Fraser River Watershed, White Sturgeon Provincial Action Framework

Working Draft - October 2019

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Summary and Provincial Priorities

White Sturgeon evolved with dinosaurs, survived extinction events, and have not significantly changed physically for millions of years. Due to low population numbers, this incredible species is also "at-risk". The Province is the lead jurisdiction responsible for the management of freshwater species and is committed to recovering and maintaining population abundances at healthy and self-sustaining levels.

There have been significant investments in White Sturgeon recovery across the Fraser River watershed over the years. This work has largely been organized around geographically discreet areas based on administrative boundaries. While significant gains have been achieved through these investments, White Sturgeon do not live within administrative boundaries. A comprehensive plan for the full Fraser River is needed to ensure management is cohesive at the local, regional and river scales.

This Plan is a starting point, it the first iteration outlining the collective action required for the effective management and population recovery of White Sturgeon in the Fraser River Watershed. Through annual updates and implement it will enable a multi-year sequencing of actions to achieve results more quickly, help optimize investments and activities across the wide range of Government and non-Government partners involved in sturgeon management, and ensure the collective actions achieve the best outcomes for sturgeon.

Priority Action Areas - Watershed

Goal: Clear and Improved Governance.

- Invite First Nations to partner with the Ministry to shift this plan from Provincial government scope, into something that is even more comprehensive and effective.
- Develop a multi-year implementation plan and reporting requirements.
- Expand the multi-year implementation plan in partnership with parties who play a management role or provide investments, to facilitate a more coordinated delivery and optimize resources and investments. Target a funded 5-year implementation plan

Goal: Clear Science Priorities.

- Development of a monitoring program for all areas of the Fraser River. This program needs to identify the types of monitoring required for population assessments, population structure (e.g. age range), and if there are any unique monitoring needs. It needs to ensure sequencing requirements are clear in order to ensure funding is put towards the first tier of needs. This Monitoring Program would require endorsement by FLNRORD to ensure it supports the collective legal responsibilities of the Ministry. This program should be completed and endorsed prior to March 31, 2020, to enable targeted implementation in 2020/21.
- Population Modelling. Build upon the successful investments in developing world-class models particularly in the Lower Fraser, review the models, update as required and align to a single methodology.
- Complete an updated "state of the science" report. Compile and review of the current science from various sources through a science review panel and peer review. This will provide all parties with the most current information, provide the baseline to support Government decision makers, and identify future priorities in filling knowledge gaps.

Priority Action Areas - Upper and Mid Fraser Populations

Goal: Maintain the population levels.

- Understand the population structure in terms of age-class
- In order to determine management actions to protect the wild stock given the recent clarification of Presence of Hatchery fish, understand the relative abundance between hatchery and wild fish and age structure.

Priority Action Areas - Nechako Population

Goal: Recovery of the Nechako population, and ensure that recovery actions do not impact adjacent wild stocks, as per National Recovery Goals

- Improve the understanding of historic-wild and current-hatchery distribution patterns.
- Improve the understanding of habitat and water-quality requirements and limitations; develop a list of habitat improvement opportunities in order of priority.

Priority Action Areas - Lower Fraser Population

Goal: Population recovery to self-sustaining levels, population increases.

- Understand the population's age-structure in order to understand age/size class recruitment problems.
- Assess habitat needs. Compare historical habitat with current availability. Identify priority areas for habitat conservation or enhancement and deliver those priority projects.
- Develop consistent regulatory management of this population across both the tidal and non-tidal jurisdictional areas of their natural range.
- Determine which of the remaining voluntary closure areas require regulation and determine if new/additional areas require legal protection through closures.

Jennifer Davis, Director. October 22, 2019

BACKGROUND

Physical Description.

White Sturgeon (Acipenser transmontanus) are among the largest, longest-lived freshwater fish species in North America. The species evolved with dinosaurs, survived extinction events, and has not physically changed for millions of years. White Sturgeon have a cartilaginous skeleton, a long scaleless body covered with large bony plates called scutes, a shark-like (heterocercal) tail, and four barbels between the mouth and an elongated snout. White Sturgeon have a protrusible mouth which is used to create suction and pull in food. Sturgeon in the Fraser River and tributaries have been recorded up to 3.5 m fork length and have historically been recorded at over 6 m total length, with the oldest recorded Fraser sturgeon reported at 138 years of age.

Range.

White Sturgeon in the Fraser River Watershed are distributed through four primary groupings. The Lower Fraser population lives primarily between the natural barrier of Hells Gate to the ocean. Some fish are known to roam into the marine environment, but it is not clear how many or how far they go. The Mid Fraser population is in the area between hells gate and Prince George. The Nechako population is located primarily in the Nechako River, starting at the confluence with the Fraser River at Prince George. The range extends into areas such as Fraser Lake and Stuart Lake. The Upper Fraser sturgeon range starts at the confluence of the Nechako and Fraser River at Prince George and extends north to the headwaters.

Life History.

White sturgeon are considered a slow growing, long-lived species with delayed maturity. Management of While Sturgeon in the Fraser River watershed is based on the understanding that males mature between the ages of 11- 20, and females mature in their 20's. Females spawn every 4-10 years. Sturgeon make up for this pattern of delayed maturity and infrequent spawning by producing prodigious numbers of eggs – from about 700 000 in medium sized females to 3 or 4 million in the largest. When ready to spawn, White Sturgeon choose gravel or rocky substrate. When eggs are released they are negatively buoyant and develop an adhesive coat upon contact with water which allows them to attach to the substrate near where they were spawned. Hatching time is temperature dependent.

Traditional/Cultural Human Use.

For thousands of years White Sturgeon were used in a number of ways by Indigenous Peoples. Traditional fishing practices ranged from harpoons to weirs, and often required unique ritual practices and words. Sturgeon hold cultural importance to the peoples of the Pacific, with numerous stories and cultural connections. Some oral histories describe the first white sturgeon as the daughter of the first man created. Several First Nations have acknowledged a desire to increase populations to levels that would support traditional cultural uses.

Historic Post-Contact Fishing.

White Sturgeon were heavily fished in the Fraser River from 1880 to 1915 for meat and caviar, with a peak harvest of 500,000 kilograms in 1897. Commercial catches after 1915 declined dramatically to between 5,000 and 20,000 kilograms per year. The commercial fishery was closed in 1981.

Federal Conservation Status.

In 2003, the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) identified 4 Nationally Significant Populations (NSPs) of White Sturgeon in the Fraser River watershed. In 2006, two of these populations were listed as Endangered under the Species At Risk Act (SARA) and recovery strategies for these

two populations were published in 2014. https://www.canada.ca/en/environment-climate-change/services/species-risk-public-registry/recovery-strategies/white-sturgeon.html

1. Lower Fraser Population - The Mid-Fraser group was exempt from the listing under SARA in 2006 as Endangered due to social and economic factors. Even though it's the largest White Sturgeon population in BC and Canada, threats to the Lower Fraser population are high as they are closely associated with continued development and human population growth in the Lower Mainland.
2. Middle Fraser Population - The Mid-Fraser group was exempt from the listing under SARA in 2006 as Endangered due to social and economic factors. In 2014 the population was believed to be at, or near, historic levels.
3. Nechako Population - SARA listed as Endangered. The overarching goal is to recover the Nechako population and ensure that recovery actions do not impact adjacent wild stocks in the Upper Fraser and Mid-Fraser.
4. Upper Fraser Population – SARA listed as Endangered. While the population is believed to be within the historic range, the SARA decision considered how such a low population would easily be at risk.

COSEWIC switched from the concept of NSPs to that of Designatable Units (DUs), and in November 2012 a COSEWIC re-assessment divided the Fraser populations into only 2 DUs. The Middle Fraser, Upper Fraser and Nechako NSPs were amalgamated into a single Upper Fraser River population, while the Lower Fraser unit remained the same. These dual population definitions create a challenge both ongoing adaptive management and for assessments such as SARA re-review processes.

Catch-and-Release Fishery.

Based on scientific assessments, it was determined that a catch-and-release fishery could be supported in the Lower Fraser River. Given the need for careful management of the fishery, the Province implemented a suite of regulatory changes as well as a conservation surcharge as part of the license conditions. In addition, a number of Lower Fraser First Nations chose to voluntary enact a moratorium on sturgeon harvest, which was then supported by DFO through "no retention of sturgeon" in food and ceremonial, and commercial salmon fishing licenses.

Provincial licence sales have increased from approximately 9,000 when they were first implemented in 2009 to over 19,000 in 2018. The conservation surcharge generates approximately $350,000 annually, 100% of which is directly used to support a variety of population monitoring, recovery and conservation management activities. Recent data suggests the most significant growth in has occurred in the non-guided component of the fishery (Robichaud 2018), which does not have to meet the same requirements as licenced guides in practices such as best-handling practices as licenced guides.

In the Mid-Fraser River, a small but limited catch-and-release recreational fishery (guided and non-guided) occurs from Hells Gate to the closure boundary near Williams Lake (Provincial Regulations). The fishery is naturally restricted due to lack of access to the river through canyons, with the primary angling area located in the Lillooet area.

Tidal – Federal Responsibility.

The above management information only pertains to the non-tidal area under Provincial jurisdiction, a significant portion of the Lower Fraser White Sturgeon population is below the Mission Bridge which is where Federal jurisdiction takes over. Similar growth in the fishery is believed to be occurring in the tidal portion, however there is no requirement for special licencing or surcharges to enable quantitative tracking. This pace of growth coupled with differences in management requirements between the tidal and non-tidal is concerning. The collective fishery requires careful monitoring and adaptive management to ensure it remains at appropriate levels given the population conditions.

Hatchery.

The Nechako population is the only group which has hatchery supplementation included as part of the recovery strategy. This population was listed as endangered due to recruitment failure that has been documented since ~1967 (DFO 2014). The recruitment failure appears to coincide with the construction of the Kenny Dam, as all sturgeon captured were more than 50 years old. Extirpation was anticipated without intervention to restore juvenile production. At that time, the science pointed to the Nechako River being a distinct and unique population, predicated by past genetic assessment (Smith et al. 2002) and that there was limited to no exchange occurring between the Fraser populations (FRWSWG 2005). Hatchery supplementation was deemed a critical intervention. The hatchery was intended to provide an interim measure while longer term actions were undertaken to address limiting factors to recruitment (Nechako White Sturgeon Recovery Initiative 2005). Construction of the hatchery, named the Nechako Sturgeon Conservation Center, was completed in 2014 and operations follow the Breeding Plan which determines the numbers of fish released at different ages and from different family units. The first breeding plan was established in 2005 (Nechako White Sturgeon Recovery Initiative 2005). This plan recognized the challenges of achieving the dual goals of Nechako population recovery while also protecting adjacent distinct populations. According to the original Breeding Plan, the three major risks of releasing large numbers of hatchery fish per family, each year for the Nechako population include: (1) exceeding capacity of the Nechako system resulting in reduced condition and survival; (2) increasing the potential to stray to the Fraser River mainstem; and, (3) increasing the potential to genetically overwhelm the naturally recruiting population if large differences in family size exist.

Action Plan – Provincial Scope (Fraser River)

Target Outcome: A Multi-Year Action Plan with clear Roles and Responsibilities

Strategy	Priority Action Areas
Establish strategic direction to support the long-term sustainability of Fraser River Watershed White Sturgeon	• Develop a multi-year management plan that includes tangible deliverables, performance measures and reporting requirements. • Expand a multi-year management plan in partnership with parties who play a direct management role or provide investments, to facilitate a more coordinated delivery and optimize resources and investments. Target a funded 5-year implementation plan • Invite First Nations to partner with the Ministry to shift this plan from Provincial government scope, into something that is even more comprehensive and effective.
Optimize funding/resources	• Secure/coordinate resources to address annual priorities.
Advance collaboration with First Nations and other Indigenous peoples.	• See strategic direction above. • Where agreed to with Indigenous partners, improved population and habitat use information and identify data gaps using traditional knowledge and local expertise. • Where agreed to with Indigenous partners Partnerships on Guardian Programs and other recovery program activities where appropriate and possible. • Build traditional knowledge into management plans and actions.
Clarify and update (if needed) lines of authority.	• To ensure all parts are working appropriately with each other to achieve sturgeon outcomes, review and re-clarify legal roles and responsibilities. e.g. Technical Working Groups, National Recovery Group, BC Sturgeon Committee, Regional Management • Review and clarify the Provincial-Federal roles and responsibilities for sturgeon, and ensure these accountabilities are clear in the multi-year management plan.
Tidal & Non-tidal	• Improve Federal/Provincial jurisdictional alignment and collaboration on the recovery and management of sturgeon populations and protection of sturgeon habitats. • Management of recreational sturgeon fishery- alignment between the responsibilities of Province (non-tidal) and DFO (tidal). See Lower Fraser DU
Compliance and Enforcement	• Update and Clarify roles and responsibilities between MOE and FLNRORD C&E units • Seek additional Resources to support enhanced on-river presence. • Partnerships on Guardian Programs where possible (see row three above).

Target Outcome: Improvements to Systems and Knowledge Management

Strategy	Priority Action Areas
River-wide requirements	• **Monitoring**. Development of a monitoring program for all areas of the Fraser River. This program needs to identify the types of monitoring required for population assessments, population structure (e.g. age range), and if there are any unique monitoring needs in certain areas. It needs to ensure sequencing requirements are clear in order to ensure funding is put towards the first tier of needs. • **Modelling**. Improve population abundance modeling; ensure provincial access to key provincial information and decision-support tools such as modelling. Build upon the legacy of success in modelling rather than reinvent the wheel. • **Mapping**. Spatialize management objectives and provide visual representation, such as the South Coast Stewardship Baseline Objectives Tool

Improve linkages with DFO databases	• **By-Catch**. Improved monitoring and reporting of sturgeon by-catch • **Data Agreements**. Develop and implement requirements/agreements for collaborative information sharing. Update data-sharing agreements if required.
Improve online angling licencing & reporting	• **E-licencing**: Transformation of fisheries to online system (as per wildlife). 3-4 year system upgrade initiated in 2019.

Target Outcome: Clear and Current Science Priorities

Strategy	Priority Action Areas
State of the Science	• **State of the Science Report**. All parties need to work on best available information that is endorsed by the appropriate authorities, conduct a review and assessment of the current science. Suggest an independent science panel and peer review. • **Sequenced Science Questions**. Identify the key science questions that need to be addressed in order to inform adaptive management decision and put them in a prioritised order.
Population status and abundance	• **Population Monitoring Requirements**. Develop and implement a Monitoring & Evaluation Program that tracks the status of White Sturgeon populations and can be used to track their response to management actions. • **Population Structure** - Identify a population age structure (s) throughout the species' natural distribution in the Fraser River. • **Population Targets**. Identify how to improve both the scientific and social basis for population targets. Identify appropriate time frames for achieving targets and benchmarks for monitoring progress.
Habitat-abundance by life stage	• **Identify key habitats by life stage** (early development, rearing, juvenile, adult and spawning) and quantify Fraser White Sturgeon habitat availability and condition.
Increase understanding of threats	• **Threats Assessments**. Determine ways to improve the evaluation of threats and identify measures to evaluate threat reductions/increases in order to monitor performance of management actions over time.
Food Supply	• Investigate the linkage between salmon declines and sturgeon food needs.
Improve understanding of genetics	• **Genetic risk**. Improve the understanding of genetic differentiation between the three populations in the Upper DU. • **Genome BC**. Support completion of Genome BC's White Sturgeon project. • **Historic Comparative**. Combine genetic and/or fin ray microchemistry analyses etc. to refine understanding of stock structure and mixing, use of marine waters, and habitat use overlaps.
Health	• **Health Lab.** Include priority projects in the annual FFSBC Fish Lab business plan.
Climate Change	• **Climate Change and Habitat**. Undertake predictive modelling on climate change, habitat needs and threats to habitats (Suggest start with the BEC predictive modelling tool and the risk assessment modeling completed for the non-native spiny-rayed fishes)
Pollutants	• **Pollutants**. Pollutant monitoring is conducted routinely, initiate work on understanding pollutants implications on sturgeon • **Consolidated Monitoring**. Develop a plan to access and support existing information sources such as the MOE and FLNRORD Fed/Prov water quality and level monitoring stations

Target Outcome: Improved Regulatory Frameworks

Strategy	Priority Action Areas
Tidal-Non-Tidal Alignment	• **Tidal-Nontidal Angling**. Develop consistent regulatory management of this fishery across both the tidal and non-tidal jurisdictional areas.

Improve Handling Practices	• **Handling BMPS**. In consideration of the longevity and large size of the fish, identify policy and regulatory options to require all anglers to follow best-handling-practices • **Potential Licence Conditions**. Explore regulating and requiring certification on sturgeon angling and best handling practices as a condition of licensing.
Review and approve Provincial Tools	• **FRPA**: Target improvements to the Fish, Water and Riparian FRPA Values. Improve monitoring; implement FSWs; etc. • **WSA**: Review implementation for water quality needs for sturgeon • **RAR**: Improve Professional Reliance model, habitat outcomes, and compliance.
Federal Fisheries Act	• **Fisheries Act**. Partner with DFO to update the Federal Fisheries Act

ACTION PLAN – UPPER FRASER DU (Mid, Nechako and Upper NSPs)

Target Outcome: Improved Population and Updated Recovery Priorities

Strategy	Priority Action Areas
Multi-year Hatchery Release Strategy	• Develop a multi-year hatchery/stocking release strategy, with options, for statutory approval.
Understand population structure	Revisit the following Questions to verify or update knowledge gaps. • Question: Where are we at in meeting the recovery targets. What is the strategy to fully achieve them? With what level of confidence do know the spawning stock compares to the historic genetic population? • Question: Is the recovery target still appropriate. If the recovery target needs updating what is the process? • Question: What is the population structure, including age/size classes and wild/hatchery proportions for the Nechako? • Question: How will we assess for wild spawning success? How will it be monitored?
Understand population and single fish distribution/ range.	Revisit the following Questions to verify or update knowledge gaps • Question: What is the natural or low-risk distribution range of Nechako fish into adjacent populations? • Question: What probability is there that the Nechako fish would spawn with adjacent populations? If they do, what degree would represent a genetic risk? • Question: With what degree of confidence do we understand Nechako fish have specific spawning area preferences in the Nechako (e.g. Vanderhoof Bridge)? • Question: How will we know if hatchery fish follow the historic wild spawning patters?
Mitigation Wild Populations (if required)	• Should it be determined that certain populations are having a negative impact on other populations, prepare and approve a mitigation plan for how to deal with these fish and under what circumstances these actions would be taken.

Target Outcome: Improve Habitat and Build Natural Abundance

Strategy	Priority Action Areas
Assessment of habitat availability	• How much historic habitat is available and effective? • Review data and systematically characterize and confirm (ground-truth) key habitats that support: (1) spawning and incubation; (2) early and older juvenile and (3) overwintering • Compare historic and current habitat availability to help determine if some of the recruitment failure is due to lack of productivity at the upper habitat range.
Spawning Area: Improve or restore Spawning Areas	• Fully identify key spawning locations (e.g. Nechako Bridge) and relative abundance of potential spawners at each spawning site. • Assess historic habitat capacity and compare with current habitat capacity.

	• Review benefits and risks of scarifying existing spawning areas; undertake habitat remediation projects as appropriate. • Explore potential benefits of gravel platforms adjacent to high use spawning areas • Identify opportunities to improve regulated protection of spawning areas
Water flow management strategy for Nechako	• Encourage collaboration with Rio-Tinto in developing an updated flow-plan that incorporates sturgeon and salmon life-cycle needs.
Protection of key habitat areas	• Fish Passage Remediation – remediate old road crossing that are causing barriers. • Riparian access management for range cattle (Community & Cattlemen already leading on this)

Target Outcome: Reduced Mortality

Strategy	Priority Action Areas
Predation	• Investigate at all mechanisms of predation/survival relationship • Continue building the understanding of otter predation and foundational causes (e.g. has increased abundance of juvenile sturgeon through hatchery releases increased otter density, are otters shifting to sturgeon from other sources, are predators on otters in decline, etc.)
Poaching	• Poaching has not been identified as a management issue.
Catch and release fishery – Mid Fraser	• Review angling pressure and trends to ensure responsive management as required.

ACTION PLAN – LOWER FRASER

Target Outcome: Sustainable Management of Habitat

Strategy	Priority Action Areas
Assessment of habitat availability	• Assess habitat use by different life stages, including marine/ocean migration. • How much historic habitat is available and effective? • Review data and systematically confirm (ground-truth) key habitats that support: (1) spawning and incubation; (2) early and older juvenile and (3) overwintering • Compare historic and current habitat availability to help determine if some of the recruitment failure is due to lack of productivity in the gravel reach. • Assess estuary use and identify available estuary usage areas • Develop guidance documents to meet habitat protection for all habitat types but especially overwintering and spawning habitats - Regularly updated (e.g. 5 years)
Map habitats	• SBOT - Map confirmed important or high use habitats that are most likely to be limiting population capacity or recovery (e.g. spawning, overwintering, early juvenile rearing, feeding, etc.). Identify remaining habitats and potential restoration opportunities.
RAR and Floodplain Management	• Review RAR Implementation and Fraser, Pitt and Harrison Floodplain Protection and Management, and encourage or support local governments on identified or needed improvements.
Food Supply	• Investigate impacts of changing food supply, particularly considering significant downward trends for salmon and depressed population levels for Eulachon.
Predation and Displacement	• Monitor predator interactions with seals and sea lions • Identify key predator/prey and competition / displacement relationships including non-native fish species

Target Outcome: Maintain and Increase Protection, Recovery Actions

Strategy	Priority Action Areas
Protection Policies and regulations	• Closures. Review Voluntary closures and put those that are required into official closures. Remove unnecessary voluntary closures areas as they only target those who are already committed to compliance and protection. • Identify a regulatory management plan for the lower Fraser; Establish regulated closures on known sturgeon spawning sites in the interim. • Develop signage for boat ramps, parking areas, and other known access points used by sturgeon fisheries (guided and independent) • Improve/enhance signage in main channels
Protection On-the-ground-actions	• Identify habitat acquisition opportunities, if and where appropriate. • (Habitat/Protection) Re-establish the use of sanctuary areas to reduce the impact of fisheries on sturgeon in the lower Fraser River. • Investigate impacts of watercraft. While this is generally under the jurisdiction of Transport Canada, Fed-Prov discussions can occur. • Salmon Ghost Net Management: Increase efforts to ensure the timely and consistent elimination of ghost nets from the Lower Fraser. • Lost river channel, streambank or foreshore rehabilitation

Target Outcome: Reduce Mortality

Strategy	Priority Action Areas
Develop updated mortality estimates	• Estimate and prioritize all potential sources of mortality including: ○ Recreational angling (Direct and in-direct)

	○ By-catch in salmon net fisheries ○ Boat collisions ○ Sea lion and seal predation ○ Pollution ○ Cumulative stress (bioenergetics, use, fitness, environmental)
Understand by-catch	• Undertake direct studies to quantify sturgeon by-catch in salmon net fisheries. Include calculations of size range and predicted age classes.
Support for selective fishing methods	• Explore and promote viable, selective salmon fishing methods (e.g., trap nets, fishwheels etc.) that reduce injury or mortality to incidentally captured sturgeon. • Encourage and support pilot projects in partnership with First Nations
Predation	• Although seal and sea lion predation has increased over the last decade, its significance to the recovery of lower Fraser sturgeon is not currently well understood but is not considered a critical management issue at this time. • Similarly, predation on other life stage (e.g., egg, larva etc.,) is not well understood.
Poaching	• Increased COS and DFO resources available to address sturgeon poaching • Improve monitoring of salmon net fisheries • Black-market - Increase inspections at salmon landing sites and point of sales; Improve understanding of the black market and sturgeon trafficking

Target Outcome: Contemporary Management of Angling

Objective	Priority Action Areas
Harmonize tidal and non-tidal angling	• Ensure consistent management of recreational fishing across the tidal and non-tidal habitats. • Establish consistent and efficient catch and effort reporting requirements
Managing Angling	• Ensure growth of recreational fishery and overall effort is carefully managed. Determine triggers for managing growth and overall effort. • Review potential for limiting angling (should it be required). Currently, the statutory mechanism is to establish Classified Waters through s.53 of the Wildlife Act. • Explore the implementation sturgeon handling regulation (i.e. no removal of sturgeon from the water) to protect individuals from harm. • Review current opportunities for the enforcement of improper sturgeon handling through existing legislation and opportunities for improvement. • Explore opportunities to increase fines for failure to comply with sturgeon handling guidelines.
Reporting and Analysis	• Improve the recreational catch and effort monitoring program ○ Improve survey materials ○ Modernize the guided angler catch and effort reporting platform ○ Design and implement an efficient exit-style creel survey as needed. ○ Update the angling reporting requirements and reporting platform to collect more accurate data and report out in near real-time. • Stratified spatial and temporal estimates of catch and effort. • Accessible and standardized catch & effort information throughout the Fraser River and tributaries where sturgeon angling is permitted.