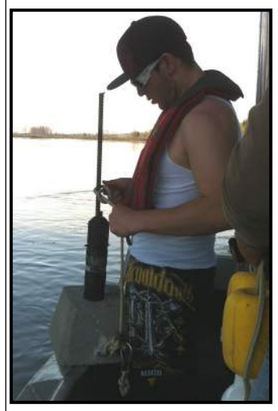
Testing Use of Acoustic Tags and Receivers Near Vanderhoof

The performance of acoustic receivers and tags was tested to see if the Nechako River's sturgeon spawning reach was a good area for installing an acoustic receiver array to monitor acoustically tagged sturgeon. Data from a functioning acoustic array within the spawning reach would provide a continuous record of the positions of tagged fish when present, and therefore allow an understanding of spawning-site selection at a refined scale.



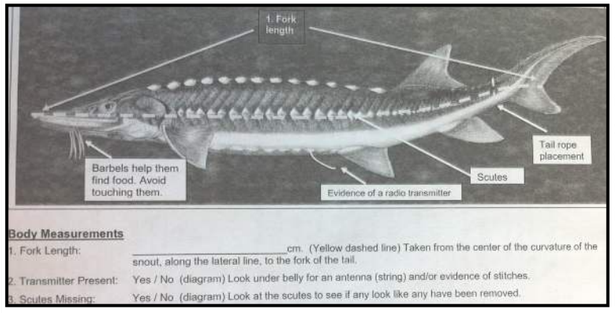
Bill Mole, getting ready to deploy a Test 1 anchor with acoustic receiver attached. The receiver needs greater than 1 meter of water depth to work properly.

Testing in 2013 was carried out with the assistance of the Okanagan Nation Alliance (ONA), who have experience with acoustic arrays. Test 1 was carried out Apr 30- May 2. The receivers were placed in the lower spawning reach to determine their ability to detect acoustic signals of differing strengths, over varying distances, and at different sites/depths. This test also allowed crews to see how different anchors worked at the site. Test 2 was done May 8-13. We switched from soft anchors to rigid anchors, using cement deck blocks with rebar to hold the receivers and sync tags. This 2nd test was also a range or line-of-sight test; to document how acoustic tags could be heard throughout the target-array area. Results were much better with the rigid anchor design. The 3rd test was carried out July 17 - 18 and involved installing the receivers in the format of a positioning array (VPS), setting out 13 receivers, each with a sync tag.

The results were informative as both low and high power test tags suggested a positioning array could be useful within the site, and identified a number of challenges that would need to be considered when designing an array for use in the area.

Test 3 Anchor design.

Sturgeon Outreach and Harm reduction



Page 2 of Sturgeon encounter form. Shows where to take measurements.

The last population estimate calculated indicated a dangerously low number of adult Nechako white sturgeon remaining in the Nechako Watershed. As a commitment to sturgeon recovery, the Nechako White Sturgeon Recovery Initiative (NWSRI) and CSTC put together an Emergency Sturgeon Release Boat Kit in 2011. In the 2013 fishing season the NWSRI and CSTC provided up to 30 First Nation fisher families in five communities with the tools necessary (boat kit) to facilitate the successful release of live sturgeon from a gill net. Sturgeon are incidentally caught during the First Nations Food, Social Ceremonial (FSC) salmon and other fisheries. A total of 14 sturgeon were live released by fishers from Na-k'azdli, Saik'uz, Tl'azt'en and Lheidli T'enneh First Nations. Three sturgeon mortalities were reported. Although the program is offered to seven First Nation communities each year, not all participate. Our goal is the voluntary participation of all First Nations within the Nechako watershed. Over the last three years 34 sturgeon have been live released using the tools contained within the boat kit! The DVD (One in each boat kit) can be seen at the NWSRI website www.nechakowhitesturgeon.org. under the tab **"Emergency Boat kit".** It can also be seen on **YouTube: http://youtu.be/YhrEJUEi-ow.** For more information on this project and how to receive a kit, contact: Lana Ciarniello, NWSRI Coordinator. Email: aklak@telus.net

The DVD shows how to use all the kit items and demonstrates how to mend a net.

Lho Dustl'us Sturgeon Issue

Carrier Sekani Tribal Council

Volume 9 Issue 1
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Bill Mole, checking egg mats for eggs. There was 27 large and 48 small egg mats deployed.

CSTC personnel carried out the sturgeon spawn monitoring, including radio telemetry, which is used to monitor the presence of tagged sturgeon in and near their spawning reach. A total of 43 individual radio tagged fish were detected (at total of 183 detections) between May 10-June 21, 2013. Seventy-five egg mats were deployed in the Nechako's spawning reach on May 23-24, 2013. Eggs were first found on May 29th (248 eggs) and again on May 30th (68 eggs), June 5th, (21 eggs) and finally June 6th (7 eggs). The mats were last checked on June 12-13. A total of 344 eggs were found over 21 days. Egg captures suggest two spawning events occurred on May 29-31 and June 5-6. Water temperatures varied 11.2C to 15.7C during the period egg mats were deployed. Temperatures were 13.0C - 15.8C when eggs were captured.

Above. Eggs found

The size of eggs is approx. 3.0mm.

Sampling for Sturgeon Larvae, Spring 2013

Larvae collected June 18,2013

Nine days of larvae sampling were completed between June 4-21; including four daylight sampling periods and five darkness sampling periods. Based on the egg captures, the drift nets were all deployed below the Burrard Bridge. During the day sampling 12 drift nets were used. The 12 nets were used at three different sites (Upper, Middle, Lower). Four drift nets were used for night sampling period. In total 9 larvae were caught. The highest larvae catch (4) occurred on June 4th in net L3 (the net furthest below the Burrard Bridge).

The four furthest downstream drift nets (L1, L2, L3, L4) caught the largest amount of larvae overall (7). The three middle nets caught no larvae. The 4 highest upstream nets (U1, U2, U3, U4) caught 2 larvae. The two different groupings of larva captures may indicate two spawning sites. Eight Larvae were caught June 4-7 (Dayshift) and 1 larvae on June 18 (Night shift). The flow velocity at net sites ranged from 0.76-1.3m/s.

Setting fyke nets.

Sample Dates	Larvae	Net Site	Veloc. m/s	Depth m
04-Jun-13	4	L3	1.14	1.2
05-Jun-13	1	U1	1.17	1.3
06-Jun-13	1	L3	0.79	1.2
07-Jun-13	1	U1	0.86	1.3
07-Jun-13	1	L4	0.76	1.1
08-Jun-13	0			
17-Jun-13	0			
18-Jun-13	1	L2	1.3	1.3
19-Jun-13	0			
20-Jun-13	0			
21-Jun-13	0			
Total	**9**	4		

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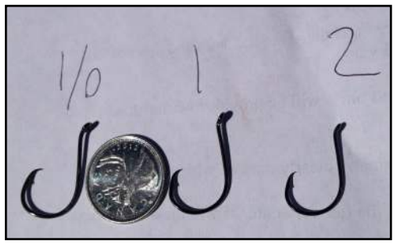
Juvenile Sturgeon Monitoring; Fall, 2013

The Nechako River was sampled from September 9-20, 2013 utilizing setlines rigged with small, light-gauge circle hooks (Sizes 4, 2, 1 and 1/0), focusing on the capture of juvenile white sturgeon (less than 100cm Total Length). Sampling was focussed in the core range of the Nechako's white sturgeon population between Vanderhoof (rkm132.8) and rkms110.2 (over 20km downstream of the Burrard Bridge in Vanderhoof).



Different sizes of circle hooks used to capture sturgeon less then 1m long.

The juvenile project monitors the presence of wild-spawned and hatchery-reared juvenile white sturgeon released during pilot-scale fish culture operations (hatchery) from 2006-2008. These sturgeon have reached sizes at which they are "catchable" via the setlines and hook sizes used. Sampling of this nature is key to assessing their growth and survival.

A total of 31 white sturgeon (WSG) capture events occurred (1 fish was captured twice during the study). The total length of the sturgeon captured varied from 36.2cm- 78.7cm (no fish greater than 100cm were captured).

Juveniles were caught throughout the study area, but the majority were associated with a few key habitats, including rkm110-12 (5 fish), rkm115-117 (21 fish) and rkm125-27 (3) (the rkms are measured from the confluence of the Fraser and Nechako rivers).

Capture success and habitats indicated a preference for depths in the 3-5m range. The 30 individual WSG captured during the study included 23 wild-recruited individuals, including 16 that had not been caught before, and 7 wild fish that had been previously captured. Seven (7) fish of hatchery-origin were captured with origins as follows; fall releases in 2006 (2), 2007 (1), and 2008 (1) and spring 2009 (3) (2008 cohort) releases. Four of the 7 hatchery fish had been captured before 2013.

Hatchery-augmentation of juvenile recruitment is apparent, although the numbers of hatchery-origin juveniles appears very low, despite the hatchery fish being well within the size range that sampling method selects for. The continued disproportionately high rate of capture and recapture of hatchery-origin juveniles from a small (59) number that were over-wintered and released as 1-year old fish in 2009 suggests that the fish released at ~6-months of age in the fall of 2006, 2007 and 2008 experienced very poor survival. This observation supports the existing long-term fish culture facility (hatchery) operational plan; to release hatchery fish as 1-year olds. The observations of poor survival of 6 -month old juvenile sturgeon may suggest a high rate of predation (or other factors negatively affecting juvenile survival in their first year). Such a factor(s) may have serious consequences on the ability to restore juvenile recruitment through spawning habitat restoration.

Captures of a relatively large number of wild fish age 2+ years in 2013 may suggest a larger than normal pulse of wild spawned fish from 2011 (the year clean substrate was placed in two "pads" within the spawning reach of the Nechako).

Results in 2014 will show us whether or not there is a notable recruitment pulse from 2011 and its potential significance.

Technical-field personnel participating in this project included: Chris Pharness (Contract Biologist), Neil Heron (Sr. Technician, CSTC), Bill Mole, Ashley Raphael and Aaron Raphael (CSTC Technicians), Shamus Curtis (Biologist, Upper Fraser Fisheries Conservation Alliance) and Kevin Laarman (Fishery Officer, DFO).

Ashley Raphael, Saik'uz First Nation, ready to release a juvenile sturgeon.

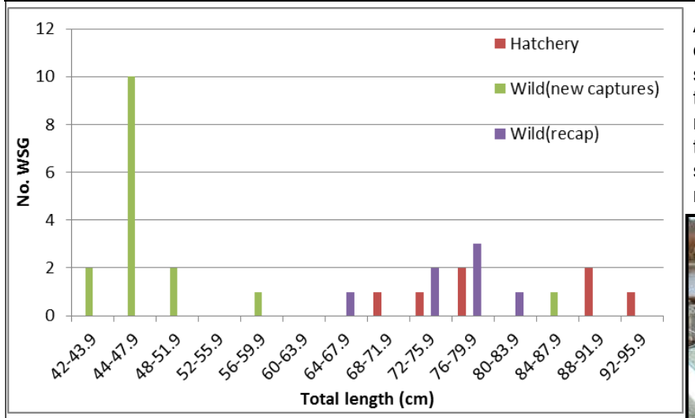


Figure 2. Length (TL) frequency distribution of the 30 individual WSG captured during sampling in 2013 – identified as hatchery or wild origin

A larger than anticipated number of smaller wild-origin juveniles were captured in 2013. Most were subsequently found to be age 2+years, suggesting their recruitment in 2011; the year when a habitat restoration experiment was undertaken entailing the placement of clean substrate (gravel) within the spawning reach, in two "pads". One is above Burrard Bridge and one is above Stoney Cr outlet.

7th International Symposium on Sturgeon (ISS7), Nanaimo, BC

In 2013 the 7th International Symposium on Sturgeon (ISS7) took place July 21-25 at the Vancouver Island University (viu.ca) in Nanaimo, BC. The 4 day symposium entitled **"Sturgeon, Science and Society – at the Crossroads: Meeting the Challenges of the 21st Century"** brought together researchers and world sturgeon experts to present on their research on 23 of the 33 species of sturgeon found worldwide! A total of approx. 330 participants from 22 countries attended the conference, despite the fact that a large number of participants form Russia, Iran, China, Turkey and other countries were not able to participate due to visa problems.

Several members of the NWSRI technical and community working groups attended the symposium.; Christina Ciesielski, CSTC, Neil Heron, CSTC, Cory Williamson (Freshwater Fisheries Society of BC (FFSBC), Steve McAdam, MOE, Zsolt Sary, MFLNRO, and Chris Pharness, (CSTC Contractor). NWSRI members delivered several presentations and posters. Christina Ciesielski presented on "Stewardship and Harm reduction featuring the Emergency Sturgeon Live Release Boat Kit Program". Chris Pharness presented on "Juvenile set line methods that the CSTC employs annually". Cory presented on "Recruitment failure of the Nechako White Sturgeon; From Uncertainty to restoration".

It was a great symposium and CSTC personnel gained a perspective of the challenges facing sturgeon worldwide.

The conference proceedings are expected to be published during the summer of 2014 in the Journal of Applied Ichthyology (JAI), the official journal of the World Sturgeon Conservation Society (WSCS).

For more information on this symposium and other Sturgeon groups check out:

Vancouver Island University http://www.viu.ca

Vancouver Aquarium posted about the ISS7 http:www.aquablog.ca/2013/07/iss7-farewell-sturgeon-symposium/

The North American Sturgeon and Paddlefish Society has lots of info at http://www.nasps-sturgeon.org/

Cory Williamson presenting on recruitment failure of the Nechako White Sturgeon.

Close up of "Sturgeons of the World" poster.