-Jun-14	NSC	91388	900 226000629172	832	925	4536	-	-	-
Nelson River (BR - GR)	GL-A	27-Jun-14	NSC	91389	900 043000103813	489	555	700	-	-	6
Nelson River (BR - GR)	GL-A	27-Jun-14	NSC	91391	900 226000629223	1095	1209	9525	-	-	-
Nelson River (BR - GR)	BR-D	27-Jun-14	NSC	91392	900 226000629063	1016	1243	13608	-	-	-
Nelson River (BR - GR)	GL-B	28-Jun-14	NSC	91393	900 226000629106	760	853	3250	-	-	-
Nelson River (BR - GR)	GL-B	28-Jun-14	NSC	91394	900 226000629203	714	817	3000	-	-	-
Nelson River (BR - GR)	GL-B	28-Jun-14	NSC	91395	900 226000629083	945	1061	6804	-	-	-
Nelson River (BR - GR)	GL-C	29-Jun-14	NSC	91396	900 226000629034	920	1020	5443	-	-	-
Nelson River (BR - GR)	GL-C	29-Jun-14	NSC	91397	900 226000629086	674	760	2225	-	-	-
Nelson River (BR - GR)	GL-B	29-Jun-14	NSC	91398	900 226000629068	655	720	2150	-	-	6
Nelson River (BR - GR)	GL-B	29-Jun-14	NSC	91399	900 043000103850	520	582	1100	-	-	6

Table A1- 1: Tagging and biological information, by waterbody, for Lake Sturgeon marked with Floy-tags and PIT tags in the Keeyask area and in Stephens Lake during spring, 2014.

Location[1]	Zone	Date	Prefix	Floy-tag	PIT Tag	Fork Length (mm)	Total Length (mm)	Weight (g)	Sex[2]	Maturity[3]	Age
Nelson River (BR - GR)	GL-B	20-Jun-14	NSC	101376	900 226000629136	815	906	4400	-	-	-
Nelson River (BR - GR)	GL-B	20-Jun-14	NSC	101377	900 226000629040	778	845	4350	-	-	-
Nelson River (BR - GR)	GL-B	21-Jun-14	NSC	101378	900 226000629137	858	974	4990	-	-	-
Nelson River (BR - GR)	GL-B	21-Jun-14	NSC	101379	900 226000629008	859	965	4990	-	-	-
Nelson River (BR - GR)	GL-B	21-Jun-14	NSC	101380	900 226000629075	854	958	4990	-	-	-
Nelson River (BR - GR)	GL-B	21-Jun-14	NSC	101381	900 226000629196	565	659	1400	-	-	6
Nelson River (BR - GR)	GL-B	21-Jun-14	NSC	101382	900 226000629132	801	908	4082	-	-	-
Nelson River (BR - GR)	GL-B	23-Jun-14	NSC	101383	900 226000629170	1148	1288	10886	-	-	-
Nelson River (BR - GR)	GL-B	23-Jun-14	NSC	101384	900 226000629053	546	623	1200	-	-	6
Nelson River (BR - GR)	GL-C	23-Jun-14	NSC	101385	900 226000629241	629	713	1800	-	-	8
Nelson River (BR - GR)	GL-C	23-Jun-14	NSC	101386	900 226000629025	574	655	1500	-	-	6
Nelson River (BR - GR)	GL-C	23-Jun-14	NSC	101387	900 226000629240	538	626	1200	-	-	5
Nelson River (BR - GR)	BR-D	22-Jun-14	NSC	101388	900 226000629119	808	916	4536	-	-	-
Nelson River (BR - GR)	BR-D	22-Jun-14	NSC	101389	900 226000629094	943	1035	5443	-	-	-
Nelson River (BR - GR)	BR-D	22-Jun-14	NSC	101390	900 226000629092	1176	1291	12247	-	-	-
Nelson River (BR - GR)	GL-B	22-Jun-14	NSC	101391	900 226000629125	794	890	3400	-	-	-
Nelson River (BR - GR)	GL-B	22-Jun-14	NSC	101392	900 226000629202	569	648	1300	-	-	6
Nelson River (BR - GR)	GL-B	22-Jun-14	NSC	101393	900 226000629120	586	655	1400	-	-	8
Nelson River (BR - GR)	GL-B	22-Jun-14	NSC	101394	900 226000629164	822	921	4536	-	-	-
Nelson River (BR - GR)	GL-A	21-Jun-14	NSC	101396	900 226000629134	1348	1455	27216	-	-	-
Nelson River (BR - GR)	GL-A	25-Jun-14	NSC	101430	900 226000629242	664	721	2350	-	-	8
Nelson River (BR - GR)	GL-A	25-Jun-14	NSC	101431	900 226000629076	776	860	4082	-	-	-
Nelson River (BR - GR)	GL-A	25-Jun-14	NSC	101432	900 226000629078	848	945	4536	-	-	-

Table A1- 1: Tagging and biological information, by waterbody, for Lake Sturgeon marked with Floy-tags and PIT tags in the Keeyask area and in Stephens Lake during spring, 2014.

Location[1]	Zone	Date	Prefix	Floy-tag	PIT Tag	Fork Length (mm)	Total Length (mm)	Weight (g)	Sex[2]	Maturity[3]	Age
Nelson River (BR - GR)	GL-B	25-Jun-14	NSC	101433	900 226000629100	804	895	4082	-	-	-
Nelson River (BR - GR)	GL-B	25-Jun-14	NSC	101434	900 226000629186	831	946	4082	-	-	-
Nelson River (BR - GR)	GL-B	25-Jun-14	NSC	101435	900 226000629175	501	563	850	-	-	6
Nelson River (BR - GR)	GL-C	25-Jun-14	NSC	101436	900 226000629050	701	794	2700	-	-	8
Nelson River (BR - GR)	GL-C	25-Jun-14	NSC	101437	900 226000629247	605	688	1750	-	-	8
Nelson River (BR - GR)	GL-C	25-Jun-14	NSC	101438	900 226000629005	496	570	1000	-	-	6
Nelson River (BR - GR)	BR-D	24-Jun-14	NSC	101439	900 226000629187	856	959	4990	-	-	-
Nelson River (BR - GR)	GL-A	24-Jun-14	NSC	101440	900 226000629037	1040	1140	9525	-	-	-
Nelson River (BR - GR)	GL-B	24-Jun-14	NSC	101441	900 226000629071	767	869	2722	-	-	-
Nelson River (BR - GR)	GL-B	24-Jun-14	NSC	101442	900 226000629191	840	955	4536	-	-	-
Nelson River (BR - GR)	GL-B	24-Jun-14	NSC	101443	900 226000629154	995	1115	7711	-	-	-
Nelson River (BR - GR)	GL-B	24-Jun-14	NSC	101444	900 226000629032	550	628	1300	-	-	-
Nelson River (BR - GR)	GL-B	24-Jun-14	NSC	101445	900 226000629018	591	684	1750	-	-	-
Nelson River (BR - GR)	GL-B	24-Jun-14	NSC	101446	900 226000629143	528	605	1050	-	-	-
Nelson River (BR - GR)	BR-D	23-Jun-14	NSC	101447	900 226000629123	1045	1167	9072	-	-	-
Nelson River (BR - GR)	GL-B	23-Jun-14	NSC	101448	900 226000629042	558	637	1450	-	-	6
Nelson River (BR - GR)	GL-B	23-Jun-14	NSC	101449	900 226000629088	830	940	4990	-	-	-
Nelson River (BR - GR)	GL-B	23-Jun-14	NSC	101450	900 226000629074	906	1005	4990	-	-	-
Nelson River (BR - GR)	GL-B	8-Jul-14	NSC	103631	900 226000629019	813	897	4300	-	-	-
Nelson River (BR - GR)	GL-B	8-Jul-14	NSC	103632	900 226000629238	726	803	3100	-	-	11
Nelson River (BR - GR)	GL-B	8-Jul-14	NSC	103633	900 226000629000	878	961	6350	-	-	-
Nelson River (BR - GR)	GL-C	7-Jul-14	NSC	103634	900 226000629015	668	742	2350	-	-	8
Nelson River (BR - GR)	GL-B	7-Jul-14	NSC	103635	900 226000629080	449	485	650	-	-	6

Table A1- 1: Tagging and biological information, by waterbody, for Lake Sturgeon marked with Floy-tags and PIT tags in the Keeyask area and in Stephens Lake during spring, 2014.

Location[1]	Zone	Date	Prefix	Floy-tag	PIT Tag	Fork Length (mm)	Total Length (mm)	Weight (g)	Sex[2]	Maturity[3]	Age
Nelson River (BR - GR)	GL-B	6-Jul-14	NSC	103636	900 226000629007	737	818	3100	-	-	-
Nelson River (BR - GR)	GL-B	6-Jul-14	NSC	103637	900 226000629156	743	836	3550	-	-	11
Nelson River (BR - GR)	GL-B	6-Jul-14	NSC	103638	900 226000629057	731	811	3900	-	-	10
Nelson River (BR - GR)	GL-B	6-Jul-14	NSC	103639	900 226000629051	830	909	4200	-	-	-
Nelson River (BR - GR)	GL-C	6-Jul-14	NSC	103640	900 043000103861	487	545	950	-	-	6
Nelson River (BR - GR)	GL-C	6-Jul-14	NSC	103641	900 226000629245	786	877	4850	-	-	-
Nelson River (BR - GR)	GL-C	6-Jul-14	NSC	103642	900 226000629113	523	574	1200	-	-	6
Nelson River (BR - GR)	GL-C	6-Jul-14	NSC	103643	900 226000629043	1399	1530	28576	-	-	-
Nelson River (BR - GR)	GL-B	6-Jul-14	NSC	103644	900 226000629194	635	692	1850	-	-	8
Nelson River (BR - GR)	GL-B	5-Jul-14	NSC	103645	900 226000629144	672	751	2650	-	-	11
Nelson River (BR - GR)	GL-B	5-Jul-14	NSC	103646	900 226000629225	541	593	1300	-	-	4
Nelson River (BR - GR)	GL-C	5-Jul-14	NSC	103647	900 226000629147	659	736	1850	-	-	-
Nelson River (BR - GR)	GL-C	5-Jul-14	NSC	103648	900 043000103868	609	667	1700	-	-	6
Nelson River (BR - GR)	GL-C	5-Jul-14	NSC	103649	900 226000629219	764	844	3600	-	-	11
Nelson River (BR - GR)	GL-B	5-Jul-14	NSC	103650	900 226000629200	875	974	5443	-	-	-
Nelson River (BR - GR)	GL-B	3-Jul-14	NSC	105101	900 043000103872	679	730	2700	-	-	8
Nelson River (BR - GR)	GL-B	3-Jul-14	NSC	105102	900 043000103836	506	565	950	-	-	6
Nelson River (BR - GR)	GL-B	3-Jul-14	NSC	105103	900 043000103825	631	690	1850	-	-	7
Nelson River (BR - GR)	GL-B	3-Jul-14	NSC	105104	900 043000103894	580	624	1350	-	-	6
Nelson River (BR - GR)	GL-C	3-Jul-14	NSC	105105	900 226000629095	668	703	2750	-	-	11
Nelson River (BR - GR)	GL-C	3-Jul-14	NSC	105106	900 043000103823	617	676	1900	-	-	6
Nelson River (BR - GR)	GL-C	3-Jul-14	NSC	105109	900 226000629002	548	597	1250	-	-	6
Nelson River (BR - GR)	GL-C	3-Jul-14	NSC	105110	900 226000629198	740	812	3250	-	-	9

Table A1- 1: Tagging and biological information, by waterbody, for Lake Sturgeon marked with Floy-tags and PIT tags in the Keeyask area and in Stephens Lake during spring, 2014.

Location[1]	Zone	Date	Prefix	Floy-tag	PIT Tag	Fork Length (mm)	Total Length (mm)	Weight (g)	Sex[2]	Maturity[3]	Age
Nelson River (BR - GR)	GL-B	3-Jul-14	NSC	105111	900 226000629027	730	808	3050	-	-	9
Nelson River (BR - GR)	GL-C	3-Jul-14	NSC	105112	900 226000629131	1040	1120	9525	-	-	-
Nelson River (BR - GR)	GL-B	3-Jul-14	NSC	105113	900 226000629166	994	1080	10433	-	-	-
Nelson River (BR - GR)	GL-B	5-Jul-14	NSC	105114	900 043000103835	636	708	2000	-	-	8
Nelson River (BR - GR)	GL-B	5-Jul-14	NSC	105115	900 043000103817	556	610	1350	-	-	6
Nelson River (BR - GR)	GL-B	5-Jul-14	NSC	105116	900 226000629217	736	814	3550	-	-	10
Nelson River (BR - GR)	GL-A	5-Jul-14	NSC	105117	900 226000629229	998	1092	9979	-	-	-
Nelson River (BR - GR)	GL-B	4-Jul-14	NSC	105118	900 226000629014	892	974	6350	-	-	-
Nelson River (BR - GR)	GL-B	4-Jul-14	NSC	105119	900 226000629192	658	712	2450	-	-	8
Nelson River (BR - GR)	GL-B	4-Jul-14	NSC	105120	900 226000629209	538	591	1150	-	-	6
Nelson River (BR - GR)	GL-B	4-Jul-14	NSC	105121	900 226000629122	507	564	850	-	-	6
Nelson River (BR - GR)	GL-B	4-Jul-14	NSC	105122	900 226000629041	742	816	3350	-	-	11
Nelson River (BR - GR)	GL-B	4-Jul-14	NSC	105123	900 226000629193	893	969	5897	-	-	-
Nelson River (BR - GR)	GL-B	3-Jul-14	NSC	105124	900 226000629018	951	1076	8618	-	-	-
Nelson River (BR - GR)	GL-B	3-Jul-14	NSC	105125	900 226000629110	849	947	5443	-	-	-
Nelson River (BR - GR)	GL-B	17-Jun-14	NSC	105401	900 226000629062	842	939	4082	-	-	-
Nelson River (BR - GR)	GL-C	17-Jun-14	NSC	105402	900 226000629206	1111	1219	10433	-	-	-
Nelson River (BR - GR)	GL-C	17-Jun-14	NSC	105403	900 226000629181	992	1104	6350	-	-	-
Nelson River (BR - GR)	GL-C	17-Jun-14	NSC	105404	900 226000629089	755	840	2722	-	-	-
Nelson River (BR - GR)	GL-C	17-Jun-14	NSC	105405	900 226000629090	807	902	3175	-	-	-
Nelson River (BR - GR)	BR-D	16-Jun-14	NSC	105406	900 226000629060	961	1052	6350	-	-	-
Nelson River (BR - GR)	BR-D	16-Jun-14	NSC	105407	900 226000629158	1640	3063	16783	-	-	-
Nelson River (BR - GR)	BR-D	15-Jun-14	NSC	105408	900 226000629031	805	903	4763	M	9	-

Table A1- 1: Tagging and biological information, by waterbody, for Lake Sturgeon marked with Floy-tags and PIT tags in the Keeyask area and in Stephens Lake during spring, 2014.

Location[1]	Zone	Date	Prefix	Floy-tag	PIT Tag	Fork Length (mm)	Total Length (mm)	Weight (g)	Sex[2]	Maturity[3]	Age
Nelson River (BR - GR)	BR-D	15-Jun-14	NSC	105409	900 226000629201	956	1063	7257	-	-	-
Nelson River (BR - GR)	GL-C	15-Jun-14	NSC	105410	900 226000629139	945	1060	6577	-	-	-
Nelson River (BR - GR)	BR-D	14-Jun-14	NSC	105411	-	1380	1520	-	F	4	-
Nelson River (BR - GR)	GL-B	14-Jun-14	NSC	105412	900 226000629130	1341	1451	19958	-	-	-
Nelson River (BR - GR)	GL-B	14-Jun-14	NSC	105414	900 226000629141	643	742	2268	-	-	-
Nelson River (BR - GR)	BR-D	13-Jun-14	NSC	105415	900 226000629081	873	982	6804	-	-	-
Nelson River (BR - GR)	BR-D	13-Jun-14	NSC	105416	900 226000629001	921	1021	4763	-	-	-
Nelson River (BR - GR)	BR-D	12-Jun-14	NSC	105417	900 226000629221	925	1033	5897	-	-	-
Nelson River (BR - GR)	BR-D	11-Jun-14	NSC	105418	900 226000629121	1440	1520	23360	F	4	-
Nelson River (BR - GR)	BR-D	10-Jun-14	NSC	105419	900 226000629237	955	990	8165	M	7	-
Nelson River (BR - GR)	BR-D	10-Jun-14	NSC	105420	900 226000629188	912	1025	5443	M	7	-
Nelson River (BR - GR)	BR-D	10-Jun-14	NSC	105421	900 226000629146	760	876	4309	-	-	-
Nelson River (BR - GR)	BR-D	9-Jun-14	NSC	105422	900 226000629059	912	1020	8391	M	7	-
Nelson River (BR - GR)	BR-D	8-Jun-14	NSC	105423	-	1310	1460	23814	F	2	-
Nelson River (BR - GR)	BR-D	6-Jun-14	NSC	105424	-	970	1054	7711	-	-	-
Nelson River (BR - GR)	BR-D	5-Jun-14	NSC	105425	-	939	1070	9072	-	-	-
Nelson River (BR - GR)	GL-C	18-Jun-14	NSC	105477	900 043000103883	518	605	1100	-	-	-
Nelson River (BR - GR)	GL-C	18-Jun-14	NSC	105478	900 043000103845	625	708	2100	-	-	-
Nelson River (BR - GR)	GL-C	18-Jun-14	NSC	105479	-	886	1001	5443	-	-	-
Nelson River (BR - GR)	GL-C	18-Jun-14	NSC	105480	-	843	951	4082	-	-	-
Nelson River (BR - GR)	GL-B	18-Jun-14	NSC	105481	900 226000629056	788	895	4082	-	-	-
Nelson River (BR - GR)	GL-C	19-Jun-14	NSC	105483	900 226000629208	579	665	1550	-	-	-
Nelson River (BR - GR)	GL-C	19-Jun-14	NSC	105485	900 226000629046	687	784	2800	-	-	-

Table A1- 1: Tagging and biological information, by waterbody, for Lake Sturgeon marked with Floy-tags and PIT tags in the Keeyask area and in Stephens Lake during spring, 2014.

Location[1]	Zone	Date	Prefix	Floy-tag	PIT Tag	Fork Length (mm)	Total Length (mm)	Weight (g)	Sex[2]	Maturity[3]	Age
Nelson River (BR - GR)	GL-C	19-Jun-14	NSC	105486	900 226000629069	743	830	3300	-	-	-
Nelson River (BR - GR)	GL-B	19-Jun-14	NSC	105487	900 226000629045	855	971	4990	-	-	-
Nelson River (BR - GR)	BR-D	19-Jun-14	NSC	105488	900 226000629171	845	955	4536	-	-	-
Nelson River (BR - GR)	GL-C	20-Jun-14	NSC	105491	900 226000629107	698	756	3050	-	-	-
Nelson River (BR - GR)	GL-B	20-Jun-14	NSC	105492	900 226000629011	664	758	2400	-	-	-
Nelson River (BR - GR)	GL-B	20-Jun-14	NSC	105493	900 226000629197	728	835	3000	-	-	-
Nelson River (BR - GR)	GL-B	18-Jun-14	NSC	105500	900 226000629052	858	947	4990	-	-	-
Nelson River (BR - GR)	GL-B	3-Jul-14	NSC	105676	900 043000103822	526	581	1050	-	-	6
Nelson River (BR - GR)	GL-B	3-Jul-14	NSC	105677	900 043000103832	575	643	1325	-	-	6
Nelson River (BR - GR)	GL-B	3-Jul-14	NSC	105679	900 226000629030	830	908	4990	-	-	-
Nelson River (BR - GR)	GL-A	2-Jul-14	NSC	105680	900 226000629096	810	905	4082	-	-	-
Nelson River (BR - GR)	GL-B	2-Jul-14	NSC	105681	900 226000629199	955	1075	6804	-	-	-
Nelson River (BR - GR)	GL-B	2-Jul-14	NSC	105682	900 226000629148	755	845	3175	-	-	-
Nelson River (BR - GR)	GL-B	2-Jul-14	NSC	105683	900 226000629048	955	1055	5897	-	-	-
Nelson River (BR - GR)	GL-B	2-Jul-14	NSC	105684	900 226000629072	675	760	2400	-	-	-
Nelson River (BR - GR)	GL-C	2-Jul-14	NSC	105685	900 043000103812	600	670	1700	-	-	-
Nelson River (BR - GR)	GL-B	2-Jul-14	NSC	105686	900 043000103826	560	650	1400	-	-	-
Nelson River (BR - GR)	GL-B	2-Jul-14	NSC	105687	900 043000103873	450	570	1000	-	-	-
Nelson River (BR - GR)	GL-B	2-Jul-14	NSC	105688	900 043000103803	510	570	900	-	-	-
Nelson River (BR - GR)	GL-B	2-Jul-14	NSC	105689	900 043000103841	510	595	1100	-	-	-
Nelson River (BR - GR)	GL-B	2-Jul-14	NSC	105690	900 043000103829	575	655	1500	-	-	-
Nelson River (BR - GR)	GL-B	2-Jul-14	NSC	105691	900 043000103824	510	595	1150	-	-	-
Nelson River (BR - GR)	GL-B	2-Jul-14	NSC	105692	900 226000629079	865	985	5443	-	-	-

Table A1- 1: Tagging and biological information, by waterbody, for Lake Sturgeon marked with Floy-tags and PIT tags in the Keeyask area and in Stephens Lake during spring, 2014.

Location[1]	Zone	Date	Prefix	Floy-tag	PIT Tag	Fork Length (mm)	Total Length (mm)	Weight (g)	Sex[2]	Maturity[3]	Age
Nelson River (BR - GR)	GL-B	2-Jul-14	NSC	105693	900 226000629029	655	745	2250	-	-	-
Nelson River (BR - GR)	GL-A	2-Jul-14	NSC	105694	900 226000629114	740	855	3500	-	-	-
Nelson River (BR - GR)	GL-B	30-Jun-14	NSC	105695	900 226000629234	930	1020	6804	-	-	-
Nelson River (BR - GR)	GL-B	30-Jun-14	NSC	105696	900 226000629115	865	990	4990	-	-	-
Nelson River (BR - GR)	GL-C	30-Jun-14	NSC	105697	900 226000629185	685	795	2500	-	-	-
Nelson River (BR - GR)	GL-C	30-Jun-14	NSC	105698	900 226000629009	755	830	3629	-	-	-
Nelson River (BR - GR)	GL-B	29-Jun-14	NSC	105699	900 043000103881	502	570	750	-	-	-
Nelson River (BR - GR)	GL-B	29-Jun-14	NSC	105700	900 226000629099	540	605	900	-	-	-
Stephens Lake	GR-A	11-Jun-14	-	-	-	910	1015	4990	-	-	-
Stephens Lake	STL-A	13-Jun-14	-	-	-	880	976	4536	M	8	-
Stephens Lake	GR-A	13-Jun-14	-	-	-	1150	2160	13608	-	-	-
Stephens Lake	GR-A	13-Jun-14	-	-	-	842	836	4082	-	-	-
Stephens Lake	GR-A	13-Jun-14	-	-	-	810	908	4082	-	-	-

1&2 – See section 3.2 for a description of sex and maturity

APPENDIX 2:
TAGGING AND BIOLOGICAL INFORMATION FOR LAKE STURGEON RECAPTURED IN THE KEEYASK AREA AND IN STEPHENS LAKE DURING SPRING, 2014.

Table A2- 1: Tagging and biological information for Lake Sturgeon recaptured in the Keeyask area and in Stephens Lake during spring, 2014.

Location[1]	Zone	Date	Prefix	Floy-tag	PIT Tag	Fork Length (mm)	Total Length (mm)	Weight (g)	Sex[2]	Maturity[3]	Age
Nelson River (CL-GR)	BR-D	28-Jun-02	NSC	48806	-	1021	1123	8618	-	-	-
Nelson River (CL-GR)	BR-D	18-Jun-03	NSC	48806	-	1013	1125	8845	-	-	-
Nelson River (CL-GR)	BR-D	14-Jun-06	NSC	48806	-	1066	1147	10433	-	-	-
Nelson River (CL-GR)	BR-D	27-Jun-08	NSC	48806	-	1075	1185	-	-	-	-
Nelson River (CL-GR)	BR-D	14-Jun-14	NSC	48806	900 226000629218	1123	1235	11793	M	8	-
Nelson River (CL-GR)	BR-D	28-Jun-02	NSC	48807	-	1161	1279	11794	M	7	-
Nelson River (CL-GR)	GL-A	29-Jun-02	NSC	48807	-	-	-	-	-	-	-
Nelson River (CL-GR)	BR-D	28-Jun-04	NSC	48807	-	1187	1312	11340	M	7	-
Nelson River (CL-GR)	BR-D	4-Jun-06	NSC	48807	-	1190	1313	12701	M	7	-
Nelson River (CL-GR)	BR-D	9-Jun-14	NSC	48807	-	1242	1337	16783	M	7	-
Nelson River (CL-GR)	GL-C	14-Jul-02	NSC	48896	-	1030	1110	10206	-	-	-
Nelson River (CL-GR)	GL-B	29-Jun-14	NSC	48896	900 226000629022	1234	1335	14515	-	-	-
Nelson River (CL-GR)	GL-C	9-Jun-03	NSC	50853	-	1088	1210	14755	-	-	-
Nelson River (CL-GR)	GL-C	11-Jun-08	NSC	50853	-	1170	1252	17236	-	-	-
Nelson River (CL-GR)	GL-C	18-Jun-14	NSC	50853	-	1236	1370	22226	-	-	-
Nelson River (CL-GR)	GL-C	10-Jun-04	NSC	64701	-	1385	1500	25402	-	-	-
Nelson River (CL-GR)	BR-D	13-Jun-14	NSC	64701	900 226000629149	1425	1575	29257	F	2	-
Nelson River (CL-GR)	GL-A	28-Jun-04	NSC	64733	-	1384	1530	28123	-	-	-
Nelson River (CL-GR)	BR-D	25-Jun-08	NSC	64733	-	1403	1535	28576	-	-	-
Nelson River (CL-GR)	GL-C	11-Jun-12	NSC	64733	-	1424	1570	29030	-	-	-
Nelson River (CL-GR)	GL-A	25-Jun-14	NSC	64733	900 226000629157	1430	1585	29484	-	-	-
Nelson River (CL-GR)	GL-C	13-Jul-04	NSC	64745	-	1070	1200	11340	-	-	-
Nelson River (CL-GR)	GL-B	2-Jul-14	NSC	64745	900 226000629215	1275	1410	15876	-	-	-
Nelson River (CL-GR)	GL-A	16-Jul-04	NSC	64748	-	930	1030	6350	-	-	-

Table A2- 1: Tagging and biological information for Lake Sturgeon recaptured in the Keeyask area and in Stephens Lake during spring, 2014.

Location[1]	Zone	Date	Prefix	Floy-tag	PIT Tag	Fork Length (mm)	Total Length (mm)	Weight (g)	Sex[2]	Maturity[3]	Age
Nelson River (CL-GR)	GL-A	4-Jul-14	NSC	64748	900 226000629058	1098	1178	10886	-	-	-
Split Lake	SPL-F	15-Jun-05	NSC	74302	-	1241	1329	17045	-	-	-
Nelson River (CL-GR)	GL-B	27-Jun-14	NSC	74302	900 226000629184	-	-	20412	-	-	-
Nelson River (CL-GR)	GL-C	23-Jun-08	NSC	75277	-	732	832	2948	-	-	-
Nelson River (CL-GR)	GL-C	15-Jun-08	NSC	75277	-	767	870	3330	-	-	-
Nelson River (CL-GR)	GL-C	5-Jul-14	NSC	75277	900 226000629145	977	1086	7711	-	-	-
Nelson River (CL-GR)	GL-C	30-Jun-08	NSC	75287	-	663	756	2722	-	-	-
Nelson River (CL-GR)	GL-C	20-Sep-08	NSC	75287	-	685	785	-	-	-	-
Nelson River (CL-GR)	BR-D	29-Jun-14	NSC	75287	900 226000629165	935	1055	7257	-	-	-
Nelson River (CL-GR)	GL-B	21-Sep-08	NSC	75306	-	658	737	2100	-	-	-
Nelson River (CL-GR)	BR-D	7-Jul-14	NSC	75306	900 226000629211	810	882	4350	-	-	-
Nelson River (CL-GR)	GL-B	18-Sep-08	NSC	75320	-	539	630	-	-	-	-
Nelson River (CL-GR)	GL-B	19-Jun-14	NSC	75320	900 226000629195	813	939	3800	-	-	-
Nelson River (CL-GR)	GL-C	18-Sep-08	NSC	75321	-	710	799	-	-	-	-
Nelson River (CL-GR)	GL-C	17-Jun-14	NSC	75321	900 226000629248	838	933	4990	-	-	-
Nelson River (CL-GR)	GL-B	16-Sep-08	NSC	75328	-	832	940	-	-	-	-
Nelson River (CL-GR)	GL-B	30-Jun-14	NSC	75328	900 226000629150	950	1050	7711	-	-	-
Nelson River (CL-GR)	GL-C	16-Sep-08	NSC	75331	-	485	545	850	-	-	-
Nelson River (CL-GR)	GL-B	6-Jul-14	NSC	75331	900 226000629226	756	831	4250	-	-	11
Nelson River (CL-GR)	GL-A	15-Sep-08	NSC	75334	-	645	750	1950	-	-	-
Nelson River (CL-GR)	BR-D	9-Jun-14	NSC	75334	-	865	993	5897	-	-	-
Nelson River (CL-GR)	GL-C	13-Sep-08	NSC	75350	-	508	575	925	-	-	-
Nelson River (CL-GR)	GL-B	2-Jul-14	NSC	75350	900 226000629126	685	770	2750	-	-	-
Nelson River (CL-GR)	BR-D	24-Jun-06	NSC	76326	-	1030	1122	9299	-	-	-

Table A2- 1: Tagging and biological information for Lake Sturgeon recaptured in the Keeyask area and in Stephens Lake during spring, 2014.

Location[1]	Zone	Date	Prefix	Floy-tag	PIT Tag	Fork Length (mm)	Total Length (mm)	Weight (g)	Sex[2]	Maturity[3]	Age
Nelson River (CL-GR)	GL-B	21-Jun-14	NSC	76326	900 226000629003	1175	1309	16783	-	-	-
Nelson River (CL-GR)	GL-C	24-Jun-06	NSC	76328	-	851	915	5670	-	-	-
Nelson River (CL-GR)	GL-C	22-Jun-12	NSC	76328	-	1035	1035	10433	-	-	-
Nelson River (CL-GR)	GL-B	21-Jun-14	NSC	76328	900 226000629021	1054	1155	9525	-	-	-
Nelson River (CL-GR)	BR-D	27-Jun-06	NSC	76342	-	720	815	2268	-	-	-
Nelson River (CL-GR)	GL-B	26-Jun-14	NSC	76342	900 226000629065	915	1033	4990	-	-	-
Nelson River (CL-GR)	GL-C	2-Jul-06	NSC	76389	-	1055	1165	8618	-	-	-
Nelson River (CL-GR)	BR-D	15-Jun-14	NSC	76389	900 226000629249	1165	1275	9752	M	9	-
Nelson River (CL-GR)	GL-A	24-Jun-06	NSC	76449	-	864	945	5443	-	-	-
Nelson River (CL-GR)	GL-B	29-Jun-06	NSC	76449	-	-	-	-	-	-	-
Nelson River (CL-GR)	GL-B	19-Jun-14	NSC	76449	900 226000629055	1094	1220	11793	-	-	-
Nelson River (CL-GR)	BR-D	5-Jun-06	NSC	76457	-	1057	1142	7750	-	-	-
Nelson River (CL-GR)	BR-D	13-Jun-10	NSC	76457	-	1074	1177	10886	-	-	-
Nelson River (CL-GR)	BR-D	6-Jun-14	NSC	76457	-	1095	1190	12701	M	7	-
Nelson River (CL-GR)	GL-C	15-Jun-06	NSC	76498	-	619	675	2155	-	-	-
Nelson River (CL-GR)	GL-B	21-Jun-14	NSC	76498	900 226000629133	977	1080	6804	-	-	-
Grass River	KGS-A	21-Aug-07	NSC	76852	-	1237	1369	23587	-	-	-
Nelson River (CL-GR)	BR-D	12-Jun-14	NSC	76852	900 226000629153	1331	1431	21546	-	-	-
Nelson River (CL-GR)	GL-A	20-Jun-11	NSC	77507	-	1310	1405	25855	F	4	-
Nelson River (CL-GR)	BR-D	11-Jun-14	NSC	77507	900 226000629028	1330	1410	29710	F	2	-
Nelson River (CL-GR)	GL-B	11-Jun-11	NSC	77513	-	945	1061	6804	-	-	-
Nelson River (CL-GR)	GL-C	15-Jun-12	NSC	77513	-	950	1070	6804	-	-	-
Nelson River (CL-GR)	GL-B	25-Jun-14	NSC	77513	900 226000629167	954	1071	6350	-	-	-
Nelson River (CL-GR)	GL-B	18-Aug-06	NSC	80114	-	790	860	3856	-	-	-

Table A2- 1: Tagging and biological information for Lake Sturgeon recaptured in the Keeyask area and in Stephens Lake during spring, 2014.

Location[1]	Zone	Date	Prefix	Floy-tag	PIT Tag	Fork Length (mm)	Total Length (mm)	Weight (g)	Sex[2]	Maturity[3]	Age
Nelson River (CL-GR)	GL-C	30-Jun-14	NSC	80114	900 226000629033	960	1075	6804	-	-	-
Nelson River (CL-GR)	BR-D	3-Jun-06	NSC	80217	-	970	1071	7450	-	-	-
Nelson River (CL-GR)	BR-D	8-Jun-06	NSC	80217	-	-	-	-	-	-	-
Nelson River (CL-GR)	BR-D	21-Jun-06	NSC	80217	-	-	-	-	-	-	-
Nelson River (CL-GR)	BR-D	22-Jun-06	NSC	80217	-	-	-	-	-	-	-
Nelson River (CL-GR)	BR-D	7-Jun-14	NSC	80217	900 226000629135	1070	-	9525	M	7	-
Nelson River (CL-GR)	BR-D	4-Jun-06	NSC	80223	-	1080	1189	10400	-	-	-
Nelson River (CL-GR)	GL-B	22-Jun-14	NSC	80223	900 226000629109	1115	1234	11340	-	-	-
Nelson River (CL-GR)	BR-D	4-Jun-06	NSC	80227	-	1180	1285	12020	-	-	-
Nelson River (CL-GR)	BR-D	6-Jun-06	NSC	80227	-	-	-	-	-	-	-
Nelson River (CL-GR)	BR-D	14-Jun-14	NSC	80227	900 226000629176	1230	1330	14969	M	8	-
Nelson River (CL-GR)	BR-D	4-Jun-06	NSC	80231	-	1150	1271	16103	-	-	-
Nelson River (CL-GR)	BR-D	5-Jul-14	NSC	80231	900 226000629104	1171	1275	15876	-	-	-
Nelson River (CL-GR)	BR-D	26-May-06	NSC	80255	-	1185	1270	13608	M	7	-
Nelson River (CL-GR)	BR-D	5-Jun-06	NSC	80255	-	-	-	-	-	-	-
Nelson River (CL-GR)	BR-D	9-Jun-14	NSC	80255	900 226000629038	1268	1385	15422	M	7	-
Stephens Lake	STL-B	27-Aug-06	NSC	81832	-	1290	1410	22680	-	-	-
Nelson River (CL-GR)	GR-A	5-Jun-10	NSC	81832	-	1349	1470	24040	-	-	-
Nelson River (CL-GR)	BR-D	10-Jun-14	NSC	81832	-	1336	1520	21999	F	2	-
Nelson River (CL-GR)	GL-B	26-Aug-06	NSC	82638	-	593	656	1588	-	-	-
Nelson River (CL-GR)	GL-B	25-Jun-14	NSC	82638	900 226000629244	845	923	4082	-	-	-
Nelson River (CL-GR)	GL-B	26-Aug-06	NSC	82642	-	878	989	6078	-	-	-
Nelson River (CL-GR)	GL-B	26-Jun-14	NSC	82642	900 226000629004	1003	1121	8165	-	-	-
Nelson River (CL-GR)	GL-B	23-Aug-06	NSC	82646	-	563	643	726	-	-	-

Table A2- 1: Tagging and biological information for Lake Sturgeon recaptured in the Keeyask area and in Stephens Lake during spring, 2014.

Location[1]	Zone	Date	Prefix	Floy-tag	PIT Tag	Fork Length (mm)	Total Length (mm)	Weight (g)	Sex[2]	Maturity[3]	Age
Nelson River (CL-GR)	GL-B	4-Jul-14	NSC	82646	900 226000629140	827	911	4536	-	-	-
Nelson River (CL-GR)	GL-A	3-Sep-06	NSC	82880	-	471	536	567	-	-	-
Nelson River (CL-GR)	GL-B	7-Jul-14	NSC	82880	900 226000629220	804	890	4050	-	-	-
Nelson River (CL-GR)	GL-C	27-Sep-08	NSC	86128	-	465	530	730	-	-	-
Nelson River (CL-GR)	GL-C	28-Jun-14	NSC	86128	900 226000629168	726	804	3000	-	-	-
Nelson River (CL-GR)	GL-B	27-Sep-08	NSC	86138	-	552	635	1280	-	-	-
Nelson River (CL-GR)	GL-B	7-Jul-14	NSC	86138	900 226000629077	719	793	3050	-	-	11
Nelson River (CL-GR)	GL-B	27-Sep-08	NSC	86146	-	640	716	2180	-	-	-
Nelson River (CL-GR)	BR-D	27-Jun-14	NSC	86146	900 226000629117	780	865	3629	-	-	-
Nelson River (CL-GR)	GL-B	22-Sep-08	NSC	87235	-	696	796	-	-	-	-
Nelson River (CL-GR)	GL-B	5-Jul-14	NSC	87235	900 226000629179	842	927	4900	-	-	-
Nelson River (CL-GR)	GL-C	23-Sep-08	NSC	87237	-	356	402	-	-	-	-
Nelson River (CL-GR)	GL-C	25-Jun-14	NSC	87237	-	711	804	2700	-	-	-
Nelson River (CL-GR)	GL-B	23-Sep-08	NSC	87247	-	740	856	-	-	-	-
Nelson River (CL-GR)	GL-B	17-Jun-12	NSC	87247	-	835	938	4536	-	-	-
Nelson River (CL-GR)	GL-B	21-Jun-14	NSC	87247	900 226000629216	866	974	4536	-	-	-
Nelson River (CL-GR)	GL-C	19-Jun-14	NSC	87270*	900 226000629017	1280	1415	18144	-	-	-
Nelson River (CL-GR)	GL-C	25-Sep-10	NSC	87863	-	620	730	1850	-	-	-
Nelson River (CL-GR)	GL-C	29-Jun-14	NSC	87863	900 226000629061	773	893	3175	-	-	-
Nelson River (CL-GR)	-	7-Aug-09	NSC	89678	-	777	857	4300	-	-	-
Nelson River (CL-GR)	GL-A	26-Jun-14	NSC	89678	900 226000629012	902	1005	5443	-	-	-
Nelson River (CL-GR)	GL-C	14-Jun-10	NSC	94006	-	1288	1395	21319	-	-	-
Nelson River (CL-GR)	BR-D	7-Jun-14	NSC	94006	900 226000629213	1330	1455	20865	-	-	-

Table A2- 1: Tagging and biological information for Lake Sturgeon recaptured in the Keeyask area and in Stephens Lake during spring, 2014.

Location[1]	Zone	Date	Prefix	Floy-tag	PIT Tag	Fork Length (mm)	Total Length (mm)	Weight (g)	Sex[2]	Maturity[3]	Age
Nelson River (CL-GR)	GL-B	7-Jun-10	NSC	94027	-	727	812	3450	-	-	-
Nelson River (CL-GR)	GL-A	17-Jun-14	NSC	94027	900 226000629049	839	923	4082	-	-	-
Nelson River (CL-GR)	BR-D	8-Jun-10	NSC	94030	-	900	998	6350	-	-	-
Nelson River (CL-GR)	BR-D	13-Jun-11	NSC	94030	-	915	1016	6804	M	7	-
Nelson River (CL-GR)	BR-D	9-Jun-14	NSC	94030	-	980	1085	9299	-	-	-
Nelson River (CL-GR)	BR-D	6-Jun-10	NSC	94099	-	1207	1325	14742	-	-	-
Nelson River (CL-GR)	BR-D	14-Jun-14	NSC	94099	900 226000629169	1233	1357	15195	M	8	-
Nelson River (CL-GR)	GL-B	21-Jun-14	NSC	94108	-	625	710	2100	-	-	-
Nelson River (CL-GR)	GL-B	25-Jun-14	NSC	94108	900 226000629159	744	849	2722	-	-	-
Nelson River (CL-GR)	GL-B	21-Jun-14	NSC	94109	-	650	730	2200	-	-	-
Nelson River (CL-GR)	GL-B	8-Jul-14	NSC	94109	900 226000629103	814	893	4536	-	-	-
Nelson River (CL-GR)	BR-D	23-Jun-10	NSC	94117	-	1120	1210	14969	-	-	-
Nelson River (CL-GR)	GL-C	18-Jun-14	NSC	94117	-	1172	1296	17690	-	-	-
Nelson River (CL-GR)	GL-C	22-Sep-11	NSC	94864	-	650	741	2000	-	-	8
Nelson River (CL-GR)	GL-B	3-Jul-14	NSC	94864	900 226000629142	724	809	3550	-	-	11
Nelson River (CL-GR)	GL-C	24-Sep-11	NSC	94880	-	597	-	1550	-	-	5
Nelson River (CL-GR)	GL-A	22-Jun-14	NSC	94880	900 226000629067	713	740	2750	-	-	-
Nelson River (CL-GR)	GL-C	23-Sep-11	NSC	94899	-	418	470	525	-	-	3
Nelson River (CL-GR)	GL-B	2-Jul-14	NSC	94899	900 226000103898	505	585	1100	-	-	-
Nelson River (CL-GR)	BR-D	1-Jun-12	NSC	100401	-	980	1067	9979	-	-	-
Nelson River (CL-GR)	GL-A	15-Jun-14	NSC	100401	900 226000629189	996	1011	9299	M	8	-
Nelson River (CL-GR)	BR-D	2-Jun-12	NSC	100406	-	900	1010	6804	M	8	-
Nelson River (CL-GR)	BR-D	5-Jun-14	NSC	100406	-	960	1100	10433	-	-	-
Nelson River (CL-GR)	GL-B	11-Jun-12	NSC	100424	-	924	1041	7031	-	-	-

Table A2- 1: Tagging and biological information for Lake Sturgeon recaptured in the Keeyask area and in Stephens Lake during spring, 2014.

Location[1]	Zone	Date	Prefix	Floy-tag	PIT Tag	Fork Length (mm)	Total Length (mm)	Weight (g)	Sex[2]	Maturity[3]	Age
Nelson River (CL-GR)	BR-D	20-Jun-14	NSC	100424	900 226000629212	923	1130	6804	-	-	-
Nelson River (CL-GR)	GL-B	11-Jun-12	NSC	100425	-	831	938	4536	-	-	-
Nelson River (CL-GR)	GL-B	26-Jun-14	NSC	100425	900 226000629108	884	991	5443	-	-	-
Nelson River (CL-GR)	GL-B	12-Jun-12	NSC	100428	-	877	965	7257	-	-	-
Nelson River (CL-GR)	GL-B	3-Jul-14	NSC	100428	900 226000629105	926	996	8165	-	-	-
Nelson River (CL-GR)	GL-B	13-Jun-12	NSC	100430	-	990	1100	8165	-	-	-
Nelson River (CL-GR)	GL-B	3-Jul-14	NSC	100430	900 226000629013	1030	1140	9525	-	-	-
Nelson River (CL-GR)	BR-D	14-Jun-12	NSC	100432	-	880	1002	6350	-	-	-
Nelson River (CL-GR)	BR-D	5-Jun-14	NSC	100432	-	905	1050	7257	-	-	-
Nelson River (CL-GR)	GL-B	15-Jun-12	NSC	100445	-	684	780	2150	-	-	-
Nelson River (CL-GR)	GL-A	29-Jun-14	NSC	100445	900 226000629035	772	877	2722	-	-	-
Nelson River (CL-GR)	GL-C	30-Aug-12	NSC	100467	-	467	537	650	-	-	4
Nelson River (CL-GR)	GL-C	18-Jun-14	NSC	100467	900 226000103860	545	621	1050	-	-	-
Nelson River (CL-GR)	GL-C	16-Apr-04	NSC	64710	-	1046	1194	9979	-	-	-
Nelson River (CL-GR)	GL-C	27-May-04	NSC	64710	-	1108	1220	11793	-	-	-
Nelson River (CL-GR)	GL-C	24-Jun-12	NSC	100492	-	1170	1170	14515	-	-	-
Nelson River (CL-GR)	BR-D	5-Jun-14	NSC	100492	-	1120	1358	18144	-	-	-
Nelson River (CL-GR)	GL-B	24-Jun-12	NSC	100497	-	655	730	2722	-	-	-
Nelson River (CL-GR)	GL-B	3-Jul-14	NSC	100497	900 226000629231	698	766	2700	-	-	11
Stephens Lake	GR-A	28-May-01	NSC	46844	-	926	1036	6750	-	-	-
Stephens Lake	STL-A	30-May-10	NSC	46844	-	1060	1165	10433	-	-	-
Stephens Lake	GR-A	11-Jun-14	NSC	46844	-	1095	2000	9525	M	8	-

Table A2- 1: Tagging and biological information for Lake Sturgeon recaptured in the Keeyask area and in Stephens Lake during spring, 2014.

Location[1]	Zone	Date	Prefix	Floy-tag	PIT Tag	Fork Length (mm)	Total Length (mm)	Weight (g)	Sex[2]	Maturity[3]	Age
Stephens Lake	GR-A	9-Jun-11	NSC	74411	-	1006	1105	8391	M	7	-
Stephens Lake	GR-A	13-Apr-14	NSC	74411	-	995	1094	9979	M	8	-
Nelson River (CL-GR)	GL-B	27-Sep-08	NSC	86136	-	722	815	2600	-	-	-
Stephens Lake	GR-A	13-Apr-14	NSC	86136	-	904	1050	5897	-	-	-
Stephens Lake	STL-B	28-Sep-10	NSC	94234	-	772	875	3570	-	-	-
Stephens Lake	GR-A	11-Jun-14	NSC	94234	-	884	980	4990	-	-	-

1 – Nelson River between Clark Lake (CL) and Gull Rapids (GR).

2 & 3 – See section 3.2for a description of sex and maturity

*Lake Sturgeon mislabeled. Tag number does not match with any tagged Lake Sturgeon.

APPENDIX 3:
POPULATION ESTIMATE INFORMATION

Table A3- 1: Population estimate results for POPAN best model.

Parameter	Estimate	SE[1]	95% Confidence Interval	
			Lower	Upper
1995-2001 Survival	0.92	0.03	0.84	0.96
2001-2004 Survival	0.77	0.04	0.70	0.84
2004-2014 Survival	0.89	0.02	0.85	0.92
Recapture (p_1)	0.09	0.01	0.07	0.12
Recapture (p_2)	0.23	0.02	0.19	0.27
1995 Abundance	688	131	431	945
2001 Abundance	461	46	370	551
2002 Abundance	355	40	277	434
2003 Abundance	496	44	410	581
2004 Abundance	380	42	298	463
2006 Abundance	722	67	590	854
2008 Abundance	572	66	443	701
2010 Abundance	764	123	524	1005
2012 Abundance	707	116	480	935
2014 Abundance	596	66	466	725

1 – Standard error.