



2015-2016 ANNUAL REPORT NECHAKO WHITE STURGEON RECOVERY INITIATIVE





INTRODUCTION

The story of the Nechako white sturgeon is a long one, a story that began here in the Nechako Valley 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 population, 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 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 is committed to ensuring that sturgeon, from juveniles to adults, continue to live in the Nechako watershed for many generations to come.

The NWSRI consists of many stakeholders throughout the Nechako watershed, all with the common goal of recovery of the Nechako white sturgeon. The NWSRI is composed of two committees: the Technical Working Group (TWG), which is responsible for identifying the reasons for the decline of white sturgeon in the Nechako watershed, and for the design and implementation of habitat protection, restoration and management options; and the Community Working Group (CWG), which focuses on increasing public awareness and knowledge about the recovery process, as well as the ecological problems facing the Nechako white sturgeon.

For more 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.



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THE NWSRI

The Nechako White Sturgeon Recovery Initiative is comprised of two working groups - the Technical Working Group and the Community Working Group. The Technical Working Group researches sturgeon behaviour, habitat needs and river habitat. The Community Working Group leads community outreach and awareness projects based on the findings of the Technical Working Group. The NWSRI participates in the following activities:

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

Goals and Objectives of the NWSRI

Together the TWG and CWG work towards a 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.

NWSRI TWG & CWG Partnerships

The members of both the Technical Working Group and Community Working Group represent a wide range of organizations. Those involved during the 2015-2016 fiscal year included:

Avison Management Ltd.	District of Vanderhoof	Lheidli T'enneh First Nation
BC Ministry of Environment	Fisheries and Oceans Canada	Rio Tinto Alcan Inc.
BC Ministry of Forests, Lands & Natural Resource Operations	Fraser Basin Council Fraser River Sturgeon Conservation Society	Tl'azt'en Fisheries Program
BC Nature (Federation of BC Naturalists)	Freshwater Fisheries Society of BC	
Carrier Sekani Tribal Council		



TECHNICAL WORKING GROUP

The Technical Working Group (TWG) was formed in September 2000, and is made up of private sector, federal and provincial biologists as well as First Nations and industry experts. 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. Some members also have a regulatory role with regard to the protection of fish and their habitats in the Nechako watershed.

This team of experts is responsible for:

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

The recovery strategy is based on the best-available science, local, and traditional knowledge.

The TWG meets 2-3 times per year, in addition to project specific meetings when needed. The meetings are lead by the TWG Chair.

Message from the TWG Chair Cory Williamson

The TWG has been very busy conducting research on all facets of sturgeon biology, habitat, genetics and management. Namely, we have engaged students and graduates from further afield that are assisting with, or implementing quality research projects assessing the habitat conditions in the river while completing research on sturgeon conservation that will be recognized internationally by peers. These students are active contributors to the TWG, and provide valuable data that assists the TWG in making sound decisions on further research and management measures needed for the recovery of the Nechako white sturgeon.



CORY WILLIAMSON, TWG CHAIR. PHOTO BY NWSRI.

By the end of year two it is clear the Nechako White Sturgeon Conservation Centre (NWSCC) is well embedded within the community of Vanderhoof, as well as the community of researchers beyond the watershed boundary. Work at the facility now includes a wide-diversity of programs focused on three core objectives for recovery of the population: (1) education; (2) conservation fish culture; and (3) habitat research.

At the NWSCC, on any given day during the summer, you might see elementary students watching the spawning process or touring the hatchery to learn about the plight of Nechako white sturgeon. Volunteers from the community, high schools and the College of New Caledonia (CNC) can often be found working alongside senior and junior fish culturists tagging or marking juvenile sturgeon, or assisting the capture of mature adults.

The TWG, in all its programs, is truly a community effort working at all levels.

Cory Williamson, Chair
NWSRI Technical Working Group



COMMUNITY WORKING GROUP

In April 2001, the Community Working Group (CWG) was assembled. Composed of some 20 individuals that represent First Nations, non-government environmental organizations, industry, local and regional governments, and affected public, the group was created to provide input from river stakeholders, and to act first and foremost as a public voice for Nechako white sturgeon and the Recovery Initiative.

The CWG provides an opportunity for key groups essential to the success of the Nechako white sturgeon recovery strategy to become involved in the process. The group focuses on increasing public awareness and knowledge about the recovery process, as well as the ecological problems facing the Nechako white sturgeon. It is also concerned with building and maintaining community support for the recovery plan and communicating progress back to their respective organizations.

The CWG meets 2-3 times per year. The meetings are lead by a CWG Chair.



WAYNE SALEWSKI, CWG CHAIR. PHOTO COURTESY WAYNE SALEWSKI.

Message from the CWG Chair Wayne Salewski

The Community Working Group has had an active year with our conservation facility now moved into its second full year of operation and most of the opening year operational challenges now out of the way. It was interesting to see the installation of a water chiller put in this year to help control water temperature.

Our outreach continues to include hosting tours of the facility from our many schools in the region, and it's very exciting to see the growth of the students knowledge and the enthusiasm that they demonstrate with each year of our outreach.

We continue to book tours and have facilitated a number of tours that include those requested by our Mayor and Council but also have included requests from those hosting family reunions, weddings and many other family functions. One can sense the opportunities for the community growth in tourism as a result of the facility.

We are pleased with the development of our outreach material for both the schools and the general public and are very pleased with having received our new brochures that are now available online and in various locations around the community.

Our release of juveniles continues to grow with students from School District 91 and the region. This year's results were excellent with students sending their specially named fish down the tube into the Nechako River.

We now are providing opportunities for students from the University of Northern BC and CNC along with students from the high school in helping with measuring, weighing and tagging juveniles, and we see opportunities to expand the program in the future.

We would like to thank our funding partners and stakeholders that help make our many outreach programs a success.

*Wayne Salewski, Chair
NWSRI Community Working Group*



NWSRI COORDINATION AND DATA MANAGEMENT

The NWSRI Coordinator 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 Recovery Initiative; 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; database management; 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.

Project Lead: Lana Ciarniello—NWSRI Coordinator

Funders: FLNRO via DFO SARCEP \$30,000

Year: 15 and ongoing



LANA CIARNIELLO, RECOVERY COORDINATOR, OVERSEEING THE JUVENILE STURGEON RELEASE EVENT IN 2015. PHOTO FROM NWSRI.



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.

In the past the spawn monitoring program was conducted to examine if, when and where sturgeon were spawning. We still use this monitoring program to detect potential new spawning areas, however now we are able to collect and use this information to help inform habitat restoration projects, to ultimately 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

The image below shows how these projects are set-up and overlap each other in the river. This set-up allows the TWG to determine spawning activity within the spawning reach in Vanderhoof. The program bases the findings against the river condition during the spawning period. In 2015, the water discharge was 500 m³/s on May 1, which is relatively high compared to regulated flows, but not historical flows. River temperature range during spawning was 10.5°C to 12.4°C, which is within the low range of previously observed spawning temperatures.



Imagery ©2016 Cnes/Spot Image, DigitalGlobe, Landsat, Province of British Columbia

- RED DOT - INDIVIDUAL ACOUSTIC RECEIVERS
- RED RECTANGLE - VPS ARRAY LOCATION
- BLUE TRIANGLE - FIXED STATION RADIO-TELEMETRY RECEIVER
- YELLOW BOXES - EGG MAT LOCATIONS

Project Lead: CSTC

Funders: \$93,700 total: \$15,000 DFO SARCEP; \$78,700 CSTC via Environment Canada (Habitat Stewardship Program), FFSBC, FLNRO and the Upper Fraser Fisheries Conservation Alliance

Year: 12 and ongoing

REPORT: *Nechako River White Sturgeon 2015 Spawn Monitoring: Egg Mats, Radio, and Acoustic Telemetry. 2016. Prepared by Carrier Sekani Tribal Council.*



ADULT SPAWN MONITORING

Fixed Station and Boat Telemetry

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.

During 2015 to 2016, FLNRO fisheries staff maintained 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). Data from the stations informs our understanding of broad scale dispersal patterns, periodicity of habitat use, and overall migration behaviours within the Nechako and Stuart rivers and beyond. Additional stations in the Upper Fraser are being planned for the spring of 2016 with support from the Lheidli T'enneh First Nation.

This data collected from the radio-telemetry work, helps us determine behaviour of spawning sturgeon, as well as their habitat use, especially in relation to river condition.

RESULTS

In the spring of 2015, spawning behaviour was inferred from the fixed telemetry station at Vanderhoof (near the spawning reach) and boat telemetry in the Vanderhoof reach.

- > 5 adults known to be in spawning condition were detected within the spawning reach.
- > Of these, 1 was a male and 4 were ripe females.
- > Three of the females were detected in the spawning reach between May 18-21, while the fourth was found May 16-24. In contrast the male was found on May 6 and was more active at the spawning reach (more detections).

REPORT: *Nechako River White Sturgeon 2015 Spawn Monitoring: Egg Mats, Radio, and Acoustic Telemetry. 2016. Prepared by Carrier Sekani Tribal Council.*

Mid-Fraser River Telemetry

Of interest, researchers conducting radio-telemetry work on the Mid-Fraser River sturgeon population detected two adult Nechako white sturgeon in 2015 in the Fraser river, one in Chimney Canyon and one by the Cottonwood River.



THE FIXED RADIO-TELEMETRY STATION JUST DOWNSTREAM OF THE BURRARD BRIDGE IN VANDERHOOF. WHENEVER A STURGEON WITH A RADIO-TRANSMITTER PASSES BY THIS ANTENNAE, THE DATE AND TIME ARE RECORDED. PHOTO COURTESY WAYNE SALEWSKI.



ADULT SPAWN MONITORING

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 Virtual Positioning System (VPS) can map the location of a sturgeon in the river to an accuracy of +/-1m. The array works by having three receivers communicate with each other at all times, and then those three communicate with another three, and so on, to achieve very precise locations of spawning fish in a positioning network.

During this pilot VPS project, the information collected will allow us to determine if fish are focusing on a particular location to spawn. This will lead future monitoring and/or restoration projects to be undertaken in locations that will best support the recovery of Nechako white sturgeon.

In 2015, 18 acoustic receivers were deployed in the spawning reach. The array was arranged in a single-thread arrangement, along the deepest area of the river, immediately downstream of the braided channel and Stoney Creek confluence to immediately upstream of the Burrard Bridge. The area included the re-mediated area (gravel pad) of the Nechako River that was completed previously.

The VPS array ran starting May 5 to July 30. Although three receivers may not have been detecting accurately, location data was successfully gathered from tags 73% of the time.

RESULTS

- > Sturgeon were detected 44 of the 88 operations days of the program. After filtering and data analysis, 7,694 positions from 8 sturgeon were calculated.
- > All sturgeon showed activity within the re-mediated zone (gravel pad) just above the Burrard Bridge.
- > The gravel pad occupies 14% of the available area within the detection zone, and sturgeon had 31% of their relocations over that area. Based on statistical analysis, sturgeon occupied the gravel pad more often than would be by chance.

The VPS pilot project will run again in 2016-2017.

REPORT: *Nechako River White Sturgeon 2015 Spawn Monitoring: Egg Mats, Radio, and Acoustic Telemetry. 2016. Prepared by Carrier Sekani Tribal Council.*



RESIDENTS ENJOYING AN AFTERNOON FISHING FOR TROUT IN THE NECHAKO RIVER. THIS PHOTO SHOWS THE RE-MEDIATED AREA UPSTREAM OF THE BURRARD BRIDGE, WHERE 31% OF THE VPS DETECTIONS WERE LOCATED IN 2015. SPAWNING STURGEON OCCUPIED THIS AREA MORE OFTEN THAN WOULD BE EXPECTED BY CHANCE. PHOTO COURTESY OF HEATHER CROSS.



ADULT SPAWN MONITORING

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.

In 2015, a total of 66 mats were used to collect sturgeon eggs. Fourty-six mats were deployed in 23 different locations on May 11, 2015. An additional 20 mats were set at 10 sites below the Burrard Bridge on May 19. No eggs were detected on the mats after May 24, and all mats were pulled on June 1.

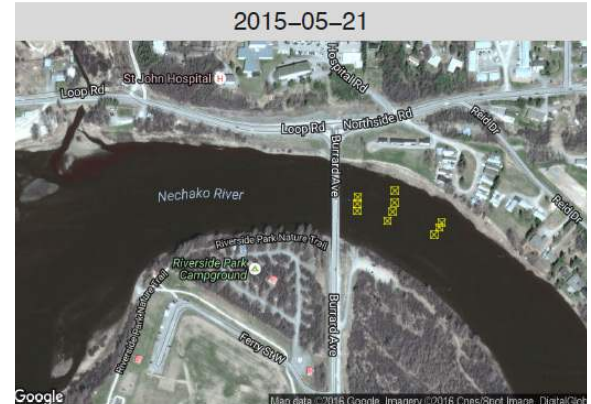
RESULTS

Eggs were collected on:

- > May 19 - 25 eggs
- > May 21 - 289 eggs
- > May 23 - 28 eggs

All eggs were collected on egg mats downstream of the bridge.

The eggs were collected and brought to the NWSCC, where they were reared in preparation to be released in May 2016.



LOCATION OF EGG MATS THAT HAD EGGS ON THEM ON THE RESPECTIVE DATES.

REPORT: *Nechako River White Sturgeon 2015 Spawn Monitoring: Egg Mats, Radio, and Acoustic Telemetry. 2016. Prepared by Carrier Sekani Tribal Council.*



JUVENILE INDEXING PROGRAM

OBJECTIVES

- > To ultimately determine juvenile sturgeon survival and recruitment success into the Nechako River population.
- > To determine juvenile sturgeon habitat use.

Project Lead: CSTC

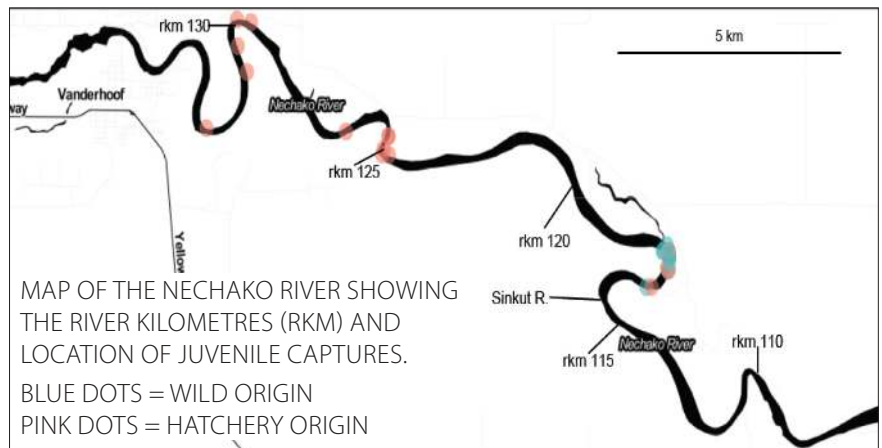
Funders: \$25,900 Aboriginal Funds for Species at Risk via Carrier Sekani Tribal Council

Year: Since 2004 - 12 and ongoing

The juvenile index program started in the early-2000's using multi-panel gill nets. In 2009, we switched to set-lines, to improve capture rates and allow sampling in all habitat types. Our current sampling utilizes set-lines with small, light-gauge circle hooks (Sizes 4, 2, 1 and 1-0) on 8-10" leaders of braided line. This gear is used to target juvenile white sturgeon less than 1 m (100 cm) in length. Biological data and location data is collected on all caught sturgeon. River condition, such as flow and temperature, is also recorded.

REPORT: 2015 Nechako Juvenile White Sturgeon Sampling; 2014AFSAR-2437 (Year 2) Juvenile Recruitment Indexing. 2016. Prepared by Carrier Sekani Tribal Council.

In 2015, the program ran from September 17 to October 14. Set-lines were used with an average of 40 hooks per line. A total of 76 set lines were deployed between rkms 110.2 and rkm 134.4. This resulted in a sampling effort of 65,359.9 hook hours.



NUMBER OF JUVENILES In total, 33 individual sturgeon were captured, including one sturgeon that was greater than 1m in length.

- > 23 were hatchery origin: 21 were from the 2015 release, one from the 2009 release (pilot project), and one from the 2006 release (pilot project). The low number of hatchery-origin juveniles caught suggests a lower rate of survival.
- > 10 were wild captures: 5 were previously captured in 2013 or 2010, and 5 were not previously captured. Two wild fish were aged at 4 years old, and one each at 8, 9 and 10 year olds. Wild sturgeon may include those produced after habitat manipulation experiments such as the gravel placement in 2011.

LOCATION

- > The majority of sturgeon were captured between rkms 116-118 and 125 (see map), suggesting these areas of the river are important for juvenile sturgeon.

HABITAT USE

- > Sturgeon were caught in the majority of habitats available within the sampling area, however the observation suggest that juveniles avoid shallow water habitats and prefer habitat that are 4-8 m in depth.

Subject to funding, there is consideration to extend the sampling area, or at least do some sampling in the Upper Fraser River for the coming year to assess broader scale habitat use and movements.



JUVENILE TELEMETRY

OBJECTIVES

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

Very little is known about the behaviour of juvenile sturgeon in the Nechako River. We understand that the first year of life is critical for sturgeon overall success, however details about their success after age one to adult is limited.

This is the first year of using radio-telemetry to determine hatchery-origin juvenile sturgeon movement within the Nechako River. This data will provide the TWG and managers with valuable data on habitat use, migration patterns and survival that will ultimately be used to plan recovery initiatives that support the increased survival and recruitment success of juvenile sturgeon in the Nechako River.

In 2015, 30 radio-tagged juveniles were released into the Nechako River on May 4, 2015. Fifteen (one half) of the juveniles had extended life transmitters (8-9 year lifespan) and 15 (one half) had smaller juvenile tags (1.5 year lifespan). The juveniles were on average 150-200g, with the larger tags placed in fish up to 1kg.

The first comprehensive boat telemetry survey was conducted by Freshwater Fisheries Society of BC (FFSBC) staff in July. A second was completed in September. These surveys extended from the Riverside Bird Sanctuary in Vanderhoof to Prince George.

- > **JULY SURVEY:** 26 of 30 tagged fish were detected, all of which were in the Nechako River main stem and the majority were upstream of the Stuart River confluence.
- > **SEPTEMBER SURVEY:** 24 of 30 fish were detected, and on average the fish had moved upstream from their previous locations.

In November, FLNRO staff conducted a comprehensive aerial over flight from the confluence of the Nautley River to Prince George, and the Stuart River. This survey was conducted to determine overwintering locations.

- > **NOVEMBER SURVEY:** 27 of 30 tags were located within the Nechako River from rkm 190 (Nautley R.) to rkm 100 (Cluculz Cr.), with 20 fish between rkm 110 - 136.

Project Lead: FLNRO and FFSBC

Funders: \$8,000 FLNRO Fish & Wildlife (radio-tags), with FLNRO and FFSBC monitoring in-kind, DFO SARCEP \$20,000

Year: 1 and ongoing



SURGICALLY IMPLANTING A RADIO-TRANSMITTER INTO A HATCHERY-ORIGIN JUVENILE STURGEON. PHOTO BY NWSRI.

From the fixed-base station telemetry network data, no movements were detected into the Stuart River system nor to Prince George. Interestingly, three tags were consistently located near the Nautley River and these were all juveniles up to 1kg in size.

These preliminary results give us a snapshot into the movement behaviours of age one juvenile sturgeon. The results observed through telemetry work is consistent with the juvenile indexing program results, but for the first time gives us an idea of their overwintering habitat use.



SEDIMENT TRANSPORT INVESTIGATION

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.

Altering the natural flow and sediment regimes of a river may cause significant physical and ecological change within the ecosystem. One common effect of flow-regulation by dams is a reduced ability to mobilize and transport sediment. As sand and fine gravels increasingly deposit on the riverbed, the gravel substrate that is used by early life stage sturgeon may become covered by sand and fine sediment and pore spaces between larger gravels and cobbles infill. Larval white sturgeon have been shown to preferentially hide within these pore spaces of gravel immediately after hatching, providing them with several survival advantages such as increased growth and reduced predation. The infilling of gravel by sand within the spawning reach in Vanderhoof is currently ongoing. In 2011, two gravel pads were placed within the spawning reach to help assess infilling rate and sediment transport within the reach.

As part of our physical monitoring work, University of British Columbia Master's student, Simon Gauthier-Fauteux, began a research project in 2014 that addresses the objectives listed above. Sampling in 2015 began on March 20 immediately after ice-off and lasted to October 17. The river flow in 2015 allowed us to refine our understanding of flow and sediment transport dynamics in the river over a wide range of conditions. Underwater imagery was also used to assess the availability of suitable habitat for early life stage sturgeon within the spawning reach.

The work done in 2015 resulted in the refinement of the estimated volume of bedload moving through the river reach, from previous calculation done using maps and historical observations.

REPORT: *2015 Sediment Transport Investigation on the Vanderhoof Reach of the Nechako River. 2016. Prepared by Northwest Hydraulic Consultants Ltd.*

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

Funders: DFO SARCEP \$74,000.

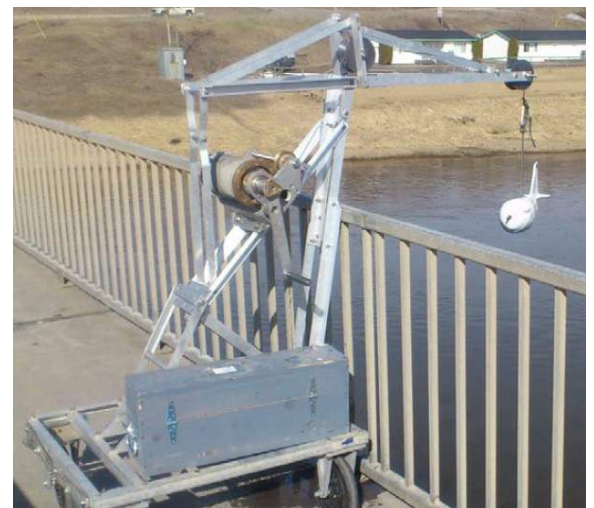
Year: 2 and ongoing

RESULTS

- > The bedload movement was estimated to be 10 times less than previous estimates.
- > Transport of sediment was higher at the observed river flow rate at the site above the spawning reach compared to below.
- > Visual evidence of infilling in the lower patch of the spawning reach. Yet there were visibly suitable habitat for spawning within the study area.

RECOMMENDATIONS

- > A sediment cleaning plan to physically clear fine sediment from gravel beds in the lower patch of the spawning area. The cleaning is planned for April 2016.
- > Continue to take underwater visual recordings of the lower patch to determine spawning quality.



SUSPENDED SEDIMENT SAMPLER AND BRIDGE CRANE. PHOTO FROM REPORT.



PILOT PHEROMONE STUDY

OBJECTIVES

- > To test if ovarian fluid can act as an attractant to mature adult white sturgeon in a river environment.

The crew of researchers from the University of British Columbia released sturgeon ovarian fluid pheromone into the Nechako River and using underwater cameras observed if sturgeon would be attracted to the release site in respond to the pheromone.

RESULTS

Water discharge during the experiment was 675 m³/s, on May 27. Water clarity was extremely low, making underwater observations difficult with the cameras. The detection distance was roughly 0.5m from the lens.

There were sturgeon detected in the vicinity of the ovarian fluid releases (observed on video and through radio-telemetry). However, experimental conditions were not optimal as the experiment could only be conducted when relatively few fish were in the spawning reach and the high turbidity at that time limited the ability to observe fish responses. This project did establish that similar tests could be repeated in future if needed.

Project Lead: University of British Columbia

Funder: \$15,000 DFO SARCEP.

Year: 1 (Pilot Project)

REPORT: *Ovarian Fluid Pheromone Testing, 2017. Prepared by Beardsall, McAdam and Yun*



A SNAPSHOT FROM VIDEO OF THE SNOUT AND BARBELL OF A WHITE STURGEON IN THE TOP RIGHT CORNER OF THE VIDEO FRAME 2 MINUTES AND 25 SECONDS AFTER TRIAL 2 STARTED. PHOTO FROM THE REPORT.



EVERY FISH COUNTS - BOAT KIT PROGRAM

GOAL

- > 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 was piloted in 2011 because the NWSRI and Carrier Sekani Tribal Council (CSTC) had become aware that an unknown number of sturgeon were caught as by-catch in association with the First Nation Food, Social and Ceremonial (FSC) fisheries and that fisher families didn't necessarily know how to release a large sturgeon safely from their gill nets. This program addresses one of the main objectives of the Recovery Plan for Nechako White Sturgeon to prevent extirpation of white sturgeon populations by preventing net loss of reproductive potential. This is done by educating and providing resources to First Nation fisher families on how to release sturgeon safely from gill nets. By reducing the number of sturgeon harmed or accidentally killed during the fisheries, we maintenance breeding adults in the population for future breeding purposes as well as genetic variability.

THE BOAT KIT PROGRAM COMPONENTS

- > 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.

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

RESULTS

- > Six of seven First Nation communities participated in the program (excluding Nadleh Whut'en).
- > Within the six reporting communities, seven live releases were reported during the FSC fisheries by two of the seven bands (Tl'azt'en = 2, Lheidli T'enneh = 5).
- > No mortalities were reported.

Project Lead: NWSRI and CSTC

Funders: \$14,686 total: Habitat Stewardship Program \$13,800; Canfor \$2,000; Mt. Milligan \$2,000; CSTC \$6,500 In-kind; NWSRI \$2,386 In-kind and cash.

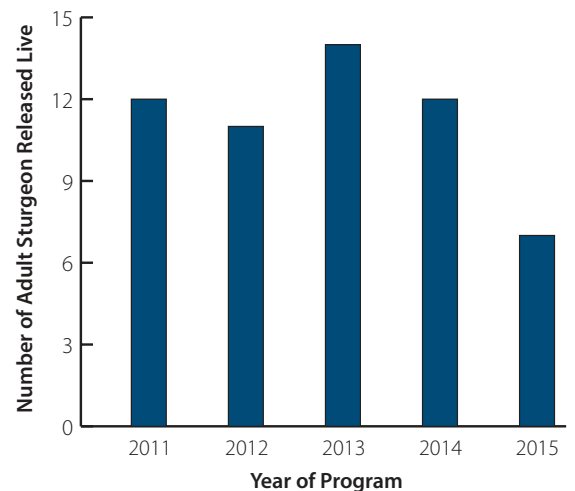
Year: 5 and ongoing

YOUTUBE VIDEO: *Every Sturgeon*

Counts: www.youtube.com/watch?v=YhrEJUEi-ow&feature=colike.

DATA FORMS: *Sturgeon Release Form (if you encounter a sturgeon, please fill out this form - click text to go to form).*

Since its pilot year in 2011, 55 sturgeon have been released live because of this program. 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.





AWARENESS AND OUTREACH EVENTS

Juvenile Sturgeon Release - May 2015

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 4, 2015 at Riverside Park between 11:00-14:30. The NWSRI, along with School District 91 and the District of Vanderhoof, hosted approximately 600 elementary school students during the event. The students named individually PIT tagged juvenile sturgeon and released them into the Nechako River, after getting their picture taken with their fish. The release data was added to the “Where is My Fish” database of the NWSRI website (see page 18). The event also saw students get a free hot dog lunch. Teachers could bring their students to a number of educational booths set-up at the event. The booths included sturgeon biology, how to track sturgeon, the Boat Kit Program, and the grades 4-7 Healthy Watersheds for Sturgeon Schools program. Tours at the NWSCC were also held for classrooms during the event. Students came from around School District 91, including classes from Fort St. James, Vanderhoof, Fraser Lake, and Burns Lake, as well as home-school families.

River’s Day - September 2015

OBJECTIVES

- > To celebrate rivers in BC, in particular the Nechako River.
- > To have a public awareness opportunity.

Each year on the last Sunday of September, local community groups come together to celebrate our province’s spectacular river heritage by hosting a public Rivers Day event.

In 2015, the YMCA in Vanderhoof hosted the Rivers Day celebration. The NWSRI had a booth at the event and showcased our sturgeon stuffy, information about Nechako white sturgeon, along with promotion of the Boat Kit Program, and the grades 4-7 Healthy Watersheds for Sturgeon school program. Although the event was well received by those who attended, the attendance was low.

Project Lead: NWSRI Community Working Group

Funders: \$24,872 total for the sturgeon release: District of Vanderhoof \$4,200 In-kind; NWSRI CWG \$4,786 In-Kind; NWSRI \$1,386; 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

Year: 7 and ongoing



STUDENTS FROM ACROSS SCHOOL DISTRICT 91 IN LINE TO NAME, HOLD AND RELEASE THEIR STURGEON INTO THE NECHAKO RIVER DURING THE RELEASE EVENT. PHOTO BY NWSRI.



NWSRI WEBSITE: WHERE IS MY FISH AND PHOTO GALLERY

OBJECTIVES

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

Project Lead: NWSRI

Funders: \$4,621 total: Habitat Stewardship Program \$3,235; NWSRI \$1,386 In-kind

Year: 2 updates complete and Where is My Fish ongoing

Where is My Fish

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. Additionally a horizontal bar is provided that extends from 0 to the maximum fish length we have captured to date (~300 cm). This visual description of the relationship of the release fish to the maximum captured to date is also provided for fish weight. Participants can search the database using their first and last name and/or by entering the fish’s PIT tag number.

In 2015, we updated the “Where is my Fish” online database with fish information from the 2015 release. In January-March 2016 alone, there were 1,244 visits to the “Where is my Fish” page. There is definite uptake by the community for this type of interactive resource.

Photo Gallery

We have also set up a Photo Gallery page that includes some memorable photos. The page will be populated as projects are undertaken. The entire NWSRI website was also made to be i-device and android friendly.



STUDENT PREPARING TO RELEASE HIS PIT TAGGED STURGEON INTO THE NECHAKO RIVER. HE WILL BE ABLE TO FOLLOW THE GROWTH AND MOVEMENT OF THIS STURGEON USING THE “WHERE IS MY FISH” PAGE OF THE NWSRI WEBSITE. PHOTO BY NWSRI.

“WHERE IS MY FISH”:

www.nechakowhitesturgeon.org/where-is-my-fish
(click text to go to website).

“PHOTO GALLERY”:

www.nechakowhitesturgeon.org/about/photo-gallery
(click text to go to website).



STURGEON AND WATERSHED CURRICULUM

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 Healthy Watersheds for Sturgeon School Curriculum Program was provided to all elementary schools within School District 91 in 2014, and 2014-15 was its first full year of implementation.

In 2015, the NWSRI conducted a review of the curriculum.

OUTCOME OF THE REVIEW

- > Overall, students liked the content of the curriculum.
- > Teachers found the curriculum useful and a great resource of facts and activities that aid learning in students.
- > Limited use of the curriculum because of poor promotion of the program in 2014.

Despite that, there is a growing interest in Nechako white sturgeon, in big part due to the Nechako White Sturgeon Conservation Centre being in Vanderhoof, and also due to the juvenile release events.

RECOMMENDATIONS

- > To expand the curriculum from Kindergarten to Grade 12.
- > To revamp the curriculum to match the new BC Curriculum being implemented in September 2016.
- > To solicit a champion teacher in every school to advocate for the program.

There is a funding request put forward to address these recommendations in 2016-2017.

Project Lead: NWSRI

Funders: \$12,622 total: Habitat Stewardship Program \$11,160; Integris Credit Union \$1,000 In-kind; NWSRI \$462

Year: 2 and ongoing



STUDENTS WATCHING AS FFSBC STAFF COLLECT EGGS FROM AN ADULT FEMALE FOR THE 2015 BROOD PROGRAM. THE CURRICULUM ENCOURAGES TEACHERS TO BRING THEIR STUDENTS FOR FIELD TRIPS, NOT ONLY TO THE NWSRI, BUT ALSO ALONG RIVER TRAILS TO LEARN ABOUT RIVER HABITAT AND RIPARIAN ZONES. PHOTO BY NWSRI.



AWARENESS AND OUTREACH MATERIALS

OBJECTIVE

- > To spread awareness of the plight of the Nechako white sturgeon to a wide range of stakeholders within the Nechako watershed.

Project Lead: NWSRI

Funders: Habitat Stewardship Program \$450

Year: 6 and ongoing

In 2015-2016, we updated our communication brochures that are used for the Boat Kit Program, general awareness, as well as the First Nation oriented brochure. The brochure had not been updated since 2010-2011.

The kit contains all of the tools necessary for the successful release of live sturgeon from a gill net. The tools in the kit were chosen in partnership with participating First Nation fishers. The kit also

Your help can make a difference now and for future generations.

Help Save the Nechako White Sturgeon

Broodstock Program

- The capture of broodstock is vital to any hatchery related operations because captured broodstock is how we obtain eggs and milk.
- Each year we try to capture 12 males and 12 females (24 adults) for broodstock.
- The Nechako White Sturgeon Conservation Facility's goal is to produce, raise and release up to 12,000

Juvenile Index Program

The primary goal of the juvenile index program is to monitor juvenile habitat use and survival, particularly of hatchery fish so we can meet the recovery target of 1000 adults at maturity.

- Each September we capture and release juvenile

Emergency Sturgeon Live Release Boat Kit Program for First Nation Fishers

www.nechakowhitesturgeon.org

Carrier Sekani Tribal Council
www.carriersekani.ca
250-562-6279

We invite you to become involved in the Nechako White Sturgeon Recovery Initiative:

- Continue to avoid harvesting sturgeon
- Report any sightings of sturgeon
- Live release any bycatch of sturgeon
- Encourage other fisher-people to live release sturgeon bycatch
- Report any sturgeon bycatch to your community monitor
- Participate in the Emergency Live Sturgeon Release Boat Kit Program
- Provide information on any dead sturgeon to your community monitor (they may want samples so please leave the fish)

Returning a sturgeon to the water quickly is critical to its survival.

- Attempt to keep the fish, particularly its gills and mouth, under the water while untangling the net.
- Avoid touching the sturgeon's barbels and gills as they are easily damaged.

Lhecho ghuni-un onle.
Ndi lho nyun cha 'ink'ez nts'u haindene cha ba dizi' netsowuhidilhzhulh-ne ts'u doni.

Please be a steward of the sturgeon. Let your leaders know these fish are important to you and future generations.

Remember, every fish counts!
"Mussi"

To learn more about the Nechako White Sturgeon Recovery Initiative Please Visit Us:
www.nechakowhitesturgeon.org
Visit Us on Facebook:
Nechako White Sturgeon Recovery Initiative

Save Our Sturgeon

www.nechakowhitesturgeon.org

Carrier Sekani Tribal Council
www.carriersekani.ca
250-562-6279

Please Help The Sturgeon!

Nechako White Sturgeon Recovery Initiative

www.nechakowhitesturgeon.org

Carrier Sekani Tribal Council
www.carriersekani.ca
250-562-6279



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 Lead: FFSBC and NWSRI

Funders: \$533,536 total from Rio Tinto, NEEF, Province of BC; \$452,754 operating expenses; \$62,632 equipment; \$18,536 building

Year: 2 and ongoing



A HIGH SCHOOL STUDENT FROM NECHAKO VALLEY SECONDARY SCHOOL VOLUNTEERS TO HELP PIT TAG JUVENILE STURGEON. PHOTO BY NWSRI.



NECHAKO WHITE STURGEON CONSERVATION CENTRE

Broodstock Capture

The broodstock capture program captures mature sturgeon that can be used for the breeding program, and underpins the success of the breeding plan for the endangered Nechako white sturgeon. The breeding plan currently calls for the production of up to 12,000 juvenile sturgeon using eggs from 12 adult females and milt 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

- > 36 adult sturgeon were caught between April 14 and May 23, using set-lines and angling.
- > 19 of 36 were males, of which 5 were kept for the brood program. Thirteen males were released with acoustic and radio tags to support other studies investing spawning habitat use.
- > 17 of 36 were females. Ten were assessed as ripe, and six of those were held for the brood program, and 4 were released with acoustic and radio tags.

A total of 22 sturgeon were released the same day they were caught. Of those, six received radio-tags, and 14 received acoustic tags. Of the sturgeon held for the brood program, 7 were implanted with acoustic tags before release after spawning. Sturgeon held at the Conservation Centre for spawning were released back into the Nechako River between May 26 and June 2.

FISHING EFFORT

Fishing effort was high compared to the previous year and may have been related to relatively high discharge, low water temperature, and the use of rainbow trout as bait (sturgeon prefer salmon, which was difficult to source).



RELEASING AN ADULT STURGEON BACK INTO THE NECHAKO RIVER AFTER THE BROOD PROGRAM. PHOTO BY NWSRI.



NECHAKO WHITE STURGEON CONSERVATION CENTRE

Interpretive Materials

OBJECTIVE

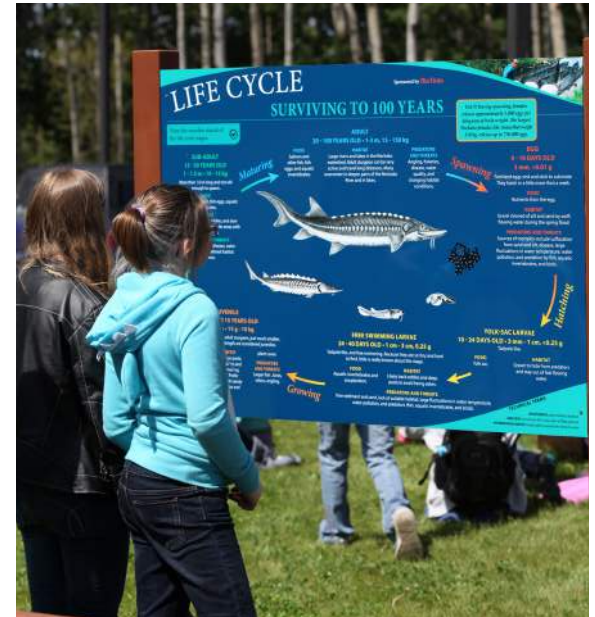
- > Creation of a user-friendly outdoor space for passive and active education and interpretation about ecosystems, sturgeon and history.

The Nechako White Sturgeon Conservation Centre has become a focal point for nature interpretation, education and tourism. In 2015 and 2016 the educational value of the NWSCC was enhanced through development of educational and interpretive signs and hands-on materials. The materials covered topics such as geological time, physical geography, evolution, human history, ecosystems, and biodiversity and include wood carving of a life-size female sturgeon as well as a wood carved life-cycle mural; windows on some of the tanks to allow small children to see inside, outdoor signs about Nechako white sturgeon biology, ecology and habitat, picnic tables and cameras to live-stream. These materials were designed to integrate with existing public school curriculum to expand educational opportunities for grade school audiences. The proposed completion date for these materials is May 2016.

Project Lead: FFSBC, NWSRI

Funders: Rio Tinto \$85,000.

Year: 1



STUDENTS READING OVER ONE OF THE INTERPRETIVE SIGNS AT THE NWSCC. PHOTO BY MICHELLE ROBERGE.



LIFE-SIZED WOOD CARVED STURGEON, MADE BY CARVER JOERG JUNG, ON DISPLAY AT THE ENTRANCE TO THE NWSCC. PHOTO BY MICHELLE ROBERGE.



FINANCIAL SUMMARY FOR 2015-2016

NWSCC

In 2015-2016 the total operating expenses of the Nechako White Sturgeon Conservation Centre was \$533,536. Contributions to the NWSCC came from Rio Tinto, the Province of BC, and Nechako Environmental Enhancement Fund (NEEF).

Project Funding

During the 2015-2016 fiscal year, project funding was roughly \$421,098 (\$384,492 cash and \$36,606 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 2015-2016.

BC Ministry of Forests, Lands & Natural Resource Operations — \$38,000 (\$30,000 Coordinator and \$8,000 radio-tags)

Carrier Sekani Tribal Council — \$111,100 In-kind & Cash (\$25,900 via Fisheries and Oceans Canada's Aboriginal Funds for Species at Risk, and \$78,700 via Environment Canada's Habitat Stewardship Program, and \$6,500 In-Kind for the Boat Kit Program)

Fisheries and Oceans Canada's SARCEP — \$124,000

Habitat Stewardship Program — \$28,685

Integrus Credit Union — \$1,000

Canfor Pulp Products Inc. — \$2,000

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

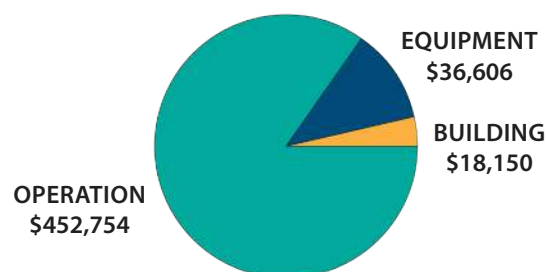
NWSRI Community and Technical Working Groups — \$10,406 In-kind

NWSRI Sales — \$247

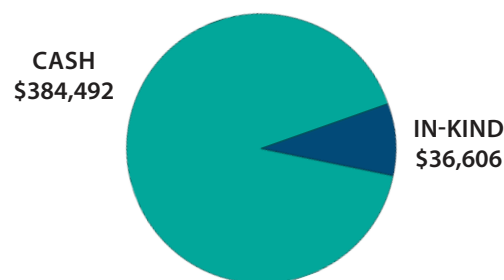
Freshwater Fisheries Society of BC — \$7,000 In-kind

Rio Tinto — \$85,800 Cash (\$85,000) & In-kind (\$800)

TOTAL OPERATING COSTS OF THE NECHAKO WHITE STURGEON CONSERVATION CENTRE 2015-2016 \$533,536



TOTAL FUNDS TO SUPPORT RECOVERY PROJECTS OF THE NWSRI 2015-2016 \$421,098



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.

NECHAKO WHITE STURGEON



RECOVERY INITIATIVE

COVER PHOTO: CORY WILLIAMSON AND MIKE MANKY INSPECTING AN ADULT STURGEON AT THE NWSCC. PHOTO CREDIT FFSBC.

CONTACT THE NWSRI

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

E-mail: info@nechakowhitesturgeon.org

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

www.nechakowhitesturgeon.org

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Canada 