



2016-2017 ANNUAL REPORT NECHAKO WHITE STURGEON RECOVERY INITIATIVE





TABLE OF CONTENTS

Message from the NWSRI Chairs	ii
Introduction	1
Structure and Function of the NWSRI	2
Technical Working Group	2
Community Working Group	2
About the NWSRI	2
NWSRI Partnerships	3
Adult Spawn Monitoring	4
Fixed Station and Boat Telemetry	5
Acoustic Telemetry (VPS)	6
Egg Mat Program	7
Juvenile Indexing Program	8
Juvenile Telemetry	9
Sediment Transport Investigation	10
Genetic Parentage and Individual Stock Identification	11
Every Fish Counts - Boat Kit Program	12
Sturgeon Curriculum	13
Awareness and Outreach Events	14
Juvenile Sturgeon Release - May 2016	14
UNBC Green Day	14
NWSRI Website	15
Website and Facebook	15
Where is My Fish Page	15
Nechako White Sturgeon Conservation Centre	16
Conservation Fish Culture	16
Hatchery Tours	17
Broodstock Capture	18
Juvenile Release	18
Financial Summary for 2016-2017	19

MESSAGE FROM THE NWSRI CHAIRS

Technical Working Group Chairs Cory Williamson & Ian Spendlow

The 2016-2017 year brought many successes and challenges for the TWG team, including a change in co-ordinator in 2016 and Chair early in 2017. In a year of transition, as the Chair, I would like to celebrate the achievements of the Nechako White Sturgeon Conservation Centre (NWSCC) in year three of operation with a successful broodstock collection, rearing, and release in 2017. In addition, the NWSCC staff and volunteers have been instrumental in bringing information and education to the community, facilitating research programs within the facility, including working on rearing wild captured eggs. Throughout the year the TWG team co-ordinated several annual research and monitoring activities on the Nechako including adult spawn monitoring, juvenile index and monitoring, physical habitat investigations, cleaning and maintenance of gravel enhancement works, and gearing up for expanded acoustic monitoring efforts. Having these new hatchery release juveniles in the river provides the TWG increasing opportunities to understand survival and dispersal, habitat use and predation on juvenile Nechako white sturgeon. The entire TWG will be busy on several fronts making adjustments to the breeding plan, hatchery outputs, and the release strategy to carry on the tradition of adaptive management. The TWG team brings great dedication to sturgeon recovery to the table, along with an array of skills and experience, which allows the NWSRI to work collaboratively toward the goals of conservation and research of Nechako white sturgeon.

Community Working Group Chair Wayne Salewski

The Community Working Group continues to evolve into its role of outreach support and promotion of the Nechako White Sturgeon Recovery Initiative and the results could not be more evident than the excitement and participation of the many school kids that released “their” fish into the Nechako River in May. I think the only disappointment could be that not every person can release a fish but the attendance alone speaks of the awareness and support that the region has for this annual event. We can also see the support when you recognize that we had over 5000 individual looks at “where’s my fish” website and this followup certainly demonstrates the support and curiosity this fish has brought to our community.

I am also very pleased for the support and encouragement we are receiving from our neighbouring communities as we move our communication plan forward and have had productive conversations on increased signage and awareness with the City of Prince George and the Village of Fraser Lake as we work towards a sign design that includes their relationship with this amazing relative to dinosaur’s.

I think a highlight has been the support of HSP in approving our three year funding application which simply put create certainty in the funding for the following three years.

Tourism at the NWSCC continues to increase. This growth has seen tour buses requesting visits from around the world increasing along with increased request from locals that are now discovering the facility. The CWG continues to work with the District of Vanderhoof to understand how to increase our capacity to serve this growth opportunity.

I would like to thank the membership of the CWG along with our many stakeholders for their support and look forward to the following years as we continue our work to save this incredible fish.



INTRODUCTION

The story of the Nechako white sturgeon is a long one, a story that began here in the Nechako watershed after the last ice age. Nechako White Sturgeon have likely been in the Nechako watershed for over 10,000 years. It is expected that the watershed historically had a population of over 2,000 adults and many more juvenile sturgeon. Within the last 100 years — the normal life span of a sturgeon — the Nechako white sturgeon have become an endangered group, due to many possible factors, including changes to habitat and flow regulation from the creation of the Nechako Reservoir, predation, and over-fishing.

The Nechako White Sturgeon Recovery Initiative (NWSRI) was established to find out why the Nechako White Sturgeon numbers have dropped, and what actions can be taken restore a self-sustaining population within the Nechako River. The NWSRI consists of many stakeholders throughout the Nechako watershed, all with the common goal of Nechako White Sturgeon recovery.

This report highlights some of the new and ongoing projects on Nechako White Sturgeon from April 2016 to March 2017. The report is broken down into three main sections that highlight key aspects of the NWSRI, and the projects and findings from 2016-2017 for the Technical Working Group (science-based arm of the NWSRI), and the Community Working Group (outreach and awareness arm).

For further information on the NWSRI, and for detailed reports on projects outlined in this report, please visit our website at:

WWW.NECHAKOWHITESTURGEON.ORG



Please note: If you are reading this report on your computer, you can open the reports and links in the yellow boxes by clicking the text.

The Nechako White Sturgeon Curriculum Field Kit Available on loan to teachers in School District 91. PHOTO BY MICHELLE ROBERGE.

ABOUT THE NWSRI

Structure and Function of the NWSRI

The Nechako White Sturgeon Recovery Initiative (NWSRI) was established in 2000 in response to learning that Nechako white sturgeon juvenile sturgeon were no longer as abundant and the population was smaller and older than expected. The NWSRI consists of individuals from the private sector, federal and provincial specialists, First Nations members and technical staff, industry experts, and members from non-profit wildlife and wilderness groups. The work of the NWSRI is based on the Recovery Strategy for Nechako White Sturgeon. **The Recovery Strategy is based on the best-available science, local, and traditional knowledge.** The NWSRI members work together in different capacities to address the Recovery Strategy.

The NWSRI participates in the following activities **to ensure that sturgeon, from juveniles to adults, continue to live in the Nechako watershed for many generations to come:**

- > Conservation Fish Culture
- > Habitat Research and Recruitment Failure mitigation
- > Stewardship and Education

The NWSRI is comprised of two working groups - the Technical Working Group (TWG) and the Community Working Group (CWG). Together the TWG and CWG work towards the common vision of sturgeon population recovery:

- > The TWG works to develop and oversee implementation of the Nechako White Sturgeon Recovery Strategy. This includes designing and carrying out the projects that are described in this Annual Report.
- > The CWG is the communication and extension arm of the NWSRI, and assists the TWG by garnering public and financial support for sturgeon recovery within the Nechako watershed, and sharing information with stakeholders.

Technical Working Group

The Technical Working Group was formed in September 2000, and is made up of fisheries, habitat and river geomorphology scientists and researchers. The TWG meets 2-3 times per year, in addition to project specific meetings when needed to discuss latest research project findings, plan future projects and discuss the progress of the group. Each member brings specific qualifications related to the technical problems being researched that might include: a working knowledge of white sturgeon biology; expertise in stream flow management/hydraulic engineering; or experience in other animal recovery initiatives.

This TWG is responsible for addressing the Recovery Strategy by:

- > investigating why the Nechako white sturgeon population is in decline; and,
- > implementing the strategies to help restore the fish to a self-sustaining population.



Community Working Group

The Community Working Group is comprised of First Nations, non-government environmental organizations, industry, local and regional governments, and affected public. The CWG meets 2-3 times per year to plan:

- > outreach and educational programs that relate to the latest research of the TWG
- > public awareness campaigns for Nechako White Sturgeon in the watershed.

Increasing the knowledge about sturgeon recovery in the watershed is a key focus of the group, and programs target key interest groups and stakeholders, including school children, riverside residents, industrial companies in the watershed, First Nations partners, and local governments.

NWSRI Recovery Coordinator

The NWSRI has a paid Recovery Coordinator that reports on meetings of the TWG and CWG and shares information between the two groups, as well as communicates out to stakeholder groups. The coordination and administrative support involves the following services: organizing meetings; tracking action items; completing technical tasks assigned by members of the NWSRI; assisting in or leading project proposal development and Terms of Reference for projects and the development of funding proposals; assisting in the development of outreach materials and the coordination of public events; website maintenance and updating; and, where necessary, assisting team members with their assigned tasks. Technical support is provided to ensure scientific accuracy and technical expertise in planning and executing of recovery tasks.

In 2016, Lana Ciarnello left her long-time position as Recovery Coordinator to pursue her passion in bear research. The NWSRI thanks Lana for her years of hard work and dedication to the NWSRI and sturgeon recovery. In August 2016, Michelle Roberge started as the new Recovery Coordinator. Michelle is a Fisheries Biologist who lives in Vanderhoof and has worked with the NWSRI on several outreach projects. We welcome Michelle to her new role.

NWSRI Partnerships

The members of both the Technical Working Group and Community Working Group represent a wide range of organizations. Those involved during the 2016-2017 fiscal year included:

Avison Management Ltd.

BC Ministry of Environment

BC Ministry of Forests, Lands & Natural Resource Operations

BC Nature (Federation of BC Naturalists)

Carrier Sekani Tribal Council

District of Vanderhoof

Environment and Climate Change
Canada's Habitat Stewardship Program

Fisheries and Oceans Canada

Fraser Basin Council

Fraser River Sturgeon Conservation Society

Freshwater Fisheries Society of BC

Lheidli T'enneh First Nation

Rio Tinto

Tl'azt'en Fisheries Program

Project: NWSRI Recovery Coordinator

Project Lead: NWSRI

Funders: FLNRO via Land Base Inventory Strategy -
Species at Risk \$28,000

Start Year: 2001

TWG RESEARCH PROJECTS

ADULT SPAWN MONITORING

OBJECTIVES

- > To determine the timing of spawning, incubation success, larval drift, and the physical parameters of the river that occur during spawning, such as river flow, temperature and substrate.
- > To ascertain the exact location(s) that spawning occurs to inform habitat restoration decisions.

Project: Adult Spawn Monitoring

Project Lead: CSTC

Funders: \$76,650 CSTC via Environment Canada

Start Year: 2004

This is one of the longest lasting projects of the NWSRI. The information gathered to date has led to a better understanding of the spawning behaviours and locations adult Nechako White Sturgeon use within the Nechako River. We use this information to help inform habitat restoration projects with the goal to improve in-river survival of eggs to year-old sturgeon.

There are a three projects that make up the adult spawn monitoring program:

- > Radio-telemetry (fixed station and boat telemetry)
- > Acoustic telemetry (VPS)
- > Egg Mats



This photo shows the spawning reach of the Nechako River, just upstream of the Nechako River bridge. The adult spawn monitoring work occurs in this section of the river, but also further upstream to the confluence of stoney Creek, and to just downstream of the bridge.

This photo shows some of the sediment transport and habitat rehabilitation work done in 2016. Here a spider excavator is seen cleaning the spawning gravel within this reach by picking up the substrate and gently shaking it

back into the river. The fine sediments are then carried by the current downstream, resulting in 'cleaner' gravel. Clean gravel is an important habitat feature of sturgeon spawning habitat.

This project, carried out in April 2016, came from a recommendation based on geomorphology research carried out in 2015. See page 10 for more information about the sediment transportation work being done on the Nechako River. PHOTO BY MICHELLE ROBERGE.



Fixed Station and Boat Telemetry

Telemetry data informs our understanding of broad scale dispersal patterns, periodicity of habitat use, and overall migration behaviours within the Nechako and Stuart rivers and beyond.

OBJECTIVES

- > To determine the timing of spawning.
- > To determine dispersal patterns of adults within the Nechako River, before, during and after spawning.
- > To determine migration behaviours of adult sturgeon.
- > To determine habitat use of adult sturgeon, especially during spawning.

In 2016, there were five fixed telemetry stations in the Nechako watershed, two year-round sites (Vanderhoof, and Nechako confluence), and three operated seasonally (Nautley River, Upper Stuart, and Lower Stuart). There was a one week data gap in July at the Nautley River and Upper Stuart sites. Boat telemetry surveys were also completed.

RESULTS

In general, sturgeon became active in mid-April as they started moving out of overwintering sites. Sturgeon were moving into the spawning reach by early May, however they moved back out of the reach due to an unseasonable cold snap that cooled the Nechako River to below ideal spawning temperature.

- > 30-40 sturgeon were detected per boat survey.
- > Majority of fish were detected downstream of Vanderhoof prior to May.
- > By early May, movement was to the spawning area.
- > A sudden cold weather snap lowered river temperature out of the spawning range and adults moved back downstream (followed by a return upstream when water temperature increased).
- > The distance, frequency and speed of movements were higher in 2016 compared to previous years.

Fraser River Telemetry

NWSRI researchers work with researchers from other areas in the Fraser River system to conduct radio-telemetry to see if Nechako white sturgeon move into the Fraser River and vice versa.

During the summer of 2016 sturgeon from the Upper Fraser River group were detected moving to the confluence of the Nechako River, however no detections were made within the Nechako River.

In 2016, three tagged Nechako white sturgeon were captured in the Cottonwood Canyon, which is an overlap area between both the Nechako and the Mid-Fraser River sturgeon group. One of these sturgeon was a male that was used in the 2011 brood year, and one was a female that was also previously used in the brood program in the Nechako. Further research into movement of sturgeon out of the Nechako River is planned for 2017.

TWG RESEARCH PROJECTS

Acoustic Telemetry (VPS)

OBJECTIVES

- > To determine the timing of spawning.
- > To determine specific locations/habitats sturgeon are associated with within the spawning reach during spawning.
- > To determine interaction between male and female adults during spawning.

The acoustic Vemco Positioning System (VPS) can map the location of a sturgeon in the river to an accuracy of +/-1m. The array is able to locate a tagged fish's position when the fish is within the array. A tagged fish emits a signal; three receivers must hear that signal, and a location is generated based on the time difference of when the signal arrives at each of the three receivers. Very accurate positions (+/- 1m) can be calculated when the signal is heard by several groups of three receivers.

This is the second full year of data collection using the VPS system. Thirty (30) sturgeon have acoustic tags implanted and are able to be detected within the VPS array.

In 2016, 22 acoustic receivers were deployed in the spawning reach, and one receiver was placed upstream of the island complex as a 'gate' to monitor activity upstream of the spawning reach (an increase of 5 receivers from 2015). The array coverage included the "lower gravel pad" (located immediately upstream of Burrard Bridge), which had been monitored in 2015, and extended upstream to Stoney Creek confluence, including monitoring coverage of a secondary gravel pad had been deposited in 2011.

The VPS array ran April 25-June 21, 2016 (57 day operational period).

RESULTS

- > 14 tagged sturgeon entered the array (3-4 m spatial resolution).
- > Two major peaks of activity on May 9-10 and May 18-20.
- > Activity detected over the spawning beds upstream of the Burrard bridge to the Stoney Creek confluence.

RECOMMENDATIONS

Based on observations and egg mat data, spawning activity is suspected downstream of the bridge. Suggestions for 2017 include:

- > Extending the VPS array downstream of the Burrard bridge to confirm spawning activity there.
- > Extending the VPS array upstream to determine upper range of spawning area.



Egg Mat Program

Because sturgeon spawn in the water column, eggs are broadcast and are adhesive, and the eggs drift some distance downstream after spawning until they adhere to the substrate. Sturgeon eggs are therefore found downstream of where adults are detected during spawning. This program sets egg mats on the river bottom within and downstream of the known spawning area.

OBJECTIVES

- > To confirm wild spawning activity in the river, and relate back to river conditions and spawning behaviours/habitat preference prior to egg detection.
- > To collect wild eggs for rearing within the NWSCC, to bring these eggs past the critical stage of recruitment failure and ensure genetic diversity is maintained in the population.

RESULTS

In 2016, a total of 51 egg mats were used to collect sturgeon eggs. The sampling started in April and over 300 eggs were collected on:

- > May 9 - 14 eggs
- > May 11 - 300+ eggs
- > May 16 - 1 egg

The majority of the eggs were collected upstream of the Burrard Bridge, downstream of Stoney Creek confluence.

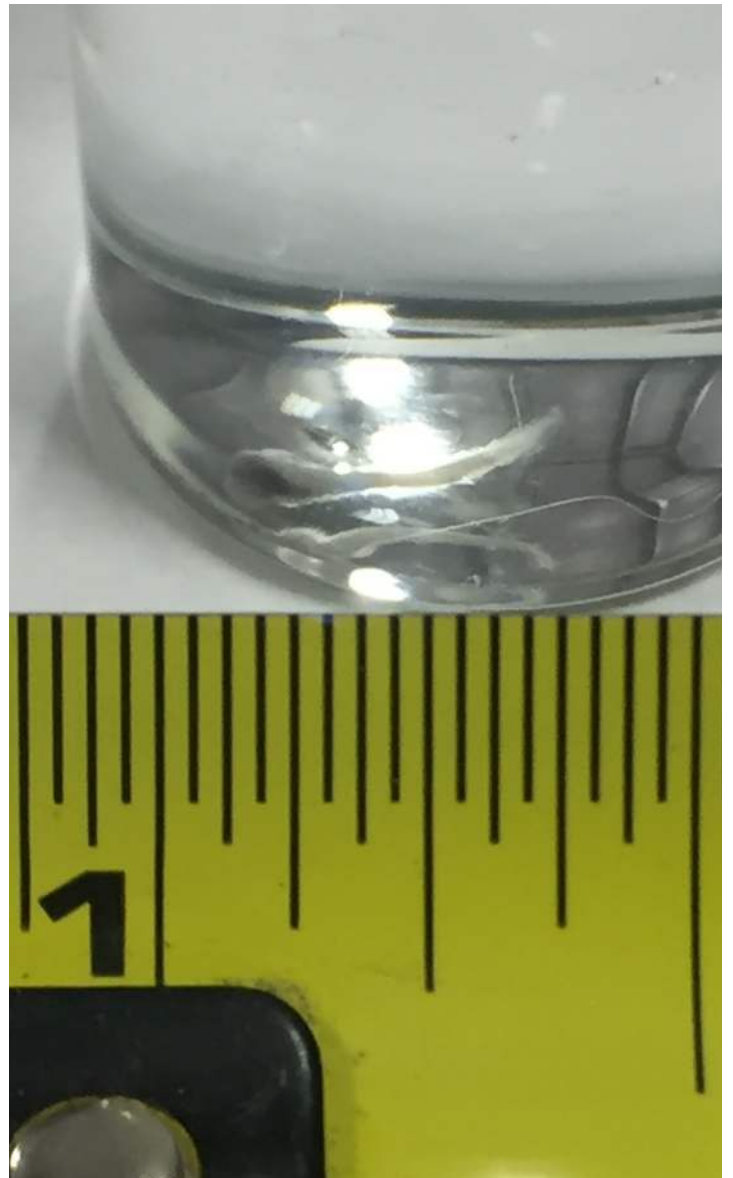
An exciting find in 2016 was the capture of a larval sturgeon. Fyke net sampling was completed from May 16 to 19, May 29-June 2, and June 10-12.

- > May 31 - 1 larval sturgeon was captured downstream of the Burrard Bridge

The eggs and larval sturgeon were brought to the NWSCC, where they were reared in preparation to be released in May 2017.

RECOMMENDATION

- > to add more eggs mats, particularly downstream of the Burrard bridge in 2017 to increase the sampling area.



Larval Nechako white sturgeon caught in a fyke net on May 28, 2016. This is the first River-origin larval sturgeon caught in over a decade in the Nechako River. PHOTO BY CHRISTINA CIESIELSKI.

STURGEON LOSS

During fyke net sampling one adult sturgeon swam into the net and got stuck. Despite the efforts of the sampling crew, unfortunately the sturgeon died in the net. This sturgeon death has led to discussions by the Technical Working Group on different equipment and safer research sampling techniques to be employed next season.

TWG RESEARCH PROJECTS

JUVENILE INDEXING PROGRAM

OBJECTIVES

- > To gain insight into hatchery-origin juvenile sturgeon survival and growth rates.
- > To monitor the presence of wild-origin juvenile sturgeon.
- > To refine knowledge of juvenile sturgeon habitat in the Nechako River.

Project: Juvenile White Sturgeon Monitoring

Project Lead: CSTC

Funders: \$25,900 Aboriginal Funds for Species at Risk via Carrier Sekani Tribal Council

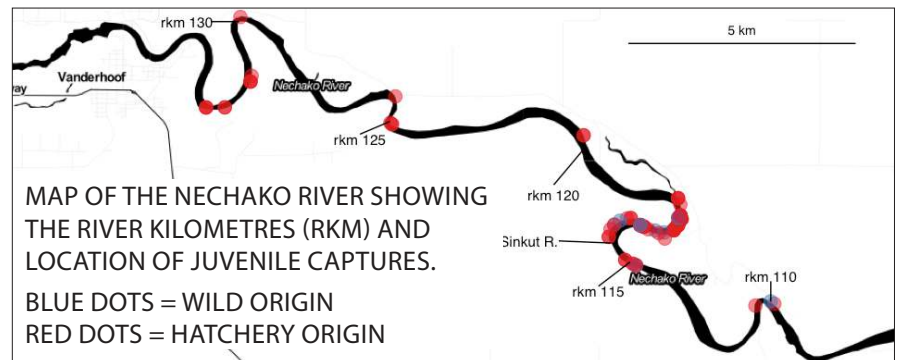
Start Year: 2004

The juvenile index program has used the same standardized set-line sampling technique and methodology since 2009 to be able to compare results from year to year for both river-origin and hatchery-origin juvenile sturgeon. The gear used targets juvenile white sturgeon less than 1 m (100 cm) in length. Biological data and location data is collected on all caught sturgeon, as well as river condition, such as flow and temperature.

In 2016, the program ran from August 31 to October 4. A total of 93 setlines were deployed between rkms 110 and rkm 132.7 for a total of 36,284 hook-hours. Overall river condition during the indexing period was ideal for sampling young sturgeon (water temperature 10°C - 15°C and 50-90 m³/sec).

NUMBER OF JUVENILES

In total, 105 unique sturgeon were caught, with five of those being caught twice, or a total of 110 captures. 2016 represents the largest number of juvenile sturgeon caught to date. This was anticipated as 9,175 hatchery-origin sturgeon were released into the Nechako River in May-June 2016, the largest release to date.



- > 90 were hatchery origin: 74 from the 2016 release, 14 from the 2015 release, 2 from the 2009 release (pilot project). Their size ranged from 39-90 cm in length.
- > 15 were wild captures: 12 had never been captured before, 3 had been captured previously. Their size ranged from 47-92cm in length (birth years 2004, 2005, 2009, 2010-2013).

HABITAT USE

- > Sturgeon were caught in locations typically associated with river bends and relatively deep areas. Similar habitat and location that adult sturgeon occupy.

SURVIVAL

- > It will take several more years of indexing data to confidently estimate a survival rate for juvenile sturgeon. However, based on data from 2015 and 2016, 1-year old hatchery-origin sturgeon are experiencing lower rates of survival than anticipated.

LOCATION

- > The majority of sturgeon were captured at rkm 117, a known overwintering area for juvenile and adult sturgeon. Juvenile captures were recorded in this area in 2015 as well, suggesting this area (to rkm 114) of the river is Critical habitat for Nechako White sturgeon.

A number of recommendations were developed from this year's sampling to improve sampling and assessment methods.

REPORT: [2016 Nechako Juvenile White Sturgeon Sampling; 2016AFSAR-2861 \(Year 1\) Juvenile Recruitment Indexing. 2016.](#)
[Prepared by Carrier Sekani Tribal Council.](#)



JUVENILE TELEMETRY

OBJECTIVES

- > To determine juvenile sturgeon distribution, migration patterns, and habitat use.
- > To determine overwintering movements and seasonal habitat use.
- > To ultimately determine juvenile sturgeon recruitment success into the Nechako River population.

This is the second year of using radio-telemetry to follow hatchery-origin juvenile sturgeon within the Nechako River. This data will lead to a better understanding of the behaviour of juvenile sturgeon in the Nechako River, particularly hatchery-origin sturgeon. The use of radio-telemetry allows researchers to follow sturgeon through their first two years of life in the river, and to determine their success and what, if any, are the limiting factors to their survival.

Thirty (30) juvenile hatchery-origin sturgeon were fitted with radio-tags in 2016, making the total number of juvenile sturgeon with radio-tags 60 (30 in 2015).

Crews used a combination of aerial, boat and ground surveys to detect the location of juvenile sturgeon from April to November 2016. A total of 17 surveys were completed: 7 helicopter flights over the Nechako River, and 10 boat-based from Vanderhoof.



Crew searching for radio-tagged juvenile sturgeon in November 2016 along the banks of the Nechako River. PHOTO BY ZSOLT SARY.

Project: Juvenile Telemetry

Project Lead: FLNRO and FFSBC

Funders: \$27,000 total: \$7,000 FLNRO (Land Base Inventory Strategy - Species at Risk), with FLNRO and FFSBC monitoring in-kind, DFO Species at Risk \$20,000

Start Year: 2015

RESULTS

Both upstream and downstream movements were detected of these fish after release in May, with some individuals moving downstream of the Stuart River confluence (to rkm 78), and several moving upstream to the Nautley River (rkm 192). Most juveniles were found above Hulatt Rapids. However, by the fall of 2016 further movement of the majority of these juvenile fish was not detected. This led to a suspicion that other factors were influencing these fish. Upon closer inspection in November (ground surveys):

- > 80% of the juveniles fitted with radio-tags in 2015 and 2016 were presumed deceased.
- > Tag recovery and locations were in close proximity to predator habitat (both terrestrial and aquatic predators).

RECOMMENDATION

This research is becoming increasingly important for managers as this rate of mortality in radio-tagged sturgeon is higher than expected. Further research into the possibility of tag-effects (radio-tags have an external antennae that may limit their mobility) is planned for 2017.

TWG RESEARCH PROJECTS

SEDIMENT TRANSPORT INVESTIGATION

Infilling of spawning gravels has been identified as a contributing factor to recruitment failure of Nechako White Sturgeon. Understanding where sediment is being transported from and deposited within the spawning reach has implications on further research and mitigation measures to improve the potential of the spawning reach.

This is the third year of investigation into sediment transport within the spawning reach of the Nechako River. This project was initially proposed to address the following objectives.

Project: Geomorphology and Sediment Transport Study

Project Lead: Ministry of Forests, Lands and Natural Resource Operations and UBC Graduate Program

Funders: DFO Species at Risk \$45,000.

Start Year: 2014

OBJECTIVES

- > To estimate bed and suspended sediment loads and refine bedload-discharge rating curves.
- > To determine the cause of apparent imbalance between upstream and downstream sediment transportation rates.
- > To quantify the impact of suspended sediment input from Murray Creek and other tributaries on the mainstem Nechako River.
- > To produce in-stream maps of reach elevation, bathymetry, velocity and morphology change.

In 2016-2017, Simon Gauthier-Fauteux, University of British Columbia Master's student, analyzed the extensive dataset that was collected during field sampling in 2015. The information collected in 2015 included bedload samples at several locations in the river; bathymetry measurements within the spawning reach; water surface elevation profile at a discharge of 523 m³/s; and, cross-channel velocity profiles. Simon also used the dataset to develop a 2D model (Nays2DH model) to view the results at varying flow rates.

ANALYSIS OF 2015 DATASET RESULTS

- > Sediment transport into the spawning reach increased as discharge increased. The relationship was not linear - rates of transport increased rapidly at flows exceeding 400 m³/s.
- > The high flow period was long enough that it began exhausting the sediment supply from upstream; the amount of sediment being transported into the spawning reach began to decrease despite the continued high flows because there was less sediment available within the channel upstream as it had already been carried down the river, meaning that the amount of sediment stored within the channel started to run out.
- > Sediment transport rates at the lower end of the spawning reach remained low regardless of discharge rate.
- > Sediment was primarily transported through secondary channels conveying a disproportionate amount of sediment compared to flow.

2D FLOW MODELING RESULTS

- > Velocity, shear stress and sediment transport capacity at the lower end of the reach do not increase with discharge, as they do at the upstream end of the reach.
- > Shear stress over the Lower Patch* area remains very low, suggesting the inability of the river to mobilize and convey coarse gravel at this location.
- > The locations of max shear stress and transport capacity shift upstream with increasing discharge, but the max shear stress does not exceed 23 N/m².

FURTHER RESEARCH

Plans for 2017 include monitoring the condition of sediment in the Lower Patch, investigating what is causing the backwatering downstream of the spawning reach, and to expand the study area further downstream.

*The Lower Patch is an area of the spawning reach that was restored in 2016.



GENETIC PARENTAGE AND INDIVIDUAL STOCK IDENTIFICATION

OBJECTIVES

- > Evaluate the use of genetic tools to help inform and improve the implementation and monitoring of recovery measures.

Parentage

One component of the project will evaluate the **parentage** of wild caught juveniles, using previously established techniques. For example, this will allow us to determine wild juveniles born in 2011 that were from fertilized eggs that we released directly onto restored substrates in 2011. Successfully linking wild juveniles to the parental broodstock used for this egg release experiment could provide a clear indication of the potential of substrate restoration. Additionally, identifying the number of unique parents that contribute to the wild juveniles will provide information about the number of parents that contributed to the observed juvenile production.

Stock ID

A second **genetics** project addresses a more challenging problem, and is investigating methods to identify the population of origin of individual fish. While genetic analysis has shown that the Nechako population is distinct from the upper and middle Fraser populations, it is much more difficult to assign an individual fish to a particular population. For sturgeon this difficulty is increased as a result of being octaploid (i.e. they have 8 sets of chromosomes whereas many other organisms are diploid and have only two sets). However, the need to be able to distinguish individual fish results from the potential exchange of fish between the Nechako and the mainstem Fraser River. In particular a successful development of genetic screening tool would allow us to exclude non-Nechako fish from the hatchery program. These sorts of genetic tools are just being developed for other species, but have not yet been developed for white sturgeon.

PILOT YEAR

2016-2017 involved preparatory work including gathering samples and conducting pilot tests. Results are expected in the coming year. The parentage component will be completed first.

Project: Genetic Parentage and Individual Stock Identification

Project Lead: BC MOE and University of Victoria

Funder: \$37,500 DFO Species at Risk

Start Year: 2016



A juvenile sturgeon from the 2016 brood year at 4 months of age. PHOTO BY NWSRI.

CWG OUTREACH PROJECTS

EVERY FISH COUNTS - BOAT KIT PROGRAM

OBJECTIVE

- > To reduce accidental harm to sturgeon and the sturgeon population as a result of sturgeon by-catch associated with the First Nation gill net fisheries.

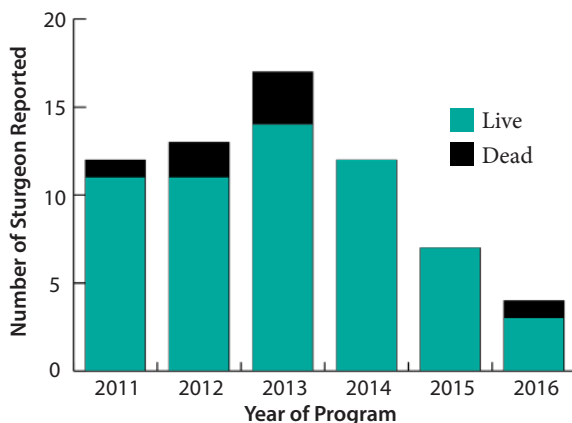
The Emergency Sturgeon Live Release Boat Kit program has been operating since 2011. It is an initiative developed by the NWSRI and Carrier Sekani Tribal Council (CSTC) to reduce the potential for by-catch mortalities associated with the First Nation Food, Social and Ceremonial (FSC) fisheries. Every sturgeon saved because of this program remains in the population to breed in the future and contribute to the genetic variability of the population to prevent extirpation of the white sturgeon population.

Since 2011, 65 sturgeon have been reported by the program, and 58 sturgeon have been released live. Considering the adult population to be roughly 550, the number of live released sturgeon since 2011 is likely 10% of the available adults in the population.

METHODS AND KIT COMPONENTS

Seven First Nation Communities, including Nadleh Whut'en, Stelat'en, Saik'uz, Nak'azdli Whuten, Tl'azt'en, Takla and Lheidli T'enneh, are approached each year to participate in this program. By-catch Monitors are hired in each community to distribute kits to the fisher families, and assist with sturgeon removal and data collection. The kit consists of

- > A kit small enough to remain in the boat at all times and contain all of the tools necessary for a successful live release.
- > A video, "Every Sturgeon Counts" as an education and training tool for Fisher Families.
- > An on-site community By-catch Monitor that can explain the program and help release sturgeon caught in a net.



PROJECT: Boat Kit Program

Lead: NWSRI and CSTC

Funders: Total: \$26,784:

Environment and Climate Change Canada's Habitat Stewardship Program \$13,800; Canfor \$2,000; Mt. Milligan \$2,000; CSTC \$6,500; In-kind: FLNRO \$1,484, NWSRI \$1,000

Start Year: 2011

Youtube Video: Search for 'Every Sturgeon Counts'

Report: 2011-2016 Summary Report

Data Form: Sturgeon Release Form

RESULTS

- > Six of seven First Nation communities participated in the program (excluding Nadleh Whut'en).
- > Within the six reporting communities, only Tl'azt'en reported releasing three sturgeon live. Two were 1-1.5m long (sub-adults), and the other was less than 1m long (juvenile).
- > One mortality was reported by Tl'azt'en. This fish was less than 1m in length.
- > Of the four total reported sturgeon, all were non-breeding size.
- > There was limited fishing in the FSC Fishery in 2016, due to a low salmon returns.
- > A summary report was produced for all data collected from 2011-2016.

RECOMMENDATIONS

- > Increase awareness among fisher families that smaller sturgeon, mainly from the hatchery program, will be becoming vulnerable.
- > Develop strategies to increase participation by First Nation communities.



STURGEON CURRICULUM

The Healthy Watersheds for Sturgeon School Curriculum Program was first introduced in schools within School District 91 in 2014.

OBJECTIVES

- > Tool to increase awareness of the connection between maintaining healthy rivers, riparian areas and watersheds to benefit sturgeon and all organisms.
- > To provide educational tools to teachers and students within the Nechako watershed (School District 91), to learn about the biology, history, environment and value of the Nechako white sturgeon.

The goal for 2016-2017 was to expand the existing curriculum, that was initially developed for grades 4-7, to higher grades, as well as to improve on the existing resources available to teachers. The main component to the expansion, was the development of a Nature Guide for students and teachers that covers all aspects of watershed health, including links back to sturgeon.

CURRICULUM RESOURCES

The curriculum now consists of:

- > Paper and digital curriculum (Grade 4-7) that includes activities, lesson plans, field trips, and links to further resources.
- > Sturgeon Classroom Kit that comprises of hands-on sturgeon tools and resources, include a silicon sturgeon, PIT tags, bioballs, fishing hooks etc..
- > Life-size sturgeon length and life stage floor mat for students to measure up to a sturgeon in the classroom.
- > Map of the Nechako watershed with sturgeon distribution.
- > Self-guided tour of the Nechako White Sturgeon Conservation Centre, opportunities for guided tours, volunteerism in the hatchery, as well as specific duties and projects.
- > A Nature Guide for Grade 7-10 students, given to science teachers to be used by students for research and during field trips.
- > Curriculum resources available online to teachers and students to help with research. www.nechakowhitesturgeon.org/education

In 2016, over 15 teachers attended a Pro-D Day Workshop to review the curriculum resources available to them, to provide input on new resources for older grades, and to get a lesson on sturgeon ecology, conservation and recovery.

PROJECT: Nechako White Sturgeon Curriculum

Project Lead: NWSRI

Funders: \$12,660 total: Environment and Climate Change Canada's Habitat Stewardship Program \$11,160; Integris \$1,000

Start Year: 2014

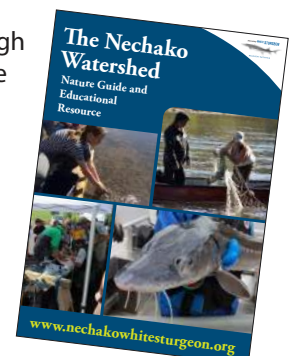
LIST OF RESOURCES

www.nechakowhitesturgeon.org/education



ABOVE: Teacher Lori Gridley from WL McLeod School tests out the sturgeon length and life stage floor mat that is part of the sturgeon school kit at the Pro-D Day workshop. PHOTO BY MICHELLE ROBERGE.

RIGHT: The cover of the high school student field nature guide that is part of the sturgeon curriculum.



CWG OUTREACH PROJECTS

AWARENESS AND OUTREACH EVENTS

Juvenile Sturgeon Release - May 2016

OBJECTIVES

- > To provide an opportunity for students from School District 91 (Nechako watershed) to participate hands-on in the recovery of Nechako white sturgeon.
- > To have a public awareness opportunity.

The Sturgeon Release Event was held on May 13, 2016 at Riverside Park in Vanderhoof. The NWSRI, along with Freshwater Fisheries Society of BC, School District 91 and the District of Vanderhoof, hosted the event. Students came from schools around School District 91, including public, private, First Nations, and home-school.

At the event, students name and release a PIT (passive integrated transponder) tagged juvenile sturgeon that were spawned at the Nechako White Sturgeon Conservation Centre (NWSCC) the spring previous (2015). Each student gets a picture with their sturgeon before it's released into the Nechako River. After the release component of the event, teachers lead their students around to a number of educational booths that cover topics including sturgeon biology, how to track sturgeon, the Boat Kit Program, the grades 4-7 Healthy Watersheds for Sturgeon Schools program, as well as interactive displays such as the Wheel of Life, and the research boats on display. Participants get a free hot dog lunch and a tour at the NWSCC as well.

The data collected from the event was later added to the "Where is My Fish" database of the NWSRI website.

RESULTS

- > 676 sturgeon were released at the May 13 event.
- > 600 plus students attended the event from Vanderhoof, Fraser Lake, Fort St. James, Takla, Yekooche, the Southside, Prince George, and Burns Lake.

OUTCOMES

- > Feedback from the students and teachers was very positive and appreciative of the opportunity to attend and participate in the event.
- > The CWG will continue to explore additional ways to increase the learning potential for students at the event.

PROJECT: Juvenile Sturgeon Release

Project Lead: NWSRI Community Working Group

Funders: \$24,535:

Environment and Climate Change Canada's Habitat Stewardship Program \$3,235*; District of Vanderhoof \$4,200 In-kind; NWSRI In-Kind \$2,600; FFSBC \$7,000 In-kind; UNBC \$400 In-kind; School District 91 \$3,000 In-kind; Avison Management Services \$3,300 In-kind; Rio Tinto \$800 In-kind

Start Year: 2006-2009, 2014 ongoing

*ECCC Habitat Stewardship Program funding supports both the Sturgeon Release and Where is My Fish database (page 15).

Web Link:

www.nechakowhitesturgeon.org/where-is-my-fish



Students Take a spin on the Wheel of Life at the Release Event. PHOTO BY MICHELLE ROBERGE.

UNBC Green Day

In February 2017 the NWSRI participated in UNBC's Green Day event. This event is a campus lead event that spreads awareness about green living initiatives, environmental groups, and research. The NWSRI booth had many visitors and questions about the recovery initiative and Nechako white sturgeon.



NWSRI WEBSITE

OBJECTIVES

- > To promote further interest in Nechako white sturgeon recovery.
- > To allow citizens an opportunity to actively participate in sturgeon recovery, by naming a tagged sturgeon, and following it online.
- > Have a user-friendly website that provides information about Nechako white sturgeon and their recovery.

Website and Facebook

The NWSRI website has a wealth of information on it that is available to the general public. The website includes a photo gallery, project updates and reports, information about the Nechako White Sturgeon Conservation Centre, and much more. The NWSRI website is i-device and android friendly.

The NWSRI now has a Facebook page @NWSRI as another avenue to increase awareness and engagement by local citizens towards sturgeon recovery. The Facebook page following continues to increase with time.

Where is My Fish Page

The “Where is My Fish” page of the NWSRI website allows participants of the Juvenile Sturgeon Release Event to find information about their fish. The information available online includes fork length, weight, release location on a Google map, and a photo of the student and their sturgeon at release (if applicable). Any subsequent recaptures of these fish are uploaded and added to the database so participants can follow the life of their sturgeon.

SEARCH RESULTS - APRIL 2016-MARCH 2017

- > 9298 unique visitors viewed the website.
- > 4131 visits to the Where is My Fish page of the website.

OUTCOMES

- > There is definite uptake and interest by the community for this type of interactive resource.
- > Improvements to the search function of the database is planned for 2017.

PROJECT: NWSRI Website and Where Is My Fish

Project Lead: NWSRI

Funders: Environment and Climate Change Canada's Habitat Stewardship Program \$3,235*

Start Year: 2012

*ECCC Habitat Stewardship Program funding supports both the Where is My Fish database and the Sturgeon Release (page 14).

Web Link:

www.nechakowhitesturgeon.org/where-is-my-fish



ABOVE: Student releasing her PIT TAGGED sturgeon into the Nechako River. PHOTO BY M. ROBERGE.

BELOW: The same student's fish data page from the where is my fish page.

help save the nechako white sturgeon

Where's My Fish?
Fish name: Kate
PIT tag: 0A181C3E68



Nickname: Kate
School: McLeod/SC61
Student: Kate Hoberge
Grade: 6

Release Info
Date: May 13, 2016
Fork Length: 25.4 cm
Weight: 0.096 kg

NECHAKO WHITE STURGEON CONSERVATION CENTRE

Conservation Fish Culture

OBJECTIVES

- > To produce the next generation of sturgeon that will spawn naturally in the Nechako River.
- > To conserve genetic diversity within the Nechako white sturgeon population.
- > To grow sturgeon to 1 year of age to get them through the critical recruitment failure stage.

This marks the second year of operation for the Nechako White Sturgeon Conservation Centre. Cory Williamson, TWG Chair is the Hatchery Manager, Mike Manky is the senior fish culturist, and Phil Baskin, Amber Merko and Fraser Linza were the seasonal fish culture technicians.

Fish were spawned in two events in 2015: the last week of May and the first week of June. A number of volunteers came to the centre to help mix the eggs with the milt; this was definitely a community effort! There was good representation for each of the six females used in the brood program. Of the 17 females caught during brood sampling, three were kept over the winter to be used in the 2016 brood program, as these females when caught, were 1-2 years from having mature eggs.

Eggs hatched by mid June, and first feeding was a week later. As of February 2016, there were about 9,200 juvenile sturgeon in the hatchery. The growth and development of juvenile sturgeon was on target, and the water temperature was reduced to mimic natural conditions in the river just before release.

By May 2016, our hope is that these fish will be past the stage of recruitment failure identified by our TWG and therefore a greater number will survive to breeding age. These young fish will be released in May at various locations on the Nechako River, including approximately 600 of them during the Juvenile Release Event that will involve approximately 600 students from across the Nechako watershed.

The NWSRI continues to recognize that the facility is a stop-gap for sturgeon recovery that will aid in providing more time for the TWG to continue to research, implement, and monitor the more permanent solutions required to achieve a self-sustaining sturgeon population.

PROJECT: Conservation Fish Culture

Project Lead: FFSBC and NWSRI

Funders: \$493,021 total from Rio Tinto, NEEF, Province of BC; \$489,848 operating expenses; \$3,173 equipment

Start Year: 2014



Juvenile Sturgeon at roughly 4 months of age. PHOTO BY MICHELLE ROBERGE.



Students from the College of New Caledonia volunteer to help PIT tag juvenile sturgeon. PHOTO BY FFSBC.



PROJECT: Merchandise

Project Lead: FFSBC & NWSRI

Funders: \$3,495 FLNRO

For: 2016

Hatchery Tours

OBJECTIVES

- > To increase public awareness in sturgeon conservation and recovery initiatives through public interaction.
- > To facilitate a better understanding of the hatchery's role in sturgeon conservation.

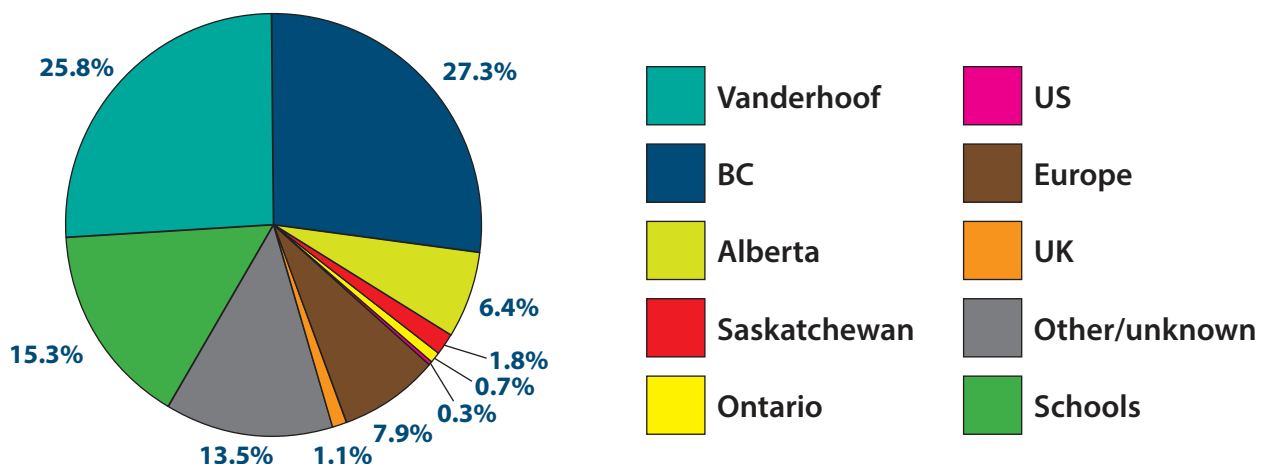
Freshwater Fisheries Society of BC staff along with NWSRI volunteers provided tours of the Nechako White Sturgeon Conservation Centre (NWSCC). Tours were scheduled on Thursdays at 2:00pm, in addition to private bookings for groups on the weekend or at other times of the week that worked for the hatchery staff and our volunteers.

The NWSRI received funding to purchase additional souvenirs, to help raise funds for sturgeon recovery. The NWSRI purchased t-shirts, lapel pins, and sturgeon stuffies.

TOUR STATISTICS

Data was collected about the visitors to the NWSCC. The statistics presented here are an under representation of the number of visitors to the hatchery, as many people visited the grounds without taking a guided tour. Visitors enjoyed the picnic area interpretive signs situated outside the facility.

- > Tours were given to public and private school students, tourists, industry managers, local governments, researchers, and the general public.
- > 58 tours were given to 733 people from July to November 2016.
- > The percentage of visitors by origin is show in the graph below.



NWSCC staff lead a tour of the inside of the hatchery to a home-school family. PHOTO BY MICHELLE ROBERGE.



Students from Evelyn Dickson Elementary School pose by the wooden sturgeon sculpture after their tour of the hatchery. PHOTO BY WAYNE SALEWSKI.

Broodstock Capture

The broodstock capture program underpins the success of the breeding plan for the endangered Nechako white sturgeon. This program captures wild adult sturgeon in breeding condition to use to seed the hatchery program for the coming year. The Breeding Plan currently calls for the production of up to 12 adult females and from 12 adult males in a factorial mating design (up to 144 crosses).

OBJECTIVES

- > To capture 12 female and 12 male mature sturgeon, which supply eggs and milt for the conservation fish culture program.
- > To assist NWSRI research programs such as the application of radio and acoustic tags, or tracking of tagged adults to inform programs such as spawn monitoring.
- > To monitor and assess the health of the adult sturgeon population.

RESULTS

- > The breeding season was 5 weeks early in 2016 due to unseasonable weather.
- > 34 adult sturgeon were caught in a six week period in April and May 2016, using set-lines and angling.
- > 8 of 34 were males, of which 4 were kept for the brood program. Four males were released with acoustic to support other studies investing spawning habitat use.
- > 5 of 34 were mature females, 3 of which had never been caught. One of these was released with an acoustic tag to follow in the river during breeding.

The crews were able to implant 15 radio-tags and 12 acoustic tags in adult sturgeon that were released. Sturgeon are released after capture if they are not in breeding condition.

Juvenile Release

Approximately 9,300 juvenile sturgeon that were spawned from the 2015 brood were released into the Nechako River in April and May. Approximately 600 fish were released at each of 10 locations along the Nechako River from as far upstream as Fort Fraser to rkm 116.



Adult female Nechako white sturgeon overwintering in anticipation of spawning in 2017. PHOTO BY MICHELLE ROBERGE.

LIST OF RESOURCES

Report: [Breeding Plan for Nechako White Sturgeon](#)



Juvenile sturgeon from the 2015 brood year being released downstream of Vanderhoof. PHOTO BY ANNA MANWARING.



FINANCIAL SUMMARY FOR 2016-2017

NWSSC

In 2015-2016 the total operating expenses of the Nechako White Sturgeon Conservation Centre was \$493,021. Contributions to the NWSSC came from the Nechako Environmental Enhancement Fund (\$400,000), Rio Tinto (\$50,000), and the Province of BC (\$43,000).

Project Funding

During the 2016-2017 fiscal year, project funding was roughly \$315,496 (\$282,496 cash and \$33,000 In-kind). Project dollars came from a variety of sources including industry, government, environmental funding sources, and volunteer hours. The following provides a breakdown of financial and in-kind contributions to the NWSRI for 2016-2017.

BC Ministry of Forests, Lands & Natural Resource Operations — \$39,979 (\$35,000 Land Based Investment Strategy)

Carrier Sekani Tribal Council — \$109,050 In-kind & Cash (\$25,900 via Fisheries and Oceans Canada's Aboriginal Funds for Species at Risk, and \$76,650 via Environment and Climate Change Canada's Habitat Stewardship Program, and \$6,500 In-Kind for the Boat Kit Program)

Fisheries and Oceans Canada Species at Risk Program — \$103,000

Environment and Climate Change Canada's Habitat Stewardship Program (aquatic species) — \$28,695

Integrus Credit Union — \$1,000

Canfor Pulp Products Inc. — \$5,000

Mt. Milligan Community Fund — \$2,000

District of Vanderhoof — \$4,200 In-kind

School District 91 — \$3,000 In-kind

Avison Management Services Ltd. — \$3,300 In-kind

UNBC Fish & Wildlife Club — \$400 In-kind

NWSRI Community and Technical Working Groups — \$7,800 In-kind

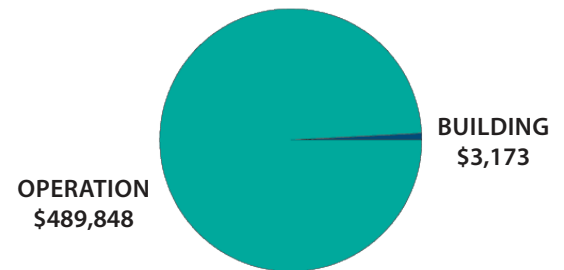
NWSRI Sales & Donations — \$272

Freshwater Fisheries Society of BC — \$7,000 In-kind

Rio Tinto — \$800 In-kind

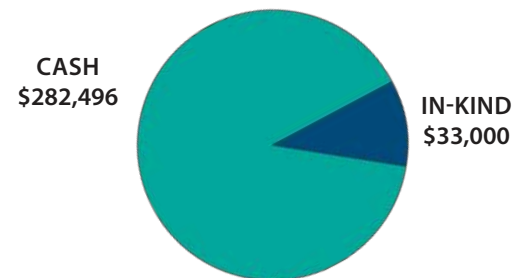
TOTAL OPERATING COSTS OF THE NECHAKO WHITE STURGEON CONSERVATION CENTRE 2016-2017

\$493,021



TOTAL FUNDS TO SUPPORT RECOVERY PROJECTS OF THE NWSRI 2016-2017

\$315,496



The NWSRI extends a sincere thank you to all of the groups and individuals who have contributed funds, time and/or other in-kind contributions. This support is essential to the success of the NWSRI and the recovery of white sturgeon in the Nechako watershed.

COVER PHOTO: Ian Spendlow of FLNRO tracking juvenile Nechako white sturgeon along the banks of the river. PHOTO BY ZSOLT SARY.

CONTACT THE NWSRI

Nechako White Sturgeon Recovery Initiative
c/o the Nechako White Sturgeon Conservation Centre
PO Box 710
3030 Burrard Avenue
Vanderhoof, BC
V0J 3A0

E-mail: info@nechakowhitesturgeon.org

Visit our website for more information about the program, projects both past and present.

www.nechakowhitesturgeon.org

This project was undertaken with the financial support of the Government of Canada.

Ce projet a été réalisé avec l'appui financier du gouvernement du Canada.

Canada 