2009 Assessment of Juvenile Nechako White Sturgeon

Prepared for the:

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Photograph on Front Cover: Juvenile white sturgeon captured in the Nechako River on August 29, 2009. Credit Andrea Erwin

EXECUTIVE SUMMARY

The Nechako River supports a small population of white sturgeon genetically distinct from other sturgeon populations within the Fraser River watershed. The Nechako white sturgeon is provincially ranked as a "red-listed" population and is federally designated as an "endangered" species under Schedule 1 of the *Species At Risk Act*. A multi-year sampling program was initiated in 2004, and continued annually until 2009, with the intent to gather data regarding juvenile Nechako white sturgeon; ultimately this program will lead to the development of a standardized long-term indexing program to monitor juvenile recruitment. The utility of various sampling techniques, such as gillnets, cod traps, beach seines and angling, were investigated between 2004 and 2008 after which it was suggested that alternative captured techniques be investigated.

The Nechako River was sampled for juvenile sturgeon between August 24 and October 6, 2009. Sampling was focused towards areas of known sturgeon rearing/overwintering habitat between river kilometres 110 and 135. Set-lines and angling were the primary sampling techniques, resulting in 10,015.37 hook-hours and 123.93 rod-hours of effort, respectively and the total capture of 20 white sturgeon. Nine sturgeon, all juveniles, were captured on set-lines. Eleven sturgeon, six juveniles, two sub-adults and three adults were captured on angling gear. Gillnets and seine nets were also employed as capture techniques, resulting in 43.78 panel-hours and 50 minutes of net effort, respectively. No sturgeon were captured using either of these techniques.

A total of 15 juvenile white sturgeon between 29.6 and 99.3cm fork length were captured, of which seven were recaptures. One of these recaptures was a hatchery raised fish from 2008 fitted with a sonic tag and released in June, 2009. A total of 227 other fish were incidentally captured. Juveniles were captured in areas in proximity of known over-wintering sites near river kilometres 110 and 117.

Evidence from this assessment suggests that set-lines and angling are effective methods of juvenile sturgeon capture and should be incorporated into future monitoring activities.

ACKNOWLEDGEMENTS

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The work was completed by Andrea Erwin, Cody Naples and Jessica Courtier (BC Conservation Foundation staff), Cory Willamsom and Ray Pillipow (Ministry of Environment fisheries biologists) and James (Jako) Prince (Carrier Sekani Tribal Council). Nick Basok, retired Freshwater Fisheries Society of BC (FFSBC) employee and current FFSBC Angling Ambassador, also provided valuable expertise on all aspects of angling for sturgeon.

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1.0 INTRODUCTION

1.1 Background

In British Columbia, white sturgeon (*Acipenser transmontanus*) inhabit portions of the Fraser, Columbia, Kootenay, and Nechako Rivers. Flows in the latter three rivers are regulated by dams, and white sturgeon populations in these three rivers show chronic recruitment failure. In recent years, research has shown that sturgeon population sizes in these drainages have been declining. In April 1990, the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) listed the white sturgeon as a species of "special concern" in Canada (COSEWIC, 2003). On November 22, 2003 COSEWIC officially designated white sturgeon as "endangered" (COSEWIC, 2003), a species facing imminent extirpation or extinction. The Nechako white sturgeon, a genetically distinct population within the Fraser River watershed (Nelson et al. 1999; Smith et al. 2002), was provincially ranked as a "red listed" or "critically imperilled" population by the BC Conservation Data Center in 2002 (BC CDC, 2010). COSEWIC added the Nechako white sturgeon to Schedule 1 of Canada's *Species At Risk Act* in August 2006.

A long-term study (1995 – 1999) conducted by RL&L (*now* Golder & Associates Ltd.), of white sturgeon throughout the Fraser River drainage, indicated that the Nechako River population exhibited low reproductive success (RL&L 2000). Moreover, RL&L (2000) proposed that the limited natural recruitment of juveniles may be insufficient to maintain the Nechako River population. The Ministry of Water, Land and Air Protection (*now* Ministry of Environment) initiated the recovery planning process for the Nechako white sturgeon following a review of the results from the comprehensive study by RL&L. The Nechako River White Sturgeon Recovery Initiative (NWSRI) was established in 2000 and published the Recovery Plan for Nechako White Sturgeon in 2004. This recovery plan specified that a juvenile indexing program be established to obtain baseline juvenile abundance levels (NWSRI, 2004).

A multi-year sampling program, designed to gather data, regarding both wild and hatchery-reared juvenile white sturgeon in the Nechako River, was initiated in 2004 by the Carrier Sekani Tribal Council (CSTC) and Alcan Primary Metals – B.C. A wide variety of habitats were sampled using gillnets during the 2004 assessment and resulted in the capture of five juvenile and three adult sturgeon (CSTC, 2005). Nine juvenile white sturgeon, three of which were

recaptures, were caught during the 2005 assessment using gillnets (EDI, 2006). Gillnets were successful in capturing two juvenile sturgeon during the 2007 assessment (CSTC, 2008). Five juvenile sturgeon were captured using gillnets during the 2008 juvenile assessment (CSTC, 2009). In 2007 and 2008, the effectiveness of cod traps and angling as alternative capture techniques were investigated, however this effort resulted in no sturgeon captures (CSTC, 2008). The 2008 assessment also investigated the effectiveness of beach seines; this capture technique also resulted in no sturgeon captures (CSTC, 2009). Results of this multi-year program suggest that alternative capture techniques need to be investigated further.

1.2 Objectives

The objectives of this project were to:

- Experiment with alternative capture techniques to gillnets and cod-traps including the use of set-lines, angling and beach seines to develop new methodologies for indexing juveniles
- Locate both acoustic tagged and general hatchery released sturgeon to index growth and survival of hatchery fish
- Collect morphometric and biological data from captured sturgeon to index growth, survival and recruitment of wild spawned juveniles.

2.0 METHODOLOGY

2.1 Sampling Locations and Timing

Sampling for juvenile white sturgeon occurred within the Nechako River mainstem downstream of the town of Vanderhoof, British Columbia, from river kilometre (rkm) 110 to rkm 135 (Figure 2.1). Sampling effort was focused towards areas of known sturgeon rearing/overwintering habitat and was not an index.

The capture of juvenile Nechako white sturgeon was conducted over three sampling periods between August and October 2009. The first sampling period extended from August 24 to September 5, the second from September 14 to September 18, and the third from October 4 to October 6, 2009. The sampling dates are summarized in Table 2.1.

Table 2.1 Sampling schedule dates for the 2009 Assessment of Nechako River juvenile white sturgeon.

	August	September	October	Total # of days
Set-lines	26-31	1-5, 14-18	4-6	14
Angling	24-28, 31	1-4, 15-18	5	15
Gillnets	24-26, 28	2, 3	-	6
Beach seine	-	3	-	1

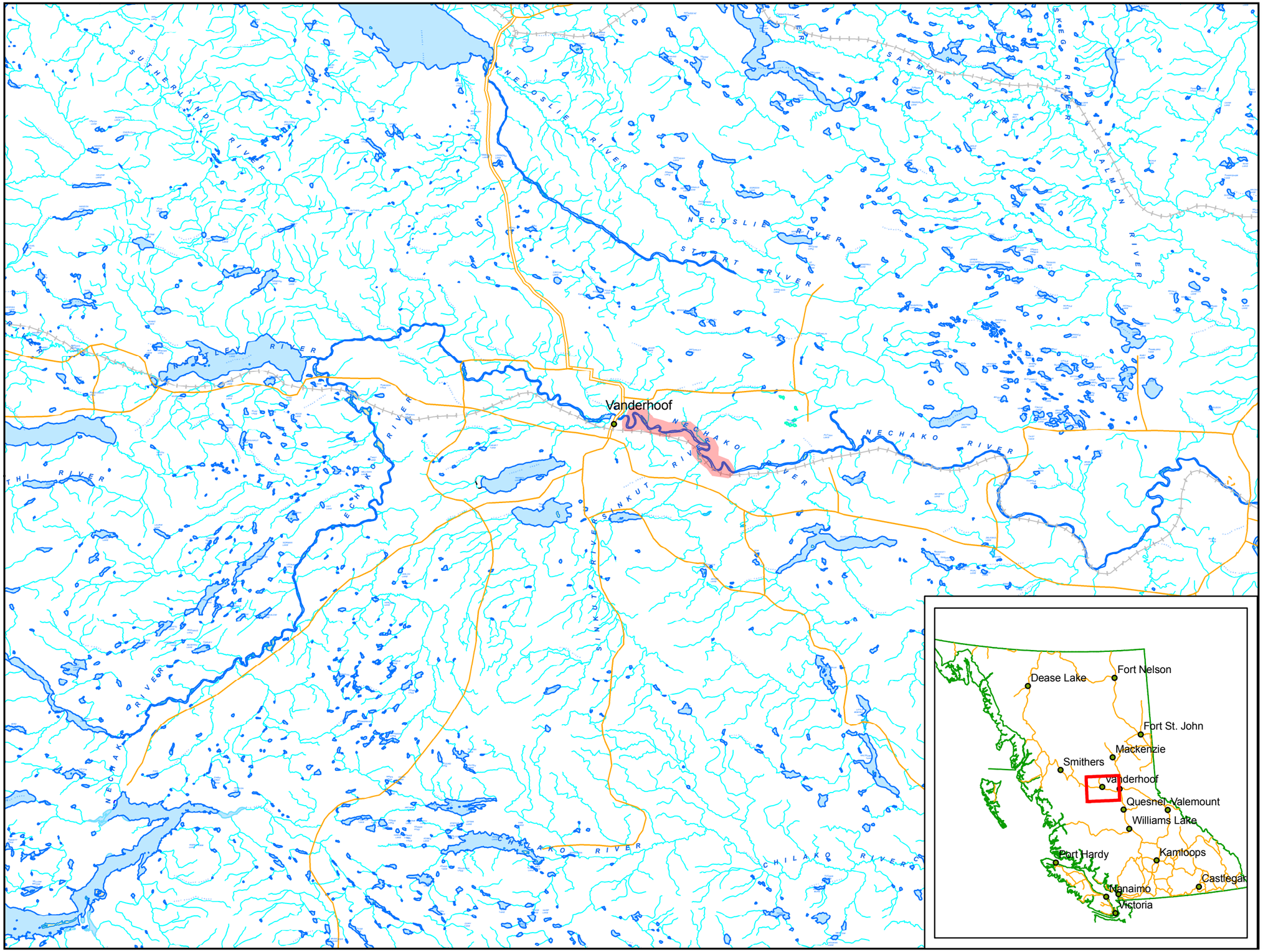

Figure 2.1 Overview map - 2009 Assessment of juvenile Nechako white sturgeon study area

Legend

Sampled Area

1:475,000

0 5 10 15 20 25

Kilometers

Data Sources and Notes

N W E S

Produced for:
NWSRI

Produced by:
BRITISH COLUMBIA
www.gov.bc.ca
Ministry of Environment
Environmental Stewardship Division

Projection/Datum: BC Albers/NAD83
Date Created: 2010-03-07
Created by: Jessica Courtier

2.2 Fish Capture

Four capture techniques were used in an attempt to capture juvenile Nechako white sturgeon. Set-lines and angling were the primary capture techniques employed; gillnets and beach seines were also utilized. Set-line, angling, gillnet, and beach seine locations are shown in Figure 2.2.

2.2.1 Set-lines

Set-lines configuration, deployment and retrieval techniques were similar to the methods used by the Upper Columbia River White Sturgeon broodstock collection program as described in Golder (2006).

Set-lines were constructed of 9.5-mm (3/8") diameter sinking Danline®. A steel railway plate was used as a weight on the onshore end. An anchor was used on the offshore/downstream end of the line to reduce the possibility of set-line movement and consequently fish entanglement. A float and buoy line were attached at both ends. The set-line was secured to the river bank with a shore-line. In some instances set-lines were set in a mid-river location and were not attached to shore.

Short set-lines, 20 meters in length, were used during this assessment. Hook configuration varied between 6 and 12 hooks per line. Physical characteristics of the sampling site dictated which configuration was deployed. During the 1st and 2nd sampling periods, single stainless steel barbed J-hooks were attached approximately three meters apart along the length of the set-line; circle hooks were used during the 3rd sampling period to investigate the capture success when using alternative hook types. Hook size was variable depending on the set. Hooks sizes included 12, 1, 2, 1/0, and 2/0. Hooks were baited with a variety of baits including sockeye salmon, chinook, eulachon, lamprey, whitefish, and salmon roe.

Bent and/or straightened hooks, hereinafter referred to as bent hooks, found on retrieval of set-lines indicated the capture and loss of larger (sub-adult or adult) sturgeon. Bent hooks were tallied for 30 of the set-lines during the second half of the sampling period as adult sturgeon moved into overwintering areas (based on past location history and visual sightings).

Set-lines were, for the most part, deployed in the afternoon or early evening and retrieved the following morning. In a few instances, set-lines were deployed during the day and were checked after a few hours. These lines were usually re-set in the same location and left to soak overnight.

Set-lines were deployed in a variety of habitats and flow conditions throughout the study area Data from each set-line deployment were recorded on a standard data form (Appendix I).

2.2.2 Angling

Angling was conducted from shore and from the boat close to locations of deployed set-lines or gillnets thus allowing crews to angle during the period of time between deployment and retrieval.

Angling gear consisted of a basic spin casting salmon rod equipped 50-80 test tuff-line. The line was weighted so that the baited single stainless steel hook (variable sizes: 1/0, 2/0, 3/0) would rest on the river bottom. A variety of baits were used including sockeye salmon, chinook, northern pike minnow, eulachon, lamprey, salmon roe, and dew worms. Data from each angling event were recorded on a standard data form (Appendix I).

2.2.3 Gillnets

Gillnets were constructed of one or two (ganged) sinking, standardized panels, each 2.4 m deep x 15.2 m long (37.2 m^2). Each panel was constructed from monofilament strand mesh (stretched size: 5.08 cm, 6.35 cm, 7.62 cm, 8.89 cm, or 10.16 cm). Combinations of mesh sizes were varied between gillnet deployments by attaching panels of different mesh sizes together. Anchors were attached at both ends using a "bridal system" to ensure that the lead line of the net maintained contact with the river bottom. A float and buoy line were attached at both ends.

Gillnets were deployed in a variety of habitats, generally exhibiting slack-water conditions, throughout the study area and were either set perpendicular, diagonal or parallel to shore depending on site characteristics. Set times were variable but generally were set for less than 1 hour to reduce the risk of harm to captured sturgeon and other incidental species. Gillnets were retrieved and captured fish removed from the net. Data from each sampling event, including incidental catch, were recorded on a standard data form (Appendix I).

2.2.4 Beach Seine

A seine net, 15.24 m (50 ft) in length by 2.43 m (8 ft) deep, mesh size 30 mm, was used on a trial basis in locations exhibiting shallow maximum depths. The seine net was deployed from shore with the aid of a boat.

Set-line Locations

Angling Locations

Gillnet Locations

Seine Net Locations

Nechako River

CHILCO CREEK

GILBERT KNIGHT CREEK

Figure 2.2 2009 Assessment of juvenile Nechako white sturgeon - sampling locations by technique

Legend

Sampling Period

- Aug 24 to Sept 5
- Sept 14 to Sept 18
- Oct 4 to Oct 6
- River Kilometers

1:90,000

0 0.5 1 1.5 2 2.5 3

Kilometers

Data Sources and Notes

Produced for: NWSRI

Produced by:

British Columbia
www.gov.bc.ca

Ministry of Environment

Environmental Stewardship Division

Projection/Datum: BC Albers/NAD83
Date Created: 2010-03-14
Created by: Jessica Courtier

2.3 Fish Sampling

Sturgeon were first examined for evidence of previous capture events, including the presence of tags (PIT, Floy, Radio) and/or other marks (i.e., missing scutes, fin clips, removal of fin rays). Unmarked sturgeon were classified as a "first time capture" and a full workup was completed. Sturgeon were classified as a "recapture" if tags or marks were observed. If PIT tags or radio tags were found upon capture, the initial year and location of capture was determined for the recaptured sturgeon using the NWSRI Microsoft Access database. Full workups were completed on recaptures unless a sturgeon had been previously captured within a timeframe where an increase in growth would not be detectable. Incidental catch was identified to species and sub-sampled for length to the nearest millimetre.

Biological Measurements, Aging, and Genetics

Sturgeon were measured for total length (TL), fork length (FL) to the nearest 0.1 cm. Fish were classified as juveniles, sub-adults or adults depending on their fork length: juveniles > 1-m FL, sub-adults 1 m > 1.5-m FL, and adults > 1-m FL. Post-orbital length and pre-opercular lengths were measured to the nearest 0.1 cm. Girth, circumference of the body behind the pectoral fins, was measured to the nearest 0.1 cm. Weight was determined by using either a digital balance or a handheld Pesola® spring scale and was measured to the nearest 0.5 g. A section of the leading ray on the left pectoral fin was removed for aging purposes. A two-centimetre square of tissue from a fin tip was removed, from first-time captured sturgeon, and preserved in 95% pure ethanol for possible future genetic analysis.

Sex and Maturity

Sex and maturity information was not determined for sturgeon captured during the assessment. Sturgeon were either coded as 97 (unknown sex; sub-adult / adult based on size; no surgical examination) or as 98 (unknown sex; juvenile based on size, no surgical examination).

Marking and Tagging

Sturgeon were marked in a variety of ways to enable the collection of information such growth rates, movements, and maturation upon recapture. PIT tags were injected subdermally into muscle tissue midway between the dorsal and lateral scutes and immediately posterior to the bones of the skull, if a PIT tag was not already present. The second lateral scute (R2) on the right side of the body was also removed to indicate tagging during future recaptures.

2.4 Physical and Habitat Parameters

Nechako River discharge information was provided by Environment Canada's Water Survey of Canada. Discharge data were collected at the Water Survey of Canada's hydrometric station 08JC001 located at the Burrard Avenue Bridge in Vanderhoof, British Columbia. Water temperatures were collected to the nearest 0.1 ^{o}C at each sampling site using the onboard depth sounder. General site information, such as minimum and maximum depths measured to the nearest 0.1 m, was collected for each sampling event.

2.5 Bio-Telemetry

150 juvenile white sturgeon from the 2008 brood year were held over winter in Vanderhoof. In the spring of 2009, the surviving sturgeon (n = 59) were marked with PIT tags and the removal of two scutes (L1 and L10) to indicate year of hatch. Of the 59 marked fish, 30 were surgically implanted with Vemco® V7-4L coded tags. These juveniles were released into the Nechako River, at rkm 116 and rkm 136.9, on June 26, 2009. Movements of fish fitted with these acoustic tags were then monitored over the course of the summer by CSTC staff. A separate report detailing the results of the monitoring program will be completed by CSTC.

3.0 RESULTS

3.1 Sampling Results and Catch Rates

3.1.1 Set-lines

A total of 53 set-lines were deployed over 14 days between August 26, 2009 and October 6, 2009. Set-line sampling effort totalled 10015.33 hook-hours and resulted in the capture of nine sturgeon and a catch per unit effort (CPUE) of 0.09 fish/100 hook-hours (Appendix II – Table 1). All sturgeon captured on set-lines were classified as juveniles by size; no adults were captured. Set-lines also incidentally captured 92 fish of various species (by-catch); by-catch CPUE totalled 0.92 fish/100 hook-hours. Table 3.1 summarizes the daily set-line effort and corresponding sturgeon and by-catch CPUEs. The majority of sturgeon (88.8%) and incidental species (95.7%) were captured during the second and third sampling periods.

Table 3.1 Summary of daily setline effort and catch during the 2009 assessment of juvenile Nechako white sturgeon

Date	Total # of set-lines	Total # of hooks	Total # of hook-hours	Total # of sturgeon caught	Sturgeon CPUE (fish / 100 hook-hours)	Total # of by-catch caught	By-catch CPUE (fish / 100 hook-hours)
2009-08-26	2	24	204.8	1	0.488	0	0
2009-08-27	2	24	253	0	0	1	0.394
2009-08-28	2	24	52	0	0	0	0
2009-08-31	2	24	400.4	0	0	0	0
2009-09-01	4	48	707.2	0	0	1	0.141
2009-09-02	2	23	499.3	0	0	2	0.401
2009-09-03	2	23	458.8	0	0	0	0
2009-09-04	1	12	19.4	0	0	0	0
2009-09-14	3	35	814.82	0	0	3	0.368
2009-09-15	4	48	816.2	2	0.245	2	0.245
2009-09-16	6	72	1293	3	0.232	4	0.309
2009-09-17	7	87	1461.51	1	0.068	14	0.958
2009-10-04	8	90	1480.4	1	0.068	35	2.364
2009-10-05	8	96	1554.5	1	0.064	30	1.930
Total	53	630	10015.33	9	0.09	91	0.91

3.1.1.1 Bent or Straightened Hooks

Of the 356 hooks examined upon set-line retrieval; 72 were bent. Sampling effort of these set-lines totalled 6110 hook-hours and resulted in 1.17 bent hooks/100 hooks-hours. These bent

hooks may represent the capture of 72 or less sturgeon, as a single sturgeon may have been the cause of multiple bent hooks.

Table 3.2 Summary of daily setline effort sampled for bent hooks and the resulting potential catch of adult sturgeon during the 2009 assessment of juvenile Nechako white sturgeon

Date	Total number of set-lines	Total number of hooks set	Total number of bent hooks	Total number of hook-hours	Possible sturgeon CPUE (bent hooks/ 100 hook-hours)
2009-09-14	1	11	11	312.2	3.523
2009-09-15	1	12	1	203.8	0.491
2009-09-16	6	72	23	1293	1.779
2009-09-17	7	87	28	1461.5	1.916
2009-10-04	8	90	3	1480.4	0.203
2009-10-05	7	84	6	1359.1	0.441
Total	30	356	72	6110	1.17

3.1.2 Angling

Angling was carried out at 22 locations, between rkm 100 and rkm 135, over 15 days between August 24, 2009 and October 5, 2009. A total of 123.93 rod-hours of angling effort resulted in the hooking of 23 white sturgeon and a catch per unit effort of 0.186 sturgeon per rod-hour (Appendix II – Table 2). However, only 11 sturgeon were landed on board the boat for work-up. Six sturgeon were classified as juveniles by size, two as sub-adults and three as adults. Larger sturgeon, deemed to be adults either by visual sightings or by their pull on the rods, were "released" by pointing the rod tips down thus causing the hooks to straighten. Adults were released because the focus of this assessment was to capture and sample juvenile sturgeon.

The highest number (n = 10) of sturgeon were hooked on September 17, 2009, including five that were landed for work-up. Angling effort also incidentally captured 80 fish of various species for a by-catch CPUE of 0.65 fish/ rod hour. Table 3.3 summarizes the daily angling sampling effort and resulting sturgeon and by-catch CPUE.

Table 3.3 Summary of daily angling effort and catch during the 2009 assessment of juvenile Nechako white sturgeon

Date	Total number of rod-hours	Number of sturgeon			Sturgeon CPUE (fish / hook-hour)	Total number of by-catch	By-catch CPUE (fish / hook-hour)
		captured	hooked & released	total			
2009-08-24	4.25	1	2	3	0.706	2	0.471
2009-08-25	5.72	0	0	0	0.000	3	0.525
2009-08-26	4.7	0	0	0	0.000	4	0.851
2009-08-27	11.87	0	2	2	0.169	3	0.253
2009-08-28	3.28	1	0	1	0.305	0	0.000
2009-08-31	2.83	0	0	0	0.000	4	1.412
2009-09-01	1.75	0	0	0	0.000	0	0.000
2009-09-02	5.47	0	0	0	0.000	4	0.774
2009-09-03	2.43	0	0	0	0.000	1	0.411
2009-09-04	9.35	1	0	1	0.107	13	1.390
2009-09-15	14.52	1	0	1	0.069	7	0.482
2009-09-16	10.77	0	0	0	0.000	6	0.557
2009-09-17	15.6	5	5	10	0.641	15	0.962
2009-09-18	17.05	2	3	5	0.293	12	0.704
2009-10-05	14.35	0	0	0	0.000	6	0.418
Total	123.93	11	12	23	0.186	80	0.646

3.1.3 Gillnets

A total of 35 gillnets, 58 panels combined, were deployed over six days between August 24, 2009 and September 3, 2009. The sampling effort totalled 43.78 panel hours and resulted in no white sturgeon captures (Appendix II – Table 3). Several other species of fish were incidentally captured including northern pikeminnow (*Ptychocheilus oregonensis*), peamouth chub (*Mylocheilus caurinus*), and mountain whitefish (*Prosopium williamsoni*). By-catch totalled 53 fish and the resulting CPUE was 3.25 fish per 100m^2/hour. Table 3.4 summarizes the gillnet sampling effort by mesh size and the corresponding by-catch CPUE.

Table 3.4 Summary of gillnet effort by mesh size and by-catch CPUE during the 2009 assessment of juvenile Nechako white sturgeon (1 panel = 37.2m^2)

Mesh size (cm)	Total panel hours	Hours fished for net area/m^2	Number of by-catch	By-catch CPUE (per 100m^2/hr)
5.08	11.77	437.72	24	5.48
6.35	0.93	34.72	0	0
7.62	17.28	642.94	23	3.58
8.89	6.90	256.68	3	1.17
10.16	6.90	256.68	3	1.17
Total	43.78	1628.74	53	3.25

3.1.4 Beach Seine

Four passes with a beach seine were completed over a 200 meter section of the Nechako River (rkm 134.2 to rkm 134.4) on September 3, 2009 (Appendix II – Table 4). This method was not successful in capturing sturgeon, of any size. A single northern pike minnow (length = 405 mm) and a longnose sucker (length = 174mm) were incidentally captured during approximately 50 minutes of effort.

3.2 By-Catch

A total of 227 fish were captured incidentally during this assessment (Table 3.5). Species captured included bull trout (*Salvelinus confluentus*), rainbow trout (*Oncorhynchus* mykiss), northern pikeminnow (*Ptychocheilus oregonensis*), peamouth chub (*Mylocheilus caurinus*), prickly sculpin (*Cottus asper*), mountain whitefish (*Prosopium williamsoni*), and longnose sucker (*Catostomus catostomus*). Northern pikeminnow accounted for the majority of the by-catch (78.3%). Numerically, set-lines produced the most by-catch (92 fish), followed by angling (80 fish), gillnets (53 fish), and seine nets (2 fish). Whitefish and sucker species were captured in gillnets but were not recruited to set-lines or angling gear.

Table 3.5 Summary of species specific by-catch by sample method caught during the 2009 assessment of juvenile Nechako white sturgeon

Sampling Method	Species Caught									Total
	Bull trout	Rainbow trout	Northern pike-minnow	Peamouth chub	Prickly Sculpin	Mountain whitefish	Long-nose Sucker	White-fish species[1]	Sucker species[1]	
Set-line	3	2	75	5	7	0	0	0	0	92
Angling	2	7	69	1	1	0	0	0	0	80
Gillnet	0	1	35	2	0	1	3	3	8	53
Seine Net	0	0	1	0	0	0	1	0	0	2
Total	5	10	180	8	8	1	4	3	8	227

[1] not identified to species

A sub-sample of incidentally captured fish were measured for fork length. Mean lengths (±1 standard deviation) of the various by-catch species are provided in Table 3.6. Bull trout were the largest of the incidentally captured species; prickly sculpins were the smallest. Fish captured by gillnets exhibited smaller mean fork lengths then fish captured by site lines or angling.

Table 3.6 Mean length (±1 standard deviation), by species, of incidentally captured fish during the 2009 assessment of juvenile Nechako white sturgeon

		Set-line			Angling			Gillnet			Seine Net		
		n	mean length	SD	n	mean length	SD	n	mean length	SD	n	mean length	SD
Species Caught	Bull trout	3	565.0	56.57	2	620.0	127.3	0	-	-	0	-	-
	Rainbow trout	1	360.0	-	1	280.0	-	1	300.0	-	0	-	-
	Northern pikeminnow	56	309.9	44.68	48	320.2	49.15	35	288.7	56.25	1	405.00	-
	Peamouth chub	5	282.0	27.06	1	244.0	-	2	241.0	5.66	0	-	-
	Prickly Sculpin	4	143.3	15.28	1	145.0	-	0	-	-	0	-	-
	Mountain whitefish	0	-	-	0	-	-	1	225.0	-	0	-	-
	Longnose sucker	0	-	-	0	-	-	3	351.7	128.75	1	174.00	-
	Whitefish species[1]	0	-	-	0	-	-	3	279.7	13.65	0	-	-
	Sucker species[1]	0	-	-	0	-	-	8	324.0	73.43	0	-	-

[1] not identified to species

3.3 Capture Distribution and Habitat Type

Sturgeon were captured at seven of the sampling locations, within close proximity to rkms 110, 117 and 134.5. It should also be noted that 10 sturgeon were hooked and released at rkm 116.8. Two other sturgeon were hooked and released at rkm 110.5. Total hook / rod-hours and total sturgeon captured by set-line and angling at each sampling location are shown in Figures 3.1 and 3.2, respectively. Catch rates varied somewhat between successful sampling locations. Set-line CPUEs were slightly higher at rkm 117.1 and 134.3 (CPUE = 0.548 fish/100 hook-hours and 0.4883 fish/100 hook-hours, respectively) then at rkm 117.2 and 117.7 (CPUE = 0.418 fish/100 hook-hours and 0.318 fish/100 hook-hours, respectively). Angling CPUE was greatest at rkm 110.0 (CPUE = 0.357 fish/hook-hour), followed by rkm 116.8 (CPUE = 0.292 fish/hook-hour). Angling CPUE at rkms 110.5 and 117.1 were much lower totalling 0.087 fish/hook-hour and 0.068 fish/hook-hour, respectively. All sub-adult / adult sturgeon retained (n = 5) were captured at rkm 116.8. Consequently, the angling CPUE at rkm 116.8 does not represent the CPUE of juvenile sturgeon as compared to other sites as sub-adult / adult sturgeon were captured at this location. The CPUE of juvenile sturgeon at rkm 116.8 totalled 0.183 fish/hook-hour

Set-line average depth was obtained by calculating the arithmetic mean of the minimum set depth and the maximum set depth at each location of capture. Average depths, of juvenile sturgeon capture by set-line, ranged from 2.2 m to 4.35 m. Juvenile sturgeon were captured by angling at a minimum depth of 4.7 m and a maximum of 8.6 m. Adult sturgeon were angled at a minimum depth of 3.6 m and a maximum of 6.6 m.

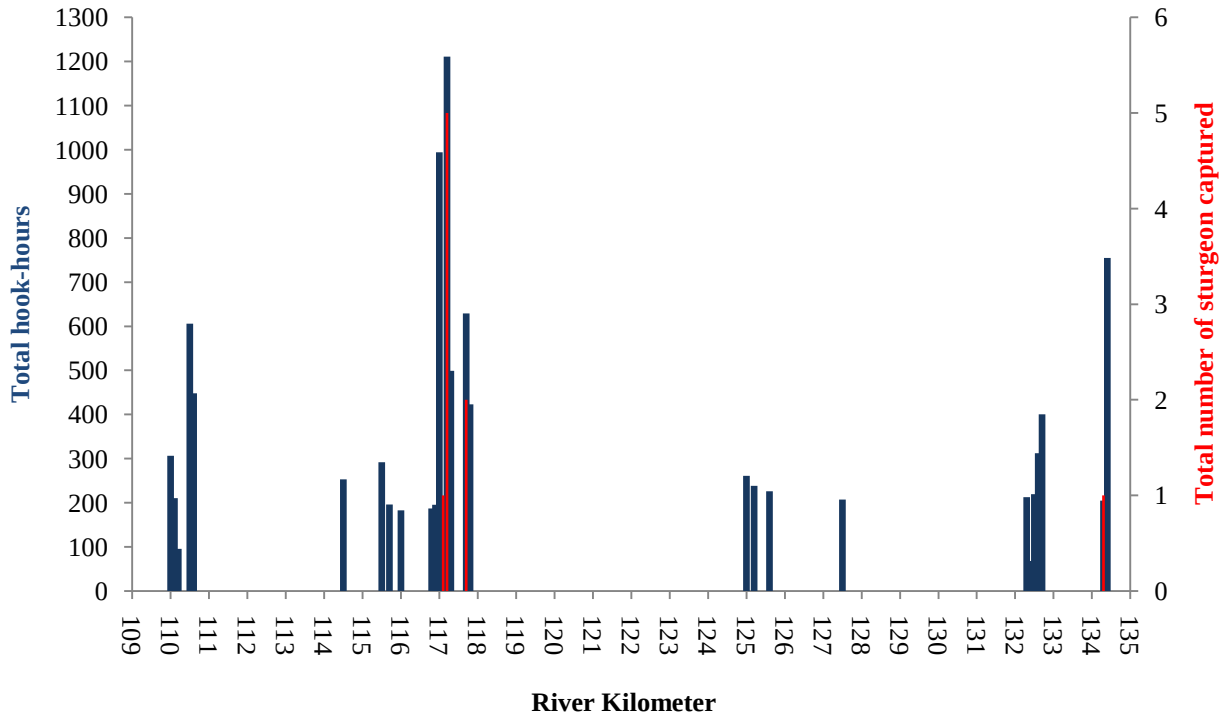

Figure 3.1 Total hook-hours and number of sturgeon captured at set-line locations during the 2009 assessment of juvenile Nechako white sturgeon.

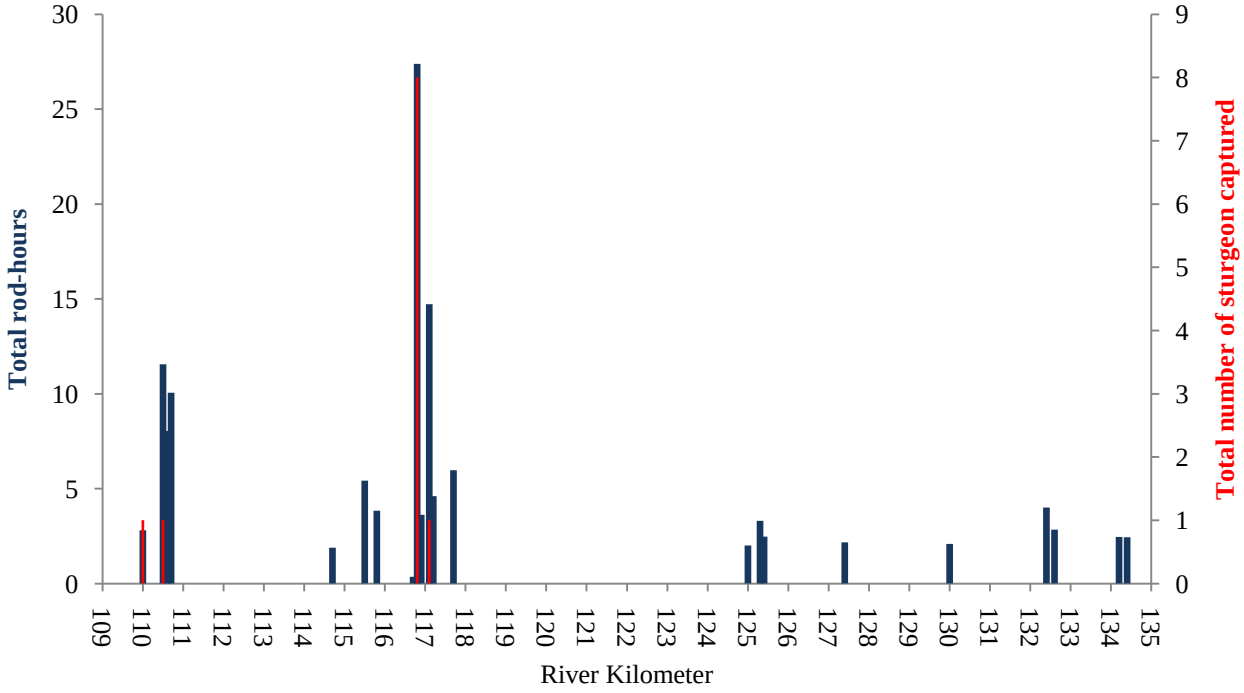

Figure 3.2 Total rod-hours and number of sturgeon captured at angling locations during the 2009 assessment of juvenile Nechako white sturgeon

3.4 White Sturgeon Captures

A total of 20 white sturgeon were captured during the 2009 juvenile sampling program. A total fifteen sturgeon were classified as juveniles, two were classified as sub-adults and three as adults by size (Appendix III – Table 1). Of the fifteen juvenile sturgeon, nine were captured by set-line and six by angling. All sub-adult and adult sturgeon were captured by angling. It should also be mentioned that an additional three juveniles and five sub-adults were captured during the 2009 broodstock capture program in the spring of 2009. Specific information regarding these fish will be reported upon in the separate broodstock capture report.

3.4.1 Juvenile first-time captures

Eight (53.3%) of the 15 juvenile white sturgeon captured displayed no previous indication of capture and were consequently classified as "first-time" captures.

3.4.2 Juvenile recaptures

Seven (46.7%) of the 15 juvenile white sturgeon were classified as "recaptures" (Table 3.8). The majority of these sturgeon (5 of 7) were captured for the first-time in the Nechako River between October 2006 and May 2009. Days at large (# of days since previous capture) ranged from 118 to 1065.

One recapture (PIT 501F701824) was initially caught in the Fraser River near Shelley, British Columbia (rkm 826.8) in 1999. In 2000, it was re-captured in the Fraser River at rkm 831.3, close to the confluence of the Salmon River. This particular sturgeon was re-captured again in the Nechako River (rkm 116.8) in 2009 after 3334 days at large. In comparison to other juvenile recaptures, this fish migrated a long distance and exhibited slow growth. From 1999 to 2009, its fork length had only increased from 56.0 cm to 78.4 cm.

One recapture (PIT 4A0D381815) was identified as a hatchery juvenile fitted with a Vemco® coded tag. Upon release at rkm 136.9, on June 26, 2009, this particular sturgeon had a fork length of 23 cm and a weight of 87 grams. It was recaptured approximately 2.5-kilometers downstream on August 26, 2009 at rkm 134.3 after 61 days-at-large. Its fork length had increased by 6.6 cm to 29.6 cm and its weight by 62.2 grams to 149.2 grams.

Table 3.7 Days at large and summary of biological data of recaptured juvenile white sturgeon

PIT Tag Number	Previous (initial) Capture				Recapture in 2009				Days at large
	Date	Fork Length (cm)	Weight (kg)	rKm	Date	Fork Length (cm)	Weight (kg)	rKm	
423C1B2E61	2006-10-18	71.5	1.905	124.6	2009-09-17	84.9	4.000	117.2	1065
424D4B206C	2007-09-19	74.0	3.000	114.5	2009-09-17	90.8	4.500	117.2	729
4B08443453	2009-05-22	95.5	5.500	132.7	2009-09-17	97.4	6.000	117.2	118
422E616706	2008-08-31	79.0	3.060	116.6	2009-09-16	94.5	5.400	117.7	381
4867517C1E	2008-09-08	-[a]	1.445	110.1	2009-09-16	72.3	2.068	117.2	373
501F701824	2000-08-01[c]	56.0	0.990	831.3[b]	2009-09-17	78.4	3.250	116.8	3334
4A0D381815	2009-06-26	23.0	0.087	136.9	2009-08-26	29.6	0.149	134.3	61

[a] – fork length not available; [b] – Fraser River; [c] – recapture date; fish initially captured in 1999

3.4.3 Sub-Adult and Adult first-time captures

Four (80%) of the five sub-adult / adult white sturgeon captured displayed no previous indication of capture and were consequently classified as "first-time" captures.

3.4.4 Adult recaptures

A single adult sturgeon (PIT 424F201F7F) was identified as a recapture. This fish was initially caught in the Fraser River at rkm 808.4 in August 2001, approximately 10-kilometers upstream of the Nechako River confluence. It was then recaptured in the Nechako River in September 2005 at rkm 116.8. This particular sturgeon was not re-captured again until 2009 after 1462 days at large.

3.5 Biological Measurements

3.5.1 Juveniles

A summary of biological data obtained from the juvenile white sturgeon (sex /maturity code = 98) is provided in Table 3.7. Juvenile sturgeon ranged in fork length (FL) from 29.6 cm to 99.3 cm with a mean FL (± 1 SD) of 73.16 ± 6.32 cm. Total length (TL) ranged from 34.7 cm to 114.9 cm with a mean TL (± 1 SD) of 83.98 ± 7.25 cm. Girth ranged from 12.3 cm to 35.5 cm with a mean girth (± 1 SD) of 25.56 ± 2.07 cm. Weights of juvenile sturgeon ranged from 0.149 kg to 5.85 kg with a mean weight (± 1 SD) of 3.09 ± 0.59 kg.

Table 3.8 Summary of biological data of juvenile Nechako white sturgeon (sex / maturity code 98) captured in 2009.

Capture Date	River Km	Fork Length (cm)	Total Length (cm)	Girth (cm)	Weight (kg)	PIT Tag Number
2009-08-28	110.5	37.7	43.9	14	0.286	484942465C
*2009-08-26	134.3	29.6	34.7	12.3	0.1492	4A0D381815
2009-09-04	110	45	51.7	17	0.486	4849247305
2009-09-15	117.1	56.4	65.7	20.8	1.01	48681D0F72
*2009-09-16	117.2	72.3	78.6	24.9	2.068	4867517C1E
*2009-09-16	117.7	94.5	108.5	24.5	5.4	422E616706
*2009-09-17	117.2	84.9	99	31.7	4	423C1B2E61
*2009-09-17	117.2	90.8	102	31.7	4.5	424D4B206C
*2009-09-17	117.2	97.4	114.9	34.3	6	4B08443453
2009-09-17	116.8	95.5	108.5	35	5.5	484916465D
2009-09-17	116.8	96.5	110.5	33	5.6	4868372B4C
*2009-09-17	116.8	78.4	90.5	28	3.25	501F701824
2009-09-18	117.7	99.3	114.8	35.5	5.9	4848735629
2009-10-05	117.2	76.1	86.8	24.5	1.75	48653B5A02
2009-10-06	117.1	43	49.6	16.2	0.468	487058171F

*- recapture date, fish captured previously

The length-frequency distribution of the white sturgeon catch is shown in Figure 3.3. Sturgeon between 90 and 100 cm dominated the catch. No fish under 20 cm, or between 60 and 70 cm, in length were captured. The upper end of the distribution is sparse as the capture techniques in this assessment specifically targeted juveniles. Both sub-adults and adults presumably escaped capture by bending set-line hooks; this may also lead to a juvenile biased distribution.

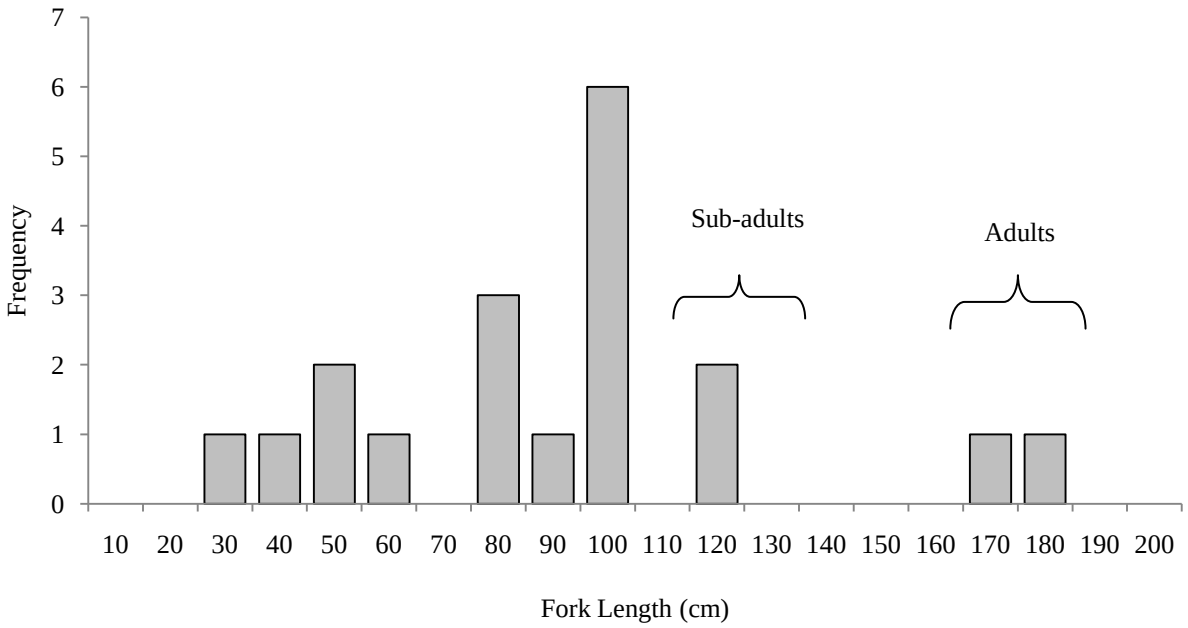

Figure 3.3 Length-frequency distribution of white sturgeon captured in the Nechako River during the 2009 assessment.

3.5.2 Sub-Adults and Adults

A summary of biological data obtained from the sub-adult / adult white sturgeon (sex /maturity code = 97) is provided in Table 3.9. Sub-adult fork length (FL) ranged from 133.5 to 133.6 cm and adult FL ranged from 163.5 to 176.5 cm.

Table 3.9 Summary of biological data of sub-adult / adult Nechako white sturgeon (sex / maturity code 97) captured in 2009

Capture Date	River Km	Fork Length (cm)	Total Length (cm)	Girth (cm)	Weight (kg)	PIT Tag Number
2009-08-24	116.8	163.5	191	65.5	-	4849187A40
2009-09-17	116.8	data not collected; large fish; PIT tagged and released				4868576305
*2009-09-17	116.8	113.5	130.5	40.5	8.5	424F201F7F
2009-09-18	116.8	113.6	128.2	41.5	10.25	48490C3B7A
2009-09-18	116.8	176.5	198.5	70	-	48490D695D

*- recapture date, fish captured previously

3.6 Physical and Habitat Parameters

Figure 3.4 displays the Nechako River discharge and water temperature information collected at the hydrometric station 08JC001 as provided by Water Survey of Canada (March 2010). The data provided were raw and are subject to revision by Water Survey of Canada.

Discharge declined steadily from 200m^3/s to 50 m^3/s between August 23 and September 18, 2009, after which discharge remained relatively constant at 50 m^3/s until the end of sampling (October 6, 2009). Water temperature generally fluctuated around 14-17 ^{o}C between August 23 and September 17, 2009, after which a general decline in temperature was observed through October 6, 2009.

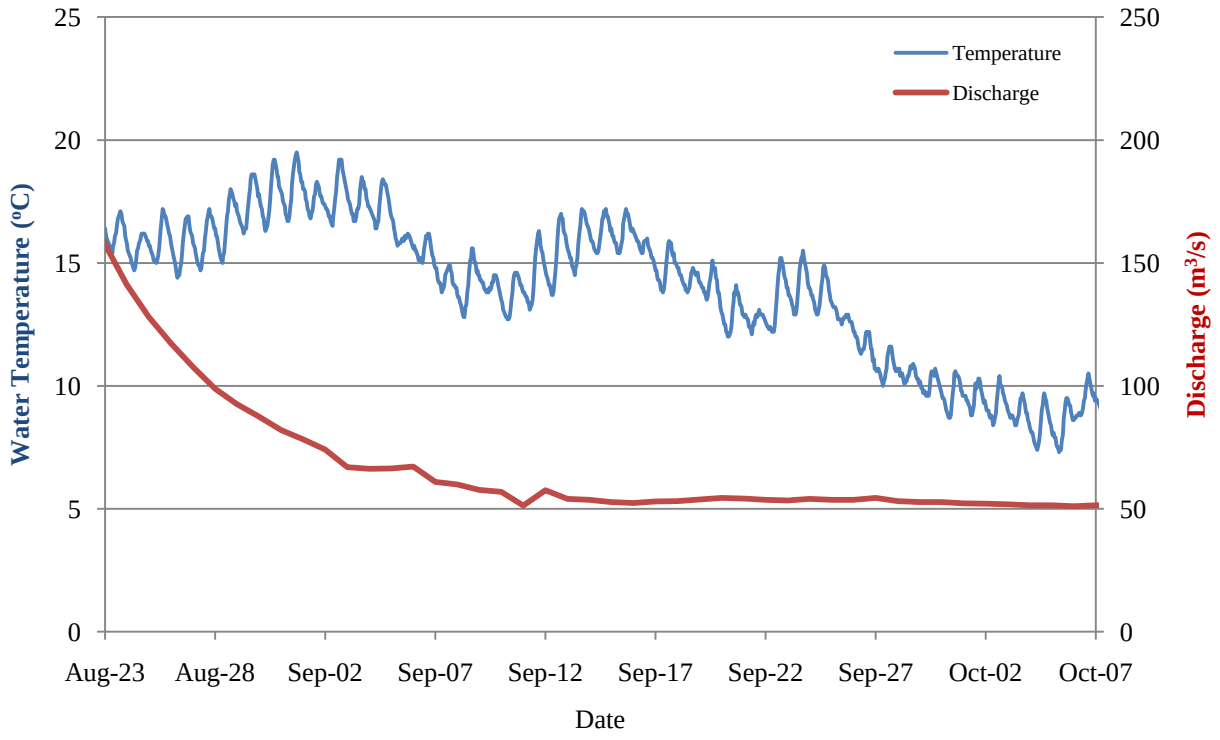

Figure 3.4 Daily average discharge (m^3/s) and water temperature (^{o}C) for the Nechako River at Vanderhoof (Water Survey of Canada hydrometric station 08JC001) from August 23 to October 7, 2009.

4.0 DISCUSSION

The Recovery Plan for Nechako White Sturgeon published in 2004, by the Nechako River White Sturgeon Recovery Initiative (NWSRI), specified that a juvenile indexing program be established to obtain baseline juvenile abundance levels (NWSRI, 2004). The Carrier Sekani Tribal Council (CSTC) and Alcan Primary Metals – B.C. initiated a multi-year sampling program in 2004 with the long-term objective of developing an annual standardized sampling protocol that would provide an index of juvenile abundance within the Nechako River. Various sampling techniques were used during assessments completed annually between 2004 and 2008 including gillnets, cod traps, beach seines and angling. Gillnets were successful in capturing juvenile sturgeon in each year of the program; however it was noted that this sampling technique also captures high numbers of by-catch and is expensive in terms of the effort required to set and retrieve nets. Cod traps, used in 2007 and 2008, and beach seines used in 2008, were not effective at capturing juvenile sturgeon. Results of this multi-year program suggested that alternative captures techniques needed to be investigated.

In 2009, the utility of hook-and-line methods (set-lines and angling) for capturing juvenile sturgeon was tested. The use of small hooks (sizes 1/0, 2/0) deployed on set-lines to target juveniles proved successful as nine sturgeon under one meter in length were captured during this assessment. Set-lines also do not appear to be size selective for juveniles as this method was responsible for capturing the smallest juvenile (29.6 cm FL) and the largest juvenile (99.3 cm FL) in any year of the program, however this observation should be substantiated in subsequent assessments. Only one other juvenile (FL = 28.5) with a fork length less than 29.6cm has been captured during juvenile assessments in the Nechako River (CSTC, 2009); this specific fish was captured by a gillnet. Larger adult sturgeon did not recruit to the smaller hooks, as expected. Upon retrieval of set-lines, approximately 20% of the hooks examined were found to be bent which indicated a capture and loss of larger (sub-adult / adult) sturgeon. Set-lines may also be useful in sampling areas of higher velocities which could not be successfully sampled with gillnets as the nets tended to drift out of place and foul easily.

During the first sampling period, only a single sturgeon was captured on set-lines and daily catch rates of by-catch were relatively low. It was noted by field crews that many hooks were fouled by algae and large macrophytes during the first sampling period which may have considerably

affected the daily catch rates. Daily catch rates of juvenile sturgeon, and by-catch, on set-lines increased during the 2nd and 3rd sampling periods which may be attributed to cooling river temperatures and movement of sturgeon towards overwintering sites throughout September.

Angling also proved to be a valuable method for capturing juvenile sturgeon. A total of six juvenile and five sub-adults / adults were captured during approximately 124 hours of rod-effort. Unfortunately due to limited resources, only areas known to be rearing / overwintering habitat were angled; the relatively high-catch rates reflect this biased sampling method. The efficiency of angling in lower use-areas is still unknown at this time; it is suggested, however, that set-lines would be a more efficient hook-and-line method in lower use-areas as they require relatively little effort from field crews to deploy and can be left to fish for extended periods of time. Nevertheless, angling proved to be an effective method of capture and in future may prove to be highly efficient as the understanding of juvenile habitat use within the Nechako River increases. It is evident from this assessment that set-lines and angling are an effective method for capturing juvenile sturgeon.

Set-line and angling were the main techniques employed during the 2009 assessment and consequently gillnetting effort expended during 2009 was relatively low compared to previous years (~25% of effort expended in 2008, CSTC 2009). In the past, gillnetting proved to be a somewhat effective method of capturing juvenile sturgeon (CSTC 2009, 2008, 2006, 2005), however gillnet sampling was not successful during 2009; this may be a consequence of the low effort expended on gillnetting during the assessment.

Gillnets caught species of non-target fish not captured by set-lines or angling. Unfortunately, direct mortalities of incidentally captured fish were not tallied during the sampling program and consequently the effects of gillnets versus hook and line methods on survival of by-catch species cannot be explored. It was, however, noted in passing by field crews that a high number of incidentally captured fish succumbed to gillnetting. A comparison of mesh size captures of non-target fish showed that the CPUE of the 5.08-cm (stretched) mesh was almost equal to that of all other mesh sizes combined. If gillnets are to be utilized in future, it is suggested that the use of 5.08-cm mesh by scrutinized as the removal of this mesh size may considerably reduce the quantity of by-catch. However, it should be noted that this mesh size was highly effective at

capturing shovelnose sturgeon (*Scaphirhynchus platorynchus*) in the Middle Mississippi River (Phelps *et al*., 2009). It is theorized that the effectiveness of gillnets in the Nechako River may be influenced by the relatively low abundance of juvenile sturgeon within the system. Moreover, it is also possible that the relatively short soak times (less than 1.5 hours) may have also reduced the potential for sturgeon capture.

Beach seining was attempted but did not prove to be successful at capturing many fish, sturgeon or any other species. Based on data from the 2008 (CSTC 2009) assessment and the unsuccessful attempts made in 2009, it is suggested that seine nets may not be a suitable method for sampling juvenile sturgeon within the Nechako River. It should be noted, however, that sampling techniques, used while setting/pulling seines, are vital in their capture success; the effectiveness of seine nets during this assessment may have been influenced by field crews with relatively little experience using this type of net in a river environment.

Similar to results in previous years, juvenile white sturgeon exhibited a clumped distribution within the study area. The majority of juvenile white sturgeon were captured within close proximity to areas (rkm 110 to 118) where juvenile white sturgeon were captured during previous assessments (CSTC 2009, 2008, 2005, EDI 2007) and where high use by adult white sturgeon has been documented (RL&L 1997, 1999, 2000b). The channel morphology and hydrology in the capture locations are influenced by natural features, such as a bend in the river and over-wintering sites have been documented near river kilometres 110 and 116. However, one must be cautious that these observations be interpreted as the exclusive rearing/overwintering locations of juvenile sturgeon within the Nechako River as the assessment was not synoptic in nature and targeted only areas of known juvenile habitat to assess capture techniques and to capture hatchery-reared fish. The high catch rates near river kilometre 110 and 117 are indicative of the intensive sampling compared to other sampling locations. Nevertheless, high catch rates in few locations may suggest a preference of sturgeon towards the habitats features in those areas.

During this assessment, a hatchery-reared juvenile white sturgeon, equipped with an acoustic tag, was captured near river kilometre 134. It had been released upstream two months earlier. Interestingly, tracking of sturgeon fitted with acoustic tags indicated that this juvenile spent time around river kilometre 136 during July 2009, after which it moved downstream; it was last

encountered at river kilometre 126 in October 2009. This specific fish was also the smallest juvenile captured during the assessment.

No wild juveniles under 34 cm (fork length) were captured. Between 2006 and 2008, the Nechako white sturgeon broodstock program successfully released approximately 14,300 juvenile white sturgeon into the Nechako River. If these hatchery fish survived, they should begin to recruit to set-line and angling gear in the near future as they reach adequate sizes. Investigations of catch-rates and size-structure of shovelnose sturgeon in the Middle Mississippi River by Phelps *et al.* (2009) indicated that shovelnose sturgeon began to recruit to trot-lines (deployed with 3/0 hooks) at approximately 40 cm fork length. If subsequent investigations are successful in capturing hatchery juveniles it may provide insight into factors limiting survival of wild juvenile sturgeon.

The 2009 assessment marked the highest number of juvenile white sturgeon captured in any year of the multi-year Nechako River juvenile white sturgeon sampling program. The capture of seven un-marked juvenile sturgeon suggests that a very low level natural recruitment is occurring; however, as aging of fin rays had not been completed for the first-time captures, little more can be accurately added to the understanding of juvenile recruitment in the Nechako River.

5.0 RECOMMENDATIONS

- Continue sampling with set-lines deployed with small hooks (1/0, 2/0) to target juveniles as this method appears to be quite effective, requires relatively less effort to deploy and retrieve, and can be deployed in a variety of habitat types and water velocities, unlike gillnets
    - Consider using hooks smaller than 1/0 or 2/0 to determine if these hook sizes are selective for smaller juveniles
- Continue sampling with angling gear (deployed with small hooks)
- Expand the scope of the juvenile assessment to comprehensively sample the Nechako River in order to increase the understanding of juvenile white sturgeon population size, distribution and habitat use within the system
- Scrutinize the use of gillnets as a method of juvenile capture in the Nechako River as this method is particularly labour intensive to deploy and retrieve and has not been as successful as hook-and-line methods
- Investigate the possibility of using underwater videography to document juvenile white sturgeon observations and associated habitat characteristics
- Investigate habitat preferences of juvenile sturgeon through an expanded bio-telemetry program

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APPENDIX I

Data Sheets

NECHAKO RIVER - WHITE STURGEON SET LINE DATA FORM

PHYSICAL DATA: Page ____ of ____

River: _____ Station: _____ River Km: _____ UTM: _____ E _____ N Set Type (circle): Index Synoptic

Personnel: _____ Channel Location: _____ Site Description: _____ Weather: _____

SET: 20____ / ____ / ____ @ _____h Water Temp: _____ °C Visibility: _____ m Depth: Min _____ Max _____

PULL: 20____ / ____ / ____ @ _____h Water Temp: _____ °C Visibility: _____ m Total Effot: _____ h

Gear Type: _____ No. Hooks Set (lost): Size 12 = _____ (_____) Size 14 = _____ (_____) Size 16 = _____ (_____)

Bait Type: _____ No. Hooks Fouled: _____ No. Hooks Bent: _____ Sampling Efficiency (1-4) _____

BIOLOGICAL DATA:

No.	RECAP (Y/N)	DEPTH (m)	HOOK SIZE	SEX MAT. CODE	LENGTH (cm)				GIRTH (cm)	WEIGHT (kg)	SCUTE MARKS @ CAPT	SCUTE MARKS @ REL	TAGS @ CAPT	TAGS @ REL	FIN RAY	TAG NUMBERS					
					Fork	Total	Pre Operc	Post Operc								PIT	RADIO			FLOY	
																	Freq.	Ch.	Cd.	C.	No.
1																					
1																					
2																					
2																					
3																					
3																					
4																					
4																					
5																					
5																					
6																					
6																					
7																					
7																					
8																					
8																					

COMMENTS:

MAP: Show shore configuration, flow patterns, set location , velocity, locations of measurements, substrate type(s), bank habitat, etc.)

INCIDENTAL SP:

SPECIES	LENGTH	WEIGHT	SEX	TAG	CAP CODE	AGE STRUCTURE	FATE	HOOK SIZE	COMMENTS

NECHAKO RIVER - WHITE STURGEON ANGLING DATA FORM

PHYSICAL DATA: Page____ of ____

River: _____ Station: _____ River Km: _____ Channel Location: _____ UTM: _____ E _____ N

Personnel: _____ Site Description: _____ Weather: _____

Date: 20____ / _____ /_____ Water Temp: _____°C Visibility: _____ m Depth: _____ m Boat or Shore: _____

Rod # 1	**Rod # 2**	**Rod # 3**	**Rod # 4**	**Rod # 5**	**Rod # 6**
Start: _____	Start: _____	Start: _____	Start: _____	Start: _____	Start: _____
End: _____	End: _____	End: _____	End: _____	End: _____	End: _____
Bait: _____	Bait: _____	Bait: _____	Bait: _____	Bait: _____	Bait: _____
Hook Size: _____	Hook Size: _____	Hook Size: _____	Hook Size: _____	Hook Size: _____	Hook Size: _____
Baitless: _____	Baitless: _____	Baitless: _____	Baitless: _____	Baitless: _____	Baitless: _____
Fouled: _____	Fouled: _____	Fouled: _____	Fouled: _____	Fouled: _____	Fouled: _____
Lost: _____	Lost: _____	Lost: _____	Lost: _____	Lost: _____	Lost: _____

BIOLOGICAL DATA:

No.	RECAP (Y/N)	DEPTH (m)	HOOK SIZE	SEX MAT. CODE	LENGTH (cm)				GIRTH (cm)	WEIGHT (kg)	SCUTE MARKS @ CAPT	SCUTE MARKS @ REL	TAGS @ CAPT	TAGS @ REL	FIN RAY	TAG NUMBERS					
					Fork	Total	Pre Operc	Post Operc								PIT	RADIO			FLOY	
																	Freq.	Ch.	Cd.	C.	No.
1																					
1																					
2																					
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8																					

COMMENTS:

MAP: Show shore configuration, flow patterns, set location, velocity, and location of measurements, etc.)

INCIDENTAL SP:

Rod #	SPECIES	LENGTH	WEIGHT	SEX	TAG	CAP CODE	AGE STRUCTURE	FATE	HOOK SIZE	COMMENTS

NECHAKO RIVER - WHITE STURGEON GILLNET DATA FORM

PHYSICAL DATA: Page____ of ____

River: _____ Station: _____ River Km: _____ UTM: _____ E _____ N Set Type (circle): Index Synoptic

Personnel: _____ Channel Location: _____ Site Description: _____ Weather: _____

SET: 20____ / ____ / ____ @ _____h Water Temp: _____ °C Visibility: _____ m Depth: Min _____ Max _____

PULL: 20____ / ____ / ____ @ _____h Water Temp: _____ °C Visibility: _____ m Total Effot: _____ h

Net Type: _____ Net Length: _____ Panel Length: _____ Panel Height: _____ Total Net Area: _____

Mesh Sizes: _____ , _____ , _____ , _____ , _____ Condition: _____ Set Orientation: _____ Set Location: _____

Sampling Efficiency (1-4) _____

BIOLOGICAL DATA:

No.	RECAP (Y/N)	DEPTH (m)	HOOK SIZE	SEX MAT. CODE	LENGTH (cm)				GIRTH (cm)	WEIGHT (kg)	SCUTE MARKS @ CAPT	SCUTE MARKS @ REL	TAGS @ CAPT	TAGS @ REL	FIN RAY	TAG NUMBERS					
					Fork	Total	Pre Operc	Post Operc								PIT	RADIO			FLOY	
																	Freq.	Ch.	Cd.	C.	No.
1																					
1																					
2																					
2																					
3																					
3																					
4																					
4																					
5																					
5																					
6																					
6																					
7																					
7																					
8																					
8																					

COMMENTS:

MAP: Show shore configuration, flow patterns, set location , velocity, locations of measurements, substrate type(s), bank habitat, etc.)

INCIDENTAL SP:

SPECIES	LENGTH	WEIGHT	SEX	TAG	CAP CODE	AGE STRUCTURE	FATE	MESH SIZE	COMMENTS

APPENDIX II

Capture Data

Appendix II - Table 1 Summary of set-line catch and CPUE (fish/100 hook-hours) during the 2009 assessment of juvenile Nechako white sturgeon

Station (rKm)	Set		Pull		Duration (hours)	# of hooks set	Hook Hours	White sturgeon	
	Date	Time	Date	Time				Catch	CPUE
SSL 134.3	2009-08-26	13:47	2009-08-26	14:17	0.50	12	6.00	0	0.00
SSL 134.3	2009-08-26	20:01	2009-08-27	12:35	16.57	12	198.80	1	0.50
SSL 114.5	2009-08-27	16:18	2009-08-27	19:14	2.93	12	35.20	0	0.00
SSL 114.5	2009-08-27	19:20	2009-08-28	13:29	18.15	12	217.80	0	0.00
SSL 110.6	2009-08-28	14:46	2009-08-28	16:28	1.70	12	20.40	0	0.00
SSL 110.6	2009-08-28	16:38	2009-08-28	19:16	2.63	12	31.60	0	0.00
SSL 132.7	2009-08-31	20:18	2009-09-01	13:04	16.77	12	201.20	0	0.00
SSL 132.7	2009-08-31	20:38	2009-09-01	13:14	16.60	12	199.20	0	0.00
SSL 132.4	2009-09-01	14:20	2009-09-01	20:00	5.67	12	68.00	0	0.00
SSL 127.5	2009-09-01	19:47	2009-09-02	13:03	17.27	12	207.20	0	0.00
SSL 132.5	2009-09-01	20:10	2009-09-02	14:27	18.28	12	219.40	0	0.00
SSL 132.3	2009-09-01	20:32	2009-09-02	14:15	17.72	12	212.60	0	0.00
SSL 125.2	2009-09-02	15:40	2009-09-03	13:20	21.67	11	238.33	0	0.00
SSL 125	2009-09-02	15:50	2009-09-03	13:35	21.75	12	261.00	0	0.00
SSL 134.4	2009-09-03	15:57	2009-09-04	13:45	21.80	11	239.80	0	0.00
SSL 134.4	2009-09-03	19:45	2009-09-04	14:00	18.25	12	219.00	0	0.00
SSL 134.4	2009-09-04	14:00	2009-09-04	15:37	1.62	12	19.40	0	0.00
SSL 134.4	2009-09-14	14:18	2009-09-15	13:21	23.05	12	276.60	0	0.00
SSL 132.6	2009-09-14	14:50	2009-09-15	19:13	28.38	11	312.22	0	0.00
SSL 125.6	2009-09-14	19:00	2009-09-15	13:50	18.83	12	226.00	0	0.00
SSL 117.2	2009-09-15	18:40	2009-09-16	12:15	17.58	12	211.00	1	0.47
SSL 117	2009-09-15	18:46	2009-09-16	11:51	17.08	12	205.00	0	0.00
SSL 117.7	2009-09-15	19:08	2009-09-16	12:07	16.98	12	203.80	1	0.49
SSL 117.8	2009-09-15	19:29	2009-09-16	11:51	16.37	12	196.40	0	0.00
SSL 117.8	2009-09-16	18:44	2009-09-17	13:37	18.88	12	226.60	0	0.00
SSL 117.7	2009-09-16	18:48	2009-09-17	13:30	18.70	12	224.40	0	0.00
SSL 117.3	2009-09-16	18:53	2009-09-17	13:21	18.47	12	221.60	0	0.00
SSL 117.2	2009-09-16	19:00	2009-09-17	13:01	18.02	12	216.20	1	0.46
SSL 117.2	2009-09-16	19:12	2009-09-17	12:10	16.97	12	203.60	2	0.98
SSL 117	2009-09-16	19:19	2009-09-17	12:02	16.72	12	200.60	0	0.00
SSL 116	2009-09-17	19:27	2009-09-18	12:04	16.62	11	182.78	0	0.00
SSL 117.2	2009-09-17	19:32	2009-09-18	12:21	16.82	12	201.80	0	0.00
SSL 115.7	2009-09-17	19:37	2009-09-18	11:57	16.33	12	196.00	0	0.00
SSL 117	2009-09-17	19:43	2009-09-18	12:30	16.78	12	201.40	0	0.00
SSL 117.2	2009-09-17	19:47	2009-09-18	12:34	16.78	12	201.40	0	0.00
SSL 117.7	2009-09-17	19:53	2009-09-18	12:37	16.73	12	200.80	1	0.50
SSL 117.3	2009-09-17	20:05	2009-09-18	13:25	17.33	16	277.33	0	0.00
SSL 110.1	2009-10-04	17:38	2009-10-05	11:10	17.53	12	210.40	0	0.00
SSL 110	2009-10-04	17:42	2009-10-05	11:13	17.52	12	210.20	0	0.00
SSL 110.5	2009-10-04	17:53	2009-10-05	11:04	17.18	12	206.20	0	0.00
SSL 110.6	2009-10-04	18:06	2009-10-05	10:55	16.82	12	201.80	0	0.00
SSL 115.5	2009-10-04	18:21	2009-10-05	10:35	16.23	6	97.40	0	0.00
SSL 117	2009-10-04	18:30	2009-10-05	10:22	15.87	12	190.40	0	0.00
SSL 116.8	2009-10-04	18:36	2009-10-05	10:11	15.58	12	187.00	0	0.00
SSL 117.2	2009-10-04	18:40	2009-10-05	9:25	14.75	12	177.00	1	0.56
SSL 110	2009-10-05	17:58	2009-10-06	10:00	16.03	6	96.20	0	0.00

Appendix II – Table 1 Continued

Station (rKm)	Set		Pull		Duration (hours)	# of hooks set	Hook Hours	White sturgeon	
	Date	Time	Date	Time				Catch	CPUE
SSL 110.2	2009-10-05	18:07	2009-10-06	10:02	15.92	6	95.50	0	0.00
SSL 110.5	2009-10-05	18:09	2009-10-06	10:08	15.98	25	399.58	0	0.00
SSL 110.6	2009-10-05	18:16	2009-10-06	10:27	16.18	12	194.20	0	0.00
SSL 115.5	2009-10-05	18:30	2009-10-06	10:42	16.20	12	194.40	0	0.00
SSL 116.9	2009-10-05	18:38	2009-10-06	10:55	16.28	12	195.40	0	0.00
SSL 117	2009-10-05	18:45	2009-10-06	11:09	16.40	12	196.80	0	0.00
SSL 117.1	2009-10-05	18:55	2009-10-06	11:30	16.58	11	182.42	1	0.55

Appendix II - Table 2 Summary of angling catch and CPUE (fish/hook-hour) during the 2009 assessment of juvenile Nechako white sturgeon

Station (rKm)	Date	Time		Duration (hours)	Rod Number	Hook Size	White sturgeon		
		Start	End				caught	hooked & released	CPUE
AN 116.7	2009-08-24	16:25	16:38	0.22	1	2/0	0	0	0.00
AN 116.8	2009-08-24	16:25	16:38	0.22	1	3/0	0	0	0.00
AN 116.7	2009-08-24	16:30	16:38	0.13	2	2/0	0	0	0.00
AN 116.8	2009-08-24	16:30	16:38	0.13	2	3/0	0	0	0.00
AN 116.8	2009-08-24	17:00	17:35	0.58	3	3/0	0	0	0.00
AN 116.8	2009-08-24	17:01	17:37	0.60	4	3/0	0	0	0.00
AN 116.8	2009-08-24	17:13	17:35	0.37	5	3/0	0	0	0.00
AN 116.8	2009-08-24	17:57	18:30	0.55	1	3/0	0	1	1.82
AN 116.8	2009-08-24	17:59	18:30	0.52	2	3/0	0	0	0.00
AN 116.8	2009-08-24	18:01	18:30	0.48	3	3/0	0	0	0.00
AN 116.8	2009-08-24	18:31	18:40	0.15	1	3/0	1	0	6.67
AN 116.8	2009-08-24	18:31	18:40	0.15	2	3/0	0	0	0.00
AN 116.8	2009-08-24	18:31	18:40	0.15	3	3/0	0	1	6.67
AN 114.7	2009-08-25	17:53	18:30	0.62	1	2/0	0	0	0.00
AN 114.7	2009-08-25	17:55	18:32	0.62	2	2/0	0	0	0.00
AN 114.7	2009-08-25	17:55	18:34	0.65	3	2/0	0	0	0.00
AN 115.8	2009-08-25	19:00	20:20	1.33	1	2/0	0	0	0.00
AN 115.8	2009-08-25	19:00	20:15	1.25	2	2/0	0	0	0.00
AN 115.8	2009-08-25	19:00	20:15	1.25	3	2/0	0	0	0.00
AN 134.2	2009-08-26	14:10	14:55	0.75	1	2/0	0	0	0.00
AN 134.2	2009-08-26	14:56	15:14	0.30	2	2/0	0	0	0.00
AN 134.2	2009-08-26	15:15	15:48	0.55	3	2/0	0	0	0.00
AN 134.2	2009-08-26	15:50	16:41	0.85	4	2/0	0	0	0.00
AN 132.4	2009-08-26	17:01	17:17	0.27	1	2/0	0	0	0.00
AN 132.4	2009-08-26	17:19	17:45	0.43	2	2/0	0	0	0.00
AN 132.4	2009-08-26	17:47	18:47	1.00	3	2/0	0	0	0.00
AN 132.4	2009-08-26	18:55	19:15	0.33	4	2/0	0	0	0.00
AN 132.4	2009-08-26	17:00	19:30	0.22	5	2/0	0	0	0.00
AN 116.9	2009-08-27	14:07	15:20	1.22	1	2/0	0	0	0.00
AN 116.9	2009-08-27	14:10	15:25	1.25	2	2/0	0	0	0.00
AN 116.9	2009-08-27	14:13	14:39	0.43	3	2/0	0	0	0.00
AN 116.9	2009-08-27	14:42	15:25	0.72	4	2/0	0	0	0.00
AN 116.8	2009-08-27	15:32	16:04	0.53	1	2/0	0	0	0.00
AN 116.8	2009-08-27	15:32	16:04	0.53	2	2/0	0	0	0.00
AN 116.8	2009-08-27	15:32	16:04	0.53	3	2/0	0	0	0.00
AN 110.6	2009-08-27	16:35	17:06	0.52	1	2/0	0	0	0.00
AN 110.6	2009-08-27	16:36	17:37	1.02	2	2/0	0	0	0.00
AN 110.6	2009-08-27	16:38	17:37	0.98	3	2/0	0	0	0.00
AN 110.6	2009-08-27	17:08	17:37	0.48	4	2/0	0	0	0.00
AN 110.5	2009-08-27	17:46	19:00	1.23	1	2/0	0	2	1.62
AN 110.5	2009-08-27	17:46	18:26	0.67	2	2/0	0	0	0.00
AN 110.5	2009-08-27	17:47	19:00	1.22	3	2/0	0	0	0.00
AN 110.5	2009-08-27	18:28	19:00	0.53	4	2/0	0	0	0.00
AN 110.6	2009-08-28	17:26	17:48	0.37	1	2/0	0	0	0.00
AN 110.6	2009-08-28	17:29	17:48	0.32	2	2/0	0	0	0.00
AN 110.5	2009-08-28	17:50	18:00	0.17	1	2/0	0	0	0.00

Appendix II – Table 2 Continued

Station (rKm)	Date	Time		Duration (hours)	Rod Number	Hook Size	White sturgeon		
		Start	End				caught	hooked & released	CPUE
AN 110.5	2009-08-28	17:50	18:00	0.17	2	2/0	1	0	6.00
AN 110.5	2009-08-28	18:01	19:09	1.13	3	2/0	0	0	0.00
AN 110.5	2009-08-28	18:01	19:09	1.13	4	2/0	0	0	0.00
AN 132.6	2009-08-31	18:30	19:55	1.42	1	2/0	0	0	0.00
AN 132.6	2009-08-31	18:30	19:55	1.42	2	2/0	0	0	0.00
AN 132.4	2009-09-01	14:30	15:20	0.83	1	2/0	0	0	0.00
AN 132.4	2009-09-01	14:40	15:30	0.83	2	2/0	0	0	0.00
AN 132.4	2009-09-01	15:35	15:40	0.08	3	2/0	0	0	0.00
AN 127.4	2009-09-02	14:00	14:15	0.25	1	2/0	0	0	0.00
AN 127.4	2009-09-02	16:20	17:00	0.67	2	2/0	0	0	0.00
AN 127.4	2009-09-02	16:30	17:00	0.50	3	2/0	0	0	0.00
AN 127.4	2009-09-02	17:50	18:20	0.50	4	2/0	0	0	0.00
AN 127.4	2009-09-02	18:00	18:15	0.25	5	2/0	0	0	0.00
AN 125.3	2009-09-02	19:00	20:40	1.67	1	2/0	0	0	0.00
AN 125.3	2009-09-02	19:02	20:40	1.63	2	2/0	0	0	0.00
AN 134.4	2009-09-03	16:02	16:50	0.80	0	2/0	0	0	0.00
AN 134.4	2009-09-03	16:02	16:50	0.80	0	2/0	0	0	0.00
AN 134.4	2009-09-03	19:15	19:40	0.42	0	2/0	0	0	0.00
AN 134.4	2009-09-03	19:15	19:40	0.42	0	2/0	0	0	0.00
AN 110	2009-09-04	14:42	14:50	0.13	0	2/0	1	0	7.50
AN 110	2009-09-04	14:50	17:30	2.67	0	2/0	0	0	0.00
AN 130	2009-09-04	15:05	16:10	1.08	1	2/0	0	0	0.00
AN 130	2009-09-04	15:10	16:10	1.00	2	2/0	0	0	0.00
AN 125	2009-09-04	16:20	16:48	0.47	1	2/0	0	0	0.00
AN 125	2009-09-04	16:20	16:48	0.47	2	2/0	0	0	0.00
AN 125.4	2009-09-04	16:55	18:09	1.23	1	2/0	0	0	0.00
AN 125.4	2009-09-04	16:55	18:09	1.23	2	2/0	0	0	0.00
AN 125	2009-09-04	18:20	18:52	0.53	1	2/0	0	0	0.00
AN 125	2009-09-04	18:20	18:52	0.53	2	2/0	0	0	0.00
AN 117.1	2009-09-15	14:45	17:15	2.50	1	2/0	0	0	0.00
AN 117.1	2009-09-15	14:45	17:15	2.50	2	2/0	1	0	0.40
AN 117.1	2009-09-15	14:45	17:15	2.50	3	2/0	0	0	0.00
AN 117.1	2009-09-15	14:50	17:15	2.42	4	2/0	0	0	0.00
AN 117.2	2009-09-15	17:21	18:30	1.15	1	2/0	0	0	0.00
AN 117.2	2009-09-15	17:21	18:30	1.15	2	2/0	0	0	0.00
AN 117.2	2009-09-15	17:21	18:30	1.15	3	2/0	0	0	0.00
AN 117.2	2009-09-15	17:21	18:30	1.15	4	2/0	0	0	0.00
AN 117.7	2009-09-16	13:30	15:01	1.52	1	2/0	0	0	0.00
AN 117.7	2009-09-16	13:30	15:01	1.52	3	2/0	0	0	0.00
AN 117.7	2009-09-16	13:32	15:01	1.48	2	2/0	0	0	0.00
AN 117.7	2009-09-16	13:34	15:01	1.45	4	2/0	0	0	0.00
AN 117.1	2009-09-16	17:05	18:17	1.20	1	2/0	0	0	0.00
AN 117.1	2009-09-16	17:05	18:17	1.20	2	2/0	0	0	0.00
AN 117.1	2009-09-16	17:05	18:17	1.20	3	2/0	0	0	0.00
AN 117.1	2009-09-16	17:05	18:17	1.20	4	2/0	0	0	0.00
AN 116.8	2009-09-17	14:11	18:30	4.32	1	2/0	2	1	0.69

Appendix II – Table 2 Continued

Station (rKm)	Date	Time		Duration (hours)	Rod Number	Hook Size	White sturgeon		
		Start	End				caught	hooked & released	CPUE
AN 116.8	2009-09-17	14:11	17:40	3.48	2	2/0	2	2	1.15
AN 116.8	2009-09-17	14:11	18:30	4.32	3	2/0	1	1	0.46
AN 116.8	2009-09-17	14:11	17:40	3.48	4	2/0	0	1	0.29
AN 115.5	2009-09-18	13:46	14:41	0.92	1	2/0	0	0	0.00
AN 115.5	2009-09-18	13:46	14:41	0.92	2	2/0	0	0	0.00
AN 115.5	2009-09-18	13:46	14:41	0.92	3	2/0	0	0	0.00
AN 115.5	2009-09-18	13:46	14:41	0.92	4	2/0	0	0	0.00
AN 110.7	2009-09-18	14:59	17:30	2.52	1	2/0	0	0	0.00
AN 110.7	2009-09-18	14:59	17:30	2.52	2	2/0	0	0	0.00
AN 110.7	2009-09-18	14:59	17:30	2.52	3	2/0	0	0	0.00
AN 110.7	2009-09-18	15:00	17:30	2.50	4	2/0	0	0	0.00
AN 116.8	2009-09-18	18:10	19:00	0.83	1	2/0	2	3	6.00
AN 116.8	2009-09-18	18:10	19:00	0.83	2	2/0	0	0	0.00
AN 116.8	2009-09-18	18:10	19:00	0.83	3	2/0	0	0	0.00
AN 116.8	2009-09-18	18:10	19:00	0.83	4	1/0	0	0	0.00
AN 110.5	2009-10-05	11:37	12:53	1.27	3	2/0	0	0	0.00
AN 110.5	2009-10-05	11:37	12:53	1.27	3	2/0	0	0	0.00
AN 110.5	2009-10-05	11:37	12:53	1.27	3	2/0	0	0	0.00
AN 110.6	2009-10-05	13:05	14:32	1.45	3	2/0	0	0	0.00
AN 110.6	2009-10-05	13:05	14:32	1.45	3	2/0	0	0	0.00
AN 110.6	2009-10-05	13:05	14:32	1.45	3	2/0	0	0	0.00
AN 110.5	2009-10-05	14:35	15:05	0.50	3	2/0	0	0	0.00
AN 110.5	2009-10-05	14:35	15:05	0.50	3	2/0	0	0	0.00
AN 110.5	2009-10-05	14:35	15:05	0.50	3	2/0	0	0	0.00
AN 115.5	2009-10-05	15:25	16:00	0.58	3	2/0	0	0	0.00
AN 115.5	2009-10-05	15:25	16:00	0.58	3	2/0	0	0	0.00
AN 115.5	2009-10-05	15:25	16:00	0.58	3	2/0	0	0	0.00
AN 116.8	2009-10-05	16:07	17:06	0.98	3	2/0	0	0	0.00
AN 116.8	2009-10-05	16:07	17:06	0.98	3	2/0	0	0	0.00
AN 116.8	2009-10-05	16:07	17:06	0.98	3	2/0	0	0	0.00

Appendix II - Table 3 Summary of gillnet catch and CPUE (fish/100 hook-hours) during the 2009 assessment of juvenile Nechako white sturgeon

Station (rKm)	Set		Pull		Duration (hours)	Number of panels set	Mesh Size(s) (cm)	White sturgeon	
	Date	Time	Date	Time				Catch	CPUE
GN 125.2	2009-09-02	16:00	2009-09-02	17:00	1.00	1	7.62	0	0.00
GN 125.3	2009-09-02	16:05	2009-09-02	17:08	1.05	1	5.08	0	0.00
GN 125.3	2009-09-02	17:06	2009-09-02	18:23	1.28	1	7.62	0	0.00
GN 125.4	2009-09-02	17:10	2009-09-02	18:30	1.33	1	5.08	0	0.00
GN 125.5	2009-09-02	18:45	2009-09-02	19:35	0.83	1	7.62	0	0.00
GN 125.5	2009-09-02	18:47	2009-09-02	19:40	0.88	1	5.08	0	0.00
GN 127.5	2009-09-03	14:30	2009-09-03	14:45	0.25	2	5.08 / 5.08	0	0.00
GN 127.3	2009-09-03	15:03	2009-09-03	15:15	0.20	2	5.08 / 5.08	0	0.00
GN 114.7	2009-08-25	14:23	2009-08-25	14:31	0.13	2	6.35 / 6.35	0	0.00
GN 114.7	2009-08-25	14:38	2009-08-25	14:58	0.33	2	6.35 / 6.35	0	0.00
GN 110.6	2009-08-25	15:13	2009-08-25	15:37	0.40	1	7.62	0	0.00
GN 110.4	2009-08-25	15:32	2009-08-25	16:07	0.58	2	8.89 / 10.16	0	0.00
GN 110.6	2009-08-25	15:54	2009-08-25	16:27	0.55	2	8.89 / 10.16	0	0.00
GN 110.3	2009-08-25	16:10	2009-08-25	16:45	0.58	2	8.89 / 10.16	0	0.00
GN 114.6	2009-08-25	17:38	2009-08-25	18:20	0.70	1	7.62	0	0.00
GN 114.7	2009-08-25	17:46	2009-08-25	18:30	0.73	2	8.89 / 10.16	0	0.00
GN 134.9	2009-08-26	14:13	2009-08-26	15:06	0.88	2	8.89 / 10.16	0	0.00
GN 134.8	2009-08-26	14:23	2009-08-26	15:16	0.88	2	7.62 / 7.62	0	0.00
GN 134.4	2009-08-26	14:58	2009-08-26	15:47	0.82	2	5.08 / 5.08	0	0.00
GN 134.4	2009-08-26	15:52	2009-08-26	16:31	0.65	2	5.08 / 5.08	0	0.00
GN 134.4	2009-08-26	16:18	2009-08-26	17:00	0.70	2	8.89 / 10.16	0	0.00
GN 134.3	2009-08-26	16:27	2009-08-26	17:15	0.80	2	7.62 / 7.62	0	0.00
GN 134.2	2009-08-26	17:19	2009-08-26	18:19	1.00	2	7.62 / 7.62	0	0.00
GN 132.6	2009-08-26	18:06	2009-08-26	19:05	0.98	2	5.08 / 5.08	0	0.00
GN 132.6	2009-08-26	18:09	2009-08-26	19:24	1.25	2	8.89 / 10.16	0	0.00
GN 132.5	2009-08-26	19:01	2009-08-26	19:55	0.90	2	7.62 / 7.62	0	0.00
GN 117	2009-08-24	16:04	2009-08-24	16:39	0.58	2	8.89 / 10.16	0	0.00
GN 116.7	2009-08-24	16:16	2009-08-24	16:52	0.60	1	7.62	0	0.00
GN 117	2009-08-24	16:40	2009-08-24	17:42	1.03	2	8.89 / 10.16	0	0.00
GN 116.7	2009-08-24	16:56	2009-08-24	17:50	0.90	1	7.62	0	0.00
GN 110.6	2009-08-28	15:01	2009-08-28	15:51	0.83	2	7.62 / 7.62	0	0.00
GN 110.6	2009-08-28	15:24	2009-08-28	16:20	0.93	2	5.08 / 5.08	0	0.00
GN 110.6	2009-08-28	15:54	2009-08-28	17:16	1.37	2	7.62 / 7.62	0	0.00
GN 110.6	2009-08-28	16:25	2009-08-28	16:50	0.42	2	5.08 / 5.08	0	0.00

Appendix II - Table 4 Summary of seine net catch and CPUE (fish/100 hook-hours) during the 2009 assessment of juvenile Nechako white sturgeon

Station (rKm)	Set		Pull		Duration (hours)	Panel height / width (m)	Mesh Size(s) (cm)	White sturgeon	
	Date	Time	Date	Time				Catch	CPUE
SN 134.4	2009-09-03	17:37	2009-09-03	17:47	0.17	15.24 / 2.44	3.81	0	0.00
SN 134.3	2009-09-03	18:00	2009-09-03	18:10	0.17	15.24 / 2.44	3.81	0	0.00
SN 134.2	2009-09-03	18:35	2009-09-03	18:40	0.08	15.24 / 2.44	3.81	0	0.00
SN 134.2	2009-09-03	18:44	2009-09-03	18:50	0.10	15.24 / 2.44	3.81	0	0.00

APPENDIX III

Biological Data

Appendix III - Table 1 Summary of biological data collected from white sturgeon captured during the 2009 assessment of juvenile Nechako white sturgeon

Station (rKm)	Capture Date	Recap	Sex	Fork Length (cm)	Total Length (cm)	Post-orbital Length (cm)	Pre-Opercular Length (cm)	Girth (cm)	Weight (kg)	PIT Tag Number	Tags at Capture	Tags at Release	Scute Marks at Capture	Scute Marks at Release	Floy Colour	Floy Tag	Radio Tag Freq.	Radio Tag Code	Sonic Tag Freq.	Sonic Tag Serial Number	Comments
AN 117.1 L	2009-09-15	No	98	56.4	65.7	7.5	14.8	20.8	1.01	48681D0F72		Pit		2R FR							
SSL 117.2 L	2009-09-16	Yes	98	72.3	78.6	9.2	18	24.9	2.068	4867517C1E	Pit	Pit	2R FR	2R FR							Part of tail missing, therefore total length is less than it should be.
SSL 117.7 M	2009-09-16	Yes	98	94.5	108.5	12	-	24.5	5.4	422E616706	Pit	Pit		2R							
SSL 117.2 L	2009-09-17	Yes	98	84.9	99	10	22	31.7	4	423C1B2E61	Pit	Pit	FR	2R FR							
SSL 117.2 L	2009-09-17	Yes	98	90.8	102	10	22	31.7	4.5	424D4B206C	Pit	Pit	17L	17L 2R							
SSL 117.2 L	2009-09-17	Yes	98	97.4	114.9	11	24	34.3	6	4B08443453	Pit	Pit	2R	2R							
AN 110.5 M	2009-08-28	No	98	37.7	43.9	6	10	14	0.286	484942465C		Pit		2R FR							
SSL 134.3 R	2009-08-27	Yes	98	29.6	34.7	5	8	12.3	0.1492	4A0D381815	Pit Acoustic	Pit Acoustic	L1 L10	L1 L10					69kHz	1071069	
AN 116.8 L	2009-08-24	No	97	163.5	191	19	44	65.5		4849187A40		Pit		LP R2							
AN 110 M	2009-09-04	No	98	45	51.7	6.5	12	17	0.486	4849247305		Pit		L2 LP							
AN 116.8 M	2009-09-17	No	98	95.5	108.5	12	24	35	5.5	484916465D		Pit		2R FR							
AN 116.8 M	2009-09-17	No	98	96.5	110.5	10	22	33	5.6	4868372B4C		Pit		2R FR							
AN 116.8 M	2009-09-17	No	97							4868576305		Pit									data not collected; large fish; PIT tagged and released
AN 116.8 M	2009-09-17	Yes	98	78.4	90.5	10	20	28	3.25	501F701824	Pit Floy	Pit Floy		2R	B	00091					fish stressed
AN 116.8 M	2009-09-17	Yes	97	113.5	130.5	14	29	40.5	8.5	424F201F7F	Pit Radio	Pit		2R			149.700	14			Radio tag removed, fish in good condition
SSL 117.7 L	2009-09-18	No	98	99.3	114.8	12	24	35.5	5.9	4848735629		Pit		2R FR							
AN 116.8 M	2009-09-18	No	97	113.6	128.2	13	28	41.5	10.25	48490C3B7A		Pit		2R							Fish had lots of scratches and marks, brushed up against another?
AN 116.8 M	2009-09-18	No	97	176.5	198.5	17	42	70	0	48490D695D		Pit		2R							looked like a fat female
SSL 117.2 L	2009-10-05	No	98	76.1	86.8	10	18	24.5	1.75	48653B5A02		Pit		2R FR							
SSL 117.1 L	2009-10-06	No	98	43	49.6	7	12	16.2	0.468	487058171F		Pit		2R FR							