



## Keeyask Generation Project Aquatic Effects Monitoring Plan

# Adult Lake Sturgeon Population Monitoring Report

AEMP-2022-05



# **KEEYASK GENERATION PROJECT**

## **AQUATIC EFFECTS MONITORING PLAN**

REPORT #AEMP-2022-05

### **ADULT LAKE STURGEON POPULATION MONITORING IN THE KEEYASK RESERVOIR AND STEPHENS LAKE, 2021**

Prepared for

Manitoba Hydro

By

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June 2022



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# 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.

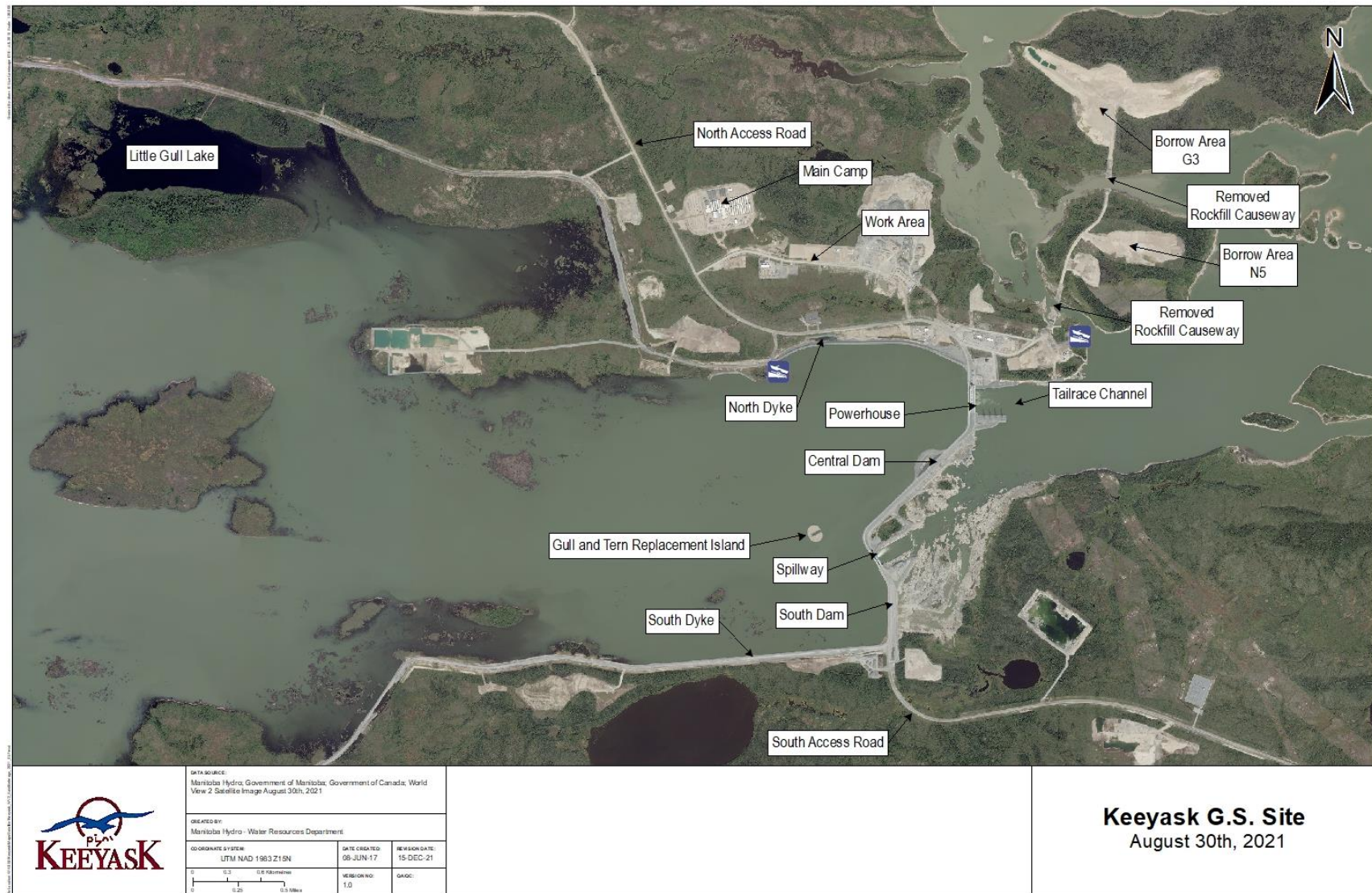
Construction of the Keeyask GS began in mid-July 2014 and instream work was completed in 2020. The reservoir was impounded with water levels being raised to full supply level between August 31 and September 5, 2020. Commissioning of the powerhouse turbines was initiated after impoundment and five of seven units were in service by fall 2021. During commissioning and as units came into service, substantial flows continued through the spillway until the summer of 2021 when more flow was going through the powerhouse than spillway. By mid-September the spillway was closed and barely used in the fall.

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:

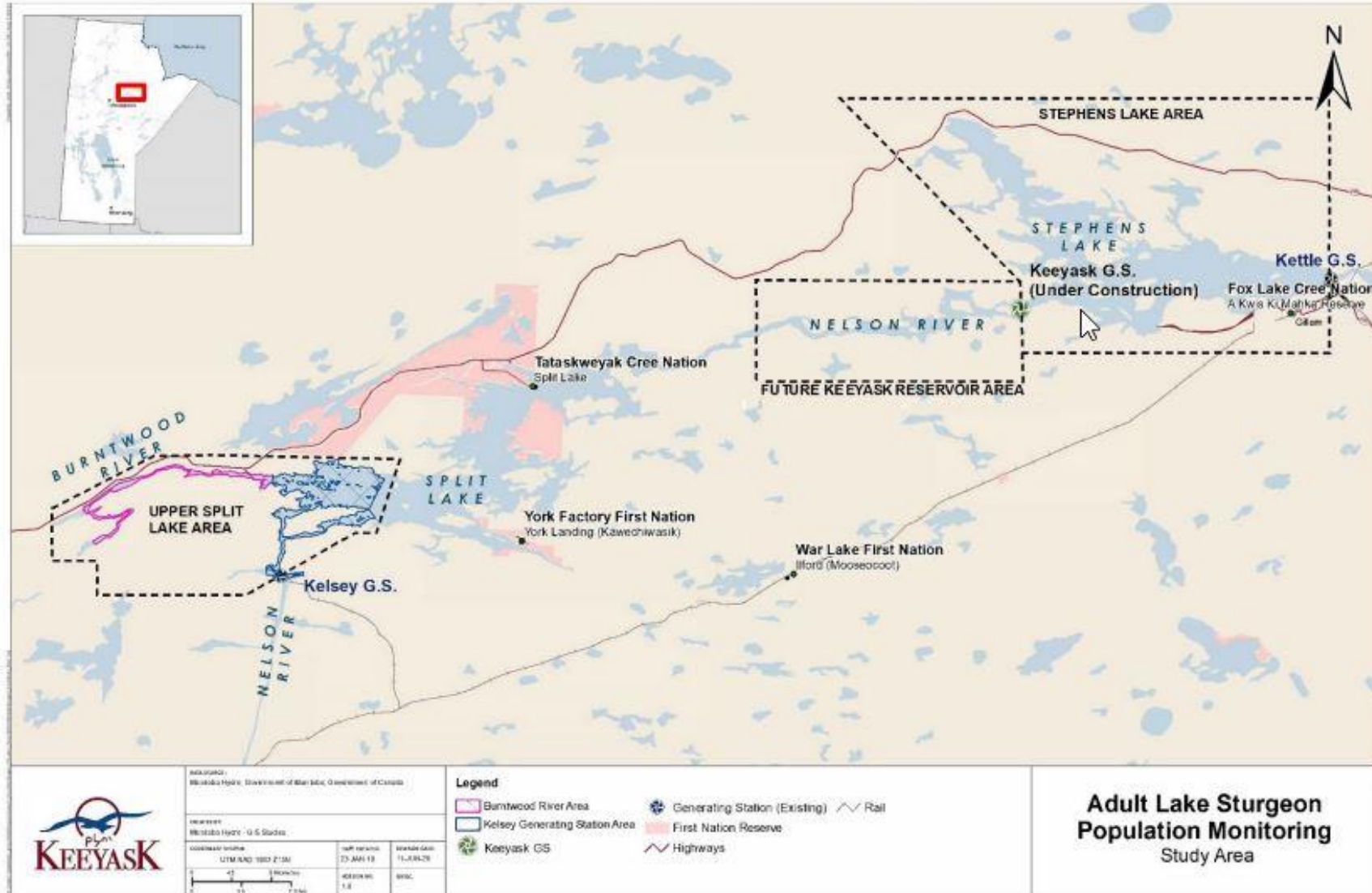
- Estimating the number of adults;
- Estimating the number and growth of juveniles (less than 800 millimetres [mm] in length);
- Identifying spawning locations and numbers of spawning fish; and
- Recording seasonal habitat use and long-distance movements (*i.e.*, over GS's or rapids) through movement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

This report presents results of adult Lake Sturgeon population monitoring, conducted in the Keeyask reservoir (*i.e.*, the Nelson River between Clark Lake and Gull Rapids/the Keeyask GS) and Stephens Lake (see study area map below), during spring, 2021.





**Map illustrating instream structures at the Keeyask Generating Station site, August 2021.**



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 Keeyask reservoir and Stephens Lake is being done to answer several questions:

*Is there a change in how many Lake Sturgeon are in the Keeyask reservoir and Stephens Lake?*

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 Keeyask reservoir and Stephens Lake?*

If the mortality rate increases, then steps would need to be taken to determine the cause and to develop a plan to stop further decreases in the population.

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

This question is important because natural spawning sites for adult Lake Sturgeon in Stephens Lake (at Gull Rapids) are no longer present after construction except when water is released via the spillway. Sturgeon will need to use new spawning habitat downstream of the tailrace. 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 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. 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.

*Are spawning adults present in the Keeyask reservoir and Stephens Lake?*

This question is important because if there are no spawning fish, recruitment will not happen and the populations will decrease. If this happens, we would need to try and find the cause (for example, if there is no suitable habitat for spawning).

*Where (on a coarse-scale) do Lake Sturgeon spawn in the post-Project environment?*

This question is important to ensure that there is suitable habitat for Lake Sturgeon spawning.



### What was done?

Sampling was conducted in the Keeyask reservoir and Stephens Lake from May 28 to July 3, 2021, 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 178 Lake Sturgeon were caught in the Keeyask reservoir in 2021. Most (119) were classified as adults because they measured 800 mm or longer. Of these, 71 were recaptures from previous gillnetting studies, two were hatchery-reared fish, four were previously tagged during TCN traditional knowledge studies, and 101 were newly-captured fish.

In Stephens Lake, 170 Lake Sturgeon were caught, 120 of which were classified as adults. Of these, 89 were recaptures from previous gillnetting studies, six were hatchery-reared fish, and 75 were newly-captured fish.

Spawning fish were caught in both the Keeyask reservoir and Stephens Lake. Nineteen spawning fish (including one female) were caught upstream and five (all males) were caught downstream of the GS. In the reservoir, confirmed spawning fish were captured in the vicinity of Birthday Rapids. In Stephens Lake, they were captured on the south shore downstream of the Keeyask GS spillway.

A computer model is used each study year to generate estimates of population size and survival for adult Lake Sturgeon. Until 2018, not enough Lake Sturgeon had been recaptured in Stephens Lake for the model to work, so 2021 was the second year an estimate was calculated. In 2021, the Keeyask reservoir population was estimated at 913 fish, which was comparable to the 2018 estimate. 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 2021 was estimated at 765 individuals. Survival in Stephens Lake was estimated at 97%, which is also high. Like the Keeyask reservoir, the estimate shows that the number of fish in Stephens Lake is increasing.

Overall catch-per-unit-effort (CPUE) in the Keeyask reservoir in 2021 (0.54 Lake Sturgeon/91.4 m net/24 h) was higher than in previous years (0.12–0.33 Lake Sturgeon). Similarly, the CPUE in Stephens Lake (0.64 Lake Sturgeon) was also higher than in any previous year (0.02–0.46 Lake Sturgeon).

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 both areas.



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

#### **What does it mean?**

The population estimate calculated for Lake Sturgeon in the Keeyask reservoir has been relatively stable since 2010, though numbers are greater than recorded since 2001. Similarly for Stephens Lake the population estimate indicates that numbers of adults are increasing over the long term. 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. Spawning fish were caught downstream of both Birthday Rapids and the Keeyask GS.

#### **What will be done next?**

Monitoring of adult Lake Sturgeon in the Keeyask reservoir and Stephens Lake will continue by sampling in spring every two years until 2044. Use of the same sampling approach will allow long-term comparisons of the numbers of adult Lake Sturgeon prior to construction, and during construction and operation.

# ACKNOWLEDGMENTS

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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: Grant Connell, Jason Beardy, Kelvin Kitchekeesik, Tyler Kitchekeesik, and Terry Kitchekeesik of TCN; Drayden Jobb, Ray Mayham, and Randy Naismith Jr. of FLCN; and Darren Chapman and Justin Spence of WLFN.

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 #08-2021.



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# 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 and the reservoir was impounded in early fall. In spring 2021, approximately one third of the units were commissioned so flow was passing through both the spillway and powerhouse.

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 (AESV)*. 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<sup>1</sup>.

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*

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<sup>1</sup> See the Fisheries Offsetting and Mitigation Plan for more information on the selection of stocking locations and the stocking plan.

*al.* 2018; Holm and Hrenchuk 2019; Ambrose *et al.* 2020). Studies focused on adults were conducted during alternate years among locations, i.e., alternating between the Upper Split Lake Area and in the Nelson River between Clark Lake and Gull Rapids/the Keeyask GS and Stephens Lake. 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 have also been used to develop adult abundance estimates for populations in all three areas.

Adult Lake Sturgeon population monitoring was scheduled to occur in spring 2020 within the future Keeyask reservoir and Stephens Lake; however, due to complications associated with conducting field work during the COVID-19 pandemic, monitoring was deferred to spring 2021. Therefore, data presented herein are the first collected in the area since 2018.

This report presents results of adult Lake Sturgeon population monitoring conducted in the Keeyask reservoir (i.e., the Nelson River between Clark Lake and the Keeyask GS [Map 2]) and in Stephens Lake (Map 3) in spring 2021 and compares these results to previous years. This is the fourth monitoring study conducted on adult Lake Sturgeon in Gull Lake, now the Keeyask reservoir, and in Stephens Lake since construction of the Project began in July 2014. Sampling in the reservoir in 2021 represents the first year of post-impoundment data and two additional key questions outlined in the AEMP can be addressed. Data collected during the field program are relevant to the adult population monitoring and movement monitoring programs. 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 Keeyask reservoir and Stephens Lake populations?
- Is there a biologically relevant (and statistically significant) change in survival for the 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?
- Are spawning adults present in the Keeyask reservoir and Stephens Lake?
- Where (on a coarse-scale) do Lake Sturgeon spawn in the post-Project environment?
- 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 (Small and Hrenchuk 2022).

## 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. Clark Lake is located immediately downstream of Split Lake, and approximately 42 km upstream of the Keeyask GS (formerly 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. The area between Clark Lake and the Keeyask GS is considered the Keeyask reservoir.

Birthday Rapids is located approximately 10 km downstream of Clark Lake and 30 km upstream of Gull Rapids/the Keeyask GS (Maps 1 and 2) and marks the upstream end of major water level changes as a result of impoundment by the Keeyask GS. The drop in elevation from the upstream to downstream side of Birthday Rapids was approximately 2 m prior to impoundment but is now a nearly level, albeit fast-flowing section of river. The 14 km reach of the Nelson River between Birthday Rapids and Gull Lake was characterized as a large and somewhat uniform channel with medium to high water velocities and a few large bays. This area is now within the Keeyask reservoir, though flooding was limited to mainly shoreline areas.

Prior to impoundment, Gull Lake was a widening of the Nelson River, with moderate to low water velocity beginning approximately 20 km upstream of Gull Rapids/the Keeyask GS. Water levels on Gull Lake increased by several metres following impoundment and flooding along the shoreline and small tributaries entering this reach was extensive. Although this area is now a portion of the Keeyask reservoir, it is referred to herein as Gull Lake.

Just below the Keeyask GS, the Nelson River enters Stephens Lake. Stephens Lake was formed in 1971 by construction of the Kettle GS. Construction of the Keeyask GS has altered the flow distribution immediately downstream of the station.

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 the Keeyask GS.

## 2.1 FLOWS, WATER LEVELS, AND KEEYASK OPERATIONS

From October 2020 to mid-June 2021 the calculated Split Lake outflow varied about the median flow of about 3,300 m<sup>3</sup>/s, ranging between about 3,000 m<sup>3</sup>/s and 3,900 m<sup>3</sup>/s. From mid-June to mid-August, the flows steadily decreased from about 3,700 m<sup>3</sup>/s to about 2,000 m<sup>3</sup>/s, which is approximately the 5th percentile low flow. Low flow conditions persisted from summer into winter, with flows dropping to a low of about 1,800 m<sup>3</sup>/s at the end of November 2021. These are the lowest flows that have occurred during Keeyask construction. It is not since 2005 that flows this low have occurred on the Nelson River.

Water levels on Gull Lake have been held steady between about 158.8-159 m since reservoir impoundment in September 2020. Upstream of Gull Lake at gauges below and above Birthday Rapids the levels were about 0.5 m and 2 m higher than on Gull Lake, a smaller difference than would have occurred prior to the project. Upstream levels increased about 3-4 m at these sites in winter due to ice effects as in previous years. Due to low flows in summer 2021 the water surface was relatively flat from Gull Lake to the gauge just upstream of Birthday Rapids, with a difference of only about 0.8-0.9 m between the two.

Keeyask is transitioning from a construction project to an operating station (Map 4). In 2021, the work at site has been focused on bringing units into service. By the end of April 2021, prior to the start of aquatic monitoring, Unit 1 and Unit 2 were in service. Throughout the open water period more units were being tested and brought into service one at a time. As units came into service, the distribution of flow between the spillway and powerhouse has gradually shifted, as summarized below. By the end of October 2021 five units were fully in service.

Discharges from the spillway and powerhouse are not measured but have been estimated based on performance design curves. For reference it is noted that the design discharge capacity of the powerhouse is 4,000 m<sup>3</sup>/s, giving each turbine unit a discharge capacity of approximately 570 m<sup>3</sup>/s.



Table below outlines Keeyask GS operation, including powerhouse and spillway flows, in 2021.

Dates	Powerhouse Units	Spillway Gate Operation	Powerhouse	Spillway	Keeyask Total
			Discharge (m <sup>3</sup> /s)		
End Apr. - end June 2021	Unit 2 online; Unit 3 testing	Gates 1, 2, 3, 5, 7 in use until mid-June. Gates 1, 3, 5, 7 primarily mid- to end-June.	Steady at about 1,100 varying down to 600 on a few intermittent days and up to 1,650 during two weeks of Unit 3 testing.	Generally, 2,200-2,800 except during Unit 3 testing it varied from about 1,400-2,400.	Generally, 3,400-3,900 except during Unit 3 testing it varied from 2,600-3,600.
End June – mid-Sept. 2021	Unit 3 online; Unit 5 testing	Generally, Gates 1,3, 5, 7 until mid-July. Gates 3, 5, 7 until end of July. Various gates used in Aug. Gates 1 and 7 used in Sept. until closure of all gates on Sept. 11.	About 1,650, but reduced to 1,100 for two weeks with a unit shut down and varying up to 2,100 during two weeks of Unit 5 testing.	From end of June to mid-Aug. Nelson R inflow declined from about 3,600 to about 1,800-2,200 and has remained steady around 2,000-2,200 since then – corresponding spillway discharge gradually declined from about 2,400 to 0 by mid-Sept. when Unit 5 came into service, although daily variations of +/- 200-400 or more in a few instances occurred during this time.	Total Keeyask discharge declined from about 3,600 to an average of about 2,000-2,200 corresponding to the decrease in Nelson R inflow, and daily variation of about +/- 200-400 depending on spillway and powerhouse operations.
Mid-Sept. – end Oct. 2021	Unit 5 online; Unit 4 testing; Unit 4 online Oct. 25	Various gates used very sporadically. First reopening on Sept. 28.	Average discharge about 2,000-2,200 with typical daily variation from 1,600-2,200 and a maximum variation between 1,000-2,800 depending on unit operations and Unit 4 testing.	No spillway flow except for a few intermittent days of up to 1,000.	Same as powerhouse.

## 3.0 METHODS

### 3.1 GILLNETTING

Large mesh gill nets were used to capture adult ( $\geq 800$  mm fork length) Lake Sturgeon in the Keeyask reservoir and in Stephens Lake. Gillnetting occurred from May 28 to July 3, 2021 in the Keeyask reservoir and from May 30 to July 3, 2021 in Stephens Lake.

Gill net gangs consisted of four 100 yd (91.4 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. Gill nets were checked approximately every 24 hours, weather permitting. At each gillnetting site, UTM coordinates were taken using a handheld GPS unit (Garmin Limited, Olathe, Kansas).

Water temperature was measured daily using a handheld thermometer ( $\pm 0.5^\circ\text{C}$ ). HOBO Water Temperature Pro data loggers ( $\pm 0.2^\circ\text{C}$ ), set approximately 1 m off the substrate were also used to log water temperature at 6-hour intervals.

Captured Lake Sturgeon were measured for fork length (FL) and total length (TL;  $\pm 1$  cm), weighed (with a digital handheld hanging scale, handheld conventional scale, or pan scale  $\pm 25$  g), and externally marked with an individually numbered plastic Floy-FD-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., Barsinghausen, 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)

2 – maturing to spawn (pre-spawn)

3 – ripe

4 – spent (post-spawn)

#### Male (M)

7 – maturing to spawn (pre-spawn)

8 – ripe

9 – spent (post-spawn)

Species other than Lake Sturgeon captured in the gill nets were measured for FL, 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 with FL measuring 800 mm or greater). Mesh sizes are used to target large Lake Sturgeon, but smaller fish are also captured. Inclusion of 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 three years of monitoring data (2016, 2018, and 2021), by FL interval, using Mann-Whitney U-tests in XLSTAT (Addinsoft 2006). Significance was determined using a p-value of 0.05. Although 2021 represents the first year of post-impoundment monitoring in the Keeyask reservoir, results with respect to condition factor reflect conditions during the construction phase.

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:

$$\text{Log}_{10}(W) = \text{Log}_{10}(a) + b \cdot \text{Log}_{10}(L)$$

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 91.4 m (50 yd; the standard length of adult Lake Sturgeon nets) of net per 24-hour period using the following formula:

$$\text{CPUE} = \Sigma \# \text{ Lake Sturgeon} / \Sigma \text{ gillnetting hours} \times 24 \text{ h} / \text{length of gill net used} \times 91.4 \text{ m}$$

Where:

$\Sigma$  = sum of the number of fish or gillnetting hours at all sites.

Lake Sturgeon that were tagged in a previous year and recaptured in 2021 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 Keeyask reservoir based on data collected during spring from 13 different years (1995, 2001-2004, 2006, 2008, 2010, 2012, 2014, 2016, 2018 and 2021). For Stephens Lake, 2021 was the second year during which sufficient numbers of fish were re-captured that mark-recapture population estimates could be calculated. Given that encounter histories were developed for these fish, estimates were calculated for the spring in all the years that sturgeon gillnetting studies were conducted in Stephens Lake (2001-2006, 2008, 2010-2012, 2014, 2016, 2018 and 2021). However, estimates from years prior to 2018 are associated with a higher degree of uncertainty due to the small numbers of fish captured. 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 are collected biennially as part of monitoring studies related to the Keeyask GS project.

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 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 Keeyask reservoir, survival was estimated as follows:

- Model recommendation: 1995–2001, 2001–2004, 2004–2021; and
- Pre-construction (2004–2014) and construction (2015–2021).

For Stephens Lake, survival was estimated as follows:

- Model recommendation: 2001–2013 and 2014–2021; and
- Pre-construction (2001–2014) and construction (2015–2021).

In order to track short-term trends in population size, current-year estimates were compared to those from the previous one (*i.e.*, 2018) and two (*i.e.*, 2016) sampling periods. A statistically significant change was determined as an increase beyond the 95<sup>th</sup> percentile or a decrease below the 5<sup>th</sup> percentile (*e.g.*, if the 2021 estimate was greater than the 95<sup>th</sup> percentile from the 2018 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 Keeyask reservoir to Stephens Lake prior to the spring sampling period were removed from upstream analysis and added to Stephens Lake.

Detailed methods for the population estimation can be found in Appendix 3.



## 4.0 RESULTS

In total, 370 individual fish, comprised of six species, were captured in large mesh gill nets set in the Nelson River downstream of Clark Lake and in Stephens Lake during spring 2021 (Table 1; Maps 2 and 3). Of these, 348 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 KEEYASK RESERVOIR

#### 4.1.1 RELATIVE ABUNDANCE/CPUE

Gill nets were set at 61 sites between Clark Lake and the Keeyask GS between May 28 and July 3, 2021 (Table 2; Map 2). Despite reservoir impoundment, gill nets were generally set in the same areas as in previous years. Water temperature increased from 5.2 to 17.5°C over the duration of the study (Figure 1). A total of 195 fish were captured, the majority of which ( $n = 178$ ; 91%) were Lake Sturgeon (Table 1). No Lake Sturgeon mortalities occurred during sampling.

In total, 178 Lake Sturgeon were captured in 7,911 gill net hours, resulting in an overall CPUE of 0.54 LKST/91.4 m net/24 h (Table 2). Site-specific CPUEs ranged from 0.0–3.3 LKST/91.4 m net/24 h. Gillnetting effort was highest in Zone BR-D (the reach of the Nelson River downstream of Birthday Rapids), at 5,445 hours, followed by Zone GL-B (1,179 hours), Zone GL-A (740 hours), Zone GL-C (450 hours), and Zone BR-U (95 hours) (Map 2; Table 3). Overall CPUE by zone was:

- BR-U = 0.00 LKST/91.4 m net/24 h;
- BR-D = 0.68 LKST/91.4 m net/24 h;
- GL-A = 0.32 LKST/91.4 m net/24 h;
- GL-B = 0.20 LKST/91.4 m net/24 h; and
- GL-C = 0.21 LKST/91.4 m net/24 h.

The first Lake Sturgeon was captured on May 30, when the water temperature measured 6.8°C, and the last Lake Sturgeon was captured on the final day of sampling on July 3, when the water temperature measured 17.5°C (Figure 1; Appendix 1).

#### 4.1.2 BIOLOGICAL METRICS

Lake Sturgeon captured had a mean fork length of 908 mm (range: 401–1,435 mm), a mean weight of 6,892 g (range: 450–27,216 g), and a mean condition factor of 0.82 (range: 0.61–1.54) (Table 4). Five fish were unintentionally released prior to being measured. Of the 173 Lake

Sturgeon measured, 119 were considered adults (FL  $\geq$  800 mm) and 54 were considered juveniles (FL < 800 mm). Lake Sturgeon in the 750–799 mm FL interval were captured most frequently (n = 34), making up 20% of the total and 63% of the juvenile Lake Sturgeon catch (Figure 2). Sturgeon in the 800–849 mm FL interval were the next most frequent (n = 20), accounting for 12% of the total catch and 17% of the adult catch (Figure 2).

Mean condition factor of adult Lake Sturgeon did not differ significantly between baseline (2001–2014) and construction (2016, 2018, and 2021) for any of the 10 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 confirmed for 20 individuals, including 1 ripe female, 14 pre-spawn males, and 5 ripe males (Table 6). All of the spawners were captured in Zone BR-D (Map 2). Five mature fish (Floy tag #120802 [female], #106985 [male], #117038 [male], #117037 [male], #117047 [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.* (2022).

### 4.1.3 MOVEMENTS

Of the 178 Lake Sturgeon captured in the Keeyask reservoir, 71 were recaptures from previous gillnetting studies, two were hatchery-reared fish, four were previously tagged during TCN traditional knowledge studies, and 101 were untagged fish. Floy and PIT tags were applied to 99 newly captured fish; two were released prior to being tagged (Appendix 1).

In total, 40% (71 of 178) Lake Sturgeon were recaptures from previous gillnetting studies (Table 7). Biological and previous capture information for previously tagged Lake Sturgeon are provided in Appendix 2 and are summarized below:

- Sixty-nine fish were originally tagged in the reach of the Nelson River between Birthday Rapids and Gull Rapids (now the Keeyask GS);
- One was originally tagged upstream of Birthday Rapids in 2001 and was recaptured immediately downstream in 2021; and
- One was originally tagged in Stephens Lake in 2011. It was recaptured in Gull Lake in 2016. In 2021 it was captured immediately downstream of Birthday Rapids.

### 4.1.4 POPULATION ESTIMATION

The population estimate for adult Lake Sturgeon (measuring  $\geq$  800 mm FL) in the Keeyask reservoir in 2021 was 913 individuals (95% CI: 673–1,239), which is similar to previous years (Figure 5; Table A3-1). The estimated annual survival (2004–2021) was 91%. The annual population growth rate ( $\lambda$ ) fluctuated greatly between 2001 and 2010 (between 8.5 and

74.0% annual change), but only ranged from 0.2 to 9.3% change between 2012 and 2021. This indicates a relatively stable population (Figure 6).

There was no significant difference in mean population abundance between 2016, 2018, and 2021 (Figure 7). Overall, abundance estimates calculated between 1995 and 2021 show a significant increasing trend ( $r^2 = 0.77$ ,  $F = 37.59$ ,  $p = <0.001$ ) (Figure 8).

## 4.2 STEPHENS LAKE

### 4.2.1 RELATIVE ABUNDANCE/CPUE

Large mesh gill nets were set at 72 sites in Stephens Lake between May 30 and July 3 (Table 2; Map 3). Water temperature ranged from 5.9 to 17.5°C during this time (Figure 1). A total of 175 fish, comprised of three fish species, were captured, the majority of which (97%) were Lake Sturgeon (Table 1). No Lake Sturgeon mortalities occurred during sampling.

In total, 170 Lake Sturgeon were captured in 6,382 gill net hours, resulting in an overall CPUE of 0.64 LKST/91.4 m net/24 h (Table 2). Gillnetting effort was considerably higher in Zone STL-A (4,885 gill net hours) compared to Zones GR-A (974 hours) and STL-B (523 hours) (Map 3; Table 3). However, the relative effort in each zone is similar to previous years. Overall CPUE by zone was:

- GR-A = 0.22 LKST/91.4 m net/24 h;
- STL-A = 0.76 LKST/91.4 m net/24 h; and
- STL-B = 0.28 LKST/91.4 m net/24 h.

The first Lake Sturgeon was captured on May 31 at a water temperature of 6.5°C, and the last on July 3 at a water temperature of 17.5°C (Figure 9; Appendix 1).

### 4.2.2 BIOLOGICAL METRICS

Lake Sturgeon captured in the Stephens Lake Area had a mean FL of 837 mm (range: 335–1,480 mm), a mean weight of 6,717 g (range: 250–29,000 g), and a mean condition factor of 0.97 (range: 0.64–1.77) (Table 5). Of the 170 Lake Sturgeon captured, 120 were classified as adults (FL  $\geq$  800 mm) and 50 were classified as juveniles (FL < 800 mm). Lake Sturgeon in the 850–899 and 800–849 mm FL intervals were captured most frequently ( $n = 28$  and  $26$ , respectively), comprising a combined 32% of the total and 45% of the adult Lake Sturgeon catch (Figure 10). Most (24%) of the 50 juvenile fish (FL < 800 mm) captured were in the 750–799 mm intervals ( $n = 12$ ).

Mean condition factor of adult Lake Sturgeon did not differ significantly between baseline (2001–2014) and construction (2016, 2018, and 2021) for any of the four FL intervals for which

comparisons were possible (Mann Whitney U test,  $p > 0.05$ ; Figure 11). The length-weight relationship is presented in Figure 12.

Sex and maturity were confirmed for five individuals, all of which were identified as pre-spawning males (Table 6). The males were all captured along the south shore in Zone STL-A (Map 3) between May 31 and June 5, when the water temperature measured approximately 8°C (Figure 9).

### 4.2.3 MOVEMENTS

Of the 170 Lake Sturgeon captured in Stephens Lake, 89 were recaptures from previous gillnetting studies, six were hatchery-reared fish, and 75 were newly-captured fish. Floy and PIT tags were applied to 70 newly-captured fish; five were released prior to being tagged (Appendix 1).

In total, 52% of Lake Sturgeon were recaptures from previous gillnetting studies ( $n = 89$ ) (Table 8). Biological and previous capture information for previously tagged Lake Sturgeon are provided in Appendix 2 and are summarized below:

- Eighty-three were originally tagged in Stephens Lake between 2001 and 2020.
  - One Lake Sturgeon (Floy tag #46827) was tagged downstream of Gull Rapids in 2001, then was recaptured in the Nelson River downstream of Birthday Rapids in late June 2003 and was later recaptured downstream of Gull Rapids/Keeyask GS in early June 2016, 2018, and 2021.
- Six were originally tagged upstream of Gull Rapids/the Keeyask GS.
  - Floy tags #47181, #50808, #80114, #101449, #109998, and #109999 were tagged in Gull Lake (now the Keeyask reservoir) between 2001 and 2016.
    - Two were captured in Stephens Lake for the first time since tagging while four were captured in Stephens Lake in previous years.

### 4.2.4 POPULATION ESTIMATION

The 2021 population estimate for adult Lake Sturgeon (measuring  $\geq 800$  mm FL) in Stephens Lake was 765 individuals (CI 95%: 550–1,063) (Figure 13: Adult Lake Sturgeon abundance estimates based on POPAN best model for Stephens Lake (2001–2021)). **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 black dots represent the minimum and maximum estimates, and the vertical bar lines represent the upper and lower 95% confidence intervals.**

13; Table A3-2). The annual survival estimate (2014–2021) was 97%. The annual population growth rate ( $\lambda$ ) has continued to fluctuate, showing a 27% increase between 2018 and 2021 (Figure 14).

Overall, there was a significant increase in the estimated mean abundance of Lake Sturgeon in Stephens Lake compared to 2016 and 2018 (Figure 15). The 2021 population estimate showed an increase of 69% from 2016 and 80% from 2018. Abundance estimates between 2001 and 2021 show a significant increasing trend ( $r^2 = 0.80$ ,  $F = 45.06$ ,  $p = <0.0001$ ) (Figure 16).



## 5.0 DISCUSSION

The main objective of long-term adult Lake Sturgeon population monitoring in the Keeyask reservoir and Stephens Lake is to identify potential changes in abundance and condition factor during construction and operation of the Project. Continued monitoring will aid in identifying long-term trends in the size of the adult population as well as the influence of stocking, which was initiated in 2014. Data collection in 2021 represents the first adult Lake Sturgeon population monitoring data collected since impoundment of the Keeyask GS reservoir in fall 2020. 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 every two years. Adult Lake Sturgeon population monitoring was scheduled to occur in spring 2020 in Gull and Stephens lakes; however, due to complications associated with conducting field work during the COVID-19 pandemic, monitoring was deferred to spring 2021. Therefore, three years have elapsed since the last adult Lake Sturgeon population monitoring in this area.

Results suggest that the mark-recapture methodology is performing well for estimating Lake Sturgeon abundance. Population estimates have remained relatively stable, and large numbers of outliers (*i.e.*, large unexplained increases in untagged fish) have not been observed. Sufficient tags have now been applied to Lake Sturgeon in Stephens Lake to produce an abundance estimate. One tag from a Lake Sturgeon in Stephens Lake was returned by a local resource user in 2021. The inclusion of this tag 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

In the short-term (2016, 2018, and 2021 data sets), Lake Sturgeon abundance in the Keeyask reservoir has remained stable with no statistically significant change. The long-term trajectory between 2001 and 2021 shows a significant increasing trend over time. Overall abundance estimates calculated between 2001 and 2021 in Stephens Lake show a significant increasing trend over time. In the short-term, the 2021 population estimate for Stephens Lake was significantly higher than either the 2016 or 2018 estimates.

This increasing trend is also reflected in the CPUE of fish captured in both sampling locations. Overall CPUE in the Keeyask reservoir in 2021 (0.54 Lake Sturgeon/91.4 m net/24 h) was higher than in any previous year since sampling began in 2001 (0.12–0.33 Lake Sturgeon). Similarly,

the CPUE in Stephens Lake (0.64 Lake Sturgeon) was also higher than in any previous year (0.02–0.46 Lake Sturgeon).

## 5.3 SPAWNING

In the Keeyask reservoir, one confirmed female spawner was captured, and eggs were collected and used to produce broodstock for the Keeyask Lake Sturgeon production and stocking program. Additionally, two females that were not in spawning condition when captured were classified as resting females when examined using a trocar for broodstock collection. A total of 19 male Lake Sturgeon were identified as being in spawning condition, which is within the observed range since the study began in 2001. All fish in spawning condition were captured in the vicinity of Birthday Rapids (Map 2). This is similar to capture locations in previous years (Hrenchuk *et al.* 2015; Legge *et al.* 2017; Holm and Hrenchuk 2019).

It was predicted in the EIS that the inundation of Birthday Rapids may change spawning habitat and potentially result in Lake Sturgeon no longer using this area to spawn, potentially moving upstream to spawn at Long Rapids instead. Due to low water and navigational concerns, only two nets were set upstream of Birthday Rapids during spring 2021. No Lake Sturgeon were captured. Ongoing acoustic telemetry studies also suggest that post-impoundment, Lake Sturgeon continued to use spawning areas in the vicinity of Birthday Rapids and a small set of rapids at the inlet to Gull Lake. Sixteen fish (39% of all tracked fish) made a distinct movement to these areas during the spawning period in 2021 (Small and Hrenchuk 2022). This, along with evidence of spawning individuals at Birthday Rapids, suggests Lake Sturgeon continue to use this habitat post-impoundment.

In Stephens Lake, spawning Lake Sturgeon have been observed in nine of the previous 12 sampling years, representing between 3% and 75% of the total number of fish captured. In 2021, 3% of fish captured were in spawning condition, lower than either of the two previous sampling periods (2016 [11%] and 2018 [12%]). However, two young-of-the-year Lake Sturgeon were captured during juvenile Lake Sturgeon monitoring conducted in September 2021, indicating that successful spawning occurred downstream of the Keeyask GS in 2021 (Burnett and Hrenchuk 2022).

## 5.4 MOVEMENT

Since spring adult population monitoring was initiated in 2001, 459 and 236 Lake Sturgeon have been recaptured in the Keeyask reservoir and in Stephens Lake, respectively (Table 7 and 8). The majority of recaptured sturgeon have been tagged and recaptured in the same general area (*i.e.*, those originally tagged in the Nelson River upstream of Gull Rapids/the Keeyask GS 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.

One potential effect of construction of the Keeyask GS identified during the Project assessment was increased emigration of adult Lake Sturgeon out of the Keeyask reservoir. A relatively small proportion ( $n = 6$  or 6.7%) of the 89 fish recaptured in Stephens Lake in 2021 were first tagged in the Keeyask reservoir. The majority of these fish ( $n = 4$ ) had moved downstream prior to reservoir impoundment and were first captured in Stephens Lake between 2016 and 2019.

Adult Lake Sturgeon movement monitoring using acoustic telemetry has been conducted in the Nelson River between Clark Lake and the Limestone Reservoir (Map 1) as part of the AEMP since 2011. Prior to 2021, only six fish tagged with acoustic transmitters had been observed moving downstream. In 2021, 13 of 41 adult Lake Sturgeon tagged upstream of the Keeyask GS moved downstream through the GS between July and September, after completion of this study. Additional information, and results of 2021 monitoring and a summary of movements observed since the study was initiated are provided in Hrenchuk and Small (2022).

## 5.5 KEY QUESTIONS

Impoundment of the Keeyask reservoir was completed on September 5, 2020 and sampling in the Keeyask reservoir in 2021 represented the first year that water levels and flows were the same as they will be during operation. Monitoring in Stephens Lake, however, represented a transition between construction and operation as a considerable portion of the flow was still being passed through the spillway, and only a few units were functioning in the powerhouse during spring. Due to Keeyask reservoir impoundment, several key questions identified in the AEMP that have not been previously discussed are addressed below.

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

The 2021 population estimate for the Keeyask reservoir did not differ significantly from the 2016 and 2018 estimates. However, the overall abundance estimates calculated between 2001 and 2021 show a significant increasing trend over time.

The 2021 population estimate for Stephens Lake was significantly higher than both the 2016 and 2018 estimates, indicating a short-term increase in population. As in the Keeyask reservoir, the overall abundance estimates calculated between 2001 and 2021 show a significant increasing trend over time.

*Is there a biologically relevant (and statistically significant) change in survival for the Keeyask reservoir and Stephens Lake populations?*

The best-fit model did not indicate a marked change in the survival rate in either sampling area compared to the estimate calculated in 2018. The survival rate for the Keeyask reservoir (2004–2021) was 91%, while the survival rate for Stephens Lake (2014–2021) was 97%. Both estimates

are higher than other populations on the Nelson River (*i.e.*, the Burntwood River and Kelsey GS area).

*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 both the Keeyask reservoir and Stephens Lake for any size class. It should be noted that the condition factor in Lake Sturgeon can vary considerably between years, and that average condition factor from the Keeyask reservoir continues to be between 0.82–0.90 (which is typical for adult Lake Sturgeon in Manitoba), while in Stephens Lake mean condition factor was above this typical range (0.97).

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

The CPUE of Lake Sturgeon in 2021 in Stephens Lake (0.64 LKST/91.4 m net/24 h) was notably higher than in both 2018 (0.36 LKST/91.4 m net/24 h) and 2016 (0.10 LKST/91.4 m net/24 h). In addition to the population estimate, these results also suggest that the abundance of Lake Sturgeon is increasing in Stephens Lake.

*Are spawning adults present in the Keeyask reservoir and Stephens Lake?*

Spawning adult Lake Sturgeon were captured both in the Keeyask reservoir and Stephens Lake during spring 2021. Both spawning females (n=1) and males (n=19) were captured in the reservoir, while only spawning males (n=5) were captured in Stephens Lake.

*Where (on a coarse-scale) do Lake Sturgeon spawn in the post-Project environment?*

All spawning adult Lake Sturgeon were captured in the reservoir at Birthday Rapids. In Stephens Lake, spawning fish were captured on the south shore downstream of the Keeyask GS spillway.

## 6.0 SUMMARY AND CONCLUSIONS

- Population monitoring was conducted in spring 2021 to derive an adult Lake Sturgeon population estimate and examine size and condition of the sturgeon populations in the Keeyask reservoir and Stephens Lake.
- A total of 348 individual Lake Sturgeon were captured. Of these, 178 were caught in the Keeyask reservoir, with 119 classified as adults ( $\geq 800$  mm). In Stephens Lake, 170 Lake Sturgeon were captured, with 120 classified as adults.
- The overall CPUE in the Keeyask reservoir in 2021 (0.54 Lake Sturgeon/91.4 m net/24 h) was higher than in any previous year since sampling began in 2001 (0.12–0.33 Lake Sturgeon). Similarly, the CPUE in Stephens Lake (0.64 Lake Sturgeon) was also higher than in any previous year (0.02–0.46 Lake Sturgeon).
- Sex and maturity were confirmed for 19 fish in the Keeyask reservoir: 14 pre-spawn and five ripe males. Downstream of the Keeyask GS, five of the 170 Lake Sturgeon captured were confirmed to be males preparing to spawn.
- The population estimate for adult Lake Sturgeon (measuring  $\geq 800$  mm FL) in 2021 was 913 individuals (95% CI: 673–1,239) in the Keeyask reservoir and 765 individuals (CI 95%: 550–1,063) in Stephens Lake.
- Key questions in the AEMP related to Lake Sturgeon monitoring in the 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 Keeyask reservoir?*

The 2021 population estimate for the Keeyask reservoir did not differ significantly from the 2016 and 2018 estimates. However, the overall abundance estimates calculated between 2001 and 2021 show a significant increasing trend over time.

The 2021 population estimate in Stephens Lake was significantly higher than the 2016 and 2018 estimates. As in the Keeyask reservoir, the overall abundance estimates calculated between 2001 and 2021 also shows a significant increasing trend over time.

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

The best-fit model did not indicate a marked change in the survival rate in either sampling area. The survival rate for the Keeyask reservoir (2004–2021) was 91%, while the survival rate for Stephens Lake (2014–2021) was 97%. Both estimates are higher than other populations on the Nelson River (i.e., the Burntwood River and Kelsey GS area).



- *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 both the Keeyask reservoir and Stephens Lake.

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

The CPUE of Lake Sturgeon in 2021 in Stephens Lake (0.64 LKST/91.4 m net/24 h) was notably higher than in both 2018 (0.36 LKST/91.4 m net/24 h) and 2016 (0.10 LKST/91.4 m net/24 h).

- *Are spawning adults present in the Keeyask reservoir and Stephens Lake?*

Spawning adult Lake Sturgeon were captured both in the Keeyask reservoir and Stephens Lake during spring 2021. Spawning condition is confirmed by the extrusion of gametes. Both confirmed spawning females (n=1) and males (n=19) were captured in the reservoir, while only confirmed spawning males (n=5) were captured in Stephens Lake.

- *Where (on a coarse-scale) do Lake Sturgeon spawn in the post-Project environment?*

In the Keeyask reservoir all sturgeon in spawning condition (i.e., gametes could be extruded) were captured in the vicinity of Birthday Rapids. In Stephens Lake, spawning fish were captured on the south shore downstream of the Keeyask GS spillway.

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## **TABLES**

**Table 1: Number of fish, by species, captured during adult Lake Sturgeon population monitoring in the Keeyask reservoir (28 May–3 July) and Stephens Lake (30 May–3 July), spring 2021.**

Species	Scientific Name	Abbreviation	Keeyask reservoir	Stephens Lake	Total
<b>Lake Sturgeon</b>	<b><i>Acipenser fulvescens</i></b>	<b>LKST</b>	<b>178</b>	<b>170</b>	<b>348</b>
White Sucker	<i>Catostomus commersoni</i>	WHSC	1	1	<b>2</b>
Northern Pike	<i>Esox lucius</i>	NRPK	12	4	<b>16</b>
Sauger	<i>Sander canadensis</i>	SAUG	1	-	<b>1</b>
Walleye	<i>Sander vitreus</i>	WALL	2	-	<b>2</b>
Lake Whitefish	<i>Coregonus clupeaformis</i>	LKWH	1	-	<b>1</b>
<b>Total<sup>1</sup></b>			<b>195</b>	<b>175</b>	<b>370</b>

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



**Table 2: Lake Sturgeon catch-per-unit-effort (CPUE; # LKST/91.4 m net/24 h) values observed during mark/recapture studies in the Keeyask reservoir and Stephens Lake from 2001–2021.**

Location	Year	# Sites	Total Lake Sturgeon <sup>1</sup>	Total Gill Net Hours <sup>5</sup>	Total CPUE <sup>4</sup>
Nelson River (BR-GR) <sup>2</sup>	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
	<b>2021</b>	<b>61</b>	<b>178</b>	<b>7911</b>	<b>0.54</b>
Stephens Lake <sup>3</sup>	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 <sup>4</sup>	23	15	3555	0.10
	2014 <sup>4</sup>	5	9	473	0.46
	2016	90	71	17037	0.10
	2018	62	241	15863	0.36
	<b>2021</b>	<b>72</b>	<b>170</b>	<b>6382</b>	<b>0.64</b>

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

**Table 3: Number and catch-per-unit-effort (CPUE; # LKST/91.4 m net/24 h) values, by zone, observed during adult Lake Sturgeon population monitoring in the Keeyask reservoir and Stephens Lake, spring 2021.**

Location	Zone	# Sites	Total # Lake Sturgeon <sup>1</sup>	Total Gill Net Hours <sup>2</sup>	Total CPUE
<b>Keeyask reservoir</b>	BR-U	2	0	95	0.00
	BR-D	37	154	5445	0.68
	GL-A	7	10	740	0.32
	GL-B	10	10	1179	0.20
	GL-C	5	5	450	0.21
<b>Stephens Lake</b>	GR-A	11	9	974	0.22
	STL-A	52	155	4885	0.76
	STL-B	9	6	523	0.28

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 gill net gang consisting of four panels (*i.e.*, 91.4 m long) was doubled (*i.e.*, equivalent of two 91.4 m gang sets).

**Table 4: Fork length (mm), weight (g), and relative condition factor (K) of Lake Sturgeon captured during adult Lake Sturgeon population monitoring in the Keeyask reservoir, spring 2001–2021.**

Location	Year	Fork Length (mm)				Weight (g)				K		
		n <sup>2</sup>	Mean	Std <sup>3</sup>	Range	n	Mean	Std	Range	n	Mean	Range
Nelson River (BR-GR) <sup>1</sup>	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
	<b>2021</b>	<b>178</b>	<b>908</b>	<b>189</b>	<b>401–1435</b>	<b>178</b>	<b>6892</b>	<b>4760</b>	<b>450–27216</b>	<b>178</b>	<b>0.82</b>	<b>0.61–1.54</b>

1. Nelson River from Birthday Rapids (BR) to Gull Rapids (GR)/the Keeyask GS. 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 2001–2021.**

Location	Year	Fork Length (mm)				Weight (g)				K		
		n <sup>2</sup>	Mean	Std <sup>3</sup>	Range	n	Mean	Std	Range	n	Mean	Range
Stephens Lake <sup>1</sup>	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
	<b>2021</b>	<b>170</b>	<b>837</b>	<b>215</b>	<b>335–1480</b>	<b>170</b>	<b>6717</b>	<b>4538</b>	<b>250–29000</b>	<b>170</b>	<b>0.97</b>	<b>0.64–1.77</b>

1. The portion of Stephens Lake downstream of Gull Rapids/the Keeyask GS. 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 Keeyask reservoir and Stephens Lake during adult population monitoring, spring, 2001–2021.**

Location	Year	Sex and Maturity <sup>3</sup>						# of Spawners <sup>4</sup>	Unknown Maturity	Total
		Male			Female					
		7	8	9	2	3	4			
Nelson River (BR-GR) <sup>1</sup>	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
	2021	14	5	-	-	1	-	20	158	178
Stephens Lake <sup>2</sup>	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
	2021	5	-	-	-	-	-	5	165	170

1. Nelson River from Birthday Rapids (BR) to Gull Rapids (GR)/the Keeyask GS. 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/the Keeyask GS. 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 Keeyask reservoir during adult population monitoring, spring 2002–2021.**

Recapture Location	Year	Original Tagging Location							Total Recaptures <sup>2</sup>	Total Captured	% Recaptures
		Kelsey GS Area	Split Lake	Upstream Birthday Rapids	Downstream Birthday Rapids	Gull Lake	Stephens Lake	Unknown			
<b>Nelson River (BR-GR<sup>1</sup>)</b>	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
	<b>2021</b>	-	-	<b>1</b>	<b>29</b>	<b>40</b>	<b>1</b>	-	<b>71</b>	<b>178</b>	<b>39.9</b>

1. Nelson River from Birthday Rapids (BR) to Gull Rapids (GR)/the Keeyask GS. 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.



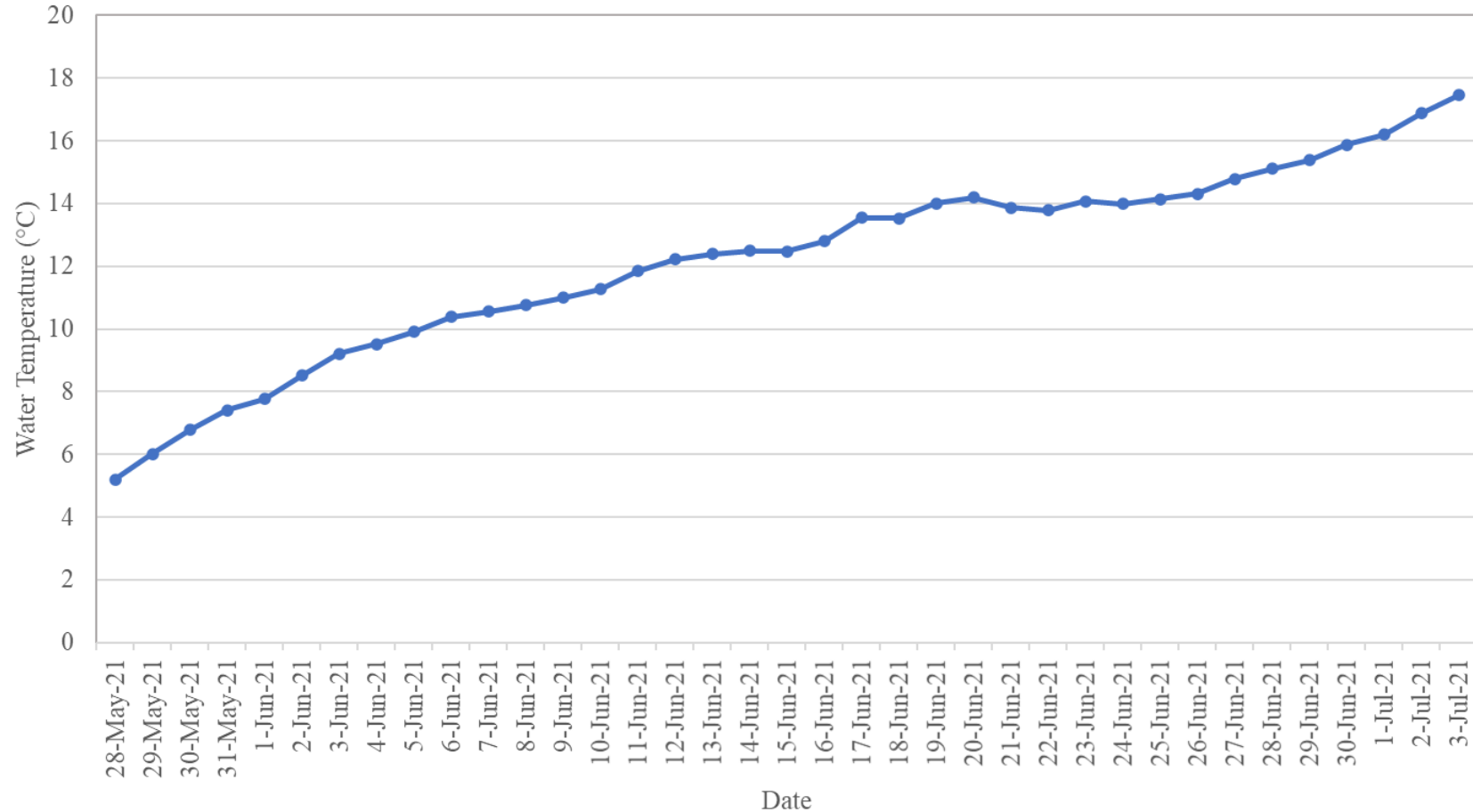
**Table 8: Recapture data for Lake Sturgeon captured in Stephens Lake during adult population monitoring, spring 2002–2021.**

Recapture Location	Year	Original Tagging Location							Total Recaptures <sup>2</sup>	Total Captured	% Recaptures
		Kelsey GS Area	Split Lake	Upstream Birthday Rapids	Downstream Birthday Rapids	Gull Lake	Stephens Lake	Unknown			
Stephens Lake <sup>1</sup>	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
	<b>2021</b>	-	-	-	-	<b>6</b>	<b>82</b>	<b>1</b>	<b>89</b>	<b>170</b>	<b>52.3</b>

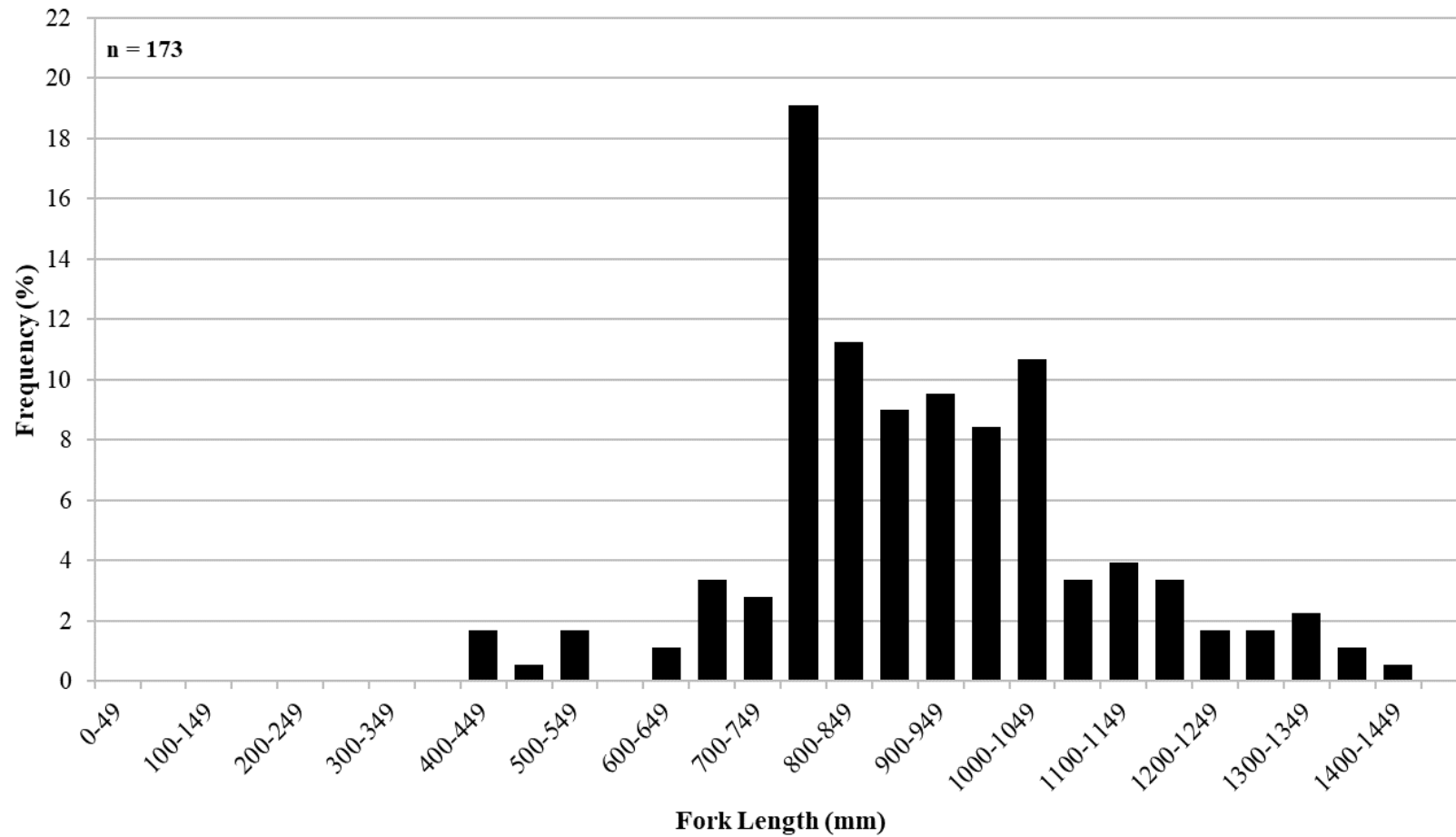
1. The portion of Stephens Lake downstream of Gull Rapids/the Keeyask GS. An \*\* indicates a few individuals from elsewhere in Stephens Lake are included in the analysis.

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.

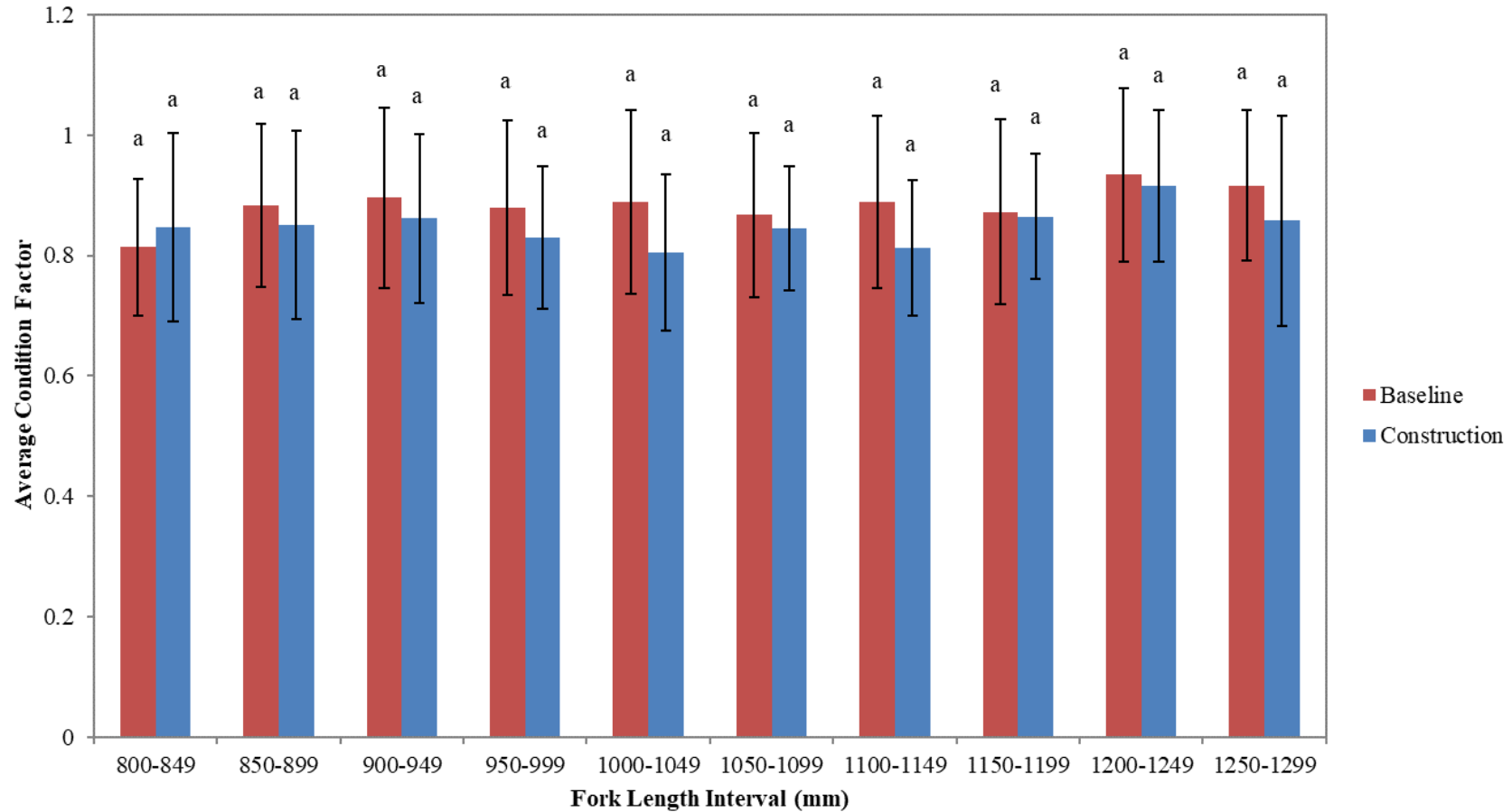
## FIGURES



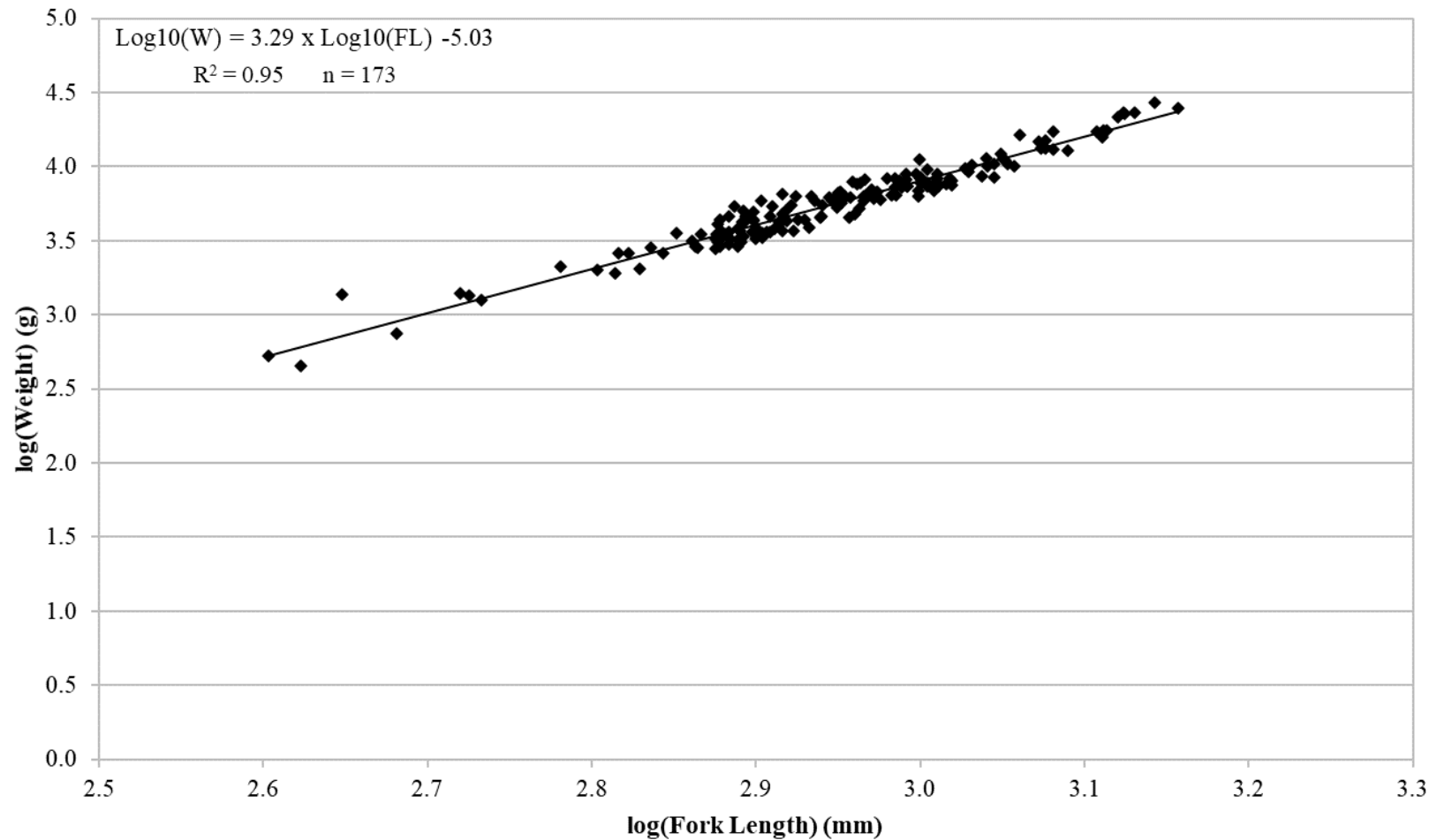
**Figure 1:** Mean daily water temperature as measured in the main channel of the Keeyask reservoir, approximately 10 km upstream of the Keeyask GS, May 28 to July 3, 2021. HOBOTemperature logger stopped working on June 14, therefore temperatures from Stephens Lake were used for June 15 – July 3, 2021.



**Figure 2: Length-frequency distribution for Lake Sturgeon captured in large mesh gill nets set in the Keeyask reservoir, spring 2021.**

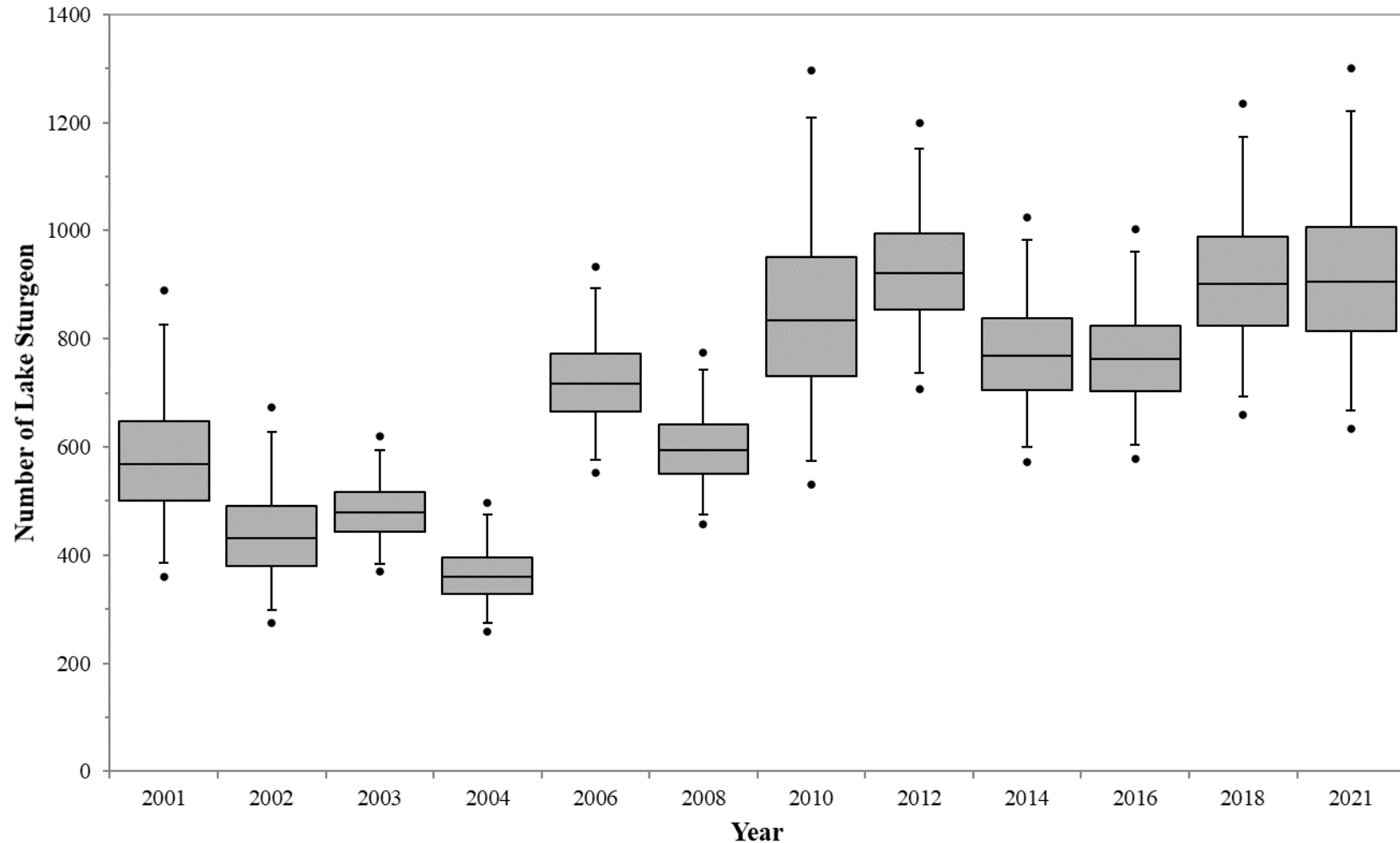


**Figure 3:** Mean condition factor by 50 mm length intervals for adult ( $\geq 800$  mm) Lake Sturgeon captured in the Keeyask reservoir during baseline studies (red bars) and construction monitoring (blue bars). There were no significant differences between groups (Mann Whitney U test,  $p < 0.05$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

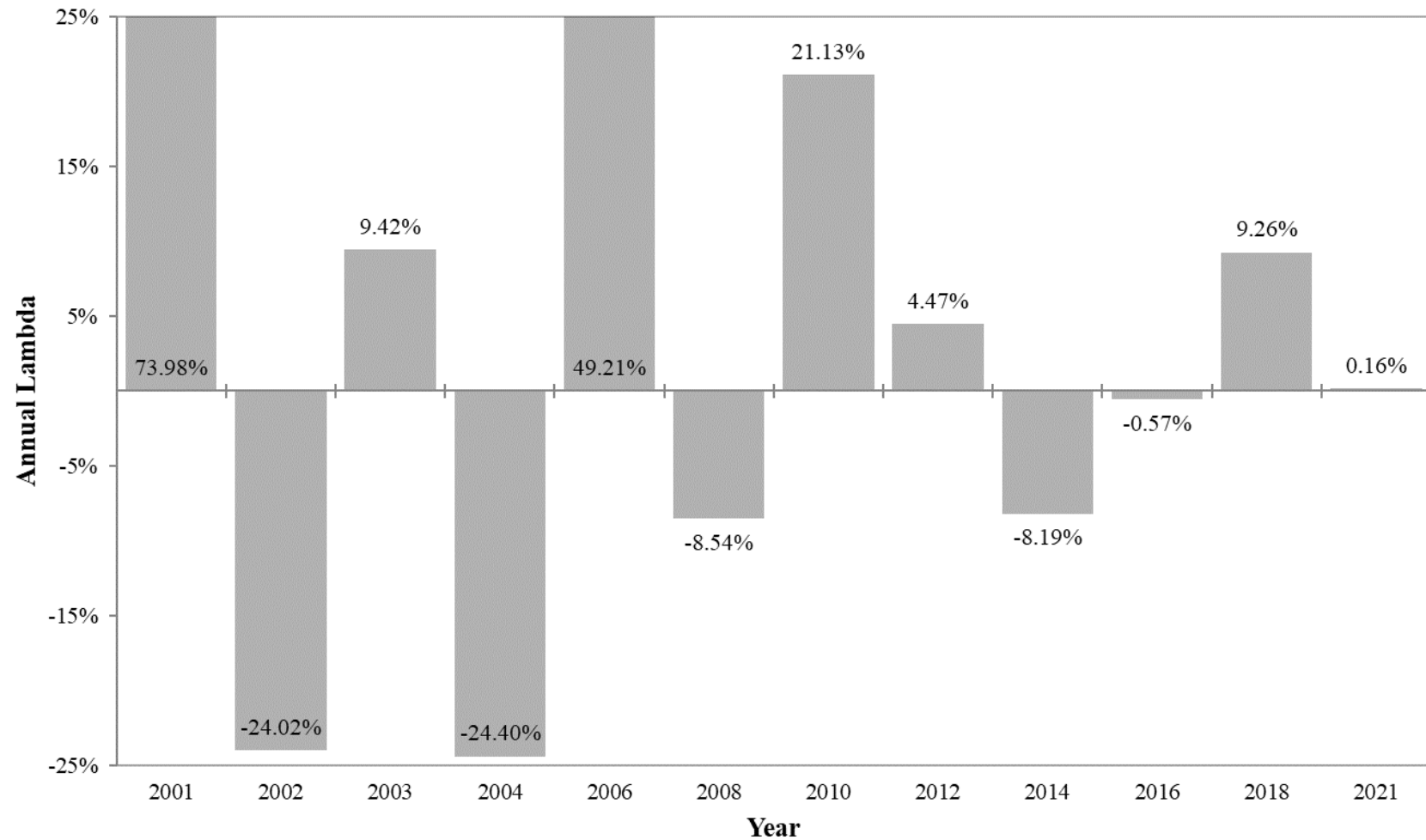


**Figure 4: Length-weight regression for Lake Sturgeon captured in large mesh gill nets set in the Keeyask reservoir, spring 2021.**

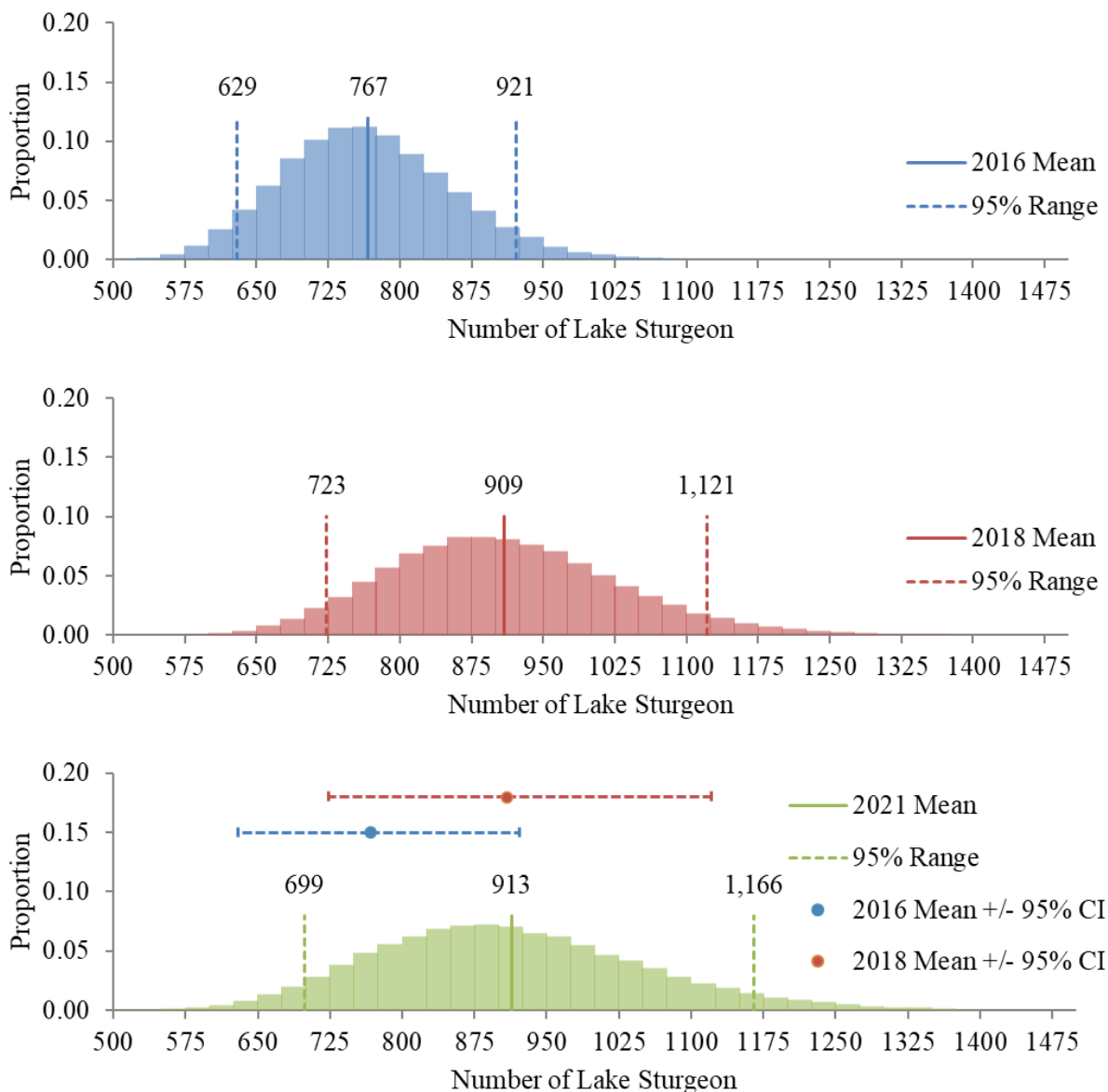




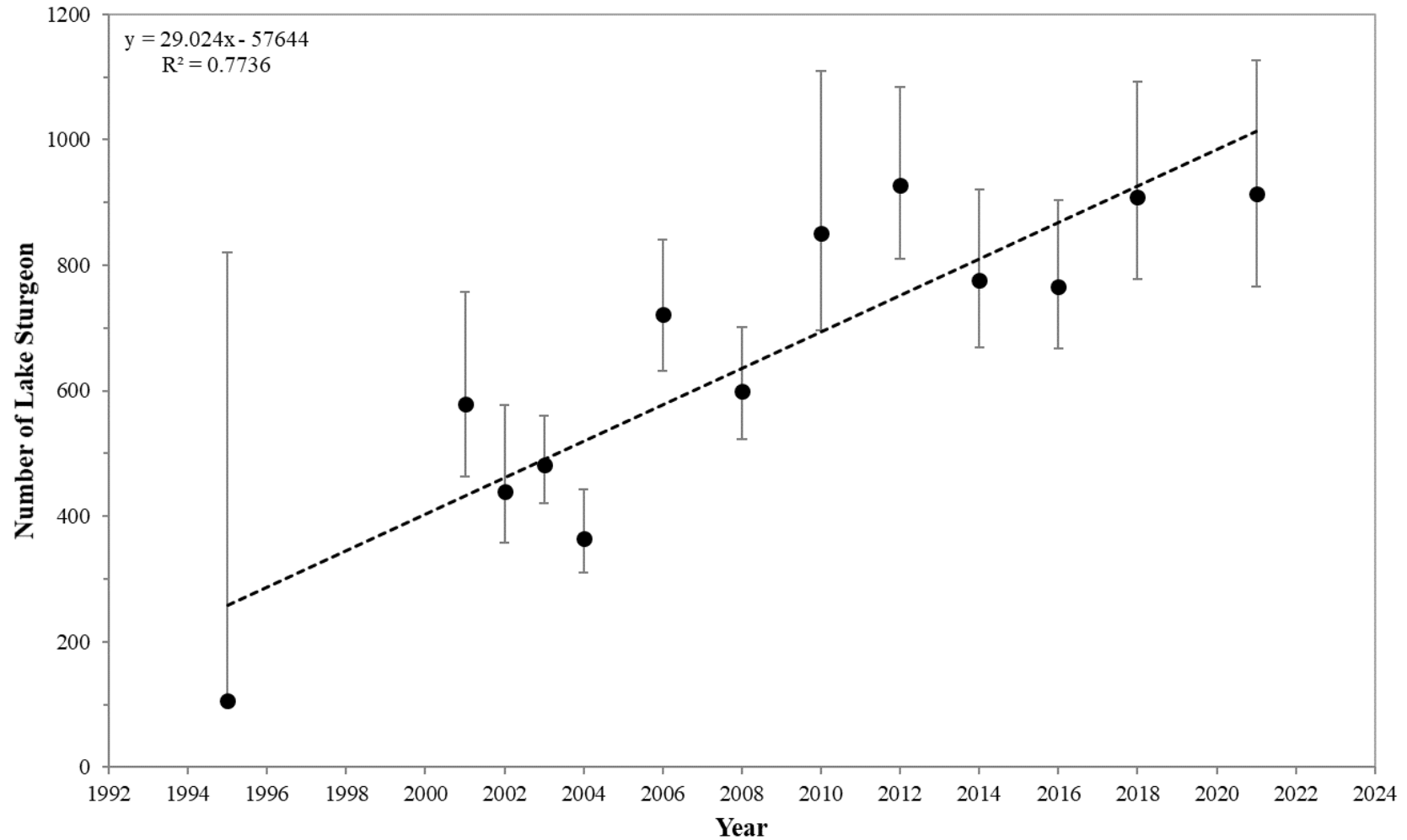
**Figure 5:** Adult Lake Sturgeon abundance estimates based on POPAN best model for the Keeyask reservoir (2001–2021). Horizontal line inside the box represents the estimated abundance (*i.e.*, the number of adult Lake Sturgeon in the area during the time of capture), the black dots represent the minimum and maximum estimates, and the vertical bar lines represent the upper and lower 95% confidence intervals.



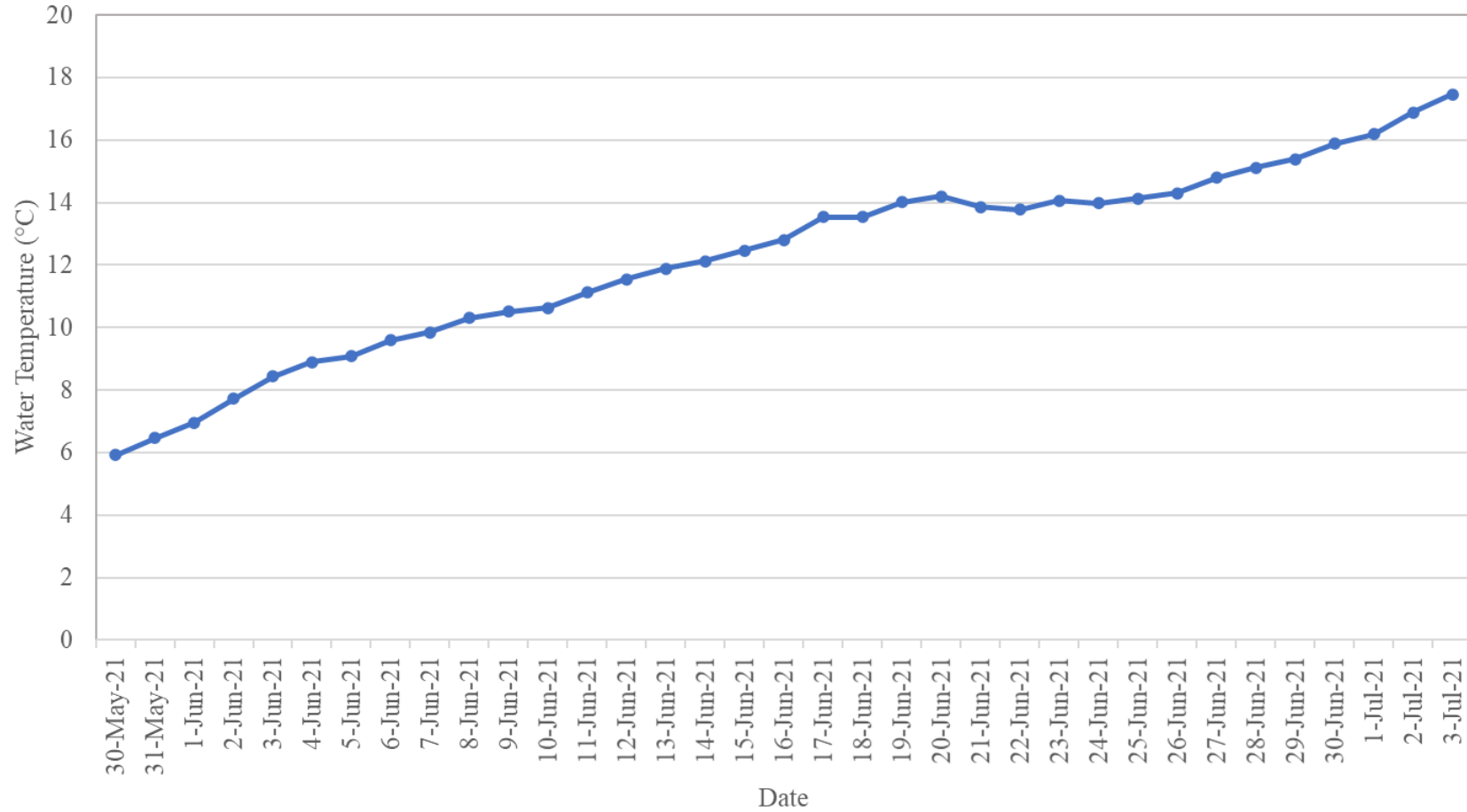
**Figure 6: Annual percent change in adult Lake Sturgeon population growth estimates (lambda) based on the POPAN annual estimates for the Keeyask Reservoir. Percentages indicate change in population abundance between years.**



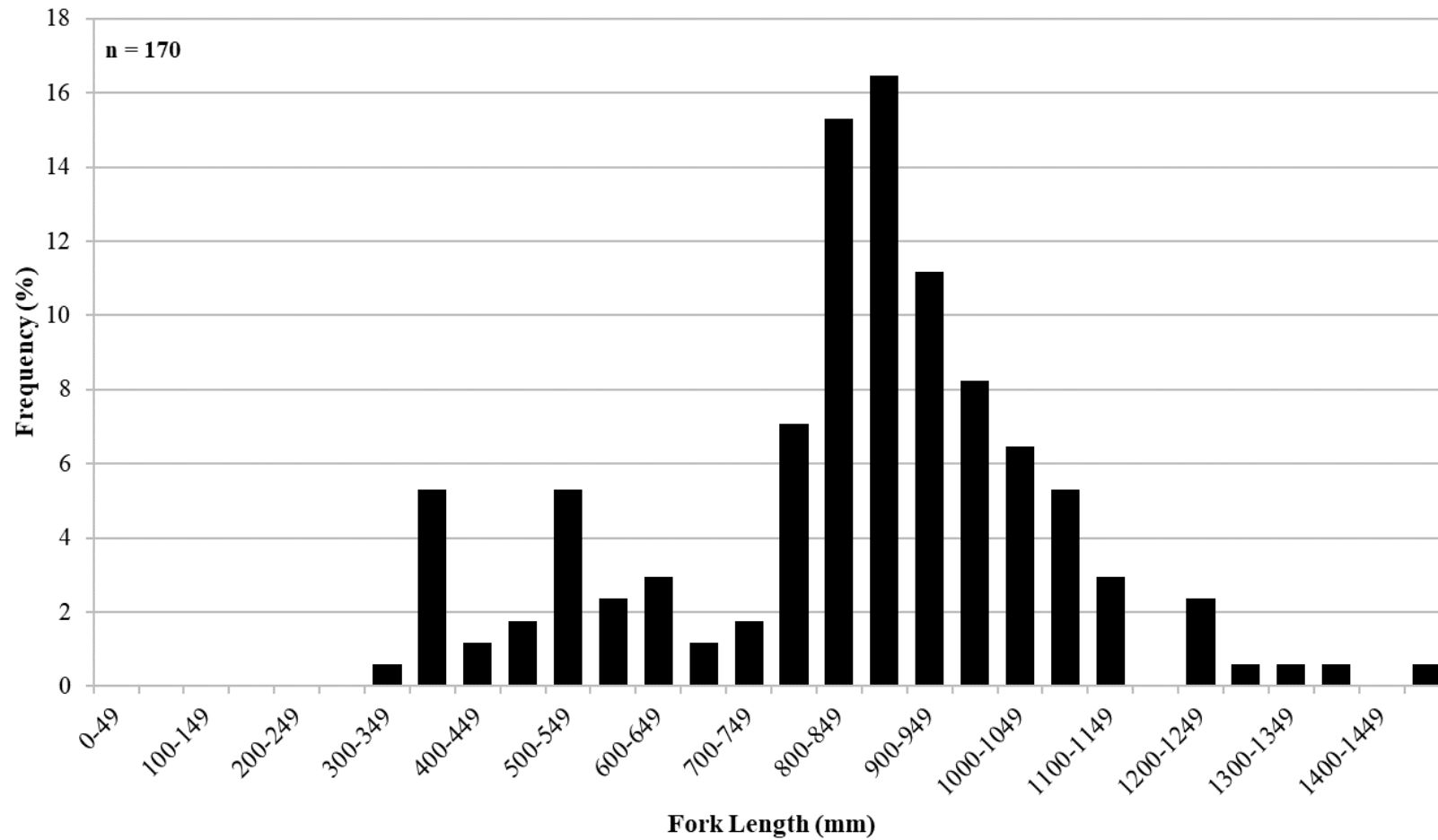
**Figure 7:** Analysis of change in mean population abundance estimates for the Keeyask reservoir between one sample period (2018 to 2021) and two sampling periods (2016 to 2021). A significant change from the 2016 estimate would be a 18% decrease or a 20% increase. A significant change from the 2018 estimate would be a 20% decrease or a 23% increase. The mean population estimate in 2021 showed a 19% increase from 2016 and a 0.51% increase from 2018.



**Figure 8: Abundance estimates for adult Lake Sturgeon in the Keeyask reservoir by sampling year (1995–2021) showing a significant positive trend.**

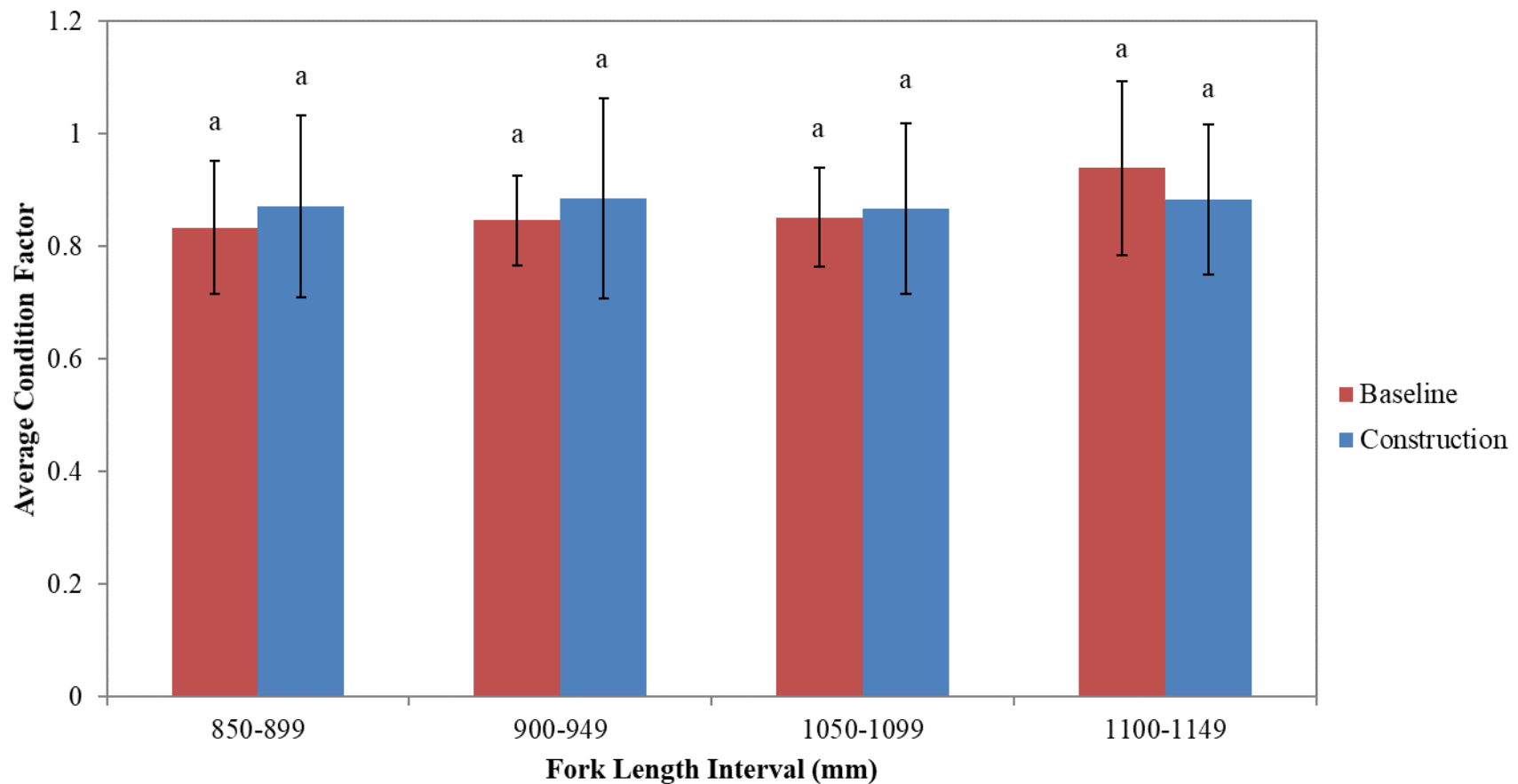


**Figure 9: Mean daily water temperature as measured in the main channel of Stephens Lake, approximately 10 km downstream of the Keeyask GS, May 30 to July 3, 2021.**

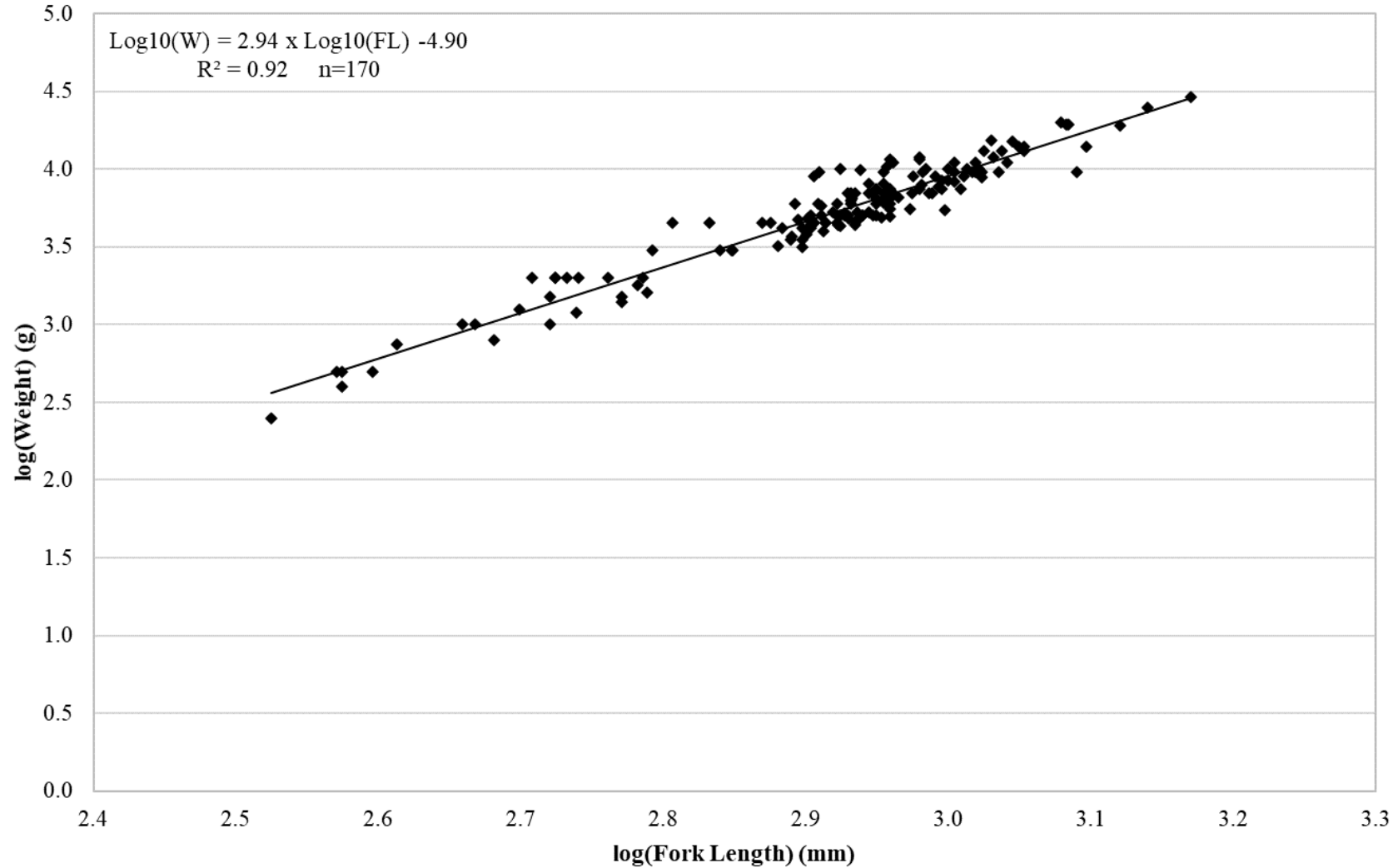


**Figure 10: Length-frequency distribution for Lake Sturgeon captured in large mesh gill nets set in Stephens Lake, spring 2021.**

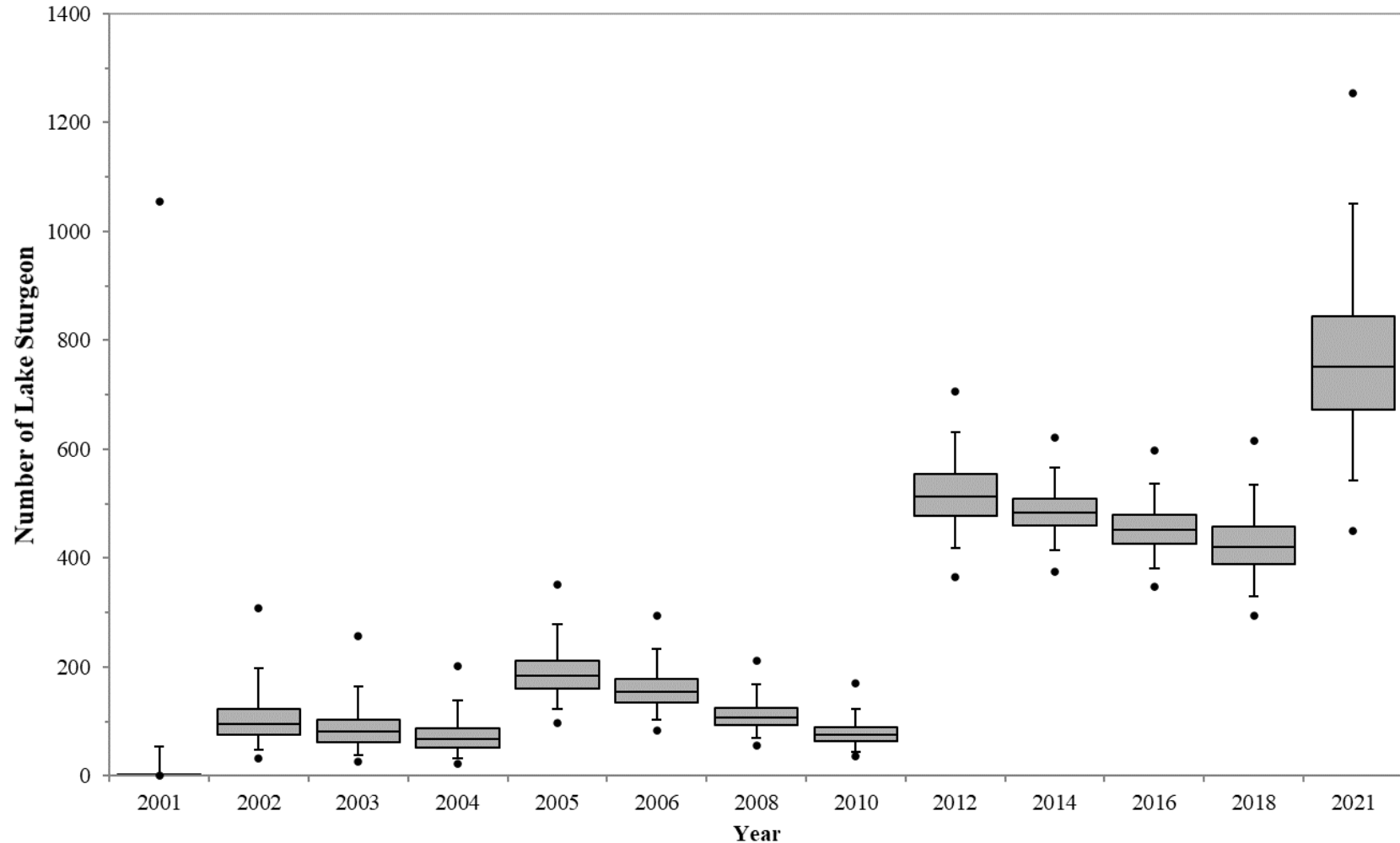




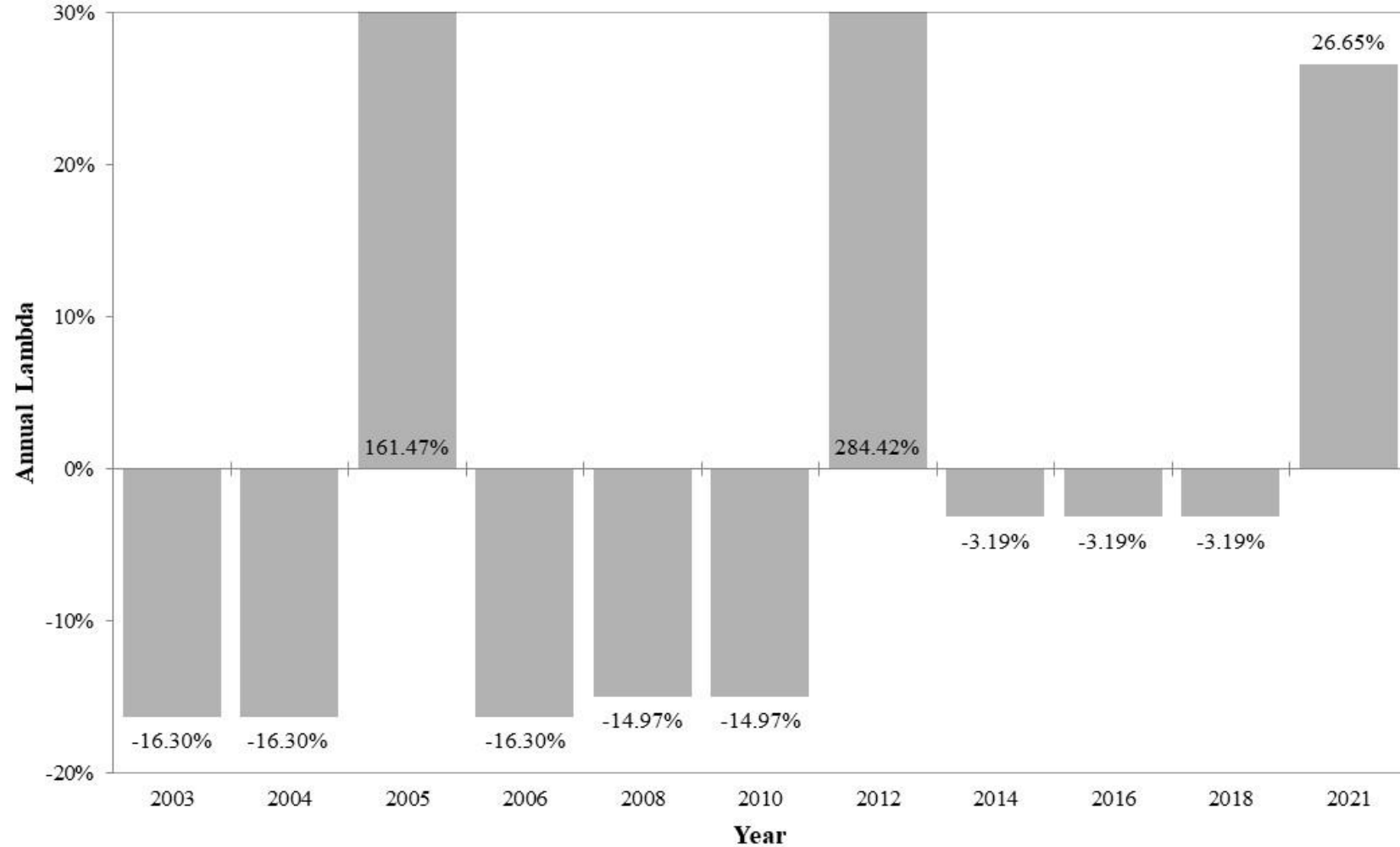
**Figure 11:** Mean condition factor by 50 mm length intervals for adult ( $\geq 800$  mm) Lake Sturgeon captured in Stephens Lake during baseline studies (red bars) and construction monitoring (blue bars). There were no significant differences between groups (Mann Whitney U test,  $p < 0.05$ ). Error bars represent standard deviations.



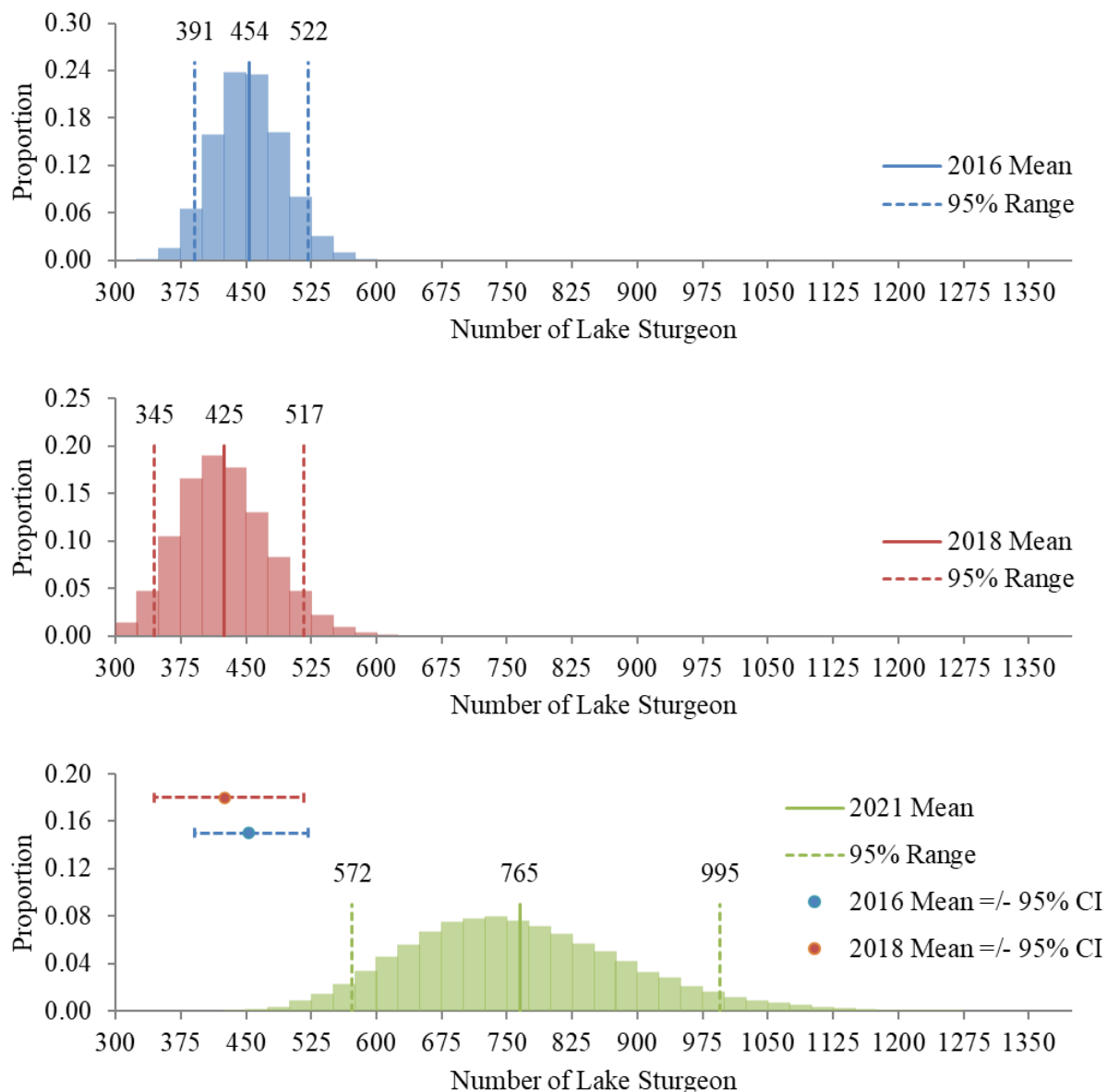
**Figure 12: Length-weight regression for Lake Sturgeon captured in large mesh gill nets set in Stephens Lake, spring 2021.**



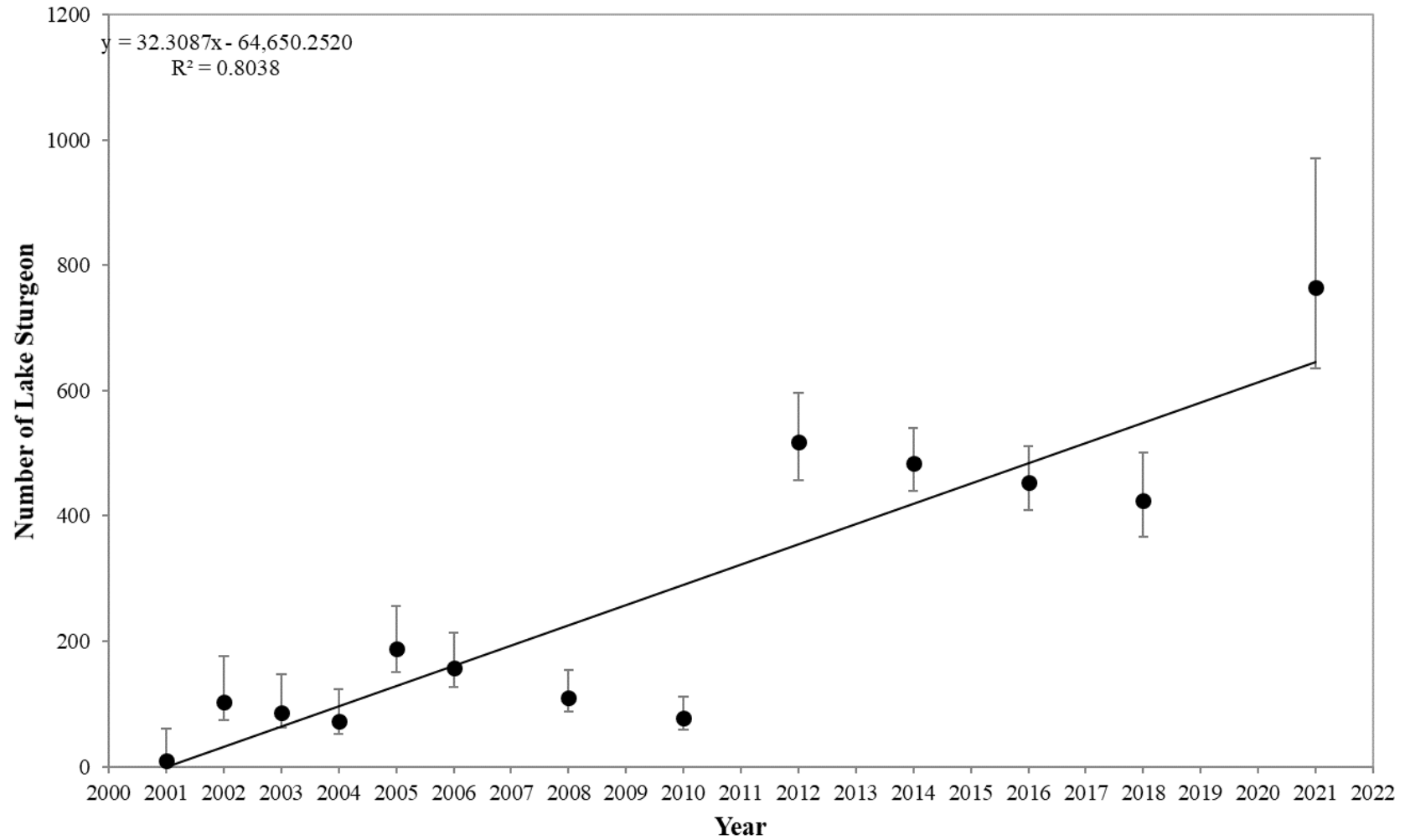
**Figure 13:** Adult Lake Sturgeon abundance estimates based on POPAN best model for Stephens Lake (2001–2021). Horizontal line inside the box represents the estimated abundance (*i.e.*, the number of adult Lake Sturgeon in the area during the time of capture), the black dots represent the minimum and maximum estimates, and the vertical bar lines represent the upper and lower 95% confidence intervals.



**Figure 14: Annual percent change in adult Lake Sturgeon population growth estimates (lambda) based on the POPAN annual estimates in Stephens Lake. Percentages indicate change in population abundance between years.**



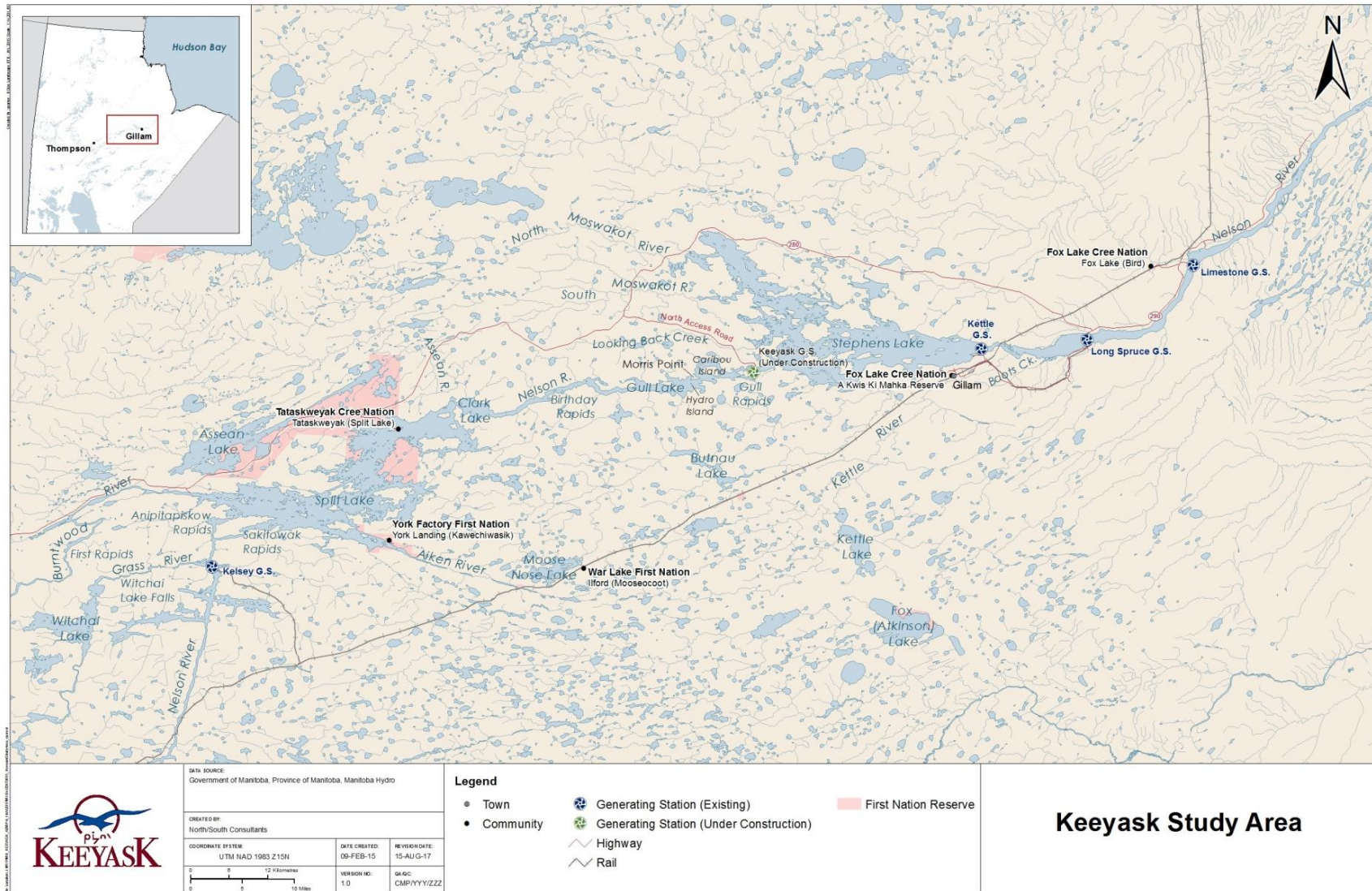
**Figure 15: Analysis of change in mean population abundance estimates for Stephens Lake between one sample period (2018 to 2021) and two sampling periods (2016 to 2021). A significant change from the 2016 estimate would be a 14% decrease or a 15% increase. A significant change from the 2018 estimate would be a 19% decrease or a 22% increase. The mean population estimate in 2021 showed a 69% increase from 2016 and an 80% increase from 2018.**



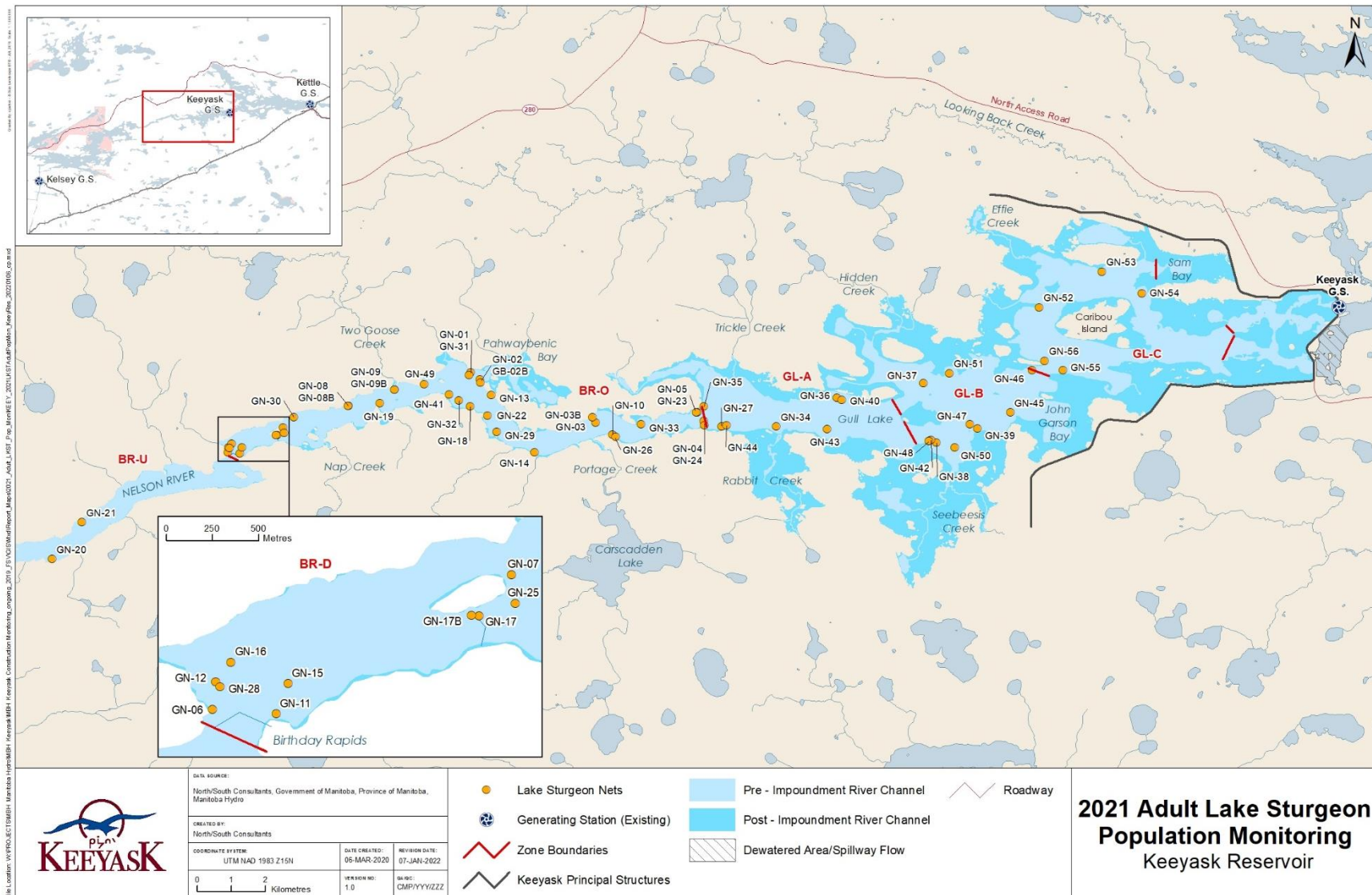
**Figure 16: Abundance estimates for adult Lake Sturgeon in Stephens Lake by sampling year (2001–2021) showing a significant positive trend.**



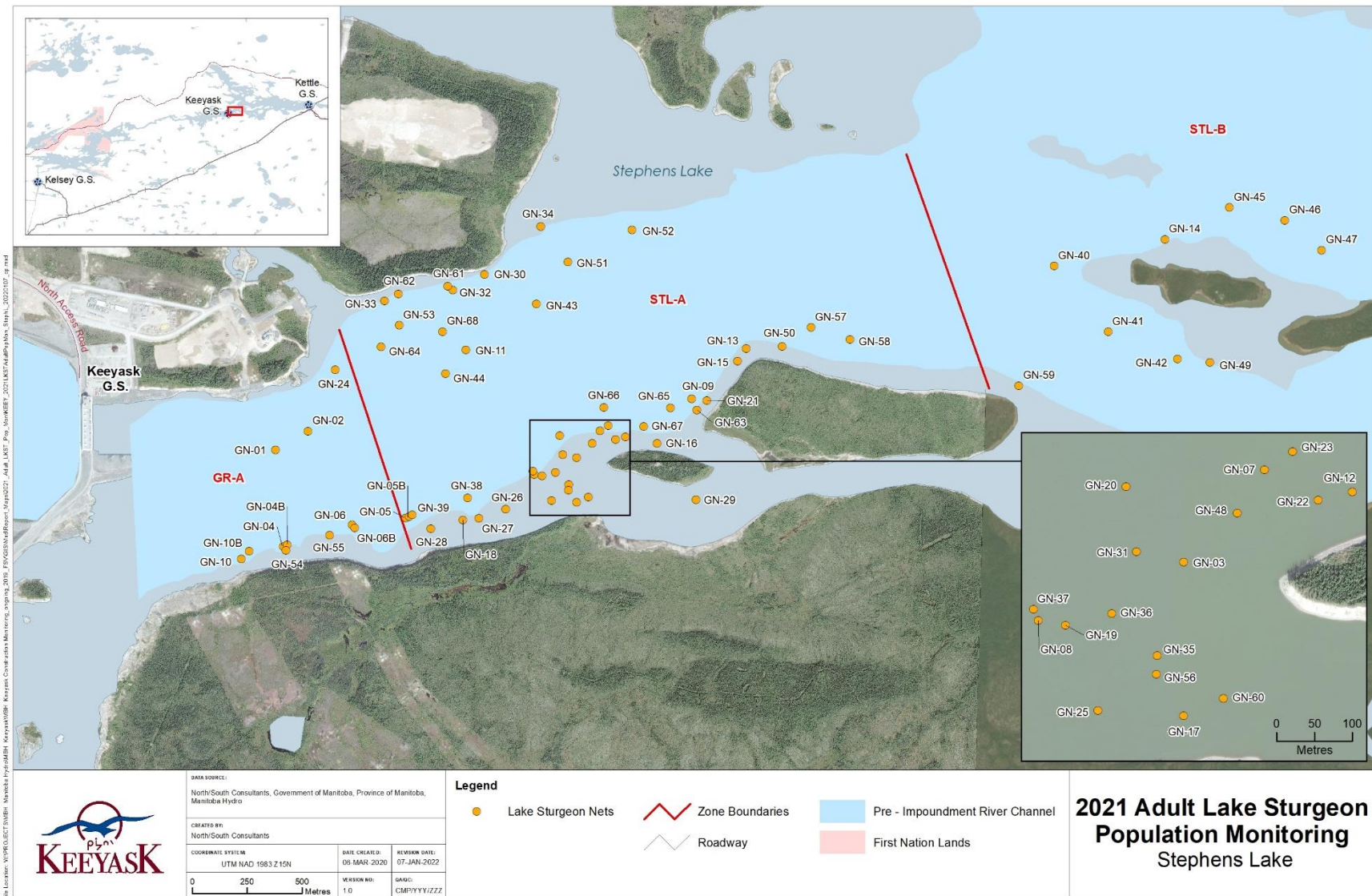
# MAPS



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

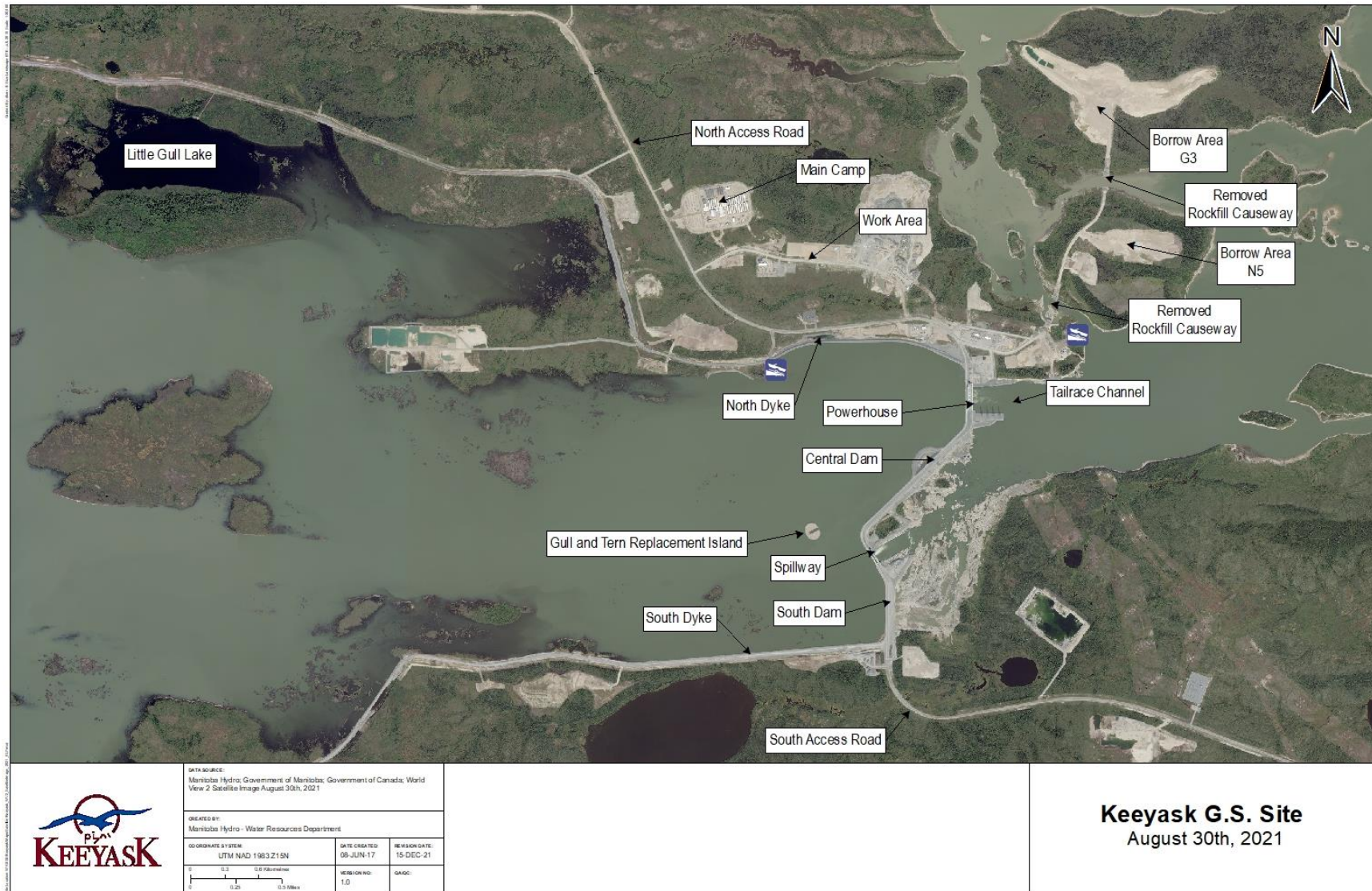






**Map 3: Sites fished with large mesh gill net gangs in the Nelson River in Stephens Lake, spring 2021.**





**Map 4: Map of instream structures at the Keeyask Generating Station site, August 2021.**

# APPENDICES

# **APPENDIX 1: TAGGING AND BIOLOGICAL INFORMATION FOR LAKE STURGEON CAPTURED IN THE KEEYASK RESERVOIR AND IN STEPHENS LAKE IN SPRING, 2021**

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Table A1-1: Tagging and biological information for Lake Sturgeon marked with Floy tags and PIT tags in the Keeyask reservoir (the Nelson River between Clark Lake and the Keeyask GS) and Stephens Lake, spring 2021.....	55
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**Table A1-1: Tagging and biological information for Lake Sturgeon marked with Floy tags and PIT tags in the Keeyask reservoir (the Nelson River between Clark Lake and the Keeyask GS) and Stephens Lake, spring 2021.**

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-21	NSC	117026	900 226001225569	934	1032	7000	-	-
Nelson River (CL-GR)	BR-D	01-Jun-21	NSC	117027	900 226001225557	1181	1331	14700	-	-
Nelson River (CL-GR)	BR-D	01-Jun-21	NSC	117028	900 226001225505	872	954	5500	-	-
Nelson River (CL-GR)	BR-D	01-Jun-21	NSC	117029	900 226000767024	974	1052	7200	-	-
Nelson River (CL-GR)	BR-D	03-Jun-21	NSC	117030	900 226001225589	1024	1142	8300	-	-
Nelson River (CL-GR)	BR-D	03-Jun-21	NSC	117031	900 226001225531	1000	1122	8500	-	-
Nelson River (CL-GR)	BR-D	03-Jun-21	NSC	117032	900 226001225511	971	1072	8100	-	-
Nelson River (CL-GR)	BR-D	03-Jun-21	NSC	117033	900 226001225535	1330	1475	23050	-	-
Nelson River (CL-GR)	BR-D	03-Jun-21	NSC	117037	900 226001225551	982	1032	7320	M	7
Nelson River (CL-GR)	BR-D	03-Jun-21	NSC	117038	900 226000629088	924	1034	5900	F	1
Nelson River (CL-GR)	BR-D	03-Jun-21	NSC	117039	900 226001225524	997	6850	6850	M	7
Nelson River (CL-GR)	BR-D	03-Jun-21	NSC	117040	900 226001225528	842	935	4400	-	-
Nelson River (CL-GR)	BR-D	04-Jun-21	NSC	117041	900 226001225665	801	918	3550	-	-
Nelson River (CL-GR)	BR-D	06-Jun-21	NSC	117042	-	1026	1141	7348.2	-	-
Nelson River (CL-GR)	BR-D	06-Jun-21	NSC	117044	-	997	1072	6259.6	-	-
Nelson River (CL-GR)	BR-D	06-Jun-21	NSC	117045	-	1071	1184	9299	M	7
Nelson River (CL-GR)	BR-D	06-Jun-21	NSC	117046	-	890	997	5325	-	-
Nelson River (CL-GR)	BR-D	06-Jun-21	NSC	117047	-	980	1091	8981.28	M	7
Nelson River (CL-GR)	BR-D	06-Jun-21	NSC	117048	-	927	1039	6441.12	-	-
Nelson River (CL-GR)	BR-D	07-Jun-21	NSC	117049	-	732	835	2850	-	-
Nelson River (CL-GR)	BR-D	07-Jun-21	NSC	117050	-	838	926	3680	-	-
Nelson River (CL-GR)	BR-D	03-Jun-21	NSC	117053	900 226001225583	907	1017	6200	M	7
Stephens Lake	STL-A	08-Jun-21	NSC	117276	900 226001225220	820	930	4500	-	-



**Table A1-2: Tagging and biological information for Lake Sturgeon marked with Floy tags and PIT tags in the Keeyask reservoir (the Nelson River between Clark Lake and the Keeyask GS) and Stephens Lake, spring 2021 (continued).**

Location	Zone	Date	Prefix	Floy Tag	Pit Tag	Fork Length (mm)	Total Length (mm)	Weight (g)	Sex	Maturity
Stephens Lake	STL-A	17-Jun-21	NSC	117277	900 067000055455	590	677	1500	-	-
Stephens Lake	STL-A	08-Jun-21	NSC	117278	900 226001225441	910	1022	6500	-	-
Stephens Lake	STL-A	09-Jun-21	NSC	117279	900 226001225489	1480	1550	29000	-	-
Stephens Lake	STL-A	09-Jun-21	NSC	117280	900 226001225400	960	1085	9500	-	-
Stephens Lake	STL-A	09-Jun-21	NSC	117281	900 226000768015	805	910	4500	-	-
Stephens Lake	STL-A	14-Jun-21	NSC	117282	900 226001225408	890	1010	5000	-	-
Stephens Lake	STL-A	14-Jun-21	NSC	117283	900 226001225419	856	955	6500	-	-
Stephens Lake	STL-A	15-Jun-21	NSC	117284	900 226001225203	550	623	2000	-	-
Stephens Lake	STL-A	14-Jun-21	NSC	117285	900 226001225430	815	903	5800	-	-
Stephens Lake	STL-A	15-Jun-21	NSC	117286	900 067000055483	530	610	2000	-	-
Stephens Lake	STL-A	15-Jun-21	NSC	117287	900 226001225263	750	835	4500	-	-
Stephens Lake	STL-A	15-Jun-21	NSC	117288	900 226001225440	797	910	4800	-	-
Stephens Lake	STL-A	15-Jun-21	NSC	117289	900 226001225206	945	1060	9000	-	-
Stephens Lake	STL-A	15-Jun-21	NSC	117290	900 226001225299	640	727	4500	-	-
Stephens Lake	STL-A	16-Jun-21	NSC	117291	900 226001225242	577	653	2000	-	-
Stephens Lake	STL-A	16-Jun-21	NSC	117293	900 226001225244	530	610	2000	-	-
Stephens Lake	STL-A	16-Jun-21	NSC	117294	900 226001225259	815	910	5000	-	-
Stephens Lake	STL-A	18-Jun-21	NSC	117296	900 067000113764	372	430	500	-	-
Stephens Lake	STL-A	16-Jun-21	NSC	117297	900 226001225215	691	775	3000	-	-
Stephens Lake	STL-A	18-Jun-21	NSC	117298	900 226001225295	456	518	1000	-	-
Stephens Lake	STL-A	19-Jun-21	NSC	117299	900 067000055670	615	705	1600	-	-
Stephens Lake	STL-A	18-Jun-21	NSC	117611	900 226001225275	880	985	6000	-	-
Stephens Lake	STL-A	31-May-21	NSC	117612	900 226001225296	1045	1150	11000	-	-
Stephens Lake	STL-A	31-May-21	NSC	117613	900 226001225251	800	895	5000	M	7

**Table A1-3: Tagging and biological information for Lake Sturgeon marked with Floy tags and PIT tags in the Keeyask reservoir (the Nelson River between Clark Lake and the Keeyask GS) and Stephens Lake, spring 2021 (continued).**

Location	Zone	Date	Prefix	Floy Tag	Pit Tag	Fork Length (mm)	Total Length (mm)	Weight (g)	Sex	Maturity
Stephens Lake	STL-A	31-May-21	NSC	117614	900 226001225272	740	840	4500	-	-
Stephens Lake	STL-A	31-May-21	NSC	117615	900 043000182593	465	532	1000	-	-
Stephens Lake	STL-A	31-May-21	NSC	117616	900 226001225231	885	980	7000	-	-
Stephens Lake	STL-A	01-Jun-21	NSC	117617	900 226001225225	850	955	7000	M	7
Stephens Lake	STL-A	01-Jun-21	NSC	117618	900 226001225247	960	1075	9500	-	-
Stephens Lake	STL-A	01-Jun-21	NSC	117619	900 226000629000	965	1075	10000	-	-
Stephens Lake	STL-A	01-Jun-21	NSC	117620	900 226001225261	900	1010	9700	-	-
Stephens Lake	STL-A	02-Jun-21	NSC	117621	900 226001225222	905	1025	10300	-	-
Stephens Lake	STL-A	02-Jun-21	NSC	117622	900 226001225268	840	960	10000	-	-
Stephens Lake	STL-A	02-Jun-21	NSC	117625	900 226001225224	1230	1350	21000	-	-
Nelson River (CL-GR)	BR-D	21-Jun-21	NSC	119101	900 226001055314	751	839	3250	-	-
Nelson River (CL-GR)	BR-D	22-Jun-21	NSC	119105	900 226001225562	825	931	3700	-	-
Nelson River (CL-GR)	BR-D	22-Jun-21	NSC	119107	900 226001055393	771	855	5400	-	-
Nelson River (CL-GR)	BR-D	22-Jun-21	NSC	119108	900 226000893614	825	925	6500	-	-
Nelson River (CL-GR)	BR-D	23-Jun-21	NSC	119109	900 226001055341	791	888	4950	-	-
Nelson River (CL-GR)	BR-D	26-Jun-21	NSC	119110	900 067000121364	525	606	1400	-	-
Nelson River (CL-GR)	BR-D	23-Jun-21	NSC	119111	900 226001055456	894	1005	6800	-	-
Nelson River (CL-GR)	BR-D	23-Jun-21	NSC	119112	900 226001055345	813	919	5350	-	-
Nelson River (CL-GR)	BR-D	24-Jun-21	NSC	119113	900 226001055360	880	986	6200	-	-
Nelson River (CL-GR)	BR-D	24-Jun-21	NSC	119114	900 226001225520	890	990	5600	-	-
Nelson River (CL-GR)	BR-D	24-Jun-21	NSC	119115	900 226001055398	775	875	3200	-	-
Nelson River (CL-GR)	BR-D	25-Jun-21	NSC	119116	900 226001055388	892	995	6300	-	-
Nelson River (CL-GR)	BR-D	25-Jun-21	NSC	119117	900 226001225540	636	735	2000	-	-
Nelson River (CL-GR)	BR-D	22-Jun-21	NSC	119119	900 226001055358	755	861	4350	-	-

**Table A1-4: Tagging and biological information for Lake Sturgeon marked with Floy tags and PIT tags in the Keeyask reservoir (the Nelson River between Clark Lake and the Keeyask GS) and Stephens Lake, spring 2021 (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	21-Jun-21	NSC	119120	900 226001055304	794	889	3250	-	-
Nelson River (CL-GR)	BR-D	21-Jun-21	NSC	119121	900 226001225556	794	889	3700	-	-
Nelson River (CL-GR)	BR-D	21-Jun-21	NSC	119122	900 226001225623	856	970	3900	-	-
Nelson River (CL-GR)	BR-D	20-Jun-21	NSC	119123	900 226001055337	830	940	4300	-	-
Nelson River (CL-GR)	BR-D	20-Jun-21	NSC	119125	900 226001225606	795	901	3750	-	-
Nelson River (CL-GR)	BR-D	20-Jun-21	NSC	119129	900 226001225546	1020	1126	6900	-	-
Nelson River (CL-GR)	BR-D	26-Jun-21	NSC	119252	900 226001055322	755	865	3200	-	-
Nelson River (CL-GR)	BR-D	27-Jun-21	NSC	119253	900 226001055374	778	870	3100	-	-
Nelson River (CL-GR)	BR-D	28-Jun-21	NSC	119254	900 067000121469	480	544	750	-	-
Nelson River (CL-GR)	BR-D	29-Jun-21	NSC	119256	900 043000182276	541	622	1250	-	-
Nelson River (CL-GR)	GL-A	29-Jun-21	NSC	119258	900 226001055332	711	809	3550	-	-
Nelson River (CL-GR)	GL-B	30-Jun-21	NSC	119259	900 226001225500	915	1035	7650	-	-
Nelson River (CL-GR)	GL-B	30-Jun-21	NSC	119260	900 226001055373	810	924	3600	-	-
Nelson River (CL-GR)	BR-D	01-Jul-21	NSC	119261	900 043000182258	531	610	1350	-	-
Nelson River (CL-GR)	BR-D	01-Jul-21	NSC	119262	900 226001055412	828	934	5000	-	-
Nelson River (CL-GR)	BR-D	01-Jul-21	NSC	119263	900 226001055329	655	746	2600	-	-
Nelson River (CL-GR)	GL-A	01-Jul-21	NSC	119265	900 226001055424	675	775	2050	-	-
Nelson River (CL-GR)	GL-B	02-Jul-21	NSC	119268	900 226001055339	730	835	2900	-	-
Nelson River (CL-GR)	GL-B	02-Jul-21	NSC	119270	900 226001055303	752	854	3500	-	-
Nelson River (CL-GR)	BR-D	02-Jul-21	NSC	119271	900 226001055385	697	796	2600	-	-
Nelson River (CL-GR)	GL-C	03-Jul-21	NSC	119272	900 226001055394	796	900	3700	-	-
Nelson River (CL-GR)	GL-C	03-Jul-21	NSC	119273	900 226001055386	735	831	3500	-	-
Nelson River (CL-GR)	BR-D	26-Jun-21	NSC	119274	900 226001055315	780	885	5000	-	-
Stephens Lake	STL-A	04-Jun-21	NSC	119402	900 226001225292	915	1030	7000	-	-

**Table A1-5: Tagging and biological information for Lake Sturgeon marked with Floy tags and PIT tags in the Keeyask reservoir (the Nelson River between Clark Lake and the Keeyask GS) and Stephens Lake, spring 2021 (continued).**

Location	Zone	Date	Prefix	Floy Tag	Pit Tag	Fork Length (mm)	Total Length (mm)	Weight (g)	Sex	Maturity
Stephens Lake	STL-A	07-Jun-21	NSC	119403	900 226001225298	990	1100	8500	-	-
Stephens Lake	STL-A	07-Jun-21	NSC	119404	900 226001225205	855	947	6300	-	-
Stephens Lake	STL-A	07-Jun-21	NSC	119405	900 226001225270	784	880	4700	-	-
Stephens Lake	STL-A	07-Jun-21	NSC	119406	900 226001225253	525	590	1500	-	-
Stephens Lake	STL-A	07-Jun-21	NSC	119407	900 226001225207	855	963	7000	-	-
Stephens Lake	STL-A	07-Jun-21	NSC	119411	900 226001225285	943	1055	7000	-	-
Stephens Lake	STL-A	06-Jun-21	NSC	119412	900 226001225269	540	622	2000	-	-
Stephens Lake	STL-A	06-Jun-21	NSC	119414	900 226001225267	854	943	6000	-	-
Stephens Lake	STL-A	06-Jun-21	NSC	119415	900 226001225255	890	995	6000	-	-
Stephens Lake	STL-A	06-Jun-21	NSC	119416	900 226001225265	1056	1173	9600	-	-
Stephens Lake	STL-A	05-Jun-21	NSC	119417	900 226001225234	880	980	7000	-	-
Stephens Lake	STL-A	05-Jun-21	NSC	119418	900 226001225280	900	1005	8000	-	-
Stephens Lake	STL-A	05-Jun-21	NSC	119419	900 226000767244	610	680	2000	-	-
Stephens Lake	STL-A	05-Jun-21	NSC	119420	900 226001225219	868	975	9800	-	-
Stephens Lake	STL-A	05-Jun-21	NSC	119421	900 226001225239	805	920	6000	-	-
Stephens Lake	STL-A	05-Jun-21	NSC	119422	900 226001225254	955	1060	12000	-	-
Stephens Lake	STL-A	05-Jun-21	NSC	119423	900 226001225209	1210	1310	19500	-	-
Stephens Lake	STL-A	05-Jun-21	NSC	119424	900 226001225246	865	970	10500	-	-
Stephens Lake	GR-A	04-Jun-21	NSC	119425	900 226001225221	910	1020	11000	-	-
Stephens Lake	STL-A	04-Jun-21	NSC	120051	900 226001225283	897	1010	4900	-	-
Stephens Lake	STL-A	19-Jun-21	NSC	120052	900 226001225252	860	967	4600	-	-
Stephens Lake	STL-A	23-Jun-21	NSC	120054	900 067000113707	375	430	400	-	-
Stephens Lake	STL-B	22-Jun-21	NSC	120055	900 226001225290	955	1070	7400	-	-
Stephens Lake	STL-A	23-Jun-21	NSC	120056	900 226001225258	830	920	5300	-	-

**Table A1-6: Tagging and biological information for Lake Sturgeon marked with Floy tags and PIT tags in the Keeyask reservoir (the Nelson River between Clark Lake and the Keeyask GS) and Stephens Lake, spring 2021 (continued).**

Location	Zone	Date	Prefix	Floy Tag	Pit Tag	Fork Length (mm)	Total Length (mm)	Weight (g)	Sex	Maturity
Stephens Lake	STL-A	24-Jun-21	NSC	120060	900 226001225282	480	552	800	-	-
Stephens Lake	STL-A	25-Jun-21	NSC	120061	900 226001225238	775	882	3500	-	-
Stephens Lake	GR-A	26-Jun-21	NSC	120063	900 226001225256	760	857	3200	-	-
Stephens Lake	GR-A	29-Jun-21	NSC	120064	-	790	878	3150	-	-
Stephens Lake	GR-A	30-Jun-21	NSC	120065	-	901	1030	6100	-	-
Stephens Lake	GR-A	30-Jun-21	NSC	120066	-	863	960	5300	-	-
Stephens Lake	GR-A	01-Jul-21	NSC	120067	-	795	900	3800	-	-
Stephens Lake	STL-A	02-Jul-21	NSC	120068	-	790	883	3500	-	-
Stephens Lake	GR-A	03-Jul-21	NSC	120069	-	1055	1150	8800	-	-
Nelson River (CL-GR)	BR-D	10-Jun-21	NSC	120201	-	980	1080	8164.8	-	-
Nelson River (CL-GR)	BR-D	10-Jun-21	NSC	120202	-	925	1015	8164.8	-	-
Nelson River (CL-GR)	BR-D	10-Jun-21	NSC	120203	-	840	965	6350.4	-	-
Nelson River (CL-GR)	BR-D	10-Jun-21	NSC	120204	-	445	510	1360.8	-	-
Nelson River (CL-GR)	BR-D	12-Jun-21	NSC	120205	-	753	860	4082.4	-	-
Nelson River (CL-GR)	BR-D	12-Jun-21	NSC	120206	-	800	900	5896.8	-	-
Nelson River (CL-GR)	BR-D	10-Jun-21	NSC	120226	-	859	905	6350.4	-	-
Nelson River (CL-GR)	BR-D	20-Jun-21	NSC	120436	900 226001225582	755	840	2900	-	-
Nelson River (CL-GR)	BR-D	20-Jun-21	NSC	120437	900 226000767045	955	1060	8350	-	-
Nelson River (CL-GR)	BR-D	20-Jun-21	NSC	120438	900 226001055589	652	749	1900	-	-
Nelson River (CL-GR)	BR-D	20-Jun-21	NSC	120439	900 226001030951	1000	1100	7700	-	-
Nelson River (CL-GR)	BR-D	20-Jun-21	NSC	120440	900 226001055333	604	692	2100	-	-
Nelson River (CL-GR)	GL-A	20-Jun-21	NSC	120441	900 226001055379	757	841	3700	-	-
Nelson River (CL-GR)	BR-D	20-Jun-21	NSC	120443	900 226000327516	777	867	3700	-	-
Nelson River (CL-GR)	GL-A	20-Jun-21	NSC	120445	900 226001225593	779	878	4250	-	-

**Table A1-7: Tagging and biological information for Lake Sturgeon marked with Floy tags and PIT tags in the Keeyask reservoir (the Nelson River between Clark Lake and the Keeyask GS) and Stephens Lake, spring 2021 (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	20-Jun-21	NSC	120447	900 226001225597	1230	1341	12800	-	-
Nelson River (CL-GR)	GL-A	20-Jun-21	NSC	120448	900 043000182279	780	885	3400	-	-
Nelson River (CL-GR)	GL-A	20-Jun-21	NSC	120449	989 001038119613	871	985	4600	-	-
Nelson River (CL-GR)	GL-A	20-Jun-21	NSC	120450	900 226001225663,	1205	1331	13100	-	-
Nelson River (CL-GR)	BR-D	08-Jun-21	NSC	120801	900 226001225699	751	845	2800	-	-
Nelson River (CL-GR)	BR-D	08-Jun-21	NSC	120802	900 226001225640	1292	1409	17400	-	-
Nelson River (CL-GR)	BR-D	08-Jun-21	NSC	120803	900 226001225633	761	865	3500	-	-
Nelson River (CL-GR)	BR-D	09-Jun-21	NSC	120804	900 226001225604	982	1071	7400	-	-
Nelson River (CL-GR)	BR-D	09-Jun-21	NSC	120805	900 226001225626	1332	1491	22700	-	-
Nelson River (CL-GR)	BR-D	09-Jun-21	NSC	120806	900 226001225645	825	914	4300	-	-
Nelson River (CL-GR)	BR-D	09-Jun-21	NSC	120807	900 226001225632	753	855	3100	-	-
Nelson River (CL-GR)	BR-D	09-Jun-21	NSC	120808	900 226001225666	815	907	3800	-	-
Nelson River (CL-GR)	BR-D	14-Jun-21	NSC	120809	900 226001225503	791	892	4400	-	-
Nelson River (CL-GR)	BR-D	14-Jun-21	NSC	120810	900 226001225561	765	863	4580	-	-
Nelson River (CL-GR)	BR-D	14-Jun-21	NSC	120812	900 226001225544	810	897	4650	-	-
Nelson River (CL-GR)	BR-D	18-Jun-21	NSC	120815	900 226001225570	895	1025	5700	-	-
Nelson River (CL-GR)	BR-D	18-Jun-21	NSC	120816	900 043000182265	1110	1240	10500	-	-
Nelson River (CL-GR)	BR-D	16-Jun-21	NSC	120817	900 226001225656	801	905	3300	-	-
Nelson River (CL-GR)	BR-D	18-Jun-21	NSC	120818	900 043000182229	821	924	4250	-	-
Nelson River (CL-GR)	BR-D	18-Jun-21	NSC	120819	900 226001225506	961	1062	6400	-	-
Nelson River (CL-GR)	BR-D	18-Jun-21	NSC	120821	-	995	1120	8850	-	-
Nelson River (CL-GR)	BR-D	18-Jun-21	NSC	120822	-	905	1005	4550	M	8
Nelson River (CL-GR)	BR-D	18-Jun-21	NSC	120824	-	944	1260	-	-	-
Nelson River (CL-GR)	BR-D	19-Jun-21	NSC	120825	-	800	889	3500	-	-

**Table A1-8: Tagging and biological information for Lake Sturgeon marked with Floy tags and PIT tags in the Keeyask reservoir (the Nelson River between Clark Lake and the Keeyask GS) and Stephens Lake, spring 2021 (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	19-Jun-21	NSC	120826	-	765	881	3600	-	-
Nelson River (CL-GR)	BR-D	19-Jun-21	NSC	120829	-	1010	1033	7800	-	-
Stephens Lake	STL-A	03-Jul-21	NSC	122058	900 226001225287	590	668	1400	-	-
Nelson River (CL-GR)	BR-D	07-Jun-21	-	-	-	1156	1238	8700	-	-
Nelson River (CL-GR)	BR-D	10-Jun-21	-	-	-	1435	1575	24948	M	7
Stephens Lake	STL-A	25-Jun-21	-	-	900 043000182146	394	442	500	-	-
Stephens Lake	STL-A	06-Jun-21	-	-	900 067000113770	355	407	400	-	-
Stephens Lake	STL-A	16-Jun-21	-	-	900 226001225201	335	365	250	-	-
Stephens Lake	STL-A	15-Jun-21	-	-	900 226001225474	1075	1185	12000	-	-
Stephens Lake	STL-A	09-Jun-21	-	-	900 226001225428	380	435	-	-	-
Nelson River (CL-GR)	BR-D	31-May-21	-	-	900 067000112121	420	462	450	-	-
Nelson River (CL-GR)	BR-D	1-Jun-21	-	-	900 067000108643	401	458	525	-	-

## **APPENDIX 2: TAGGING AND BIOLOGICAL INFORMATION FOR LAKE STURGEON RECAPTURED IN THE KEEYASK RESERVOIR AND IN STEPHENS LAKE DURING SPRING, 2021.**

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Table A2-1: Tagging and biological information for Lake Sturgeon recaptured in the Keeyask reservoir and Stephens Lake, spring 2021. ....	64
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**Table A2-1: Tagging and biological information for Lake Sturgeon recaptured in the Keeyask reservoir and Stephens Lake, spring 2021. 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 2021 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
Nelson River (CL-GR)	BR-D	20-Jun-21	AAE	83	-	989 001038119653	-	-	4300	-	-
Nelson River (CL-GR)	BR-D	18-Jun-21	AAE	368	-	989 001038119615	795	906	3800	-	-
Nelson River (CL-GR)	BR-D	12-Jun-21	AAE	407	-	-	870	950	4536	-	-
Nelson River (CL-GR)	BR-D	9-Jun-21	AAE	438	-	989 001038119634	775	892	3800	-	-
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	2-Jun-01	NSC	46827	-	-	-	-	-	-	-
Nelson River (CL-GR)	BR-D	24-Jun-03	NSC	46827	-	-	964	1060	8165	-	-
Stephens Lake	GR-A	5-Jun-16	NSC	46827	-	900 226000548789	1120	1100	9072	-	-
Stephens Lake	STL-A	1-Jun-18	NSC	46827	-	900 226000548789	1044	1133	9208	M	8
Stephens Lake	STL-A	7-Jun-18	NSC	46827	-	900 226000548789	-	-	-	M	8
Stephens Lake	STL-A	5-Jun-21	NSC	46827	-	900 226000548789	1040	1133	9600	-	-
Nelson River (CL-GR)	BR-U	7-Jun-01	NSC	47127	-	-	908	1008	6250	M	8
Nelson River (CL-GR)	BR-D	7-Jun-21	NSC	47127	-	-	1021	1123	7580	-	-
Nelson River (CL-GR)	GL-C	7-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	6
Nelson River (CL-GR)	GL-A	15-Jun-18	NSC	47181	-	900 226000767025	-	-	-	-	-
Nelson River (CL-GR)	BR-D	22-Jun-18	NSC	47181	-	900 226000767025	-	-	-	-	-
Stephens Lake	STL-A	5-Jun-21	NSC	47181	-	900 226000767025	1050	1165	10000	M	7

**Table A2-2: Tagging and biological information for Lake Sturgeon recaptured in the Keeyask reservoir and Stephens Lake, spring 2021. 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 2021 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	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	5-Jun-06	NSC	48926	-	-	1321	1440	21772	-	-
Nelson River (CL-GR)	GL-C	9-Jun-16	NSC	48926	-	900 226000768497	-	-	-	-	-
Nelson River (CL-GR)	BR-D	7-Jun-18	NSC	48926	-	900 226000768497	1370	1500	26490	-	-
Nelson River (CL-GR)	GL-C	3-Jul-21	NSC	48926	-	900 226000768497	1184	1300	13381	-	-
Nelson River (CL-GR)	GL-B	3-Jun-03	NSC	50808	-	-	1015	1132	12000	-	-
Nelson River (CL-GR)	BR-D	1-Jul-06	NSC	50808	-	-	1130	1255	13154	-	-
Nelson River (CL-GR)	GL-B	19-Aug-06	NSC	50808	-	-	1134	1259	-	-	-
Nelson River (CL-GR)	GL-C	16-Jun-11	NSC	50808	-	-	1260	1375	19958	-	-
Stephens Lake	GR-A	3-Jun-19	NSC	50808	-	900 226000327776	1371	1510	19504	-	-
Stephens Lake	STL-A	5-Jun-21	NSC	50808	-	900 226000327776	1380	1500	25000	-	-
Stephens Lake	STL-B	27-Sep-11	NSC	69864	-	-	756	861	4125	-	-
Stephens Lake	STL-A	4-Jun-16	NSC	69864	-	900 226000548931	927	1040	9525	-	-
Stephens Lake	GR-A	8-Jun-16	NSC	69864	-	-	-	-	-	-	-
Stephens Lake	GR-A	9-Jun-16	NSC	69864	-	-	-	-	-	-	-
Stephens Lake	STL-A	30-May-18	NSC	69864	-	900 226000548931	987	1111	8800	-	-
Stephens Lake	STL-A	29-Jun-21	NSC	69864	-	900 226000548931	1030	1154	10000	-	-
Stephens Lake	STL-A	26-Sep-11	NSC	69866	-	-	863	962	7711	-	-
Stephens Lake	STL-A	28-Jun-21	NSC	69866	-	900 226001225297	975	1070	7000	-	-
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	STL-A	18-Jun-21	NSC	69872	-	900 226000152961	905	1019	6000	-	-

**Table A2-3: Tagging and biological information for Lake Sturgeon recaptured in the Keeyask reservoir and Stephens Lake, spring 2021. 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 2021 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	12-Jun-11	NSC	74415	-	-	1116	1239	11793	-	-
Nelson River (CL-GR)	GL-C	14-Jun-16	NSC	74415	-	900 226000153870	1262	1500	18144	-	-
Nelson River (CL-GR)	BR-D	3-Jun-21	NSC	74415	-	900 226000153870	1192	1318	15000	-	-
Nelson River (CL-GR)	BR-D	21-Sep-08	NSC	75305	-	-	892	1020	6804	-	-
Nelson River (CL-GR)	BR-D	21-Jun-21	NSC	75305	-	-	1150	1290	16450	-	-
Nelson River (CL-GR)	GL-C	15-Sep-08	NSC	75343	-	-	701	790	2850	-	-
Nelson River (CL-GR)	BR-D	25-Jun-21	NSC	75343	-	900 226001055372	1010	1120	7400	-	-
Nelson River (CL-GR)	GL-C	24-Jun-06	NSC	76329	-	-	851	915	5670	-	-
Nelson River (CL-GR)	GL-C	22-Jun-12	NSC	76329	-	-	1035	1200	10433	-	-
Nelson River (CL-GR)	GL-B	21-Jun-14	NSC	76329	-	900 226000629021	1054	1155	9525	-	-
Nelson River (CL-GR)	BR-D	22-Jun-21	NSC	76329	76328	900 226000629021	1123	1221	11350	-	-
Nelson River (CL-GR)	BR-D	1-Jul-06	NSC	76370	-	-	824	915	4536	-	-
Nelson River (CL-GR)	BR-D	3-Jun-21	NSC	76370	76371	900 226001225543	1038	1420	7600	M	7
Nelson River (CL-GR)	BR-D	16-Jun-21	NSC	76370	76371	900 226001225543	-	-	-	M	7
Nelson River (CL-GR)	GL-B	1-Jul-06	NSC	76376	76377	-	706	-	2722	-	-
Nelson River (CL-GR)	BR-D	3-Jun-21	NSC	76376	76377	900 226000153883	1022	1134	8250	-	-
Nelson River (CL-GR)	GL-A	17-Jun-06	NSC	76401	76411	-	758	859	3629	-	-
Nelson River (CL-GR)	GL-B	2-Jun-10	NSC	76401	76411	-	924	1001	7484	-	-
Nelson River (CL-GR)	BR-D	3-Jun-21	NSC	76401	76411	900 226001225534	1127	1215	10900	-	-
Nelson River (CL-GR)	GL-C	17-Jun-06	NSC	76406	-	-	1085	1194	11340	-	-
Nelson River (CL-GR)	GL-C	24-Jun-16	NSC	76406	-	900 226000768440	1284	1404	20865	-	-
Nelson River (CL-GR)	BR-D	28-Jun-21	NSC	76406	76320	900 226000768440	1300	1435	17400	-	-

**Table A2-4: Tagging and biological information for Lake Sturgeon recaptured in the Keeyask reservoir and Stephens Lake, spring 2021. 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 2021 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	17-Jun-06	NSC	76410	-	-	758	859	3629	-	-
Nelson River (CL-GR)	GL-B	2-Jun-10	NSC	76410	-	-	924	1001	7484	-	-
Nelson River (CL-GR)	BR-D	14-Jun-21	NSC	76410	76411	900 226001225534	1120	1227	12150	-	-
Nelson River (CL-GR)	BR-D	20-Jun-06	NSC	76427	-	-	970	1069	7938	-	-
Nelson River (CL-GR)	BR-D	27-Jun-06	NSC	76427	-	-	-	-	-	-	-
Nelson River (CL-GR)	BR-D	31-May-21	NSC	76427	-	900 226001225567	1099	1238	10000	-	-
Nelson River (CL-GR)	BR-D	3-Jun-21	NSC	76427	-	900 226001225567	1091	1295	8680	M	7
Nelson River (CL-GR)	BR-D	6-Jun-21	NSC	76427	-	900 226001225567	-	-	-	-	-
Nelson River (CL-GR)	BR-D	13-Jun-21	NSC	76427	-	900 226001225567	1091	1295	8680	M	7
Nelson River (CL-GR)	BR-D	14-Jun-21	NSC	76427	-	900 226001225567	-	-	-	-	-
Nelson River (CL-GR)	BR-D	15-Jun-06	NSC	76485	-	-	960	1046	7257	-	-
Nelson River (CL-GR)	BR-D	16-Jun-11	NSC	76485	-	-	1026	1133	7711	M	8
Nelson River (CL-GR)	GL-C	16-Jun-16	NSC	76485	-	900 226000768402	1055	-	9525	-	-
Nelson River (CL-GR)	BR-D	28-Jun-21	NSC	76485	76484	900 226000768402	1065	1200	9700	-	-
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)	BR-D	18-Jun-21	NSC	77503	-	900 226000767057	-	-	-	-	-
Nelson River (CL-GR)	GL-B	27-Jun-21	NSC	77503	-	900 226000767057	-	-	-	-	-
Nelson River (CL-GR)	BR-D	16-Jun-11	NSC	77508	-	-	1072	1195	10886	M	7
Nelson River (CL-GR)	GL-A	22-May-16	NSC	77508	-	-	1093	1226	12927	M	7
Nelson River (CL-GR)	BR-D	18-Jun-21	NSC	77508	-	900 226001225565	1110	1230	8500	M	8

**Table A2-5: Tagging and biological information for Lake Sturgeon recaptured in the Keeyask reservoir and Stephens Lake, spring 2021. 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 2021 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	18-Aug-06	NSC	80114	-	-	790	860	3856	-	-
Nelson River (CL-GR)	GL-C	30-Jun-14	NSC	80114	-	900 226000629033	960	1075	6804	-	-
Stephens Lake	STL-A	30-May-18	NSC	80114	-	900 226000629033	1018	1129	7700	-	-
Stephens Lake	STL-B	22-Jun-21	NSC	80114	80113	900 226000629033	1020	1135	7500	-	-
Nelson River (CL-GR)	BR-D	4-Jun-06	NSC	80222	-	-	1080	1189	10400	-	-
Nelson River (CL-GR)	GL-B	22-Jun-14	NSC	80222	-	900 226000629109	1115	1234	11340	-	-
Nelson River (CL-GR)	BR-D	8-Jun-21	NSC	80222	80223	900 226000629109	1131	1244	10400	-	-
Nelson River (CL-GR)	BR-D	4-Jun-06	NSC	80228	-	-	1180	1285	12020	M	7
Nelson River (CL-GR)	BR-D	6-Jun-06	NSC	80228	-	-	-	-	-	-	-
Nelson River (CL-GR)	BR-D	14-Jun-14	NSC	80228	-	900 226000629176	1230	1330	14969	M	8
Nelson River (CL-GR)	GL-B	21-Jun-16	NSC	80228	-	900 226000629176	1240	1365	19731	-	-
Nelson River (CL-GR)	GL-C	17-Jun-18	NSC	80228	-	900 226000629176	1245	1360	16193	-	-
Nelson River (CL-GR)	BR-D	10-Jun-21	NSC	80228	80227	-	1290	1465	15876	M	8
Nelson River (CL-GR)	BR-D	26-May-06	NSC	80253	-	-	1080	1175	10433	-	-
Nelson River (CL-GR)	BR-D	4-Jun-06	NSC	80253	-	-	-	-	-	-	-
Nelson River (CL-GR)	BR-D	5-Jun-06	NSC	80253	-	-	-	-	-	-	-
Nelson River (CL-GR)	GL-C	1-Jul-06	NSC	80253	-	-	-	-	-	-	-
Nelson River (CL-GR)	BR-D	3-Jun-21	NSC	80253	-	900 226001225538	1192	1272	13400	-	-
Nelson River (CL-GR)	BR-D	26-May-06	NSC	80256	-	-	1185	1270	13608	M	7
Nelson River (CL-GR)	BR-D	5-Jun-06	NSC	80256	-	-	-	-	-	-	-
Nelson River (CL-GR)	BR-D	9-Jun-14	NSC	80256	-	900 226000629038	1268	1385	15422	M	7
Nelson River (CL-GR)	BR-D	21-Jun-21	NSC	80256	-	900 226000629038	1280	1371	17300	-	-

**Table A2-6: Tagging and biological information for Lake Sturgeon recaptured in the Keeyask reservoir and Stephens Lake, spring 2021. 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 2021 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	80270	-	-	1258	1373	15876	-	-
Nelson River (CL-GR)	GL-B	20-Aug-06	NSC	80270	-	-	-	-	-	-	-
Nelson River (CL-GR)	GL-B	17-Jun-10	NSC	80270	-	-	1260	1390	17690	-	-
Nelson River (CL-GR)	BR-D	3-Jun-21	NSC	80270	-	-	1319	1446	21500	-	-
Nelson River (CL-GR)	BR-D	2-Jun-06	NSC	80299	-	-	1061	1150	8600	-	-
Nelson River (CL-GR)	GL-A	7-Jun-18	NSC	80299	-	900 226000767098	1155	1253	14016	-	-
Nelson River (CL-GR)	BR-D	8-Jun-21	NSC	80299	80300	900 226000767098	1141	1254	10000	-	-
Nelson River (CL-GR)	BR-D	18-Jun-21	NSC	80299	80300	900 226000767098	-	-	-	-	-
Nelson River (CL-GR)	BR-D	10-Jun-08	NSC	80366	-	-	856	925	4763	-	-
Nelson River (CL-GR)	GL-B	24-Jun-16	NSC	80366	-	900 226000153822	1028	1132	9299	-	-
Nelson River (CL-GR)	BR-D	13-Sep-19	NSC	80366	-	900 226000153822	1060	1160	8550	-	-
Nelson River (CL-GR)	BR-D	30-May-21	NSC	80366	-	900 226000153822	1046	1156	8000	-	-
Nelson River (CL-GR)	GL-B	20-Aug-06	NSC	82606	-	-	764	862	4445	-	-
Nelson River (CL-GR)	GL-B	26-Aug-06	NSC	82606	-	-	753	847	4264	-	-
Nelson River (CL-GR)	BR-D	15-Jun-12	NSC	82606	-	-	905	1005	7257	-	-
Nelson River (CL-GR)	BR-D	26-May-18	NSC	82606	-	900 226000767069	990	1011	7711	-	-
Nelson River (CL-GR)	BR-D	9-Jun-21	NSC	82606	82605	900 226000767069	909	1119	7900	-	-
Nelson River (CL-GR)	GL-B	26-Aug-06	NSC	82641	-	-	653	741	2495	-	-
Nelson River (CL-GR)	BR-D	23-May-16	NSC	82641	-	-	974	1092	7484	M	7
Nelson River (CL-GR)	BR-U	31-May-18	NSC	82641	-	-	983	1104	6804	M	7
Nelson River (CL-GR)	BR-D	23-Jun-21	NSC	82641	82640	900 226001055356	1000	1120	8300	-	-
Nelson River (CL-GR)	GL-B	23-Sep-08	NSC	87241	-	-	692	788	-	-	-
Nelson River (CL-GR)	GL-B	29-Jun-21	NSC	87241	-	900 226001055325	965	1025	8300	-	-

**Table A2-7: Tagging and biological information for Lake Sturgeon recaptured in the Keeyask reservoir and Stephens Lake, spring 2021. 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 2021 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	23-Sep-08	NSC	87245	-	-	729	821	-	-	-
Nelson River (CL-GR)	BR-D	23-May-16	NSC	87245	-	-	880	982	5670	M	7
Nelson River (CL-GR)	BR-D	1-Jun-21	NSC	87245	-	900 226001225504	918	992	5200	-	-
Nelson River (CL-GR)	GL-B	24-Sep-10	NSC	87856	-	-	350	399	300	-	-
Nelson River (CL-GR)	GL-A	2-Jul-21	NSC	87856	-	900 226001055311	726	820	3150	-	-
Nelson River (CL-GR)	GL-C	25-Sep-10	NSC	87863	-	-	620	730	1850	-	-
Nelson River (CL-GR)	GL-C	29-Jun-14	NSC	87863	-	900 226000629061	773	893	3175	-	-
Nelson River (CL-GR)	BR-D	16-Jun-21	NSC	87863	-	900 226000629061	924	1066	6300	-	-
Nelson River (CL-GR)	BR-D	20-Jun-21	NSC	87863	-	900 226000629061	-	-	-	-	-
Stephens Lake	STL-A	26-Sep-14	NSC	88477	-	900 226000629330	699	767	2750	-	-
Stephens Lake	STL-A	31-May-19	NSC	88477	-	900 226000629330	850	936	4536	-	-
Stephens Lake	STL-A	6-Jun-21	NSC	88477	-	900 226000629330	885	970	5000	-	-
Stephens Lake	STL-B	26-Sep-10	NSC	88767	-	-	304	403	310	-	-
Stephens Lake	STL-A	13-Sep-12	NSC	88767	-	-	501	564	575	-	-
Stephens Lake	STL-A	26-Sep-14	NSC	88767	-	900 226000629444	623	701	1650	-	-
Stephens Lake	STL-A	9-Jun-21	NSC	88767	-	900 226000629444	840	935	5000	-	-
Stephens Lake	STL-B	26-Sep-10	NSC	88770	-	-	661	752	2460	-	-
Stephens Lake	STL-B	27-Sep-10	NSC	88770	-	-	-	-	-	-	-
Stephens Lake	GR-A	6-Jun-18	NSC	88770	-	900 226000152969	875	980	5579	-	-
Stephens Lake	GR-A	9-Jun-21	NSC	88770	-	900 226000152969	910	1020	7500	-	-

**Table A2-8: Tagging and biological information for Lake Sturgeon recaptured in the Keeyask reservoir and Stephens Lake, spring 2021. 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 2021 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	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	1-Jun-18	NSC	88788	-	900 226000548905	1038	1154	9389	-	-
Stephens Lake	STL-A	4-Jun-18	NSC	88788	-	900 226000548905	-	-	-	-	-
Stephens Lake	STL-A	5-Jun-18	NSC	88788	-	900 226000548905	-	-	-	-	-
Stephens Lake	GR-A	9-Jun-18	NSC	88788	-	900 226000548905	-	-	-	-	-
Stephens Lake	STL-A	6-Jun-21	NSC	88788	-	900 226000548905	1085	1205	9600	-	-
Stephens Lake	STL-B	17-Jun-15	NSC	89016	-	900 226000628824	930	1042	7484	-	-
Stephens Lake	STL-A	22-Jun-15	NSC	89016	-	900 226000628824	-	-	-	-	-
Stephens Lake	STL-B	26-Jun-15	NSC	89016	-	900 226000628824	-	-	-	-	-
Stephens Lake	STL-A	6-Jun-21	NSC	119409	-	900 226000628824	1000	1072	8500	-	-
Nelson River (CL-GR)	GL-B	7-Aug-09	NSC	89677	-	-	889	991	6000	-	-
Nelson River (CL-GR)	BR-D	3-Jun-21	NSC	89677	-	-	1042	1162	8250	-	-
Stephens Lake	STL-A	18-Sep-09	NSC	89858	-	-	579	660	-	-	-
Stephens Lake	STL-A	1-Jun-18	NSC	89858	-	900 226000893435	926	1036	6985	M	8
Stephens Lake	STL-A	6-Jun-18	NSC	89858	-	900 226000893435	-	-	-	-	-
Stephens Lake	STL-A	30-Jun-18	NSC	89858	-	900 226000893435	-	-	-	-	-
Stephens Lake	GR-A	23-Jun-21	NSC	89858	-	900 226000893435	958	1071	7900	-	-
Nelson River (CL-GR)	GL-B	16-Sep-14	NSC	90275	-	900 226000629300	537	606	1025	-	-
Nelson River (CL-GR)	BR-D	19-Jun-21	NSC	90275	-	900 226000629300	806	900	3600	-	-
Nelson River (CL-GR)	GL-B	26-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)	BR-D	10-Jun-21	NSC	91384	-	-	900	1020	6350	-	-



**Table A2-9: Tagging and biological information for Lake Sturgeon recaptured in the Keeyask reservoir and Stephens Lake, spring 2021. 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 2021 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	29-Sep-11	NSC	91708	-	-	405	462	450	-	-
Stephens Lake	STL-B	25-Jun-21	NSC	91708	-	900 226001225218	880	1005	5300	-	-
Stephens Lake	STL-A	30-Sep-11	NSC	91715	-	-	434	497	550	-	-
Stephens Lake	STL-A	30-Sep-11	NSC	91721	-	-	440	500	725	-	-
Stephens Lake	STL-B	4-Jun-21	NSC	91721	-	900 226001225257	840	940	9500	-	-
Nelson River (CL-GR)	GL-B	20-Sep-11	NSC	93860	-	-	447	510	600	-	-
Nelson River (CL-GR)	BR-D	29-Jun-21	NSC	93860	-	900 226001225541	791	890	4300	-	-
Nelson River (CL-GR)	GL-B	20-Sep-11	NSC	93865	-	-	586	656	1600	-	-
Nelson River (CL-GR)	GL-B	2-Jul-21	NSC	93865	-	900 226001055316	885	991	5900	-	-
Nelson River (CL-GR)	GL-C	17-Jun-10	NSC	94023	-	-	760	850	4082	-	-
Nelson River (CL-GR)	GL-A	28-May-18	NSC	94023	-	900 226000893930	934	1018	7666	M	6
Nelson River (CL-GR)	BR-D	3-Jun-21	NSC	94023	-	900 226000893930	941	1042	6800	-	-
Nelson River (CL-GR)	BR-D	6-Jun-21	NSC	94023	-	900 226000893930	-	-	-	-	-
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-D	18-Jun-21	NSC	94048	-	900 226001225530	967	1075	6400	-	-
Stephens Lake	GR-A	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	15-Jun-21	NSC	94238	-	900 226001225422	780	880	6000	-	-
Stephens Lake	STL-B	29-Sep-10	NSC	94243	-	-	340	390	3010	-	-
Stephens Lake	STL-A	24-Jun-21	NSC	94243	-	900 226001225217	777	879	3700	-	-
Stephens Lake	STL-A	18-Sep-12	NSC	94968	-	-	487	564	900	-	-
Stephens Lake	STL-B	5-Jun-21	NSC	94968	-	900 226000893323	805	920	4500	-	-

**Table A2-10: Tagging and biological information for Lake Sturgeon recaptured in the Keeyask reservoir and Stephens Lake, spring 2021. 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 2021 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	22-Sep-12	NSC	100140	-	-	610	680	1725	-	-
Stephens Lake	STL-B	22-Jun-21	NSC	100140	-	900 226001225208	870	905	5000	-	-
Stephens Lake	STL-A	22-Sep-12	NSC	100151	-	-	740	833	3325	-	-
Stephens Lake	STL-B	31-May-19	NSC	100151	-	900 226000327771	890	996	5897	-	-
Stephens Lake	STL-A	2-Jun-21	NSC	100151	-	900 226000327771	910	1005	11500	-	-
Stephens Lake	STL-A	24-Jun-21	NSC	100151	-	900 226000327771	-	-	-	-	-
Stephens Lake	STL-B	23-Sep-12	NSC	100162	-	-	488	544	800	-	-
Stephens Lake	GR-A	31-May-19	NSC	100162	-	900 226000327713	830	917	4536	-	-
Stephens Lake	STL-A	6-Jun-21	NSC	100162	119410	900 226000327713	875	967	6000	-	-
Stephens Lake	STL-A	3-Jun-12	NSC	100409	-	-	1100	1212	12927	-	-
Stephens Lake	GR-A	3-Jun-21	NSC	100409	-	900 226001225204	1215	1355	19500	-	-
Nelson River (CL-GR)	GL-B	11-Jun-12	NSC	100425	-	-	831	938	4536	-	-
Nelson River (CL-GR)	GL-B	25-Jun-14	NSC	100425	-	900 226000629108	884	991	5443	-	-
Nelson River (CL-GR)	GL-B	27-Jun-16	NSC	100425	-	900 226000629108	934	1042	7257	-	-
Nelson River (CL-GR)	BR-D	20-Jun-21	NSC	100425	-	900 226000629108	1000	1115	8300	-	-
Nelson River (CL-GR)	GL-B	28-Jun-12	NSC	100454	-	-	1320	1440	23587	-	-
Nelson River (CL-GR)	BR-D	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	-	-
Nelson River (CL-GR)	BR-D	20-Jun-21	NSC	100454	-	900 226000767095	1350	1467	23300	-	-
Nelson River (CL-GR)	GL-C	30-Aug-12	NSC	100471	-	-	465	535	575	-	-
Nelson River (CL-GR)	GL-B	2-Jul-21	NSC	100471	-	900 226001055309	850	964	4350	-	-
Stephens Lake	STL-A	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-A	6-Jun-21	NSC	100651	-	900 226000893786	850	955	5000	-	-

**Table A2-11: Tagging and biological information for Lake Sturgeon recaptured in the Keeyask reservoir and Stephens Lake, spring 2021. 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 2021 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	19-Sep-17	NSC	100658	-	900 226000628317	725	822	3050	-	-
Stephens Lake	SRL-A	3-Jun-21	NSC	100658	-	900 226000628317	812	925	9500	-	-
Stephens Lake	STL-A	19-Sep-14	NSC	101042	-	900 226000629370	578	645	1750	-	-
Stephens Lake	STL-A	15-Sep-16	NSC	101042	-	900 226000629370	650	735	2280	-	-
Stephens Lake	STL-A	23-Jun-21	NSC	101042	-	900 226000629370	800	902	4700	-	-
Nelson River (CL-GR)	GL-B	21-Jun-14	NSC	101380	-	900 226000629075	854	958	4990	-	-
Nelson River (CL-GR)	BR-D	3-Jun-21	NSC	101380	-	900 226000629075	999	1115	11250	-	-
Nelson River (CL-GR)	GL-B	23-Jun-14	NSC	101449	-	900 226000629088	830	940	4990	-	-
Nelson River (CL-GR)	GL-B	6-Jul-14	NSC	101449	-	900 226000629088	-	-	-	-	-
Nelson River (CL-GR)	GL-A	13-Jun-16	NSC	101449	-	900 226000629088	882	990	6123	-	-
Stephens Lake	STL-B	28-Sep-15	NSC	101489	-	900 226000548603	712	754	2400	-	-
Stephens Lake	STL-A	26-Jun-21	NSC	120062	-	900 226000548603	860	930	4350	-	-
Stephens Lake	STL-B	25-Sep-15	NSC	101996	-	900 226000703426	632	684	2000	-	-
Stephens Lake	STL-B	15-Sep-16	NSC	101996	-	900 226000703426	683	766	2720	-	-
Stephens Lake	GR-A	5-Jun-21	NSC	101996	-	900 226000703426	835	925	5000	M	7
Stephens Lake	STL-B	17-Sep-13	NSC	103237	-	-	500	571	1075	-	-
Stephens Lake	STL-B	21-Jun-18	NSC	103237	-	900 226000768666	711	811	3400	-	-
Stephens Lake	STL-A	22-Jun-21	NSC	103237	-	900 226000768666	765	865	4200	-	-
Stephens Lake	STL-A	13-Sep-12	NSC	103601	-	-	548	621	1420	-	-
Stephens Lake	STL-A	29-Jun-21	NSC	103601	-	900 226001225228	845	957	5200	-	-
Stephens Lake	STL-A	16-Sep-12	NSC	103619	-	-	505	575	1275	-	-
Stephens Lake	STL-A	16-Jun-21	NSC	103619	-	-	-	-	-	-	-

**Table A2-12: Tagging and biological information for Lake Sturgeon recaptured in the Keeyask reservoir and Stephens Lake, spring 2021. 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 2021 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	17-Sep-12	NSC	103620	-	-	816	910	4050	-	-
Stephens Lake	STL-A	30-Jun-18	NSC	103620	-	900 226000767456	1075	1198	11022	-	-
Stephens Lake	STL-A	16-Jun-21	NSC	103620	-	900 226000767456	1130	1230	14000	-	-
Nelson River (CL-GR)	GL-B	5-Jul-14	NSC	105116	-	900 226000629217	736	814	3550	-	-
Nelson River (CL-GR)	BR-D	9-Jun-21	NSC	105116	-	900 226000629217	862	971	5890	-	-
Stephens Lake	STL-A	4-Jul-14	NSC	105123	-	900 226000629193	893	969	5897	-	-
Stephens Lake	STL-B	3-Jul-21	NSC	105123	-	-	1045	1165	9500	-	-
Nelson River (CL-GR)	BR-D	15-Jun-14	NSC	105408	-	900 226000629031	805	903	4763	M	9
Nelson River (CL-GR)	BR-D	10-Jun-21	NSC	105408	-	-	890	1000	6350	-	-
Nelson River (CL-GR)	BR-D	15-Jun-14	NSC	105409	-	900 226000629201	956	1063	7257	-	-
Nelson River (CL-GR)	BR-D	1-Jun-18	NSC	105409	-	900 226000629201	999	1141	9163	M	7
Nelson River (CL-GR)	BR-D	31-May-21	NSC	105409	-	900 226000629201	1010	1112	9500	-	-
Nelson River (CL-GR)	BR-D	21-Jun-21	NSC	105409	-	900 226000629201	-	-	-	-	-
Nelson River (CL-GR)	GL-C	15-Jun-14	NSC	105410	-	900 226000629139	945	1060	6577	-	-
Nelson River (CL-GR)	BR-D	18-Jun-21	NSC	105410	-	900 226000629139	1076	1210	10200	-	-
Nelson River (CL-GR)	BR-D	20-Jun-21	NSC	105410	-	900 226000629139	-	-	-	-	-
Nelson River (CL-GR)	GL-B	27-Jun-16	NSC	106985	-	900 226000153869	802	865	4990	-	-
Nelson River (CL-GR)	BR-D	5-Jun-21	NSC	106985	-	-	824	881	4800	M	7
Stephens Lake	STL-B	16-Jun-16	NSC	107109	-	900 226000153831	-	-	6350	-	-
Stephens Lake	STL-A	23-Jun-21	NSC	107109	-	900 226000153871	985	1095	7700	-	-

**Table A2-13: Tagging and biological information for Lake Sturgeon recaptured in the Keeyask reservoir and Stephens Lake, spring 2021. 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 2021 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	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)	BR-D	28-May-19	NSC	107113	-	900 226000768436	1034	1145	8165	-	-
Nelson River (CL-GR)	BR-D	18-Jun-21	NSC	107113	-	900 226000768436	1045	1160	7550	-	-
Nelson River (CL-GR)	BR-D	15-Jun-21	NSC	107113	-	900 226000768436	-	-	-	-	-
Nelson River (CL-GR)	BR-D	20-Jun-21	NSC	107113	-	900 226000768436	-	-	-	-	-
Nelson River (CL-GR)	BR-D	15-Jun-16	NSC	107116	-	900 226000153800	687	772	3402	-	-
Nelson River (CL-GR)	BR-D	6-Jun-21	NSC	107116	-	900 226000768436	790	882	3629	-	-
Nelson River (CL-GR)	GL-C	3-Jun-16	NSC	107211	-	900 226000768582	1000	1182	12701	-	-
Nelson River (CL-GR)	BR-D	27-Jun-21	NSC	107211	-	900 226000768582	1205	1317	17300	-	-
Nelson River (CL-GR)	GL-C	22-Jun-16	NSC	107704	-	900 226000153821	845	936	6123	-	-
Nelson River (CL-GR)	BR-D	3-Jun-21	NSC	117034	-	900 226000153821	891	987	6690	-	-
Nelson River (CL-GR)	GL-B	23-Jun-16	NSC	107711	-	900 226000153806	642	724	2268	-	-
Nelson River (CL-GR)	BR-D	23-Jun-21	NSC	107711	-	900 226000153806	783	869	4600	-	-
Nelson River (CL-GR)	GL-C	12-Sep-17	NSC	109561	-	900 226000154205	768	975	3400	-	-
Nelson River (CL-GR)	BR-D	10-Jun-21	NSC	109561	-	-	835	980	5443	-	-
Nelson River (CL-GR)	GL-B	23-Sep-16	NSC	109998	-	900 226000767186	718	811	2870	-	-
Stephens Lake	STL-A	15-Jun-21	NSC	109998	-	900 226000767186	860	965	7000	-	-
Nelson River (CL-GR)	GL-C	23-Sep-16	NSC	109999	-	900 226000768861	674	772	2530	-	-
Stephens Lake	STL-A	20-Sep-19	NSC	109999	-	900 226000768861	784	888	3600	-	-
Stephens Lake	STL-B	7-Jun-21	NSC	109999	-	900 226000768861	810	915	6000	-	-
Stephens Lake	STL-A	28-May-16	NSC	110407	-	900 226000548970	865	980	4536	-	-
Stephens Lake	STL-B	9-Jun-21	NSC	110407	-	900 226000548970	970	1085	7000	-	-

**Table A2-14: Tagging and biological information for Lake Sturgeon recaptured in the Keeyask reservoir and Stephens Lake, spring 2021. 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 2021 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-Jun-16	NSC	110462	-	900 226000548881	1065	1178	10433	-	-
Stephens Lake	STL-A	2-Jun-21	NSC	110462	-	900 226000548881	1120	1230	14000	-	-
Stephens Lake	STL-A	22-May-16	NSC	110550	-	-	1430	1549	26082	-	-
Stephens Lake	STL-A	2-Jun-21	NSC	110550	-	900 226000767128	805	915	9000	-	-
Stephens Lake	GR-A	18-Sep-16	NSC	110555	-	900 226000768014	610	690	2180	-	-
Stephens Lake	STL-A	22-Jun-21	NSC	110555	-	900 226000768014	705	763	3000	-	-
Stephens Lake	STL-A	22-Jun-21	NSC	110555	-	900 226000768014	-	-	-	-	-
Stephens Lake	STL-A	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-B	24-Jun-21	NSC	110556	-	900 226000767140	837	936	4400	-	-
Stephens Lake	STL-A	19-Sep-16	NSC	110570	-	900 043000103816	274	315	130	-	-
Stephens Lake	STL-B	21-Sep-17	NSC	110570	-	900 043000103816	368	427	325	-	-
Stephens Lake	STL-A	18-Jun-21	NSC	110570	-	900 226001225407	525	600	1000	-	-
Stephens Lake	STL-A	21-Sep-16	NSC	110571	-	900 043000103532	741	835	3470	-	-
Stephens Lake	STL-A	22-Jun-21	NSC	110571	-	900 043000103532	851	942	4800	-	-
Stephens Lake	STL-A	14-Sep-16	NSC	110596	-	900 226000767136	730	821	2800	-	-
Stephens Lake	STL-A	15-Jun-21	NSC	110596	-	900 226000767136	890	997	6500	-	-
Stephens Lake	STL-A	22-Jun-18	NSC	110710	-	900 226000767409	978	1091	8550	-	-
Stephens Lake	GR-A	4-Jun-19	NSC	110710	-	900 226000767409	1003	1123	8618	-	-
Stephens Lake	GR-A	16-Jun-21	NSC	117295	-	900 226000767409	1010	1130	11000	-	-
Stephens Lake	STL-A	21-Jun-18	NSC	110712	-	900 226000154057	1251	1390	16057	-	-
Stephens Lake	STL-A	24-Jun-21	NSC	120057	-	900 226000154057	1250	1388	14000	-	-

**Table A2-15: Tagging and biological information for Lake Sturgeon recaptured in the Keeyask reservoir and Stephens Lake, spring 2021. 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 2021 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	20-Jun-18	NSC	110716	-	900 226000154014	1050	1164	4990	-	-
Stephens Lake	STL-B	3-Jun-19	NSC	110716	-	900 226000154014	1065	1181	12020	-	-
Stephens Lake	STL-A	14-Jun-21	NSC	110716	-	900 226000154014	1090	1205	13000	-	-
Stephens Lake	STL-A	20-Jun-18	NSC	110717	-	900 226000768903	602	675	1750	-	-
Stephens Lake	STL-A	14-Jun-21	NSC	110717	-	900 226000768903	706	785	3000	-	-
Stephens Lake	STL-A	14-Jun-18	NSC	110724	-	900 226000153814	812	895	4750	-	-
Stephens Lake	STL-A	22-Jun-18	NSC	110724	-	900 226000153814	-	-	-	-	-
Stephens Lake	STL-A	31-May-21	NSC	110724	-	900 226000153814	890	975	7500	-	-
Stephens Lake	STL-A	11-Jun-16	NSC	110993	-	900 226000548802	945	1060	7257	-	-
Stephens Lake	STL-A	4-Jun-18	NSC	110993	-	900 226000548802	778	1095	7200	-	-
Stephens Lake	GR-A	31-May-21	NSC	110993	-	900 226001225289	990	1025	7500	M	7
Nelson River (CL-GR)	GL-B	16-Sep-17	NSC	111042	-	900 226000154258	618	709	1950	-	-
Nelson River (CL-GR)	GL-B	3-Jul-21	NSC	111042	-	900 226000154258	686	781	2850	-	-
Stephens Lake	STL-A	13-Sep-17	NSC	111069	-	900 226000154295	830	945	4725	-	-
Stephens Lake	STL-A	6-Jun-21	NSC	111069	-	900 226000154295	880	995	8000	-	-
Nelson River (CL-GR)	GL-A	28-May-18	NSC	111755	111754	900 226000767027	901	1010	6985	-	-
Nelson River (CL-GR)	GL-B	9-Jun-18	NSC	111755	111754	900 226000767027	-	-	-	-	-
Nelson River (CL-GR)	BR-D	10-Jun-21	NSC	111755	111754	-	965	1055	7258	M	7
Nelson River (CL-GR)	BR-D	29-May-18	NSC	111757	-	900 226000767033	855	963	7484	-	-
Nelson River (CL-GR)	BR-D	10-Jun-21	NSC	111757	-	-	920	990	7711	-	-
Nelson River (CL-GR)	BR-D	31-May-18	NSC	111766	-	900 226000767099	901	996	7167	-	-
Nelson River (CL-GR)	BR-D	18-Jun-21	NSC	111766	-	900 226000767099	912	1016	4800	-	-
Nelson River (CL-GR)	BR-D	1-Jun-18	NSC	111770	-	-	925	1036	7983	M	8
Nelson River (CL-GR)	BR-D	5-Jun-21	NSC	111770	-	-	937	1066	6100	-	-
Nelson River (CL-GR)	BR-D	2-Jun-18	NSC	111772	-	900 226000767090	931	1041	8936	-	-
Nelson River (CL-GR)	BR-D	23-Jun-21	NSC	111772	-	900 226000767090	946	1065	6000	-	-
Nelson River (CL-GR)	BR-D	18-Jun-18	NSC	111902	-	900 226000628949	980	1078	8029	-	-
Nelson River (CL-GR)	BR-D	12-Jun-21	NSC	111902	-	-	1025	1130	7711	M	8

**Table A2-16: Tagging and biological information for Lake Sturgeon recaptured in the Keeyask reservoir and Stephens Lake, spring 2021. 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 2021 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	14-Jun-18	NSC	111931	-	900 226000768098	1390	-	30119	-	-
Nelson River (CL-GR)	BR-D	3-Jun-21	NSC	111931	-	-	1390	1590	27216	F	1
Nelson River (CL-GR)	BR-D	7-Jun-18	NSC	111964	-	900 226000767009	745	831	3084	-	-
Nelson River (CL-GR)	BR-D	14-Jun-21	NSC	111964	-	900 226000767009	782	818	4200	-	-
Nelson River (CL-GR)	BR-D	11-Jun-18	NSC	111992	-	900 226000768587	1020	1150	8845	-	-
Nelson River (CL-GR)	BR-D	3-Jun-21	NSC	111992	-	900 226000768587	1025	1152	8950	-	-
Stephens Lake	GR-A	23-Jun-18	NSC	112281	-	900 226000154289	1120	1238	12565	-	-
Stephens Lake	STL-A	14-Jun-21	NSC	112281	-	900 226000154289	1060	1290	13000	-	-
Stephens Lake	STL-A	19-Sep-18	NSC	113282	-	900 226000327958	409	467	425	-	-
Stephens Lake	STL-A	7-Jun-21	NSC	113282	-	900 226000327958	500	575	1250	-	-
Stephens Lake	STL-A	18-Oct-18	NSC	113342	-	900 226000893889	545	623	1200	-	-
Stephens Lake	STL-A	16-Jun-21	NSC	113342	-	900 226001225243	680	746	4500	-	-
Nelson River (CL-GR)	BR-D	7-Jun-19	NSC	114774	-	900 226000767228	1020	1142	7257	-	-
Nelson River (CL-GR)	BR-D	18-Jun-21	NSC	114774	-	900 226000767228	1020	1130	7600	M	8
Stephens Lake	GR-A	3-Jun-19	NSC	114780	-	900 226000327727	1050	1174	9072	-	-
Stephens Lake	STL-A	3-Jun-21	NSC	114780	-	900 226000327727	1072	1200	15300	-	-
Stephens Lake	STL-B	1-Jun-19	NSC	114790	-	900 226000767247	930	1040	5443	M	7
Stephens Lake	STL-A	19-Jun-21	NSC	117300	-	900 226000767247	940	1055	5500	-	-
Stephens Lake	STL-A	28-May-18	NSC	115726	-	900 226000768208	760	858	3150	-	-
Stephens Lake	STL-A	8-Jun-21	NSC	119401	-	900 226000768208	820	930	4500	-	-
Stephens Lake	GR-A	29-May-18	NSC	115730	-	900 226000893477	1110	1230	11022	-	-
Stephens Lake	STL-B	1-Jun-18	NSC	115730	-	900 226000893477	-	-	-	-	-
Stephens Lake	STL-A	3-Jun-21	NSC	115730	-	900 226000893477	1110	1240	15000	-	-



**Table A2-17: Tagging and biological information for Lake Sturgeon recaptured in the Keeyask reservoir and Stephens Lake, spring 2021. 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 2021 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	30-May-18	NSC	115741	-	900 226000893345	1310	1440	21863	-	-
Stephens Lake	STL-A	18-Jun-18	NSC	115741	-	900 226000893345	-	-	-	-	-
Stephens Lake	GR-A	5-Jun-21	NSC	115741	-	900 226000893345	1320	1445	19000	-	-
Stephens Lake	STL-A	30-May-18	NSC	115742	-	900 226000893369	961	1067	8391	-	-
Stephens Lake	STL-A	6-Jun-21	NSC	119408	-	900 226000893369	1000	1110	10000	-	-
Stephens Lake	STL-A	30-May-18	NSC	115743	-	900 226000893450	1075	1183	10387	-	-
Stephens Lake	GR-A	10-Jun-18	NSC	115743	-	900 226000893450	-	-	-	-	-
Stephens Lake	GR-A	14-Jun-18	NSC	115743	-	900 226000893450	-	-	-	-	-
Stephens Lake	GR-A	16-Jun-21	NSC	115743	-	900 226000893450	1130	1240	13000	-	-
Stephens Lake	STL-A	30-May-18	NSC	115744	-	900 226000893399	735	817	3000	-	-
Stephens Lake	STL-A	22-Jun-21	NSC	120053	-	900 226000893399	800	892	4200	-	-
Stephens Lake	GR-A	30-May-18	NSC	115745	-	900 226000893442	837	951	5625	-	-
Stephens Lake	STL-A	14-Jun-18	NSC	115745	-	900 226000893442	-	-	-	-	-
Stephens Lake	STL-A	24-Jun-21	NSC	115745	-	900 226000893442	850	970	5000	-	-
Stephens Lake	STL-A	1-Jun-18	NSC	115756	-	900 226000893415	901	1010	5761	-	-
Stephens Lake	STL-A	2-Jun-21	NSC	115756	-	900 226000893415	955	1068	11500	-	-
Stephens Lake	STL-A	1-Jun-18	NSC	115763	-	900 226000152966	905	1021	6895	M	7
Stephens Lake	STL-A	4-Jun-18	NSC	115763	-	900 226000152966	-	-	-	M	7
Stephens Lake	STL-A	29-Jun-21	NSC	115763	-	900 226000152966	922	1052	6550	-	-
Stephens Lake	STL-A	1-Jun-18	NSC	115766	-	900 226000893417	946	1043	6622	-	-
Stephens Lake	STL-A	5-Jun-21	NSC	115766	-	900 226000893417	1010	1110	9500	-	-
Stephens Lake	STL-A	5-Jun-21	NSC	115766	-	900 226000893417	-	-	-	-	-
Stephens Lake	STL-A	5-Jun-21	NSC	115766	-	900 226000893417	-	-	-	-	-

**Table A2-18: Tagging and biological information for Lake Sturgeon recaptured in the Keeyask reservoir and Stephens Lake, spring 2021. 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 2021 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	1-Jun-18	NSC	115771	-	900 226000768076	745	837	3425	-	-
Stephens Lake	STL-A	30-Jun-21	NSC	115771	-	-	800	900	4400	-	-
Stephens Lake	STL-A	1-Jun-18	NSC	115776	-	900 226000152922	1025	1140	8890	-	-
Stephens Lake	STL-A	4-Jun-18	NSC	115776	-	900 226000152922	-	-	-	-	-
Stephens Lake	GR-A	14-Jun-21	NSC	115776	-	900 226000152922	1025	1150	9000	-	-
Stephens Lake	STL-A	2-Jun-18	NSC	115778	-	900 226000152945	1010	1130	7938	-	-
Stephens Lake	STL-A	15-Jun-21	NSC	115778	-	900 226000152945	1050	1170	10000	-	-
Stephens Lake	STL-A	4-Jun-18	NSC	115780	-	900 226000152926	840	940	4500	-	-
Stephens Lake	STL-A	3-Jun-21	NSC	115780	-	900 226001225216	915	1025	11000	-	-
Stephens Lake	STL-B	4-Jun-18	NSC	115781	-	900 226000152931	784	880	3650	-	-
Stephens Lake	STL-A	12-Jun-18	NSC	115781	-	900 226000152931	-	-	-	-	-
Stephens Lake	STL-A	25-Jun-21	NSC	122059	-	900 226000152931	837	942	4350	-	-
Stephens Lake	STL-B	4-Jun-18	NSC	115790	-	900 226000152913	955	1061	6078	-	-
Stephens Lake	STL-A	4-Jun-21	NSC	117624	-	900 226000152913	995	1100	12000	-	-
Stephens Lake	STL-A	6-Jun-18	NSC	115794	-	900 226000152991	780	871	3675	-	-
Stephens Lake	STL-A	14-Jun-21	NSC	115794	-	900 226000152991	870	975	5000	-	-
Stephens Lake	STL-A	6-Jun-18	NSC	115795	-	900 226000152920	775	870	3650	-	-
Stephens Lake	STL-A	6-Jun-21	NSC	115795	-	900 226000152920	835	950	4500	-	-
Stephens Lake	GR-A	7-Jun-18	NSC	115797	-	900 226000152925	760	858	3400	-	-
Stephens Lake	GR-A	5-Jun-21	NSC	115797	-	900 226000152925	845	963	5000	-	-
Stephens Lake	GR-A	9-Jun-18	NSC	115810	-	900 226000152992	1071	1195	11839	-	-
Stephens Lake	GR-A	12-Jun-18	NSC	115810	-	900 226000152992	-	-	-	-	-
Stephens Lake	STL-A	16-Jun-21	NSC	115810	-	900 226001225249	1100	1215	11000	-	-

**Table A2-19: Tagging and biological information for Lake Sturgeon recaptured in the Keeyask reservoir and Stephens Lake, spring 2021. 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 2021 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-18	NSC	115814	-	900 067000055189	497	578	775	-	-
Stephens Lake	STL-A	14-Jun-21	NSC	115814	-	900 226001225264	605	703	1800	-	-
Stephens Lake	STL-A	10-Jun-18	NSC	115816	-	900 226000152985	873	920	6441	-	-
Stephens Lake	STL-A	1-Jun-21	NSC	115816	-	900 226000152985	900	955	9500	-	-
Stephens Lake	GR-A	11-Jun-18	NSC	115824	-	900 226000152935	714	816	3100	-	-
Stephens Lake	STL-A	23-Jun-21	NSC	115824	-	900 226000152935	790	900	4200	-	-
Stephens Lake	STL-A	11-Jun-18	NSC	115828	-	900 226000768536	994	1084	8936	-	-
Stephens Lake	GR-A	23-Jun-21	NSC	115828	-	900 226000768536	1010	1100	8300	-	-
Stephens Lake	STL-A	11-Jun-18	NSC	115833	-	900 226000153921	850	952	4725	-	-
Stephens Lake	STL-A	9-Jun-21	NSC	115833	-	900 226000153921	910	1025	6000	-	-
Stephens Lake	STL-B	12-Jun-18	NSC	115842	-	900 226000768058	1169	1305	15876	-	-
Stephens Lake	STL-A	2-Jun-21	NSC	117623	-	900 226000768058	1200	1340	20000	-	-
Nelson River (CL-GR)	GL-C	11-Sep-19	NSC	116004	-	900 226001030396	745	837	2925	-	-
Nelson River (CL-GR)	GL-C	3-Jul-21	NSC	116004	-	900 226001030396	766	862	3250	-	-
Stephens Lake	STL-A	12-Sep-19	NSC	116030	-	900 067000055561	502	580	700	-	-
Stephens Lake	GR-A	5-Jun-21	NSC	116030	-	900 043000182179	530	614	1700	-	-
Stephens Lake	STL-A	14-Sep-19	NSC	116036	-	900 226001030356	950	1100	700	-	-
Stephens Lake	STL-A	15-Jun-21	NSC	116036	-	900 226001030356	980	1100	9000	-	-
Stephens Lake	STL-A	15-Sep-19	NSC	116093	-	900 226001030358	498	552	900	-	-
Stephens Lake	STL-A	25-Jun-21	NSC	116093	-	900 226001030358	548	611	1200	-	-
Stephens Lake	STL-A	15-Sep-19	NSC	116098	-	900 226001030328	905	1010	5100	-	-
Stephens Lake	STL-A	9-Jun-21	NSC	116098	-	900 226001030328	910	1002	5500	-	-
Nelson River (CL-GR)	GL-B	1-Jul-14	NSC	117036	105681	900 226000629199	955	1075	6804	-	-
Nelson River (CL-GR)	BR-D	3-Jun-21	NSC	117036	-	900 226000629199	1097	1232	11400	-	-

**Table A2-20: Tagging and biological information for Lake Sturgeon recaptured in the Keeyask reservoir and Stephens Lake, spring 2021. 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 2021 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	13-Sep-19	NSC	117060	-	900 226001031120	790	803	4050	-	-
Nelson River (CL-GR)	BR-D	25-Jun-21	NSC	117060	-	900 226001031120	-	-	-	-	-
Nelson River (CL-GR)	BR-D	14-Sep-19	NSC	117069	-	900 226001031195	666	770	2300	-	-
Nelson River (CL-GR)	GL-B	29-Jun-21	NSC	117069	-	900 226001031195	-	-	-	-	-
Stephens Lake	STL-B	20-Sep-19	NSC	117693	-	900 226000767246	594	676	1500	-	-
Stephens Lake	STL-A	16-Jun-21	NSC	117693	-	900 226000767246	620	705	3000	-	-
Stephens Lake	STL-A	20-Sep-19	NSC	117698	-	900 226001030359	813	895	4200	-	-
Stephens Lake	STL-A	15-Jun-21	NSC	117698	-	900 226001030359	835	920	6000	-	-
Nelson River (CL-GR)	GL-C	22-Sep-20	NSC	118305	-	899 226001658856	770	867	3350	-	-
Nelson River (CL-GR)	BR-D	25-Jun-21	NSC	118305	-	900 226001658856	-	-	-	-	-
Stephens Lake	STL-A	4-Jun-18	NSC	118827	-	899 226000152911	361	418	250	-	-
Stephens Lake	STL-B	25-Sep-20	NSC	118827	-	898 226000152911	501	571	900	-	-
Stephens Lake	STL-A	15-Jun-21	NSC	118827	-	900 226000152911	510	574	2000	-	-
Stephens Lake	STL-B	20-Sep-20	NSC	118859	91715	900 226001055084	805	910	3625	-	-
Stephens Lake	STL-A	6-Jun-21	NSC	118859	-	900 226001055084	817	910	4000	-	-
Nelson River (CL-GR)	GL-B	7-Jul-14	NSC	119255	103635	900 226000629080	449	485	650	-	-
Nelson River (CL-GR)	BR-D	28-Jun-21	NSC	119255	-	900 226000629080	664	738	2600	-	-
Nelson River (CL-GR)	GL-C	17-Jun-18	NSC	119269	111943	900 226000154248	732	840	3039	-	-
Nelson River (CL-GR)	GL-B	2-Jul-21	NSC	119269	-	900 226000154248	765	879	3000	-	-
Nelson River (CL-GR)	GL-A	13-Sep-15	NSC	120811	105036	900 226000548592	688	762	2480	-	-
Nelson River (CL-GR)	BR-D	14-Jun-21	NSC	120811	-	900 226000548592	774	851	2900	-	-

## APPENDIX 3:

### POPULATION ESTIMATE INFORMATION

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Table A3-1:	Results of POPAN analysis of adult Lake Sturgeon from the Keeyask reservoir. Best model was constant survival and variable recapture. Confidence intervals are rounded. ....	88
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. ....	89

Mark-recapture population estimates have been calculated for the Keeyask reservoir during the spring of 13 different years (1995, 2001–2004, 2006, 2008, 2010, 2012, 2014, 2016, 2018, and 2021) and for Stephens Lake during the spring of 13 different years (2001–2006, 2008, 2010, 2012, 2014, 2016, 2018, and 2021). 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 data set 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 and returned to North/South Consultants. In 2021, one tag was harvested in Stephens Lake 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 1's (encountered live capture) and 0's (not-encountered) 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 "101 -1;" indicates that 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, and an animal that was released alive would have the history "101 1;", where the -1 tells the model the animal is dead, and 1 indicates alive.

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 (*i.e.*, marking and recapture 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, 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 Keeyask reservoir was best using three time periods of fish capture corresponding to i) 1995–2001 (93% survival); ii) 2001–2004 (76% survival); and iii) 2004–2021 (91% survival). Survival rate within each time period was constant.
  - The 2004–2001 period was further split into pre- (2004–2013; 90% survival) and post-construction (2014–2021; 96% survival) periods.
- Model fit for survival in Stephens Lake was best using two time periods of fish capture: 2001–2013 (84% survival) and 2014–2021 (97% survival). Survival rate within each time period was constant.
  - Between 2001 and 2014, fish were sampled opportunistically (e.g., for acoustic tagging), while 2014–2021 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 for the Keeyask reservoir varied annually with a mean of  $0.20 \pm 0.129$  (Range: 0.08 and 0.58). Recapture rates have remained consistently high since 2014 between 0.13 and 0.24.
- Recapture rates for Stephens Lake varied annually with a mean of  $0.22 \pm 0.246$  (Range: 0.02 and 0.85). Recapture rates have varied since 2014 between 0.04 and 0.58.

An abundance estimate is provided for each year sampling was conducted for both the 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

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**Table A3-1: Results of POPAN analysis of adult Lake Sturgeon from the 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	0.83	0.97
Survival (2001–2004)	0.76	0.04	0.67	0.83
Survival (2004–2021)	0.91	0.01	0.89	0.94
1995 Recapture	0.58	6.84	0.00	1.00
2001, Recapture	0.17	0.04	0.11	0.26
2002, Recapture	0.17	0.04	0.11	0.25
2003, Recapture	0.26	0.03	0.20	0.33
2004, Recapture	0.20	0.03	0.14	0.27
2006, Recapture	0.25	0.03	0.20	0.32
2008, Recapture	0.11	0.02	0.08	0.15
2010, Recapture	0.08	0.02	0.05	0.13
2012, Recapture	0.08	0.01	0.06	0.11
2014, Recapture	0.18	0.03	0.14	0.24
2016, Recapture	0.24	0.03	0.19	0.31
2018, Recapture	0.15	0.02	0.11	0.20
2021, Recapture	0.13	0.02	0.09	0.19
1995, Abundance	106	1249	1	8268
2001, Abundance	579	112	397	844
2002, Abundance	440	84	303	638
2003, Abundance	481	54	387	598
2004, Abundance	364	52	276	480
2006, Abundance	722	80	581	896
2008, Abundance	599	68	479	748
2010, Abundance	851	168	581	1248
2012, Abundance	927	106	742	1160
2014, Abundance	776	99	605	994
2016, Abundance	767	89	611	962
2018, Abundance	909	122	700	1180
2021, Abundance	913	143	673	1239

**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 (2001–2013)	0.84	0.03	0.77	0.89
Survival (2014–2021)	0.97	0.03	0.85	0.99
2001, Recapture	0.85	19.43	0.00	1.00
2002, Recapture	0.04	0.02	0.01	0.12
2003, Recapture	0.27	0.11	0.11	0.53
2004, Recapture	0.07	0.04	0.02	0.19
2005, Recapture	0.04	0.02	0.02	0.08
2006, Recapture	0.23	0.06	0.14	0.36
2008, Recapture	0.02	0.01	0.00	0.07
2010, Recapture	0.30	0.09	0.15	0.51
2012, Recapture	0.08	0.01	0.06	0.11
2014, Recapture	0.04	0.01	0.02	0.06
2016, Recapture	0.16	0.02	0.12	0.21
2018, Recapture	0.58	0.07	0.43	0.71
2021, Recapture	0.16	0.03	0.11	0.22
2001, Abundance	9	215	0	1269
2002, Abundance	103	39	50	212
2003, Abundance	86	33	42	177
2004, Abundance	72	28	35	149
2005, Abundance	188	39	126	283
2006, Abundance	158	33	105	237
2008, Abundance	110	25	71	172
2010, Abundance	77	20	47	129
2012, Abundance	518	55	421	637
2014, Abundance	485	39	415	566
2016, Abundance	454	40	382	539
2018, Abundance	425	53	334	541
2021, Abundance	765	130	550	1063