



FRASER RIVER STURGEON CONSERVATION SOCIETY

BACKGROUND

RE: RESULTS OF 5-YEAR LOWER FRASER RIVER WHITE STURGEON MONITORING AND ASSESSMENT PROGRAM

A 5-year study of the population and distribution of white sturgeon (*Acipenser transmontanus*) in the lower Fraser River, British Columbia, Canada, has been completed by the Fraser River Sturgeon Conservation Society (FRSCS), a not-for-profit charity dedicated to the conservation and restoration of wild Fraser River white sturgeon. Results are presented in a report entitled *The Status of White Sturgeon in the Lower Fraser River, British Columbia*, (Nelson et al. 2004). The credible and reliable data used to generate the population and distribution information was collected under a FRSCS-managed white sturgeon monitoring and assessment program that has been in place since October 1999. This significant, volunteer-driven program has coordinated activities and in-kind contributions from true stewards of the resource: sport fishing guides, recreational, commercial, and aboriginal fishermen, test fishery and enforcement personnel, and various fishery monitors. The program has gathered sponsorship and support from provincial, federal, and aboriginal governments, plus non-government institutions, associations, and foundations.

Over 22,000 tags were applied to sturgeon during the first 5 years of the monitoring and assessment program within a study area that spans over 185 linear kilometers from the Fraser Canyon (at Yale) to the Fraser River estuary (at the Strait of Georgia). Over 5000 of these tags were recaptured in live sturgeon during the same time period.

Financial sponsorship was provided through partnership arrangements with provincial, federal, and non-government foundations and organizations, plus private donations:

- Habitat Conservation Trust Fund
- BC Ministry of Environment
- Fisheries and Oceans Canada
- Environment Canada – (Habitat Stewardship for Species at Risk Program)
- North Growth Foundation
- The Nature Trust of BC
- Canadian National Sportsmen's Shows
- Vancouver Port Authorities
- Vancouver Foundation
- Willow Grove Foundation
- Endswell Foundation
- HSBC Bank Canada

Program volunteers and individuals/organizations that provided in-kind contributions of time and/or equipment to the project include:

- Angling guides
- First Nations fishers
- Recreational anglers
- Commercial fishers
- Test fisheries
- Enforcement personnel

Brief History of Fraser River White Sturgeon

Fraser River White Sturgeon - A Provincial Heritage

White sturgeon are the largest freshwater fish in North America, attaining lengths in excess of 6 meters and weights of over 600 kilograms. An ancient relic of the Jurassic, they can live for over 150 years. Tough and resilient to environmental change, they can tolerate both fresh and salt water environments; however, white sturgeon spawn only in fresh water. Because of this, the population of white sturgeon in the Fraser River, the last population of wild (not affected by fish culture or hatchery activities) white sturgeon in the world, are entirely dependant upon the continued health of the Fraser ecosystem and the integrity of critical habitats. In the late 1800's and early 1900's, white sturgeon in the lower Fraser River were nearly driven to extinction by an aggressive commercial fishery. Although directed commercial fishing was halted, the remaining population has been fighting to recover over the past century in the face of increased pressures of urbanization.

In 1993 and 1994, several large (up to 14 feet) white sturgeon washed up on the banks of the lower Fraser River; the unexplained die-off of these large, mature white sturgeon, most of which were females, prompted First Nations authorities to call for a closure to all retention fisheries for white sturgeon in BC. In 1994, the province of BC imposed catch-and-release sport fishing regulations, commercial harvest of sturgeon was restricted to zero, and local aboriginal fisheries authorities elected voluntary retention moratoriums. A 5-year Fraser sturgeon research initiative was implemented in 1995 by a team of BC provincial fisheries biologists and resource managers.

In 1998, a group of dedicated sturgeon enthusiasts from the lower mainland of BC came together to work with the provincial government to expand the scope and scale of the provincial sturgeon initiative in the lower Fraser River and estuary. This group, which formed the FRSCS, now includes federal and provincial fisheries biologists, commercial, recreational, and First Nation fishermen, sport fishing guides, test fishery operators, tackle shop owners, conservationists, and federal, provincial, and First Nation resource enforcement officers.

Currently, the Conservation Data Center (MWLAP) lists Fraser River white sturgeon as a "threatened" stock (the stock is "red" listed, classification S-2). From the onset of this program in April 2000, through November 2003, the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) listed white sturgeon as a "species of special concern." However, since the passage of SARA (Species at Risk Act), the committee designated white sturgeon as "endangered" (see 28 November 2003 COSEWIC press release: <http://www.cosewic.gc.ca/eng/sct7/sct732e.cfm>).

Under the tagging and recapture program components of the monitoring and assessment program, volunteers are trained and supported by a professional biologist/program manager and a field coordinator. Sturgeon are tagged with uniquely numbered passive integrated transponder (PIT) tags. Program volunteers are trained to scan captured sturgeon for the presence of a PIT tag (with a PIT tag scanner unit), record tag numbers from recaptured sturgeon, apply PIT tags to untagged sturgeon in good condition, take measurements (fork length and girth), carefully release sturgeon, and secure and transfer the data. Quality assurance measures are rigorously applied to all field and data collection activities to ensure that program integrity and data reliability was maintained at a very high level.

A First Nations (aboriginal) stewardship component of the core FRSCS sturgeon tagging program, sponsored by Environment Canada, provides opportunities for hands-on program involvement for First Nation fishermen and has helped to develop "best practices" regarding the interception of sturgeon in gill nets (intended to capture migrating species of salmon). Each year, several thousand white sturgeon are unintentionally captured in gill nets deployed in the lower Fraser River during First Nation food and pilot sales fisheries that target upstream migrating salmon stocks. Under the FRSCS First Nation stewardship program, floating "sturgeon cages" were deployed at strategic locations near

concentrations of First Nation gill netting activities. Participating First Nation fishermen placed captured sturgeon in the floating enclosures; program technicians visited the cages on a daily basis and sampled/tagged these sturgeon prior to release. The First Nations program hopes to develop and deliver a broader level of education and awareness of sturgeon conservation and protection issues to Fraser First Nation communities; information delivered in this program would be based on the lessons learned and “best practices” developed during the field program.

Recapture rates in May 2005 ranged between 22-26% depending on location within the survey area. Preliminary tag recapture data suggest patterned inter-annual migrations for subsets of the total sturgeon population in the lower Fraser River. Recapture and auxiliary data suggest that observed seasonal migrations of sturgeon within the lower Fraser River may be based in part on feeding behavior and the timing of food/prey availability. Recapture analyses indicate that observed downstream migrations of sturgeon in the spring are linked strongly to the timing and location of eulachon (*Thaleichthys pacificus*) spawning events in April and May, and that observed upstream migrations of sturgeon in the summer and fall are in response to spawning activities of Pacific salmon species (*Onchorhynchus* sp.). Other recapture and relative abundance information suggest that some portion of the white sturgeon population in the lower Fraser River stage in selected deep-water habitats during the winter (December through March).

A descriptive population model has been developed. This model provides reliable estimates of the population of white sturgeon in the lower Fraser River, by size/age group and location, based on tag release and recapture data. The population component of the model considers tag distribution and seasonal mixing, and is sensitive to estimates of mortality, emigration, and observer error. In addition, patterns of inter- and intra-annual movement and migration, and specific feeding and overwintering behaviors, by size/age group, are described. The population estimate at the mid-point of the 5-year program (31 December 2001) for sturgeon in the 40-220 cm length range that reside in the mainstem of the lower Fraser River between Steveston and Yale stands at approximately 57,262. The precision of this estimate is very high, with 95% confidence limits ranging from 53,118 to 59,406. Population estimates were also estimated for specific size classes of sturgeon (Figure 1). These results suggest that the number of juvenile sturgeon in the population is disproportionately high. This observation raises questions regarding the survivability of the stock to maturity, but also suggests the current positioning of the population for possible stock recovery. These estimates are the sum of estimates by sampling region from Steveston to Yale. A comparison of population estimates for the first 2 years of sampling versus the second 2 years suggests an overall increase in the population, with the majority of this increase occurring in the central Fraser Valley between Mission and Hope (region C; Figure 2).

The utility of these estimates is highly valuable when used as part of a strategic monitoring and assessment plan for stock recovery. As well, these data and results will be integral to the pending development of a watershed-wide recovery plan/strategic management plan for Fraser River white sturgeon.

Key Accomplishments and Findings

Accomplishments of the monitoring project through August 2005

- Over 23,000 sturgeon tagged and released
- Over 31,000 sturgeon sampled for the presence of tags
- Over 6000 tagged sturgeon recaptured
- Development of model that provides estimates of the population of sturgeon, with confidence limits, by location (region) and size ranges (respective age groups)
- Population model is sensitive to parameters that could effect the estimates, such as migration, mortality, emigration, and observer error

- Activities involved over trained 100 volunteers that captured, tagged, and recaptured sturgeon from Steveston to Yale
- Inclusion of Fraser First Nation fishermen with sturgeon stewardship and research
- High-profile project with good public involvement and broad public awareness

Findings

- Estimated population (February 2004) of white sturgeon that are 40-220 cm in length in the mainstem Fraser River from Steveston to Yale is approximately 57,262, with 95% confidence limits from 53,118 to 59,406)
- Highest segment of the population is for fish from 50-80 cm in length (typically 4-10 years old)
- Only an estimated 9.8% of the population is likely sexually mature
- Fish over 200 cm in length likely represent less than 2% of the population

White Sturgeon Facts

- The white sturgeon is the largest freshwater fish in North America and can attain lengths of 6 meters, weights in excess of 620 kgs, and can live for over 150 years
- The population of white sturgeon in the lower Fraser River plummeted to near-extinction levels in the early 1900's as a result of intensive, directed commercial fisheries.
- Sturgeon are slow to reproduce; they do not reach sexual maturity until 25-30 years of age, and females may only spawn once every 6-11 years
- White sturgeon require large rivers with intact ecosystems that can provide the required habitats and food abundance for survival
- Of the 3 major remaining world populations of white sturgeon (these being the Sacramento, Columbia, and Fraser populations), the Fraser River stock is the only remaining wild population (not enhanced by hatchery activities, and not exposed to extensive hydro electric dams, habitat alterations, and hydrograph alterations)

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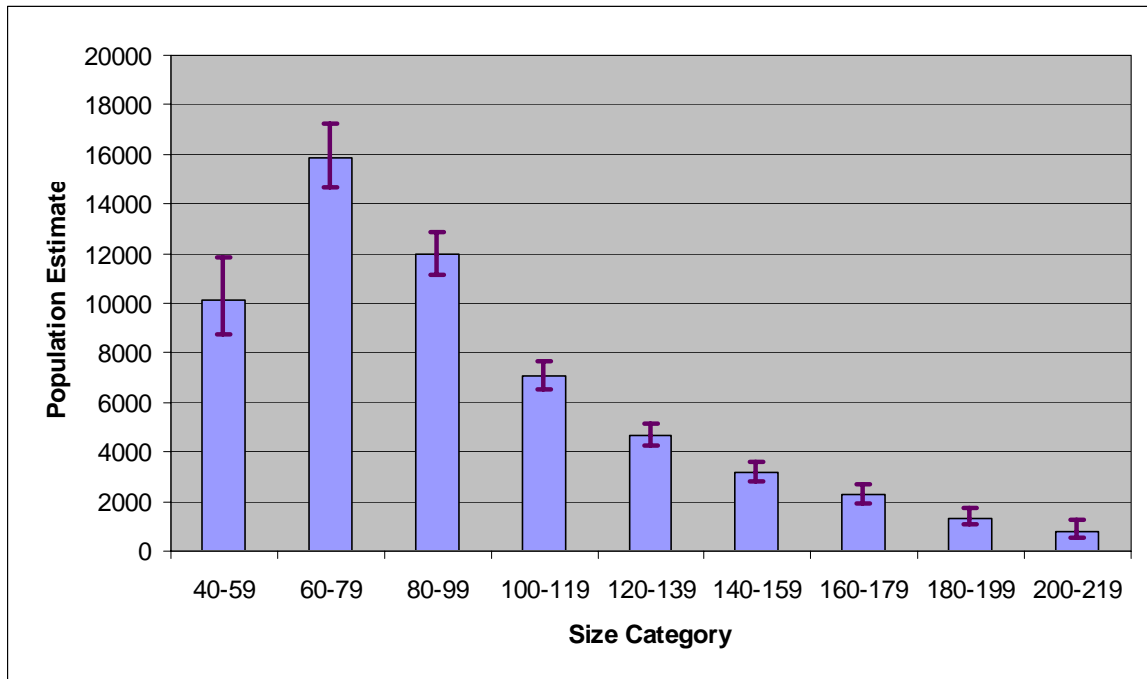


Figure 1. Population estimates of white sturgeon for the Lower Fraser River, by size category (cm), as of 31 December 2001. Ranges show the 95% Highest Probability Density. All regions are combined for this analysis.

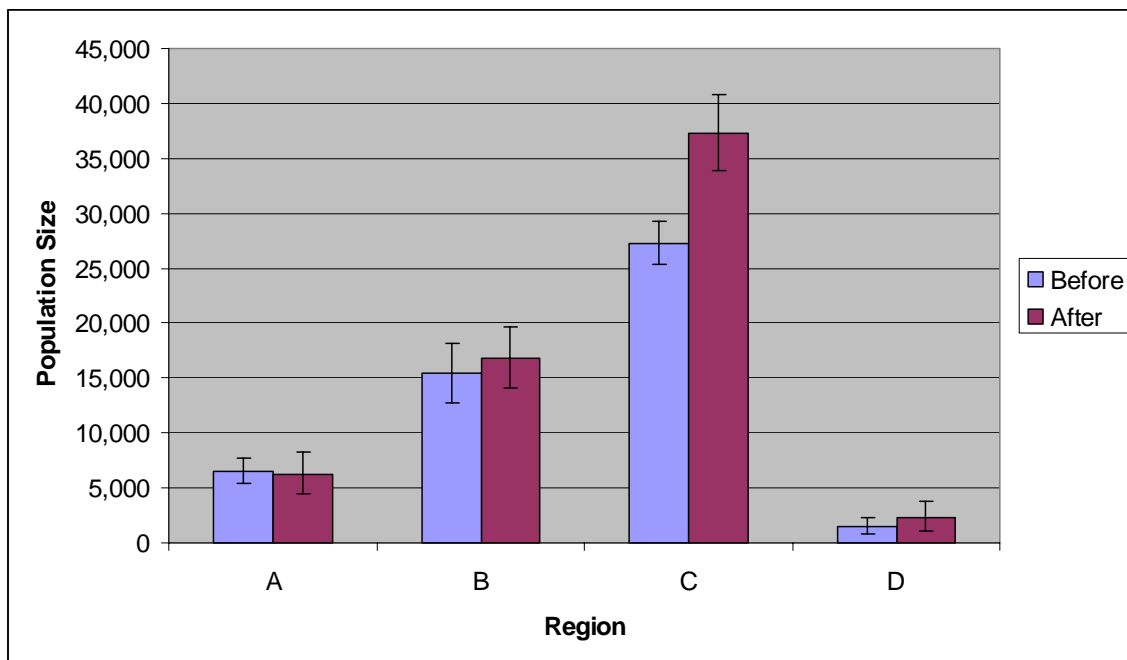


Figure 2. Population estimates of white sturgeon in the Lower Fraser River, by region and period, before and after 1 January 2002. Ranges show the 95% Highest Probability Density calculations.



Fraser River Sturgeon Conservation Society

The FRSCS was founded in 1997 by a group of dedicated sturgeon enthusiasts from several sectors in BC. The founding and current chairman of the FRSCS, Rick Hansen, has provided leadership and motivation to a talented set of directors, made up of community representatives from provincial, federal, and First Nation governments, industry, science, education, the environment. The Society's mandate is to conserve and protect Fraser River white sturgeon and their habitat. This is addressed through: the development and implementation of stewardship activities, public education and awareness initiatives; conducting research and communicating the results; and professionally addressing key issues facing sturgeon with appropriate actions.

In April 2002, a significant contribution from a private donor, the North Growth Foundation, made it possible for the FRSCS to hire a full-time Executive Director. This organizational change provided the means to lever project grant funds, and allowed the Society to develop and deliver several strategic and stewardship-based programs and projects, including an award-winning, volunteer-driven monitoring and assessment program, a First Nations sturgeon stewardship program, and a Fraser watershed-wide White Sturgeon Conservation Plan. Community contributions of the FRSCS and its programs have been acknowledged; the City of Vancouver awarded the FRSCS with the Mayor's Environmental Achievement Award in June 2000, and the Society's Chairman, Rick Hansen, received the Vancouver Public Aquarium's 2003 Murray A. Newman Award for Significant Achievement in Aquatic Conservation.

The Society has made great progress in identifying and addressing issues affecting the recovery of white sturgeon in the Lower Fraser River. In order to produce reliable estimates of the population of Fraser River white sturgeon, novel life history and migration information for the species, and heightened awareness levels in the public regarding the state of this culturally and ecologically significant species, the Society designed a cost-effective monitoring and assessment program. This significant, volunteer-driven program has coordinated activities and in-kind contributions from true stewards of the resource: sport fishing guides, recreational, commercial, and aboriginal fishermen, test fishery and enforcement personnel, and various fishery monitors. The program has gathered sponsorship and support from provincial, federal, and aboriginal governments, plus non-government institutions, associations, and foundations.

Program volunteers tagged and released over 22,000 live white sturgeon during the first five years of the program within a study area that spans over 185 linear kilometers of river from the Fraser Canyon to the Fraser estuary. The program has resulted in one of the best baseline datasets on sturgeon in the world, creating an internationally recognized population model.