Keeyask Generation Project

Aquatic Effects Monitoring Plan

Adult Lake Sturgeon Population Monitoring Report
(Future Keeyask Reservoir and Stephens Lake)

AEMP-2019-05

ᑮᔮᐢᒃ
KEEYASK

Manitoba Sustainable Development Client File 5550.00
Manitoba Environment Act Licence No. 3107

2018 - 2019

KEEYASK GENERATION PROJECT

AQUATIC EFFECTS MONITORING PLAN

REPORT #AEMP-2019-05

ADULT LAKE STURGEON POPULATION MONITORING IN THE FUTURE KEEYASK RESERVOIR AND STEPHENS LAKE, 2018

Prepared for

Manitoba Hydro

By

J. Holm and C.L. Hrenchuk

June 2019

North/South Consultants Inc.
Aquatic Environment Specialists

83 Scurfield Blvd.
Winnipeg, Manitoba, R3Y 1G4
Website: www.nscons.ca

Tel.: (204) 284-3366
Fax: (204) 477-4173
E-mail: nscons@nscons.ca

This report should be cited as follows:

Holm, J. and C.L. Hrenchuk. 2019. Adult Lake Sturgeon population monitoring in the future Keeyask reservoir and Stephens Lake, 2018. Keeyask Generation Project Aquatic Effects Monitoring Plan Report #AEMP-2019-05. A report prepared for Manitoba Hydro by North/South Consultants Inc., June 2019. xv + 99 pp.

SUMMARY

Background

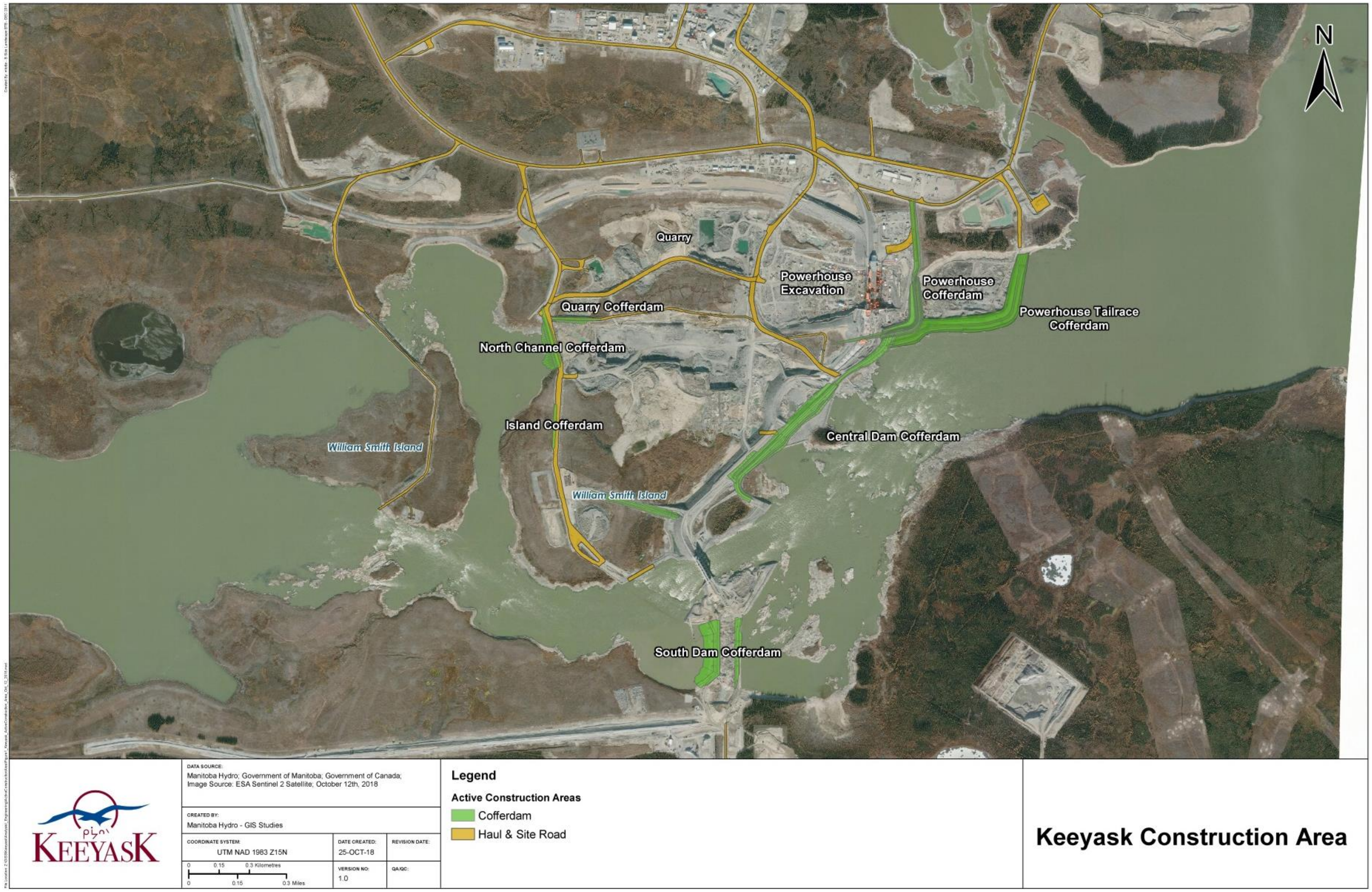
The Keeyask Hydropower Limited Partnership (KHLP) was required to prepare a plan to monitor the effects of construction and operation of the Keeyask Generating Station (GS) on the environment. Besides measuring the accuracy of the predictions made and actual effects of the GS on the environment, monitoring results will provide information on how construction and operation of the GS will affect the environment and if more needs to be done to reduce harmful effects.

Construction of the Keeyask GS began in mid-July 2014 with the construction of cofferdams that blocked flow in the north and central channels of Gull Rapids (see map). During the winter of 2015/2016, the Spillway Cofferdam, which partially blocks the south channel was constructed. Beginning late in 2016 and continuing in 2017, the Tailrace Cofferdam was constructed. Work was completed in fall 2017 with the exception of an opening that was left to allow fish movement into and out of the cofferdam over the 2017/2018 winter. This opening was closed in spring 2018, and the area was dewatered. The spillway was commissioned in August 2018. The South Dam Cofferdam was completed in fall 2018, blocking the channel and forcing the entire flow of the river through the spillway.

Lake Sturgeon were identified as one of the key species for monitoring. They were chosen because they are culturally important to local people, the local sturgeon populations have been previously impacted, and construction and operation of the GS will change or negatively impact important habitat. The plan to monitor the impacts of GS construction and operation on sturgeon includes several types of studies:

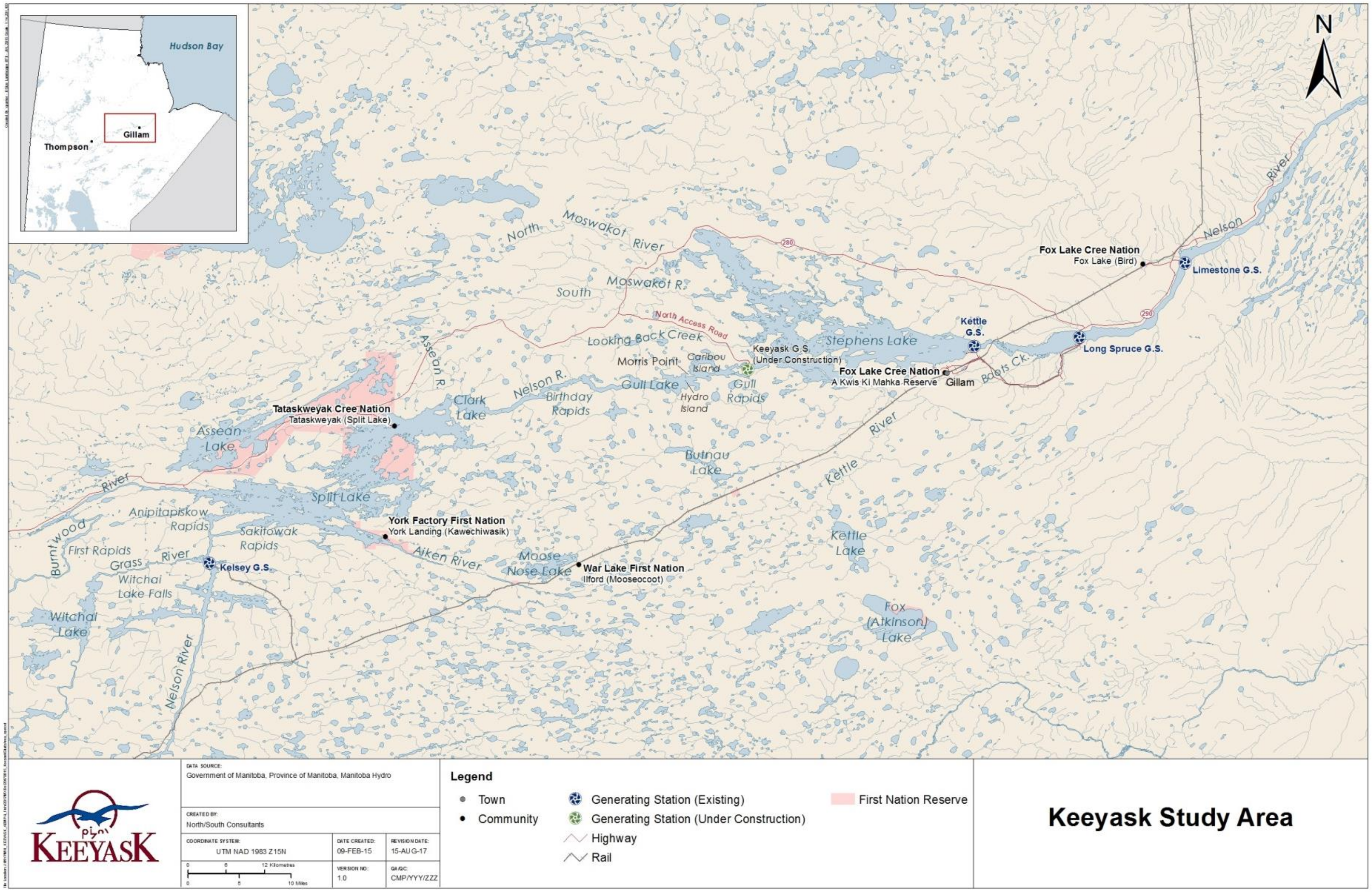
- Estimating the number of adults;
- Estimating the number and growth of juveniles (less than 800 millimetres [mm] in length);
- Identifying spawning locations and numbers of spawning fish; and
- Recording seasonal habitat use and long distance movements (*i.e.*, over GS's or rapids) through movement studies.

This report presents results from adult Lake Sturgeon population monitoring in spring 2018 in the river reach that will form the future reservoir of the Keeyask GS (*i.e.*, the Nelson River between Clark Lake and Gull Rapids) and Stephens Lake (see study area map below).



Satellite Imagery - October 12th, 2018

Map illustrating instream structures at the Keeyask Generating Station site, October 2018.



Map of the lower Nelson River showing the site of the Keeyask Generating Station and the Lake Sturgeon study setting.

Why is the study being done?

Monitoring of the adult Lake Sturgeon population in the future Keeyask reservoir and Stephens Lake is being done to answer several questions:

Is there a change in how many Lake Sturgeon are in the future Keeyask reservoir?

Population estimates will allow us to determine how the number of adults is changing as we try to increase the number of sturgeon by stocking young fish. Lake Sturgeon are different from other fish in Manitoba because they do not begin to reproduce until they are at least 15 years old and they can live a very long time (more than 60 years and even up to 100 years). If the remaining adult fish disappear before enough young fish are born or stocked, then the population will not recover.

Is there a change in the mortality rate of Lake Sturgeon in the future Keeyask reservoir?

The rate at which sturgeon are dying is important to know if we want the population of sturgeon to increase. If the mortality rate increases, then we would need to try to find the cause and possibly a way to reduce it.

Is there a change in the number of Lake Sturgeon captured in Stephens Lake each year the monitoring occurs?

This question is important because spawning sites for adult Lake Sturgeon in Stephens Lake (at Gull Rapids) will be changed by construction. Changes in the number of fish captured will tell us if the population is increasing or decreasing.

Is there a significant change in the condition (how fat they are) of Lake Sturgeon in the future Keeyask reservoir and in Stephens Lake?

This question is important because if sturgeon become fatter or skinnier than they used to be, something is changing in their environment. In the long term (more than 10 or 15 years), it might also mean that stocking has increased population levels to the point that there is not enough food for all the fish, and stocking should be reduced or stopped.

What was done?

Sampling was conducted in the future Keeyask reservoir and Stephens Lake from May 24 to July 1, 2018, using gill nets to target adult sturgeon. For this study, sturgeon that were 800 mm or longer were classified as adults. Although the exact size at which Lake Sturgeon become mature and ready to reproduce can vary, previous information tells us that 800 mm is a good standard size to use to determine whether fish are mature. Nets were set at locations where adults are known to occur, including at spawning sites, because sturgeon gather there to spawn in spring and are easy to catch. When a fish was caught it was measured, weighed, and examined for signs of spawning. If the fish was not already tagged, then two different tags were applied; an external (Floy®) tag and a small internal (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 a population. Populations are estimated using a model. Each year as more data are collected and added to the model, the population estimates get more precise and accurate. Therefore, these estimates are recalculated each sampling year, so they might differ between reports.



Pulling a gill net (left), captured adult Lake Sturgeon (middle), and releasing an adult Lake Sturgeon after processing (right).

What was found?

A total of 235 Lake Sturgeon were caught in the future Keeyask reservoir in 2018. About half (132) were classified as adults because they measured 800 mm or longer and 18 of these fish were expected to spawn in the current year (adult Lake Sturgeon do not spawn every year). Seventy-four fish were recaptures of fish tagged in previous years. Of these recaptured fish, all were originally tagged in the future Keeyask reservoir. Two were hatchery fish released in the future Keeyask reservoir in 2015. In Stephens Lake, 241 Lake Sturgeon were caught, 173 of which were long enough to be considered adults. Thirty-two of the fish were classified as spawners. Eighty-seven of the fish had been captured and tagged in previous years, six of which had been tagged in the future Keeyask reservoir, one as far upstream as the reach between Clark Lake and Birthday Rapids. An additional four Lake Sturgeon were hatchery fish released into Stephens Lake in 2015.

A computer model is used each study year to generate estimates of population size and survival for adult Lake Sturgeon in the future Keeyask reservoir and Stephens Lake. Previously, not enough Lake Sturgeon had been recaptured in Stephens Lake for the model to work, so 2018 was the first year an estimate was calculated. In 2018, the future Keeyask reservoir population was estimated at 820 fish, which was comparable to both the 2014 and 2016 estimates. Survival in this area was 91%, which is high. Overall, the calculated estimates show that the population in this area is increasing. The Stephens Lake population in 2018 was estimated at 296 individuals, which was comparable to both the 2014 and 2016 estimates[1]. Survival in Stephens Lake was estimated at 94%, which is also high. Like the future Keeyask reservoir, the

[1] Although a population estimate could not be generated until 2018 based on recaptures, the model provides estimates of population size for each year that fish were previously marked and recaptured.

population estimate shows that the number of fish in Stephens Lake is increasing over time since 2001.

As more data are collected and added to the model, the population estimates get more precise and accurate. Particularly large changes in previous estimates occur when fish that were thought to be alive are reported as dead (for example from a tag return) or a fish that has not been captured for many years (and was thought to be dead) is captured again. This is also especially true for Stephens Lake, as 2018 was the first time a population estimate could be calculated. As more fish are captured, this estimate will become more refined.

The condition factor (a measure of how fat a sturgeon is at a given size) was similar to previous years for sturgeon of all sizes in the future Keeyask reservoir. In Stephens Lake, most sturgeon had similar condition factors to previous years, but medium-sized fish measuring 1,000–1,049 mm were thinner than in previous years. Overall, the condition factors of all the sturgeon were within the range seen elsewhere in Manitoba.

Weighing (left), measuring (middle), and scanning for a PIT tag (right) an adult Lake Sturgeon

What does it mean?

The population of Lake Sturgeon in the future Keeyask reservoir has remained relatively stable, and shows a significant increasing trend since 2001. Because 2018 is the first year a population estimate could be calculated for Stephens Lake and there is not as much data available, the estimates have varied more over the years. However, the population also appears to be increasing over time. Condition factors in both areas have not changed much since studies began and fish captured before the construction of the Keeyask GS have similar condition factors to those captured after construction began.

What will be done next?

Monitoring will continue in the future Keeyask reservoir and Stephens Lake every two years until 2044. Further monitoring will show whether the population increases, decreases or remains similar to current levels in both areas. Changes in the numbers of adult sturgeon generally occur slowly, unless a large number of sturgeon move to a different area. The effects of stocking will not begin to be seen in the adult population for several years, until the stocked fish reach 800 mm in size.

ACKNOWLEDGMENTS

We would like to thank Manitoba Hydro for the opportunity and resources to conduct this study.

The following members of Tataskweyak Cree Nation (TCN), Fox Lake Cree Nation (FLCN), War Lake First Nation (WLFN), and York Factory First Nation (YFFN) are thanked for their local expertise and assistance in conducting the field work: Michael John Garson and Kelvin Kitchekeesik of TCN; Johnathan Sandberg of FLCN; Darren Chapman of WLFN; and Nicholas Beardy of YFFN.

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 #22-18.

STUDY TEAM

Data Collection

Nicholas Beardy

Duncan Burnett

Darren Chapman

Michael John Garson

Laura Henderson

Kelvin Kitchekeesik

Christine Lacho

Mike Legge

Jordan Mazur

Jon Peake

Johnathan Sandberg

Data Analysis, Report Preparation, and Report Review

Jodi Holm

Claire Hrenchuk

Christine Lacho

Patrick Nelson

Candace Parker

Friederike Schneider-Vieira

TABLE OF CONTENTS

1.0 INTRODUCTION 1
2.0 STUDY SETTING 3
2.1 CONSTRUCTION SUMMARY 4
2.2 FLOWS AND WATER LEVELS 4
3.0 METHODS 6
3.1 GILLNETTING 6
3.2 DATA ANALYSIS 7
3.3 POPULATION ESTIMATION 8
4.0 RESULTS 10
4.1 FUTURE KEEYASK RESERVOIR 10
4.1.1 Relative Abundance/CPUE 10
4.1.2 Biological Metrics 11
4.1.3 Movements 11
4.1.4 Population Estimation 12
4.2 STEPHENS LAKE 12
4.2.1 Relative Abundance/CPUE 12
4.2.2 Biological Metrics 13
4.2.3 Movements 14
4.2.4 Population Estimation 14
5.0 DISCUSSION 16
5.1 EVALUATION OF METHODOLOGY 16
5.2 ADULT LAKE STURGEON ABUNDANCE 16
5.3 SPAWNING 17
5.4 SIZE DISTRIBUTION AND CONDITION FACTOR 18
5.5 MOVEMENT 18
5.6 KEY QUESTIONS 19
6.0 SUMMARY AND CONCLUSIONS 21

7.0 LITERATURE CITED 23

LIST OF TABLES

Table 1: Number of fish, by species, captured during adult Lake Sturgeon population monitoring in the future Keeyask reservoir (24 May–1 July) and Stephens Lake (27 May–30 June), spring 2018. 26

Table 2: Lake Sturgeon catch-per-unit-effort (CPUE; # LKST/45.7 m net/24 h) values observed during mark/recapture studies in the future Keeyask reservoir and Stephens Lake from 2001–2018. 27

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 future Keeyask reservoir and Stephens Lake, spring 2018. 28

Table 4: Fork length (mm), weight (g), and relative condition factor (K) of Lake Sturgeon captured during adult Lake Sturgeon population monitoring in the future Keeyask reservoir, spring 2001–2018. 29

Table 5: Fork length (mm), weight (g), and relative condition factor (K) of Lake Sturgeon captured during adult Lake Sturgeon population monitoring in Stephens Lake, spring 2001–2018. 30

Table 6: Sex and maturity data for Lake Sturgeon captured in the future Keeyask reservoir and Stephens Lake during adult population monitoring, spring, 2001–2018. 31

Table 7: Recapture data for Lake Sturgeon captured in the future Keeyask reservoir during adult population monitoring, spring, 2002–2018. 32

Table 8: Recapture data for Lake Sturgeon captured in Stephens Lake during adult population monitoring, spring, 2002–2018. 33

LIST OF FIGURES

Figure 1: Mean daily water temperature in the Nelson River mainstem, 24 May–1 July, 2018. 35
Figure 2: Length-frequency distribution for Lake Sturgeon captured in large mesh gill nets set in the future Keeyask reservoir, spring 2018....36
Figure 3: Mean condition factor by 50 mm length intervals for adult (≥ 800 mm) Lake Sturgeon captured in the future Keeyask reservoir during baseline studies (red bars) and construction monitoring (blue bars). 37
Figure 4: Length-weight regression for Lake Sturgeon captured in large mesh gill nets set in the future Keeyask reservoir, spring 2018. 38
Figure 5: Adult Lake Sturgeon abundance estimates based on POPAN best model for the future Keeyask reservoir (1995–2018). 39
Figure 6: Analysis of change in mean population abundance estimates for the future Keeyask reservoir between one sample period (2016 to 2018) and two sampling periods (2014 to 2018). 40
Figure 7: Abundance estimates for adult Lake Sturgeon in the future Keeyask reservoir by sampling year (2001–2018) showing a significant positive trend. 41
Figure 8: Length-frequency distribution for Lake Sturgeon captured in large mesh gill nets set in Stephens Lake, spring 2018. 42
Figure 9: Mean condition factor by 50 mm length intervals for adult (≥ 800 mm) Lake Sturgeon captured in Stephens Lake during baseline studies (red bars) and construction monitoring (blue bars). 43
Figure 10: Length-weight regression for Lake Sturgeon captured in large mesh gill nets set in Stephens Lake, spring 2018. 44
Figure 11: Adult Lake Sturgeon abundance estimates based on POPAN best model for Stephens Lake (2001–2018). 45
Figure 12: Analysis of change in mean population abundance estimates for Stephens Lake between one sample period (2016 to 2018) and two sampling periods (2014 to 2018). 46
Figure 13: Abundance estimates for adult Lake Sturgeon in Stephens Lake by sampling year (2001–2018) showing a significant positive trend. 47

LIST OF MAPS

Map 1: Map of the Keeyask Study Area. 49
Map 2: Sites fished with large mesh gill net gangs in the Nelson River between Clark Lake and Gull Rapids (*i.e.*, the future Keeyask reservoir), spring 2018. 50
Map 3: Sites fished with large mesh gill net gangs in Stephens Lake, spring 2018. 51
Map 4: Map of instream structures at the Keeyask Generating Station site, October 2018. 52

LIST OF APPENDICES

Appendix 1: Tagging and biological information for Lake Sturgeon captured upstream of Gull Rapids and in Stephens Lake in spring, 2018 54
Appendix 2: Tagging and biological information for Lake Sturgeon recaptured upstream of Gull Rapids and in Stephens Lake during spring, 2018. 68
Appendix 3: Population estimate information 94

1.0 INTRODUCTION

The Keeyask Generation Project (the Project) is a 695-megawatt (MW) hydroelectric generating station at Gull Rapids on the lower Nelson River in northern Manitoba. The Project is approximately 725 kilometres (km) northeast of Winnipeg, 35 km upstream of the existing Kettle Generating Station, where Gull Lake flows into Stephens Lake, 60 km east of the community of Split Lake, 180 km east-northeast of Thompson and 30 km west of Gillam (Map 1). Construction of the Project began in July 2014.

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 licensing 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, adult Lake Sturgeon populations, for the construction and operation phases of the Project

Adult population monitoring studies were initiated in 2001. Two areas were considered: the area that would be directly affected by the Project (including the reach of the Nelson River from Clark Lake to Gull Rapids) and Stephens Lake; and rivers flowing into the upstream portion of Split Lake (referred to as the Upper Split Lake Area). When studies were initiated in 2001, it was known that Lake Sturgeon habitat in the Upper Split Lake Area would not be affected by the Project, but the degree of interaction between Lake Sturgeon in the Upper Split Lake Area and Gull and Stephens lakes was not known. Genetic studies completed since that time have demonstrated that sturgeon in Gull Lake are a separate population from sturgeon in the Upper Split Lake Area (Gosselin *et al*. 2016). However, some movement of adult Lake Sturgeon between Gull Lake and the Nelson River downstream of the Kelsey GS has been recorded. Studies have continued in the Upper Split Lake Area because this area was selected as a location where the KHLP could support the recovery of a Lake Sturgeon population outside the direct influence of the Project as an offsetting measure[1].

Since 2001, Lake Sturgeon data have been collected in multiple years from the Upper Split Lake, Clark Lake to Gull Rapids, and Stephens Lake areas (Barth and Mochnacz 2004; Barth 2005; Barth and Murray 2005; Barth and Ambrose 2006; Barth and MacDonald 2008; MacDonald 2008a, b; Michaluk and MacDonald 2010; MacDonald and Barth 2011; Hrenchuk and McDougall 2012; Hrenchuk 2013; Groening *et al*. 2014; Henderson *et al.* 2016; Legge *et al.* 2017; Lacho *et al.* 2018). Studies focused on adults were conducted during alternate years among locations: in the Upper Split Lake Area during odd numbered years; and in the Nelson

[1] See the Fisheries Offsetting and Mitigation Plan for more information on the selection of stocking locations and the stocking plan.

River between Clark Lake and Gull Rapids and Stephens Lake in even numbered years. These studies were conducted during spring and identified sturgeon spawning areas, determined the relative importance of spawning sites, and contributed to the understanding of sturgeon movements. Mark-recapture data also have been used to develop adult abundance estimates for populations in the Upper Split Lake Area and in the Nelson River between Clark Lake and Gull Rapids. It has not been possible to develop an estimate for Stephens Lake because too few fish have been captured. The last population estimate for the Upper Split Lake Area was derived in 2017 (Lacho *et al*. 2018). The last population estimate for the future Keeyask reservoir was derived in 2016 (Legge *et al.* 2017).

This report presents results of the adult Lake Sturgeon population monitoring conducted in the future Keeyask reservoir (*i.e.*, the Nelson River between Clark Lake and Gull Rapids [Map 2]) and in Stephens Lake (Map 3) in spring 2018, and compares these results to previous years. This is the second monitoring study conducted on adult Lake Sturgeon in the future Keeyask reservoir and in Stephens Lake since construction of the Project began in July 2014. Data collected during the field program address the adult population monitoring program and also provides information relevant to the movement monitoring program. The key questions set out in the AEMP for adult population monitoring were:

- Is there a biologically relevant (and statistically significant) change in the rate of population growth for the future Keeyask reservoir and Stephens Lake populations?
- Is there a biologically relevant (and statistically significant) change in survival for the future Keeyask reservoir and Stephens Lake populations?
- Is there a biologically relevant (and statistically significant) change in the condition factor of Lake Sturgeon?
- Is the relative abundance/CPUE of adult Lake Sturgeon in Stephens Lake changing?
- Over the long-term, is there a measurable effect on population growth due to stocking?
- Over the long-term, is the Lake Sturgeon population considered sustainable based on the size of the adult population and the population viability analysis?

The last two questions in this list relate to long-term changes and are not addressed in this report.

Movement monitoring, as described in the AEMP, is based on both mark/recapture methods (this report) and acoustic telemetry (Hrenchuk and Lacho 2019).

2.0 STUDY SETTING

The study area encompasses an approximately 110 km long reach of the Nelson River from Clark Lake to the upstream end of the Limestone Reservoir (Map 1). This section of river offers a diversity of physical habitat conditions, including a variety of substrate types, and variable water depths (range 0–30 m) and velocities. Water velocities were classified as low (0.2–0.5 metres per second [m/s]), moderate (0.5–1.5 m/s), or high (greater than 1.5 m/s), as described in the Keeyask AE SV.

Clark Lake is located immediately downstream of Split Lake, and approximately 42 km upstream of Gull Rapids (Map 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 (Maps 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 and 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 (Maps 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 (Map 2).

Gull Rapids is located approximately 3 km downstream of Caribou Island on the Nelson River (Map 1 and 2). The rapids are approximately 2 km in length, and the river elevation drops approximately 11 m along its 2 km length. Two large islands and several small islands occur within the rapids, prior to the river narrowing; these features are within the Project footprint and have been substantially altered during construction (Map 2 and 4). A summary of construction activities at Gull Rapids is provided in Section 2.1.

Just below Gull Rapids, the Nelson River enters Stephens Lake (Map 3). 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 has altered the flow distribution immediately downstream of Gull Rapids as all flow now passes via the south channel of Gull Rapids. In August 2018, flow was further constricted when the spillway was commissioned (see Section 2.1).

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

2.1 Construction Summary

Construction of the Keeyask GS began in mid-July 2014 with the construction of cofferdams in the north and central channels of Gull Rapids (Map 4). These cofferdams resulted in the dewatering of the north and central channels and the diversion of all flow to the south channel. Construction of the Spillway Cofferdam (SWCD), which extends into the south channel of Gull Rapids, was completed in 2015. The rock placement for the inner and outer groins of the Tailrace Cofferdam (TRCD) started in late 2016 and the impervious fill placement was completed in fall 2017. An opening was created to allow fish to move freely over the winter of 2017-2018. The opening was closed in spring 2018 and dewatering of the TRCD occurred in July, at which time a fish salvage was completed. In preparation for commissioning of the spillway, the SWCD was watered-up on both sides of the structure in June 2018. Removal of the SWCD started in early July and continued into August. The spillway was commissioned between August 3 and 7, 2018. Closing the south channel with the upstream South Dam Cofferdam (SDCD) commenced at the beginning of August and river closure was achieved on August 16. This closure and the work that continued to seal the cofferdam forced the entire river flow through the spillway. The downstream SDCD was completed in September and the area between the two cofferdams was dewatered, allowing for fish salvage to be completed by late September 2018. Work continued on the upstream SDCD until it was complete in late fall 2018.

2.2 Flows and Water Levels

From October 2017 to October 2018, Split Lake outflow ranged from about 2,800-4,000 m^3/s. Flow typically fell in the range of about 3,000-3,500 m^3/s, which is near the historical annual median flow of approximately 3,300 m^3/s. Flow was generally higher during the 2017-2018 winter period, gradually declining from about 3,800 m^3/s at the end of February 2018 to about 2,800 m^3/s by the beginning of May. From early May 2018 to the beginning of July, flow gradually increased to about 3,500 m^3/s and remained at that level to the end of July. The flow subsequently declined to about 2,800 m^3/s by the end of September. Water levels varied in conjunction with the flows, ranging from about 153.4-155.2 m ASL on Gull Lake.

3.0 METHODS

3.1 GILLNETTING

Large mesh gill nets were used to capture adult (≥ 800 mm fork length) Lake Sturgeon in areas along the Nelson River: the future Keeyask reservoir and in Stephens Lake. Gillnetting occurred from May 24 and July 1, 2018 upstream of Gull Rapids, and from May 27 to June 30, 2018, in Stephens Lake.

Gillnet gangs consisted of four 25 yd (22.9 m) long, 2.7 yd (2.5 m) deep panels of 8, 9, 10, and 12" (203, 229, 254, and 305 mm) twisted nylon stretched mesh[1]. 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 using a hand-held thermometer (± 0.5°C). HOBO Water Temperature Pro data loggers (± 0.2°C), set approximately 1 m off the substrate were also used to log water temperature at 6-hour intervals in each of the study areas.

Captured Lake Sturgeon were measured for fork length (FL) and total length (TL; ± 1 mm), weighed (with a digital hand-held hanging scale, hand-held conventional scale, or pan scale ± 1 lb), and externally marked with individually numbered plastic Floy®-GD-94 T-bar anchor tag (Floy tag). Floy® tags were inserted between the basal pterygiophores of the dorsal fin using a Dennison® Mark II tagging gun. In addition to the external tag, each sturgeon had an individually numbered Passive Integrated Transponder (PIT) tag (Oregon RFID Ltd., Portland, Oregon) 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 dorsal muscle tissue parallel to the horizontal axis of the fish. Following implantation, the fish was scanned using an Agrident® APR 350 Reader (Agrident Ltd., Steinkippenstrasse, Germany).

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 expressed, sex and maturity codes were not assigned. The following sexual maturity codes were used:

Female (F)	Male (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)

[1] A two panel gang consisting of 9 and 12" mesh was set at Site GN-05 downstream of the Birthday Rapids due to space constraints.

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

3.2 DATA ANALYSIS

As was done in previous years, data analysis included all sizes of Lake Sturgeon captured (as opposed to only those measuring more than 800 mm FL). Mesh sizes used target large Lake Sturgeon, but smaller fish are also captured. Including all fish in the summary statistics ensures comparability among years.

Mean FL (mm), weight (g), and condition factor (K) were calculated for all first-time captures and recaptured Lake Sturgeon 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)

Mean condition factor was calculated by 50 mm FL interval for adult Lake Sturgeon. Condition factor for pre-Project data (*i.e.*, 2001–2014) was then compared to the first two years of monitoring data (2016 and 2018), by FL interval, using Mann-Whitney U-tests in XLSTAT® (Addinsoft 2006). Significance was determined using a p-value of 0.05.

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

A length-weight relationship was calculated using least squares regression analysis on logarithmic transformations of FL and weight 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; the standard length of adult Lake Sturgeon nets) 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.

For the calculation of CPUE, the gillnetting effort (in hours) was standardized to gillnet gang length. For example, the duration of a gillnet set at a site where a 4-panel gang (91.4 m in length) was used was doubled to be the equivalent of a 2-panel gillnet gang (45.7 m in length).

Lake Sturgeon that were tagged in a previous year and recaptured in 2018 were included in all analyses; however, current-year recaptures (*i.e.*, those captured multiple times within the same sampling year) were only included for the first capture.

3.3 POPULATION ESTIMATION

Mark-recapture population estimates have been calculated for the future Keeyask reservoir during the spring of 12 different years (1995, 2001-2004, 2006, 2008, 2010, 2012, 2014, 2016, and 2018). In Stephens Lake, 2018 was the first year in which mark-recapture population estimates could be calculated. Estimates were calculated for the spring of 13 different years (2001-2006, 2008, 2010-2012, 2014, 2016, and 2018). Sampling methods and protocols differed between time periods. Lake Sturgeon were tagged in 1995 in Gull Lake by Manitoba Fisheries Branch and the Split Lake Resource Management Board. All data for the period 2001–2012 were collected annually as part of environmental studies related to the pre-Project environment, while data from 2014 until 2044 will be collected biennially as part of monitoring studies related to the Keeyask GS project. Detailed methods can be found in Appendix 3.

The Jolly-Seber model (POPAN formulation; Arnason and Schwarz 2002), as implemented within MARK, was used to estimate the annual abundance of adult Lake Sturgeon in both the future Keeyask reservoir and Stephens Lake. Survival estimates were calculated in two ways: i) split into groups based on model recommendations; and ii) split into pre-construction and construction estimates. These differed based on location.

For the future Keeyask reservoir, survival was estimated as follows:

- Model recommendation: 1995–2001, 2002–2004, and 2006–2018.
- Pre-construction (2004–2014) and construction (2015–2018).

For Stephens Lake, survival was estimated as follows:

- Model recommendation: 2001–2014 and 2015–2018; and
- Pre-construction (2001–2014) and construction (2015–2018).

In order to track short-term trends in population size, current year estimates were compared to those from the previous one (*i.e.,* 2016) and two (*i.e.*, 2014) sampling periods. A statistically significant change was determined as an increase beyond the 95th percentile or a decrease below the 5th percentile (*e.g.,* if the 2018 estimate was greater than the 95th percentile from the 2016 estimate, the increase in population size was significant).

Long-term population trajectory was analysed using a standard linear regression. Slopes that were significantly different than zero (F-tests, $p < 0.05$) indicated an increasing or decreasing trend. The slope of the regression through time indicated the approximate number of individuals added to or removed from the population each year.

Fish that moved downstream from the future Keeyask reservoir to Stephens Lake were removed from upstream analysis and added to Stephens Lake.

4.0 RESULTS

In total, 544 individual fish, comprised of five species, were captured in large mesh gill nets set in the Nelson River downstream of Clark Lake and in Stephens Lake during spring 2018 (Table 1). Of these, 476 were Lake Sturgeon. Tag and biological data for first-time Lake Sturgeon captures are presented in Appendix 1. Data from recaptured Lake Sturgeon are presented in Appendix 2.

4.1 FUTURE KEEYASK RESERVOIR

4.1.1 RELATIVE ABUNDANCE/CPUE

Gill nets were set at 53 sites between Clark Lake and Gull Rapids between May 24 and July 1, 2018 (Table 2; Map 2). Water temperature increased from 6 to 18°C over the duration of the study (Figure 1). A total of 246 fish, comprised of three species, were captured, the majority of which (96%) were Lake Sturgeon (Table 1). No gillnetting mortalities occurred during sampling.

A total of 235 Lake Sturgeon were captured over 16,763 equivalent gillnetting hours, resulting in an overall CPUE of 0.33 LKST/45.7 m net/24 h (Table 2). The site-specific CPUE ranged from 0.0–1.4 LKST/45.7 m net/24 h by site. Gillnetting effort was highest in Zone BR-D (the reach of the Nelson River downstream of Birthday Rapids), at 9,233 equivalent hours (Map 2; Table 3). Lake Sturgeon CPUE was higher in Gull Lake compared to the Nelson River (Map 2; Table 3). Overall CPUE by zone was:

- BR-U = 0.06 LKST/45.7 m net/24 h;
- BR-D = 0.27 LKST/45.7 m net/24 h;
- GL-A = 0.38 LKST/45.7 m net/24 h;
- GL-B = 0.41 LKST/45.7 m net/24 h; and
- GL-C = 0.44 LKST/45.7 m net/24 h.

The first Lake Sturgeon was captured on May 26, when the water temperature measured 7.3°C, and the last Lake Sturgeon was captured on the final day of sampling on July 1, when the water temperature measured 17.0°C (Figure 1; Appendix 1). The daily catch peaked at 13 Lake Sturgeon on June 7 and June 12 when water temperature was 10.3 and 15.6°C, respectively (Figure 1; Appendix 1).

4.1.2 BIOLOGICAL METRICS

Lake Sturgeon captured had a mean fork length of 850 mm (range: 436–1,550 mm), a mean weight of 5,960 g (range: 318–30,844 g), and a mean condition factor of 0.81 (range: 0.28–1.43) (Table 4). Of the 235 Lake Sturgeon caught, 132 were considered adults (FL ≥ 800 mm) and 103 were considered juveniles (FL < 800 mm). Lake Sturgeon in the 900–949 mm FL intervals were captured most frequently (n = 35), making up 15% of the total and 26% of the adult Lake Sturgeon catch (Figure 2). Sturgeon in the 700–749 mm FL interval were the next most frequent (n = 30), accounting for 13% of the total catch and 29% of the juvenile catch (Figure 2).

Mean condition factor of adult Lake Sturgeon did not differ significantly between baseline (2001–2014) and construction (2016 and 2018) for any of the 13 FL intervals for which comparisons were possible (Mann Whitney U test, $p > 0.05$; Figure 3). The length-weight relationship is presented in Figure 4.

Sex and maturity were determined for 18 individuals, two of which were current year recaptures (captured more than once in 2018) whose maturity status progressed between captures (*e.g.*, a fish was initially captured in pre-spawn condition and recaptured in ripe or spent condition) (Table 6). The catch included 13 pre-spawn and 4 ripe males and one pre-spawn female (Table 6). Spawners were captured in Zones BR-U and BR-D. Five mature fish (Floy tag #111765 [female], #75316 [male], #105409 [male], #111758 [male], #111770 [male]) were used as broodstock for the Project's stocking program. Details on gamete collection, egg fertilization, egg transport, hatch, larval rearing, and stocking can be found in Klassen *et al*. (2019).

4.1.3 MOVEMENTS

PIT tags were applied to all 158 newly-captured Lake Sturgeon in the future Keeyask reservoir, as well as 36 Lake Sturgeon that had previously been tagged with Floy® tags (Appendix 1). PIT tags were inadvertently not applied to the three Lake Sturgeon captured in Zone BR-U; two of these fish had existing Floy® tags. The remaining 38 fish had been previously tagged. Two of these were hatchery fish released into Gull Lake in 2015; these fish were implanted with PIT tags before release from the hatchery but had not been previously captured in gill nets (Appendix 2).

In total, 32% of Lake Sturgeon were recaptures from previous gillnetting studies (n = 74) (Table 7). Lake Sturgeon have been recaptured up to 6 years after being tagged. These fish often move between the Nelson River below Birthday Rapids and Gull Lake. Biological and previous capture information for previously tagged Lake Sturgeon are provided in Appendix 2 and are summarized below:

- Seventy-three were originally tagged between 2001 and 2017 in the same reach in which they were recaptured:
    - Sixteen were recaptured in the Nelson River downstream of Birthday Rapids.

- Fifty-seven were recaptured in Gull Lake.
    - Two (Floy® tag #77503 and #105480) were implanted with acoustic transmitters upstream of Gull Rapids in 2011 and 2014. Details on their movements since this time can be found in Hrenchuk and Lacho (2019).
  - Four Lake Sturgeon lost a Floy® tag and were identified by their PIT tags (new Floy® tag #79417, #79411, #111979, and #111994).
- Tagging information could not be located for one Lake Sturgeon (Floy® tag #96492); it is possible the tag number was recorded incorrectly in the field.

4.1.4 POPULATION ESTIMATION

The population estimate for the future Keeyask reservoir in 2018 was 820 individuals (range: 678–991), which was greater than the 95% confidence limits of estimates from between 1995 and 2004, but within the 95% confidence limits of estimates from between 2006 and 2016 (Figure 5; Appendix 3). The estimated annual survival (2006–2018) was 91%. Both pre-construction (2004–2014) and construction (2015–2018) survival was estimated at 91%.

To better examine potential short term changes in population size, estimates for the past two sampling periods were compared. The current (2018) mean population estimate was compared to the 95% confidence interval (CI) of the past two estimates (Figure 6). The 95% confidence interval (CI) for the 2014 estimate encompassed a 16% decrease or 18% increase from the median estimate, while the 2016 CI ranged from a 14% decrease to a 16% increase. The mean estimate for 2018 fell within the 95% CI for both 2014 and 2016, given that it was 2% and 10% greater than 2014 and 2016, respectively.

Overall, abundance estimates calculated between 2001 and 2018 show a significant increasing trend ($r^2 = 0.71$, $F = 22.11$, $p = 0.001$) (Figure 7).

4.2 STEPHENS LAKE

4.2.1 RELATIVE ABUNDANCE/CPUE

Large mesh gill nets were set at 62 sites downstream of Gull Rapids and in Stephens Lake between May 27 and June 30 (Table 2; Map 3). As a result of the temperature logger malfunctioning, temperatures from the Nelson River mainstem upstream of Gull Rapids were used. Water temperatures measured using a hand-held thermometer in Stephens Lake were comparable to temperatures measured upstream of Gull Rapids with the HOBO, byt were not measured every day. Water temperature ranged from 8 to 18°C during the sampling period

(Figure 1). A total of 298 fish were captured, comprised of five fish species, the majority of which (81%) were Lake Sturgeon (Table 1).

Three gillnetting mortalities occurred during sampling. One fish was a new capture of unknown sex and maturity measuring 1,411 mm FL. Two fish were recaptures tagged in previous years: one male measuring 1,210 mm FL originally tagged in 2006 (Floy® tag #80405), and one mature male measuring 925 mm FL (missing Floy® tag; PIT tag # 900 226000548916; Appendix 2).

The 241 Lake Sturgeon were caught over 15,863 equivalent gillnet hours, resulting in an overall CPUE of 0.36 LKST/45.7 m net/24 h (Table 2). Zone-specific CPUE ranged from 0.16–0.48 LKST/45.7 m net/24 h (Table 3). Gillnetting effort was considerably higher in Zone STL-A compared to Zones GR-A and STL-B (Map 3; Table 3). Overall CPUE by zone was:

- GR-A = 0.48 LKST/45.7 m net/24 h;
- STL-A = 0.38 LKST/45.7 m net/24 h; and
- STL-B = 0.16 LKST/45.7 m net/24 h.

The first Lake Sturgeon was captured on May 28 at a water temperature of 9°C, and the last on June 30 at a water temperature of about 18°C (Figure 1; Appendix 1). The catch was highest on June 1 (n = 10) when water temperature measured 11°C (Figure 1; Appendix 1).

4.2.2 BIOLOGICAL METRICS

Lake Sturgeon captured in the Stephens Lake Area had a mean FL of 901 mm (range: 361–1,411 mm), a mean weight of 6,692 g (range: 250–27,125 g), and a mean condition factor of 0.83 (range: 0.43–1.53) (Table 5). Of the 241 Lake Sturgeon captured, 173 were classified as adults (FL ≥ 800 mm). Lake Sturgeon in the 800–849 and 900–949 mm FL intervals were captured most frequently (n = 34 and 32, respectively), comprising a combined 27% of the total and 38% of the adult Lake Sturgeon catch (Figure 8). Most (87%) of the 67 juvenile fish (FL < 800 mm) captured were in the 700–749 and 750–799 mm intervals (n = 29 each).

Mean condition factor was higher during baseline monitoring than construction monitoring for only one size class (1,000–1,049 mm FL; Figure 9). There were no significant differences in condition factors for any other size class[1]. The length-weight relationship is presented in Figure 10.

Sex and maturity were determined for 32 individuals, including 11 pre-spawn, 15 ripe, and six spent males (Table 6). The ripe males were captured along the south shore in Zones GR-A and STL-A (Map 3) between May 30 and June 7, when the water temperature was about 9°C, while the spent males were captured at similar locations between June 1 and 16, when the water

[1] The statistical analysis was run on the pooled sample for the 1,250–1,299, 1,300–1,349, 1,350–1,399, and 1,400–1,449 mm size classes due to the small number of fish in each interval.

temperature increased from 9 to 15°C (Map 4; Figure 1). No fish identified as spawning females were captured in Stephens Lake.

4.2.3 Movements

Floy® tags and PIT tags were applied to 148 of the 150 newly captured Lake Sturgeon (excluding one mortality and one fish that was inadvertently not tagged). One untagged Lake Sturgeon received a PIT tag only. The remaining 91 fish were recaptures tagged in a previous year (Table 7). Four of these recaptures were hatchery fish released into Stephens Lake in 2015 that had been implanted with PIT tags before release from the hatchery but had not been previously captured in gill nets (Appendix 2).

In total, 36% of the Lake Sturgeon captured in Stephens Lake in spring 2018 were recaptures from previous gillnetting studies (n = 87):

- Eighty-one had originally been tagged in Stephens Lake between 2001 and 2017.
    - Twenty have been captured over multiple years since the original date of tagging; all but one recapture occurred in Stephens Lake.
        - One (Floy® tag #46827) was tagged downstream of Gull Rapids in 2001, was recaptured in the Nelson River downstream of Birthday Rapids in late-June 2003, and was later recaptured downstream of Gull Rapids in early June 2016 and 2018.
    - Seven (Floy® tag #55557, #69868, #74421, #81628, #88788, #91174, and #103230) were implanted with acoustic transmitters in Stephens Lake in 2011 and 2012. Details on their movements since this time can be found in Hrenchuk and Lacho (2019).
- Six were originally tagged upstream of Gull Rapids.
    - One (Floy® tag #94085) was tagged in the Nelson River upstream of Birthday Rapids in 2010.
    - Two (Floy® tag #105424 and #110528) were tagged in the Nelson River downstream of Birthday Rapids in 2014 and 2016.
    - Three (Floy® tags #80114, #86140, and #103633) were tagged in Gull Lake between 2006 and 2014.

4.2.4 Population Estimation

Two Lake Sturgeon (Floy® tag #103622 and #115822) were reported as harvested by a local resource user. These fish had been tagged in Stephens Lake in 2012 and 2018, respectively, and both were harvested in Stephens Lake.

The 2018 population estimate for Stephens Lake was 296 individuals (range: 218–401), which was above the 95% confidence limits of the 2001–2011 estimates, but within the 95% confidence limits of all other years (Figure ; Appendix 3). The annual survival estimate pre-construction (2001 to 2014) was 86%, while the survival estimate during construction (2015 to 2018) was 94%.

The current (2018) mean population estimate was compared to the 95% confidence interval (CI) of the past two estimates (2014 and 2016) (Figure 12). The 95% confidence interval (CI) for the 2014 estimate encompassed a 36% decrease or 52% increase from the median estimate, while the 2016 CI ranged from a 15% decrease to a 17% increase. The mean estimate for 2018 fell within the 95% CI for both 2014 and 2016, given that it was 37% greater than 2014 and 12% lower than 2016, respectively.

Abundance estimates between 2001 and 2018 show a significant increasing trend ($r^2 = 0.66$, $F = 21.63$, $p = 0.0007$) (Figure 13).

5.0 DISCUSSION

The main objective of long-term adult Lake Sturgeon population monitoring in the future Keeyask reservoir and Stephens Lake is to identify potential changes in abundance and condition factor during construction and operation of the Project. Adult Lake Sturgeon population monitoring is planned to continue until 2044.

5.1 EVALUATION OF METHODOLOGY

Population monitoring data for adult Lake Sturgeon in the Keeyask area are currently being collected by area (Upper Split Lake and future Keeyask reservoir/Stephens Lake) every two years. Gill net mortality remains low. In 2018, three mortalities occurred from a total of 487 captures (0.6%). Analyses suggest that this methodology is performing well for determining Lake Sturgeon abundance as estimates have not fluctuated greatly between years and large numbers of outliers (*i.e.,* large increases in untagged fish) have not been observed. By 2018, sufficient Lake Sturgeon had been tagged and re-captured in Stephens Lake to produce an abundance estimate for the first time.

Since 2013, double tagging (Floy® and PIT) has been used to mark fish. This methodology is expected to improve confidence in the data set by reducing the probability that marked fish will be misidentified as unmarked fish due to Floy® tag loss. In 2018, four fish were recaptured that had lost Floy® tags. Without PIT tags, these fish would have been misidentified as newly-captured fish, leading to an artificially low recapture rate and an over-estimate of the population size. Two tags from Stephens Lake) were returned by local resource users in 2018. The inclusion of these tags helps to refine the population estimate, and reduces the chance of overestimating Lake Sturgeon abundance (*i.e.*, by counting fish which are no longer in the population).

5.2 ADULT LAKE STURGEON ABUNDANCE

More sturgeon were captured in both the future Keeyask reservoir (n = 232) and Stephens Lake (n = 241) than in any previous year of study (Table 2). The increase in Stephens Lake is particularly striking, given that the previous largest catch in 2014 was 71 fish. The 2018 population estimate for the future Keeyask reservoir (820 individuals, 95% CI 678–991) was not statistically different from the 2014 (802 individuals, 95% CI 654–982) or 2016 (745 individuals, 95% CI 621–892) estimates. Despite this, overall abundance estimates calculated between 2001 and 2018 show a significant increasing trend over time. Similarly, the 2018 population estimate for Stephens Lake (296 individuals, 95% CI 218–401) did not differ significantly from the 2014 (216 individuals, 95% CI 125–374) or 2016 (334 individuals, 95% CI 218–401) estimates. Abundance estimates between 2001 and 2018 in Stephens Lake also show an increasing trend over time.

Addition of data collected in 2018 to the population model in the future Keeyask reservoir did not indicate a substantial change in the survival rate, so a single rate for the 2004–2018 period continued to be used in the population model. The calculated survival rate in the future Keeyask reservoir remains high, at 91%, which is greater than the estimate determined for the 2001–2004 period (77%; Table A3-2). It is also higher than annual survival rates calculated both for the Burntwood (88%) and Kelsey GS area (81%) populations in 2017 (Lacho *et al*. 2018). The survival estimates did not change when split into pre-construction (2004 to 2014; 91%) and construction (2015 to 2018; 91%) periods. The calculated survival rate during construction for Stephens Lake (2015 to 2018) was also high, at 94%; while the survival rate for 2001–2014 (86% was considerably lower). However, these estimates will likely change as data is added to the model and estimates are refined.

5.3 Spawning

A total of 18 Lake Sturgeon identified as being in spawning condition were captured in the future Keeyask reservoir in 2018, which is within the observed range since the study began in 2001. About half of the spawning individuals (including the one female) were captured where the Nelson River enters Gull Lake (zone GL-A; n = 8 or 44%), with almost as many (including all of the ripe males) captured downstream of Birthday Rapids (zone BR-D; n = 6; 33%; Map 2). These locations are similar to capture locations in previous years (Hrenchuk *et al.* 2015; Legge *et al.* 2017). An additional three pre-spawn males (17%) were captured downstream of Clark Lake in the vicinity of Long Rapids (zone BR-U). Sturgeon that were preparing or ready to spawn have been previously captured in this area in 2004 (n = 4; Barth and Ambrose 2006), 2010 (n = 1; MacDonald and Barth 2011), 2011 (n = 1; Hrenchuk and McDougall 2012), and 2012 (n = 1; Hrenchuk 2013), suggesting that Lake Sturgeon may use Long Rapids to spawn.

For the first time since studies began in 2001, the number of spawning Lake Sturgeon captured was higher in Stephens Lake compared to the future Keeyask reservoir. More adult Lake Sturgeon in spawning condition were captured in Stephens Lake in 2018 (n = 32) compared to all years of pre-construction sampling (2001–2014, n = 22) and the first year of construction monitoring (2016, n = 8), combined. During the construction period, all of the sturgeon in spawning condition were captured downstream of Gull Rapids (the only suitable spawning habitat for Lake Sturgeon in Stephens Lake). The increase in spawning adults, along with the observed increased abundance of Lake Sturgeon in the area, suggests that spawning activity at Gull Rapids may be increasing.

5.4 SIZE DISTRIBUTION AND CONDITION FACTOR

The mean size of Lake Sturgeon from the future Keeyask reservoir has been lower in studies conducted since 2012 (838–872 mm) compared to earlier studies (901–1,149 mm). A similar trend has been observed in Stephens Lake, where the mean length has been <950 mm since 2011, but was >1,000 mm in six of the seven years prior to this.

Based on the size distribution of Lake Sturgeon captured in the future Keeyask reservoir, there will likely be an increase in the number of spawning fish in the near future. Of the 235 Lake Sturgeon captured, 132 (56%) were large enough to be considered adults. Of the 103 juveniles captured, 37 (36%) measured between 600 and 699 mm FL and 56 (54%) measured between 700 and 799 mm FL. Soon these fish will be recruited to the adult population. A similar trend was observed in Stephens Lake. Of the 68 juvenile fish captured, 58 (85%) measured between 700 and 799 mm FL. The 2008 cohort has dominated the juvenile catch in both the future Keeyask reservoir and Stephens Lake since 2010 (Burnett *et al.* 2018). It is likely that these large juvenile fish represent this cohort, which will soon be recruited to the adult population. This will likely increase the number of adult Lake Sturgeon captured in both locations in the next sampling period (*i.e.*, 2020).

Condition factor of Lake Sturgeon captured during baseline studies and in 2016 and 2018 were similar for the majority of size classes in both the future Keeyask reservoir and Stephens Lake. Mean condition factor was not significantly different between baseline and construction monitoring for any size classes in the future Keeyask reservoir. In Stephens Lake, one size class (1,000–1,049 mm FL) had significantly higher average condition factors during baseline studies than during construction. Future monitoring will indicate whether this difference persists and is biologically significant or just reflects natural variability within the catch. Mean Lake Sturgeon condition factors in the future Keeyask reservoir (0.82) and Stephens Lake (0.83) remain within the range typical for adult Lake Sturgeon populations in Manitoba (0.75–0.95).

5.5 MOVEMENT

A total of 384 Lake Sturgeon have been recaptured in the future Keeyask reservoir (Table 7) and 147 in Stephens Lake (Table 8) during spring population monitoring since 2001. The majority of recaptured sturgeon have not traveled far; most were tagged and recaptured in the same area (*i.e.*, those originally tagged in the Nelson River upstream of Gull Rapids were recaptured in that reach, and those originally tagged in Stephens Lake were recaptured in Stephens Lake). Movement between zones within a waterbody are common.

None of the 74 recaptures from the future Keeyask reservoir in 2018 are known to have moved outside of the waterbody in which they were initially captured. A small proportion (n = 6 or 2.5%) of the 87 fish recaptured in Stephens Lake in 2018 were first tagged in the future Keeyask reservoir (#80114, #86140, #94085, #103633, #105424, and #110528). Two of these fish

(#94085 and #110528) exhibited signs of spawning during initial capture and recapture (Appendix 2).

Since 2011, an acoustic telemetry study encompassing Clark Lake to the Limestone Reservoir (Map 1) has tracked 12 movements made by nine Lake Sturgeon through Gull Rapids (six upstream and six downstream movements) (Hrenchuk and Lacho 2019). Nine fish tagged with acoustic transmitters were captured during the current study (two in the future Keeyask reservoir and seven in Stephens Lake); however, all were recaptured near their original tagging location. Both studies show that large-scale movements of these fish are generally rare and unless they are moving to a spawning area, adult Lake Sturgeon tend to remain within a general area (*e.g.*, the upper basin of Gull Lake).

One potential effect of construction of the Keeyask GS identified during the Project assessment was increased emigration of adult Lake Sturgeon upstream to the Upper Split Lake Area. Mark-recapture data continue to show that low numbers of fish move between Upper Split Lake and the Keeyask Area. Although no such movements were observed in 2018, downstream movements of fish from Upper Split Lake Area to the Keeyask Area have been observed in previous monitoring years (four fish or 1% of total recaptures; Table 7).

5.6 KEY QUESTIONS

Information related to the key questions posed in the AEMP regarding adult Lake Sturgeon in the future Keeyask reservoir and Stephens Lake is presented in the preceding discussion. The current understanding of the answers to the key questions is summarized below.

Is there a biologically relevant (and statistically significant) change in the rate of population growth for the future Keeyask reservoir population?

The 2018 population estimate for the future Keeyask reservoir did not differ significantly from the 2014 or 2016 estimates. However, the overall abundance estimates calculated between 2001 and 2018 show a significant increasing trend over time.

Population size in Stephens Lake was estimated for the first time in 2018. The 2018 estimate did not differ significantly from the 2014 or 2016 estimates. However, as in the future Keeyask reservoir, the overall abundance estimates calculated between 2001 and 2018 show a significant increasing trend over time.

Is there a biologically relevant (and statistically significant) change in survival for the future Keeyask reservoir population?

Inclusion of the 2018 data into the calculated survival rate for the 2004–2018 period indicates that survival of adult Lake Sturgeon in the future Keeyask reservoir remains high (91%). There was no difference in pre-construction (2004 to 2014) and construction (2015 to 2018) survival rates (91%). Survival was calculated for the first time in Stephens Lake. Survival was higher during construction (2015 to 2018; 94%) than pre-construction (2001 to 2014; 86%).

Is there a biologically relevant (and statistically observable) change in the condition factor of Lake Sturgeon?

There were no significant differences in the condition factor of adult Lake Sturgeon captured during baseline studies and construction monitoring in the future Keeyask reservoir for any size class. In Stephens Lake, condition factor of sturgeon captured during baseline monitoring was significantly higher for fish measuring 1,000–1,049 mm, but there were no significant differences for any other size class. Since 2018 represents only the second year of construction monitoring, further monitoring is necessary to see if the observed differences in condition factor are biologically relevant. It should be noted that the condition factor in Lake Sturgeon can vary considerably between years, and that average condition factor from both areas post-construction continues to be between 0.82–0.90, which is typical for adult Lake Sturgeon in Manitoba.

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

The CPUE of Lake Sturgeon in 2018 in Stephens Lake (0.36 LKST/45.7 m net/24 h) was higher than reported in previous years with comparable program objectives (0.02–0.10 LKST/45.7 m net/24 h). The majority of the adults captured in 2018 measured less than 1,000 mm FL, indicating the increased number of fish is due to recruitment of juveniles to the adult segment of the population.

6.0 SUMMARY AND CONCLUSIONS

- Population monitoring was conducted in spring 2018 to derive an adult Lake Sturgeon population estimate and examine size and condition of the future Keeyask reservoir and Stephens Lake sturgeon populations.
- A total of 476 individual Lake Sturgeon were captured. Of these, 235 were caught in the Nelson River between Clark Lake and Gull Rapids, with 132 of these classified as adults (≥ 800 mm). In Stephens Lake, 241 Lake Sturgeon were captured, with 173 of these classified as adults.
- Of the 235 Lake Sturgeon captured upstream of Gull Rapids, 18 were in spawning condition: 13 pre-spawn and four ripe males; and one female that was preparing to spawn. Downstream of Gull Rapids, 32 of the 241 Lake Sturgeon captured were in spawning condition, all of which were identified as males: 11 were preparing to spawn; 15 were ripe; and six were spent.
- Mark-recapture data indicate that long-range movements are rare and that fish tend to stay in the area in which they were originally tagged. Continued monitoring will reveal if long-range upstream movements become more common as construction of the Keeyask GS progresses. Emigration of Lake Sturgeon in response to water level changes in the future Keeyask reservoir was identified as a potential effect of the construction of the Keeyask GS.
- Key questions in the AEMP related to Lake Sturgeon monitoring in the future Keeyask reservoir and Stephens Lake are addressed below:
    - *Is there a biologically relevant (and statistically significant) change in the rate of population growth for the future Keeyask reservoir?*

      The 2018 population estimate for the future Keeyask reservoir did not differ significantly from the 2014 or 2016 estimates. However, the overall abundance estimates calculated between 2001 and 2018 show a significant increasing trend over time.

      Population size in Stephens Lake was estimated for the first time in 2018. The 2018 estimate did not differ significantly from the 2014 or 2016 estimates. However, as in the future Keeyask reservoir, the overall abundance estimates calculated between 2001 and 2018 show a significant increasing trend over time.
    - *Is there a biologically relevant (and statistically significant) change in survival for the future Keeyask reservoir population?*

      Inclusion of the 2018 data into the calculated survival rate for the 2004–2018 period indicates that survival of adult Lake Sturgeon in the future Keeyask reservoir remains high (91%). There was no difference in pre-construction

(2004 to 2014) and construction (2015 to 2018) survival rates (91%). Survival was calculated for the first time in Stephens Lake. Survival was higher during construction (2015 to 2018; 94%) than pre-construction (2001 to 2014; 86%).

- *Is there a biologically relevant (and statistically observable) change in the condition factor of Lake Sturgeon?*

  Condition factor of sturgeon captured during baseline monitoring and construction were similar for all size classes in the future Keeyask reservoir. However, mean condition factor was significantly lower than baseline for one size class of adults in Stephens Lake (1,000–1,049 mm FL). Future monitoring will determine if this trend continues. It should be noted, however, that the condition factor in Lake Sturgeon can vary considerably between years, and that the average condition factor from both areas continues to measure between 0.82 and 0.90, which is typical for adult Lake Sturgeon in Manitoba.

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

  The CPUE of Lake Sturgeon in 2018 (0.36 LKWH/45.7 m/24 h) was higher than those reported in previous years with comparable sampling programs (0.02-0.10 LKST/45.7 m/24 h), and indicates the population is likely increasing. Future monitoring will determine if this trend continues.

7.0 LITERATURE CITED

Arnason, A.N. and Schwarz, C.J. 2002. POPAN-6: Exploring convergence and estimate properties with SIMULATE. Journal of Applied Statistics 29: 649-668.

Barth, C.C. 2005. Lake Sturgeon investigations in the Gull (Keeyask) Study Area, 2002. A report prepared for Manitoba Hydro by North/South Consultants Inc. xii + 114 pp.

Barth, C.C. and Ambrose, K. 2006. Lake Sturgeon investigations in the Keeyask Study Area, 2004. A report prepared for Manitoba Hydro by North/South Consultants Inc. x + 91 pp.

Barth, C.C. and MacDonald, J.E. 2008. Lake Sturgeon investigations in the Keeyask Study Area, 2005. A report prepared for Manitoba Hydro by North/South Consultants Inc. xiii + 50 pp.

Barth, C.C. and Mochnacz, N.J. 2004. Lake Sturgeon investigations in the Gull (Keeyask) Study Area, 2001. A report prepared for Manitoba Hydro by North/South Consultants Inc. xvi + 130 pp.

Barth, C.C. and Murray, L. 2005. Lake Sturgeon investigations in the Keeyask Study Area, 2003. A report prepared for Manitoba Hydro by North/South Consultants Inc. xiv + 101 pp.

Burnett, D.C., Hrenchuk, C.L. and Barth, C.C. 2018. Juvenile Lake Sturgeon population monitoring, fall 2017: Year 4 Construction. Keeyask Generation Project Aquatic Effects Monitoring Report #AEMP-2018-02. A report prepared for Manitoba Hydro by North/South Consultants Inc., June 2018. xv + 120 pp.

Gosselin, T., Nelson, P.A., McDougall, C.A. and Bernatchez, L. 2016. Population genomics of Lake Sturgeon (*Acipenser fulvescens*) from northern Manitoba, final report. A report prepared for Manitoba Hydro by Université Laval and North/South Consultants Inc. 67 pp.

Groening, L., Henderson, L.M. and Hrenchuk, C.L. 2014. Results of adult Lake Sturgeon gillnetting in the Upper Split Lake Area, 2013. A report prepared for Manitoba Hydro by North/South Consultants Inc. ix + 64 pp.

Henderson, L.M., Hrenchuk, C.L., Nelson, P.A., Lacho, C.D. and Barth, C.C. 2016. Adult Lake Sturgeon population monitoring in the Upper Split Lake Area, 2015. Keeyask Generation Project Aquatic Effects Monitoring Report #AEMP-2016-01. A report prepared for Manitoba Hydro by North/South Consultants Inc., June 2016. xii + 72 pp.

Hrenchuk, C.L. 2013. Adult Lake Sturgeon investigations in the Keeyask Study Area, 2012. A report prepared for Manitoba Hydro by North/South Consultants Inc. x + 62 pp.

Hrenchuk, C.L. and Lacho, C.D. 2019. Adult Lake Sturgeon movement monitoring in the Nelson River between Clark Lake and the Limestone Generating Station, October 2017 to October 2018: Year 5 Construction. Keeyask Generation Project Aquatic Effects Monitoring Plan Report #AEMP-2019-01. A report prepared for Manitoba Hydro by North/South Consultants Inc., June 2019. xvii + 149 pp.

Hrenchuk, C.L. and McDougall, C.A. 2012. Lake Sturgeon investigations in the Keeyask Study Area, 2011. A report prepared for Manitoba Hydro by North/South Consultants Inc. xii + 169 pp.

Hrenchuk, C.L. Barth, C.C. and Nelson, P.A. 2015. Adult Lake Sturgeon population and spawn monitoring in the Keeyask area and Stephens Lake, 2014. Keeyask Generation Project Aquatic Effects Monitoring Report #AEMP-2015-06. A report prepared for Manitoba Hydro by North/South Consultants Inc., June 2015. x + 52 pp.

Klassen, C, Michaluk, Y., Kirchmann, S. and Groening, L. 2019. Lake Sturgeon production and stocking summary for Birthday Rapids and Burntwood River populations, November 2017 to October 2018: Year 5 Construction. Keeyask Generation Project Fisheries Off-setting and Mitigation Report. A report prepared by Manitoba Hydro, In Prep.

Lacho, C.D., Hrenchuk, C.L., Nelson, P.A. and Barth, C.C. 2018. Adult Lake Sturgeon population monitoring in the Upper Split Lake area, 2017. Keeyask Generation Project Aquatic Effects Monitoring Report #AEMP-2018-01. A report prepared for Manitoba Hydro by North/South Consultants Inc., June 2018. xvi + 94 pp.

Legge, M.M., Hrenchuk, C.L., Nelson, P.A., Burnett, D.C. and Barth, C.C. 2017. Adult Lake Sturgeon population monitoring in the future Keeyask reservoir and Stephens Lake, 2016. Keeyask Generation Project Aquatic Effects Monitoring Plan Report #AEMP-2017-05. A report prepared for Manitoba Hydro by North/South Consultants Inc., June 2017. xii + 67 pp.

MacDonald, J.E. 2008a. Lake Sturgeon investigations in the Keeyask Study Area, 2005. A report prepared for Manitoba Hydro by North/South Consultants Inc. xiv + 100 pp.

MacDonald, J.E. 2008b. Lake Sturgeon investigations in the Keeyask Study Area, 2006. A report prepared for Manitoba Hydro by North/South Consultants Inc. xv + 95 pp.

MacDonald, J.E. and Barth, C.C. 2011. Lake Sturgeon investigations in the Keeyask Study Area, 2010. A report prepared for Manitoba Hydro by North/South Consultants Inc. xii + 64 pp.

Michaluk, Y. and MacDonald, J.E. 2010. Lake Sturgeon investigations in the Keeyask Study Area, 2009. A report prepared for Manitoba Hydro by North/South Consultants Inc. xiii + 68 pp.

Ricker, W.E. 1975. Computation and interpretation of biological statistics of fish populations. Fisheries Research Board of Canada Bulletin 191. xvii + 382 pp.

TABLES

Table 1: Number of fish, by species, captured during adult Lake Sturgeon population monitoring in the future Keeyask reservoir (24 May–1 July) and Stephens Lake (27 May–30 June), spring 2018.

Species	Scientific Name	Abbreviation	Nelson River (CL-GR[2])	Stephens Lake	Total
Lake Sturgeon	***Acipenser fulvescens***	**LKST**	**235**	**241**	**476**
Longnose Sucker	*Catostomus catostomus*	LNSC	-	1	**1**
Northern Pike	*Esox lucius*	NRPK	7	17	**24**
Sauger	*Sander canadensis*	SAUG	-	16	**16**
Walleye	*Sander vitreus*	WALL	4	23	**27**
Total[1]			**246**	**298**	**544**

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).

Table 2: Lake Sturgeon catch-per-unit-effort (CPUE; # LKST/45.7 m net/24 h) values observed during mark/recapture studies in the future Keeyask reservoir and Stephens Lake from 2001–2018.

Location	Year	# Sites	Total Lake Sturgeon[1]	Total Gillnet Hours[5]	Total CPUE
Nelson River (BR-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	34	33	6734	0.12
	2012	32	114	10018	0.27
	2014	62	239	17897	0.32
	2016	55	189	15503	0.29
	2018	**49**	**232**	**16763**	**0.33**
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	35	6	7933	0.02
	2006	21	13	6084	0.05
	2010	37	17	4898	0.08
	2011	49	18	6663	0.06
	2012[4]	23	15	3555	0.10
	2014[4]	5	9	473	0.46
	2016	90	71	17037	0.10
	2018	**62**	**241**	**15863**	**0.36**

1. Does not include fish recaptured in the same waterbody in the season/year in which they were tagged.
2. Nelson River from Birthday Rapids (BR) to Gull Rapids (GR). The catch and effort from gillnetting in the reach upstream of Birthday Rapids (*i.e.*, zones BR-U, CL-A, SPL-F) has been excluded from this table in the years it was conducted.
3. The catch and effort from gillnetting conducted in other areas of Stephens Lake other than the reach downstream of Gull Rapids (*i.e.*, zones GR-A, STL-A, and STL-B) have been excluded from this table in the years it was conducted.
4. CPUE value reflects study objective (i.e., fish were captured for acoustic tagging) and may not be comparable to studies conducted in other years.
5. The effort has been corrected to account for panel length. For example, the duration of a gillnet gangs consisting of 4 panels (*i.e.*, 91.4 m long) was doubled (*i.e.*, equivalent of two 45.7 m gang sets).

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 future Keeyask reservoir and Stephens Lake, spring 2018.

Location	Zone	# Sites	Total # Lake Sturgeon[1]	Total Gillnet Hours[2]	Total CPUE
Nelson River (CL-GR[3])	BR-U	4	3	1136	0.06
	BR-D	22	103	9233	0.27
	GL-A	5	26	1660	0.38
	GL-B	12	53	3119	0.41
	GL-C	10	50	2752	0.44
Stephens Lake	GR-A	11	61	3080	0.48
	STL-A	38	165	10461	0.38
	STL-B	13	15	2321	0.16

1. Does not include fish recaptured in the same waterbody in the season/year in which they were tagged.
2. The effort (h) has been corrected to account for panel length set at each site. For example, the duration of a gillnet gang consisting of 4 panels (*i.e.*, 91.4 m long) was doubled (*i.e.*, equivalent of two 45.7 m gang sets).
3. Nelson River from Clark Lake (CL) to Gull Rapids (GR).

Table 4: Fork length (mm), weight (g), and relative condition factor (K) of Lake Sturgeon captured during adult Lake Sturgeon population monitoring in the future Keeyask reservoir, spring 2001–2018.

Location	Year	Fork Length (mm)				Weight (g)				K		
		n[2]	Mean	Std[3]	Range	n	Mean	Std	Range	n	Mean	Range
Nelson River (BR-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	52	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	52	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
	2016*	189	872	229	301–1439	184	7569	6531	227–33566	184	0.90	0.49–1.46
	2018*	**235**	**850**	**189**	**436–1550**	**235**	**5960**	**4960**	**318–30844**	**235**	**0.81**	**0.28–1.43**

1. Nelson River from Birthday Rapids (BR) to Gull Rapids (GR). An * indicates that a few individuals from the Nelson River between Clark Lake to Birthday Rapids are included in the analysis.
2. Number of fish measured.
3. Standard deviation.

Table 5: Fork length (mm), weight (g), and relative condition factor (K) of Lake Sturgeon captured during adult Lake Sturgeon population monitoring in Stephens Lake, spring 2001–2018.

Location	Year	Fork Length (mm)				Weight (g)				K		
		n[2]	Mean	Std[3]	Range	n	Mean	Std	Range	n	Mean	Range
Stephens Lake[1]	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
	2016	71	902	152	343–1425	69	6740	3540	253–22680	69	0.85	0.63–1.20
	2018	**240**	**901**	**159**	**361–1411**	**240**	**6692**	**3951**	**250–27125**	**239**	**0.83**	**0.43–1.53**

1. The portion of Stephens Lake downstream of Gull Rapids. An ** indicates a few individuals from elsewhere in Stephens Lake are included in the analysis.
2. Number of fish measured.
3. Standard deviation.

Table 6: Sex and maturity data for Lake Sturgeon captured in the future Keeyask reservoir and Stephens Lake during adult population monitoring, spring, 2001–2018.

Location	Year	Sex and Maturity[3]						# of Spawners[4]	Unknown Maturity	Total
		Male			Female					
		7	8	9	2	3	4			
Nelson River (BRL-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	21	227	248
	2016*	16	2	-	2	2	-	22	168	190
	2018*	**13**	**4**	**-**	**1**	**-**	**-**	**18**	**217**	**235**
Stephens Lake[2]	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
	2016	4	4	-	-	-	-	8	63	71
	2018	**11**	**15**	**6**	**-**	**-**	**-**	**30**	**211**	**241**

1. Nelson River from Birthday Rapids (BR) to Gull Rapids (GR). An * indicates that a few individuals from the Nelson River between Clark Lake to Birthday Rapids are included in the analysis.
2. The portion of Stephens Lake downstream of Gull Rapids. An ** indicates a few individuals from elsewhere in Stephens Lake are included in the analysis.
3. Refer to Section 3.1 for maturity codes.
4. 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), but the columns may not add up to the "# of Spawners" column since this only includes individual fish captured (*i.e.*, CYTR that were captured in different maturity classifications were only counted once).

Table 7: Recapture data for Lake Sturgeon captured in the future Keeyask reservoir during adult population monitoring, spring, 2002–2018.

Recapture Location	Year	Original Tagging Location: Kelsey GS Area	Split Lake	Upstream Birthday Rapids	Downstream Birthday Rapids	Gull Lake	Stephens Lake	Unknown	Total Recaptures[2]	Total Captured	% Recaptures
Nelson River (BR-GR[1])	2002				6	9			15	59	25.4
	2003	-	-	-	10	5	1	-	16	85	18.8
	2004	-	-	-	11	4	-	-	15	51	29.4
	2006	-	-	-	23	2	-	-	25	150	16.7
	2008	1	-	-	16	7	-	-	24	52	46.2
	2010	-	-	-	11	9	1	-	21	65	32.3
	2011*	-	-	-	10	4	-	1	15	34	44.1
	2012*	-	-	-	6	27	-	-	33	116	28.4
	2014	1	1	-	16	50	1	1	70	239	29.3
	2016*	1	-	-	20	51	2	2	76	190	40.0
	2018*	**-**	**-**	**-**	**16**	**57**	**-**	**1**	**74**	**235**	**31.5**

1. Nelson River from Birthday Rapids (BR) to Gull Rapids (GR). An * indicates that a few individuals from the Nelson River between Clark Lake to Birthday Rapids are included in the analysis.
2. Does not include fish recaptured in the same waterbody in the season/year in which they were tagged nor does it include hatchery fish that were captured in gill nets for the first time.

Table 8: Recapture data for Lake Sturgeon captured in Stephens Lake during adult population monitoring, spring, 2002–2018.

Recapture Location	Year	Original Tagging Location: Kelsey GS Area	Split Lake	Upstream Birthday Rapids	Downstream Birthday Rapids	Gull Lake	Stephens Lake	Unknown	Total Recaptures[2]	Total Captured	% Recaptures
Stephens Lake[1]	2002	-	-	-	-	-	-	-	0	4	0.0
	2003	-	-	-	-	1	3	-	4	24	16.7
	2004	-	-	-	-	-	3	-	3	5	60.0
	2005**	-	-	-	-	-	2	-	2	7	28.6
	2006**	-	-	-	-	2	7	-	9	14	64.3
	2010	-	-	-	2	-	8	-	10	17	58.8
	2011	-	-	-	-	-	6	-	6	18	33.3
	2012	-	-	-	1	-	5	-	6	15	40.0
	2014	-	-	-	-	1	3	-	4	9	44.4
	2016	-	-	-	-	1	15	-	16	71	22.5
	2018	**-**	**-**	**1**	**2**	**3**	**81**	**-**	**87**	**241**	**36.1**

1. The portion of Stephens Lake downstream of Gull Rapids. An ** indicates a few individuals from elsewhere in Stephens Lake are included in the analysis.
2. Does not include fish recaptured in the same waterbody in the season/year in which they were tagged nor does it include hatchery fish that were captured in gill nets for the first time.

FIGURES

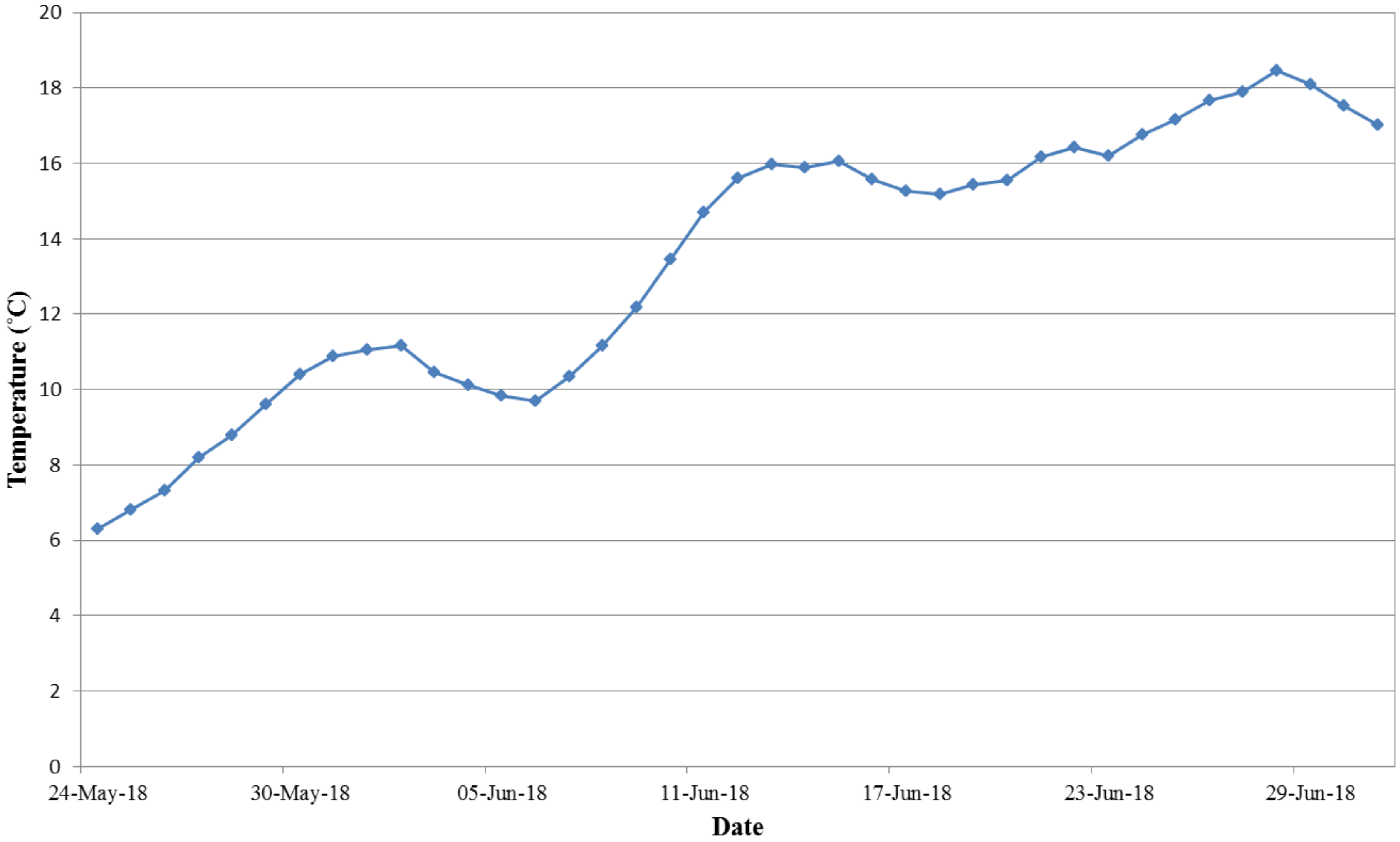


Figure 1: Mean daily water temperature in the Nelson River mainstem, 24 May–1 July, 2018.

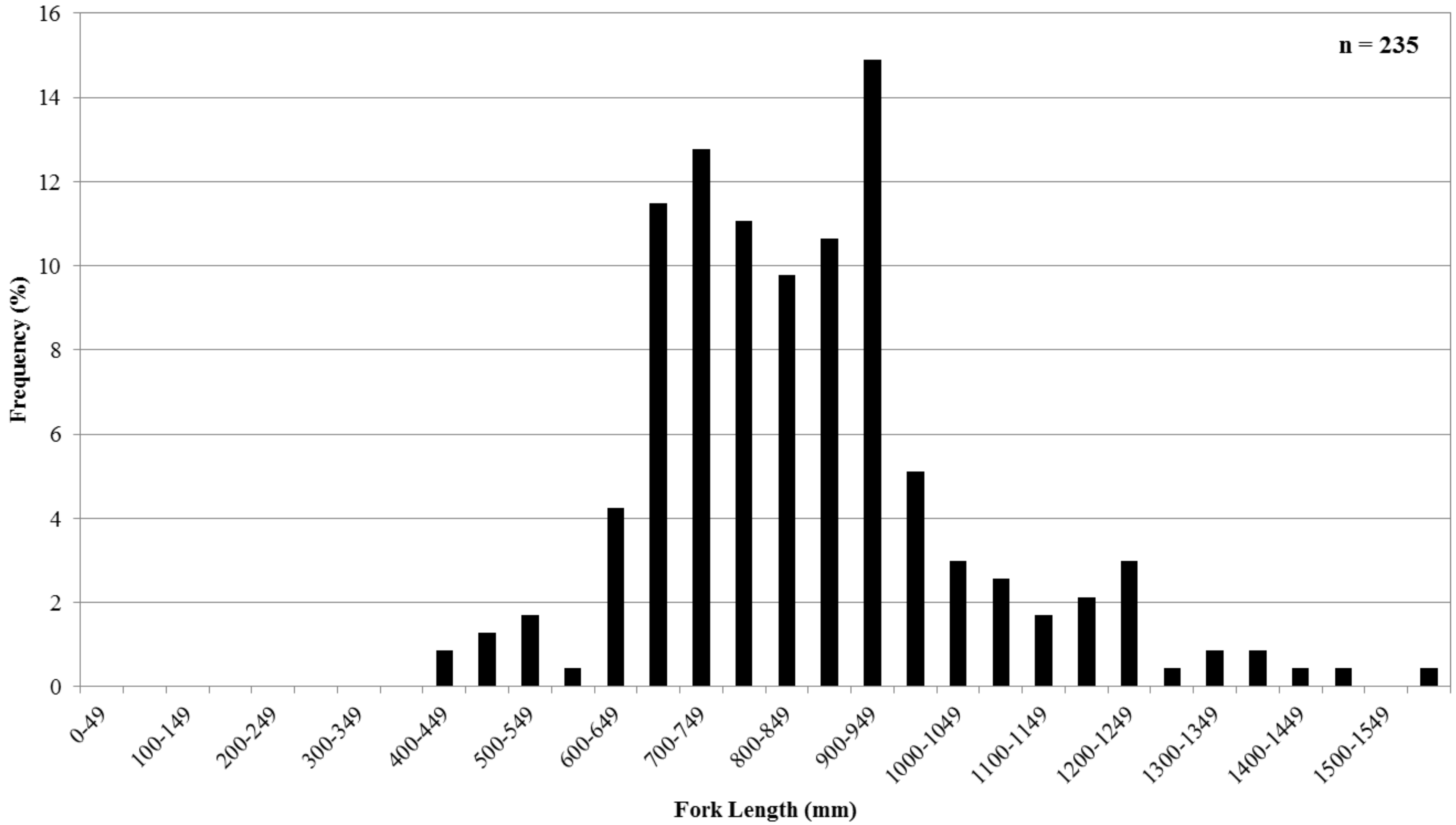


Figure 2: **Length-frequency distribution for Lake Sturgeon captured in large mesh gill nets set in the future Keeyask reservoir, spring 2018.**

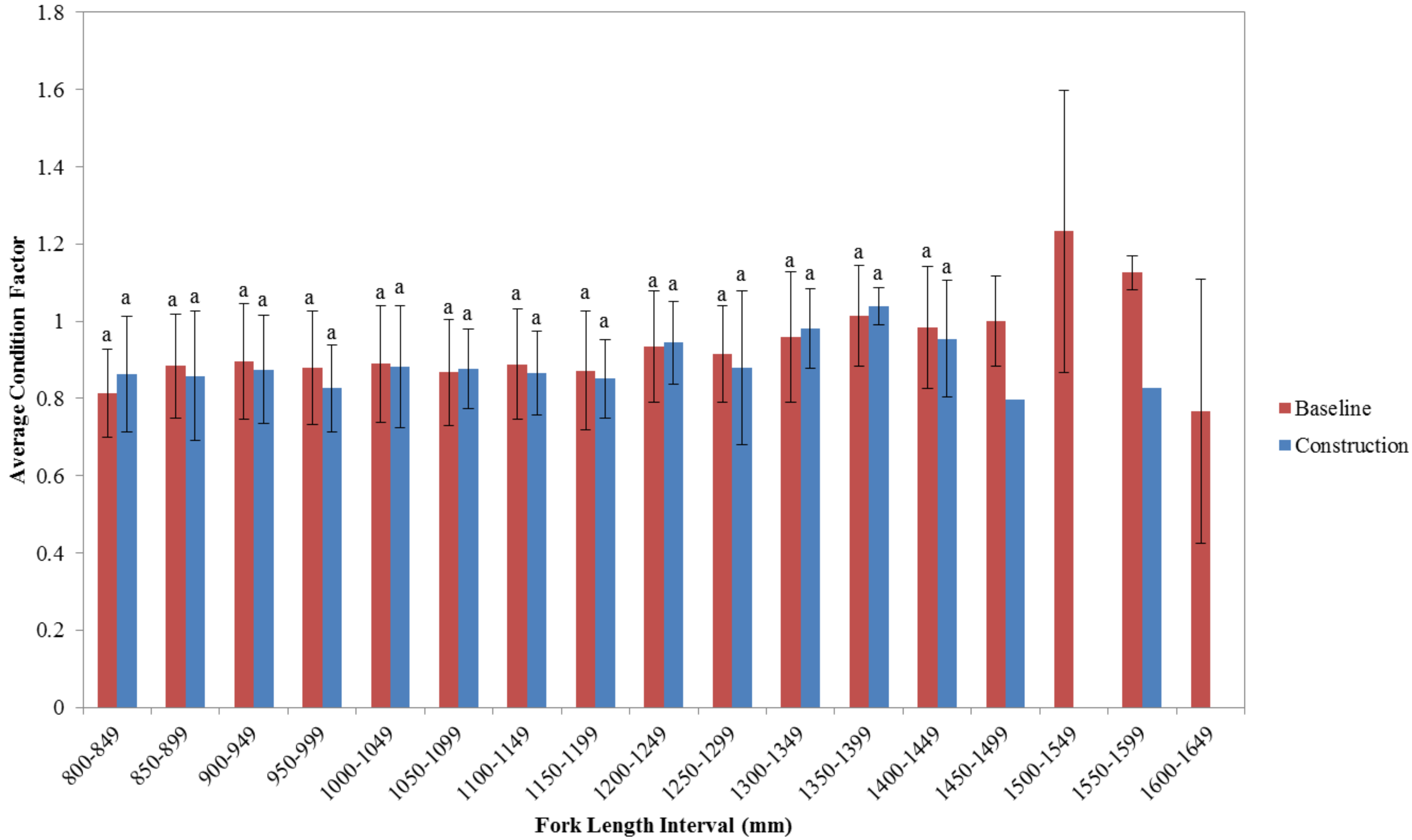


Figure 3: **Mean condition factor by 50 mm length intervals for adult (≥ 800 mm) Lake Sturgeon captured in the future Keeyask reservoir during baseline studies (red bars) and construction monitoring (blue bars). There were no significant differences between groups (Mann Whitney U test, $p < 0.05$). Error bars represent standard deviations.**

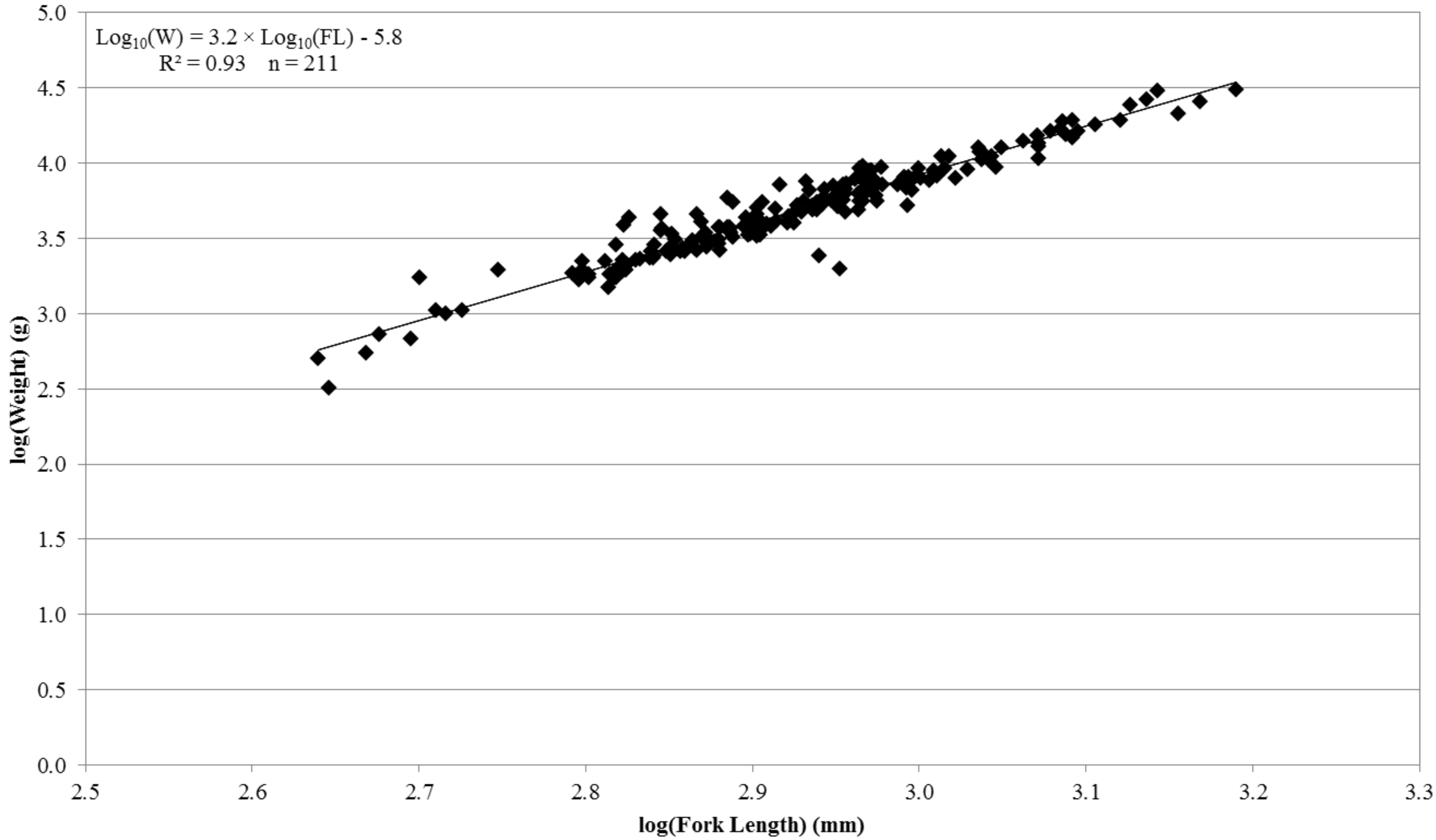


Figure 4: **Length-weight regression for Lake Sturgeon captured in large mesh gill nets set in the future Keeyask reservoir, spring 2018.**

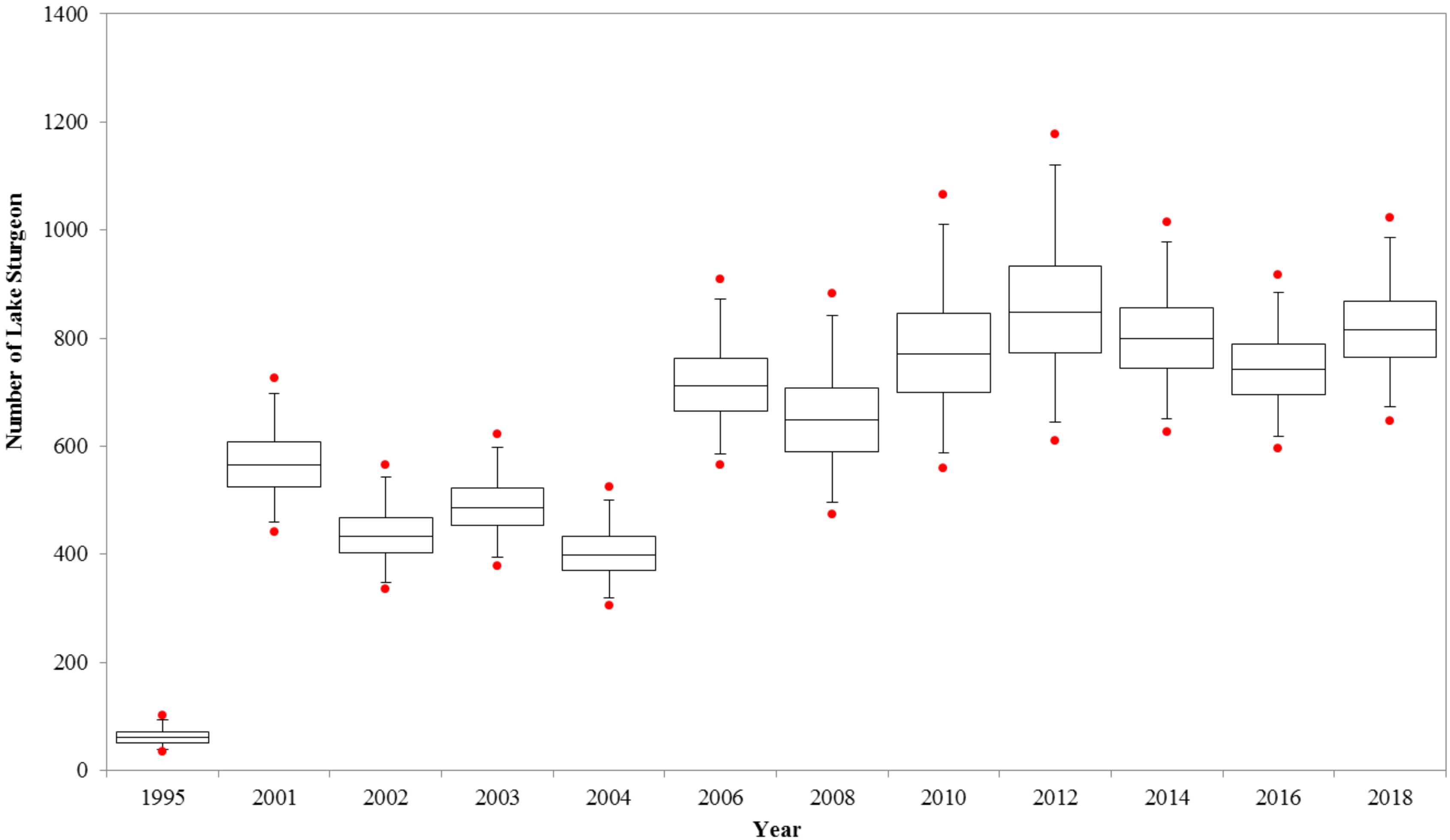


Figure 5: Adult Lake Sturgeon abundance estimates based on POPAN best model for the future Keeyask reservoir (1995–2018). Horizontal line inside the box represents the estimated abundance (*i.e.*, the number of adult Lake Sturgeon in the area during the time of capture), the red dots represent the minimum and maximum estimates, and the vertical bar lines represent the upper and lower 95% confidence intervals.

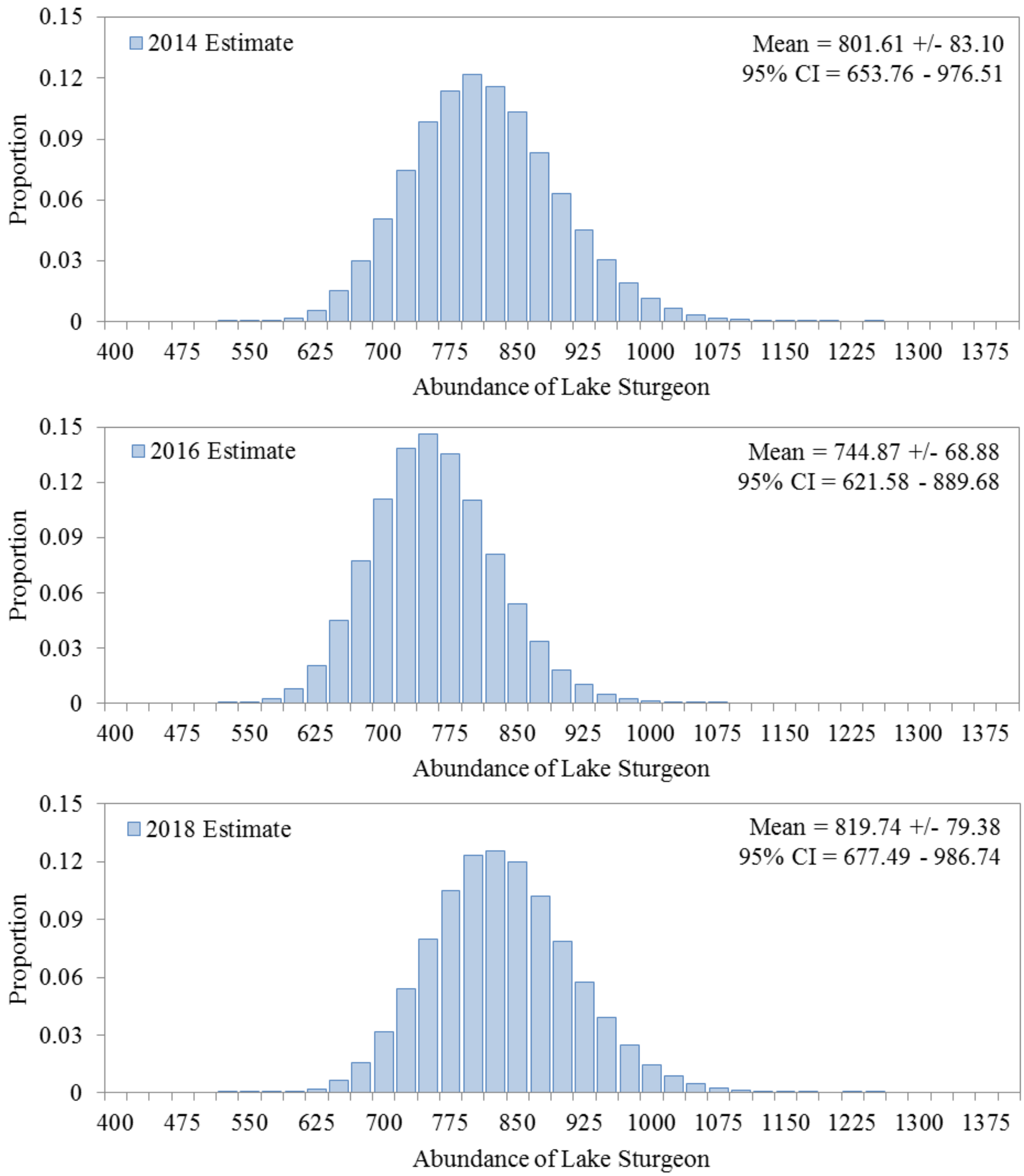


Figure 6: **Analysis of change in mean population abundance estimates for the future Keeyask reservoir between one sample period (2016 to 2018) and two sampling periods (2014 to 2018). A significant change from the 2014 estimate would be a 16% decrease or a 18% increase. A significant change from the 2016 estimate would be a 14% decrease or a 16% increase. The mean population estimate in 2018 showed a 2% increase from 2014 and a 10% increase from 2016.**

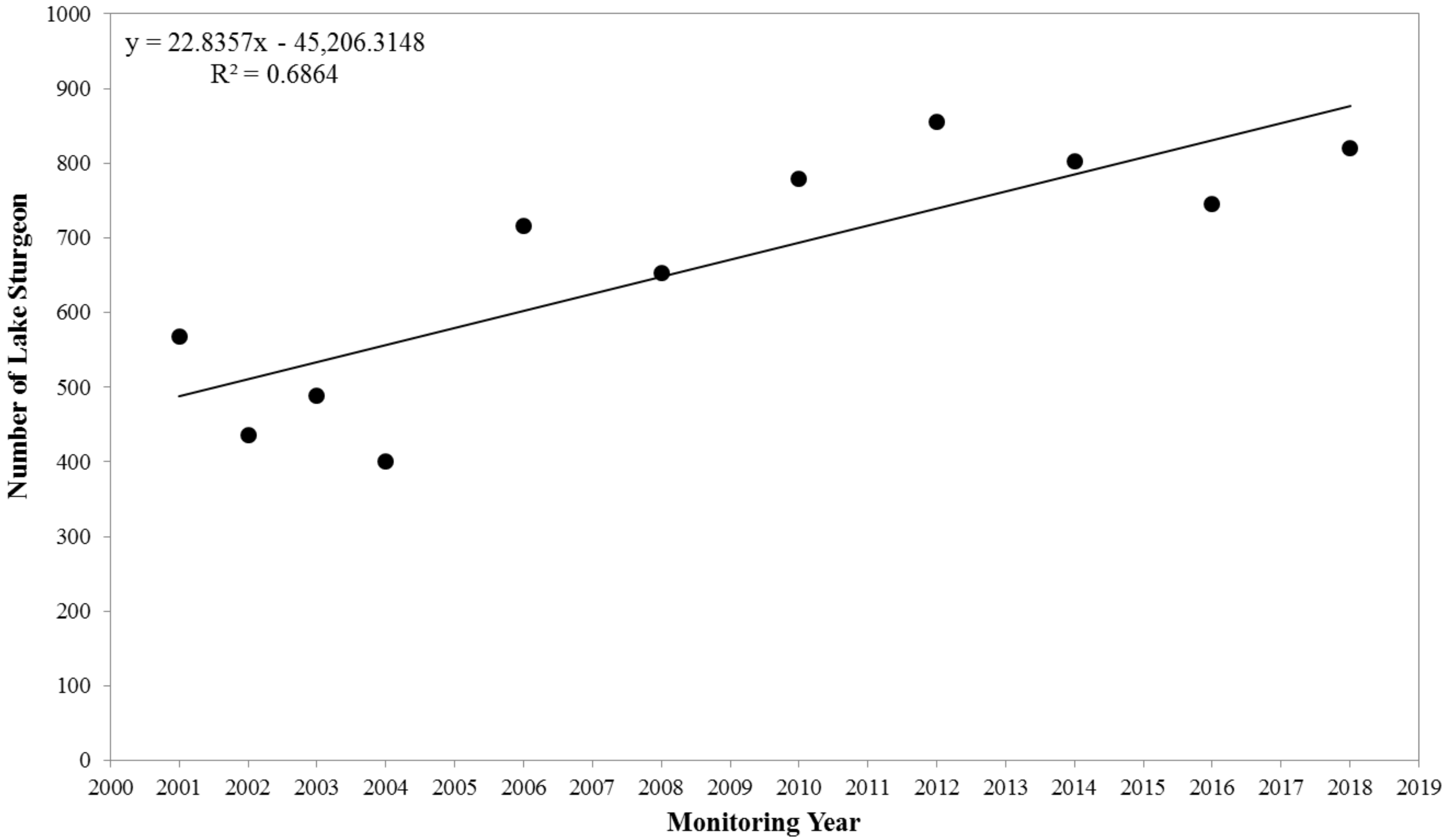


Figure 7: **Abundance estimates for adult Lake Sturgeon in the future Keeyask reservoir by sampling year (2001–2018) showing a significant positive trend.**

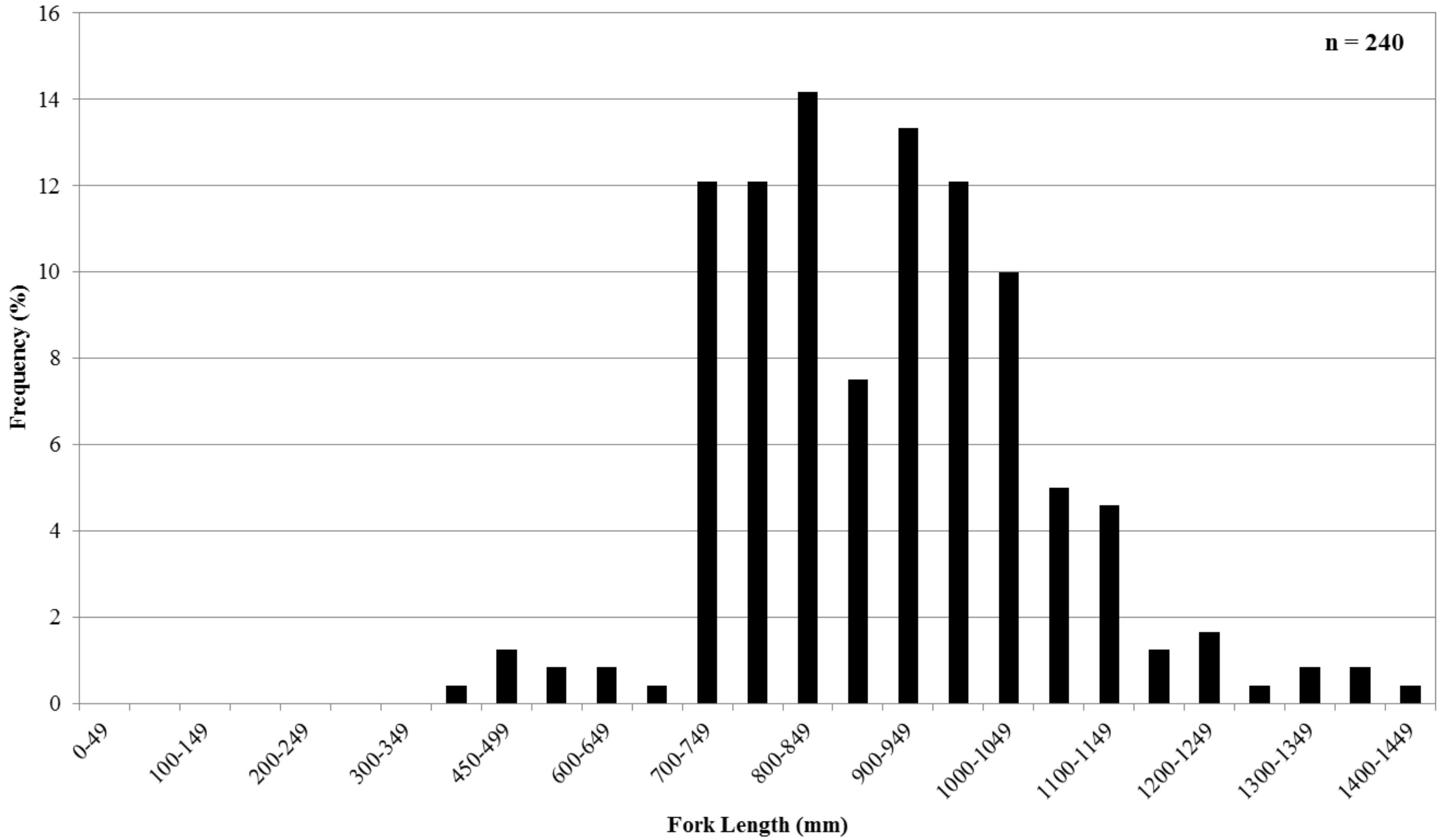


Figure 8: Length-frequency distribution for Lake Sturgeon captured in large mesh gill nets set in Stephens Lake, spring 2018.

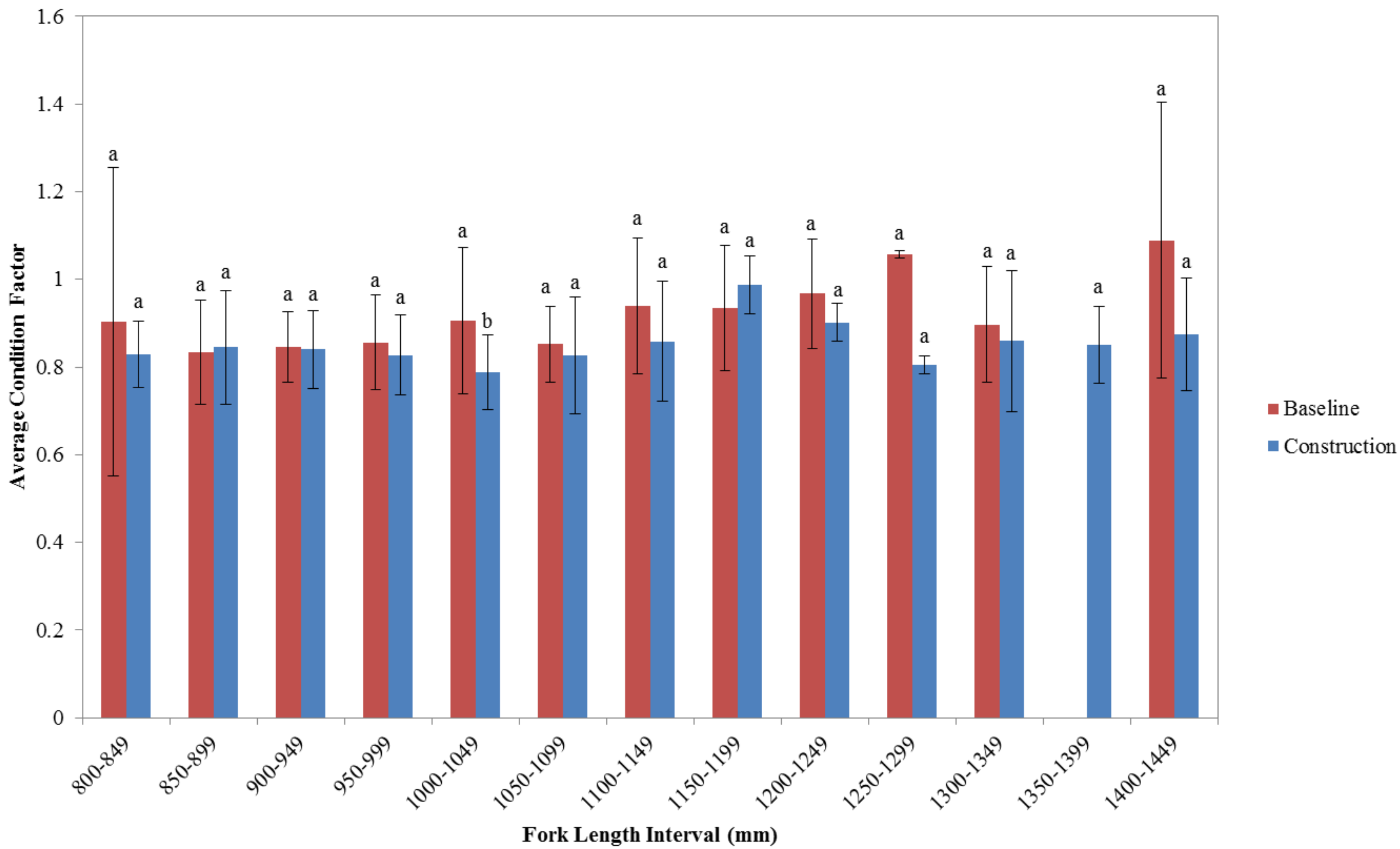


Figure 9: Mean condition factor by 50 mm length intervals for adult (≥ 800 mm) Lake Sturgeon captured in Stephens Lake during baseline studies (red bars) and construction monitoring (blue bars). Letters denote significant differences between groups (Mann Whitney U test, $p < 0.05$). Error bars represent standard deviations.

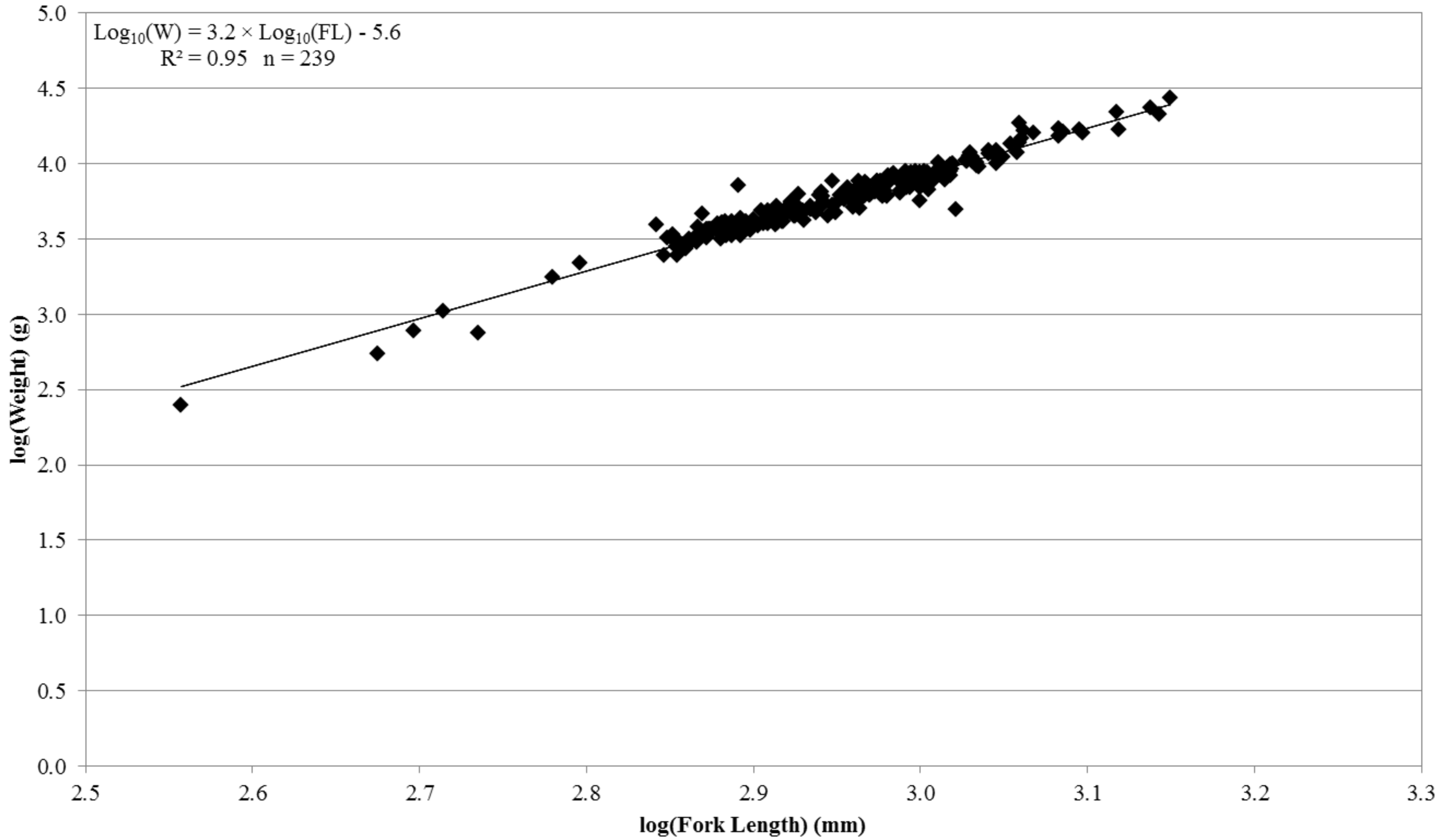


Figure 10: **Length-weight regression for Lake Sturgeon captured in large mesh gill nets set in Stephens Lake, spring 2018.**

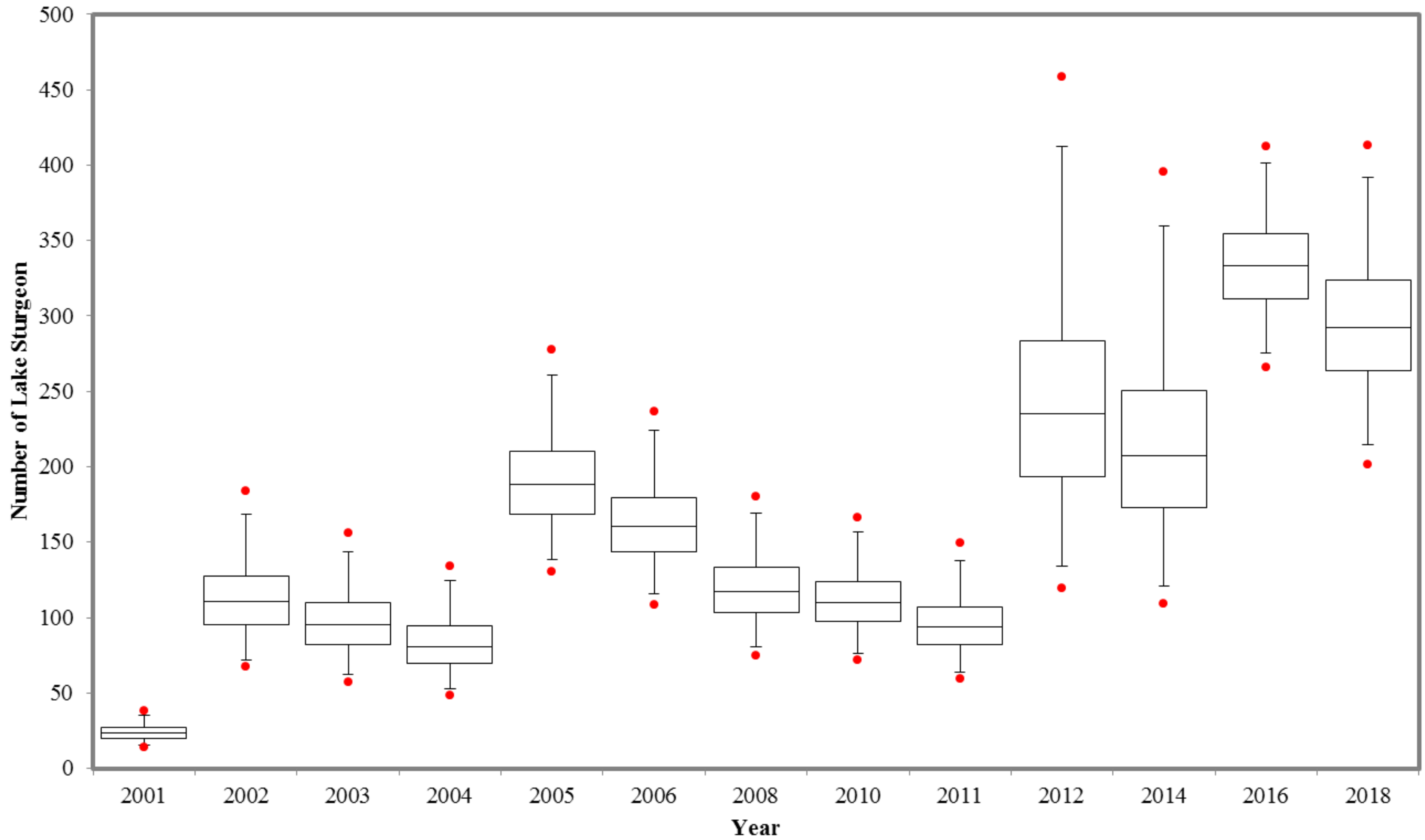


Figure 11: Adult Lake Sturgeon abundance estimates based on POPAN best model for Stephens Lake (2001–2018). Horizontal line inside the box represents the estimated abundance (*i.e.*, the number of adult Lake Sturgeon in the area during the time of capture), the red dots represent the minimum and maximum estimates, and the vertical bar lines represent the upper and lower 95% confidence intervals.

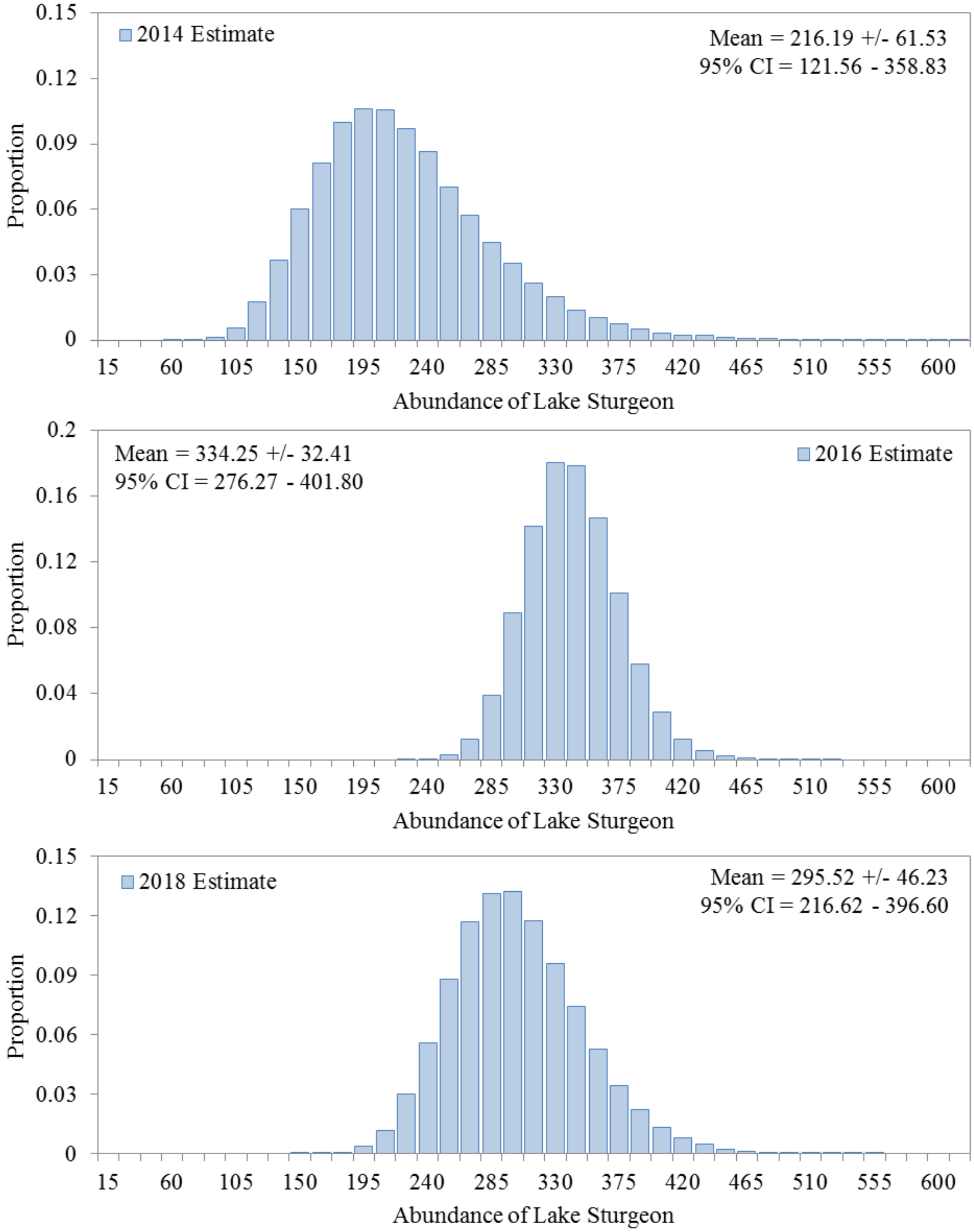


Figure 12: **Analysis of change in mean population abundance estimates for Stephens Lake between one sample period (2016 to 2018) and two sampling periods (2014 to 2018). A significant change from the 2014 estimate would be a 39% decrease or a 52% increase. A significant change from the 2016 estimate would be a 15% decrease or a 17% increase. The mean population estimate in 2018 showed a 37% increase from 2014 and a 12% decrease from 2016.**

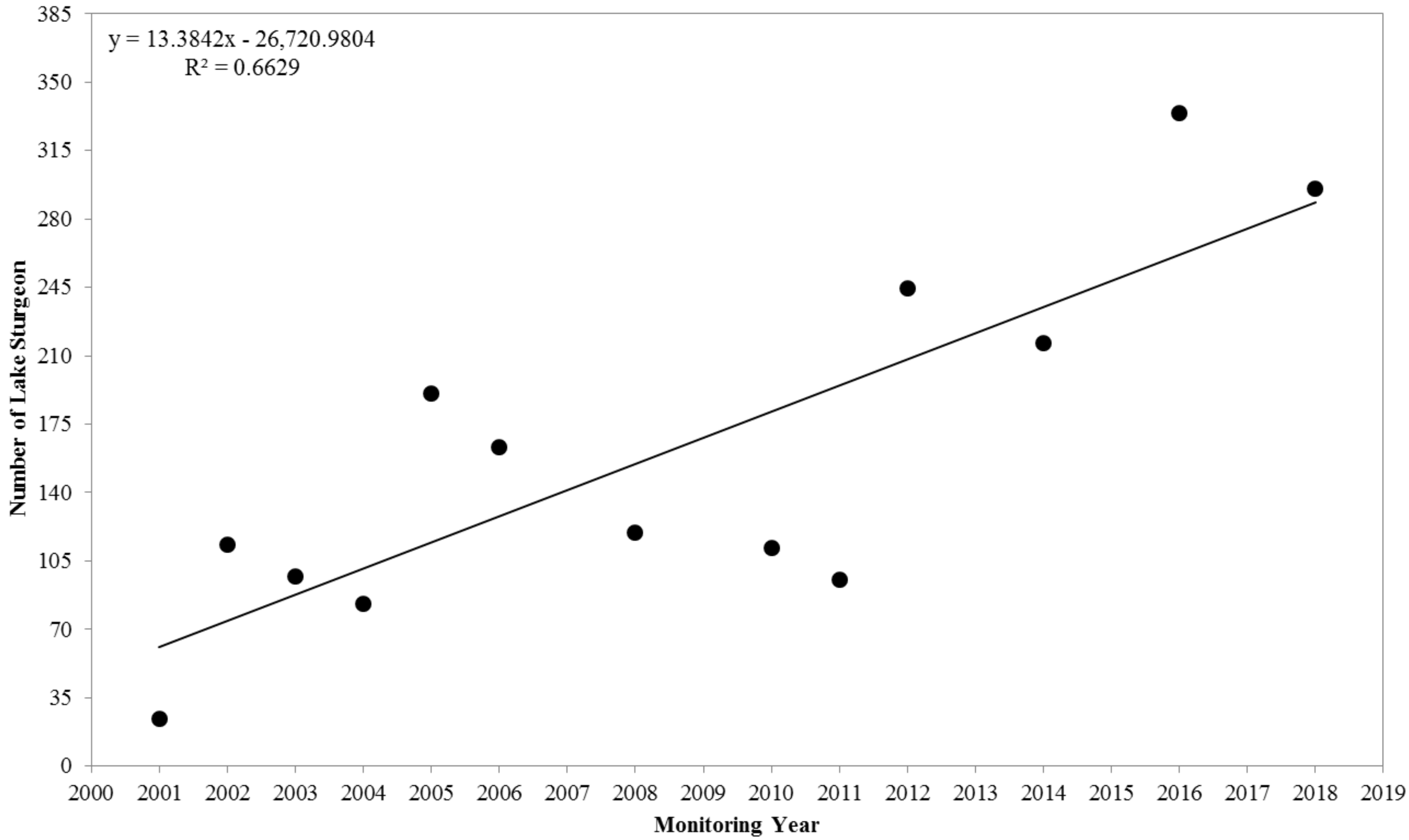
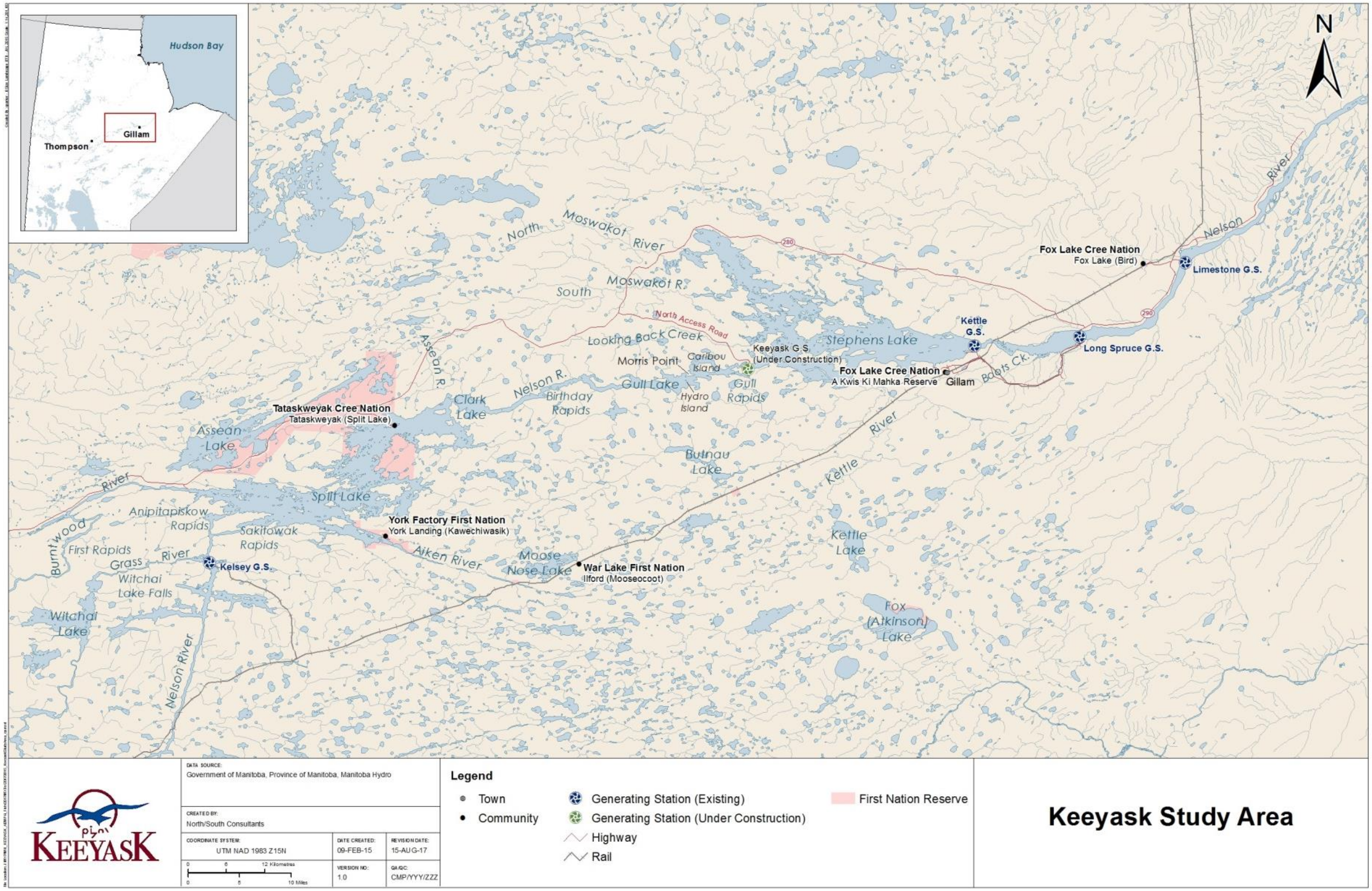
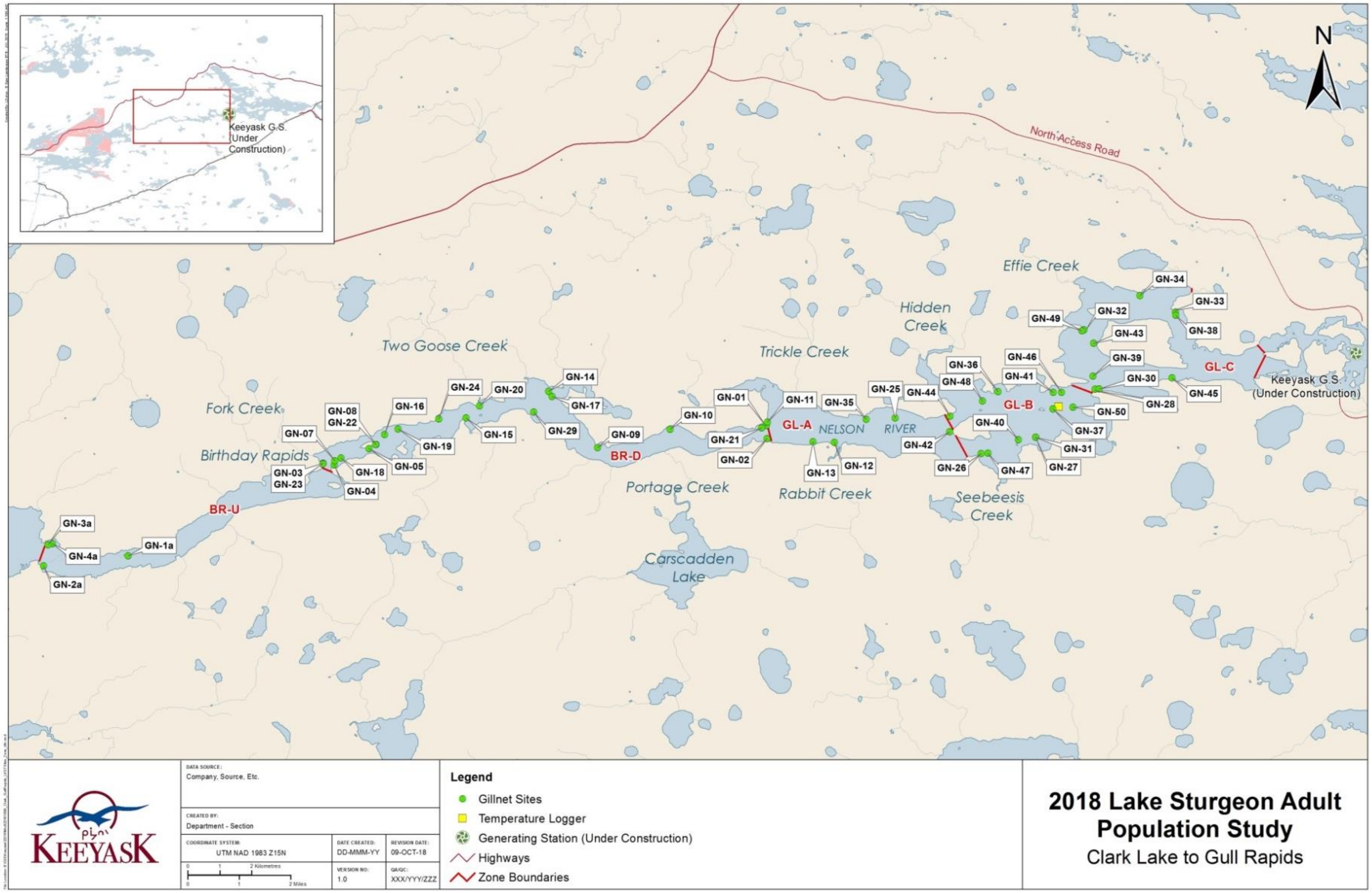


Figure 13: Abundance estimates for adult Lake Sturgeon in Stephens Lake by sampling year (2001–2018) showing a significant positive trend.

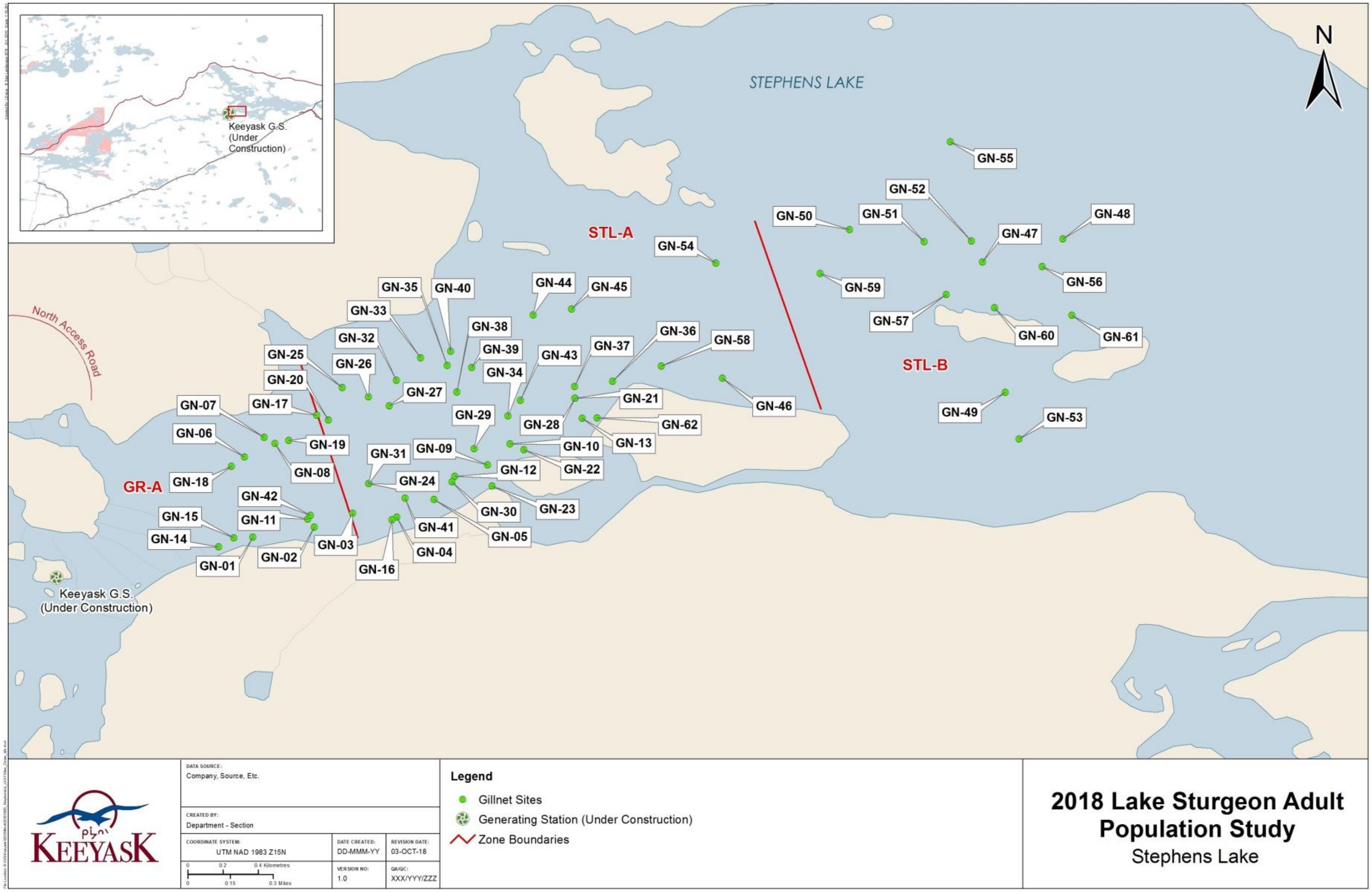
MAPS



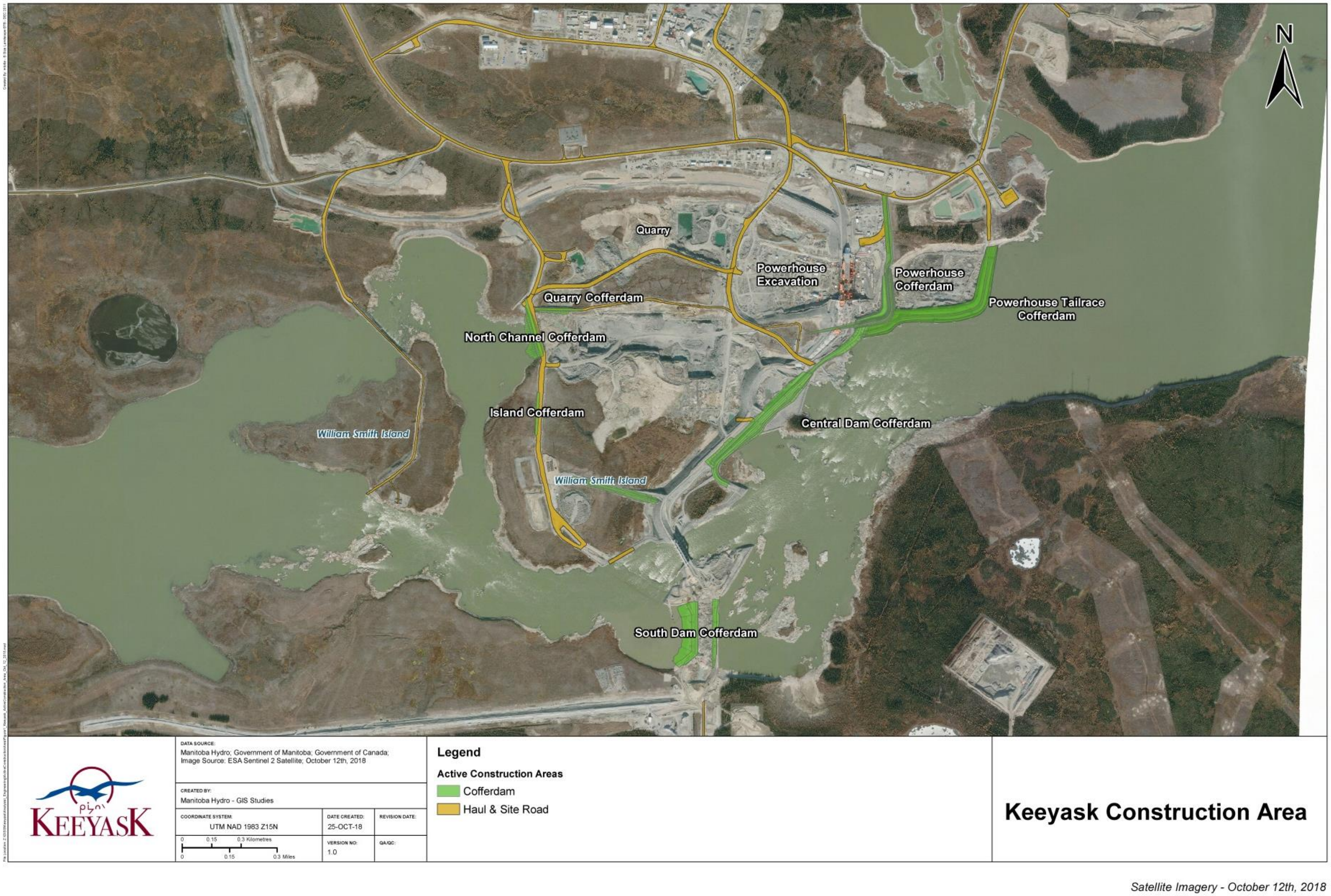
Map 1: **Map of the Keeyask Study Area.**



Map 2: Sites fished with large mesh gill net gangs in the Nelson River between Clark Lake and Gull Rapids (*i.e.*, the future Keeyask reservoir), spring 2018.



Map 3: **Sites fished with large mesh gill net gangs in Stephens Lake, spring 2018.**



Map 4: **Map of instream structures at the Keeyask Generating Station site, October 2018.**

APPENDICES

APPENDIX 1:
TAGGING AND BIOLOGICAL INFORMATION FOR LAKE STURGEON CAPTURED UPSTREAM OF GULL RAPIDS AND IN STEPHENS LAKE IN SPRING, 2018

Table A1-1: Tagging and biological information for Lake Sturgeon marked with Floy® tags and PIT tags in the future Keeyask reservoir (the Nelson River between Clark Lake and Gull Rapids) and Stephens Lake, spring 2018. 55

Table A1-1: Tagging and biological information for Lake Sturgeon marked with Floy® tags and PIT tags in the future Keeyask reservoir (the Nelson River between Clark Lake and Gull Rapids) and Stephens Lake, spring 2018.

Location	Zone	Date	Prefix	Floy Tag	Pit Tag	Fork Length (mm)	Total Length (mm)	Weight (g)	Sex	Maturity
Nelson River (CL-GR)	GL-C	01-Jul-18	NSC	79408	900 226000628771	684	776	2450	-	-
Nelson River (CL-GR)	GL-B	30-Jun-18	NSC	79410	900 226000154216	904	1036	6150	-	-
Nelson River (CL-GR)	GL-B	30-Jun-18	NSC	79412	900 226000893283	713	799	2350	-	-
Nelson River (CL-GR)	GL-B	30-Jun-18	NSC	79413	900 226000154217	608	690	1700	-	-
Nelson River (CL-GR)	GL-B	30-Jun-18	NSC	79414	900 226000628944	804	904	4000	-	-
Nelson River (CL-GR)	GL-C	30-Jun-18	NSC	79415	900 226000893260	793	881	3600	-	-
Nelson River (CL-GR)	GL-C	29-Jun-18	NSC	79416	900 226000893427	800	900	3650	-	-
Nelson River (CL-GR)	GL-B	29-Jun-18	NSC	79418	900 226000893365	730	825	2750	-	-
Nelson River (CL-GR)	GL-B	29-Jun-18	NSC	79419	900 226000577193	674	770	2100	-	-
Nelson River (CL-GR)	GL-B	29-Jun-18	NSC	79420	900 226000629595	920	1018	5900	-	-
Nelson River (CL-GR)	GL-B	29-Jun-18	NSC	79421	900 226000628773	915	1042	5700	-	-
Nelson River (CL-GR)	GL-B	29-Jun-18	NSC	79422	900 226000893400	764	858	3450	-	-
Nelson River (CL-GR)	GL-B	29-Jun-18	NSC	79423	900 226000628999	704	809	2800	-	-
Nelson River (CL-GR)	GL-C	28-Jun-18	NSC	79424	900 226000628950	684	768	2550	-	-
Nelson River (CL-GR)	GL-B	28-Jun-18	NSC	79425	900 226000154259	656	749	2025	-	-
Stephens Lake	STL-B	30-Jun-18	NSC	91529	900 226000768778	1081	1198	10251	-	-
Stephens Lake	STL-B	30-Jun-18	NSC	91530	900 226000768793	823	933	5000	-	-
Stephens Lake	STL-B	30-Jun-18	NSC	91531	900 226000767413	764	840	3900	-	-
Stephens Lake	STL-B	30-Jun-18	NSC	91532	900 226000767464	927	1010	7600	-	-
Stephens Lake	STL-B	30-Jun-18	NSC	91533	900 226000767472	756	859	4000	-	-
Stephens Lake	STL-A	27-Jun-18	NSC	110701	900 226000767443	765	862	3750	-	-
Stephens Lake	STL-A	27-Jun-18	NSC	110702	900 226000767496	795	905	4300	-	-
Stephens Lake	STL-A	25-Jun-18	NSC	110703	900 226000154041	1021	1142	8709	-	-
Stephens Lake	STL-A	25-Jun-18	NSC	110704	900 226000768510	952	1054	6622	-	-
Stephens Lake	STL-B	25-Jun-18	NSC	110705	900 226000768920	890	977	4750	-	-

Table A1-1: Tagging and biological information for Lake Sturgeon marked with Floy® tags and PIT tags in the future Keeyask reservoir (the Nelson River between Clark Lake and Gull Rapids) and Stephens Lake, spring 2018 (continued).

Location	Zone	Date	Prefix	Floy Tag	Pit Tag	Fork Length (mm)	Total Length (mm)	Weight (g)	Sex	Maturity
Stephens Lake	STL-B	24-Jun-18	NSC	110706	900 226000768576	1034	1145	7850	-	-
Stephens Lake	STL-B	23-Jun-18	NSC	110707	900 226000767462	1000	1096	7350	-	-
Stephens Lake	STL-A	22-Jun-18	NSC	110708	900 226000153925	738	820	3350	-	-
Stephens Lake	STL-A	22-Jun-18	NSC	110709	900 226000768613	823	891	4700	-	-
Stephens Lake	STL-A	22-Jun-18	NSC	110710	900 226000767409	978	1091	8550	-	-
Stephens Lake	STL-A	22-Jun-18	NSC	110711	900 226000768942	830	939	4700	-	-
Stephens Lake	STL-A	21-Jun-18	NSC	110712	900 226000154057	1251	1390	16057	-	-
Stephens Lake	STL-A	20-Jun-18	NSC	110714	900 226000767132	714	795	2800	-	-
Stephens Lake	STL-A	20-Jun-18	NSC	110715	900 226000154055	822	920	4050	-	-
Stephens Lake	STL-A	20-Jun-18	NSC	110716	900 226000154014	1050	1164	4990	-	-
Stephens Lake	GR-A	20-Jun-18	NSC	110717	900 226000768903	602	675	1750	-	-
Stephens Lake	GR-A	20-Jun-18	NSC	110719	900 226000768015	747	832	3650	-	-
Stephens Lake	STL-A	17-Jun-18	NSC	110720	900 226000768997	934	1045	6250	-	-
Stephens Lake	STL-A	16-Jun-18	NSC	110721	900 226000768977	920	1008	5050	M	9
Stephens Lake	STL-A	15-Jun-18	NSC	110722	900 226000153899	912	1014	6450	-	-
Stephens Lake	GR-A	15-Jun-18	NSC	110723	900 226000768595	702	783	2450	-	-
Stephens Lake	STL-A	14-Jun-18	NSC	110724	900 226000153814	812	895	4750	-	-
Stephens Lake	STL-A	14-Jun-18	NSC	110725	900 226000768992	845	939	6250	-	-
Nelson River (CL-GR)	BR-D	26-May-18	NSC	111751	900 226000767048	658	739	2858	-	-
Nelson River (CL-GR)	BR-D	26-May-18	NSC	111752	900 226000767045	940	1051	7847	-	-
Nelson River (CL-GR)	BR-D	27-May-18	NSC	111753	900 226000767051	502	578	1724	-	-
Nelson River (CL-GR)	BR-D	28-May-18	NSC	111754	900 226000767027	901	1010	6985	-	-
Nelson River (CL-GR)	BR-D	29-May-18	NSC	111756	900 226000767004	904	1028	4717	-	-
Nelson River (CL-GR)	BR-D	29-May-18	NSC	111757	900 226000767033	855	963	7484	-	-
Nelson River (CL-GR)	BR-D	29-May-18	NSC	111758	900 226000767044	1031	1152	11068	-	-

Table A1-1: Tagging and biological information for Lake Sturgeon marked with Floy® tags and PIT tags in the future Keeyask reservoir (the Nelson River between Clark Lake and Gull Rapids) and Stephens Lake, spring 2018 (continued).

Location	Zone	Date	Prefix	Floy Tag	Pit Tag	Fork Length (mm)	Total Length (mm)	Weight (g)	Sex	Maturity
Nelson River (CL-GR)	BR-D	30-May-18	NSC	111759	900 226000767042	863	964	4853	-	-
Nelson River (CL-GR)	BR-D	30-May-18	NSC	111760	900 226000767029	744	845	3130	-	-
Nelson River (CL-GR)	BR-D	30-May-18	NSC	111761	900 226000767038	920	1031	4899	-	-
Nelson River (CL-GR)	BR-D	30-May-18	NSC	111762	900 226000767062	921	1028	6169	-	-
Nelson River (CL-GR)	BR-D	30-May-18	NSC	111763	900 226000767096	774	865	5534	-	-
Nelson River (CL-GR)	BR-D	30-May-18	NSC	111764	900 226000767094	950	1042	9435	M	7
Nelson River (CL-GR)	BR-D	30-May-18	NSC	111765	900 226000767019	1431	1479	21319	F	2
Nelson River (CL-GR)	BR-D	31-May-18	NSC	111766	900 226000767099	901	996	7167	-	-
Nelson River (CL-GR)	BR-D	31-May-18	NSC	111767	900 226000628383	559	640	1950	-	-
Nelson River (CL-GR)	BR-D	31-May-18	NSC	111768	900 226000767046	740	824	4082	-	-
Nelson River (CL-GR)	BR-D	31-May-18	NSC	111769	900 226000893691	905	1020	7303	-	-
Nelson River (CL-GR)	BR-D	01-Jun-18	NSC	111771	900 226000767066	860	961	6577	M	7
Nelson River (CL-GR)	BR-D	02-Jun-18	NSC	111772	900 226000767090	931	1041	8936	-	-
Nelson River (CL-GR)	BR-D	02-Jun-18	NSC	111773	900 226000767077	921	1053	9208	-	-
Nelson River (CL-GR)	BR-D	02-Jun-18	NSC	111774	900 226000767080	878	984	6759	-	-
Nelson River (CL-GR)	BR-D	02-Jun-18	NSC	111775	900 226000893919	736	845	4536	-	-
Nelson River (CL-GR)	BR-D	01-Jun-18	NSC	111778	900 226000767021	925	1036	7983	M	7
Nelson River (CL-GR)	GL-A	18-Jun-18	NSC	111901	900 226000768933	740	828	3221	-	-
Nelson River (CL-GR)	BR-D	18-Jun-18	NSC	111902	900 226000628949	980	1078	8029	-	-
Nelson River (CL-GR)	GL-C	19-Jun-18	NSC	111903	900 226000629738	520	576	998	-	-
Nelson River (CL-GR)	GL-C	19-Jun-18	NSC	111904	900 226000767059	759	862	3765	-	-
Nelson River (CL-GR)	GL-C	19-Jun-18	NSC	111905	900 226000154226	773	885	3221	-	-
Nelson River (CL-GR)	GL-B	19-Jun-18	NSC	111906	900 226000767087	805	906	3674	-	-
Nelson River (CL-GR)	GL-B	19-Jun-18	NSC	111907	900 226000703372	700	791	3538	-	-
Nelson River (CL-GR)	GL-A	19-Jun-18	NSC	111908	900 226000577071	971	1083	7212	-	-

Table A1-1: Tagging and biological information for Lake Sturgeon marked with Floy® tags and PIT tags in the future Keeyask reservoir (the Nelson River between Clark Lake and Gull Rapids) and Stephens Lake, spring 2018 (continued).

Location	Zone	Date	Prefix	Floy Tag	Pit Tag	Fork Length (mm)	Total Length (mm)	Weight (g)	Sex	Maturity
Nelson River (CL-GR)	GL-C	20-Jun-18	NSC	111909	900 226000893432	701	805	3674	-	-
Nelson River (CL-GR)	GL-C	20-Jun-18	NSC	111910	900 226000768242	513	584	1043	-	-
Nelson River (CL-GR)	GL-B	20-Jun-18	NSC	111911	900 226000893330	835	922	4445	-	-
Nelson River (CL-GR)	GL-A	20-Jun-18	NSC	111912	900 226000629610	900	949	5715	-	-
Nelson River (CL-GR)	GL-C	12-Jun-18	NSC	111913	900 226000767010	815	895	3810	-	-
Nelson River (CL-GR)	GL-A	20-Jun-18	NSC	111913	900 226000153402	800	904	5035	-	-
Nelson River (CL-GR)	BR-D	20-Jun-18	NSC	111914	900 226000629569	931	1036	7394	-	-
Nelson River (CL-GR)	GL-C	21-Jun-18	NSC	111915	900 226000629636	656	740	1724	-	-
Nelson River (CL-GR)	GL-C	21-Jun-18	NSC	111916	900 226000767097	748	843	3084	-	-
Nelson River (CL-GR)	GL-C	21-Jun-18	NSC	111917	900 226000153867	770	874	3583	-	-
Nelson River (CL-GR)	GL-B	21-Jun-18	NSC	111918	900 226000893337	803	904	3311	-	-
Nelson River (CL-GR)	GL-B	21-Jun-18	NSC	111919	900 226000893311	759	850	3084	-	-
Nelson River (CL-GR)	GL-B	21-Jun-18	NSC	111920	900 226000628976	821	920	4128	-	-
Nelson River (CL-GR)	GL-A	21-Jun-18	NSC	111921	900 226000629626	628	723	2223	-	-
Nelson River (CL-GR)	GL-A	21-Jun-18	NSC	111922	900 226000629664	720	804	2585	-	-
Nelson River (CL-GR)	GL-C	22-Jun-18	NSC	111923	900 226000628877	850	960	4717	-	-
Nelson River (CL-GR)	GL-C	22-Jun-18	NSC	111924	900 226000154204	904	1013	6260	-	-
Nelson River (CL-GR)	GL-B	22-Jun-18	NSC	111925	900 226000629506	795	877	3719	-	-
Nelson River (CL-GR)	BR-D	12-Jun-18	NSC	111926	900 226000767003	842	946	3992	-	-
Nelson River (CL-GR)	GL-C	13-Jun-18	NSC	111927	900 226000154077	1002	1136	7938	-	-
Nelson River (CL-GR)	GL-C	14-Jun-18	NSC	111928	900 226000767055	892	997	6033	-	-
Nelson River (CL-GR)	GL-C	14-Jun-18	NSC	111929	900 226000767002	746	831	2767	-	-
Nelson River (CL-GR)	GL-A	14-Jun-18	NSC	111930	900 226000768650	810	905	3901	-	-
Nelson River (CL-GR)	BR-D	14-Jun-18	NSC	111931	900 226000768098	1390	-	30119	-	-
Nelson River (CL-GR)	BR-D	14-Jun-18	NSC	111932	900 226000767060	634	716	1814	-	-

Table A1-1: Tagging and biological information for Lake Sturgeon marked with Floy® tags and PIT tags in the future Keeyask reservoir (the Nelson River between Clark Lake and Gull Rapids) and Stephens Lake, spring 2018 (continued).

Location	Zone	Date	Prefix	Floy Tag	Pit Tag	Fork Length (mm)	Total Length (mm)	Weight (g)	Sex	Maturity
Nelson River (CL-GR)	GL-A	15-Jun-18	NSC	111933	900 226000153978	664	706	1905	-	-
Nelson River (CL-GR)	BR-D	15-Jun-18	NSC	111934	900 226000767039	834	948	3992	-	-
Nelson River (CL-GR)	BR-D	15-Jun-18	NSC	111935	900 226000767043	1475	-	25537	-	-
Nelson River (CL-GR)	BR-D	15-Jun-18	NSC	111936	900 226000893390	714	797	3130	-	-
Nelson River (CL-GR)	BR-D	15-Jun-18	NSC	111937	900 226000768988	745	842	3447	-	-
Nelson River (CL-GR)	GL-A	16-Jun-18	NSC	111938	900 226000628931	711	815	2812	-	-
Nelson River (CL-GR)	GL-A	16-Jun-18	NSC	111939	900 226000768056	652	738	1814	-	-
Nelson River (CL-GR)	GL-A	16-Jun-18	NSC	111940	900 226000767064	890	1002	5443	-	-
Nelson River (CL-GR)	BR-D	16-Jun-18	NSC	111941	900 226000122776	651	741	1497	-	-
Nelson River (CL-GR)	BR-D	16-Jun-18	NSC	111942	900 226000154026	496	548	680	-	-
Nelson River (CL-GR)	GL-C	17-Jun-18	NSC	111943	900 226000154248	732	840	3039	-	-
Nelson River (CL-GR)	GL-C	17-Jun-18	NSC	111944	900 226000893293	842	950	4627	-	-
Nelson River (CL-GR)	GL-A	17-Jun-18	NSC	111945	900 226000153446	1015	1141	7620	-	-
Nelson River (CL-GR)	BR-D	17-Jun-18	NSC	111946	900 226000893495	771	875	3447	-	-
Nelson River (CL-GR)	BR-D	17-Jun-18	NSC	111947	900 226000893336	889	990	5761	-	-
Nelson River (CL-GR)	GL-C	18-Jun-18	NSC	111948	900 226000629557	694	780	2858	-	-
Nelson River (CL-GR)	GL-C	18-Jun-18	NSC	111949	900 226000629558	760	861	3765	-	-
Nelson River (CL-GR)	GL-B	18-Jun-18	NSC	111950	900 226000768927	676	768	2268	-	-
Nelson River (CL-GR)	BR-D	04-Jun-18	NSC	111951	900 226000767001	800	887	3266	-	-
Nelson River (CL-GR)	BR-D	04-Jun-18	NSC	111952	900 226000767005	825	935	7167	-	-
Nelson River (CL-GR)	BR-D	04-Jun-18	NSC	111953	900 226000767076	768	863	5851	-	-
Nelson River (CL-GR)	BR-D	04-Jun-18	NSC	111954	900 226000767063	670	752	4309	-	-
Nelson River (CL-GR)	BR-D	04-Jun-18	NSC	111955	900 226000767067	665	727	3856	-	-
Nelson River (CL-GR)	BR-D	05-Jun-18	NSC	111956	900 226000767070	1094	1210	11521	-	-
Nelson River (CL-GR)	BR-D	05-Jun-18	NSC	111957	900 226000767007	1180	1284	10659	M	7

Table A1-1: Tagging and biological information for Lake Sturgeon marked with Floy® tags and PIT tags in the future Keeyask reservoir (the Nelson River between Clark Lake and Gull Rapids) and Stephens Lake, spring 2018 (continued).

Location	Zone	Date	Prefix	Floy Tag	Pit Tag	Fork Length (mm)	Total Length (mm)	Weight (g)	Sex	Maturity
Nelson River (CL-GR)	BR-D	05-Jun-18	NSC	111958	900 226000767054	871	982	2404	-	-
Nelson River (CL-GR)	BR-D	05-Jun-18	NSC	111959	900 226000767052	790	921	3311	-	-
Nelson River (CL-GR)	BR-D	07-Jun-18	NSC	111960	900 226000767040	943	1058	5625	M	7
Nelson River (CL-GR)	BR-D	07-Jun-18	NSC	111961	900 226000767000	935	1036	8981	-	-
Nelson River (CL-GR)	BR-D	07-Jun-18	NSC	111962	900 226000767049	1235	1350	19232	-	-
Nelson River (CL-GR)	BR-D	07-Jun-18	NSC	111963	900 226000893790	1178	1317	15331	-	-
Nelson River (CL-GR)	BR-D	07-Jun-18	NSC	111964	900 226000767009	745	831	3084	-	-
Nelson River (CL-GR)	BR-D	07-Jun-18	NSC	111965	900 226000767050	811	910	3901	-	-
Nelson River (CL-GR)	BR-D	07-Jun-18	NSC	111966	900 226000767041	665	768	2041	-	-
Nelson River (CL-GR)	BR-D	07-Jun-18	NSC	111967	900 226000767026	868	996	4853	-	-
Nelson River (CL-GR)	BR-D	07-Jun-18	NSC	111968	900 226000767035	760	864	2631	-	-
Nelson River (CL-GR)	GL-A	08-Jun-18	NSC	111969	900 226000767031	628	716	1950	-	-
Nelson River (CL-GR)	BR-D	08-Jun-18	NSC	111970	900 226000767073	1235	1370	14651	M	8
Nelson River (CL-GR)	BR-D	08-Jun-18	NSC	111971	900 226000767079	1112	1192	9435	M	8
Nelson River (CL-GR)	BR-D	08-Jun-18	NSC	111972	900 226000767083	734	831	2722	-	-
Nelson River (CL-GR)	BR-D	08-Jun-18	NSC	111973	900 226000767075	864	978	5216	-	-
Nelson River (CL-GR)	BR-D	09-Jun-18	NSC	111974	900 226000768107	896	998	6260	M	8
Nelson River (CL-GR)	BR-D	09-Jun-18	NSC	111975	900 226000767074	896	1012	6078	-	-
Nelson River (CL-GR)	BR-D	09-Jun-18	NSC	111976	900 226000767071	800	895	4581	-	-
Nelson River (CL-GR)	BR-D	09-Jun-18	NSC	111977	900 226000768121	820	921	4944	-	-
Nelson River (CL-GR)	GL-B	10-Jun-18	NSC	111978	900 226000893952	845	951	5216	-	-
Nelson River (CL-GR)	GL-B	10-Jun-18	NSC	111980	900 226000767093	798	885	4354	-	-
Nelson River (CL-GR)	GL-B	10-Jun-18	NSC	111981	900 226000768051	667	746	1950	-	-
Nelson River (CL-GR)	GL-B	10-Jun-18	NSC	111982	900 226000767078	785	870	3810	-	-
Nelson River (CL-GR)	BR-D	10-Jun-18	NSC	111983	900 226000767092	805	922	5534	-	-

Table A1-1: Tagging and biological information for Lake Sturgeon marked with Floy® tags and PIT tags in the future Keeyask reservoir (the Nelson River between Clark Lake and Gull Rapids) and Stephens Lake, spring 2018 (continued).

Location	Zone	Date	Prefix	Floy Tag	Pit Tag	Fork Length (mm)	Total Length (mm)	Weight (g)	Sex	Maturity
Nelson River (CL-GR)	GL-B	11-Jun-18	NSC	111984	900 226000767061	693	778	2359	-	-
Nelson River (CL-GR)	GL-B	11-Jun-18	NSC	111985	900 226000767089	664	746	2268	-	-
Nelson River (CL-GR)	GL-B	11-Jun-18	NSC	111986	900 226000767085	625	702	1678	-	-
Nelson River (CL-GR)	GL-B	11-Jun-18	NSC	111987	900 226000767017	532	605	1043	-	-
Nelson River (CL-GR)	GL-A	11-Jun-18	NSC	111988	900 226000768610	722	811	2722	-	-
Nelson River (CL-GR)	BR-D	11-Jun-18	NSC	111989	900 226000767028	920	1026	6260	-	-
Nelson River (CL-GR)	BR-D	11-Jun-18	NSC	111990	900 226000767047	795	890	4037	-	-
Nelson River (CL-GR)	BR-D	11-Jun-18	NSC	111992	900 226000768587	1020	1150	8845	-	-
Nelson River (CL-GR)	GL-C	12-Jun-18	NSC	111995	900 226000767014	658	735	1724	-	-
Nelson River (CL-GR)	GL-C	12-Jun-18	NSC	111997	900 226000768133	845	944	5216	-	-
Nelson River (CL-GR)	GL-A	12-Jun-18	NSC	111998	900 226000767091	924	1012	6350	-	-
Nelson River (CL-GR)	BR-D	12-Jun-18	NSC	111999	900 226000767068	1550	-	30844	-	-
Nelson River (CL-GR)	BR-D	12-Jun-18	NSC	112000	900 226000153132	888	1011	7076	-	-
Nelson River (CL-GR)	GL-B	22-Jun-18	NSC	112276	900 226000628967	803	916	3765	-	-
Nelson River (CL-GR)	GL-B	22-Jun-18	NSC	112277	900 226000629583	796	888	4128	-	-
Nelson River (CL-GR)	GL-A	22-Jun-18	NSC	112278	900 226000122766	620	794	1860	-	-
Nelson River (CL-GR)	GL-A	22-Jun-18	NSC	112279	900 226000893453	475	538	726	-	-
Nelson River (CL-GR)	GL-A	22-Jun-18	NSC	112280	900 226000893342	895	996	5942	-	-
Nelson River (CL-GR)	GL-C	23-Jun-18	NSC	112281	900 226000154289	1120	1238	12565	-	-
Nelson River (CL-GR)	GL-C	24-Jun-18	NSC	112283	900 226000153496	802	886	4173	-	-
Nelson River (CL-GR)	GL-B	24-Jun-18	NSC	112284	900 226000154215	710	794	2449	-	-
Nelson River (CL-GR)	GL-B	24-Jun-18	NSC	112285	900 226000154256	668	743	2132	-	-
Nelson River (CL-GR)	GL-B	24-Jun-18	NSC	112286	900 226000893272	436	494	499	-	-
Nelson River (CL-GR)	GL-B	24-Jun-18	NSC	112287	900 226000893264	984	988	5262	-	-
Nelson River (CL-GR)	GL-C	25-Jun-18	NSC	112290	900 226000628791	736	845	2631	-	-

Table A1-1: Tagging and biological information for Lake Sturgeon marked with Floy® tags and PIT tags in the future Keeyask reservoir (the Nelson River between Clark Lake and Gull Rapids) and Stephens Lake, spring 2018 (continued).

Location	Zone	Date	Prefix	Floy Tag	Pit Tag	Fork Length (mm)	Total Length (mm)	Weight (g)	Sex	Maturity
Nelson River (CL-GR)	GL-C	25-Jun-18	NSC	112288 / 112289	900 226000893398	941	1030	6895	-	-
Nelson River (CL-GR)	GL-C	25-Jun-18	NSC	112291	900 226000154287	768	863	3765	-	-
Nelson River (CL-GR)	GL-B	25-Jun-18	NSC	112292	900 226000629702	680	773	2313	-	-
Nelson River (CL-GR)	GL-B	25-Jun-18	NSC	112293	900 226000893306	634	708	1724	-	-
Nelson River (CL-GR)	GL-B	25-Jun-18	NSC	112294	900 226000153804	894	1001	5171	-	-
Nelson River (CL-GR)	GL-C	26-Jun-18	NSC	112295	900 226000893367	662	742	1950	-	-
Nelson River (CL-GR)	GL-B	26-Jun-18	NSC	112296	900 226000893431	694	786	2404	-	-
Nelson River (CL-GR)	GL-A	27-Jun-18	NSC	112297	900 226000768544	788	895	4309	-	-
Nelson River (CL-GR)	GL-B	27-Jun-18	NSC	112298	900 226000893286	690	791	2359	-	-
Nelson River (CL-GR)	GL-B	28-Jun-18	NSC	112299	900 226000628906	704	-	2400	-	-
Nelson River (CL-GR)	GL-B	28-Jun-18	NSC	112300	900 226000893276	866	986	5250	-	-
Nelson River (CL-GR)	BR-U	01-Jun-18	NSC	112563	-	930	1029	7257	M	7
Stephens Lake	STL-A	28-May-18	NSC	115726	900 226000768208	760	858	3150	-	-
Stephens Lake	GR-A	01-Jun-18	NSC	115727	900 226000893375	1000	1125	7212	-	-
Stephens Lake	GR-A	29-May-18	NSC	115728	900 226000893445	930	1032	7303	-	-
Stephens Lake	STL-A	29-May-18	NSC	115729	900 226000768093	1067	1185	10387	-	-
Stephens Lake	GR-A	29-May-18	NSC	115730	900 226000893477	1110	1230	11022	-	-
Stephens Lake	GR-A	29-May-18	NSC	115731	900 226000893287	946	1038	6260	-	-
Stephens Lake	GR-A	30-May-18	NSC	115733	900 226000548923	836	948	5225	-	-
Stephens Lake	GR-A	30-May-18	NSC	115734	900 226000893291	860	964	4925	-	-
Stephens Lake	GR-A	30-May-18	NSC	115735	900 226000893372	830	933	5000	-	-
Stephens Lake	GR-A	30-May-18	NSC	115736	900 226000893351	886	990	7666	-	-
Stephens Lake	STL-A	30-May-18	NSC	115737	900 226000893298	982	1093	7802	M	7
Stephens Lake	STL-A	30-May-18	NSC	115738	900 226000768013	518	586	1050	-	-
Stephens Lake	STL-A	30-May-18	NSC	115739	900 226000893394	790	893	3875	-	-

Table A1-1: Tagging and biological information for Lake Sturgeon marked with Floy® tags and PIT tags in the future Keeyask reservoir (the Nelson River between Clark Lake and Gull Rapids) and Stephens Lake, spring 2018 (continued).

Location	Zone	Date	Prefix	Floy Tag	Pit Tag	Fork Length (mm)	Total Length (mm)	Weight (g)	Sex	Maturity
Stephens Lake	STL-A	30-May-18	NSC	115740	900 226000767151	1132	1265	13608	-	-
Stephens Lake	STL-A	30-May-18	NSC	115741	900 226000893345	1310	1440	21863	-	-
Stephens Lake	STL-A	30-May-18	NSC	115742	900 226000893369	961	1067	8391	-	-
Stephens Lake	STL-A	30-May-18	NSC	115743	900 226000893450	1075	1183	10387	-	-
Stephens Lake	STL-A	30-May-18	NSC	115744	900 226000893399	735	817	3000	-	-
Stephens Lake	STL-A	30-May-18	NSC	115745	900 226000893442	837	951	5625	-	-
Stephens Lake	STL-A	30-May-18	NSC	115746	900 226000893300	826	932	4125	-	-
Stephens Lake	STL-A	30-May-18	NSC	115747	900 226000893407	911	1019	5579	-	-
Stephens Lake	STL-A	30-May-18	NSC	115748	900 226000893328	805	905	4025	-	-
Stephens Lake	GR-A	30-May-18	NSC	115749	900 226000893277	1218	1342	16375	-	-
Stephens Lake	GR-A	30-May-18	NSC	115750	900 226000893377	1146	1270	18733	-	-
Stephens Lake	GR-A	01-Jun-18	NSC	115751	900 226000152965	986	1095	6895	M	8
Stephens Lake	GR-A	01-Jun-18	NSC	115752	900 226000893747	1000	1113	5715	M	8
Stephens Lake	GR-A	01-Jun-18	NSC	115753	900 226000893258	1153	1262	16511	M	8
Stephens Lake	GR-A	01-Jun-18	NSC	115754	900 226000893465	911	1105	5126	M	8
Stephens Lake	STL-A	01-Jun-18	NSC	115755	900 226000893325	847	948	5080	-	-
Stephens Lake	STL-A	01-Jun-18	NSC	115756	900 226000893415	901	1010	5761	-	-
Stephens Lake	STL-A	01-Jun-18	NSC	115757	900 226000152959	1002	1110	7212	M	9
Stephens Lake	STL-A	01-Jun-18	NSC	115758	900 226000893353	942	1056	7620	-	-
Stephens Lake	STL-A	01-Jun-18	NSC	115759	900 226000893379	1045	1130	9979	-	-
Stephens Lake	STL-A	01-Jun-18	NSC	115760	900 226000893498	803	911	4853	-	-
Stephens Lake	STL-A	01-Jun-18	NSC	115761	900 226000152962	870	988	6214	-	-
Stephens Lake	STL-A	01-Jun-18	NSC	115762	900 226000152964	1026	1135	10115	-	-
Stephens Lake	STL-A	01-Jun-18	NSC	115763	900 226000152966	905	1021	6895	M	7
Stephens Lake	STL-A	01-Jun-18	NSC	115764	900 226000154004	927	1042	6214	M	7

Table A1-1: Tagging and biological information for Lake Sturgeon marked with Floy® tags and PIT tags in the future Keeyask reservoir (the Nelson River between Clark Lake and Gull Rapids) and Stephens Lake, spring 2018 (continued).

Location	Zone	Date	Prefix	Floy Tag	Pit Tag	Fork Length (mm)	Total Length (mm)	Weight (g)	Sex	Maturity
Stephens Lake	STL-A	01-Jun-18	NSC	115765	900 226000893460	1042	1152	8301	-	-
Stephens Lake	STL-A	01-Jun-18	NSC	115766	900 226000893417	946	1043	6622	-	-
Stephens Lake	STL-A	01-Jun-18	NSC	115767	900 226000893253	791	889	3629	-	-
Stephens Lake	STL-A	01-Jun-18	NSC	115768	900 226000893256	1099	1225	12338	-	-
Stephens Lake	STL-A	01-Jun-18	NSC	115769	900 226000893270	923	1032	6260	M	8
Stephens Lake	STL-A	01-Jun-18	NSC	115770	900 226000152937	771	865	4125	-	-
Stephens Lake	STL-A	01-Jun-18	NSC	115771	900 226000768076	745	837	3425	-	-
Stephens Lake	STL-A	01-Jun-18	NSC	115772	900 226000152971	745	846	3200	-	-
Stephens Lake	STL-A	01-Jun-18	NSC	115773	900 226000152936	1099	1226	11612	-	-
Stephens Lake	STL-A	01-Jun-18	NSC	115774	900 226000152989	1042	1155	9934	-	-
Stephens Lake	STL-A	01-Jun-18	NSC	115775	900 226000152916	892	991	5625	-	-
Stephens Lake	GR-A	01-Jun-18	NSC	115776	900 226000152922	1025	1140	8890	-	-
Stephens Lake	GR-A	01-Jun-18	NSC	115777	900 226000152946	946	1060	7121	-	-
Stephens Lake	GR-A	02-Jun-18	NSC	115778	900 226000152945	1010	1130	7938	-	-
Stephens Lake	STL-A	04-Jun-18	NSC	115780	900 226000152926	840	940	4500	-	-
Stephens Lake	STL-A	04-Jun-18	NSC	115781	900 226000152931	784	880	3650	-	-
Stephens Lake	STL-A	04-Jun-18	NSC	115782	900 226000152972	881	1005	4525	-	-
Stephens Lake	STL-A	04-Jun-18	NSC	115783	900 226000893931	841	963	4475	-	-
Stephens Lake	STL-A	04-Jun-18	NSC	115784	900 226000152910	780	857	3350	-	-
Stephens Lake	STL-A	04-Jun-18	NSC	115785	900 226000152909	1374	1580	23678	-	-
Stephens Lake	GR-A	04-Jun-18	NSC	115786	900 226000152986	826	920	4354	-	-
Stephens Lake	GR-A	07-Jun-18	NSC	115787	900 226000152914	969	1092	7802	-	-
Stephens Lake	GR-A	04-Jun-18	NSC	115788	900 226000152993	920	1040	6260	M	8
Stephens Lake	STL-A	04-Jun-18	NSC	115789	900 226000154294	982	1092	6985	-	-
Stephens Lake	STL-A	04-Jun-18	NSC	115790	900 226000152913	955	1061	6078	-	-

Table A1-1: Tagging and biological information for Lake Sturgeon marked with Floy® tags and PIT tags in the future Keeyask reservoir (the Nelson River between Clark Lake and Gull Rapids) and Stephens Lake, spring 2018 (continued).

Location	Zone	Date	Prefix	Floy Tag	Pit Tag	Fork Length (mm)	Total Length (mm)	Weight (g)	Sex	Maturity
Stephens Lake	STL-A	04-Jun-18	NSC	115791	900 226000152949	976	1086	7620	-	-
Stephens Lake	STL-A	05-Jun-18	NSC	115792	900 226000152996	740	845	4650	-	-
Stephens Lake	STL-A	06-Jun-18	NSC	115793	900 226000152947	812	905	4600	-	-
Stephens Lake	STL-A	06-Jun-18	NSC	115794	900 226000152991	780	871	3675	-	-
Stephens Lake	GR-A	06-Jun-18	NSC	115795	900 226000152920	775	870	3650	-	-
Stephens Lake	STL-A	07-Jun-18	NSC	115796	900 226000152973	820	937	4450	M	7
Stephens Lake	STL-A	07-Jun-18	NSC	115797	900 226000152925	760	858	3400	-	-
Stephens Lake	STL-A	07-Jun-18	NSC	115798	900 226000152998	761	849	4050	-	-
Stephens Lake	STL-A	07-Jun-18	NSC	115799	900 226000152982	1390	1530	21183	-	-
Stephens Lake	GR-A	07-Jun-18	NSC	115800	900 226000152995	736	832	3800	-	-
Stephens Lake	GR-A	07-Jun-18	NSC	115801	900 226000152929	918	1026	7620	-	-
Stephens Lake	STL-A	08-Jun-18	NSC	115802	900 226000152980	940	1050	6532	-	-
Stephens Lake	GR-A	08-Jun-18	NSC	115802	900 226000152979	1084	1207	9480	M	9
Stephens Lake	STL-A	09-Jun-18	NSC	115804	900 226000152984	810	900	4275	-	-
Stephens Lake	STL-A	09-Jun-18	NSC	115805	900 226000152955	736	836	3400	-	-
Stephens Lake	STL-A	09-Jun-18	NSC	115806	900 226000152905	1000	1103	8754	-	-
Stephens Lake	STL-A	09-Jun-18	NSC	115807	900 226000893887	822	923	4875	-	-
Stephens Lake	GR-A	09-Jun-18	NSC	115808	900 226000152918	625	708	2175	-	-
Stephens Lake	GR-A	09-Jun-18	NSC	115809	900 226000152923	1005	1111	8981	-	-
Stephens Lake	GR-A	09-Jun-18	NSC	115810	900 226000152992	1071	1195	11839	-	-
Stephens Lake	STL-A	11-Jun-18	NSC	115811	900 226000154095	748	851	3675	-	-
Stephens Lake	STL-A	10-Jun-18	NSC	115812	900 226000152903	842	940	5225	-	-
Stephens Lake	STL-A	10-Jun-18	NSC	115813	900 226000152942	772	869	3775	-	-
Stephens Lake	STL-A	10-Jun-18	NSC	115815	900 226000152987	895	982	6169	-	-
Stephens Lake	STL-A	10-Jun-18	NSC	115816	900 226000152985	873	920	6441	-	-

Table A1-1: Tagging and biological information for Lake Sturgeon marked with Floy® tags and PIT tags in the future Keeyask reservoir (the Nelson River between Clark Lake and Gull Rapids) and Stephens Lake, spring 2018 (continued).

Location	Zone	Date	Prefix	Floy Tag	Pit Tag	Fork Length (mm)	Total Length (mm)	Weight (g)	Sex	Maturity
Stephens Lake	STL-A	10-Jun-18	NSC	115817	900 226000152981	957	1103	8301	-	-
Stephens Lake	STL-A	10-Jun-18	NSC	115819	900 226000152908	762	840	3800	-	-
Stephens Lake	STL-A	11-Jun-18	NSC	115820	900 226000154066	810	900	4900	-	-
Stephens Lake	GR-A	10-Jun-18	NSC	115822	900 226000893797	960	1075	7666	-	-
Stephens Lake	STL-A	11-Jun-18	NSC	115823	900 226000768016	712	822	3225	-	-
Stephens Lake	STL-A	11-Jun-18	NSC	115824	900 226000152935	714	816	3100	-	-
Stephens Lake	STL-A	11-Jun-18	NSC	115825	900 226000152958	985	1076	7167	-	-
Stephens Lake	STL-A	11-Jun-18	NSC	115826	900 226000154078	825	925	4275	-	-
Stephens Lake	STL-A	11-Jun-18	NSC	115827	900 226000154088	1110	1225	10070	-	-
Stephens Lake	STL-A	11-Jun-18	NSC	115828	900 226000768536	994	1084	8936	-	-
Stephens Lake	STL-A	11-Jun-18	NSC	115829	900 226000152939	860	960	5200	-	-
Stephens Lake	GR-A	11-Jun-18	NSC	115830	900 226000153854	745	832	3275	-	-
Stephens Lake	GR-A	11-Jun-18	NSC	115831	900 226000768094	746	835	3375	-	-
Stephens Lake	GR-A	11-Jun-18	NSC	115832	900 226000768535	820	916	4450	-	-
Stephens Lake	GR-A	11-Jun-18	NSC	115833	900 226000153921	850	952	4725	-	-
Stephens Lake	GR-A	11-Jun-18	NSC	115834	900 226000768599	947	1050	7620	-	-
Stephens Lake	GR-A	11-Jun-18	NSC	115835	900 226000154089	980	1099	8981	-	-
Stephens Lake	GR-A	12-Jun-18	NSC	115836	900 226000768964	819	931	3950	-	-
Stephens Lake	GR-A	12-Jun-18	NSC	115837	900 226000153703	695	790	3900	-	-
Stephens Lake	GR-A	12-Jun-18	NSC	115838	900 226000768985	746	834	3500	-	-
Stephens Lake	STL-A	12-Jun-18	NSC	115839	900 226000768092	918	1034	6350	-	-
Stephens Lake	STL-A	12-Jun-18	NSC	115840	900 226000768508	886	975	5350	-	-
Stephens Lake	STL-A	12-Jun-18	NSC	115841	900 226000154056	971	1065	7900	-	-
Stephens Lake	STL-A	12-Jun-18	NSC	115842	900 226000768058	1169	1305	15876	-	-
Stephens Lake	STL-A	12-Jun-18	NSC	115843	900 226000768940	867	993	5050	-	-

Table A1-1: Tagging and biological information for Lake Sturgeon marked with Floy® tags and PIT tags in the future Keeyask reservoir (the Nelson River between Clark Lake and Gull Rapids) and Stephens Lake, spring 2018 (continued).

Location	Zone	Date	Prefix	Floy Tag	PIT Tag	Fork Length (mm)	Total Length (mm)	Weight (g)	Sex	Maturity
Stephens Lake	STL-A	12-Jun-18	NSC	115844	900 226000154093	1065	1202	10478	-	-
Stephens Lake	GR-A	14-Jun-18	NSC	115845	900 226000154003	1120	1200	11158	-	-
Stephens Lake	STL-A	14-Jun-18	NSC	115846	900 226000768575	799	901	3850	-	-
Stephens Lake	STL-A	14-Jun-18	NSC	115847	900 226000768589	1000	1099	6900	-	-
Stephens Lake	STL-A	14-Jun-18	NSC	115848	900 226000153779	721	816	2900	-	-
Stephens Lake	STL-A	14-Jun-18	NSC	115849	900 226000768525	922	1017	5850	-	-
Stephens Lake	STL-A	14-Jun-18	NSC	115850	900 226000153905	975	1110	8150	-	-
Stephens Lake	STL-A	04-Jun-18	-	-	900 226000152911	361	418	250	-	-

APPENDIX 2: TAGGING AND BIOLOGICAL INFORMATION FOR LAKE STURGEON RECAPTURED UPSTREAM OF GULL RAPIDS AND IN STEPHENS LAKE DURING SPRING, 2018.

Table A2-1: Tagging and biological information for Lake Sturgeon recaptured in the future Keeyask reservoir and Stephens Lake, spring 2018. 69

Table A2-1: Tagging and biological information for Lake Sturgeon recaptured in the future Keeyask reservoir and Stephens Lake, spring 2018. Red highlighting indicates a mortality / local resource user harvest. Red font indicates that the tag number does not match any tagged Lake Sturgeon and may have been recorded incorrectly in the field. A Floy tag that was lost and fish was retagged in 2018 is indicated by an asterisk.

Location	Zone	Date	Prefix	Floy Tag 1	Floy Tag 2	PIT Tag	Fork Length (mm)	Total Length (mm)	Weight (g)	Sex	Maturity
Stephens Lake	GR-A	28-May-01	NSC	46827	-	-	945	1040	7500	M	7
Stephens Lake	GR-A	30-May-01	NSC	46827	-	-	-	-	-	-	-
Stephens Lake	GR-A	02-Jun-01	NSC	46827	-	-	-	-	-	-	-
Gull Lake	BR-D	24-Jun-03	NSC	46827	-	-	964	-	8166	-	-
Stephens Lake	GR-A	05-Jun-16	NSC	46827	-	900 226000548789	1120	1100	9072	-	-
Stephens Lake	STL-A	01-Jun-18	NSC	46827	-	900 226000548789	1044	1133	9208	M	8
Stephens Lake	STL-A	07-Jun-18	NSC	46827	-	900 226000548789	-	-	-	M	8
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
Stephens Lake	GR-A	04-Jun-18	NSC	46844	-	900 226000152917	1116	1230	10977	-	-
Stephens Lake	STL-A	08-Jun-18	NSC	46844	-	900 226000152917	-	-	-	-	-
Stephens Lake	GR-A	29-May-01	NSC	46847	-	-	1010	1109	9000	M	7
Stephens Lake	GR-A	30-May-01	NSC	46847	-	-	-	-	-	-	-
Stephens Lake	GR-A	30-Jun-01	NSC	46847	-	-	-	-	-	-	-
Stephens Lake	GR-A	01-Jun-10	NSC	46847	-	-	1100	1214	8618	-	-
Stephens Lake	GR-A	02-Jun-18	NSC	46847	-	900 226000152967	1142	1257	11839	-	-
Nelson River (CL-GR)	GL-C	07-Jul-01	NSC	47181	-	-	739	855	4000	-	-
Nelson River (CL-GR)	GL-B	22-Jun-02	NSC	47181	-	-	770	885	4536	-	-
Nelson River (CL-GR)	BR-D	23-Jun-03	NSC	47181	-	-	810	926	4763	-	-
Nelson River (CL-GR)	GL-B	14-Jun-12	NSC	47181	-	-	980	1102	9072	-	-
Nelson River (CL-GR)	BR-D	28-May-18	NSC	47181	-	900 226000767025	1036	1152	9163	M	7
Nelson River (CL-GR)	GL-A	22-Jun-18	NSC	47181	-	900 226000767025	-	-	-	-	-
Nelson River (CL-GR)	BR-D	15-Jun-18	NSC	47181	-	900 226000767025	-	-	-	-	-

Table A2-2: Tagging and biological information for Lake Sturgeon recaptured in the future Keeyask reservoir and Stephens Lake, spring 2018. Red highlighting indicates a mortality / local resource user harvest. Red font indicates that the tag number does not match any tagged Lake Sturgeon and may have been recorded incorrectly in the field. A Floy tag that was lost and fish was retagged in 2018 is indicated by an asterisk (continued).

Location	Zone	Date	Prefix	Floy Tag 1	Floy Tag 2	PIT Tag	Fork Length (mm)	Total Length (mm)	Weight (g)	Sex	Maturity
Nelson River (CL-GR)	BR-D	01-Jul-02	NSC	48878	-	-	1047	1159	11567	-	-
Nelson River (CL-GR)	GL-A	27-Jun-18	NSC	48878	-	900 226000153400	1225	1332	15422	-	-
Nelson River (CL-GR)	BR-D	11-Jun-02	NSC	48926	-	-	1299	1420	21092	M	7
Nelson River (CL-GR)	BR-D	14-Jun-04	NSC	48926	-	-	1318	1435	17237	-	-
Nelson River (CL-GR)	BR-D	05-Jun-06	NSC	48926	-	-	1321	1440	21772	-	-
Nelson River (CL-GR)	GL-A	29-May-16	NSC	48926	-	900 226000768497	1362	1491	25855	M	7
Nelson River (CL-GR)	GL-C	09-Jun-16	NSC	48926	-	900 226000768497	-	-	-	-	-
Nelson River (CL-GR)	BR-D	07-Jun-18	NSC	48926	-	900 226000768497	1370	1500	26490	-	-
Nelson River (CL-GR)	BR-D	06-Jun-03	NSC	50836	-	-	1159	1260	10500	-	-
Nelson River (CL-GR)	BR-D	26-May-06	NSC	50836	-	-	1120	1190	11793	M	7
Nelson River (CL-GR)	GL-A	22-May-16	NSC	50836	-	-	1198	1295	14742	-	-
Nelson River (CL-GR)	BR-D	07-Jun-18	NSC	50836	-	900 226000767006	1200	1320	16239	M	-
Stephens Lake	STL-A	22-Jun-02	NSC	53159	-	-	1001	1100	9500	-	-
Stephens Lake	GR-A	01-Jun-18	NSC	53159	-	900 226000893307	1113	1234	11113	M	7
Stephens Lake	STL-A	19-Sep-03	NSC	55557	-	-	717	790	2500	-	-
Stephens Lake	STL-A	08-Jun-12	NSC	55557	-	-	992	1100	-	M	7
Stephens Lake	STL-A	01-Jun-18	NSC	55557	-	900 226000767112	1110	1223	12156	-	-
Stephens Lake	GR-A	25-Jun-03	NSC	56205	-	-	771	877	4000	-	-
Stephens Lake	GR-A	26-Jun-03	NSC	56205	-	-	-	-	-	-	-
Stephens Lake	GR-A	29-May-16	NSC	56205	-	900 226000548766	1115	1246	12701	-	-
Stephens Lake	STL-A	30-May-18	NSC	56205	-	900 226000893315	1150	1282	14606	-	-
Nelson River (CL-GR)	GL-C	16-Jun-04	NSC	64711	-	-	902	1001	6350	-	-
Nelson River (CL-GR)	GL-C	22-Jun-18	NSC	64711	-	900 226000628871	1180	1311	13517	-	-

Table A2-3: Tagging and biological information for Lake Sturgeon recaptured in the future Keeyask reservoir and Stephens Lake, spring 2018. Red highlighting indicates a mortality / local resource user harvest. Red font indicates that the tag number does not match any tagged Lake Sturgeon and may have been recorded incorrectly in the field. A Floy tag that was lost and fish was retagged in 2018 is indicated by an asterisk (continued).

Location	Zone	Date	Prefix	Floy Tag 1	Floy Tag 2	PIT Tag	Fork Length (mm)	Total Length (mm)	Weight (g)	Sex	Maturity
Stephens Lake	STL-B	24-Sep-11	NSC	69863	-	-	413	474	500	-	-
Stephens Lake	STL-B	25-Sep-11	NSC	69863	-	-	-	-	-	-	-
Stephens Lake	STL-A	12-Jun-18	NSC	69863	-	900 226000768504	787	886	4000	-	-
Stephens Lake	STL-A	25-Sep-11	NSC	69864	-	-	735	820	3590	-	-
Stephens Lake	STL-A	04-Jun-16	NSC	69864	-	900 226000548931	927	1040	9525	-	-
Stephens Lake	GR-A	08-Jun-16	NSC	69864	-	900 226000548931	-	-	-	-	-
Stephens Lake	GR-A	09-Jun-16	NSC	69864	-	900 226000548931	-	-	-	-	-
Stephens Lake	STL-A	30-May-18	NSC	69864	-	900 226000548931	987	1111	8800	-	-
Stephens Lake	STL-A	26-Sep-11	NSC	69868	-	-	941	1040	8165	-	-
Stephens Lake	STL-A	28-May-16	NSC	69868	-	900 226000548760	1036	1150	9072	M	8
Stephens Lake	STL-A	10-Jun-16	NSC	69868	-	900 226000548760	-	-	-	-	-
Stephens Lake	STL-B	11-Jun-16	NSC	69868	-	900 226000548760	-	-	-	-	-
Stephens Lake	STL-A	16-Jun-16	NSC	69868	-	900 226000548760	-	-	-	-	-
Stephens Lake	GR-A	02-Jun-18	NSC	69868	-	900 226000548760	1070	1180	11204	-	-
Stephens Lake	STL-A	26-Sep-11	NSC	69872	-	-	475	541	775	-	-
Stephens Lake	STL-A	10-Jun-18	NSC	69872	-	900 226000152961	828	931	4100	-	-
Stephens Lake	GR-A	26-Jun-11	NSC	74421	-	-	903	1001	7257	-	-
Stephens Lake	GR-A	30-May-18	NSC	74421	-	900 226000893485	1107	1222	11612	-	-
Stephens Lake	STL-A	15-Jun-18	NSC	74421	-	900 226000893485	-	-	-	-	-
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	05-Jul-14	NSC	75277	-	900 226000629145	977	1086	7711	-	-
Nelson River (CL-GR)	GL-C	12-Jun-18	NSC	75277	-	900 226000629145	1052	1180	7983	-	-

Table A2-4: Tagging and biological information for Lake Sturgeon recaptured in the future Keeyask reservoir and Stephens Lake, spring 2018. Red highlighting indicates a mortality / local resource user harvest. Red font indicates that the tag number does not match any tagged Lake Sturgeon and may have been recorded incorrectly in the field. A Floy tag that was lost and fish was retagged in 2018 is indicated by an asterisk (continued).

Location	Zone	Date	Prefix	Floy Tag 1	Floy Tag 2	PIT Tag	Fork Length (mm)	Total Length (mm)	Weight (g)	Sex	Maturity
Nelson River (CL-GR)	GL-C	29-Jun-08	NSC	75285	-	-	722	823	2722	-	-
Nelson River (CL-GR)	GL-C	27-Sep-08	NSC	75285	-	-	760	868	3420	-	-
Nelson River (CL-GR)	GL-B	13-Sep-14	NSC	75285	-	-	946	1050	-	-	-
Nelson River (CL-GR)	BR-D	09-Jun-18	NSC	75285	-	900 226000629285	998	1122	8391	-	-
Nelson River (CL-GR)	GL-B	21-Sep-08	NSC	75306	-	-	658	737	2100	-	-
Nelson River (CL-GR)	BR-D	07-Jul-14	NSC	75306	-	900 226000629211	810	882	4350	-	-
Nelson River (CL-GR)	BR-D	15-Jun-18	NSC	75306	-	900 226000629211	897	995	1996	-	-
Nelson River (CL-GR)	GL-B	21-Sep-08	NSC	75310	-	-	610	756	2450	-	-
Nelson River (CL-GR)	GL-B	09-Jun-18	NSC	75310	-	900 226000628766	903	1006	6713	-	-
Nelson River (CL-GR)	GL-C	20-Sep-08	NSC	75316	-	-	575	663	-	-	-
Nelson River (CL-GR)	BR-D	28-May-18	NSC	75316	-	900 226000767023	937	1052	8845	-	-
Nelson River (CL-GR)	BR-D	01-Jun-18	NSC	75316	-	900 226000767023	-	-	-	M	7
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-C	18-Sep-15	NSC	75321	-	900 226000629248	880	960	7257	-	-
Nelson River (CL-GR)	GL-C	27-Jun-16	NSC	75321	-	900 226000629248	884	952	8391	-	-
Nelson River (CL-GR)	GL-C	29-Jun-18	NSC	*	79417	900 226000629248	910	987	6900	-	-
Nelson River (CL-GR)	GL-B	14-Sep-08	NSC	75345	-	-	515	592	850	-	-
Nelson River (CL-GR)	BR-D	09-Jun-18	NSC	75345	-	900 226000767058	868	984	5534	-	-
Nelson River (CL-GR)	GL-C	25-Jun-06	NSC	76333	76334	-	862	942	5670	-	-
Nelson River (CL-GR)	GL-C	15-Jun-10	NSC	76333	76334	-	955	1060	6350	-	-
Nelson River (CL-GR)	GL-A	23-Jun-16	NSC	76333	76334	900 226000153808	1085	1160	11340	-	-
Nelson River (CL-GR)	BR-D	19-Jun-18	NSC	76333	76334	900 226000153808	1091	1208	10523	-	-

Table A2-5: Tagging and biological information for Lake Sturgeon recaptured in the future Keeyask reservoir and Stephens Lake, spring 2018. Red highlighting indicates a mortality / local resource user harvest. Red font indicates that the tag number does not match any tagged Lake Sturgeon and may have been recorded incorrectly in the field. A Floy tag that was lost and fish was retagged in 2018 is indicated by an asterisk (continued).

Location	Zone	Date	Prefix	Floy Tag 1	Floy Tag 2	PIT Tag	Fork Length (mm)	Total Length (mm)	Weight (g)	Sex	Maturity
Nelson River (CL-GR)	GL-B	27-Jun-06	NSC	76347	76348	-	633	702	2268	-	-
Nelson River (CL-GR)	GL-B	31-Aug-06	NSC	76347	76348	-	641	721	1588	-	-
Nelson River (CL-GR)	BR-D	09-Jun-18	NSC	76347	-	900 226000767024	925	1022	6169	-	-
Nelson River (CL-GR)	GL-C	02-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-C	06-Jun-16	NSC	76389	-	900 226000629249	1170	1288	11793	-	-
Nelson River (CL-GR)	GL-B	23-Jun-18	NSC	76389	-	900 226000629249	1180	1296	12973	-	-
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	-	-
Nelson River (CL-GR)	GL-B	04-Jul-14	NSC	76498	-	900 226000629133	-	-	-	-	-
Nelson River (CL-GR)	BR-D	14-Jun-18	NSC	76498	79044	900 226000629133	-	-	-	-	-
Nelson River (CL-GR)	BR-D	04-Jun-18	NSC	76498	79044	900 226000629133	1043	1146	11068	-	-
Nelson River (CL-GR)	GL-A	21-Jun-11	NSC	77503	-	-	1305	1443	14515	-	-
Nelson River (CL-GR)	GL-B	15-Jun-12	NSC	77503	-	-	1305	1450	16329	-	-
Nelson River (CL-GR)	GL-C	13-Jun-18	NSC	77503	-	900 226000767057	1220	1457	18960	-	-
Nelson River (CL-GR)	GL-B	21-Jun-11	NSC	77504	-	-	805	901	3175	-	-
Nelson River (CL-GR)	GL-A	22-May-16	NSC	77504	-	900 226000768411	884	980	6123	-	-
Nelson River (CL-GR)	GL-A	28-May-16	NSC	77504	-	900 226000768411	-	-	-	-	-
Nelson River (CL-GR)	BR-D	30-May-18	NSC	77504	-	900 226000768411	915	1011	7802	-	-
Stephens Lake	STL-A	26-Sep-14	NSC	79251	-	900 226000629493	910	1010	7050	-	-
Stephens Lake	STL-A	28-May-16	NSC	79251	-	900 226000629493	938	1053	6577	-	-
Stephens Lake	STL-A	30-May-18	NSC	79251	-	900 226000629493	984	1095	7484	-	-

Table A2-6: Tagging and biological information for Lake Sturgeon recaptured in the future Keeyask reservoir and Stephens Lake, spring 2018. Red highlighting indicates a mortality / local resource user harvest. Red font indicates that the tag number does not match any tagged Lake Sturgeon and may have been recorded incorrectly in the field. A Floy tag that was lost and fish was retagged in 2018 is indicated by an asterisk (continued).

Location	Zone	Date	Prefix	Floy Tag 1	Floy Tag 2	PIT Tag	Fork Length (mm)	Total Length (mm)	Weight (g)	Sex	Maturity
Stephens Lake	STL-B	27-Sep-14	NSC	79256	-	900 226000629431	585	663	1450	-	-
Stephens Lake	STL-A	10-Jun-18	NSC	79256	-	900 226000629431	727	821	2900	-	-
Nelson River (CL-GR)	GL-B	18-Aug-06	NSC	80114	80113	-	790	860	3856	-	-
Nelson River (CL-GR)	GL-C	30-Jun-14	NSC	80114	80113	900 226000629033	960	1075	6804	-	-
Stephens Lake	STL-A	30-May-18	NSC	80114	80113	900 226000629033	1018	1129	7700	-	-
Nelson River (CL-GR)	GL-B	19-Aug-06	NSC	80123	80124	-	607	697	1588	-	-
Nelson River (CL-GR)	GL-A	20-Jun-18	NSC	80123	80124	900 226000629581	986	1112	8029	-	-
Nelson River (CL-GR)	BR-D	03-Jun-06	NSC	80206	-	-	1280	-	14969	-	-
Nelson River (CL-GR)	BR-D	16-Jun-06	NSC	80206	-	-	-	-	-	-	-
Nelson River (CL-GR)	BR-D	06-Jun-10	NSC	80206	-	-	1283	1362	16103	M	8
Nelson River (CL-GR)	BR-D	07-Jun-18	NSC	80206	-	900 226000767081	1320	1414	19096	-	-
Nelson River (CL-GR)	BR-D	03-Jun-06	NSC	80217	-	-	970	1071	7450	-	-
Nelson River (CL-GR)	BR-D	08-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	07-Jun-14	NSC	80217	-	900 226000629135	1070	-	9525	M	7
Nelson River (CL-GR)	GL-A	19-Jun-16	NSC	80217	-	900 226000629135	1085	1200	10433	-	-
Nelson River (CL-GR)	BR-D	05-Jun-18	NSC	80217	-	900 226000629135	1105	1223	11068	-	-
Nelson River (CL-GR)	BR-D	04-Jun-06	NSC	80227	80228	-	1180	1285	12020	M	7
Nelson River (CL-GR)	BR-D	06-Jun-06	NSC	80227	80228	-	-	-	-	-	-
Nelson River (CL-GR)	BR-D	14-Jun-14	NSC	80227	80228	900 226000629176	1230	1330	14969	M	8
Nelson River (CL-GR)	GL-B	21-Jun-16	NSC	80227	80228	900 226000629176	1240	1365	19731	-	-
Nelson River (CL-GR)	GL-C	17-Jun-18	NSC	80227	80228	900 226000629176	1245	1360	16193	-	-

Table A2-7: Tagging and biological information for Lake Sturgeon recaptured in the future Keeyask reservoir and Stephens Lake, spring 2018. Red highlighting indicates a mortality / local resource user harvest. Red font indicates that the tag number does not match any tagged Lake Sturgeon and may have been recorded incorrectly in the field. A Floy tag that was lost and fish was retagged in 2018 is indicated by an asterisk (continued).

Location	Zone	Date	Prefix	Floy Tag 1	Floy Tag 2	PIT Tag	Fork Length (mm)	Total Length (mm)	Weight (g)	Sex	Maturity
Nelson River (CL-GR)	BR-D	30-May-06	NSC	80277	80278	-	812	914	3969	-	-
Nelson River (CL-GR)	BR-D	29-Jun-08	NSC	80277	-	-	-	-	-	-	-
Nelson River (CL-GR)	BR-D	02-Jun-12	NSC	80277	-	-	882	972	4990	M	8
Nelson River (CL-GR)	GL-A	22-May-16	NSC	80277	-	-	919	1011	6123	-	-
Nelson River (CL-GR)	GL-C	21-Jun-18	NSC	80277	-	900 226000628929	921	1033	5625	-	-
Nelson River (CL-GR)	BR-D	30-May-06	NSC	80285	80286	-	1030	1135	8400	-	-
Nelson River (CL-GR)	GL-A	23-Jun-16	NSC	80285	80286		1068	1184	11793	-	-
Nelson River (CL-GR)	BR-D	08-Jun-18	NSC	80285	-	900 226000153880	1087	1220	11748	M	8
Nelson River (CL-GR)	BR-D	02-Jun-06	NSC	80299	80300	-	1061	1150	8600	-	-
Nelson River (CL-GR)	BR-D	07-Jun-18	NSC	80299	80300	900 226000767098	1155	1253	14016	-	-
Stephens Lake	STL-A	27-May-06	NSC	80405	-	-	1105	1195	11340	M	8
Stephens Lake	GR-A	11-Jun-10	NSC	80405	-	-	1145	1244	13608	-	-
Stephens Lake	GR-A	01-Jun-18	NSC	80405	-	-	1210	1308	15286	M	8
Stephens Lake	GR-A	04-Jun-06	NSC	80411	80412	-	1003	1099	7711	-	-
Stephens Lake	GR-A	05-Jun-10	NSC	80411	80412	-	1110	1210	10886	-	-
Stephens Lake	GR-A	01-Jun-18	NSC	80411	80412	900 226000893338	1315	1415	16964	-	-
Stephens Lake	STL-A	15-Sep-08	NSC	81628	-	-	660	740	2550	-	-
Stephens Lake	STL-A	09-Jun-10	NSC	81628	-	-	703	786	-	-	-
Stephens Lake	STL-B	13-Jun-12	NSC	81628	-	-	810	900	5443	-	-
Stephens Lake	STL-A	01-Jun-18	NSC	81628	-	900 226000152938	977	1070	7802	-	-

Table A2-8: Tagging and biological information for Lake Sturgeon recaptured in the future Keeyask reservoir and Stephens Lake, spring 2018. Red highlighting indicates a mortality / local resource user harvest. Red font indicates that the tag number does not match any tagged Lake Sturgeon and may have been recorded incorrectly in the field. A Floy tag that was lost and fish was retagged in 2018 is indicated by an asterisk (continued).

Location	Zone	Date	Prefix	Floy Tag 1	Floy Tag 2	PIT Tag	Fork Length (mm)	Total Length (mm)	Weight (g)	Sex	Maturity
Stephens Lake	STL-A	24-Aug-06	NSC	81829	81830	-	428	483	600	-	-
Stephens Lake	STL-A	06-Jun-16	NSC	81829	81830	900 226000548756	893	996	5443	-	-
Stephens Lake	STL-A	30-May-18	NSC	81829	81830	900 226000548756	955	1061	6123	-	-
Stephens Lake	STL-A	11-Jun-18	NSC	81829	81830	900 226000548756	-	-	-	-	-
Stephens Lake	STL-A	10-Jun-18	NSC	81829	81830	900 226000548756	-	-	-	-	-
Nelson River (CL-GR)	GL-B	20-Aug-06	NSC	82606	82605	-	764	862	4445	-	-
Nelson River (CL-GR)	BR-D	26-Aug-06	NSC	82606	82605	-	753	847	4264	-	-
Nelson River (CL-GR)	BR-D	15-Jun-12	NSC	82606	82605	-	905	1005	7257	-	-
Nelson River (CL-GR)	BR-D	26-May-18	NSC	82606	82605	900 226000767069	990	1011	7711	-	-
Nelson River (CL-GR)	GL-B	26-Aug-06	NSC	82640	82641	-	653	741	2495	-	-
Nelson River (CL-GR)	GL-A	23-May-16	NSC	82640	82641	-	974	1092	7484	M	7
Nelson River (CL-GR)	BR-U	31-May-18	NSC	82640	82641	-	983	1104	6804	M	7
Nelson River (CL-GR)	BR-D	12-Sep-14	NSC	82831	-	900 226000629451	590	685	1850	-	-
Nelson River (CL-GR)	BR-D	12-Sep-15	NSC	82831	-	900 226000629451	624	725	2100	-	-
Nelson River (CL-GR)	BR-D	31-May-18	NSC	82831	-	900 226000629451	700	801	4581	-	-
Nelson River (CL-GR)	GL-B	02-Sep-06	NSC	82878	82879	-	766	844	3402	-	-
Nelson River (CL-GR)	BR-D	14-Jun-18	NSC	82878	82879	900 226000153196	990	1076	6622	-	-
Nelson River (CL-GR)	GL-A	03-Sep-06	NSC	82880	-	-	471	536	567	-	-
Nelson River (CL-GR)	GL-B	07-Jul-14	NSC	82880	-	900 226000629220	804	890	4050	-	-
Nelson River (CL-GR)	BR-D	14-Jun-18	NSC	82880	82881	900 226000629220	942	1053	6033	-	-
Nelson River (CL-GR)	GL-B	27-Sep-08	NSC	86139	-	-	523	588	1060	-	-
Nelson River (CL-GR)	BR-D	30-May-18	NSC	86139	-	-	925	1028	9480	-	-
Nelson River (CL-GR)	BR-D	12-Jun-18	NSC	86139	-	900 226000154090	-	-	-	-	-

Table A2-9: Tagging and biological information for Lake Sturgeon recaptured in the future Keeyask reservoir and Stephens Lake, spring 2018. Red highlighting indicates a mortality / local resource user harvest. Red font indicates that the tag number does not match any tagged Lake Sturgeon and may have been recorded incorrectly in the field. A Floy tag that was lost and fish was retagged in 2018 is indicated by an asterisk (continued).

Location	Zone	Date	Prefix	Floy Tag 1	Floy Tag 2	PIT Tag	Fork Length (mm)	Total Length (mm)	Weight (g)	Sex	Maturity
Nelson River (CL-GR)	GL-B	27-Sep-08	NSC	86140	-	-	644	739	1930	-	-
Stephens Lake	STL-A	01-Jun-18	NSC	86140	-	900 226000893314	950	1020	6078	-	-
Stephens Lake	STL-A	04-Jun-18	NSC	86140	-	900 226000893314	-	-	-	-	-
Stephens Lake	GR-A	05-Jun-10	NSC	87223	-	-	995	1110	-	-	-
Stephens Lake	GR-A	29-May-18	NSC	87223	-	900 226000893268	1210	1328	17010	-	-
Nelson River (CL-GR)	GL-B	24-Sep-10	NSC	87858	-	-	332	380	250	-	-
Nelson River (CL-GR)	GL-B	30-Jun-18	NSC	87858	-	900 226000628878	621	706	1450	-	-
Nelson River (CL-GR)	GL-B	29-Sep-10	NSC	87883	-	-	319	357	200	-	-
Nelson River (CL-GR)	GL-B	29-Jun-18	NSC	87883	-	900 226000629633	699	782	2450	-	-
Stephens Lake	STL-B	25-Sep-14	NSC	88478	-	900 226000629439	591	652	1500	-	-
Stephens Lake	STL-A	01-Jun-18	NSC	88478	-	900 226000629439	-	-	2860	-	-
Stephens Lake	STL-A	23-Sep-14	NSC	88490	-	900 226000629424	796	866	4900	-	-
Stephens Lake	STL-B	28-Jun-18	NSC	88490	-	900 226000629424	874	980	6100	-	-
Nelson River (CL-GR)	GL-B	19-Sep-11	NSC	88623	-	-	405	460	400		
Nelson River (CL-GR)	GL-B	12-Jun-18	NSC	88623	-	900 226000767034	729	821	2858	-	-
Stephens Lake	STL-B	26-Sep-10	NSC	88770	-	-	661	752	2460	-	-
Stephens Lake	GR-A	06-Jun-18	NSC	88770	-	900 226000152969	875	980	5579	-	-
Stephens Lake	GR-A	11-Jun-10	NSC	88788	-	-	730	823	3200	-	-
Stephens Lake	GR-A	10-Jun-11	NSC	88788	-	-	790	885	4536	-	-
Stephens Lake	STL-A	11-Jun-16	NSC	88788	-	900 226000548905	981	1093	8165	-	-
Stephens Lake	STL-A	01-Jun-18	NSC	88788	-	900 226000548905	1038	1154	9389	-	-
Stephens Lake	GR-A	09-Jun-18	NSC	88788	-	900 226000548905	-	-	-	-	-
Stephens Lake	STL-A	05-Jun-18	NSC	88788	-	900 226000548905	-	-	-	-	-

Table A2-10: Tagging and biological information for Lake Sturgeon recaptured in the future Keeyask reservoir and Stephens Lake, spring 2018. Red highlighting indicates a mortality / local resource user harvest. Red font indicates that the tag number does not match any tagged Lake Sturgeon and may have been recorded incorrectly in the field. A Floy tag that was lost and fish was retagged in 2018 is indicated by an asterisk (continued).

Location	Zone	Date	Prefix	Floy Tag 1	Floy Tag 2	PIT Tag	Fork Length (mm)	Total Length (mm)	Weight (g)	Sex	Maturity
Stephens Lake	STL-A	04-Jun-18	NSC	88788	-	900 226000548905	-	-	-	-	-
Stephens Lake	STL-A	01-Oct-11	NSC	89481	-	-	597	689	1950	-	-
Stephens Lake	STL-A	16-Jun-16	NSC	89481	-	-	784	890	4082	-	-
Stephens Lake	STL-A	30-May-18	NSC	89481	-	900 226000893352	866	981	4750	-	-
Nelson River (CL-GR)	GL-C	23-Sep-11	NSC	89821	-	-	525	593	1050	-	-
Nelson River (CL-GR)	GL-C	30-Aug-12	NSC	89821	-	-	560	624	1300	-	-
Nelson River (CL-GR)	GL-B	14-Sep-14	NSC	89821	-	900 226000768842	692	779	2940	-	-
Nelson River (CL-GR)	GL-C	12-Sep-17	NSC	89821	-	900 226000768842	709	804	2900	-	-
Nelson River (CL-GR)	GL-C	25-Jun-18	NSC	89821	-	900 226000768842	711	801	3402	-	-
Stephens Lake	STL-A	18-Sep-09	NSC	89858	-	-	579	660	-	-	-
Stephens Lake	STL-A	01-Jun-18	NSC	89858	-	900 226000893435	926	1036	6985	M	8
Stephens Lake	STL-B	30-Jun-18	NSC	89858	-	900 226000893435	-	-	-	-	-
Stephens Lake	GR-A	06-Jun-18	NSC	89858	-	900 226000893435	-	-	-	-	-
Stephens Lake	STL-A	24-Sep-11	NSC	91174	-	-	1070	1182	10886	-	-
Stephens Lake	STL-A	29-May-18	NSC	91174	-	900 226000893613	1246	1376	16964	-	-
Nelson River (CL-GR)	GL-A	25-Jun-14	NSC	91376	-	900 226000629127	783	896	3629	-	-
Nelson River (CL-GR)	BR-D	19-Jun-18	NSC	91376	-	900 226000629127	878	996	5851	-	-
Nelson River (CL-GR)	GL-B	27-Jun-14	NSC	91384	-	900 226000629210	758	855	3500	-	-
Nelson River (CL-GR)	GL-B	19-Jun-18	NSC	91384	-	900 226000629210	875	988	5307	-	-
Nelson River (CL-GR)	GL-B	29-Jun-14	NSC	91398	-	900 226000629068	655	720	2150	-	-
Nelson River (CL-GR)	GL-B	10-Jun-18	NSC	*	111979	900 226000629068	790	868	3992	-	-
Stephens Lake	STL-B	22-Jun-15	-	-	-	900 067000055109	241	279	75	-	-
Stephens Lake	STL-B	27-Jun-18	NSC	91528	-	900 067000055109	544	557	750	-	-

Table A2-11: Tagging and biological information for Lake Sturgeon recaptured in the future Keeyask reservoir and Stephens Lake, spring 2018. Red highlighting indicates a mortality / local resource user harvest. Red font indicates that the tag number does not match any tagged Lake Sturgeon and may have been recorded incorrectly in the field. A Floy tag that was lost and fish was retagged in 2018 is indicated by an asterisk (continued).

Location	Zone	Date	Prefix	Floy Tag 1	Floy Tag 2	PIT Tag	Fork Length (mm)	Total Length (mm)	Weight (g)	Sex	Maturity
Stephens Lake	STL-A	27-Sep-11	NSC	91701	-	-	464	538	725	-	-
Stephens Lake	STL-A	11-Jun-18	NSC	91701	-	900 226000768543	810	920	4100	-	-
Stephens Lake	STL-A	30-Sep-11	NSC	91713	-	-	391	445	475	-	-
Stephens Lake	STL-A	14-Jun-18	NSC	91713	-	900 226000768925	715	811	3100	-	-
Stephens Lake	STL-A	30-Sep-11	NSC	91717	-	-	467	529	875	-	-
Stephens Lake	STL-A	06-Jun-18	NSC	91717	-	900 226000152968	780	871	4375	-	-
Stephens Lake	STL-A	30-Sep-11	NSC	91719	-	-	453	515	725	-	-
Stephens Lake	STL-A	30-May-18	NSC	91719	-	900 226000893384	810	910	4025	-	-
Nelson River (CL-GR)	GL-B	20-Sep-11	NSC	93861	-	-	417	478	475		
Nelson River (CL-GR)	GL-C	25-Jun-18	NSC	93861	-	900 226000893280	758	853	2903	-	-
Nelson River (CL-GR)	GL-C	17-Jun-10	NSC	94023	-	-	760	850	4082	-	-
Nelson River (CL-GR)	BR-D	28-May-18	NSC	94023	-	900 226000893930	934	1018	7666	M	7
Nelson River (CL-GR)	GL-B	13-Jun-10	NSC	94048	-	-	646	715	2000	-	-
Nelson River (CL-GR)	GL-C	12-Jun-18	NSC	94048	-	900 226000767022	925	1040	5625	-	-
Nelson River (CL-GR)	BR-U	31-May-10	NSC	94085	-	-	950	999	4989	M	7
Stephens Lake	GR-A	01-Jun-18	NSC	94085	-	900 226000893423	999	1092	7394	M	8
Stephens Lake	STL-B	28-Sep-10	NSC	94238	-	-	349	392	310	-	-
Stephens Lake	STL-B	29-Sep-10	NSC	94238	-	-	-	-	-	-	-
Stephens Lake	STL-A	11-Jun-18	NSC	94238	-	-	712	801	3100	-	-
Stephens Lake	STL-B	29-Sep-10	NSC	94239	-	-	679	970	2300	-	-
Stephens Lake	STL-A	04-Jun-16	NSC	94239	-	900 226000548916	858	968	6350	-	-
Stephens Lake	STL-A	11-Jun-18	-	-	-	900 226000548916	925	1040	6425	M	9

Table A2-12: Tagging and biological information for Lake Sturgeon recaptured in the future Keeyask reservoir and Stephens Lake, spring 2018. Red highlighting indicates a mortality / local resource user harvest. Red font indicates that the tag number does not match any tagged Lake Sturgeon and may have been recorded incorrectly in the field. A Floy tag that was lost and fish was retagged in 2018 is indicated by an asterisk (continued).

Location	Zone	Date	Prefix	Floy Tag 1	Floy Tag 2	PIT Tag	Fork Length (mm)	Total Length (mm)	Weight (g)	Sex	Maturity
Stephens Lake	STL-A	14-Jun-12	NSC	94599	-	-	645	711	-	-	-
Stephens Lake	STL-A	04-Jun-18	NSC	94599	-	900 226000628373	830	932	5000	-	-
Stephens Lake	STL-A	21-Sep-12	NSC	94955	-	-	457	529	800	-	-
Stephens Lake	STL-A	01-Jun-18	NSC	94955	-	900 226000548813	742	858	3400	-	-
Stephens Lake	STL-A	20-Jun-18	NSC	94955	-	900 226000548813	-	-	-	-	-
Stephens Lake	STL-B	22-Sep-12	NSC	94959	-	-	540	814	1225	-	-
Stephens Lake	STL-A	30-May-18	NSC	94959	-	900 226000893942	741	833	3350	-	-
Stephens Lake	STL-B	27-Jun-18	NSC	94959	-	900 226000893942	-	-	-	-	-
Nelson River (CL-GR)	BR-D	14-Jun-18	NSC	96492	-	900 226000767036	1100	1192	10523	-	-
Nelson River (CL-GR)	GL-B	16-Sep-15	NSC	96515	-	-	595	679	1320	-	-
Nelson River (CL-GR)	GL-A	23-Jun-18	NSC	96515	-	900 226000120160	648	739	2223	-	-
Nelson River (CL-GR)	GL-B	16-Sep-15	NSC	96522	-	-	615	668	1920	-	-
Nelson River (CL-GR)	GL-B	10-Jun-18	NSC	96522	-	900 226000548526	691	768	2585	-	-
Nelson River (CL-GR)	GL-B	16-Sep-15	NSC	97337	-	-	539	600	1360	-	-
Nelson River (CL-GR)	GL-B	29-Jun-18	NSC	97337	-	900 226000703467	629	695	1850	-	-
Stephens Lake	STL-B	18-Sep-12	NSC	94968	-	-	487	564	900		
Stephens Lake	STL-A	01-Jun-18	NSC	94968	-	900 226000893323	745	855	3650	-	-
Stephens Lake	STL-B	22-Sep-12	NSC	100138	-	-	760	865	4050	-	-
Stephens Lake	GR-A	13-Jun-16	NSC	100138	-	900 226000548979	860	973	6804	-	-
Stephens Lake	STL-A	20-Jun-18	NSC	100138	-	900 226000548979	933	1010	6150	-	-
Stephens Lake	STL-B	23-Jun-18	NSC	100138	-	900 226000548979	-	-	-	-	-

Table A2-13: Tagging and biological information for Lake Sturgeon recaptured in the future Keeyask reservoir and Stephens Lake, spring 2018. Red highlighting indicates a mortality / local resource user harvest. Red font indicates that the tag number does not match any tagged Lake Sturgeon and may have been recorded incorrectly in the field. A Floy tag that was lost and fish was retagged in 2018 is indicated by an asterisk (continued).

Location	Zone	Date	Prefix	Floy Tag 1	Floy Tag 2	PIT Tag	Fork Length (mm)	Total Length (mm)	Weight (g)	Sex	Maturity
Stephens Lake	STL-B	22-Sep-12	NSC	100139	-	-	852	955	5225	-	-
Stephens Lake	STL-A	13-Jun-16	NSC	100139	-	900 226000548863	950	1056	7257	-	-
Stephens Lake	STL-A	04-Jun-18	NSC	100139	-	900 226000548863	996	1102	7893	-	-
Stephens Lake	GR-A	12-Jun-18	NSC	100139	-	900 226000548863	-	-	-	-	-
Stephens Lake	STL-B	22-Sep-12	NSC	100154	-	-	484	545	800	-	-
Stephens Lake	STL-A	11-Jun-18	NSC	100154	-	900 226000154051	786	868	4100	-	-
Nelson River (CL-GR)	BR-D	04-Jun-12	NSC	100412	-	-	1077	1191	11793	-	-
Nelson River (CL-GR)	BR-D	11-Jun-18	NSC	100412	-	900 226000153768	1215	1342	16874	-	-
Nelson River (CL-GR)	BR-D	15-Jun-12	NSC	100433	-	-	990	1100	7711	M	7
Nelson River (CL-GR)	BR-D	17-Jun-12	NSC	100433	-	-	-	-	-	-	-
Nelson River (CL-GR)	BR-D	23-Jun-12	NSC	100433	-	-	-	-	-	-	-
Nelson River (CL-GR)	BR-U	31-May-18	NSC	100433	-	-	1069	1204	9072	M	7
Nelson River (CL-GR)	BR-U	01-Jun-18	NSC	100433	-	-	-	-	-	-	-
Nelson River (CL-GR)	GL-C	15-Jun-12	NSC	100434	-	-	801	905	3629	-	-
Nelson River (CL-GR)	GL-C	17-Jun-18	NSC	100434	-	900 226000577090	951	1071	7167	-	-
Nelson River (CL-GR)	GL-C	15-Jun-12	NSC	100438	-	-	660	742	3175	-	-
Nelson River (CL-GR)	GL-C	30-Aug-12	NSC	100438	-	-	675	765	2400	-	-
Nelson River (CL-GR)	GL-C	16-Jun-18	NSC	100438	-	900 226000768939	876	975	5897	-	-
Nelson River (CL-GR)	GL-C	15-Jun-12	NSC	100447	-	-	402	460	400	-	-
Nelson River (CL-GR)	GL-C	24-Jun-18	NSC	100447	-	900 226000629658	730	815	2903	-	-
Nelson River (CL-GR)	GL-B	27-Jun-12	NSC	100454	-	-	1320	1440	23587	-	-
Nelson River (CL-GR)	GL-A	22-May-16	NSC	100454	-	-	1325	1460	24267	M	8
Nelson River (CL-GR)	GL-C	19-Jun-18	NSC	100454	-	900 226000767095	1339	1448	24131	-	-

Table A2-14: Tagging and biological information for Lake Sturgeon recaptured in the future Keeyask reservoir and Stephens Lake, spring 2018. Red highlighting indicates a mortality / local resource user harvest. Red font indicates that the tag number does not match any tagged Lake Sturgeon and may have been recorded incorrectly in the field. A Floy tag that was lost and fish was retagged in 2018 is indicated by an asterisk (continued).

Location	Zone	Date	Prefix	Floy Tag 1	Floy Tag 2	PIT Tag	Fork Length (mm)	Total Length (mm)	Weight (g)	Sex	Maturity
Nelson River (CL-GR)	GL-C	30-Aug-12	NSC	100475	-	-	480	562	800	-	-
Nelson River (CL-GR)	GL-C	18-Sep-15	NSC	100475	-	900 226000548726	585	675	1500	-	-
Nelson River (CL-GR)	GL-C	12-Jun-18	NSC	*	111994	900 226000548726	724	826	2585	-	-
Stephens Lake	STL-B	21-Sep-17	NSC	100651	-	900 226000893786	769	870	3850	-	-
Stephens Lake	STL-A	11-Jun-18	NSC	100651	-	900 226000893786	771	872	3350	-	-
Stephens Lake	STL-B	19-Sep-17	NSC	100655	-	900 226000768159	790	882	4425	-	-
Stephens Lake	STL-A	01-Jun-18	NSC	100655	-	900 226000768159	794	885	4050	-	-
Stephens Lake	STL-A	19-Sep-14	NSC	101039	-	900 226000629372	971	1052	8700		
Stephens Lake	STL-A	29-May-16	NSC	101039	-	900 226000629372	991	1100	7400	M	8
Stephens Lake	GR-A	03-Jun-16	NSC	101039	-	900 226000629372	-	-	-	-	-
Stephens Lake	GR-A	04-Jun-16	NSC	101039	-	900 226000629372	-	-	-	M	8
Stephens Lake	STL-A	01-Jun-18	NSC	101039	-	900 226000629372	1025	1136	8573	M	8
Stephens Lake	STL-A	08-Jun-18	NSC	101039	-	900 226000629372	-	-	-	M	9
Stephens Lake	STL-A	04-Jun-18	NSC	101039	-	900 226000629372	-	-	-	-	-
Nelson River (CL-GR)	GL-B	21-Jun-14	NSC	101381	-	900 226000629196	565	659	1400	-	-
Nelson River (CL-GR)	BR-D	11-Jun-18	NSC	101381	-	900 226000629196	746	852	3221	-	-
Nelson River (CL-GR)	GL-C	23-Jun-14	NSC	101385	-	900 226000629241	629	713	1800	-	-
Nelson River (CL-GR)	GL-B	26-Jun-18	NSC	101385	-	900 226000629241	795	895	3493	-	-
Stephens Lake	STL-B	26-Sep-15	NSC	101482	-	-	703	772	2450	-	-
Stephens Lake	STL-B	24-Jun-18	NSC	101482	-	900 226000703493	827	931	4400	-	-
Stephens Lake	STL-B	02-Oct-15	NSC	101500	-	900 226000628170	700	763	2400	-	-
Stephens Lake	STL-B	25-Jun-18	NSC	101500	-	900 226000628170	794	886	3800	-	-

Table A2-15: Tagging and biological information for Lake Sturgeon recaptured in the future Keeyask reservoir and Stephens Lake, spring 2018. Red highlighting indicates a mortality / local resource user harvest. Red font indicates that the tag number does not match any tagged Lake Sturgeon and may have been recorded incorrectly in the field. A Floy tag that was lost and fish was retagged in 2018 is indicated by an asterisk (continued).

Location	Zone	Date	Prefix	Floy Tag 1	Floy Tag 2	PIT Tag	Fork Length (mm)	Total Length (mm)	Weight (g)	Sex	Maturity
Stephens Lake	STL-A	24-Sep-15	NSC	101991	-	900 226000548980	759	817	3300	-	-
Stephens Lake	GR-A	24-Jun-18	NSC	101991	-	900 226000548980	850	957	4900	-	-
Nelson River (CL-GR)	GL-C	29-Aug-13	NSC	103123	-	-	572	650	1250	-	-
Nelson River (CL-GR)	GL-B	30-Jun-18	NSC	*	79411	900 226000893429	757	850	2700	-	-
Stephens Lake	STL-A	16-Sep-13	NSC	103230	-	-	755	842	-	-	-
Stephens Lake	STL-A	01-Jun-18	NSC	103230	-	900 226000893395	874	970	5307	-	-
Stephens Lake	STL-A	16-Sep-13	NSC	103231	-	-	610	699	1800	-	-
Stephens Lake	STL-B	15-Sep-17	NSC	103231	-	900 226000893914	835	941	5300		
Stephens Lake	STL-A	30-May-18	NSC	103231	-	900 226000893914	840	945	5150	-	-
Stephens Lake	STL-A	17-Sep-13	NSC	103237	-	-	500	571	1075	-	-
Stephens Lake	STL-A	21-Jun-18	NSC	103237	-	900 226000768666	711	811	3400	-	-
Stephens Lake	STL-A	21-Sep-13	NSC	103242	-	-	495	564	900	-	-
Stephens Lake	GR-A	11-Jun-18	NSC	103242	-	900 226000768911	711	802	3300	-	-
Stephens Lake	STL-A	22-Sep-13	NSC	103349	-	-	530	596	900	-	-
Stephens Lake	STL-A	01-Jun-18	NSC	103349	-	900 226000893488	715	796	2475	-	-
Nelson River (CL-GR)	GL-B	11-Sep-14	NSC	103456	-	900 226000629385	875	987	5750	-	-
Nelson River (CL-GR)	BR-D	18-Jun-18	NSC	103456	-	900 226000629385	926	1040	6622	-	-
Nelson River (CL-GR)	BR-D	09-Sep-14	NSC	103474	-	900 043000103670	655	741	2500	-	-
Nelson River (CL-GR)	BR-D	02-Jun-18	NSC	103474	-	900 043000103670	791	883	3674	-	-
Nelson River (CL-GR)	GL-B	07-Sep-12	NSC	103539	-	-	478	535	800	-	-
Nelson River (CL-GR)	GL-C	12-Sep-17	NSC	103539	-	900 226000767446	680	762	2400		
Nelson River (CL-GR)	GL-C	01-Jul-18	NSC	103539	-	900 226000767446	683	766	2450	-	-

Table A2-16: Tagging and biological information for Lake Sturgeon recaptured in the future Keeyask reservoir and Stephens Lake, spring 2018. Red highlighting indicates a mortality / local resource user harvest. Red font indicates that the tag number does not match any tagged Lake Sturgeon and may have been recorded incorrectly in the field. A Floy tag that was lost and fish was retagged in 2018 is indicated by an asterisk (continued).

Location	Zone	Date	Prefix	Floy Tag 1	Floy Tag 2	PIT Tag	Fork Length (mm)	Total Length (mm)	Weight (g)	Sex	Maturity
Nelson River (CL-GR)	GL-A	07-Sep-12	NSC	103543	-	-	428	486	560	-	-
Nelson River (CL-GR)	GL-A	09-Sep-12	NSC	103543	-	-	-	-	-	-	
Nelson River (CL-GR)	GL-A	19-Jun-18	NSC	103543	-	900 226000893251	658	753	1950	-	-
Stephens Lake	STL-B	15-Sep-12	NSC	103609	-	-	595	693	3000	-	-
Stephens Lake	STL-B	19-Sep-16	NSC	103609	-	900 226000768858	700	788	2960	-	-
Stephens Lake	STL-A	06-Jun-18	NSC	103609	-	900 226000768858	820	913	5200	-	-
Stephens Lake	STL-A	15-Sep-12	NSC	103613	-	-	620	710	2200	-	-
Stephens Lake	STL-A	11-Jun-18	NSC	103613	-	900 226000153946	808	910	4300	-	-
Stephens Lake	STL-B	17-Sep-12	NSC	103620	-	-	816	910	4050	-	-
Stephens Lake	STL-B	30-Jun-18	NSC	103620	-	900 226000767456	1075	1198	11022	-	-
Stephens Lake	STL-B	17-Sep-12	NSC	103622	-	-	800	896	4650	-	-
Stephens Lake	STL-A	28-May-18	NSC	103622	-	900 226000893438	972	1082	6396	-	-
Stephens Lake	GR-A	01-Jun-18	NSC	103622	-	900 226000893438	-	-	-	M	7
Stephens Lake	GR-A	07-Jun-18	NSC	103622	-	900 226000893438	-	-	-	-	-
Stephens Lake	GR-A	10-Jun-18	NSC	103622	-	900 226000893438	-	-	-	-	-
Stephens Lake	STL-A	17-Sep-12	NSC	103624	-	-	487	556	1050	-	-
Stephens Lake	STL-A	08-Jun-18	NSC	103624	-	900 226000152957	764	870	4100	-	-
Nelson River (CL-GR)	GL-B	08-Jul-14	NSC	103633	-	900 226000629000	878	961	6350	-	-
Stephens Lake	GR-A	07-Jun-18	NSC	103633	-	900 226000629000	946	1058	6700	-	-
Nelson River (CL-GR)	GL-C	05-Jul-14	NSC	103648	-	900 043000103868	609	667	1700	-	-
Nelson River (CL-GR)	GL-C	19-Jun-16	NSC	103648	-	900 043000103868	713	800	3402	-	-
Nelson River (CL-GR)	GL-C	12-Jun-18	NSC	103648	-	900 043000103868	792	885	3402	-	-

Table A2-17: Tagging and biological information for Lake Sturgeon recaptured in the future Keeyask reservoir and Stephens Lake, spring 2018. Red highlighting indicates a mortality / local resource user harvest. Red font indicates that the tag number does not match any tagged Lake Sturgeon and may have been recorded incorrectly in the field. A Floy tag that was lost and fish was retagged in 2018 is indicated by an asterisk (continued).

Location	Zone	Date	Prefix	Floy Tag 1	Floy Tag 2	PIT Tag	Fork Length (mm)	Total Length (mm)	Weight (g)	Sex	Maturity
Nelson River (CL-GR)	GL-A	05-Jul-14	NSC	105117	-	900 226000629229	998	1092	9979	-	-
Nelson River (CL-GR)	BR-D	08-Jun-18	NSC	105117	-	900 226000629229	1085	1210	12746	-	-
Nelson River (CL-GR)	BR-D	14-Jun-18	NSC	105117	-	900 226000629229	-	-	-	-	-
Nelson River (CL-GR)	GL-B	04-Jul-14	NSC	105122	-	900 226000629041	742	816	3350	-	-
Nelson River (CL-GR)	GL-C	22-Jun-18	NSC	105122	-	900 226000629041	870	980	5262	-	-
Nelson River (CL-GR)	BR-D	16-Jun-14	NSC	105407	-	900 226000629158	1640	3063	16783	-	-
Nelson River (CL-GR)	BR-D	17-Jun-18	NSC	105407	-	900 226000629158	1275	1393	18008	-	-
Nelson River (CL-GR)	BR-D	15-Jun-14	NSC	105409	-	900 226000629201	956	1063	7257	-	-
Nelson River (CL-GR)	BR-D	01-Jun-18	NSC	105409	-	900 226000629201	999	1141	9163	M	7
Nelson River (CL-GR)	BR-D	06-Jun-14	NSC	105424	-	-	970	1054	7711	-	-
Nelson River (CL-GR)	BR-D	10-Jun-14	NSC	105424	-	-	-	-	-	-	-
Nelson River (CL-GR)	BR-D	12-Jun-14	NSC	105424	-	-	-	-	-	-	-
Nelson River (CL-GR)	BR-D	14-Jun-14	NSC	105424	-	-	-	-	-	-	-
Stephens Lake	GR-A	02-Jun-18	NSC	105424	-	900 226000629084	1043	1146	8845	-	-
Stephens Lake	GR-A	04-Jun-18	NSC	105424	-	900 226000629084	-	-	-	-	-
Stephens Lake	STL-A	24-Jun-18	NSC	105424	-	900 226000629084	-	-	-	-	-
Nelson River (CL-GR)	GL-C	18-Jun-14	NSC	105480	-	-	843	951	4082	-	-
Nelson River (CL-GR)	GL-B	17-Sep-15	NSC	105480	-	900 226000629277	885	1001	4990	-	-
Nelson River (CL-GR)	GL-A	27-Jun-18	NSC	105480	-	900 226000629277	931	1050	6532	-	-
Nelson River (CL-GR)	GL-B	19-Jun-14	NSC	105487	-	900 226000629045	855	971	4990	-	-
Nelson River (CL-GR)	BR-D	20-Jun-18	NSC	105487	-	900 226000629045	980	1113	7893	-	-
Nelson River (CL-GR)	GL-C	09-Sep-17	NSC	106463	-	900 226000154225	700	800	2850	-	-
Nelson River (CL-GR)	GL-C	17-Jun-18	NSC	106463	-	900 226000154225	705	812	2585	-	-

Table A2-18: Tagging and biological information for Lake Sturgeon recaptured in the future Keeyask reservoir and Stephens Lake, spring 2018. Red highlighting indicates a mortality / local resource user harvest. Red font indicates that the tag number does not match any tagged Lake Sturgeon and may have been recorded incorrectly in the field. A Floy tag that was lost and fish was retagged in 2018 is indicated by an asterisk (continued).

Location	Zone	Date	Prefix	Floy Tag 1	Floy Tag 2	PIT Tag	Fork Length (mm)	Total Length (mm)	Weight (g)	Sex	Maturity
Nelson River (CL-GR)	GL-C	24-Jun-16	NSC	106980	-	900 226000153874	675	764	2495	-	-
Nelson River (CL-GR)	BR-D	30-May-18	NSC	106980	-	900 226000153874	770	872	3765	-	-
Nelson River (CL-GR)	GL-A	15-Jun-16	NSC	107113	-	900 226000768436	970	-	7257	-	-
Nelson River (CL-GR)	BR-D	15-Jun-18	NSC	107113	-	900 226000768436	1025	1137	8210	-	-
Nelson River (CL-GR)	GL-C	11-Jun-16	NSC	107129	-	900 226000768456	750	860	3402	-	-
Nelson River (CL-GR)	GL-C	21-Jun-18	NSC	107129	-	900 226000768456	802	905	3810	-	-
Nelson River (CL-GR)	GL-B	04-Jun-16	NSC	107216	-	900 226000768472	644	723	2268	-	-
Nelson River (CL-GR)	GL-B	30-Jun-18	NSC	107216	-	900 226000768472	720	802	2400	-	-
Nelson River (CL-GR)	GL-A	09-Jun-16	NSC	107229	-	900 226000153828	845	950	4536	-	-
Nelson River (CL-GR)	GL-A	11-Jun-18	NSC	107229	-	900 226000153828	886	994	5670	-	-
Nelson River (CL-GR)	BR-D	30-May-16	NSC	107238	-	900 226000768581	797	884	3175	-	-
Nelson River (CL-GR)	BR-D	02-Jun-18	NSC	107238	-	900 226000768581	853	952	5625	-	-
Nelson River (CL-GR)	GL-B	22-Jun-16	NSC	107706	-	900 226000153803	901	1025	6577	-	-
Nelson River (CL-GR)	GL-A	20-Jun-18	NSC	107706	-	900 226000153803	940	1055	7620	-	-
Stephens Lake	STL-A	26-May-16	NSC	110401	-	900 226000548793	880	1010	6804	M	7
Stephens Lake	STL-A	29-May-16	NSC	110401	-	900 226000548793	-	-	-	M	7
Stephens Lake	STL-A	05-Jun-16	NSC	110401	-	900 226000548793	-	-	-	-	-
Stephens Lake	STL-A	30-May-18	NSC	110401	-	900 226000548793	942	1072	6650	M	7
Stephens Lake	GR-A	14-Jun-18	NSC	110401	-	900 226000548793	-	-	-	-	-
Stephens Lake	GR-A	26-May-16	NSC	110403	-	900 226000548843	922	1046	6577	M	7
Stephens Lake	GR-A	01-Jun-18	NSC	110403	-	900 226000548843	972	1100	6622	M	8

Table A2-19: Tagging and biological information for Lake Sturgeon recaptured in the future Keeyask reservoir and Stephens Lake, spring 2018. Red highlighting indicates a mortality / local resource user harvest. Red font indicates that the tag number does not match any tagged Lake Sturgeon and may have been recorded incorrectly in the field. A Floy tag that was lost and fish was retagged in 2018 is indicated by an asterisk (continued).

Location	Zone	Date	Prefix	Floy Tag 1	Floy Tag 2	PIT Tag	Fork Length (mm)	Total Length (mm)	Weight (g)	Sex	Maturity
Stephens Lake	STL-A	27-May-16	NSC	110405	-	900 226000548930	809	918	3975	M	7
Stephens Lake	STL-A	28-May-16	NSC	110405	-	900 226000548930	-	-	-	-	-
Stephens Lake	STL-A	23-Jun-18	NSC	110405	-	900 226000548930	852	966	4200	-	-
Stephens Lake	STL-A	28-May-16	NSC	110408	-	900 226000548954	891	992	4763	-	-
Stephens Lake	STL-A	30-May-18	NSC	110408	-	900 226000548954	915	1020	5987	M	7
Stephens Lake	STL-A	28-May-16	NSC	110409	-	900 226000548770	909	1033	6350	-	-
Stephens Lake	STL-A	05-Jun-16	NSC	110409	-	900 226000548770	-	-	-	-	-
Stephens Lake	GR-A	01-Jun-18	NSC	110409	-	900 226000548770	964	1087	8664	-	-
Stephens Lake	STL-A	08-Jun-18	NSC	110409	-	900 226000548770	-	-	-	-	-
Stephens Lake	STL-A	29-Jun-18	NSC	110409	-	900 226000548770	-	-	-	-	-
Stephens Lake	STL-A	28-May-16	NSC	110411	-	900 226000548987	703	791	2525	-	-
Stephens Lake	GR-A	08-Jun-18	NSC	110411	-	900 226000548987	810	912	4250	-	-
Stephens Lake	GR-A	28-May-16	NSC	110413	-	900 226000548902	940	1051	6804	-	-
Stephens Lake	GR-A	02-Jun-16	NSC	110413	-	900 226000548902	-	-	-	-	-
Stephens Lake	GR-A	01-Jun-18	NSC	110413	-	900 226000548902	981	1092	7847	M	8
Stephens Lake	STL-A	07-Jun-18	NSC	110413	-	900 226000548902	-	-	-	M	9
Stephens Lake	STL-A	29-May-16	NSC	110414	-	900 226000548755	851	954	4763	-	-
Stephens Lake	STL-A	04-Jun-18	NSC	110414	-	900 226000548755	905	1016	6550	-	-
Stephens Lake	STL-A	29-May-16	NSC	110415	-	900 226000548750	1127	1234	14061	M	8
Stephens Lake	STL-A	01-Jun-18	NSC	110415	-	900 226000548750	1147	1250	13698	-	-
Stephens Lake	STL-A	07-Jun-18	NSC	110415	-	900 226000548750	-	-	-	M	8
Stephens Lake	STL-A	23-Jun-16	NSC	110461	-	900 226000548858	950	1070	9072	-	-
Stephens Lake	STL-A	29-May-18	NSC	110461	-	900 226000548858	1010	1132	8800	-	-

Table A2-20: Tagging and biological information for Lake Sturgeon recaptured in the future Keeyask reservoir and Stephens Lake, spring 2018. Red highlighting indicates a mortality / local resource user harvest. Red font indicates that the tag number does not match any tagged Lake Sturgeon and may have been recorded incorrectly in the field. A Floy tag that was lost and fish was retagged in 2018 is indicated by an asterisk (continued).

Location	Zone	Date	Prefix	Floy Tag 1	Floy Tag 2	PIT Tag	Fork Length (mm)	Total Length (mm)	Weight (g)	Sex	Maturity
Stephens Lake	STL-A	19-Jun-16	NSC	110465	-	900 226000548782	918	1015	6804	-	-
Stephens Lake	GR-A	06-Jun-18	NSC	110465	-	900 226000548782	980	1085	7666	-	-
Stephens Lake	STL-A	16-Jun-16	NSC	110470	-	-	1035	1140	9525	-	-
Stephens Lake	STL-A	29-May-18	NSC	110470	-	900 226000893439	1080	1182	9707	M	7
Nelson River (CL-GR)	BR-D	23-May-16	NSC	110528	110529	-	1000	1121	9299	M	7
Stephens Lake	STL-A	01-Jun-18	NSC	110528	110529	900 226000893470	1012	1135	6668	M	8
Stephens Lake	STL-B	18-Sep-16	NSC	110556	-	900 226000767140	722	814	2860	-	-
Stephens Lake	STL-A	12-Jun-18	NSC	110556	-	900 226000767140	777	876	3550	-	-
Stephens Lake	STL-A	15-Sep-16	NSC	110590	-	900 226000767128	665	760	2420	-	-
Stephens Lake	STL-A	19-Jun-18	NSC	110590	-	900 226000767128	727	828	3158	-	-
Stephens Lake	STL-A	14-Sep-16	NSC	110598	-	900 226000767182	660	751	2560	-	-
Stephens Lake	STL-A	12-Jun-18	NSC	110598	-	900 226000154043	705	795	3200	-	-
Stephens Lake	STL-A	14-Jun-18	NSC	110724	-	900 226000153814	812	895	4750	-	-
Stephens Lake	GR-A	22-Jun-18	NSC	110724	-	900 226000153814	-	-	-	-	-
Stephens Lake	STL-A	16-Sep-17	NSC	110776	-	900 226000153135	760	862	3525	-	-
Stephens Lake	STL-A	30-May-18	NSC	110776	-	900 226000153135	765	863	3325	-	-
Stephens Lake	STL-A	07-Jun-16	NSC	110981	-	900 226000548751	942	1058	7711	-	-
Stephens Lake	STL-A	04-Jun-18	NSC	110981	-	900 226000548751	1000	1120	8709	-	-
Stephens Lake	STL-A	08-Jun-16	NSC	110983	-	900 226000548951	933	1046	7257	-	-
Stephens Lake	STL-A	21-Jun-18	NSC	110983	-	900 226000548951	977	1096	7600	-	-
Stephens Lake	STL-A	10-Jun-16	NSC	110986	-	900 226000548912	886	998	6350	-	-
Stephens Lake	STL-A	29-May-18	NSC	110986	-	900 226000548912	942	1061	7620	-	-
Stephens Lake	STL-A	16-Jun-18	NSC	110986	-	900 226000548912	-	-	-	-	-

Table A2-21: Tagging and biological information for Lake Sturgeon recaptured in the future Keeyask reservoir and Stephens Lake, spring 2018. Red highlighting indicates a mortality / local resource user harvest. Red font indicates that the tag number does not match any tagged Lake Sturgeon and may have been recorded incorrectly in the field. A Floy tag that was lost and fish was retagged in 2018 is indicated by an asterisk (continued).

Location	Zone	Date	Prefix	Floy Tag 1	Floy Tag 2	PIT Tag	Fork Length (mm)	Total Length (mm)	Weight (g)	Sex	Maturity
Stephens Lake	STL-A	10-Jun-16	NSC	110989	-	900 226000548946	868	985	6350	-	-
Stephens Lake	STL-A	29-May-18	NSC	110989	-	900 226000548946	920	1044	6849	-	-
Stephens Lake	STL-B	28-Jun-18	NSC	110989	-	900 226000548946	-	-	-	-	-
Stephens Lake	STL-A	11-Jun-16	NSC	110993	-	900 226000548802	945	1060	7257	-	-
Stephens Lake	STL-A	04-Jun-18	NSC	110993	-	900 226000548802	778	1095	7200	-	-
Stephens Lake	STL-A	12-Jun-16	NSC	110995	-	900 226000548564	970	1068	7257	-	-
Stephens Lake	STL-A	01-Jun-18	NSC	110995	-	900 226000548564	1037	1134	8255	-	-
Stephens Lake	STL-A	11-Jun-18	NSC	110995	-	900 226000548564	-	-	-	-	-
Stephens Lake	STL-A	10-Sep-17	NSC	111051	-	900 226000893939	780	885	3600	-	-
Stephens Lake	STL-A	20-Jun-18	NSC	111051	-	900 226000893939	778	891	3600	-	-
Nelson River (CL-GR)	BR-D	26-May-18	NSC	111752	-	900 226000767045	940	1051	7847	-	-
Nelson River (CL-GR)	BR-D	14-Jun-18	NSC	111752	-	900 226000767045	-	-	-	-	-
Nelson River (CL-GR)	BR-D	28-May-18	NSC	111754	-	900 226000767027	901	1010	6985	-	-
Nelson River (CL-GR)	GL-B	09-Jun-18	NSC	111754	-	900 226000767027	-	-	-	-	-
Nelson River (CL-GR)	BR-D	29-May-18	NSC	111756	-	900 226000767004	904	1028	4717	-	-
Nelson River (CL-GR)	BR-D	31-May-18	NSC	111756	-	900 226000767004	-	-	-	-	-
Nelson River (CL-GR)	BR-D	29-May-18	NSC	111758	-	900 226000767044	1031	1152	11068	-	-
Nelson River (CL-GR)	BR-D	01-Jun-18	NSC	111758	-	900 226000767044	-	-	-	M	7
Nelson River (CL-GR)	BR-D	30-May-18	NSC	111764	-	900 226000767094	950	1042	9435	M	7
Nelson River (CL-GR)	BR-D	01-Jun-18	NSC	111764	-	900 226000767094	-	-	-	-	-
Nelson River (CL-GR)	BR-D	01-Jun-18	NSC	111771	-	900 226000767066	860	961	6577	M	7
Nelson River (CL-GR)	BR-D	07-Jun-18	NSC	111771	-	900 226000767066	-	-	-	-	-
Nelson River (CL-GR)	GL-A	11-Jun-18	NSC	111771	-	900 226000767066	-	-	-	-	-

Table A2-22: Tagging and biological information for Lake Sturgeon recaptured in the future Keeyask reservoir and Stephens Lake, spring 2018. Red highlighting indicates a mortality / local resource user harvest. Red font indicates that the tag number does not match any tagged Lake Sturgeon and may have been recorded incorrectly in the field. A Floy tag that was lost and fish was retagged in 2018 is indicated by an asterisk (continued).

Location	Zone	Date	Prefix	Floy Tag 1	Floy Tag 2	PIT Tag	Fork Length (mm)	Total Length (mm)	Weight (g)	Sex	Maturity
Nelson River (CL-GR)	BR-D	02-Jun-18	NSC	111773	-	900 226000767077	921	1053	9208	-	-
Nelson River (CL-GR)	BR-D	14-Jun-18	NSC	111773	-	900 226000767077	-	-	-	-	-
Nelson River (CL-GR)	GL-A	18-Jun-18	NSC	111901	-	900 226000768933	740	828	3221	-	-
Nelson River (CL-GR)	GL-A	22-Jun-18	NSC	111901	-	900 226000768933	-	-	-	-	-
Nelson River (CL-GR)	GL-C	19-Jun-18	NSC	111905	-	900 226000154226	773	885	3221	-	-
Nelson River (CL-GR)	GL-C	20-Jun-18	NSC	111905	-	900 226000154226	-	-	-	-	-
Nelson River (CL-GR)	GL-B	22-Jun-15	-	-	-	900 067000058429	243	286	92	-	-
Nelson River (CL-GR)	GL-C	12-Jun-18	NSC	111996	-	900 067000058429	443	514	318	-	-
Nelson River (CL-GR)	GL-B	22-Jun-15	-	-	-	900 067000055015	224	261	61	-	-
Nelson River (CL-GR)	GL-B	23-Jun-18	NSC	112282	-	900 067000055015	466	585	544	-	-
Stephens Lake	STL-B	21-Sep-17	NSC	112949	-	900 226000154234	753	835	3550	-	-
Stephens Lake	STL-B	30-Jun-18	NSC	112949	-	900 226000154234	750	830	3700	-	-
Stephens Lake	STL-A	10-Jun-16	NSC	110987	-	900 226000548762	890	1000	7257	-	-
Stephens Lake	GR-A	29-May-18	NSC	115232	-	900 226000548762	930	1036	6396	-	-
Stephens Lake	STL-A	01-Jun-18	NSC	115232	-	900 226000548762	-	-	-	-	-
Stephens Lake	GR-A	29-May-18	NSC	115728	-	900 226000893445	930	1032	7303	-	-
Stephens Lake	STL-A	30-May-18	NSC	115728	-	900 226000893445	-	-	-	-	-
Stephens Lake	GR-A	29-May-18	NSC	115730	-	900 226000893477	1110	1230	11022	-	-
Stephens Lake	GR-A	01-Jun-18	NSC	115730	-	900 226000893477	-	-	-	-	-
Stephens Lake	GR-A	30-May-18	NSC	115733	-	900 226000548923	836	948	5225	-	-
Stephens Lake	STL-A	14-Jun-18	NSC	115733	-	900 226000548923	-	-	-	-	-

Table A2-23: Tagging and biological information for Lake Sturgeon recaptured in the future Keeyask reservoir and Stephens Lake, spring 2018. Red highlighting indicates a mortality / local resource user harvest. Red font indicates that the tag number does not match any tagged Lake Sturgeon and may have been recorded incorrectly in the field. A Floy tag that was lost and fish was retagged in 2018 is indicated by an asterisk (continued).

Location	Zone	Date	Prefix	Floy Tag 1	Floy Tag 2	PIT Tag	Fork Length (mm)	Total Length (mm)	Weight (g)	Sex	Maturity
Stephens Lake	GR-A	30-May-18	NSC	115735	-	900 226000893372	830	933	5000	-	-
Stephens Lake	GR-A	02-Jun-18	NSC	115735	-	900 226000893372	-	-	-	-	-
Stephens Lake	STL-A	04-Jun-18	NSC	115735	-	900 226000893372	-	-	-	M	7
Stephens Lake	STL-A	30-May-18	NSC	115741	-	900 226000893345	1310	1440	21863	-	-
Stephens Lake	STL-A	18-Jun-18	NSC	115741	-	900 226000893345	-	-	-	-	-
Stephens Lake	STL-A	30-May-18	NSC	115743	-	900 226000893450	1075	1183	10387	-	-
Stephens Lake	STL-A	10-Jun-18	NSC	115743	-	900 226000893450	-	-	-	-	-
Stephens Lake	STL-A	13-Jun-18	NSC	115743	-	900 226000893450	-	-	-	-	-
Stephens Lake	STL-A	30-May-18	NSC	115745	-	900 226000893442	837	951	5625	-	-
Stephens Lake	STL-A	14-Jun-18	NSC	115745	-	900 226000893442	-	-	-	-	-
Stephens Lake	GR-A	30-May-18	NSC	115749	-	900 226000893277	1218	1342	16375	-	-
Stephens Lake	STL-A	15-Jun-18	NSC	115749	-	900 226000893277	-	-	-	-	-
Stephens Lake	GR-A	01-Jun-18	NSC	115751	-	900 226000152965	986	1095	6895	M	8
Stephens Lake	GR-A	05-Jun-18	NSC	115751	-	900 226000152965	-	-	-	-	-
Stephens Lake	GR-A	01-Jun-18	NSC	115752	-	900 226000893747	1000	1113	5715	M	8
Stephens Lake	STL-A	07-Jun-18	NSC	115752	-	900 226000893747	-	-	-	M	8
Stephens Lake	GR-A	01-Jun-18	NSC	115753	-	900 226000893258	1153	1262	16511	M	8
Stephens Lake	STL-A	05-Jun-18	NSC	115753	-	900 226000893258	-	-	-	-	-
Stephens Lake	STL-A	01-Jun-18	NSC	115763	-	900 226000152966	905	1021	6895	M	7
Stephens Lake	STL-A	04-Jun-18	NSC	115763	-	900 226000152966	-	-	-	M	7
Stephens Lake	STL-A	01-Jun-18	NSC	115768	-	900 226000893256	1099	1225	12338	-	-
Stephens Lake	STL-A	10-Jun-18	NSC	115768	-	900 226000893256	-	-	-	-	-

Table A2-24: Tagging and biological information for Lake Sturgeon recaptured in the future Keeyask reservoir and Stephens Lake, spring 2018. Red highlighting indicates a mortality / local resource user harvest. Red font indicates that the tag number does not match any tagged Lake Sturgeon and may have been recorded incorrectly in the field. A Floy tag that was lost and fish was retagged in 2018 is indicated by an asterisk (continued).

Location	Zone	Date	Prefix	Floy Tag 1	Floy Tag 2	PIT Tag	Fork Length (mm)	Total Length (mm)	Weight (g)	Sex	Maturity
Stephens Lake	STL-A	01-Jun-18	NSC	115770	-	900 226000152937	771	865	4125	-	-
Stephens Lake	GR-A	14-Jun-18	NSC	115770	-	900 226000152937	-	-	-	-	-
Stephens Lake	STL-A	01-Jun-18	NSC	115773	-	900 226000152936	1099	1226	11612	-	-
Stephens Lake	STL-A	10-Jun-18	NSC	115773	-	900 226000152936	-	-	-	-	-
Stephens Lake	GR-A	01-Jun-18	NSC	115776	-	900 226000152922	1025	1140	8890	-	-
Stephens Lake	GR-A	04-Jun-18	NSC	115776	-	900 226000152922	-	-	-	-	-
Stephens Lake	GR-A	01-Jun-18	NSC	115777	-	900 226000152946	946	1060	7121	-	-
Stephens Lake	STL-A	04-Jun-18	NSC	115777	-	900 226000152946	-	-	-	M	7
Stephens Lake	STL-B	22-Jun-15	-	-	-	900 067000055312	196	230	38	-	-
Stephens Lake	STL-A	04-Jun-18	NSC	115779	-	900 067000055312	476	550	-	-	-
Stephens Lake	STL-A	04-Jun-18	NSC	115781	-	900 226000152931	784	880	3650	-	-
Stephens Lake	STL-A	12-Jun-18	NSC	115781	-	900 226000152931	-	-	-	-	-
Stephens Lake	STL-A	04-Jun-18	NSC	115785	-	900 226000152909	1374	1580	23678	-	-
Stephens Lake	STL-A	14-Jun-18	NSC	115785	-	900 226000152909	-	-	-	-	-
Stephens Lake	STL-A	05-Jun-18	NSC	115792	-	900 226000152996	740	845	4650	-	-
Stephens Lake	STL-A	10-Jun-18	NSC	115792	-	900 226000152996	-	-	-	-	-
Stephens Lake	STL-A	09-Jun-18	NSC	115804	-	900 226000152984	810	900	4275	-	-
Stephens Lake	STL-A	20-Jun-18	NSC	115804	-	900 226000152984	-	-	-	-	-
Stephens Lake	STL-A	09-Jun-18	NSC	115806	-	900 226000152905	1000	1103	8754	-	-
Stephens Lake	STL-B	27-Jun-18	NSC	115806	-	900 226000152905	-	-	-	-	-
Stephens Lake	GR-A	09-Jun-18	NSC	115809	-	900 226000152923	1005	1111	8981	-	-
Stephens Lake	STL-A	14-Jun-18	NSC	115809	-	900 226000152923	-	-	-	-	-

Table A2-25: Tagging and biological information for Lake Sturgeon recaptured in the future Keeyask reservoir and Stephens Lake, spring 2018. Red highlighting indicates a mortality / local resource user harvest. Red font indicates that the tag number does not match any tagged Lake Sturgeon and may have been recorded incorrectly in the field. A Floy tag that was lost and fish was retagged in 2018 is indicated by an asterisk (continued).

Location	Zone	Date	Prefix	Floy Tag 1	Floy Tag 2	PIT Tag	Fork Length (mm)	Total Length (mm)	Weight (g)	Sex	Maturity
Stephens Lake	GR-A	09-Jun-18	NSC	115810	-	900 226000152992	1071	1195	11839	-	-
Stephens Lake	STL-A	12-Jun-18	NSC	115810	-	900 226000152992	-	-	-	-	-
Stephens Lake	STL-B	22-Jun-15	-	-	-	900 067000055189	223	269	61	-	-
Stephens Lake	STL-A	10-Jun-18	NSC	115814	-	900 067000055189	497	578	775	-	-
Stephens Lake	STL-B	22-Jun-15	-	-	-	900 067000055257	248	280	83	-	-
Stephens Lake	STL-A	10-Jun-18	NSC	115818	-	900 067000055257	473	542	550	-	-
Stephens Lake	GR-A	13-Jun-16	NSC	110996	-	900 226000548965	850	958	4536	-	-
Stephens Lake	STL-A	10-Jun-18	NSC	115821	-	900 226000548965	914	1028	6700	-	-
Stephens Lake	GR-A	10-Jun-18	NSC	115822	-	900 226000893797	960	1075	7666	-	-
Stephens Lake	GR-A	11-Jun-18	NSC	115822	-	900 226000893797	-	-	-	-	-
Stephens Lake	n/a	11-Jun-11	NSC	74412	-	-	362	429	-	-	-
Stephens Lake	STL-A	04-Jun-18	NSC	74412	-	900 226000152948	724	833	2700	-	-

APPENDIX 3: POPULATION ESTIMATE INFORMATION

Table A3-1: Results of POPAN analysis of adult Lake Sturgeon from the future Keeyask reservoir. Best model was constant survival and variable recapture. Confidence intervals are rounded......98
Table A3-2: Results of POPAN analysis of adult Lake Sturgeon from Stephens Lake. Best model was variable survival and variable recapture. Confidence intervals are rounded. 99

Mark-recapture population estimates have been calculated for the future Keeyask reservoir during the spring of 12 different years (1995, 2001-2004, 2006, 2008, 2010, 2012, 2014, 2016, and 2018) and for Stephens Lake during the spring of 11 different years (2001-2006, 2008, 2010-2012, 2014, 2016, and 2018). Lake Sturgeon were tagged in 1995 in Gull Lake by Manitoba Fisheries Branch and the Split Lake Resource Management Board. All data for the period 2001–2012 were collected annually as part of environmental studies related to the pre-Project environment, while data from 2014 until 2044 will be collected biennially as part of monitoring studies related to the Keeyask Project.

Only Lake Sturgeon classified as adults (*i.e.*, fork length equal to or greater than 800 mm) were included in the population estimate. Floy tag returns from local fishers were also included in the dataset to provide information on harvested Lake Sturgeon and to ensure that individuals harvested were removed from the tagged population. Between 2001 and 2012, 29 tags from Lake Sturgeon harvested in the Clark Lake to Gull Rapids reach were returned to North/South Consultants (Nelson and Barth 2012). Between 2012 and 2018, there were no reported tag returns from this section of the Nelson River, although field crews have observed resource harvesters in this reach. In 2018, two tags were harvested in Stephens Lake in 2018 and returned to North/South Consultants.

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 binary numbers to represent the encounter history of individuals, and then uses the cumulative pattern of 0's (not-encountered) and 1's (re-encountered live capture) to generate a probability distribution of tag recaptures which form the basis of population estimation. Re-encounters can also be from dead recoveries (*e.g.*, the animal is harvested) in which case the model uses a value of -1. For example, the history "10-1" indicates than an animal was captured for the first time at sampling occasion 1, not encountered at sampling occasion 2, and recovered dead at sampling occasion 3.

Several different population model variants exist, most of which can be classified as either closed or open models. Closed models assume there are no births, deaths, immigration, or emigration between sample periods, while open models assume these processes occur. Prior to 2014, a Robust Design (Kendall 2001) model was used to estimate the annual abundance of adult Lake Sturgeon (outlined in the AEMP). This model incorporates both open (*i.e.,* between sampling years) and closed (*i.e.*, pre- and post-spawning periods within a single year) population models. However, this model requires numerous assumptions, for example that the population is closed between the pre- and post- spawn sampling periods. Estimates may be confounded by variables such as spawning periodicity, inter-annual variation in environmental conditions and the timing of spawning (which was estimated based on water temperature), and harvest during the spawning period. Thus, after 2014, the Jolly-Seber model (POPAN formulation; Arnason and Schwarz 2002), as implemented within MARK, was used to estimate the annual abundance of adult Lake Sturgeon. This is an open model that requires fewer assumptions and modeled variables, and thus likely provides a more reliable estimate of abundance.

Using first-time capture and recapture information, POPAN estimates the survival (*i.e.,* the probability that a fish will survive from one capture to the next), the probability of recapture (p; *i.e.,* the probability that a fish will be recaptured given that the animal is alive and in the study area), and abundance (N; *i.e.,* the number of adult Lake Sturgeon in the area during each capture period) (Tables A3-1 and A3-3).

The model recommends how best to split the data for survival estimates.

- Model fit for survival in the future Keeyask reservoir was best using three time periods of fish capture corresponding to i) 1995–2001 (93% survival); ii) 2001–2004 (77% survival); and iii) 2004–2018 (91% survival). Survival rate within each time period was constant.
    - In the current study, time periods were split, not into pre- and post-construction periods, but into groups based on tag type and sampling periodicity to best fit the model. In 1995, the Manitoba Fisheries Branch and the Split Lake Resource Management Board tagged Lake Sturgeon capture in Gull Lake with Carlin tags, as opposed to Floy tags used in future studies. These were the only fish tagged in the area until 2001. Between 2001 and 2004, fish were sampled annually, while biennial studies were conducted between 2004 and 2018.
- Model fit for survival in Stephens Lake was best using two time periods of fish capture: 2001–2014 (86% survival) and 2014–2018 (94% survival). Survival rate within each time period was constant.
    - Between 2001 and 2014, fish were sampled opportunistically (*e.g.*, for acoustic tagging), while 2014–2018 marked the beginning of biennial studies.
- As more data is added to each model, the best fit for survival may change, and additional time periods may be added (even if sampling methods remain consistent). For example, should survival be very different in one year, the model may recommend that the data be divided.

The probability of recapture varied among years and locations.

- Recapture rates were split into four groups based on the model for the future Keeyask reservoir: i) 1995 had null recapture rates; ii) 2001, 2002, 2004, 2014, and 2018 had low recapture rates (0.09); iii) 2003, 2006, and 2016 had moderate recapture rates (0.17); and iv) 2008, 2010, and 2012 had high recapture rates (0.25).
- For Stephens Lake, recapture rates were split into seven groups: i) 1995 (null); ii) 2002, 2005, 2008 (0.03); iii) 2004, 2012, and 2014 (0.07); iv) 2011 (0.14); v) 2006 and 2016 (0.21); vi) 2003 (0.34); and vii) 2018 (0.59).

An abundance estimate is provided for each year sampling was conducted for both the future Keeyask reservoir and Stephens Lake. As sampling continues (*i.e.*, year to year) and data is added to the model, the parameters are recalculated. Thus, although survival rates and abundance estimates are calculated for the same time periods, they may differ among reporting periods. This allows the estimates to become more refined and precise over time.

References

Arnason, A.N. and Schwarz, C.J. 2002. POPAN-6: Exploring convergence and estimate properties with SIMULATE. Journal of Applied Statistics 29: 649–668.

Kendall, W.L. 2001. The robust design for capture-recapture studies: Analysis using Program MARK. In Wildlife, Land, and People: Priorities for the 21st Century. Proceedings of the Second International Wildlife Management Congress. Edited by R. Field, R.J. Warren, H. Okarma, and P.R. Sievert. The Wildlife Society, Bethesda, Maryland, USA. p. 350–356.

Nelson, P.A. and Barth, C.C. 2012. Lake Sturgeon population estimates in the Keeyask Study Area: 1995-2011. A report prepared for Manitoba Hydro by North/South Consultants Inc., December 2012. x + 36 pp.

White, G.C. and Burnham, K.P. 1999. Program MARK: Survival estimation from populations of marked animals. Bird Study 46 Supplement: p. 120–138.

Table A3-1: Results of POPAN analysis of adult Lake Sturgeon from the future Keeyask reservoir. Best model was constant survival and variable recapture. Confidence intervals are rounded.

Period	Mean	SE	95% Confidence Interval	
			Low	High
Survival (1995–2001)	0.93	0.03	0.84	0.97
Survival (2002–2004)	0.77	0.04	0.69	0.83
Survival (2006–2018)	0.91	0.01	0.89	0.93
1995 Recapture	1.00	0.20	0.00	1.00
2001, 2002, 2004, 2014, 2018 Recapture	0.09	0.01	0.07	0.12
2003, 2006, 2016 Recapture	0.17	0.02	0.15	0.21
2008, 2010, 2012 Recapture	0.25	0.02	0.21	0.30
1995	62	14	40	97
2001	568	62	459	702
2002	436	50	348	545
2003	488	53	396	603
2004	401	47	320	503
2006	716	71	589	870
2008	653	89	501	852
2010	778	110	591	1025
2012	855	121	648	1128
2014	802	83	654	982
2016	745	69	621	892
2018	820	80	678	991

Table A3-2: Results of POPAN analysis of adult Lake Sturgeon from Stephens Lake. Best model was variable survival and variable recapture. Confidence intervals are rounded.

Period	Mean	SE	95% Confidence Interval	
			Low	High
Survival (2001–2014)	0.86	0.03	0.80	0.90
Survival (2015–2018)	0.94	0.04	0.80	0.98
2001 Recapture	1.00	0.10	0.00	1.00
2002, 2005, 2008 Recapture	0.03	0.01	0.02	0.06
2004, 2012, 2014 Recapture	0.07	0.02	0.04	0.13
2011 Recapture	0.14	0.04	0.07	0.24
2006, 2016 Recapture	0.21	0.02	0.16	0.26
2003 Recapture	0.34	0.08	0.20	0.51
2018 Recapture	0.59	0.09	0.40	0.75
2001	24	5	16	37
2002	113	25	74	172
2003	97	21	63	148
2004	83	19	54	128
2005	191	31	138	263
2006	163	28	117	227
2008	120	23	82	173
2010	112	20	78	159
2011	96	19	65	140
2012	244	71	140	426
2014	216	62	125	374
2016	334	32	277	404
2018	296	46	218	401