FRSCS Lower Fraser River White Sturgeon Monitoring and Assessment Program – *Program Summary 2024*

FRASER RIVER STURGEON CONSERVATION SOCIETY

Since April 2000, the FRSCS Lower Fraser River White Sturgeon Monitoring and Assessment Program has relied on trained volunteers to tag sturgeon and collect sampling data. Each year, FRSCS volunteers sample several thousand live sturgeon for the presence of uniquely numbered PIT tags. Sturgeon samples used for abundance and other analytical purposes are taken from a core assessment area that includes over 200 linear kilometers in the lower Fraser River watershed downstream of Lady Franklin Rock (near Yale).

Key Points and Findings

- **By the end of 2024, 192,110 sturgeon samples (scanned for the presence of a PIT tag) were available for inclusion in abundance modelling (Figure 1).**
- **The program currently computes abundance estimates using an Integrated Spatial and Age-structured Mark-Recapture (ISAMR) model (Figure 2).**
  - In recent years, annual numbers of samples collected have declined while precision of estimates remains high.
- **In 2024, the abundance estimate for age 7-55 sturgeon (~60-279 cm FL) in the study area was 53,500 ± 3.9%.**
  - The current estimates for 2024 and all other years are slightly higher than previous abundance estimates.
  - Increases in abundance estimates are the result of the inclusion of additional sampling data and updated estimates of sturgeon growth rates.
  - The trend in total abundance is similar to trends previously reported and is still concerning.
- **Average annual growth rate estimates show a declining trend for most size classes of sturgeon over the assessment period; these growth rates have been used to adjust sturgeon age estimates (Figure 3).**
  - Causes of declining growth rates may include reduced food supply, habitat loss and physical and physiological stress due to various factors.
- **The ISAMR model has been used to forecast future trends in sturgeon abundance.**
  - Assuming juveniles continue enter the population at the current rate, the total population is forecast to continue to decline at an average annual rate of 1.2% per year over the next 30 years (see Figure 4 below).
- **Albion Test Fishery data from 2000-2024 has also shown a decline in sturgeon catch and CPUE, especially for juvenile sturgeon (Figure 5).**

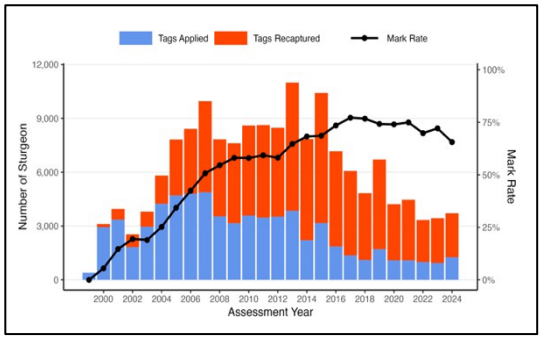

Figure 1. Annual numbers of tags applied, the reported number of tag recaptures, and the annual mark rates (proportions of sampled fish that possessed a tag at the time of capture) for 60-279 cm FL White Sturgeon, 1999-2024.

- Total sample size is large
- Annual sampling sizes have been declined in recent years
- ~68% mark rate for sturgeon data included in ISAMR model

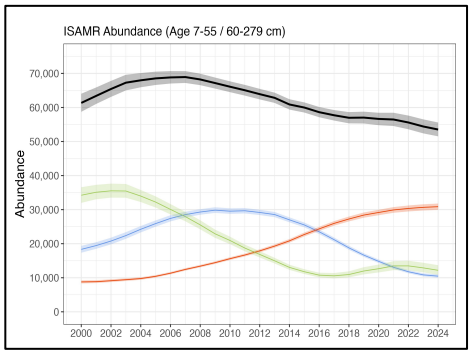

Figure 2. ISAMR abundance estimates of age 7-55 (60-279 cm FL) Lower Fraser River White Sturgeon from 2000 to 2024. Shading indicates 95% credible intervals.

- **Age 7-55 abundance estimate higher than previous estimates**
- **Age 7-12 abundance is showing a slight increase in recent years**
- **Age 13-22 abundance at a low level**
- **Age 23-55 abundance at highest level in recent years.**

Growth Rate Trends

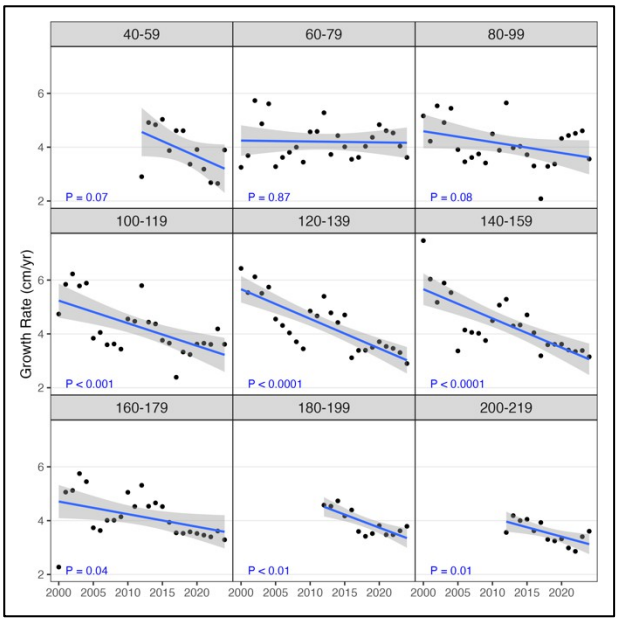

Figure 3. Average annual growth of 40-219 cm FL White Sturgeon in the lower Fraser River, by year and by 20-cm FL size group, from 2000-2024. The 95% confidence bounds around the linear trendlines are shown in grey shading, and the regression *P* values are shown in the bottom left corner of each panel. Average annual growth for 40-59, 180-199, and 200-219 cm FL size groups are not presented prior to 2012 due to insufficient numbers of recaptures during those assessment years.

- As growth rates decline, fish are older at a given size
- Effects are small for juvenile sturgeon due to small reduction in growth rates
- More noticeable effect on age estimates for larger sturgeon where growth declines are greater
- Abundance estimates are slightly higher when declining growth data are included in the model

Abundance Estimates and Forecasting

- The observed declining trend in growth rates has been included in the ISAMR model.
- Reduced growth rates affect the age estimate for the first capture event; elapsed time is used thereafter.

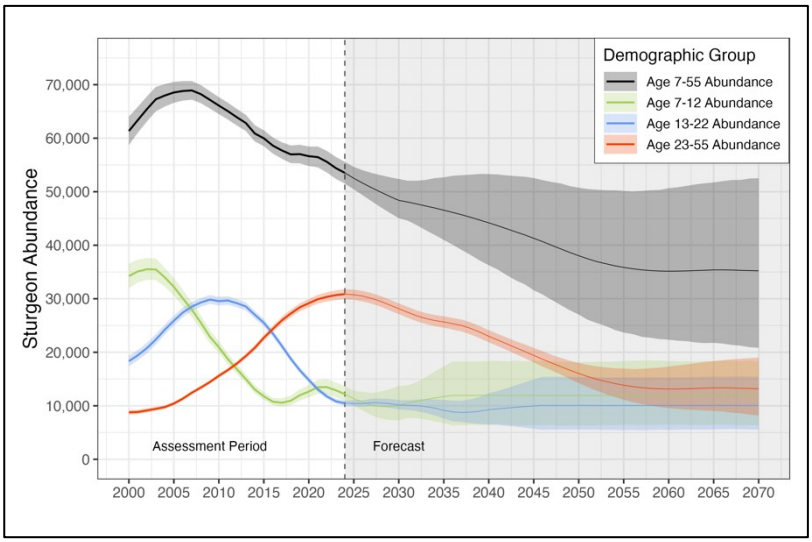

Figure 4. ISAMR abundance forecasts for Lower Fraser River White Sturgeon for 2025-2070, assuming annual growth rates and annual recruitment levels remain the same as recent estimates (i.e., 2013-2024 recruitment). Grey shading indicates forecasted years.

- Population estimates for 2000-2024 were derived using all available sturgeon sampling data collected in the core study area of the lower Fraser River, from all sources, through 31 Dec 2024.
- **While the abundance of adult and juvenile sturgeon (Age 23-55) are increasing in recent years, juvenile abundance levels remain too low to sustain or rebuild the lower Fraser River White Sturgeon population to abundance levels seen in the early 2000s.**
- Analyses do not include sturgeon sampling records collected from 2022 through 2024 through multiple concurrent Region 2 sturgeon projects; at the time of this reporting, those data had not been delivered to provincial authorities for review and inclusion in our analyses.

Albion Test Fishery

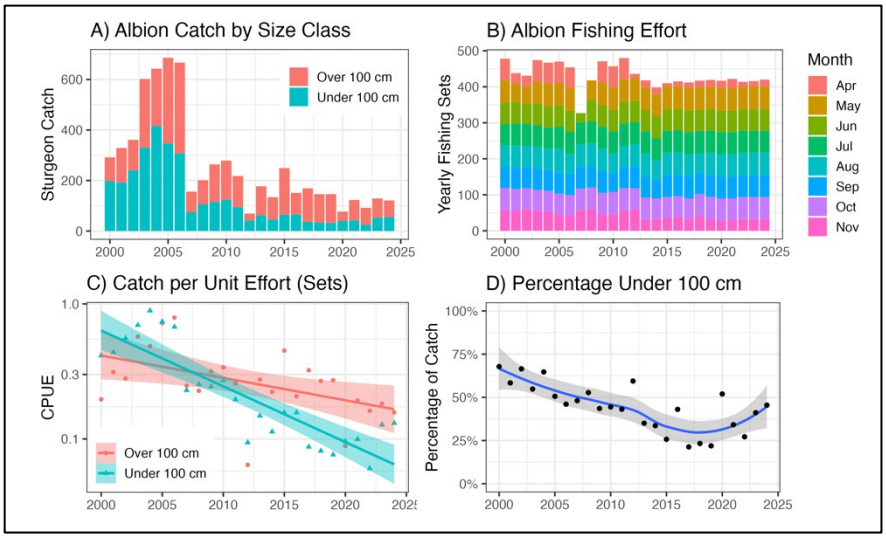

Figure 5. Summary of Albion Test Fishery sturgeon (A) total catch by size category, (B) yearly fishing sets, (C) catch per unit effort for sturgeon under and over 100 cm FL, and (D) percentage of catch under 100 cm FL during the assessment period. Lines represent simple linear regression fit, with shading indicating the 95% confidence region for the regression line.

Independent data from Albion Test Fishery supports ISAMR model results:

- The average annual catch of sturgeon in the Albion Test Fishery (DFO) from 2012 to 2024 (159 sturgeon/year) is a 71.7% decrease from the respective annual average for 2000 to 2006 (563 sturgeon/year); see Figure 5A.
- Catches of juvenile sturgeon (< 100 cm FL) have averaged 62/year since 2006, compared to average catches of 290/year from 2000-2006 (while fishing effort has remained stable; see Figure 5B).
- Annual proportions of juvenile White Sturgeon from the respective total catches of sturgeon from the Albion Test Fishery have declined from 2000 to 2019 but have increased in recent years (Figure 5D).
- **While the Albion Test Fishery only samples a small portion of the lower Fraser River, its consistency with the ISAMR model trends provides additional confidence in the ISAMR model results.**

The FRSCS is a research-based, independent, and unbiased non-profit organization dedicated to the recovery and protection of White Sturgeon. FRSCS monitoring, assessment, and research activities identify issues that may impact the recovery and survival of White Sturgeon. The FRSCS provides peer-reviewed, annual reporting of the results of the **Lower Fraser River White Sturgeon Monitoring and Assessment Program** to continually assess and monitor the abundance and health of the White Sturgeon population in the Fraser River.

Potential impacts to sturgeon abundance levels may include:

- low numbers of juvenile sturgeon;
- decline in overall food supply, particularly salmon and eulachon;
- loss of habitat for spawning, rearing and for key prey species;
- net fishing capture, handling, and bycatch mortality;
- physical and physiological stress associated with the catch-and-release recreational fishery; and
- climate change that produces increased water temperatures, and changes in water conditions and flow.

The FRSCS supports evidence-based conservation and recovery efforts and will continue to deliver scientific research programs as well as education, outreach, and recovery initiatives that help fill knowledge gaps and accelerate the pace of recovery to support the long-term survival and sustainability of wild Fraser River White Sturgeon.

Detailed annual program reports that present both study methods and results are available at:
https://www.fraserstrgeon.com/research-for-survival-reports/