FRASER RIVER WHITE STURGEON MONITORING PROGRAM

REGION 7 (OMINECA-PEACE) 1999 DATA REPORT

RL&L
Environmental Services Ltd.

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FINAL REPORT

Prepared for

BC MELP
Fisheries Branch

by

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Cover Photograph: Retrieving a gill net set in the Nechako River upstream of Cluculz Creek (rkm 96.5).

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1.0 INTRODUCTION

1.1 BACKGROUND AND STUDY OBJECTIVES

White sturgeon (*Acipenser transmontanus*) are distributed throughout the Fraser River watershed with populations documented in the lower, middle and upper Fraser River mainstem (RL&L 1999a, 1999b, 1999c, 1997a, 1997b, 1996, Scott and Crossman 1973), Seton and Anderson lakes (Northcote 1974), and the confluence areas of tributaries to the upper Fraser River including the Cottonwood (RL&L 1999c), McGregor (Dixon 1986), Bowron (RL&L 1999a), Torpy (RL&L1999a) and Nechako rivers (RL&L 1997a). White sturgeon are also known to occur sporadically in the Harrison, lower Pitt, and Thompson drainages, and Fraser and Stuart lakes (Scott and Crossman 1973; RL&L 1998a).

Commercial harvesting (Semakula and Larkin 1968; Binkowski and Doroshov 1985), sport fishing activity (Dixon 1986) and degradation of white sturgeon habitat (Deacon et al. 1979; Rochard et al. 1990) have historically had a negative impact on Fraser River white sturgeon populations. BC Ministry of Environment, Lands and Parks (BC MELP) implemented a catch-and-release fishery in the Fraser River watershed in 1994 in response to these impacts and the "imperiled" or "threatened" status of the Fraser River white sturgeon as defined by the BC Conservation Data Centre (BC CDC 1997). White sturgeon in the Nechako River and its tributaries have been designated as "critically imperilled" or "endangered" (BC CDC 1997).

In 1995, BC MELP contracted RL&L Environmental Services Ltd. (RL&L) to develop and implement a large-scale monitoring program for white sturgeon in the Fraser River watershed. Funding for this program was provided by the Habitat Conservation Trust Fund (HCTF) and Forest Renewal BC (FRBC). Results of studies conducted in the upper Fraser River drainage (i.e., Region 7: Omineca-Peace) during the past four years are summarized in RL&L (1999a, 1998a, 1997a, 1996).

The objectives of the 1999 study incorporate elements and recommendations from previous studies and discussions with BC MELP representatives and members of the Fraser River Sturgeon Technical Committee. The intent of the BC MELP program in 1999 was to focus on the spawning and early life history (egg/larval and juvenile rearing) components, and to collect additional information on the life history, distribution, and behavior of the white sturgeon in the Nechako River.

In addition to this study, Alcan Aluminum Limited (ALCAN) commissioned RL&L and Triton Environmental Consultants Ltd. (TRITON) to investigate the status of juvenile white sturgeon in the Nechako River in 1999. The Lheidli T'enneh First Nations (LTFN) also conducted a program to collect information on white sturgeon in the upper Fraser River and its tributaries in 1999. The results of these studies are highlighted in this report.

1.2 STUDY AREA AND SAMPLE PERIODS

The 1999 study area for the BC MELP program encompassed the section of the Nechako River downstream of Whitemud Rapids to upstream of Fort Fraser, and the middle and upper sections of the Stuart River (Sturgeon Point and the outlet of Stuart Lake; Figure 1.1). Synoptic-level sampling for white sturgeon was conducted in the upper Fraser River mainstem from the West Road (Blackwater) River (rkm 700.3) to upstream of the Morkill River (rkm 1082.9), by the Lheidli T'enneh First Nations (LTFN 2000). The juvenile program funded by ALCAN occurred in the Nechako River within areas previously sampled by Envirocon (1984). RL&L sampled sites in the Vanderhoof (rkm 139.5) to Keillor's Point (rkm 109.9) section whereas TRITON investigated the Engen (rkm 181.0) to Finmoore (rkm 94.5) area (Triton 2000).

White sturgeon sampling in the Nechako river drainage occurred during the spring, summer, and fall of 1999 (Table 1.1). Monitoring of radio tagged white sturgeon movements by telemetry was performed periodically throughout the year.

Table 1.1 Summary of white sturgeon sampling programs and their periods, 1999.

Study Session	Study Program	River System	Sample Methods	Sample Period
Spring	(RL&L) Spawning, egg/larval	Nechako	Egg collection mats, drift nets	early to late Jun
Summer	(RL&L) Juvenile sampling	Nechako/Stuart	Gill nets, angling, set lines, electroshocking	late Jun to mid-Jul
	(TRITON) Juvenile sampling	Nechako	Gill nets	late Jun to late Aug
	(RL&L/LTFN) Sturgeon sampling	Nechako	Set lines	early Aug
	(LTFN) Sturgeon sampling	Upper Fraser	Set lines, angling, gill nets, minnow traps	mid-Aug to early Sep
Fall	(RL&L) Sturgeon sampling	Nechako	Set lines	early to mid-Sep
	(LTFN) Sturgeon sampling	Upper Fraser	Set lines, angling	late Sep to early Oct

[a] For specific sampling dates and locations, see Appendix B, Tables B1 to B7.

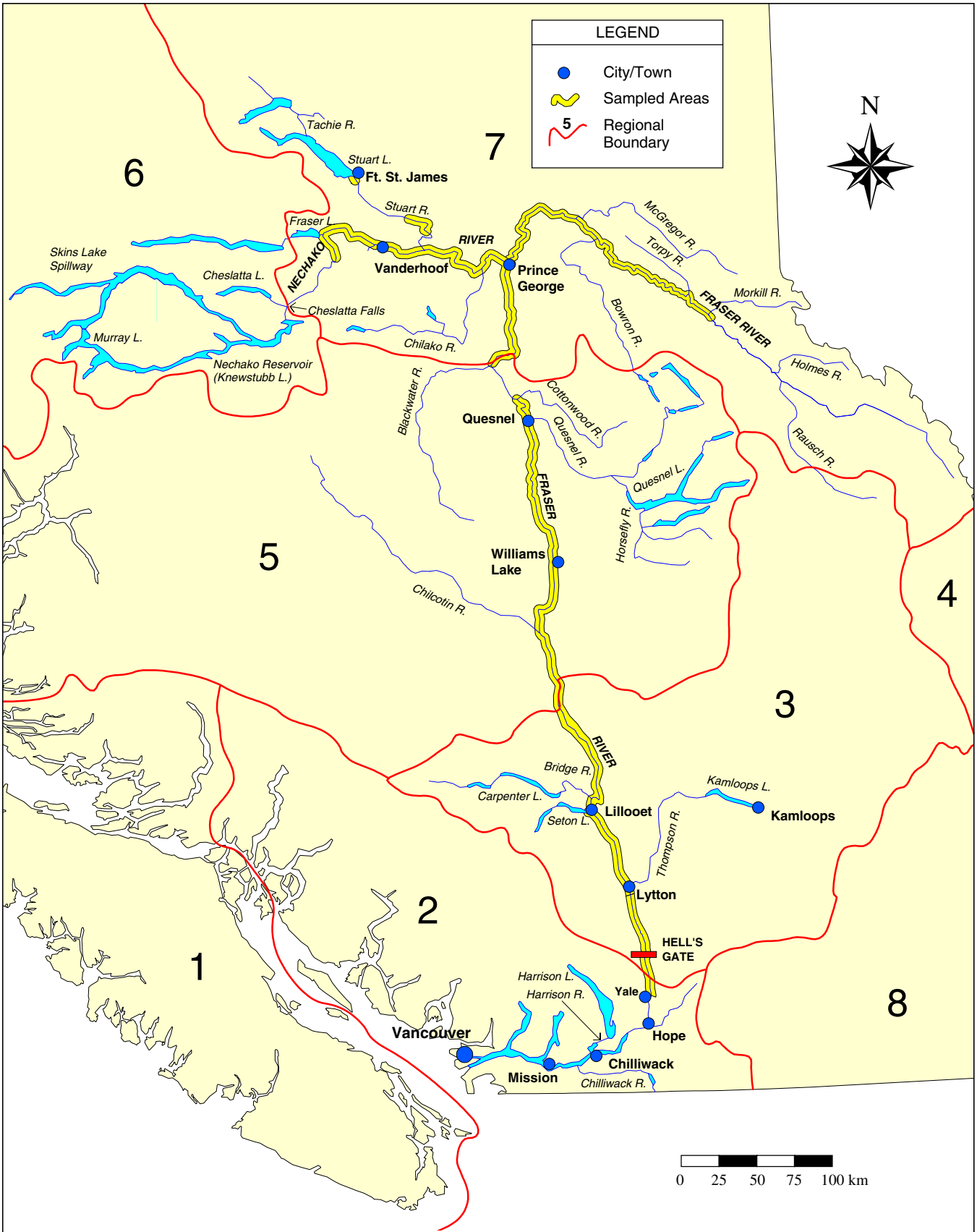

Figure 1.1 Study area and BC MELP regional boundaries for the Fraser River White Sturgeon Monitoring Program. Areas sampled in each region during 1999 are highlighted in yellow.

2.0 METHODOLOGY

2.1 PHYSICAL PARAMETERS

2.1.1 Stream Discharge

Mean daily discharge data for the study area in 1999 was obtained from the Water Survey of Canada, Data Management and Applications Department of Environment Canada (Unpub. Data, Appendix A, Table A1). Discharge data obtained included the Nechako River at Cheslatta Falls and Isle Pierre, the Nautley River near Fort Fraser, the Stuart River at Fort St. James, and the Fraser River at Shelley. Discharge records for the Skins Lake Spillway were provided by Alcan (Unpub. Data).

2.1.2 Water Temperature

Optic Stowaway™ Temp temperature data loggers were deployed in the Nechako River to monitor water temperature for the duration of the field investigations (Appendix A, Table A1). Hourly water temperatures were gathered at two locations in the Nechako River: Keillor's Point (rkm 110.2) and upstream of Isle Pierre Rapids at the ferry landing (rkm 62.3).

Additional mean daily water temperature data was acquired from Department of Fisheries and Oceans for the Nechako, Nautley, Stuart (near the outlet of Stuart Lake), and Fraser rivers (Appendix A, Table A1). All data obtained from this source coincided with salmon spawning periods. Water temperature data was also collected during each sample session with a calibrated, hand-held thermometer.

2.2 MOVEMENTS AND POPULATION DYNAMICS

2.2.1 Capture and Handling Techniques

Set lines and angling were used in 1999 to capture a wide range of fish sizes and to sample a variety of habitats in the Nechako and Stuart river mainstems. The techniques employed in 1999 and the rationale for their use has been described in RL&L (1997a, 1996). Bait (i.e., sockeye flesh) utilized during the study was provided by BC MELP and LTFN. Habitat data, sample gear configuration, and capture data (including incidental catch) were recorded and catch-per-unit-effort (CPUE) summaries were generated according to RL&L (1999a, 1998a, 1997a).

Boat electroshocking and small mesh gill nets were used extensively in 1999 in the mainstem Nechako River to sample areas potentially suitable for rearing by juvenile white sturgeon. The habitat type sampled included slow water areas, backwater pools and confluence areas. A description of techniques, gear specifications, and limitations have been reported in RL&L (1998a, 1997a).

Gill nets, ranging in size from 63.5 to 127.0 mm (2.5" to 5.0") stretched mesh, were deployed in the Nechako River from upstream of Fort Fraser to Isle Pierre Rapids during the summer. A limited amount of tangle net (203.2 mm or 8") sampling was also conducted in this section of the study area. Gill net effort was also expended in the Stuart River at Sturgeon Point and at the outlet of Stuart Lake. The typical net configuration consisted of a single panel gill net (area of 37.2 m^2), although two panel sets were also used, with each panel being of a different mesh size.

Sampling was conducted over extended periods at most gill net locations. All nets were checked frequently and set times generally did not exceed four hours between checks. CPUE data (number of fish/net-day by mesh size) was calculated for each gill net set and all incidental catches were noted.

Electroshocking for juvenile white sturgeon was performed using a 16 foot Roughneck hull equipped with a Smith-Root Type VI portable electroshocking unit and twin anode booms. Sampling was conducted in the Nechako River between the braided section above Vanderhoof (rkm 139.5) to Keillor's Point (rkm 110.0). CPUE data were calculated (expressed as number of fish/hour) for each section of river sampled.

In an attempt to capture egg or larval stages of white sturgeon and confirm spawning activity in the Nechako River, the spring egg collection mat and D-ring drift net sampling was continued in 1999. Egg collection mats and D-ring drift nets were deployed in four locations: Whitemud Rapids (rkm 35.9 to 38.5), downstream of Isle Pierre Rapids (rkm 48.5 to 48.7), Isle Pierre Rapids (rkm 53.2 to 60.2), and Hulatt Rapids(rkm 103.5 to 103.8). The configuration and method of deployment of these gear is described in RL&L (1999a, 1998a); mats were checked and cleaned at three day intervals.

In addition to the BC MELP program, RL&L was commissioned by ALCAN to sample juvenile white sturgeon in the Nechako River in cooperation with TRITON. The gill net configuration employed by RL&L was similar to that used by Envirocon (1984) and consisted of three 37.2 m^2 panels, varying in mesh size from 88.9 to 139.7 mm (3.5" to 5.5"), connected together to form a single variable-mesh test gang. Gill net sets were deployed to fish the river bottom in areas previously surveyed by Envirocon (1984) between Finmoore and Vanderhoof, although additional sites were sampled where juvenile white sturgeon were suspected to occur or had been previously documented. Gill nets were typically deployed for extended periods (i.e., day and night) and checked frequently to reduce the risk of fish mortalities. Incidental catches and sample effort were recorded similar to the BC MELP program. The methods and procedures used by TRITON to sample juvenile white sturgeon in the Nechako River and by LTFN to survey sturgeon in the upper Fraser River are described in Triton (2000) and LTFN (2000).

The handling and processing of white sturgeon used techniques described in RL&L (1997a). An emphasis on reduced handling time and the maintenance of normal fish respiration served to minimize processing stress on captured fish. Prior to release, each fish was carefully monitored to confirm normal behavior and full recovery. All white sturgeons captured and sampled for life history information were released in apparent good health and displayed normal respiration and swimming behavior.

2.2.2 Seasonal Movement and Population Estimates

2.2.2.1 Fish Marking

Fish were marked with an T-anchor tag (manufactured by Floy Tag Manufacturing Inc.) and Passive Integrated Transponder (PIT) tags (manufactured by Biomark Inc.). In addition, a small portion of the leading ray on the left pectoral fin was removed for the purposes of ageing and to provide a secondary external identification mark. All external tags and secondary marks were applied according to the methods described by RL&L (1998a, 1997a, 1996).

Three radio transmitters were available to be externally attached to white sturgeon in various states of sexual maturity to provide information on their behavior and movement patterns. Emphasis was placed on radio-tagging either mature adults or individuals juvenile in size. The high frequency radio transmitters were the same as those described RL&L (1998a, 1997a). Prior to receiving a radio transmitter, all radio tagged fish were examined surgically to determine their stage of sexual maturity following methods outlined in RL&L (1997a, 1996). Radio tags were externally attached following the methods described by Haynes et al. (1978) and RL&L (1997a, 1996).

Information on the movements of radio tagged fish was collected by fixed wing aircraft, riverboat, shore, and fixed remote ground stations (data loggers). The methods and procedures for each tracking technique were generally the same as those described in RL&L (1999). Radio signal information (i.e., frequency, channel, code, and signal strength) and location information (i.e., river kilometre, UTM coordinates, and area description) were recorded for each radio tagged fish that was detected.

2.2.2.2 Population Estimates

As in past years studies, the size of the white sturgeon population in the Nechako River was derived from mark-recapture data collected from 1995 to 1999. The Modified Schnabel Estimation Technique described in Ricker (1975) was used to generate the estimate, using confidence intervals calculated at the 95% level.

2.2.3 Life History Data Collection

Standard methods were used for the collection of life history data (RL&L 1996). White sturgeon captured during 1999 were sampled for life history information that included fork length, total length, girth, and weight. Post-opercular and post-orbital length were also measured to gather morphometric data on snout length. A portion of the white sturgeon catch was examined surgically to determine the state of reproductive maturity. In addition, a section of pectoral fin tissue was removed and preserved in 99% ethanol and submitted to BC MELP for genetic analysis and incorporation into a white sturgeon genetic database.

2.2.4 Habitat Characteristics

General habitat descriptions were recorded for sampled locations in 1999. These measurements included water temperature, water clarity, nearshore and offshore depths, and a general description of flow patterns and site features. Additional effort went into defining habitat characteristics (e.g., velocity, substrate) in areas where egg collection mats were deployed.

3.0 RESULTS

3.1 PHYSICAL PARAMETERS

3.1.1 Discharge

The mean daily discharge for the Nechako, Nautley, Stuart, and Fraser rivers are summarized in Appendix A. These hydrographs depict the annual trend in discharge.

The Nautley River near Fort Fraser, the Stuart River near Fort St. James, and the Fraser River at Shelley illustrate hydrographs typical of non-regulated systems (Figures A2, A6 and A7, respectively). Spring freshet and the corresponding increases in volume for these rivers occurred in late April. Peak flows in the Nautley River were observed in early June and early July (91.2 m^3/s, 10 June 99 and 91.1 m^3/s, 8 July 99, respectively). Flows in the Stuart River peaked at 401 m^3/s on 2 to 4 July 99. Several high flow periods were noted through the April to June period for the Fraser River, with a peak flow of 3800 m^3/s recorded on 21 June 99. Flows for all these rivers declined during the early July to September period.

The hydrographs of the Nechako River below Cheslatta Falls and at Isle Pierre are characteristic of a regulated system, but are also moderated by large lakes (i.e., Fraser and Stuart lakes). Flows from late April to June represent the natural spring freshet period with discharge peaking rapidly, leveling, and reducing gradually (Figure A6). Flows from mid-July to late August, however, were influenced by releases from Skins Lake Spillway (Figure A1). These releases are regulated as part of a temperature reduction program for migrating salmon stocks during the late summer period (RL&L 1997a). Low flows for the Nechako River below Cheslatta Falls occurred during the January to June period (approximately 30 m^3/s) and increased rapidly in mid-July with a peak discharge of 266 m^3/s measured on 8 August (Figure A1). Extreme fluctuations in releases from Skins Lake Spillway occurred during July and August. Flows varied from a maximum mean daily discharge of 453.1 m^3/s on 6 August to a minimum discharge of 14.2 m^3/s on 23 July. A rapid reduction in flow occurred in mid-August and flow remained low over the fall and winter.

3.1.2 Water Temperature

The water temperatures of several systems in the Nechako River drainage in 1999 were obtained from several sources (DFO and RL&L) and summarized in Appendix A.

Nautley River water temperatures recorded from 1 January to 14 October (Figure A2) ranged from -0.3 to 20.8ºC. Temperatures increased steadily throughout the monitoring period, with the maximum water temperature measured on 7 August. RL&L (1998a, 1997a) noted that the warm surface water temperatures of Fraser Lake had an influence on Nechako River water temperatures downstream of the Nautley River confluence area.

Water temperatures were recorded at three locations in the Nechako River (Figure A3, A4, and A6); two sites were located upstream and one downstream of the Stuart-Nechako river confluence area. Nechako River water temperatures ranged from 0˚C during winter ice conditions to 20.9ºC at peak temperatures in early August (Figures A3 and A6).

Stuart River water temperature was recorded near the outlet of Stuart Lake between 15 May to 5 October 1999 (Figure A5). Water temperature ranged from 8.0 to 20.1 ºC during this period, with peak values occurring in late July and early August. Fraser River water temperatures at Shelley were recorded from 14 May to 5 October 1999. At this location, water temperature ranged from 5.8 to 15.8 ºC during this period, with peak temperatures occurring in August.

Previous results have suggested that the spawning period for Nechako River sturgeon may vary considerably on an annual basis (RL&L 1999a, 1998a). Water temperatures that have been documented as being conducive for white sturgeon spawning in other river systems (generally ranging from 12 to 18˚C; Parsely and Beckman 1994; Perrin et al. 1999; RL&L 1994 and 1995; Wang et al. 1985) occurred in the Nechako River during the June to mid-July period in 1999. A similar spawning window for Nechako River sturgeon was identified in 1997 (RL&L 1998a) but in 1998, spawning temperatures occurred in May and June (RL&L 1999a).

3.2 DISTRIBUTION AND CATCH

3.2.1 Distribution

White sturgeon were sporadically distributed throughout the section of the Nechako River between Fort Fraser and Whitemud Rapids (Figures 3.1 and 3.2). Previous investigations identified areas of high use by white sturgeon in the Nechako River (RL&L 1997a). These high use areas included the Sinkut River area (rkm 115 to 117), downstream of Vanderhoof (rkm 122 to 127), and the section between Isle Pierre and the Stuart River (rkm 67 to 79). The areas of the Nechako River near Leduc Creek (rkm 117 to 122) and immediately downstream of Vanderhoof (rkm 126.5 to 137) remain rated as areas of low to moderate use, as defined by RL&L (1998a, 1997a). However, results from the telemetry component of the present study indicated a higher use of the Nechako River upstream of Vanderhoof to upstream of Kluk Creek (rkm 174.7) than previously documented.

RL&L (1997a) described high use areas as providing feeding and overwintering habitat based on the consistent presence of sub-adult and adult white sturgeon during all seasons. Results to date suggest the abundance of juvenile white sturgeon in the Nechako River is low and their use of habitat for rearing is restricted to only a few localized areas between Neuco Creek and Finmoore.

In 1999, LTFN initiated a study of white sturgeon in the upper Fraser River that expanded on previous sampling at a synoptic level (RL&L 1999a, 1998a). Their study area extended from the confluence of the West Road River (Blackwater River, rkm 700.3) to the confluence of the Morkill River (rkm 1083; LTFN 2000). This section of the upper Fraser River was previously described by RL&L (1999a, 1998a) as an area of undetermined use with localized areas of low to moderate use. LTFN documented white sturgeon at the confluence areas of the Willow (rkm 827), Torpy (rkm 1035), Bowron (rkm 908 to 911), and McGregor (rkm 890) rivers, and the Grand Canyon area (rkm 944 to 946; LTFN 2000).

Legend

- Set line locations; white sturgeon captured
- Set line locations; white sturgeon not captured
- Angling locations; white sturgeon not captured
- 120 River kilometre (measured from mouth of marked rivers)
- 16 Major highway

Stuart Lake
Fort St. James
Stuart River
flow
Kluk Creek
Nautley River
Fraser Lake
Fort Fraser
Vanderhoof
Nechako River
flow
Murray Lake
Kenney Dam
Knewstubb Lake
Neuco Cr.
Leduc Cr.
Sinkut River
Hulatt Rapids
Finmoore
Isle Pierre Rapids
Whitemud Rapids
Garvin Creek
Prince George
Fraser River
flow

0 5 10 15 20 Km

approx. scale 1 : 400 000

Figure 3.1

FRASER RIVER WHITE STURGEON MONITORING PROGRAM

Set Line and Angling Sample Locations in the Nechako and Stuart rivers, 1999.

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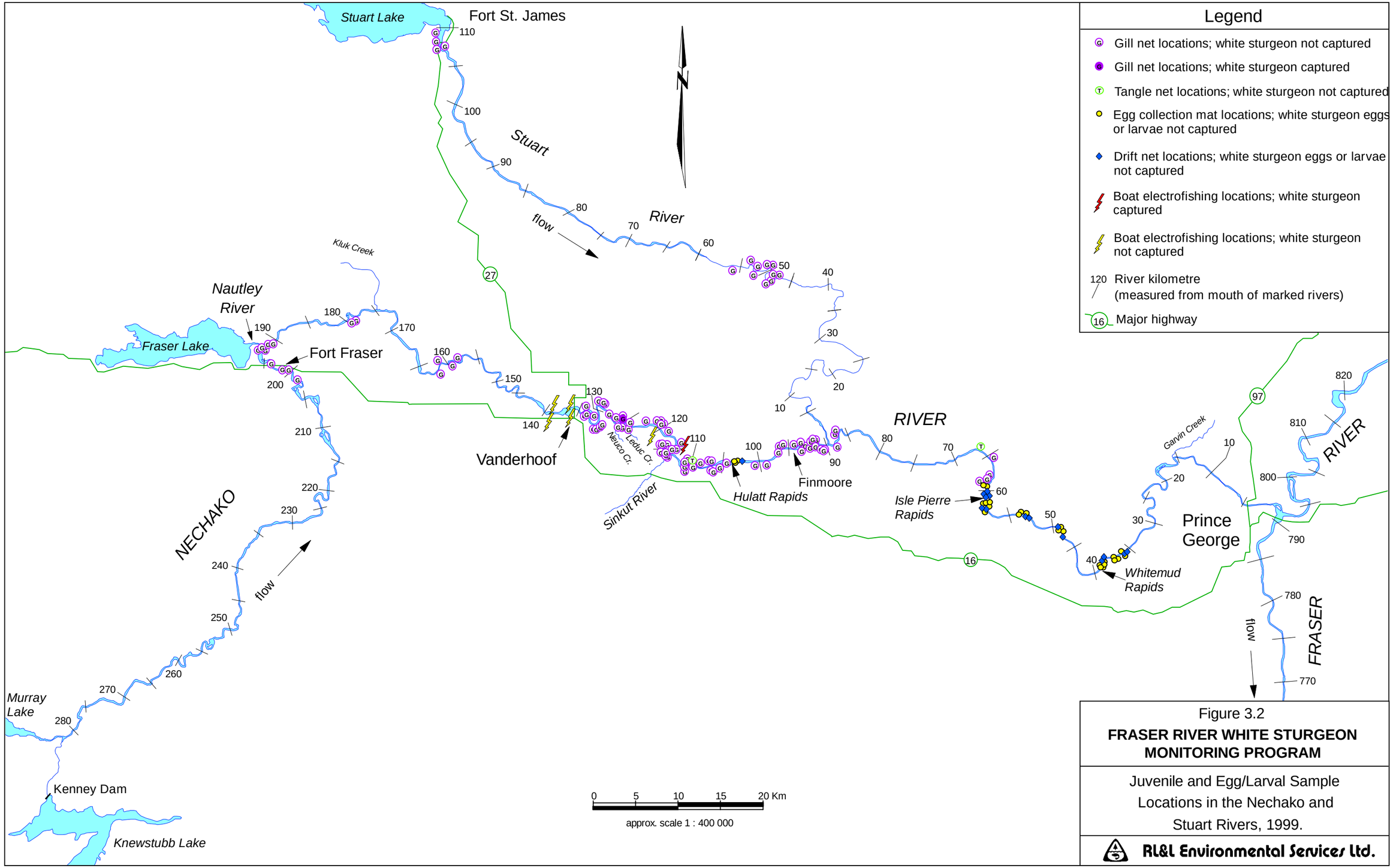


Legend

- Gill net locations; white sturgeon not captured
- Gill net locations; white sturgeon captured
- Tangle net locations; white sturgeon not captured
- Egg collection mat locations; white sturgeon eggs or larvae not captured
- Drift net locations; white sturgeon eggs or larvae not captured
- Boat electrofishing locations; white sturgeon captured
- Boat electrofishing locations; white sturgeon not captured
- River kilometre (measured from mouth of marked rivers)
- Major highway

Figure 3.2

FRASER RIVER WHITE STURGEON MONITORING PROGRAM

Juvenile and Egg/Larval Sample Locations in the Nechako and Stuart Rivers, 1999.

RL&L Environmental Services Ltd.

3.2.2 Catch Rates

Thirty-nine white sturgeon were captured in the Nechako River by RL&L during 1999. The majority of these individuals (94.8%, *n*=37) were captured by set line; one white sturgeon was sampled by gill net and another individual was observed while boat electroshocking (Appendix B, Tables B1 to B5). White sturgeon were not encountered in the Stuart River system in 1999; however, only a small amount of sampling effort occurred in system in 1999.

Forty-four white sturgeon were sampled in the upper Fraser River watershed by LTFN (LTFN 2000). One of these fish was captured in the McGregor River and seven individuals were captured in the Bowron River. The remaining individuals were captured in the Fraser River mainstem. Set lines were the only gear that captured white sturgeon in the upper Fraser River program. A summary of their effort can be found in LTFN (2000).

A total of 8420.6 hook-hours of set line sample effort was expended by RL&L in the Nechako River in 1999 (Figure 3.1, Table 3.1). Set line effort (760.7 hook-hours) in the summer period was restricted to a two-day sample period in conjunction with a white sturgeon training workshop for LTFN. Most of the set line sampling (7659.9 hook-hours) occurred during the fall, with catch rates (0.38 sturgeon/100 hook-hours) being consistent with fall programs in previous years (RL&L 1999a, 1998a, 1997a). The set line catch was comprised mainly of adult fish, although one juvenile white sturgeon was encountered near Neuco Creek (rkm 125.0). Set line effort expended by LTFN (2000) in the upper Fraser River drainage was 35 509 hook-hours; CPUE was approximately 0.12 white sturgeon/100 hook-hours.

Table 3.1 Summary of catch, catch rate (*CPUE* = No. Fish/100 hook-hours), size and age ranges for white surgeon captured by set line in the Nechako River, 1999.

Waterbody	Survey Session	Date	Sample Effort (hook-hours)	Catch	*CPUE*	Size Range[a] (cm)	Age Range (yrs)
Nechako R.	Summer	4 - 5 Aug	760.7	8	*1.05*	133.0 - 200.5	22 - 38
	Fall	4 - 14 Sep	7659.9	29	*0.38*	84.0 - 222.5	9 - 62
TOTAL			**8420.6**	**37**	***0.44***	**84.0 - 222.5**	**9 - 62**

[a] Represents size-range in fork length.

Angling effort expended by RL&L during the summer in 1999 totaled 14.87 hook-hours (Figure 3.1; Appendix B, Table B2). The majority of the effort (86.6%) occurred in the Nechako River; the remaining effort was expended at Sturgeon Point on the Stuart River. No white sturgeon were captured using this technique, although incidental catches of northern pikeminnow were recorded.

RL&L deployed nets in the Nechako River in summer to sample juvenile white sturgeon (Figure 3.2). As part of the BC MELP program, 8.35 net-days (net-day is equivalent to 100 m^2 of net set for a 24 h period) of effort were expended in the Nechako River (Table 3.2; Appendix B, Table B3). This effort resulted in the capture of one juvenile white sturgeon (77 cm FL) near Neuco Creek (rkm 125.2); catch-per-unit-effort was 0.12 sturgeon/net-day. Sample effort was also expended in the Stuart River at Sturgeon Point and the outlet of Stuart Lake for a total of 1.32 net-days of effort; no white sturgeon were captured.

Gill net sampling for juvenile white sturgeon was also conducted by RL&L during the summer as part of the ALCAN program (Table 3.2; Appendix B, Table B4). Total effort (8.38 net-days) was similar to the BC MELP program, although no white sturgeon were encountered. TRITON also conducted gill net sampling in the Nechako River for ALCAN (Triton 2000). Sample effort was applied during the summer and fall periods for a total effort of 34.59 net-days. During their program, four juvenile white sturgeon were captured at sites where juvenile sturgeon had previously been documented by Envirocon (1984); catch-effort was similar to the BC MELP program (0.12 sturgeon/net-day). These sites included the confluence areas of Neuco Creek and the Sinkut River, and the Finmoore area.

Table 3.2 Summary of catch, catch rate (*CPUE* = No. fish/net-day), size and age ranges for white surgeon captured by gill net in the Nechako River, 1999.

Sampling Program [a]	Waterbody	Survey Session	Date	Sample Effort (net-days) [a]	Catch	*CPUE*	Size Range [b] (cm)	Age Range (yrs)
BC MELP	Nechako R.	Summer	28 Jun - 13 Jul	8.35	1	*0.12*	77	10
	Stuart R.		14 - 16 Jul	1.32	0	*0*	-	-
ALCAN [c]	Nechako R.	Summer	8 - 16 Jul	8.38	0	*0*	-	-
TOTAL				**18.05**	**1**	***0.06***	**77**	**10**

[a] One net-day = 100m^2 of net set for a 24 hour period.
[b] Represents size-range in fork length.
[c] Sample effort by TRITON as part of the ALCAN program not shown.

A total of 122 non-target fish, representing two sportfish species and four non-sportfish species, were captured by gill nets (Table 3.3) during the BC MELP sampling program. The incidental catch included northern pikeminnow (n = 60), sucker species (n = 37), mountain whitefish (n = 14), peamouth chub (n = 10) and bull trout (n = 1). Incidental catch and mortalities encountered by RL&L during the ALCAN program were few and no sportfish were captured (Table 3.3). The number of mortalities did not exceed 20% of the total catch from either program, which included fish sacrificed as bait for other elements of the program (e.g., angling). TRITON recorded an incidental catch of 729 fish during the ALCAN program with an average mortality of 39% (Triton 2000). They attributed most of the by-catch and mortality to their use of 1.5" mesh gill nets.

Boat electroshocking was conducted by RL&L in three areas considered potentially suitable for rearing by juvenile white sturgeon: the braided section upstream of Vanderhoof, downstream of Leduc Creek, and downstream of the Sinkut River (Appendix B, Table B5). Approximately 29.1 km of river was sampled using this technique for a total electroshocking effort of 260.9 minutes. A single white sturgeon (undetermined size) was observed upstream of Keillor's Point (rkm 112.2).

Egg collection mats (i.e., artificial substrate mats) were deployed downstream of potential white sturgeon spawning areas between 1 and 27 June, to capture egg or larval stages of white sturgeon (Figure 3.2). Twenty-six double-mat sets were deployed for a total of 6822.10 hours of mat effort (Appendix B, Table B6). White sturgeon eggs or larva

were not encountered, although eggs from other resident fish species (e.g., sculpin, sucker spp.) were captured in all areas; one non-white sturgeon fry (spp. unknown) was sampled from the Whitemud Rapids area.

Table 3.3 Summary of incidental catch and mortalities by gill net sampling in the Nechako and Stuart rivers, 1999.

Sampling Program [a]	Waterbody	Species	No. Captured	No. Mortalities	% Mortality
BC MELP	Nechako River	Mountain whitefish	13	6	46.2
		Bull trout	1	-	0.0
		Northern pikeminnow	55	8	14.5
		Sucker spp.	34	7	20.6
		Peamouth chub	10	1	10.0
TOTAL			**113**	**22**	**19.5**
	Stuart River	Mountain whitefish	1	1	100.0
		Northern pikeminnow	5	-	0.0
		Sucker spp.	3	-	0.0
TOTAL			**9**	**1**	**11.1**
ALCAN [b]	Nechako River	Northern pikeminnow	2	1	50.0
		Sucker spp.	5	-	0.0
TOTAL			**7**	**1**	**14.3**
GRAND TOTAL			**129**	**24**	**18.6**

[a] Sample bait required for other elements of the program attributed to several post-capture mortalities (i.e., mountain whitefish, peamouth).

[b] Incidental catch and mortalities by TRITON as part of the ALCAN program are not shown.

D-ring drift nets were also deployed in the Nechako River to supplement effort to capture white sturgeon eggs and larvae (Figure 3.2). Drift net sampling was restricted to the Nechako River, with effort distributed between the potential spawning areas where egg collection mats were deployed. Drift nets were deployed for a total of 16.25 hours (Appendix B, Table B7). Eggs (n = 18), larvae (n = 41), and fry (n = 4) were collected during sampling; none of the samples were identified as white sturgeon. The majority of the eggs (94.4%) and larvae (82.9%) were collected in the Hulatt Rapids area.

3.3 MARK-RECAPTURE

3.3.1 Conventional Tagging

A total of 39 white sturgeon were captured or observed by RL&L during the 1999 sampling program. Two of these fish were observed, but not processed; one fish was observed as it escaped near the boat and the other was observed while electroshocking. T-anchor tags and PIT tags were applied to 94.9% (n = 37) and 79.5% (n = 31) of the catch

(Table 3.4; Appendix C, Tables C1 and C2). A pectoral fin ray section was collected from thirty-one white sturgeon (79.5%) for ageing purposes.

Table 3.4 Summary of mark and recapture events for white sturgeon marked with conventional tags in the Nechako River by RL&L, 1999.

Session	Number Caught	No. Tagged [a]		No. Recaptured [b]	
		Dart/Floy	PIT	No.	%
Summer	10	8	8	0	0.0
Fall	29	29	23	6	20.7
Total	**39**	**37**	**31**	**6**	**15.4**

[a] Includes fish equipped with a radio transmitter, fish receiving a new tag for the first time and recaptured fish that had lost their previous tag and received a new tag.

[b] Represents recaptures of fish tagged in any of the 1995 to 1999 programs.

3.3.2 Tag Recoveries

Six white sturgeon (15.4% of the catch) had previously been tagged (Appendix C, Table C2). Four fish were recaptured within 5 rkm of their original capture location; only one of these fish exhibited a net downstream movement. Two fish exhibited net movements greater than 10 rkm and were captured at distances of 17.5 and 26.2 rkm downstream from their original release location. The number of days-at-large for white sturgeon recaptured in 1999 ranged from 366 to 1557 days. One white sturgeon recaptured in 1999 had been recaptured on two previous occasions. This fish had a net movement of less than 2 rkm from the point of original capture. Total days-at-large for this fish since its original capture was 1178 days.

A white sturgeon originally captured by RL&L in 1996, (rkm 0.1 of the Nechako River), was recaptured in 1999 by LTFN (rkm 826.6 of the Fraser River; LTFN 2000). The days-at-large for this fish was 1179 days, with a net movement of 35.2 rkm.

3.3.3 Population Estimate

A population estimate was generated using data collected from all five years of monitoring (1995 to 1999). Recaptures of white sturgeon within sessions were excluded to avoid the effect of marks added during a sample session on the estimate. Application of the modified Schnabel Method (Ricker 1975) yielded a white sturgeon population estimate of 547 fish (95% CI = 403 to 851). The estimate represents the size of the white sturgeon population in the Nechako River from its mouth to the Nautley River confluence, and the Stuart River.

3.4 RADIO TELEMETRY

The radio telemetry program initiated in 1995 was continued in 1999, to expand information on movement and behavior of Nechako River sturgeon. Only one white sturgeon was fitted with an external radio transmitter in 1999. This fish was classed as a female in an early vitellogenic state of sexual maturity. Summaries of the sexual maturity and movements of white sturgeon radio tagged in the Nechako River from 1995 to 1998 are reported in

RL&L (1999a, 1998a, 1997a, 1996). Results described in the following paragraphs are restricted to movements of radio-tagged fish in 1999.

A total of 74.0% (*n*=37) of the radio tags in the study area were located between 13 January and 14 September 1999 (Appendix C, Table C3 and Figures C1 to C3). Those fish, where there is specific discussion of their movements, are referenced by their transmitter frequency, channel, and code (e.g., 149.500-14-110) in the following section. Movement figures presented in Appendix C exclude those radio tags that have expired and those which have been recorded at the same location for more than a year prior to 1999 (i.e., radio tag suspected shed).

Results of tracking effort to date indicated all of the radio tags deployed in 1995 and 1996 (RL&L 1999a), 60% of the tags deployed in 1997, and 42% of the tags deployed in 1998 have been shed or have expired (Appendix C, Table C3). Two radio tags applied in 1996 were confirmed shed in 1999 (Appendix C, Figure C1) based on recapture information (i.e., radio tag was absent at recapture). A non-reproductive male (149.500-10-109) was recaptured by LTFN in the upper Fraser River mainstem at rkm 826.6. The last known transmitter position was at rkm 0.1 of the Nechako River on 10 December 1997 suggesting a minimum net upstream movement of 35.2 rkm. A second, non-reproductive male (149.480-09-56) originally tagged at rkm 90.2 on 12 September 1996, was recaptured on 14 September 1999 near Hutchinson Creek (rkm 72.7). The last known location of this transmitter was rkm 103.5 on 15 June 1999, indicating a downstream movement of 30.8 rkm.

In the present study, a maturing male white sturgeon (149.480-09-52) radio-tagged in 1997 was located 52.5 rkm upstream from its last known position after 349 days at large (Appendix C, Figure C1). It is unclear as to the timing of this upstream migration, and whether the movement was related to feeding or possibly spawning.

Of the twelve white sturgeon radio tagged in 1998, approximately 58.3% (n = 7) of tags were still considered 'active' in 1999. Of these tagged white sturgeon, movements of less than 20 rkm were documented for three individuals (Appendix C, Figures C1 and C2). These movements likely represented fall migrations to overwintering areas (149.740-22-11), or spring feeding-related movements (149.658-18-111, 149.740-22-14).

Four fish radio tagged in 1998 exhibited movements of greater than 40 rkm in 1999. Three individuals traveled distances more than 50 rkm (Appendix C, Figures C2 and C3). An early vitellogenic female (149.500-10-115), exhibited a 42.9 rkm downstream movement before migrating upstream to near the confluence with the Stuart River. These movements were recorded during the May to August period which suggest they were related to feeding. Another female (early vitellogenic, 149.578-14-119) migrated downstream from Hulatt Rapids to downstream of Isle Pierre Rapids (a suspected spawning area). The distance moved was 51.5 rkm over 19 days (i.e., 2.7 rkm/day). Based on the timing of this movement and the individuals destination, the movement may have been spawning related.

The remaining two fish radio tagged in 1998 were both pre-vitellogenic females (149.578-14-121 and 149.658-18-114) that initiated movements from Keillor's Point within a ten day period of each other; both fish traveled to upstream of Vanderhoof. The 149.578-14-121 female exhibited a total movement of 51.2 rkm, that consisted of a downstream movement from Neuco Creek to Keillor's Point and a subsequent movement to upstream

of Vanderhoof. The 149.658-18-114 female traveled a distance upstream of 46.7 rkm, from Keillor's Point to below Engen, within four days (i.e., 11.7 km/day). The movements of these fish indicated a higher use of the section of the Nechako River between Vanderhoof and Kluk Creek (rkm 175) than previously documented. The observed movements may be attributable to spring flows that improve access to the upper reaches for feeding or possibly spawning purposes. Several high gradient, rapids sections comprised of cobble/boulder substrate were observed upstream of Engen that may provide suitable habitat for spawning by white sturgeon. The one white sturgeon radio tagged in fall 1999 was not tracked from its original capture location.

3.5 POPULATION DYNAMICS

3.5.1 Growth Characteristics

3.5.1.1 Length Frequency

White sturgeon captured in 1999 ranged in fork length from 77.0 to 222.5 cm and in weight from 3.5 to 87.5 kg. Snout to post-opercular length and snout to post-orbital varied from 19.5 to 56.0 cm and from 10.5 to 25.0 cm, respectively. Girth ranged from 30.0 to 89.5 cm.

White sturgeon were categorized using the juvenile, sub-adult, and adult classifications, as described in RL&L (1996). These groupings represent fish less than 100 cm in total length (TL), between 100 and 150 cm TL, and greater than 150 cm TL, respectively. As in previous studies (RL&L 1999, 1998a) the length-frequency distribution of white sturgeon in the Nechako River indicated the larger size-classes were most common (Figure 3.3). The adult cohort comprised the majority (86.5%) of the 1999 catch; sub-adult fish were less abundant and contributed 8.1% to the catch (Figure 3.4). Only two juvenile fish (5.4%) were encountered in the Nechako River drainage by RL&L in 1999. In contrast, juvenile white sturgeon were most common in catches from the upper Fraser River drainage in 1999 and contributed 52.4% to the total catch (LTFN 2000).

3.5.1.2 Length and Weight

Length and weight information were plotted for white sturgeon captured in the Nechako River drainage in 1999 (Figure 3.5). A logarithmic relationship was developed (Equation 1) between the variables length (in millimeters) and weight (in grams). Length-weight relationships documented for other white sturgeon populations in North America (RL&L 1997b, 1996; Lane and Rosenau 1993; Dixon 1986; Apperson and Anders 1991; Kolhorst et al.1980) and the equations developed from previous years studies in Region 7 (RL&L 1999a, 1998a; Dixon 1986) were generally similar to those recorded for sturgeon in the present study area.

[Equation 1] $\text{Log}(\mathbf{W}) = 2.8973\ (\text{Log}\ \mathbf{FL}) - 4.8153 \qquad (r^2=0.981;\ n=37)$

The regression equation of fork length (FL) against total length (TL) in centimeters, was determined for white sturgeon sampled in the study area (Equation 2; Figure 3.6). The relationship between fork length and total length approximated those described for white sturgeon populations in the Fraser River watershed (Lane and Rosenau 1993; RL&L 1996; Dixon 1986) and the Columbia River watershed (RL&L 1997c).

[Equation 2] $\mathbf{TL} = 1.0892\ \mathbf{FL} + 5.8975 \qquad (r^2=0.99;\ n=37)$

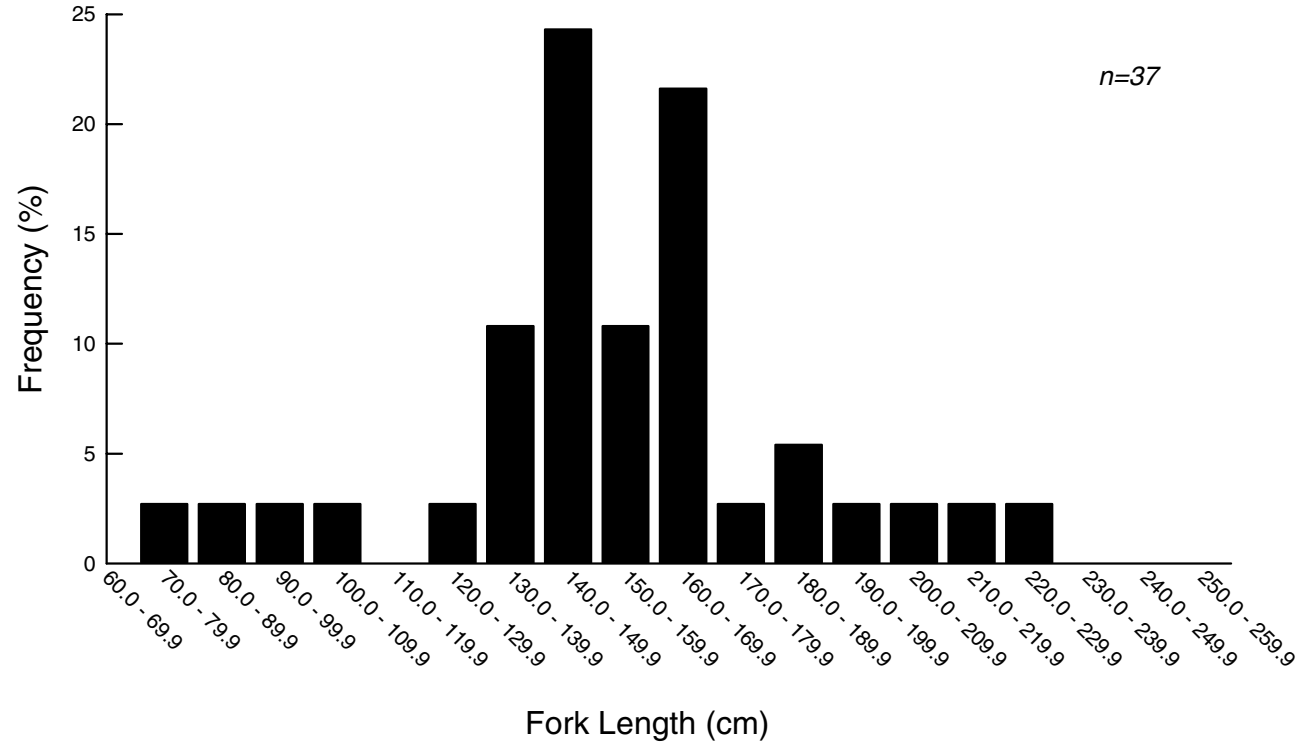
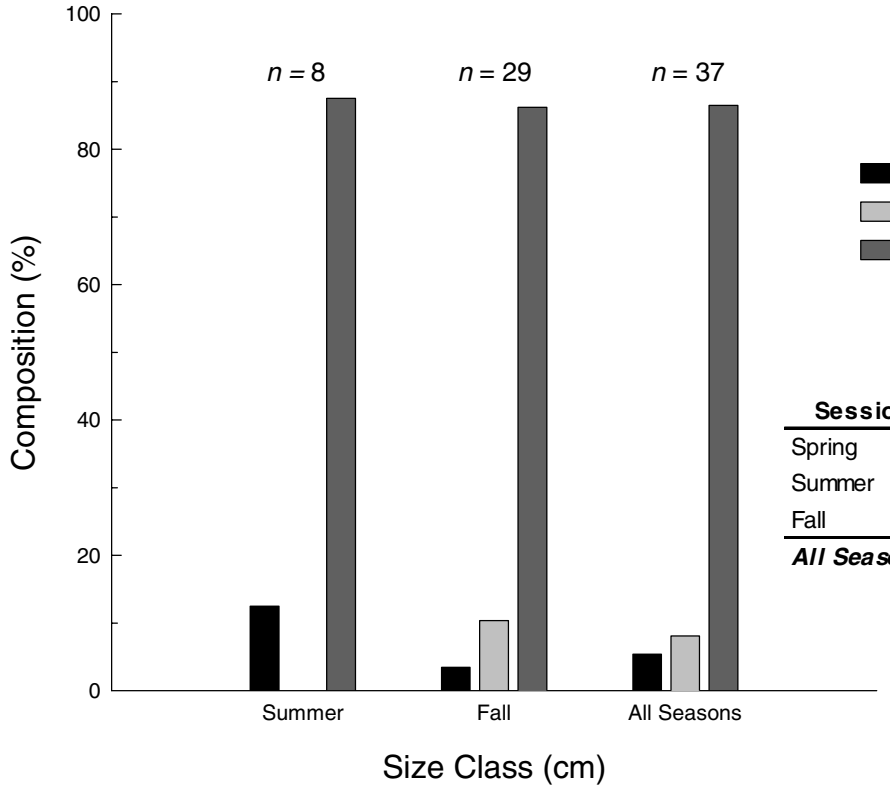


Figure 3.3 Length frequency distribution of white sturgeon captured in the Nechako River, 1999.



Session	Juvenile	Sub-adult	Adult
Spring	0	0	0
Summer	1	0	7
Fall	1	3	25
All Seasons	***2***	***3***	***32***

Figure 3.4 Percent composition of juvenile, sub-adult, and adult white sturgeon captured in the study area, 1999.

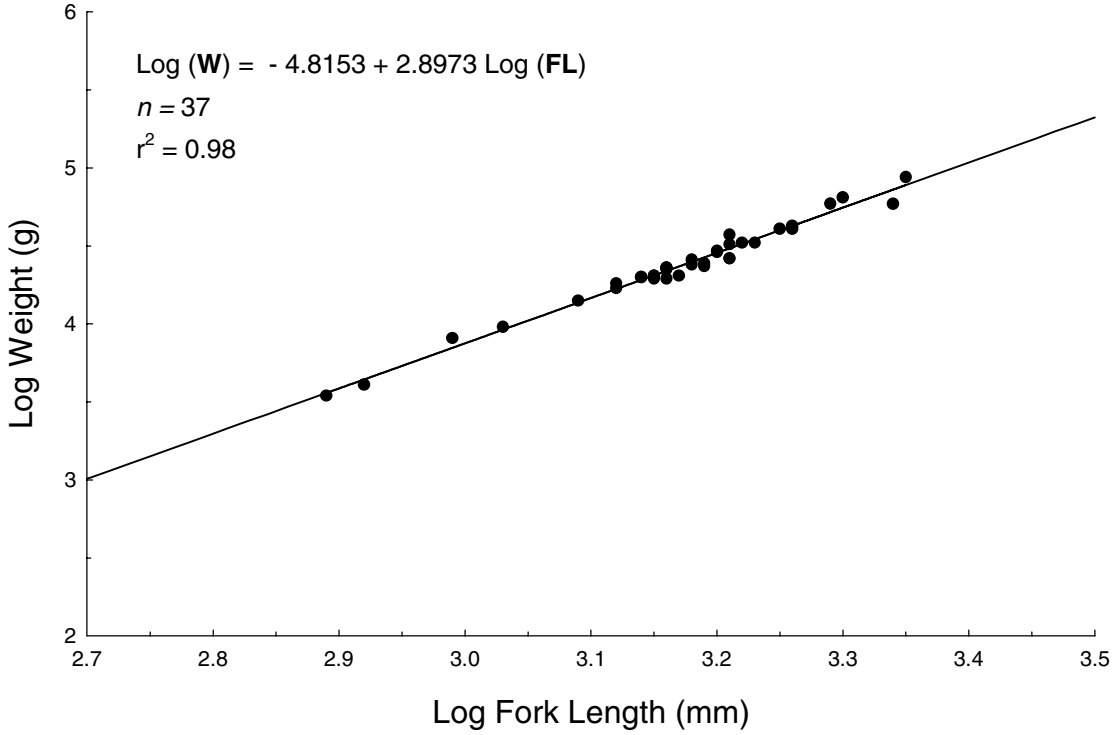


Figure 3.5 Length-weight regression of white sturgeon in the Nechako River, 1999.

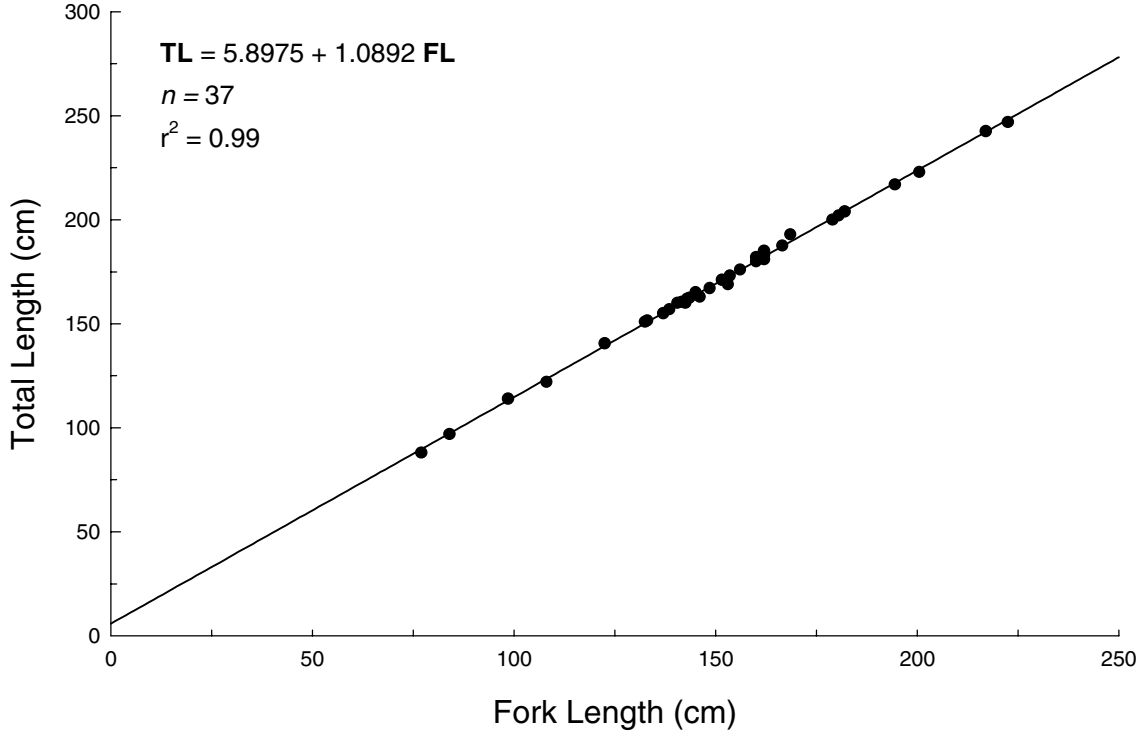


Figure 3.6 Fork length versus total length of white sturgeon in the Nechako River, 1999.

3.5.1.3 Age and Growth

A von Bertalanffy growth curve (von Bertalanffy 1938) was developed for white sturgeon sampled by RL&L in the Nechako River (Figure 3.7). The growth curve was similar to that described for Nechako River sturgeon in previous years (RL&L 1999a, 1998a, 1997a; Dixon, 1986) yet considerably slower compared with sturgeon populations in the lower Fraser River (RL&L 1999b, 1998b, 1997b; Semakula and Larkin 1968). Preliminary comparison of the age-growth curves for the Nechako River and upper Fraser River (LTFN 2000) sturgeon populations suggested the growth rate was similar.

The age-frequency distribution of white sturgeon in the Nechako River is shown in Figure 3.8. The catch ranged in age from 9 to 88 years. Similar to previous years (RL&L 1999a, 1998a, 1997a), the catch was comprised mainly of older fish between 31 and 50 years-of-age. The most common age cohort in the catch was the 31 to 40 year cohort. In contrast, the white sturgeon catch from the upper Fraser River consisted mainly of younger fish aged less than 20 years; the 11 to 20 year-of-age cohort was most common (LTFN 2000). The four juvenile fish captured by TRITON as part of the ALCAN funded program ranged in age from 4 to 6 years (Triton 2000).

3.5.2 Sex and Maturity

Fourteen white sturgeon (35.9% of the catch) were surgically examined to assess sex and state of maturity (Appendix D, Table D1). Length, weight, and age data for the sexual maturity stages of white sturgeon sampled in the study area are provided in Appendix D, Table D2. A description of the sexual maturity codes used for white sturgeon in the current study is presented in Appendix E, Table E1. This information was used to evaluate the reproductive potential of the population, to comment on the sex ratio within the population and their life history characteristics, and to assess the seasonal movements of the different maturity classes.

Surgically examined fish ranged in fork length from 98.5 to 222.5 cm; of these, seven were male and five were female. Similar to previous studies (RL&L 1999a, 1998a), this sex ratio (1.4:1) indicated males were most common in the sampled portion of the catch. The majority (78.6%) of the white sturgeon examined surgically were in the early stages of reproductive development.

The majority (60.0%) of the female sturgeon were pre-vitellogenic (Code 12). Their average fork length was 173.5 cm (±40.5) and mean age was 43.0 years (±17.1). The remaining female sturgeon were early-vitellogenic (Code 13) and measured 192.3 cm in fork length (±42.8) and weighed 60.1 kg (±38.7). The one Code 13 female aged was 42 years old; this fish was radio tagged to monitor possible future spawning behavior.

None of the male specimens were classed as non-reproductive (i.e., Code 01). Two maturing males (Code 02) were encountered with a mean fork length of 120.0 cm (±30.4) and a mean age of 20.0 years (±2.8). Male white sturgeon in the early reproductive stage of sexual development (i.e., Code 03; n=4) had a mean length of 149.3 cm (±8.5) and an average age of 36.5 years (±1.7). During 1999, one white sturgeon was categorized as a late-reproductive male (i.e., Code 04). This fish was 194.5 cm fork length and aged in 1997 at 51 years. Two white sturgeon could not be assigned a sexual maturity state due to poor visibility of reproductive organs caused by excessive fluid in the body cavity.

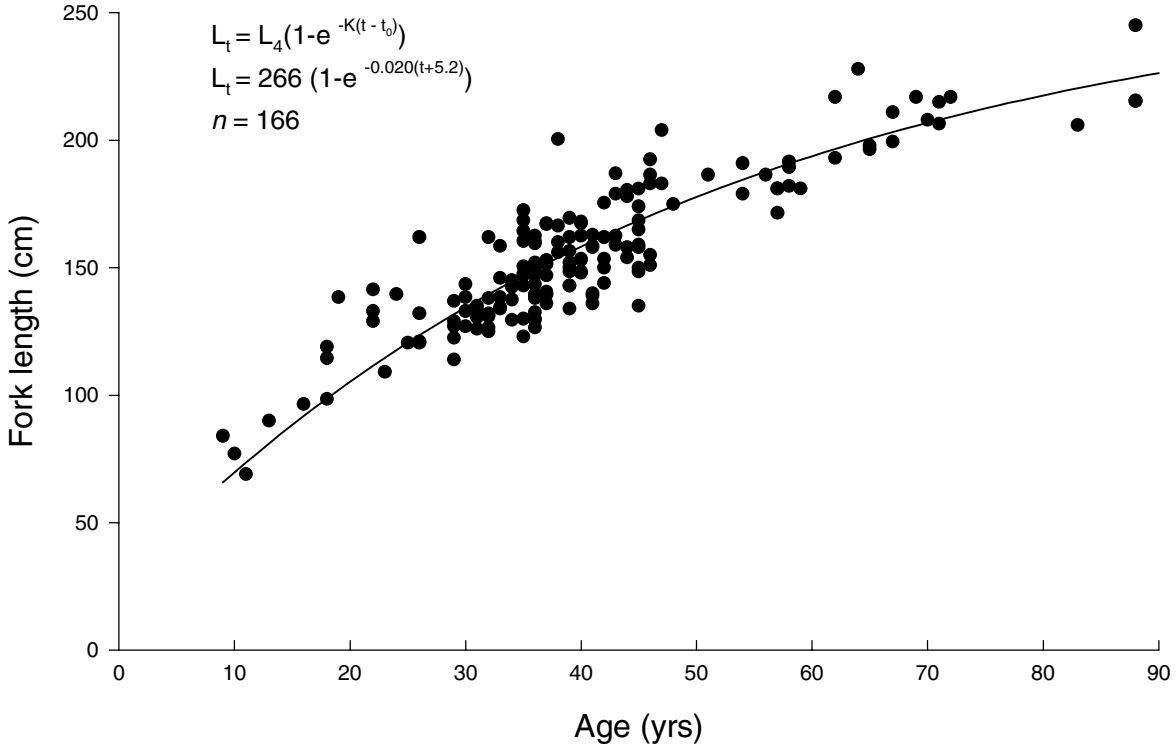


Figure 3.7 von Bertalanffy growth curve for white sturgeon captured in the Nechako River drainage, 1995 to 1999.

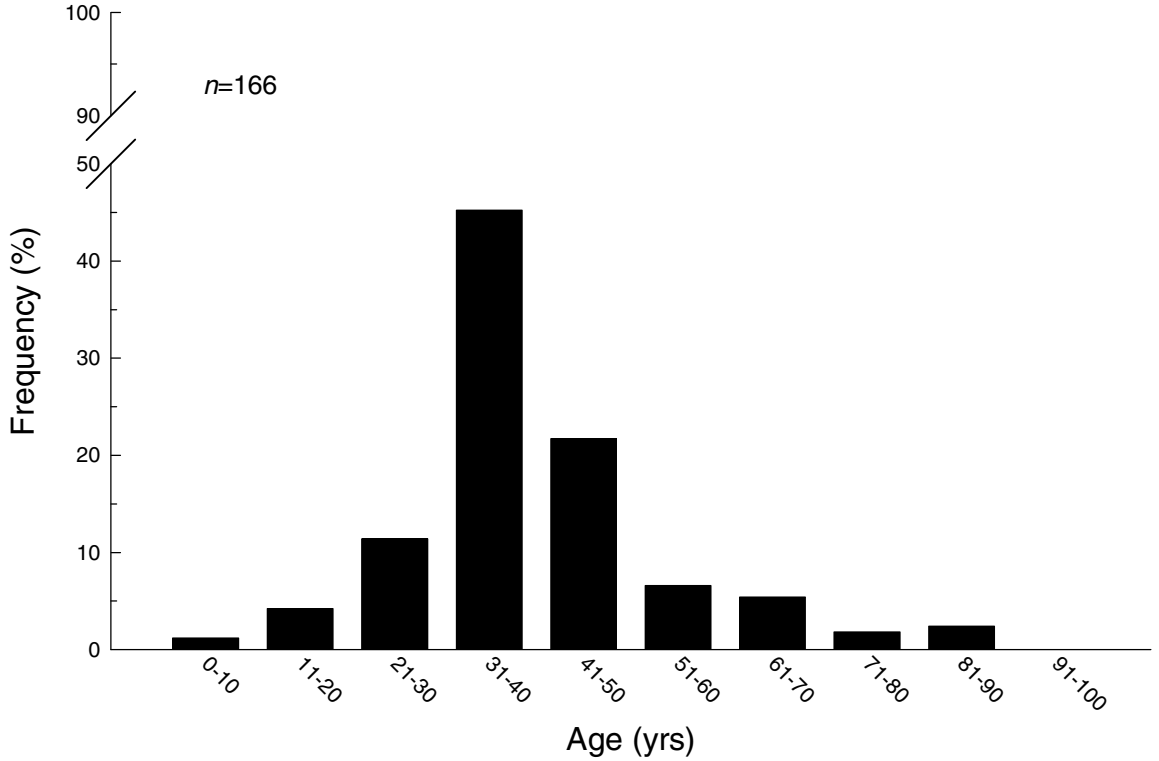


Figure 3.8 Age-frequency distribution for white sturgeon captured in the Nechako River drainage, 1995 to 1999.

3.5.3 Genetic Diversity

Biosamples collected from Nechako and upper Fraser River white sturgeon for the purposes of DNA analysis (Appendix D, Table D3) were forwarded to the Conservation Section of BC MELP, Victoria, BC. Preliminary findings have been described in RL&L (1998a, 1997a). A detailed summary of results will be provided in a subsequent report as additional information becomes available.

3.6 HABITAT USE

The general habitat features of the Nechako River and its tributaries have been defined in several reports (Slaney et al. 1986; RL&L 1998a, 1997a, 1996). In 1999, white sturgeon were encountered in similar habitats to those identified and described in previous reports (RL&L 1998a, 1997a, 1996). These habitats included low velocity laminar flow areas and nearshore depositional areas. Depths of sample locations ranged from 1.7 to 15.4 m in 1999, similar to those measured in previous years (RL&L 1999a, 1998a, 1997a).

Habitat data were collected during the spring from egg and larval sample locations at or near potential spawning locations in the Nechako River (Hulatt Rapids, Isle Pierre Rapids, downstream of Isle Pierre Rapids and Whitemud Rapids. Average surface water velocities at egg collection mats ranged from 0.05 to 3.01 m/s and depths ranged from 0.9 to 3.7 m. Water depths and surface velocities at drift net sample sites reached a maximum of 3.8 m and 2.76 m/s, respectively.

Baseline habitat data was also collected from areas sampled for juvenile sturgeon during the summer (i.e., gill net locations). Depths ranged from 1.7 to 13.7 m with velocities typically less than 0.5 m/s. Areas sampled were usually defined by low velocities, laminar flow or backwater eddies and fine substrate material (e.g., silt, sand). These areas were often associated with deep pools, calm nearshore areas with low to moderate growth of aquatic macrophytes, and tributary confluences.

4.0 SUMMARY

RL&L participated in several studies in 1999 to investigate white sturgeon populations in the Nechako and upper Fraser River drainages. These studies included the fifth year of the Fraser River White Sturgeon Monitoring Program for BC MELP in Region 7, a cooperative sampling program with TRITON (funded by ALCAN) to study juvenile Nechako River sturgeon, and a survey conducted by LTFN to gather information on upper Fraser River sturgeon. The focus of this report was to summarize the results of the study conducted for BC MELP although notable findings from the other white sturgeon studies in Region 7 in 1999 (i.e., ALCAN and LTFN) were presented.

Set line and angling were used by RL&L to collect white sturgeon in the Nechako and Stuart rivers in 1999. Gill nets and boat electroshocking were also employed to sample for juvenile white sturgeon between Fort Fraser and Isle Pierre Rapids in the Nechako River, and at Sturgeon Point and the outlet of Stuart Lake in the Stuart River. Boat electroshocking was confined to the braided area upstream of Vanderhoof to Keillor's Point. Egg collection mats and drift nets were used to collect white sturgeon eggs and larvae within suspected spawning areas (i.e., Hulatt, Isle Pierre and Whitemud Rapids).

The distribution of white sturgeon in the Nechako River was sporadic with fish captured throughout the section between Fort Fraser and White Mud Rapids. Findings from the telemetry component of the present study, however, showed more extensive sturgeon use of the Nechako River between Vanderhoof and Kluk Creek (downstream of the Nautley River) than previously documented. These results mainly reflected the distribution of individuals classed as sub-adults and adults since these cohorts were the most common in the catches. Juvenile white sturgeon were much less abundant and their distribution was restricted to only a few, localized areas between Neuco Creek and Finmoore.

Thirty-nine white sturgeon were captured or observed by RL&L in the Nechako River in 1999 and the majority (94.8%) were captured by set line. The total set line effort expended in the Nechako River in 1999 was 8421 hook-hours. Another four white sturgeon (juveniles) were encountered by Triton (2000) in the Nechako River by gill net sampling and forty-four sturgeon were captured by LTFN using set lines in the upper Fraser River drainage. The combined total gill net effort (BC MELP and ALCAN programs) expended in the Nechako River was more than 51 net-days and the catch-per-unit-effort for this combined effort was less than 0.1 juvenile white sturgeon/net-day. Total set line effort expended by LTFN in the upper Fraser River was 35 509 hook-hours, at a catch rate of 0.12 sturgeon/100 hook-hours.

Similar to the results of previous studies conducted by RL&L in the Nechako River, the catch was comprised mainly of larger and older fish; individuals classed as juveniles (i.e., TL < 1.0 m) were relatively uncommon. The length-weight relationship was within the range reported in other studies in the Fraser River drainage. The growth model suggested a slower growth rate compared with more southern populations in the Fraser River, but similar to preliminary growth estimates for upper Fraser River populations. The population size of white sturgeon in the Nechako River drainage was estimated at approximately 547 fish.

White sturgeon movements in the Nechako River were monitored using mark-recapture (conventional tagging) and radio telemetry. Three radio tagged individuals exhibited total movements during the tracking period that were greater than 50 rkm. Two white sturgeon were recaptured whose radio tags were confirmed shed. One of these individuals was originally tagged at the Nechako/Fraser confluence area and recaptured at rkm 826.6 of the Fraser River by LTFN. Notable was the upstream movement of two white sturgeon during spring to areas upstream of Vanderhoof. The behavior of these fish suggested this section of the Nechako River may be used more extensively by sturgeon than previously thought. Generally, the large distances moved by some white sturgeon were considered indicative of fall movements to overwintering area or spring feeding activity. The spring, downstream migration of one radio tagged female to an area below Isle Pierre Rapids was attributed to spawning.

Despite the capture of mainly larger and older fish, surgical examinations to assess state of reproductive maturity showed most fish were in the earlier stages of reproductive development. Males were the most common in the surgically examined portion of the catch, and the overall sex ratio for the sampled population was 1.4:1 (7 males: 5 females).

5.0 RECOMMENDATIONS FOR FUTURE STUDIES

Based on the results of the 1999 Fraser River White Sturgeon Monitoring Program in Region 7 (Omineca-Peace), it is recommended future programs focus on the following:

- ***High Priority*** - Continue to assess spawning and early life history of white sturgeon in the Nechako River drainage through intensive monitoring of spring migrations of mature fish, and mark-recapture, egg/larval, and juvenile sturgeon studies;
- ***High Priority*** - Initiate a detailed examination of the effects of regulated river flow and temperature on the spawning and early life history of Nechako River sturgeon using results of white sturgeon studies conducted in the Nechako River drainage;
- ***High Priority*** - Conduct additional studies of white sturgeon in the Stuart River drainage, including Stuart Lake, and in Fraser Lake to evaluate the potential importance of these systems to Nechako River sturgeon;
- ***Moderate Priority*** - Continue inventory of white sturgeon in upper Fraser River drainage that includes collection of information on size, growth, distribution, abundance, and habitat use; and
- ***Moderate Priority*** - Periodic surveys of the Nechako River sturgeon population to monitor its size and dynamics, and habitat suitability.

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APPENDIX A

DISCHARGE AND WATER TEMPERATURE DATA

Table A1 Summary of the temperature and discharge data collected by RL&L Environmental Services, Department of Fisheries and Oceans, Water Survey of Canada, and Alcan, 1999.

Parameter	Figure Number	Waterbody	Location (UTM - NAD83)			Sample Period [1]
			Zone	Easting	Northing	
Water Temperature [2]	A2	Nautley River	10U	395376	5994193	1 Jan 99 to 14 Oct 99
	A3	Nechako River at Irvine's	10U	378776	5949917	1 Jan 99 to 10 Jun 99; 23 Jun 99 to 30 Dec 99
	A4	Nechako River at Keillor's Farm [3]	10U	447805	5980403	12 Jun 99 to 12 Sep 99
	A5	Stuart River near Ft. St. James	10U	418600	6029000	15 May 99 to 5 Oct 99
	A6	Nechako River near Isle Pierre Rapids [3]	10U	484456	5979153	3 Jun 99 to 2 Sep 99
	A7	Fraser River at Shelley	10U	523600	5983750	14 May to 5 Oct 99
Discharge [4]	A1	Skins Lake Spillway [5]	10U	304240	5962120	1 Jan 99 to 9 Nov 99
	A1	Nechako River below Cheslattta Falls	10U	372200	5945500	1 Jan 99 to 1 Oct 99
	A2	Nautley River near Fort Fraser	10U	395376	5994193	1 Jan 99 to 4 Nov 99
	A5	Stuart River near Ft. St. James	10U	417266	6030785	6 Jan 99 to 4 Nov 99
	A6	Nechako River at Isle Pierre	10U	484578	5979114	1 Jan 99 to 5 Nov 99
	A7	Fraser River at Shelley	10U	525027	5984812	1 Jan to 25 Oct 99

[1] Data available at time of reporting.

[2] Temperature data provided by Department of Fisheries and Oceans.

[3] Thermograph deployed and maintained by RL&L Environmental Services Ltd.

[4] Discharge data provided by Water Survey of Canada.

[5] Discharge data provided by Alcan.

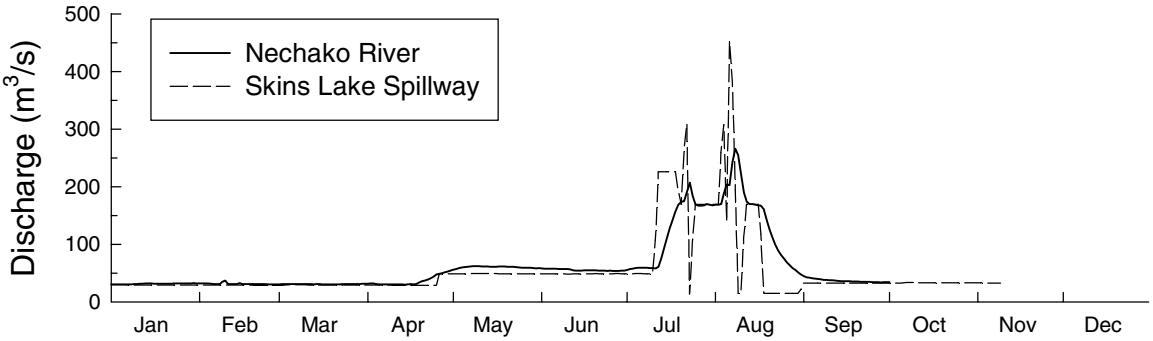

Figure A1 Mean daily discharge for Skins Lake Spillway and the Nechako River below Cheslatta Falls, 1999. Discharge data obtained from Alcan and Water Survey Canada, respectively (Unpublished data).

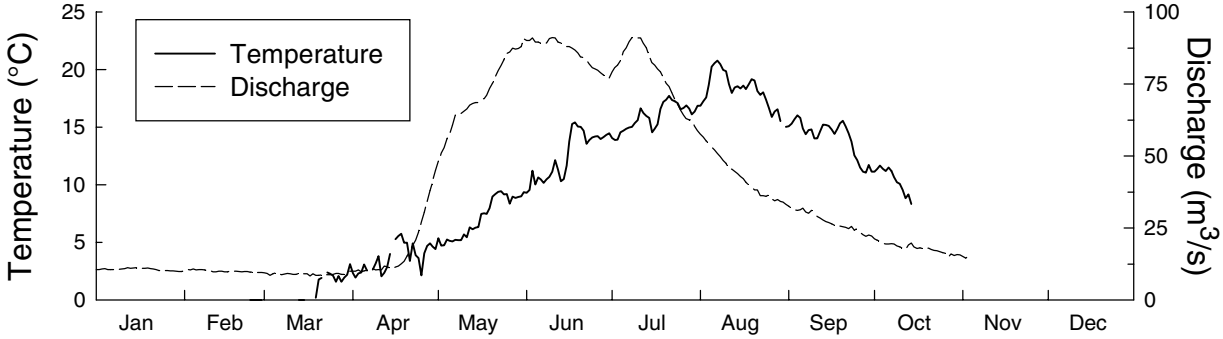

Figure A2 Mean daily temperature and discharge for the Nautley River near Fort Fraser, 1999. Temperature data obtained from D.F.O. thermograph; discharge data from Water Survey Canada (Unpublished data).

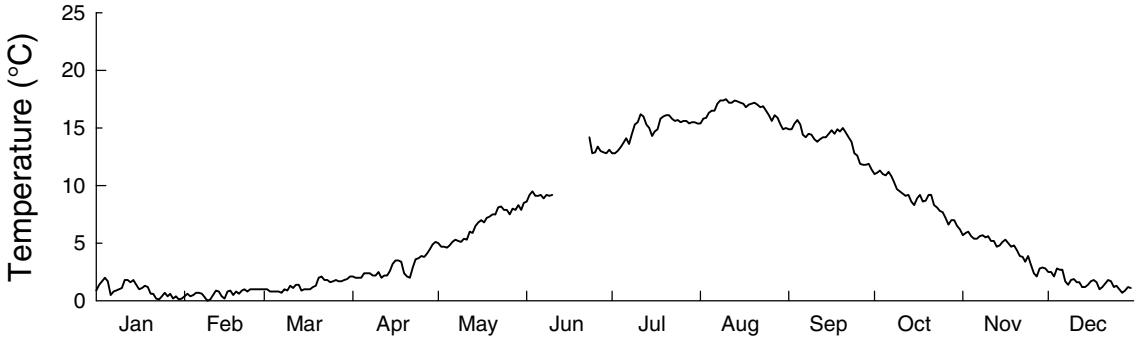

Figure A3 Mean daily temperature for the Nechako River at Irvine's, 1999. Temperature data obtained from D.F.O. thermograph (Unpublished data).

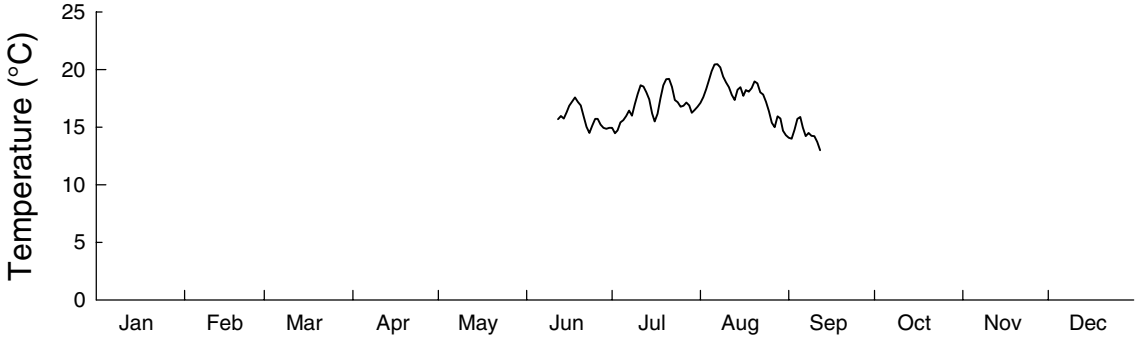

Figure A4 Mean daily temperature for the Nechako River at Keillor's Farm, 1999. Temperature data obtained from RL&L thermograph.

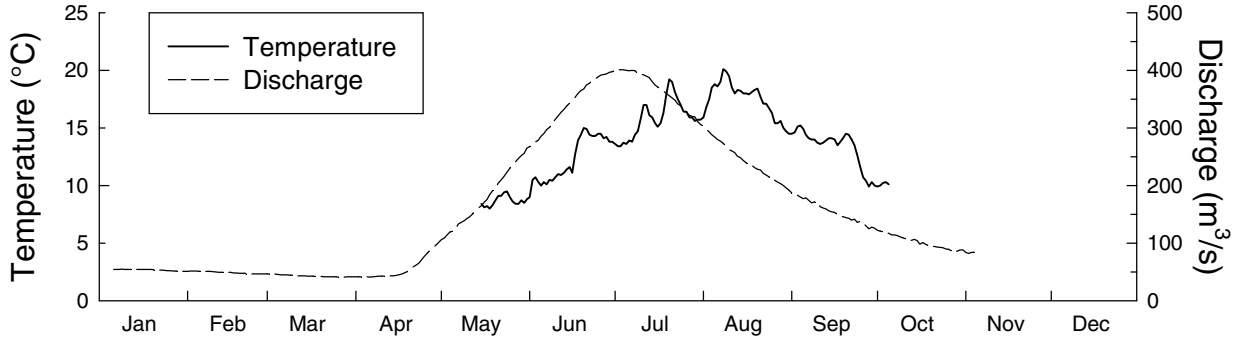

Figure A5 Mean daily temperature and mean daily discharge for the Stuart River at Ft. St. James, 1999. Temperature data obtained from D.F.O. thermograph; discharge data from Water Survey Canada (Unpublished data).

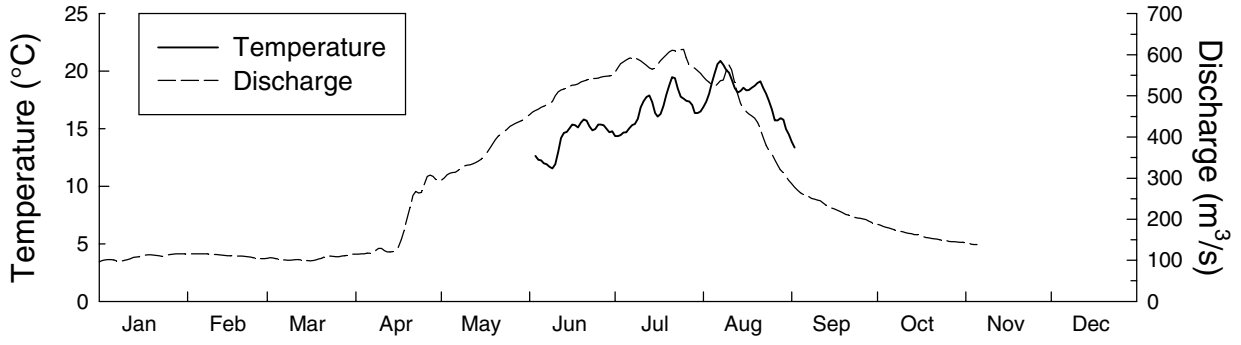

Figure A6 Mean daily temperature and discharge for the Nechako River at Isle Pierre, 1999. Temperature data obtained from RL&L thermograph; discharge data from Water Survey Canada (Unpublished data).

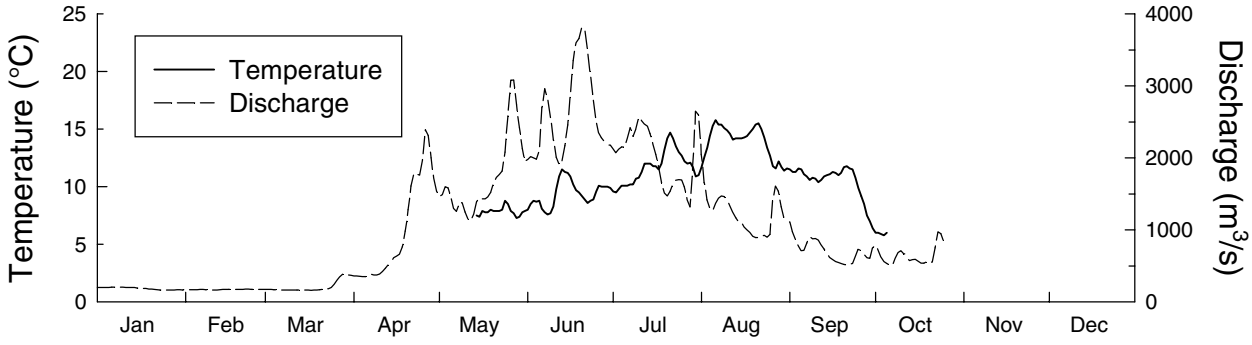

Figure A7 Mean daily temperature and discharge for the Fraser River at Shelley, 1999. Temperature data obtained from D.F.O. thermograph (Unpublished data); discharge data obtained from Water Survey Canada (Unpublished data).

APPENDIX B
CAPTURE DATA

Table B1 Summary of catch and catch rate (*CPUE* = No. caught/100 hook-hours) for white sturgeon captured by set line in the Nechako River, 1999.

Water Body	Survey Session	Station (km)	Set		Pulled		Duration (h)	No. Hooks	Hook Hours	Catch	*CPUE*
			Date	Time	Date	Time					
Nechako R.	Summer	SSL-90.1 L	04-Aug	17:26	05-Aug	10:35	17.15	8	137.20	**1**	***0.73***
		SSL-90.3 L	04-Aug	17:37	05-Aug	11:45	18.13	8	145.07	**2**	***1.38***
		SSL-91.4 R	04-Aug	17:51	05-Aug	13:05	19.23	8	153.87	**2**	***1.30***
		SSL-92.0 R	04-Aug	18:07	05-Aug	13:50	19.72	8	157.73	**3**	***1.90***
		SSL-92.6 L	04-Aug	18:18	05-Aug	15:09	20.85	8	166.80	**0**	***0.00***
	Summer Total						**95.08**	**40**	**760.67**	**8**	***1.05***
	Fall	SSL-66.2 R	13-Sep	15:28	14-Sep	11:27	19.98	8	159.87	**1**	***0.63***
		SSL-66.3 R	13-Sep	15:22	14-Sep	11:59	20.62	8	164.93	**1**	***0.61***
		SSL-67.4 R	13-Sep	15:10	14-Sep	12:39	21.48	8	171.87	**2**	***1.16***
		SSL-72.7 R	13-Sep	14:50	14-Sep	14:05	23.25	8	186.00	**1**	***0.54***
		SSL-74.2 R	13-Sep	14:38	14-Sep	14:36	23.97	8	191.73	**1**	***0.52***
		SSL-79.0 R	13-Sep	14:21	14-Sep	15:14	24.88	8	199.07	**0**	***0.00***
		SSL-83.7 R	13-Sep	14:03	14-Sep	15:31	25.47	8	203.73	**0**	***0.00***
		SSL-85.1 L	13-Sep	13:51	14-Sep	15:44	25.88	8	207.07	**0**	***0.00***
		SSL-90.0 L	12-Sep	18:31	13-Sep	11:57	17.43	8	139.47	**0**	***0.00***
		SSL-90.1 L	12-Sep	18:36	13-Sep	11:44	17.13	8	137.07	**0**	***0.00***
		SSL-90.3 L	12-Sep	18:46	13-Sep	11:34	16.80	8	134.40	**0**	***0.00***
		SSL-91.4 R	12-Sep	18:21	13-Sep	11:23	17.03	8	136.27	**0**	***0.00***
		SSL-92.1 R	12-Sep	18:11	13-Sep	11:11	17.00	8	136.00	**0**	***0.00***
		SSL-96.5 R	12-Sep	17:57	13-Sep	10:45	16.80	8	134.40	**0**	***0.00***
		SSL-96.6 M	12-Sep	17:51	13-Sep	10:32	16.68	8	133.47	**0**	***0.00***
		SSL-107.6 L	11-Sep	16:32	12-Sep	15:14	22.70	8	181.60	**3**	***1.65***
		SSL-107.9 L	10-Sep	16:42	11-Sep	14:00	21.30	8	170.40	**2**	***1.17***
		SSL-109.4 R	11-Sep	17:01	12-Sep	13:47	20.77	8	166.13	**0**	***0.00***
		SSL-110.0 R	11-Sep	17:12	12-Sep	12:16	19.07	8	152.53	**2**	***1.31***
		SSL-110.1 R	11-Sep	17:20	12-Sep	11:18	17.97	8	143.73	**1**	***0.70***
		SSL-110.2 R	11-Sep	17:29	12-Sep	11:05	17.60	8	140.80	**0**	***0.00***
		SSL-111.2 L	11-Sep	17:38	12-Sep	10:28	16.83	8	134.67	**0**	***0.00***
		SSL-114.9 L	10-Sep	17:48	11-Sep	14:46	20.97	8	167.73	**1**	***0.60***
		SSL-115.0 L	10-Sep	17:40	11-Sep	14:10	20.50	8	164.00	**1**	***0.61***
		SSL-115.2 L	10-Sep	17:30	11-Sep	13:29	19.98	8	159.87	**1**	***0.63***
		SSL-115.4 L	10-Sep	17:09	11-Sep	13:09	20.00	8	160.00	**0**	***0.00***
		SSL-116.2 R	10-Sep	15:20	10-Sep	15:28	0.13	8	1.07	**1**	***93.75***
			10-Sep	16:56	11-Sep	11:30	18.57	8	148.53	**2**	***1.35***
		SSL-116.7 R	10-Sep	15:02	11-Sep	10:09	19.12	8	152.93	**1**	***0.65***
		SSL-117.3 R	10-Sep	14:45	11-Sep	9:47	19.03	8	152.27	**0**	***0.00***
		SSL-124.6 L	08-Sep	16:40	09-Sep	12:19	19.65	8	157.20	**3**	***1.91***
			09-Sep	15:35	10-Sep	10:54	19.32	8	154.53	**1**	***0.65***
		SSL-125.0 R	08-Sep	17:13	09-Sep	15:50	22.62	30	678.50	**3**	***0.44***
			09-Sep	18:10	10-Sep	12:43	18.55	30	556.50	**1**	***0.18***
		SSL-125.2 R	08-Sep	16:22	09-Sep	11:59	19.62	8	156.93	**0**	***0.00***
			09-Sep	12:15	10-Sep	10:31	22.27	8	178.13	**0**	***0.00***
		SSL-126.5 R	08-Sep	16:09	09-Sep	11:36	19.45	8	155.60	**0**	***0.00***
		SSL-129.3 R	08-Sep	15:35	09-Sep	11:21	19.77	8	158.13	**0**	***0.00***
			09-Sep	11:30	10-Sep	10:13	22.72	8	181.73	**0**	***0.00***
		SSL-129.6 R	08-Sep	15:23	09-Sep	10:59	19.60	8	156.80	**0**	***0.00***
		SSL-131.9 L	08-Sep	15:03	09-Sep	10:34	19.52	8	156.13	**0**	***0.00***
			09-Sep	10:53	10-Sep	9:41	22.80	8	182.40	**0**	***0.00***
		SSL-132.1 L	08-Sep	14:49	09-Sep	10:17	19.47	8	155.73	**0**	***0.00***
	Fall Total						**844.28**	**388**	**7659.93**	**29**	***0.38***
Grand Total							**939.37**	**428**	**8420.60**	**37**	***0.44***

Table B2 Summary of catch and catch rate (*CPUE* = No. caught/hook-hour) for white sturgeon captured by angling in the Nechako and Stuart rivers, 1999.

Water Body	Survey Session	Site	UTM Location			Set		Pull		No. Hooks	Hook Hours	WST	*CPUE*
			Grid	Easting	Northing	Date	Time	Date	Time				
Nechako R.	Summer	AB-93.1 M	10U	461533	5982169	9-Jul	13:43	9-Jul	15:30	1	1.78	**0**	***0.00***
		AB-124.9 R	10U	439883	5984882	5-Jul	16:08	5-Jul	17:25	1	1.28	**0**	***0.00***
		AB-132.0 M	10U	436039	5984652	6-Jul	14:41	6-Jul	15:41	1	1.00	**0**	***0.00***
		AB-179.6 L	10U	406687	5996924	11-Jul	12:00	11-Jul	14:49	1	2.82	**0**	***0.00***
		AB-179.6 L	10U	406687	5996924	11-Jul	12:08	11-Jul	14:30	1	2.37	**0**	***0.00***
		AB-192.3 M	10U	396120	5993705	13-Jul	11:45	13-Jul	13:50	1	2.08	**0**	***0.00***
		AB-192.3 M	10U	396120	5993705	13-Jul	12:05	13-Jul	13:37	1	1.53	**0**	***0.00***
Total											**12.87**	**0**	***0.00***
Stuart R.	Summer	AB-47.9 M	10U	457058	6001858	14-Jul	20:27	14-Jul	21:30	1	1.05	**0**	***0.00***
		AB-47.9 M	10U	457058	6001858	14-Jul	20:32	14-Jul	21:29	1	0.95	**0**	***0.00***
Total											**2.00**	**0**	***0.00***
Grand Total											**14.87**	**0**	***0.00***

Table B3 Summary of gill net and tangle net catch and catch-per-unit-effort (CPUE = No. of fish/net-day by mesh size) in the Nechako and Stuart rivers, 1999.

Water Body	Survey Session	Station (km)[1]	Set		Pulled		Set Duration (h)	Mesh Size (mm)	Net Area (m^2)	Net-Day[2]	WST	
			Date	Time	Date	Time					Catch	*CPUE*
Stuart R.	Summer	GN-47.6 R	14-Jul	14:28	14-Jul	18:31	4.0	114.3	37.2	0.06	**0**	***0.00***
			14-Jul	18:37	14-Jul	21:54	3.3	114.3	37.2	0.05	**0**	***0.00***
		GN-48.0 M	14-Jul	14:46	14-Jul	18:44	4.0	63.5	37.2	0.06	**0**	***0.00***
								114.3	37.2	0.06	**0**	***0.00***
			14-Jul	18:54	14-Jul	22:00	3.1	63.5	37.2	0.05	**0**	***0.00***
								114.3	37.2	0.05	**0**	***0.00***
		GN-48.1 L	14-Jul	15:04	14-Jul	18:59	3.9	101.6	37.2	0.06	**0**	***0.00***
			14-Jul	19:04	14-Jul	22:12	3.1	101.6	37.2	0.05	**0**	***0.00***
		GN-49.6 R	14-Jul	15:34	14-Jul	19:14	3.7	88.9	37.2	0.06	**0**	***0.00***
								133.4	37.2	0.06	**0**	***0.00***
		GN-50.4 R	14-Jul	15:51	14-Jul	19:45	3.9	127.0	37.2	0.06	**0**	***0.00***
			14-Jul	19:54	14-Jul	22:21	2.4	127.0	37.2	0.04	**0**	***0.00***
		GN-50.9 R	14-Jul	16:04	14-Jul	20:00	3.9	76.2	37.2	0.06	**0**	***0.00***
			14-Jul	20:07	14-Jul	22:28	2.4	76.2	37.2	0.04	**0**	***0.00***
		GN-52.7 L	15-Jul	9:43	15-Jul	13:35	3.9	76.2	37.2	0.06	**0**	***0.00***
		GN-52.8 R	15-Jul	9:57	15-Jul	13:25	3.5	127.0	37.2	0.05	**0**	***0.00***
		GN-53.7 R	15-Jul	10:07	15-Jul	13:16	3.1	101.6	37.2	0.05	**0**	***0.00***
		GN-55.9 L	15-Jul	10:26	15-Jul	13:06	2.7	114.3	37.2	0.04	**0**	***0.00***
		GN-107.6 R	16-Jul	10:31	16-Jul	12:09	1.6	127.0	37.2	0.03	**0**	***0.00***
			16-Jul	12:13	16-Jul	16:11	4.0	127.0	37.2	0.06	**0**	***0.00***
		GN-107.8 L	16-Jul	10:15	16-Jul	11:59	1.7	114.3	37.2	0.03	**0**	***0.00***
			16-Jul	12:03	16-Jul	16:06	4.0	114.3	37.2	0.06	**0**	***0.00***
		GN-108.8 L	16-Jul	9:41	16-Jul	11:43	2.0	101.6	37.2	0.03	**0**	***0.00***
			16-Jul	11:46	16-Jul	15:52	4.1	101.6	37.2	0.06	**0**	***0.00***
		GN-109.2 L	16-Jul	9:52	16-Jul	11:50	2.0	76.2	37.2	0.03	**0**	***0.00***
			16-Jul	11:53	16-Jul	15:57	4.1	76.2	37.2	0.06	**0**	***0.00***
Stuart River										**1.32**	**0**	***0.00***
Nechako R.	Summer	GN-61.2 L	28-Jun	16:46	28-Jun	18:13	1.5	76.2	37.2	0.02	**0**	***0.00***
			29-Jun	10:04	29-Jun	13:28	3.4	114.3	37.2	0.05	**0**	***0.00***
			29-Jun	13:47	29-Jun	17:20	3.5	114.3	37.2	0.05	**0**	***0.00***
		GN-61.8 L	29-Jun	10:26	29-Jun	14:00	3.6	114.3	37.2	0.06	**0**	***0.00***
			29-Jun	14:06	29-Jun	17:27	3.3	114.3	37.2	0.05	**0**	***0.00***
		GN-62.5 L	28-Jun	17:15	28-Jun	18:32	1.3	114.3	37.2	0.02	**0**	***0.00***
			29-Jun	10:54	29-Jun	14:30	3.6	88.9	37.2	0.06	**0**	***0.00***
			29-Jun	15:09	29-Jun	17:35	2.4	114.3	37.2	0.04	**0**	***0.00***
		GN-64.8 R	28-Jun	17:49	28-Jun	18:51	1.0	114.3	37.2	0.02	**0**	***0.00***
			29-Jun	11:13	29-Jun	15:20	4.1	101.6	37.2	0.06	**0**	***0.00***
		TN-66.2 R	29-Jun	11:42	29-Jun	15:54	4.2	203.2	46.5	0.08	**0**	***0.00***
		GN-86.6 R	07-Jul	14:51	07-Jul	17:00	2.2	63.5	37.2	0.03	**0**	***0.00***
			07-Jul	17:08	07-Jul	20:54	3.8	63.5	37.2	0.06	**0**	***0.00***
		GN-86.7 R	07-Jul	15:05	07-Jul	17:13	2.1	76.2	37.2	0.03	**0**	***0.00***
			07-Jul	17:20	07-Jul	21:05	3.8	76.2	37.2	0.06	**0**	***0.00***
		GN-88.3 L	07-Jul	15:24	07-Jul	17:27	2.0	114.3	37.2	0.03	**0**	***0.00***
			07-Jul	17:40	07-Jul	21:25	3.8	114.3	37.2	0.06	**0**	***0.00***
		GN-90.1 L	07-Jul	15:49	07-Jul	17:47	2.0	114.3	37.2	0.03	**0**	***0.00***
			07-Jul	17:59	07-Jul	21:32	3.6	114.3	37.2	0.05	**0**	***0.00***
		GN-90.3 L	07-Jul	16:03	07-Jul	18:03	2.0	76.2	37.2	0.03	**0**	***0.00***
			07-Jul	18:09	07-Jul	21:40	3.5	76.2	37.2	0.05	**0**	***0.00***
		GN-90.7 L	07-Jul	16:17	07-Jul	18:13	1.9	101.6	37.2	0.03	**0**	***0.00***
			07-Jul	18:18	07-Jul	21:45	3.5	101.6	37.2	0.05	**0**	***0.00***
		GN-91.5 L	08-Jul	16:08	08-Jul	18:20	2.2	114.3	37.2	0.03	**0**	***0.00***
			08-Jul	18:23	08-Jul	22:29	4.1	114.3	37.2	0.06	**0**	***0.00***
			08-Jul	22:38	09-Jul	1:21	2.7	114.3	37.2	0.04	**0**	***0.00***
		GN-91.5 R	08-Jul	15:58	08-Jul	18:10	2.2	114.3	37.2	0.03	**0**	***0.00***
			08-Jul	18:15	08-Jul	22:18	4.1	114.3	37.2	0.06	**0**	***0.00***
			08-Jul	22:24	09-Jul	1:16	2.9	114.3	37.2	0.04	**0**	***0.00***
		GN-92.0 R	08-Jul	16:28	08-Jul	18:29	2.0	63.5	37.2	0.03	**0**	***0.00***
			08-Jul	18:36	08-Jul	22:41	4.1	63.5	37.2	0.06	**0**	***0.00***
			08-Jul	22:48	09-Jul	1:30	2.7	63.5	37.2	0.04	**0**	***0.00***
		GN-92.5 M	08-Jul	16:45	08-Jul	18:41	1.9	88.9	37.2	0.03	**0**	***0.00***
			08-Jul	18:45	08-Jul	22:50	4.1	88.9	37.2	0.06	**0**	***0.00***
			08-Jul	22:54	09-Jul	1:38	2.7	88.9	37.2	0.04	**0**	***0.00***
		GN-92.6 L	08-Jul	17:02	08-Jul	18:48	1.8	63.5	37.2	0.03	**0**	***0.00***
			08-Jul	18:52	08-Jul	22:56	4.1	63.5	37.2	0.06	**0**	***0.00***
			08-Jul	23:08	09-Jul	1:45	2.6	63.5	37.2	0.04	**0**	***0.00***
		GN-93.2 M	08-Jul	17:19	08-Jul	18:56	1.6	76.2	37.2	0.03	**0**	***0.00***
			08-Jul	19:00	08-Jul	23:11	4.2	76.2	37.2	0.06	**0**	***0.00***

[1] GN = Gill net; TN = Tangle net

Continued…

[2] One net-day = 100 m^2 of net set for a 24 hour period.

Table B3 Continued.

Water Body	Survey Session	Station (km)[1]	Set		Pulled		Set Duration (h)	Mesh Size (mm)	Net Area (m^2)	Net-Day[2]	WST	
			Date	Time	Date	Time					Catch	*CPUE*
Nechako R. (Cont.)	Summer (Cont.)	GN-93.2 M	08-Jul	23:16	09-Jul	1:52	2.6	76.2	37.2	0.04	**0**	***0.00***
		GN-93.3 R	08-Jul	18:01	08-Jul	19:05	1.1	127.0	37.2	0.02	**0**	***0.00***
			08-Jul	19:09	08-Jul	23:19	4.2	127.0	37.2	0.06	**0**	***0.00***
			08-Jul	23:24	09-Jul	1:58	2.6	127.0	37.2	0.04	**0**	***0.00***
		GN-94.1 L	08-Jul	17:32	08-Jul	19:14	1.7	101.6	37.2	0.03	**0**	***0.00***
			08-Jul	19:19	08-Jul	23:27	4.1	101.6	37.2	0.06	**0**	***0.00***
			08-Jul	23:31	09-Jul	2:05	2.6	101.6	37.2	0.04	**0**	***0.00***
		GN-94.8 R	09-Jul	9:44	09-Jul	11:56	2.2	114.3	33.4	0.03	**0**	***0.00***
			09-Jul	12:03	09-Jul	15:55	3.9	114.3	33.4	0.05	**0**	***0.00***
		GN-95.8 R	09-Jul	10:03	09-Jul	12:17	2.2	88.9	37.2	0.03	**0**	***0.00***
			09-Jul	12:21	09-Jul	16:04	3.7	88.9	37.2	0.06	**0**	***0.00***
		GN-96.5 R	09-Jul	10:16	09-Jul	12:26	2.2	63.5	37.2	0.03	**0**	***0.00***
			09-Jul	12:32	09-Jul	16:11	3.7	63.5	37.2	0.06	**0**	***0.00***
		GN-96.6 M	09-Jul	10:26	09-Jul	12:36	2.2	114.3	37.2	0.03	**0**	***0.00***
			09-Jul	12:42	09-Jul	16:16	3.6	114.3	37.2	0.06	**0**	***0.00***
		GN-98.2 L	09-Jul	10:46	09-Jul	12:49	2.1	76.2	37.2	0.03	**0**	***0.00***
								101.6	37.2	0.03	**0**	***0.00***
			09-Jul	12:56	09-Jul	16:27	3.5	76.2	37.2	0.05	**0**	***0.00***
								101.6	37.2	0.05	**0**	***0.00***
		GN-100.6 L	09-Jul	11:03	09-Jul	13:04	2.0	63.5	37.2	0.03	**0**	***0.00***
								139.7	37.2	0.03	**0**	***0.00***
			09-Jul	13:12	09-Jul	16:37	3.4	63.5	37.2	0.05	**0**	***0.00***
								139.7	37.2	0.05	**0**	***0.00***
		GN-104.8 M	30-Jun	14:25	30-Jun	16:37	2.2	76.2	37.2	0.03	**0**	***0.00***
								114.3	37.2	0.03	**0**	***0.00***
			30-Jun	16:53	30-Jun	20:59	4.1	76.2	37.2	0.06	**0**	***0.00***
								114.3	37.2	0.06	**0**	***0.00***
		GN-105.5 L	30-Jun	14:44	30-Jun	17:01	2.3	88.9	37.2	0.04	**0**	***0.00***
								114.3	37.2	0.04	**0**	***0.00***
			30-Jun	17:21	30-Jun	21:06	3.8	88.9	37.2	0.06	**0**	***0.00***
								114.3	37.2	0.06	**0**	***0.00***
		GN-107.5 R	30-Jun	14:59	30-Jun	17:30	2.5	114.3	37.2	0.04	**0**	***0.00***
								127.0	37.2	0.04	**0**	***0.00***
			30-Jun	17:36	30-Jun	21:15	3.7	114.3	37.2	0.06	**0**	***0.00***
								127.0	37.2	0.06	**0**	***0.00***
		GN-108.0 L	30-Jun	15:15	30-Jun	17:45	2.5	101.6	37.2	0.04	**0**	***0.00***
								139.7	37.2	0.04	**0**	***0.00***
			30-Jun	18:00	30-Jun	21:23	3.4	101.6	37.2	0.05	**0**	***0.00***
								139.7	37.2	0.05	**0**	***0.00***
		GN-108.3 L	30-Jun	15:34	30-Jun	18:08	2.6	88.9	37.2	0.04	**0**	***0.00***
								114.3	37.2	0.04	**0**	***0.00***
			30-Jun	18:15	30-Jun	21:37	3.4	88.9	37.2	0.05	**0**	***0.00***
								114.3	37.2	0.05	**0**	***0.00***
		GN-109.3 R	01-Jul	14:11	01-Jul	16:18	2.1	88.9	37.2	0.03	**0**	***0.00***
			01-Jul	20:30	01-Jul	22:58	2.5	114.3	37.2	0.04	**0**	***0.00***
			01-Jul	23:09	02-Jul	1:30	2.3	114.3	37.2	0.04	**0**	***0.00***
		GN-109.9 M	01-Jul	14:21	01-Jul	16:33	2.2	101.6	37.2	0.03	**0**	***0.00***
		GN-110.0 R	01-Jul	14:30	01-Jul	16:41	2.2	76.2	37.2	0.03	**0**	***0.00***
			01-Jul	20:36	01-Jul	23:12	2.6	76.2	37.2	0.04	**0**	***0.00***
			01-Jul	23:20	02-Jul	1:38	2.3	76.2	37.2	0.04	**0**	***0.00***
		GN-110.1 M	01-Jul	23:31	02-Jul	1:46	2.3	101.6	37.2	0.03	**0**	***0.00***
		TN-110.0 M	01-Jul	14:46	01-Jul	16:55	2.2	203.2	46.5	0.04	**0**	***0.00***
		GN-110.1 R	01-Jul	20:42	01-Jul	23:24	2.7	101.6	37.2	0.04	**0**	***0.00***
		GN-111.2 L	01-Jul	14:58	01-Jul	17:06	2.1	114.3	37.2	0.03	**0**	***0.00***
			01-Jul	20:50	01-Jul	23:37	2.8	88.9	37.2	0.04	**0**	***0.00***
			01-Jul	23:44	02-Jul	2:01	2.3	88.9	37.2	0.04	**0**	***0.00***
		GN-114.3 L	02-Jul	22:33	03-Jul	0:20	1.8	114.3	37.2	0.03	**0**	***0.00***
		GN-114.5 L	02-Jul	21:45	02-Jul	23:58	2.2	88.9	37.2	0.03	**0**	***0.00***
		GN-114.8 R	02-Jul	22:04	03-Jul	0:06	2.0	101.6	37.2	0.03	**0**	***0.00***
			03-Jul	13:56	03-Jul	15:55	2.0	88.9	37.2	0.03	**0**	***0.00***
			03-Jul	16:01	03-Jul	19:14	3.2	88.9	37.2	0.05	**0**	***0.00***
			03-Jul	19:22	03-Jul	21:19	2.0	88.9	37.2	0.03	**0**	***0.00***
		GN-114.9 L	02-Jul	22:18	03-Jul	0:13	1.9	76.2	37.2	0.03	**0**	***0.00***
			03-Jul	14:01	03-Jul	16:08	2.1	101.6	37.2	0.03	**0**	***0.00***
			03-Jul	16:13	03-Jul	19:24	3.2	101.6	37.2	0.05	**0**	***0.00***
			03-Jul	19:29	03-Jul	21:27	2.0	101.6	37.2	0.03	**0**	***0.00***
		GN-115.3 L	03-Jul	14:26	03-Jul	16:20	1.9	114.3	37.2	0.03	**0**	***0.00***
		GN-115.3 L	03-Jul	16:23	03-Jul	19:31	3.1	114.3	37.2	0.05	**0**	***0.00***
			03-Jul	19:38	03-Jul	21:34	1.9	114.3	37.2	0.03	**0**	***0.00***

[1] GN = Gill net; TN = Tangle net

[2] One net-day = 100 m^2 of net set for a 24 hour period.

Continued…

Table B3 Continued.

Water Body	Survey Session	Station (km)[1]	Set		Pulled		Set Duration (h)	Mesh Size (mm)	Net Area (m^2)	Net-Day[2]	WST	
			Date	Time	Date	Time					Catch	*CPUE*
Nechako R. (Cont.)	Summer (Cont.)	GN-116.0 R	03-Jul	14:49	03-Jul	16:30	1.7	88.9	37.2	0.03	**0**	***0.00***
			03-Jul	16:33	03-Jul	19:42	3.1	88.9	37.2	0.05	**0**	***0.00***
			03-Jul	19:47	03-Jul	21:40	1.9	88.9	37.2	0.03	**0**	***0.00***
		GN-116.4 R	03-Jul	15:09	03-Jul	16:41	1.5	63.5	37.2	0.02	**0**	***0.00***
			03-Jul	16:45	03-Jul	19:50	3.1	63.5	37.2	0.05	**0**	***0.00***
			03-Jul	19:55	03-Jul	21:46	1.9	63.5	37.2	0.03	**0**	***0.00***
		GN-117.1 R	03-Jul	15:41	03-Jul	16:55	1.2	63.5	37.2	0.02	**0**	***0.00***
			03-Jul	16:59	03-Jul	19:57	3.0	63.5	37.2	0.05	**0**	***0.00***
			03-Jul	20:02	03-Jul	21:53	1.9	63.5	37.2	0.03	**0**	***0.00***
		GN-118.6 R	04-Jul	6:17	04-Jul	8:46	2.5	114.3	37.2	0.04	**0**	***0.00***
			04-Jul	8:52	04-Jul	10:57	2.1	114.3	37.2	0.03	**0**	***0.00***
			04-Jul	11:03	04-Jul	13:04	2.0	114.3	37.2	0.03	**0**	***0.00***
		GN-120.2 R	04-Jul	7:43	04-Jul	9:43	2.0	63.5	37.2	0.03	**0**	***0.00***
			04-Jul	9:52	04-Jul	11:33	1.7	63.5	37.2	0.03	**0**	***0.00***
			04-Jul	11:38	04-Jul	13:28	1.8	63.5	37.2	0.03	**0**	***0.00***
		GN-120.3 R	04-Jul	6:43	04-Jul	9:00	2.3	88.9	37.2	0.04	**0**	***0.00***
			04-Jul	9:05	04-Jul	11:06	2.0	88.9	37.2	0.03	**0**	***0.00***
			04-Jul	11:12	04-Jul	13:09	2.0	88.9	37.2	0.03	**0**	***0.00***
		GN-121.0 R	04-Jul	6:53	04-Jul	9:10	2.3	101.6	37.2	0.04	**0**	***0.00***
			04-Jul	9:16	04-Jul	11:15	2.0	101.6	37.2	0.03	**0**	***0.00***
			04-Jul	11:19	04-Jul	13:14	1.9	101.6	37.2	0.03	**0**	***0.00***
		GN-122.3 R	04-Jul	7:20	04-Jul	9:22	2.0	76.2	37.2	0.03	**0**	***0.00***
			04-Jul	9:35	04-Jul	11:23	1.8	76.2	37.2	0.03	**0**	***0.00***
			04-Jul	11:28	04-Jul	13:22	1.9	76.2	37.2	0.03	**0**	***0.00***
		GN-124.7 L	05-Jul	12:43	05-Jul	15:00	2.3	101.6	37.2	0.04	**0**	***0.00***
			05-Jul	15:05	05-Jul	18:55	3.8	101.6	37.2	0.06	**0**	***0.00***
			05-Jul	19:00	05-Jul	20:16	1.3	101.6	37.2	0.02	**0**	***0.00***
		GN-124.8 L	05-Jul	12:57	05-Jul	14:49	1.9	76.2	37.2	0.03	**0**	***0.00***
			05-Jul	14:54	05-Jul	18:48	3.9	76.2	37.2	0.06	**0**	***0.00***
			05-Jul	18:52	05-Jul	20:11	1.3	76.2	37.2	0.02	**0**	***0.00***
		GN-125.2 R	05-Jul	12:19	05-Jul	14:40	2.3	114.3	37.2	0.04	**0**	***0.00***
			05-Jul	14:45	05-Jul	18:02	3.3	114.3	37.2	0.05	**1**	***19.65***
			05-Jul	18:09	05-Jul	20:07	2.0	114.3	37.2	0.03	**0**	***0.00***
		GN-126.4 L	05-Jul	13:38	05-Jul	15:27	1.8	114.3	37.2	0.03	**0**	***0.00***
			05-Jul	15:32	05-Jul	17:55	2.4	114.3	37.2	0.04	**0**	***0.00***
			05-Jul	17:58	05-Jul	20:01	2.0	114.3	37.2	0.03	**0**	***0.00***
		GN-126.6 R	05-Jul	11:58	05-Jul	14:28	2.5	88.9	37.2	0.04	**0**	***0.00***
			05-Jul	14:34	05-Jul	17:47	3.2	88.9	37.2	0.05	**0**	***0.00***
			05-Jul	17:51	05-Jul	19:57	2.1	88.9	37.2	0.03	**0**	***0.00***
		GN-127.3 M	05-Jul	13:16	05-Jul	15:12	1.9	63.5	37.2	0.03	**0**	***0.00***
			05-Jul	15:22	05-Jul	17:38	2.3	63.5	37.2	0.04	**0**	***0.00***
			05-Jul	17:43	05-Jul	19:51	2.1	63.5	37.2	0.03	**0**	***0.00***
		GN-129.3 R	06-Jul	10:28	06-Jul	12:45	2.3	114.3	37.2	0.04	**0**	***0.00***
			06-Jul	12:50	06-Jul	15:56	3.1	114.3	37.2	0.05	**0**	***0.00***
			06-Jul	16:04	06-Jul	18:10	2.1	114.3	37.2	0.03	**0**	***0.00***
		GN-129.5 R	06-Jul	10:44	06-Jul	12:55	2.2	63.5	37.2	0.03	**0**	***0.00***
			06-Jul	13:06	06-Jul	16:06	3.0	63.5	37.2	0.05	**0**	***0.00***
			06-Jul	16:13	06-Jul	18:15	2.0	63.5	37.2	0.03	**0**	***0.00***
		GN-131.5 L	06-Jul	10:59	06-Jul	13:13	2.2	114.3	37.2	0.03	**0**	***0.00***
			06-Jul	13:18	06-Jul	16:16	3.0	114.3	37.2	0.05	**0**	***0.00***
			06-Jul	16:21	06-Jul	18:25	2.1	114.3	37.2	0.03	**0**	***0.00***
		GN-131.9 L	06-Jul	11:18	06-Jul	13:24	2.1	88.9	37.2	0.03	**0**	***0.00***
			06-Jul	13:29	06-Jul	16:24	2.9	88.9	37.2	0.05	**0**	***0.00***
			06-Jul	16:29	06-Jul	18:31	2.0	88.9	37.2	0.03	**0**	***0.00***
		GN-132.1 L	06-Jul	11:35	06-Jul	13:34	2.0	101.6	37.2	0.03	**0**	***0.00***
			06-Jul	13:39	06-Jul	16:30	2.9	101.6	37.2	0.04	**0**	***0.00***
			06-Jul	16:36	06-Jul	18:38	2.0	101.6	37.2	0.03	**0**	***0.00***
		GN-133.7 R	06-Jul	11:57	06-Jul	13:52	1.9	76.2	37.2	0.03	**0**	***0.00***
			06-Jul	13:57	06-Jul	16:40	2.7	76.2	37.2	0.04	**0**	***0.00***
			06-Jul	16:47	06-Jul	18:45	2.0	76.2	37.2	0.03	**0**	***0.00***
		GN-134.1 R	06-Jul	12:11	06-Jul	14:01	1.8	63.5	37.2	0.03	**0**	***0.00***
			06-Jul	14:06	06-Jul	16:50	2.7	63.5	37.2	0.04	**0**	***0.00***
			06-Jul	16:57	06-Jul	18:51	1.9	63.5	37.2	0.03	**0**	***0.00***
		GN-157.1 R	10-Jul	17:06	10-Jul	21:12	4.1	114.3	33.4	0.06	**0**	***0.00***
		GN-159.4 L	10-Jul	16:48	10-Jul	21:23	4.6	63.5	37.2	0.07	**0**	***0.00***
		GN-160.7 R	10-Jul	16:21	10-Jul	21:56	5.6	114.3	37.2	0.09	**0**	***0.00***
		GN-161.9 L	10-Jul	17:27	10-Jul	22:06	4.6	88.9	37.2	0.07	**0**	***0.00***
		GN-177.9 L	11-Jul	10:28	11-Jul	15:02	4.6	63.5	37.2	0.07	**0**	***0.00***
			11-Jul	15:15	11-Jul	20:11	4.9	63.5	37.2	0.08	**0**	***0.00***

[1] GN = Gill net; TN = Tangle net

Continued…

[2] One net-day = 100 m^2 of net set for a 24 hour period.

Table B3 Concluded.

Water Body	Survey Session	Station (km)[1]	Set		Pulled		Set Duration (h)	Mesh Size (mm)	Net Area (m^2)	Net-Day[2]	WST	
			Date	Time	Date	Time					Catch	*CPUE*
Nechako R. (Cont.)	Summer (Cont.)	GN-179.6 L	11-Jul	11:30	11-Jul	14:35	3.1	114.3	33.4	0.04	**0**	***0.00***
			11-Jul	11:44	11-Jul	14:43	3.0	88.9	37.2	0.05	**0**	***0.00***
			11-Jul	14:40	11-Jul	19:53	5.2	114.3	33.4	0.07	**0**	***0.00***
			11-Jul	14:49	11-Jul	19:57	5.1	88.9	37.2	0.08	**0**	***0.00***
		GN-190.8 R	13-Jul	6:20	13-Jul	10:28	4.1	114.3	37.2	0.06	**0**	***0.00***
			13-Jul	10:31	13-Jul	14:07	3.6	114.3	37.2	0.06	**0**	***0.00***
		GN-191.7 R	13-Jul	6:37	13-Jul	10:37	4.0	63.5	37.2	0.06	**0**	***0.00***
			13-Jul	10:50	13-Jul	14:13	3.4	63.5	37.2	0.05	**0**	***0.00***
		GN-192.3 R	13-Jul	7:11	13-Jul	10:55	3.7	88.9	37.2	0.06	**0**	***0.00***
			13-Jul	11:00	13-Jul	14:22	3.4	88.9	37.2	0.05	**0**	***0.00***
		GN-192.5 R	13-Jul	7:28	13-Jul	11:04	3.6	101.6	37.2	0.06	**0**	***0.00***
			13-Jul	11:07	13-Jul	14:25	3.3	101.6	37.2	0.05	**0**	***0.00***
		GN-192.8 L	13-Jul	7:43	13-Jul	11:13	3.5	127.0	37.2	0.05	**0**	***0.00***
			13-Jul	11:16	13-Jul	14:30	3.2	127.0	37.2	0.05	**0**	***0.00***
		GN-196.1 L	12-Jul	12:59	12-Jul	17:01	4.0	101.6	37.2	0.06	**0**	***0.00***
		GN-199.2 R	12-Jul	12:42	12-Jul	16:47	4.1	63.5	37.2	0.06	**0**	***0.00***
		GN-199.8 L	12-Jul	12:18	12-Jul	16:39	4.4	114.3	37.2	0.07	**0**	***0.00***
		GN-201.1 M	12-Jul	12:00	12-Jul	16:30	4.5	88.9	37.2	0.07	**0**	***0.00***
Nechako River										**8.35**	**1**	***0.12***
Total										**9.67**	**1**	***0.10***

[1] GN = Gill net; TN = Tangle net

[2] One net-day = 100 m^2 of net set for a 24 hour period.

Table B4 Summary of gill net catch and catch-per-unit-effort (CPUE = No. fish/net-day by mesh size) in the Nechako River, ALCAN (8 to 16 July 1999).

Water Body	Station (km)	Envirocon Site #[1]	UTM Location (NAD 27)			Date/Time		Set Duration (h)	Mesh Size (mm)	Net Area (m^2)	Net-Day[2]	WST		Incidental Catch		
			Grid	Easting	Northing	Set	Pull					Catch	*CPUE*	Species[3]	Catch	*CPUE*
Nechako R.	GN-109.9 L	5	10U	448098	5980421	08 Jul 99 18:00	08 Jul 99 21:30	3.5	114.3	37.2	0.05	**0**	***0.00***		**0**	***0.00***
									139.7	37.2	0.05	**0**	***0.00***		**0**	***0.00***
									139.7	37.2	0.05	**0**	***0.00***		**0**	***0.00***
						08 Jul 99 21:32	09 Jul 99 00:35	3.0	114.3	37.2	0.05	**0**	***0.00***		**0**	***0.00***
									139.7	37.2	0.05	**0**	***0.00***		**0**	***0.00***
									139.7	37.2	0.05	**0**	***0.00***		**0**	***0.00***
						09 Jul 99 00:37	09 Jul 99 03:33	2.9	114.3	37.2	0.05	**0**	***0.00***		**0**	***0.00***
									139.7	37.2	0.05	**0**	***0.00***		**0**	***0.00***
									139.7	37.2	0.05	**0**	***0.00***		**0**	***0.00***
						09 Jul 99 03:35	09 Jul 99 06:00	2.4	114.3	37.2	0.04	**0**	***0.00***		**0**	***0.00***
									139.7	37.2	0.04	**0**	***0.00***		**0**	***0.00***
									139.7	37.2	0.04	**0**	***0.00***		**0**	***0.00***
						09 Jul 99 13:54	09 Jul 99 17:13	3.3	114.3	37.2	0.05	**0**	***0.00***		**0**	***0.00***
									139.7	37.2	0.05	**0**	***0.00***		**0**	***0.00***
									139.7	37.2	0.05	**0**	***0.00***		**0**	***0.00***
	Total							**15.2**			**0.71**	**0**	***0.00***		**0**	***0.00***
	GN-110.1 M	5	10U	447903	5980596	08 Jul 99 17:11	08 Jul 99 18:24	1.2	88.9	37.2	0.02	**0**	***0.00***		**0**	***0.00***
									114.3	37.2	0.02	**0**	***0.00***		**0**	***0.00***
									139.7	37.2	0.02	**0**	***0.00***		**0**	***0.00***
						08 Jul 99 18:26	08 Jul 99 21:45	3.3	88.9	37.2	0.05	**0**	***0.00***	Sucker spp.	**2**	***38.94***
									114.3	37.2	0.05	**0**	***0.00***		**0**	***0.00***
									139.7	37.2	0.05	**0**	***0.00***		**0**	***0.00***
						08 Jul 99 21:50	09 Jul 99 01:05	3.3	88.9	37.2	0.05	**0**	***0.00***	Sucker spp.	**2**	***39.74***
									114.3	37.2	0.05	**0**	***0.00***		**0**	***0.00***
									139.7	37.2	0.05	**0**	***0.00***		**0**	***0.00***
						09 Jul 99 01:10	09 Jul 99 04:00	2.8	88.9	37.2	0.04	**0**	***0.00***		**0**	***0.00***
									114.3	37.2	0.04	**0**	***0.00***	Sucker spp.	**1**	***22.79***
									139.7	37.2	0.04	**0**	***0.00***		**0**	***0.00***
						09 Jul 99 04:05	09 Jul 99 06:10	2.1	88.9	37.2	0.03	**0**	***0.00***		**0**	***0.00***
									114.3	37.2	0.03	**0**	***0.00***		**0**	***0.00***
									139.7	37.2	0.03	**0**	***0.00***		**0**	***0.00***
						09 Jul 99 13:30	09 Jul 99 17:22	3.9	88.9	37.2	0.06	**0**	***0.00***		**0**	***0.00***
									114.3	37.2	0.06	**0**	***0.00***		**0**	***0.00***
									139.7	37.2	0.06	**0**	***0.00***		**0**	***0.00***
	Total							**16.6**			**0.77**	**0**	***0.00***		**5**	***6.50***
	GN-114.9 M	6	10U	444724	5981819	09 Jul 99 17:37	09 Jul 99 22:00	4.4	88.9	37.2	0.07	**0**	***0.00***		**0**	***0.00***
									114.3	37.2	0.07	**0**	***0.00***		**0**	***0.00***
									139.7	37.2	0.07	**0**	***0.00***		**0**	***0.00***
						09 Jul 99 22:02	10 Jul 99 01:05	3.0	88.9	37.2	0.05	**0**	***0.00***		**0**	***0.00***
									114.3	37.2	0.05	**0**	***0.00***		**0**	***0.00***
									139.7	37.2	0.05	**0**	***0.00***		**0**	***0.00***
						10 Jul 99 20:13	11 Jul 99 00:00	3.8	88.9	37.2	0.06	**0**	***0.00***		**0**	***0.00***
									114.3	37.2	0.06	**0**	***0.00***		**0**	***0.00***
									139.7	37.2	0.06	**0**	***0.00***		**0**	***0.00***
						11 Jul 99 00:02	11 Jul 99 04:20	4.3	88.9	37.2	0.07	**0**	***0.00***		**0**	***0.00***
									114.3	37.2	0.07	**0**	***0.00***		**0**	***0.00***
									139.7	37.2	0.07	**0**	***0.00***		**0**	***0.00***
						11 Jul 99 04:22	11 Jul 99 06:20	2.0	88.9	37.2	0.03	**0**	***0.00***		**0**	***0.00***
									114.3	37.2	0.03	**0**	***0.00***		**0**	***0.00***
									139.7	37.2	0.03	**0**	***0.00***		**0**	***0.00***
	Total							**17.5**			**0.81**	**0**	***0.00***		**0**	***0.00***

NOTE: n/a = not applicable.

Continued...

[1] Envirocon (1984).

[2] Net-day = 100 m^2 of net set for a 24 hour period.

[3] NRPM = Northern pikeminnow.

[4] Capture mortality.

Table B4 Continued.

Water Body	Station (km)	Envirocon Site #[1]	UTM Location (NAD 27)			Date/Time		Set Duration (h)	Mesh Size (mm)	Net Area (m^2)	Net-Day[2]	WST		Incidental Catch		
			Grid	Easting	Northing	Set	Pull					Catch	*CPUE*	Species[3]	Catch	*CPUE*
Nechako R. (con't)	GN-115.5 L	6	10U	444788	5982293	09 Jul 99 17:52	09 Jul 99 22:09	4.3	114.3	37.2	0.07	**0**	***0.00***		**0**	***0.00***
									139.7	37.2	0.07	**0**	***0.00***		**0**	***0.00***
									139.7	37.2	0.07	**0**	***0.00***		**0**	***0.00***
						09 Jul 99 22:11	10 Jul 99 00:54	2.7	114.3	37.2	0.04	**0**	***0.00***		**0**	***0.00***
									139.7	37.2	0.04	**0**	***0.00***		**0**	***0.00***
									139.7	37.2	0.04	**0**	***0.00***		**0**	***0.00***
						10 Jul 99 20:30	11 Jul 99 00:15	3.8	114.3	37.2	0.06	**0**	***0.00***		**0**	***0.00***
									139.7	37.2	0.06	**0**	***0.00***		**0**	***0.00***
									139.7	37.2	0.06	**0**	***0.00***		**0**	***0.00***
						11 Jul 99 00:17	11 Jul 99 04:35	4.3	114.3	37.2	0.07	**0**	***0.00***		**0**	***0.00***
									139.7	37.2	0.07	**0**	***0.00***		**0**	***0.00***
									139.7	37.2	0.07	**0**	***0.00***		**0**	***0.00***
						11 Jul 99 04:37	11 Jul 99 06:10	1.5	114.3	37.2	0.02	**0**	***0.00***		**0**	***0.00***
									139.7	37.2	0.02	**0**	***0.00***		**0**	***0.00***
									139.7	37.2	0.02	**0**	***0.00***		**0**	***0.00***
	Total							**16.6**			**0.77**	**0**	***0.00***		**0**	***0.00***
	GN-116.1 M	6	10U	445598	5982093	10 Jul 99 20:50	10 Jul 99 22:30	1.7	76.2	37.2	0.03	**0**	***0.00***		**0**	***0.00***
									114.3	37.2	0.03	**0**	***0.00***		**0**	***0.00***
									139.7	37.2	0.03	**0**	***0.00***		**0**	***0.00***
						10 Jul 99 22:32	11 Jul 99 04:08	5.6	76.2	37.2	0.09	**0**	***0.00***		**0**	***0.00***
									114.3	37.2	0.09	**0**	***0.00***		**0**	***0.00***
									139.7	37.2	0.09	**0**	***0.00***		**0**	***0.00***
						11 Jul 99 04:10	11 Jul 99 06:02	1.9	76.2	37.2	0.03	**0**	***0.00***		**0**	***0.00***
									114.3	37.2	0.03	**0**	***0.00***		**0**	***0.00***
									139.7	37.2	0.03	**0**	***0.00***		**0**	***0.00***
	Total							**9.1**			**0.42**	**0**	***0.00***		**0**	***0.00***
	GN-120.9 R	n/a	10U	443510	5984699	12 Jul 99 21:23	13 Jul 99 00:12	2.8	88.9	37.2	0.04	**0**	***0.00***		**0**	***0.00***
									114.3	37.2	0.04	**0**	***0.00***		**0**	***0.00***
									139.7	37.2	0.04	**0**	***0.00***		**0**	***0.00***
						13 Jul 99 00:14	13 Jul 99 03:08	2.9	88.9	37.2	0.04	**0**	***0.00***		**0**	***0.00***
									114.3	37.2	0.04	**0**	***0.00***		**0**	***0.00***
									139.7	37.2	0.04	**0**	***0.00***		**0**	***0.00***
						13 Jul 99 03:10	13 Jul 99 06:07	3.0	88.9	37.2	0.05	**0**	***0.00***		**0**	***0.00***
									114.3	37.2	0.05	**0**	***0.00***		**0**	***0.00***
									139.7	37.2	0.05	**0**	***0.00***		**0**	***0.00***
	Total							**8.7**			**0.40**	**0**	***0.00***		**0**	***0.00***
	GN-121.0 R	n/a	10U	443422	5984788	12 Jul 99 21:10	13 Jul 99 00:06	2.9	114.3	37.2	0.05	**0**	***0.00***		**0**	***0.00***
									139.7	37.2	0.05	**0**	***0.00***		**0**	***0.00***
									139.7	37.2	0.05	**0**	***0.00***		**0**	***0.00***
						13 Jul 99 00:08	13 Jul 99 03:03	2.9	114.3	37.2	0.05	**0**	***0.00***		**0**	***0.00***
									139.7	37.2	0.05	**0**	***0.00***		**0**	***0.00***
									139.7	37.2	0.05	**0**	***0.00***		**0**	***0.00***
						13 Jul 99 03:05	13 Jul 99 06:01	2.9	114.3	37.2	0.05	**0**	***0.00***		**0**	***0.00***
									139.7	37.2	0.05	**0**	***0.00***		**0**	***0.00***
									139.7	37.2	0.05	**0**	***0.00***		**0**	***0.00***
	Total							**8.8**			**0.41**	**0**	***0.00***		**0**	***0.00***
	GN-124.7 L	7	10U	439753	5984501	11 Jul 99 21:20	12 Jul 99 00:35	3.2	114.3	37.2	0.05	**0**	***0.00***		**0**	***0.00***
									139.7	37.2	0.05	**0**	***0.00***		**0**	***0.00***
									139.7	37.2	0.05	**0**	***0.00***		**0**	***0.00***
						12 Jul 99 00:37	12 Jul 99 03:35	3.0	114.3	37.2	0.05	**0**	***0.00***		**0**	***0.00***
									139.7	37.2	0.05	**0**	***0.00***		**0**	***0.00***
									139.7	37.2	0.05	**0**	***0.00***		**0**	***0.00***
						12 Jul 99 03:37	12 Jul 99 06:23	2.8	114.3	37.2	0.04	**0**	***0.00***		**0**	***0.00***
									139.7	37.2	0.04	**0**	***0.00***		**0**	***0.00***
									139.7	37.2	0.04	**0**	***0.00***		**0**	***0.00***
	Total							**9.0**			**0.42**	**0**	***0.00***		**0**	***0.00***

NOTE: n/a = not applicable.

Continued...

[1] Envirocon (1984).

[2] Net-day = 100 m^2 of net set for a 24 hour period.

[3] NRPM = Northern pikeminnow.

[4] Capture mortality.

Table B4 Continued.

Water Body	Station (km)	Envirocon Site #[1]	UTM Location (NAD 27)			Date/Time		Set Duration (h)	Mesh Size (mm)	Net Area (m^2)	Net-Day[2]	WST		Incidental Catch		
			Grid	Easting	Northing	Set	Pull					Catch	*CPUE*	Species[3]	Catch	*CPUE*
Nechako R. (con't)	GN-124.8 R	7	10U	439924	5984780	11 Jul 99 21:03	12 Jul 99 00:18	3.2	76.2	37.2	0.05	**0**	***0.00***		**0**	***0.00***
									114.3	37.2	0.05	**0**	***0.00***		**0**	***0.00***
									139.7	37.2	0.05	**0**	***0.00***		**0**	***0.00***
						12 Jul 99 00:23	12 Jul 99 03:22	3.0	76.2	37.2	0.05	**0**	***0.00***		**0**	***0.00***
									114.3	37.2	0.05	**0**	***0.00***		**0**	***0.00***
									139.7	37.2	0.05	**0**	***0.00***		**0**	***0.00***
						12 Jul 99 03:24	12 Jul 99 06:12	2.8	76.2	37.2	0.04	**0**	***0.00***		**0**	***0.00***
									114.3	37.2	0.04	**0**	***0.00***		**0**	***0.00***
									139.7	37.2	0.04	**0**	***0.00***		**0**	***0.00***
	Total							**9.0**			**0.42**	**0**	***0.00***		**0**	***0.00***
	GN-125.3 R	7	10U	439934	5985115	11 Jul 99 20:53	11 Jul 99 23:59	3.1	88.9	37.2	0.05	**0**	***0.00***		**0**	***0.00***
									114.3	37.2	0.05	**0**	***0.00***		**0**	***0.00***
									139.7	37.2	0.05	**0**	***0.00***		**0**	***0.00***
						12 Jul 99 00:01	12 Jul 99 03:10	3.1	88.9	37.2	0.05	**0**	***0.00***		**0**	***0.00***
									114.3	37.2	0.05	**0**	***0.00***		**0**	***0.00***
									139.7	37.2	0.05	**0**	***0.00***		**0**	***0.00***
						12 Jul 99 03:12	12 Jul 99 06:01	2.8	88.9	37.2	0.04	**0**	***0.00***		**0**	***0.00***
									114.3	37.2	0.04	**0**	***0.00***		**0**	***0.00***
									139.7	37.2	0.04	**0**	***0.00***		**0**	***0.00***
	Total							**9.1**			**0.42**	**0**	***0.00***		**0**	***0.00***
	GN-129 R	n/a	10U	436788	5986823	15 Jul 99 20:53	15 Jul 99 22:20	1.5	63.5	37.2	0.02	**0**	***0.00***	NRPM[4]	**1**	***44.54***
									114.3	37.2	0.02	**0**	***0.00***		**0**	***0.00***
									139.7	37.2	0.02	**0**	***0.00***		**0**	***0.00***
						15 Jul 99 22:25	16 Jul 99 06:20	7.9	63.5	37.2	0.12	**0**	***0.00***		**0**	***0.00***
									114.3	37.2	0.12	**0**	***0.00***		**0**	***0.00***
									139.7	37.2	0.12	**0**	***0.00***		**0**	***0.00***
	Total							**9.4**			**0.44**	**0**	***0.00***		**1**	***2.30***
	GN-129.3 R	n/a	10U	436520	5986757	15 Jul 99 20:49	15 Jul 99 22:16	1.5	88.9	37.2	0.02	**0**	***0.00***		**0**	***0.00***
									114.3	37.2	0.02	**0**	***0.00***		**0**	***0.00***
									139.7	37.2	0.02	**0**	***0.00***		**0**	***0.00***
						15 Jul 99 22:18	16 Jul 99 06:12	7.9	88.9	37.2	0.12	**0**	***0.00***		**0**	***0.00***
									114.3	37.2	0.12	**0**	***0.00***		**0**	***0.00***
									139.7	37.2	0.12	**0**	***0.00***		**0**	***0.00***
	Total							**9.3**			**0.43**	**0**	***0.00***		**0**	***0.00***
	GN-132.1 L	8	10U	435998	5984877	13 Jul 99 21:55	14 Jul 99 00:05	2.2	114.3	37.2	0.03	**0**	***0.00***		**0**	***0.00***
									139.7	37.2	0.03	**0**	***0.00***		**0**	***0.00***
									139.7	37.2	0.03	**0**	***0.00***		**0**	***0.00***
						14 Jul 99 00:07	14 Jul 99 06:10	6.0	114.3	37.2	0.09	**0**	***0.00***		**0**	***0.00***
									139.7	37.2	0.09	**0**	***0.00***		**0**	***0.00***
									139.7	37.2	0.09	**0**	***0.00***		**0**	***0.00***
	Total							**8.2**			**0.38**	**0**	***0.00***		**0**	***0.00***
	GN-132.2 L	8	10U	435890	5984884	13 Jul 99 21:30	14 Jul 99 00:00	2.5	88.9	37.2	0.04	**0**	***0.00***		**0**	***0.00***
									114.3	37.2	0.04	**0**	***0.00***		**0**	***0.00***
									139.7	37.2	0.04	**0**	***0.00***		**0**	***0.00***
						14 Jul 99 00:02	14 Jul 99 05:56	5.9	88.9	37.2	0.09	**0**	***0.00***		**0**	***0.00***
									114.3	37.2	0.09	**0**	***0.00***		**0**	***0.00***
									139.7	37.2	0.09	**0**	***0.00***		**0**	***0.00***
	Total							**8.4**			**0.39**	**0**	***0.00***		**0**	***0.00***

NOTE: n/a = not applicable.

Continued...

[1] Envirocon (1984).

[2] Net-day = 100 m^2 of net set for a 24 hour period.

[3] NRPM = Northern pikeminnow.

[4] Capture mortality.

Table B4 Concluded.

Water Body	Station (km)	Envirocon Site #[1]	UTM Location (NAD 27)			Date/Time		Set Duration (h)	Mesh Size (mm)	Net Area (m^2)	Net-Day[2]	WST		Incidental Catch		
			Grid	Easting	Northing	Set	Pull					Catch	*CPUE*	Species[3]	Catch	*CPUE*
Nechako R. (con't)	GN-133.9 L	9	10U	435627	5986518	14 Jul 99 19:15	14 Jul 99 20:55	1.7	88.9	37.2	0.03	**0**	***0.00***		**0**	***0.00***
									114.3	37.2	0.03	**0**	***0.00***		**0**	***0.00***
									139.7	37.2	0.03	**0**	***0.00***		**0**	***0.00***
						14 Jul 99 20:57	15 Jul 99 01:27	4.5	88.9	37.2	0.07	**0**	***0.00***		**0**	***0.00***
									114.3	37.2	0.07	**0**	***0.00***		**0**	***0.00***
									139.7	37.2	0.07	**0**	***0.00***		**0**	***0.00***
						15 Jul 99 01:29	15 Jul 99 06:14	4.8	88.9	37.2	0.07	**0**	***0.00***		**0**	***0.00***
									114.3	37.2	0.07	**0**	***0.00***		**0**	***0.00***
									139.7	37.2	0.07	**0**	***0.00***	NRPM	**1**	***13.60***
	Total							**10.9**			**0.51**	**0**	***0.00***		**1**	***1.97***
	GN-134.1 L	9	10U	435380	5986372	14 Jul 99 19:02	14 Jul 99 20:50	1.8	63.5	37.2	0.03	**0**	***0.00***		**0**	***0.00***
									114.3	37.2	0.03	**0**	***0.00***		**0**	***0.00***
									139.7	37.2	0.03	**0**	***0.00***		**0**	***0.00***
									139.7	37.2	0.03	**0**	***0.00***		**0**	***0.00***
						14 Jul 99 20:52	15 Jul 99 01:20	4.5	63.5	37.2	0.07	**0**	***0.00***		**0**	***0.00***
									114.3	37.2	0.07	**0**	***0.00***		**0**	***0.00***
									139.7	37.2	0.07	**0**	***0.00***		**0**	***0.00***
									139.7	37.2	0.07	**0**	***0.00***		**0**	***0.00***
						15 Jul 99 01:22	15 Jul 99 06:07	4.8	63.5	37.2	0.07	**0**	***0.00***		**0**	***0.00***
									114.3	37.2	0.07	**0**	***0.00***		**0**	***0.00***
									139.7	37.2	0.07	**0**	***0.00***		**0**	***0.00***
									139.7	37.2	0.07	**0**	***0.00***		**0**	***0.00***
	Total							**11.0**			**0.68**	**0**	***0.00***		**0**	***0.00***
Grand Total								**176.8**			**8.38**	**0**	***0.00***		**7**	***0.84***

NOTE: n/a = not applicable.

[1] Envirocon (1984).

[2] Net-day = 100 m^2 of net set for a 24 hour period.

[3] NRPM = Northern pikeminnow.

[4] Capture mortality.

Table B5 Summary of catch and catch-per-unit-effort (*CPUE* = No. caught/hour) for white sturgeon captured by boat electroshocking in the study area, 1999.

Water Body	Survey Session	Station [1] (km)	Date	Sample Effort		WST	
				Duration (s)	Distance (m)	Catch[2]	*CPUE*
Nechako R.	Summer	ES-115.0 R	8-Jul	2599	4500	**1**	***1.39***
		ES-120.9 R	10-Jul	3572	5900	**0**	***0.00***
		ES-136.0 L	13-Jul	2729	5000	**0**	***0.00***
		ES-136.0 R	15-Jul	3335	6700	**0**	***0.00***
		ES-139.5 L	14-Jul	1850	3500	**0**	***0.00***
		ES-139.5 R	14-Jul	1570	3500	**0**	***0.00***
TOTAL				**15655**	**29100**	**1**	***0.23***

[1] Site designation presents the starting point of boat electroshocking section.

[2] Catch includes observed fish.

Table B6 Summary of catch and catch rate (*CPUE* = No. eggs caught/100 hours) for white sturgeon eggs or larva sampled by egg collection mats in the Nechako River, 1999.

Water Body	Survey Session	Station (km)	Mats (No.)	Set		Pulled		Duration (h)	WST Egg	Unid Egg	Other	Catch	*CPUE*
				Date	Time	Date	Time						
Nechako R.	Spring	SM-35.9L	2	06-Jun	12:07	08-Jun	13:05	48.97	0	0	0	**0**	***0.00***
			2	08-Jun	13:35	11-Jun	13:48	72.22	0	0	0	**0**	***0.00***
			2	11-Jun	14:04	14-Jun	13:25	71.35	0	0	1	**1**	***1.40***
			2	14-Jun	16:10	17-Jun	9:33	65.38	0	0	0	**0**	***0.00***
		SM-35.9L [3]	2	17-Jun	10:12	27-Jun	-	-	-	-	-	**-**	**-**
		SM-35.9R	2	08-Jun	14:22	11-Jun	14:07	71.75	0	0	0	**0**	***0.00***
			2	11-Jun	14:25	14-Jun	15:03	72.63	0	0	0	**0**	***0.00***
			2	14-Jun	15:22	17-Jun	9:55	66.55	0	0	0	**0**	***0.00***
		SM-36.2L	2	02-Jun	13:04	06-Jun	12:30	95.43	0	0	0	**0**	***0.00***
			2	06-Jun	12:54	08-Jun	13:55	49.02	0	0	0	**0**	***0.00***
		SM-36.4L	2	06-Jun	12:27	08-Jun	13:38	49.18	0	0	0	**0**	***0.00***
			2	08-Jun	13:52	11-Jun	13:28	71.60	0	0	0	**0**	***0.00***
			2	11-Jun	13:45	14-Jun	16:13	74.47	0	2	1	**3**	***4.03***
			2	14-Jun	16:47	17-Jun	10:20	65.55	0	2	0	**2**	***3.05***
			2	17-Jun	10:54	27-Jun	11:14	240.33	0	0	0	**0**	***0.00***
		SM-36.4M	2	02-Jun	11:59	06-Jun	11:44	95.75	0	0	0	**0**	***0.00***
		SM-37.8L	2	06-Jun	11:28	08-Jun	11:56	48.47	0	0	0	**0**	***0.00***
			2	08-Jun	12:14	11-Jun	12:50	72.60	0	0	0	**0**	***0.00***
			2	11-Jun	13:08	14-Jun	11:17	70.15	0	0	0	**0**	***0.00***
			2	14-Jun	11:41	17-Jun	11:01	71.33	0	0	0	**0**	***0.00***
			2	17-Jun	11:40	27-Jun	10:52	239.20	0	0	0	**0**	***0.00***
		SM-38.2L	2	08-Jun	11:04	11-Jun	11:27	72.38	0	0	0	**0**	***0.00***
			1	14-Jun	11:13	17-Jun	11:43	72.50	0	0	0	**0**	***0.00***
		SM-38.2L [2]	1	11-Jun	11:46	14-Jun	10:57	71.18	0	0	0	**0**	***0.00***
		SM-38.3L	2	02-Jun	12:24	06-Jun	11:01	94.62	0	1	0	**1**	***1.06***
		SM-38.3M	2	02-Jun	12:37	06-Jun	10:35	93.97	0	0	0	**0**	***0.00***
			2	06-Jun	10:56	08-Jun	11:09	48.22	0	0	0	**0**	***0.00***
			2	08-Jun	11:52	11-Jun	11:50	71.97	0	0	0	**0**	***0.00***
			2	11-Jun	12:43	14-Jun	10:24	69.68	0	0	0	**0**	***0.00***
			2	14-Jun	10:53	17-Jun	11:57	73.07	0	0	0	**0**	***0.00***
			2	17-Jun	12:34	27-Jun	10:29	237.92	0	0	0	**0**	***0.00***
		SM-38.5M	2	02-Jun	12:30	06-Jun	10:13	93.72	0	0	0	**0**	***0.00***
			2	06-Jun	10:33	08-Jun	10:38	48.08	0	0	0	**0**	***0.00***
		SM-48.5M	1	11-Jun	10:24	14-Jun	9:08	70.73	0	0	0	**0**	***0.00***
			1	14-Jun	9:21	17-Jun	9:02	71.68	0	0	0	**0**	***0.00***
		SM-48.7L	2	06-Jun	9:37	08-Jun	9:48	48.18	0	4	1	**5**	***10.38***
			2	11-Jun	11:05	14-Jun	8:40	69.58	0	0	0	**0**	***0.00***
			2	14-Jun	9:05	17-Jun	8:44	71.65	0	0	0	**0**	***0.00***
		SM-48.7L [2]	1	08-Jun	10:16	11-Jun	10:26	72.17	0	0	0	**0**	***0.00***
		SM-48.7M	2	06-Jun	9:43	08-Jun	9:26	47.72	0	0	0	**0**	***0.00***
			2	08-Jun	9:45	10-Jun	10:03	48.30	0	0	0	**0**	***0.00***
		SM-53.2R	2	05-Jun	13:09	07-Jun	13:22	48.22	0	0	0	**0**	***0.00***
			2	07-Jun	13:37	10-Jun	17:31	75.90	0	0	0	**0**	***0.00***
			2	10-Jun	17:47	13-Jun	14:06	68.32	0	1	0	**1**	***1.46***
			2	13-Jun	14:28	16-Jun	11:01	68.55	0	0	0	**0**	***0.00***
		SM-53.7R	2	01-Jun	11:50	05-Jun	12:52	97.03	0	0	0	**0**	***0.00***
		SM-53.8M	2	01-Jun	11:14	05-Jun	12:25	97.18	0	0	0	**0**	***0.00***
			2	05-Jun	12:48	07-Jun	12:53	48.08	0	0	0	**0**	***0.00***
			2	07-Jun	13:17	10-Jun	17:11	75.90	0	0	0	**0**	***0.00***
			2	10-Jun	17:24	13-Jun	13:41	68.28	0	0	0	**0**	***0.00***
			2	13-Jun	14:00	16-Jun	11:35	69.58	0	0	0	**0**	***0.00***
		SM-57.5L	2	05-Jun	12:16	07-Jun	12:15	47.98	0	1	0	**1**	***2.08***

[1] Substrate mats were not retrieved on scheduled day, but were recovered on 16 June 1999.

Continued…

[2] Two substrate mats were deployed; only one was retrieved.

[3] Sampling gear could not be recovered; search and salvage efforts failed to retrieve gear.

Table B6 Concluded.

Water Body	Survey Session	Station (km)	Mats (No.)	Set		Pulled		Duration (h)	WST Egg	Unid Egg	Other	Catch	*CPUE*
				Date	Time	Date	Time						
Nechako R.	Spring	SM-57.5L	2	07-Jun	12:42	10-Jun	16:24	75.70	0	0	0	**0**	***0.00***
(Cont.)	(Cont.)		2	10-Jun	16:51	13-Jun	12:28	67.62	0	3	0	**3**	***4.44***
			2	13-Jun	13:01	16-Jun	11:58	70.95	0	7	0	**7**	***9.87***
		SM-57.9R	2	01-Jun	12:30	05-Jun	11:40	95.17	0	0	0	**0**	***0.00***
		SM-58.7L	2	01-Jun	13:07	05-Jun	11:12	94.08	0	0	0	**0**	***0.00***
			2	05-Jun	11:27	07-Jun	11:43	48.27	0	0	0	**0**	***0.00***
			2	07-Jun	12:02	10-Jun	15:28	75.43	0	0	0	**0**	***0.00***
			2	10-Jun	16:10	13-Jun	11:36	67.43	0	0	0	**0**	***0.00***
			2	13-Jun	12:19	16-Jun	12:23	72.07	0	0	0	**0**	***0.00***
		SM-58.7M	2	01-Jun	13:05	05-Jun	10:53	93.80	0	0	0	**0**	***0.00***
			2	05-Jun	11:09	07-Jun	11:17	48.13	0	0	0	**0**	***0.00***
			2	07-Jun	11:40	10-Jun	14:57	75.28	0	0	0	**0**	***0.00***
			2	10-Jun	15:25	13-Jun	10:47	67.37	0	0	0	**0**	***0.00***
			2	13-Jun	11:32	16-Jun	12:45	73.22	0	0	0	**0**	***0.00***
		SM-58.7R	2	01-Jun	13:03	05-Jun	10:34	93.52	0	0	0	**0**	***0.00***
			2	05-Jun	10:51	07-Jun	10:43	47.87	0	0	0	**0**	***0.00***
			2	07-Jun	11:14	10-Jun	14:08	74.90	0	0	0	**0**	***0.00***
			2	10-Jun	14:55	13-Jun	10:22	67.45	0	0	0	**0**	***0.00***
			2	13-Jun	10:44	16-Jun	13:06	74.37	0	0	0	**0**	***0.00***
		SM-60.2L	2	02-Jun	15:28	05-Jun	9:53	66.42	0	0	0	**0**	***0.00***
			2	07-Jun	10:29	10-Jun	13:01	74.53	0	5	0	**5**	***6.71***
			2	10-Jun	13:42	13-Jun	9:52	68.17	0	0	0	**0**	***0.00***
			4	13-Jun	10:13	16-Jun	14:28	76.25	0	0	0	**0**	***0.00***
		SM-60.2L [1]	2	05-Jun	10:17	16-Jun	14:28	268.18	0	0	0	**0**	***0.00***
		SM-60.2M	2	02-Jun	11:48	06-Jun	12:11	96.38	0	0	0	**0**	***0.00***
			2	02-Jun	15:13	05-Jun	9:31	66.30	0	0	0	**0**	***0.00***
			2	05-Jun	9:46	07-Jun	9:37	47.85	0	0	0	**0**	***0.00***
			2	07-Jun	10:07	10-Jun	13:44	75.62	0	0	0	**0**	***0.00***
			2	10-Jun	13:59	13-Jun	9:29	67.50	0	0	0	**0**	***0.00***
			2	13-Jun	9:50	16-Jun	14:08	76.30	0	0	0	**0**	***0.00***
		SM-103.5M	2	09-Jun	10:55	12-Jun	10:40	71.75	0	0	0	**0**	***0.00***
			2	12-Jun	11:34	15-Jun	10:28	70.90	0	1	0	**1**	***1.41***
		SM-103.7L	2	09-Jun	10:44	12-Jun	11:37	72.88	0	0	0	**0**	***0.00***
			2	12-Jun	12:32	15-Jun	11:40	71.13	0	1	0	**1**	***1.41***
		SM-103.8M	2	09-Jun	10:49	12-Jun	12:34	73.75	0	0	0	**0**	***0.00***
			2	12-Jun	12:50	15-Jun	12:07	71.28	0	1	0	**1**	***1.40***
Total								**6822.10**	**0**	**29**	**3**	**32**	***0.47***

[1] Substrate mats were not retrieved on scheduled day, but were recovered on 16 June 1999.

[2] Two substrate mats were deployed; only one was retrieved.

[3] Sampling gear could not be recovered; search and salvage efforts failed to retrieve gear.

Table B7 Summary of catch and catch rate (*CPUE* = No. eggs caught/hour) for white sturgeon eggs sampled by drift net in the study area, 1999.

Water Body	Survey Session	Station (km)	Date	Time		Duration (h)	WST Egg	Non-WST				Catch	*CPUE*
				Set	Pull			Egg	Fry	Larval	Other		
Nechako R.	Spring	DN-35.7M	14-Jun	12:03	12:34	0.52		1		1		**2**	***3.87***
				13:43	14:13	0.50				1		**1**	***2.00***
		DN-35.8M	06-Jun	13:13	13:44	0.52						**0**	***0.00***
				14:23	14:53	0.50						**0**	***0.00***
				15:18	15:48	0.50						**0**	***0.00***
				16:20	16:50	0.50						**0**	***0.00***
		DN-37.4M	08-Jun	14:52	15:23	0.52						**0**	***0.00***
				15:53	16:24	0.52					1	**1**	***1.94***
		DN-37.8R	11-Jun	15:33	16:05	0.53					1	**1**	***1.88***
		DN-48.5L	17-Jun	13:47	14:04	0.28						**0**	***0.00***
				14:29	14:44	0.25						**0**	***0.00***
		DN-48.9M	05-Jun	14:00	14:25	0.42						**0**	***0.00***
				15:05	15:30	0.42			1			**1**	***2.40***
		DN-48.9M	05-Jun	16:18	16:44	0.43			1			**1**	***2.31***
		DN-52.7M	13-Jun	15:35	15:54	0.32						**0**	***0.00***
		DN-53.2M	13-Jun	15:01	15:07	0.10						**0**	***0.00***
		DN-58.2M	13-Jun	17:20	17:46	0.43				2		**2**	***4.62***
		DN-58.3R	10-Jun	18:35	18:50	0.25						**0**	***0.00***
		DN-59.4R	07-Jun	15:38	15:44	0.10						**0**	***0.00***
			16-Jun	16:50	17:02	0.20				3		**3**	***15.00***
		DN-59.7R	07-Jun	16:05	16:36	0.52			1			**1**	***1.94***
				19:08	19:38	0.50						**0**	***0.00***
		DN-59.7L	11-Jun	20:30	21:08	0.63						**0**	***0.00***
		DN-59.9M	02-Jun	15:46	16:26	0.67			1			**1**	***1.50***
		DN-103.5M	12-Jun	14:06	14:40	0.57		1				**1**	***1.76***
				14:45	15:45	1.00		4		4		**8**	***8.00***
				15:52	16:52	1.00		3		9		**12**	***12.00***
				17:03	17:34	0.52		2		18		**20**	***38.71***
			15-Jun	12:36	13:36	1.00		5		1		**6**	***6.00***
				13:44	14:46	1.03		1				**1**	***0.97***
				14:55	15:56	1.02		1		2		**3**	***2.95***
Total						**16.25**	**0**	**18**	**4**	**41**	**2**	**65**	***4.00***

APPENDIX C

MARK-RECAPTURE AND RADIO TELEMETRY DATA

Table C1 Capture information for white sturgeon in the study area, 1999.

Sample Number	Fork Length (cm)	Total Length (cm)	Weight (kg)	Post-orbital Length	Post-opercular Length	Girth (cm)	Sex[1]	Age (yrs)	Age Method[2]	Capture Method[3]	UTM Co-ordinates			Dart/T-Anchor		PIT Tag No.	Bio-sample Code[5]	Capture Date	Waterbody	Site (km)	Capture Code[6]	Comments
											Grid Zone	Easting	Northing	Color[4]	No.							
805	77.0	88.0	3.5		19.5	30.0	98	10	FR	GN	10U	439856	5985216	Y	1456	41392C0A2D	1	05-Jul	Nechako	125.2	0	
808	162.0	181.0	36.8	17.5	39.5	64.5	97	26	FR	SSL	10U	464223	5982184	Y	1457	4124705139	1	05-Aug	Nechako	90.1	0	
809	200.5	223.0	64.5	21.5	49.5	78.5	97	38	FR	SSL	10U	464061	5982096	Y	1459	4124731A62	1	05-Aug	Nechako	90.3	0	
810	156.0	176.0	23.2	18.5	40.5	52.5	97	38	FR	SSL	10U	464061	5982096	Y	1461	4124711077	1	05-Aug	Nechako	90.3	0	
811	133.0	151.5	16.8	16.0	33.5	49.5	97	22	FR	SSL	10U	463151	5982569	Y	1462	41247D310C	1	05-Aug	Nechako	91.4	0	
812	160.5	181.5	26.3	20.5	43.5	57.5	97	36	FR	SSL	10U	463151	5982569	Y	1463	420E616F33	1	05-Aug	Nechako	91.4	0	
813	168.5	193.0	33.1	22.5	45.5	60.4	97	35	FR	SSL	10U	462574	5982460	Y	1465	41247F0738	1	05-Aug	Nechako	92.0	0	
814	162.0	183.0	26.3	22.0	44.0	57.5	97	32	FR	SSL	10U	462574	5982460	Y	1467	41246B7817	1	05-Aug	Nechako	92.0	0	
815										SSL	10U	462574	5982460				0	05-Aug	Nechako	92.0	0	Escaped at boat.
958	142.5	160.0	20.4	17.5	36.5	51.0	97	34	FR	SSL	10U	439947	5984832	Y	1471	4124777903	1	09-Sep	Nechako	125.0	0	
959	146.0	163.0	23.1	17.5	37.5	56.0	98			SSL	10U	439947	5984832	Y	1472	7F7B0C4C09	0	09-Sep	Nechako	125.0	2	Recapture; Previous FT (Y) 350 missing.
960	166.5	187.5	33.1	21.0	45.5	63.5	12	38	FR	SSL	10U	439947	5984832	Y	1473	4125010F3C	1	09-Sep	Nechako	125.0	0	
961	137.0	155.0	20.0	16.5	34.5	52.0	12	29	FR	SSL	10U	439710	5984521	Y	1468	4124735E01	1	09-Sep	Nechako	124.6	0	
962	84.0	97.0	4.1	10.5	21.0	31.0	98	9	FR	SSL	10U	439710	5984521	Y	1469	41493F7C14	1	09-Sep	Nechako	124.6	0	
963	162.0	185.0	32.7	19.5	42.5	63.5	13	42	FR	SSL	10U	439710	5984521	Y	1470	412472515E	1	09-Sep	Nechako	124.6	0	RT 149.480 CH 09 CD 54.
964	141.5	160.5	19.5	17.0	36.0	52.5	02	22	FR	SSL	10U	439710	5984521	Y	1474	4124747221	1	10-Sep	Nechako	124.6	0	
965	98.5	114.0	8.2	11.0	23.5	34.5	02	18	FR	SSL	10U	439947	5984832	Y	1475	413931641C	1	10-Sep	Nechako	125.0	0	
966	217.0	242.5	59.4	24.0	56.0	86.5	12	62	FR	SSL	10U	445722	5981981	Y	1477	4124667D61	1	10-Sep	Nechako	116.2	0	Left pectoral deformity. D7 scute from anterior removed.
967	222.5	247.0	87.5	24.0	56.0	89.5	13			SSL	10U	444575	5981968	Y	1483	7F7D7A6A1E	0	11-Sep	Nechako	114.9	2	Recapture; Previous FT (Y) 422 missing. Pit tag on right side of fish also reads on left. Left pectoral deformed.
968	138.5	157.0	20.0	16.0	35.5	51.5	97	30	FR	SSL	10U	444571	5982116	Y	1482	4124751461	1	11-Sep	Nechako	115.0	0	
969	148.5	167.0	20.4	18.0	37.0	51.5	97	36	FR	SSL	10U	444841	5982200	Y	1481	4124665E75	1	11-Sep	Nechako	115.2	0	
970	179.0	200.0	40.8	21.0	47.5	68.0	97	43	FR	SSL	10U	445722	5981981	Y	1479	4125005E0C	1	11-Sep	Nechako	116.2	0	
971	153.0	169.0	24.0	16.0	36.5	54.0	97	37	FR	SSL	10U	445722	5981981	Y	1480	412469273C	1	11-Sep	Nechako	116.2	0	
972	194.5	217.0	59.4	23.5	50.5	76.5	04			SSL	10U	446141	5982352	Y	1478	7F7B0C5E5C	0	11-Sep	Nechako	116.7	2	Recapture; Previous FT (Y) 44 missing. D4 scute removed. Depression and lateral line deformity behind left pectoral.
973	145.0	165.0	22.7	16.5	38.5	57.0	03	34	FR	SSL	10U	449229	5979176	Y	1487	41246C3057	1	12-Sep	Nechako	107.9	0	
974	122.5	140.5	14.1	15.5	31.5	44.5	97	29	FR	SSL	10U	449229	5979176	Y	1488	4139256371	1	12-Sep	Nechako	107.9	0	
975	151.5	171.0	25.9	18.0	38.5	56.5	03	37	FR	SSL	10U	448015	5980582	Y	1485	4124692877	1	12-Sep	Nechako	110.0	0	Right pectoral fin atrophied.
976	153.5	173.0	24.5	19.5	40.5	54.5	97	42	FR	SSL	10U	448015	5980582	Y	1486	4125062840	1	12-Sep	Nechako	110.0	0	
977	180.5	202.0	42.6	21.5	48.0	67.5	97	44	FR	SSL	10U	447826	5980595	Y	1484	4124721004	1	12-Sep	Nechako	110.1	0	Right pectoral fin folded at leading edge.
978	182.0	204.0	40.8	25.0	52.5	71.0	03	58	FR	SSL	10U	449513	5979278	Y	1490	4124707E71	1	12-Sep	Nechako	107.6	0	Injected faulty PIT tag first time; injected a second tag anterior to the first.
979	143.5	162.5	22.2	18.5	39.5	57.0	97	30	FR	SSL	10U	449513	5979278	Y	1491	4124671F3B	1	12-Sep	Nechako	107.6	0	Growth along lateral line between dorsal and anal fins.
980	132.5	151.0	18.1	18.0	36.0	49.5	97	36	FR	SSL	10U	449513	5979278	Y	1489	4124792E35	1	12-Sep	Nechako	107.6	0	
981	160.0	182.0	28.6	20.5	44.5	58.5	97			SSL	10U	475955	5979802	Y	1497	7F7D7A6647	0	14-Sep	Nechako	74.2	2	Recapture. Previous FT (Y) 1455 missing. V2 scute on left side removed.
982	108.0	122.0	9.5	12.5	25.5	31.0	98			SSL	10U	477219	5980100	Y	1496	7F7B03057D	0	14-Sep	Nechako	72.7	2	Recapture. Previous FT (Y) 89 and RT 149.480 CH 09 CD 56 missing.
983	160.0	180.0	29.5	18.0	40.5	61.0	03	38	FR	SSL	10U	481536	5981762	Y	1495	4139333903	1	14-Sep	Nechako	67.4	0	
984	140.5	160.0	20.4	16.5	36.0	52.5	03	37	FR	SSL	10U	481536	5981762	Y	1494	41390D643C	1	14-Sep	Nechako	67.4	0	Lump on left pelvic. Small caudal fin.
985	143.0	162.0	19.6	18.0	38.0	51.0	97	35	FR	SSL	10U	482453	5981849	Y	1493	4139666A06	1	14-Sep	Nechako	66.3	0	Small extra lobe on upper caudal (photo #19).
986	145.0	164.0	22.7	18.0	32.0	52.5	97			SSL	10U	482568	5982099	Y	1492	7F7B0C3231	0	14-Sep	Nechako	66.2	2	Recapture. Previous FT (O) 4508 missing.
1116										ES	10U	445700	5980000				0	8-Jul	Nechako	112.2	0	Observed while electroshocking.

NOTE: Does not include fish sampled by either TRITON or LTFN.

[1] For a description of sexual maturity codes, see Appendix E.

[2] FR = section of pectoral fin ray.

[3] SSL = set line; GN = gill net; ES = boat electroshocking.

[4] Y = yellow; O = orange.

[5] 0 = no sample; 1 = tissue sampled from distal end of pectoral fin; 2 = blood sample; 3 = tissue and blood sample.

[6] 0 = original capture; 2 = recapture.

Table C2 Summary of conventionally tagged white sturgeon from the Nechako River recaptured in the Nechako and Fraser rivers, 1999.

Original Capture Data										Recapture Data										Summary	
Floy Tag		PIT Tag	Length (cm)		Weight	Capture				Floy Tag		PIT Tag	Length (cm)		Weight	Capture				Days-at-	Movement
C[1]	Number	Number	Fork	Total	(kg)	River	Method	Site (km)	Date	C	Number	Number	Fork	Total	(kg)	River	Method	Site (km)	Date	Large[2]	(km)[3]
Y	61	7F7D7A6A1E	217.0	243.0	88.1	Nechako	SL	116.2	20-Jun-96	Y	422	7F7D7A6A1E	221.5	244.5	84.9	Nechako	SL	116.8	03-Sep-98	805	0.6
Y	422	7F7D7A6A1E	221.5	244.5	84.9	Nechako	SL	116.8	03-Sep-98	Y	1483	7F7D7A6A1E	222.5	247.0	87.5	Nechako	SL	114.9	11-Sep-99	373	-1.9
Y	1455	7F7D7A6647	158.0	180.0	27.7	Nechako	SL	69.3	13-Sep-98	Y	1497	7F7D7A6647	160.0	182.0	28.6	Nechako	SL	74.2	14-Sep-99	366	4.9
Y	57	7F7D77302F	119.0	136.0	15.9	Nechako	SL	0.1	13-Jun-96	Y-LTFN	0027	7F7D77302F	138.0	156.0	29.3	Fraser	SL	826.6	05-Sep-99	1179	35.2
Y	44	7F7B0C5E5C	186.5	210.0	55.8	Nechako	SL	116.2	18-Sep-97	Y	1478	7F7B0C5E5C	194.5	217.0	59.4	Nechako	SL	116.7	11-Sep-99	723	0.5
Y	350	7F7B0C4C09	143.0	159.0	21.8	Nechako	SL	124.7	07-Sep-98	Y	1472	7F7B0C4C09	146.0	163.0	23.1	Nechako	SL	125.0	09-Sep-99	367	0.3
O	4508	7F7B0C3231	130.5	147.0	16.8	Nechako	SL	92.4	10-Jun-95	Y	1492	7F7B0C3231	145.0	164.0	22.7	Nechako	SL	66.2	14-Sep-99	1557	-26.2
Y	89	7F7B03057D	90.0	103.0	6.8	Nechako	SL	90.2	12-Sep-96	Y	1496	7F7B03057D	108.0	122.0	9.5	Nechako	SL	72.7	14-Sep-99	1097	-17.5

[1] Tag Color: O = orange; Y = yellow; Y-LTFN = yellow - Lheidli T'enneh First Nations.

[2] Indicates number of days since original capture.

[3] Negative values (-) indicate downstream movement.

Table C3 Locations (i.e., river km) of radio-tagged white sturgeon in the Nechako, Stuart, and Fraser rivers, 1995 to 1999.

Radio Tag	Release Date	Sexual Maturity	Water Body	Location Released (km)	1998			1999									
					13-Sep [B]	09-Nov [A]	07-Dec [S]	13-Jan [S]	22-Apr [A]	10-May [G]	11-May [A]	17-May [G]	21-May [G]	22-May [G]	23-May [G]	27-May [A]	02-Jun [B]
149.578-14-116	27-Sep-97	03	Fraser R.	888.6					865.0								
149.620-16-106[1]	14-Sep-95	04	Nechako R.	124.6													
149.500-10-111	14-Sep-95	02		124.6		136.5											
149.620-16-111	15-Sep-95	03		124.6													
149.740-22-106	15-Sep-95	12		124.6		137.5											
149.740-22-111	15-Sep-95	04		116.2		136.5											
149.560-13-109	16-Sep-95	13		124.6				116.2									
149.500-10-105	16-Sep-95	13		116.2					48.7 (St.)		48.7 (St.)						
149.560-13-111	19-Sep-95	12		116.2		116.2	116.2	116.2									
149.680-19-106	19-Sep-95	02		115.2			116.2	116.2									
149.500-10-109	13-Jun-96	01		0.1													
149.680-19-108	15-Jun-96	03		179.6							170.0					170.0	
149.620-16-109	18-Jun-96	02		129.3			116.2	116.2									
149.740-22-109	18-Jun-96	05		126.5		124.7		124.7									
149.620-16-110	20-Jun-96	13		116.2													
149.500-10-108	23-Jun-96	03		92.1		107.8											
149.740-22-107	26-Jun-96	03		76.4		116.2	116.2	116.2									
149.620-16-107	26-Jun-96	02		88.2				115.2									
149.460-08-33	07-Sep-96	02		124.9													
149.480-09-57	07-Sep-96	02		116.2													
149.460-08-32	07-Sep-96	03		124.5		116.2	116.2										
149.460-08-31	08-Sep-96	12		116.2		87.0											
149.460-08-35	09-Sep-96	14		111.2		132.0											
149.560-13-110	09-Sep-96	14		109.4					7.3 (St.)								
149.480-09-56	12-Sep-96	01		90.2													
149.620-16-105	16-Sep-96	02		79.1	72.4 (Tag Confirmed Shed)												
149.740-22-105	16-Sep-96	02		72.6		39.5			39.5		39.5					39.5	
149.500-10-110	20-Sep-96	12		126.5													
149.658-18-112	04-May-97	12		91.5					92.0		92.0					93.0	
149.658-18-116	07-May-97	04		129.5					132.0		133.0					132.5	
149.658-18-110	10-May-97	14		66.5					77.5		76.0					76.8	
149.680-19-109	16-Sep-97	03		98.2			116.2	116.2	116.0		115.0					116.2	
149.500-10-114	17-Sep-97	03		125.2		116.2	116.2	116.2									
149.480-09-52	19-Sep-97	02		110.0					175.5		175.5					176.0	
149.480-09-53	19-Sep-97	12		115.2			116.5	116.2	116.0							117.1	
149.500-10-113	19-Sep-97	03		116.2		116.2		116.2	116.0							116.2	
149.560-13-107	29-Sep-97	02		124.7		98.0			99.0		99.0					98.5	
149.578-14-118	29-Sep-97	04		116.0		124.9		124.9			124.0					124.9	
149.500-10-107	21-Jun-98	12		110.2		116.2		116.2	116.0							116.2	
149.658-18-115	22-Jun-98	14		115.2			116.2	116.2	116.0		116.0					116.2	
149.578-14-117	28-Aug-98	03		66.1		116.2	116.2	116.2	116.0							116.2	
149.740-22-13	01-Sep-98	12		111.2		116.2	116.2									116.2	
149.740-22-15	03-Sep-98	04		114.9		116.2			116.0							116.2	
149.578-14-119	03-Sep-98	13		115.2		116.2	116.2	116.2	108.0		56.5					54.5	52.1
149.658-18-111	03-Sep-98	12		116.8				124.9	125.0		107.0					108.0	
149.740-22-14	05-Sep-98	04		124.9		116.2		116.2	125.0							128.5	
149.500-10-115	06-Sep-98	12		124.9		124.7		124.9	82.0		92.0					92.0	
149.740-22-11	07-Sep-98	04		124.9		125.5		116.2								116.2	
149.578-14-121	07-Sep-98	12		125.1		124.9			130.5			110.4				141.5	
149.658-18-114	13-Sep-98	12		68.2	68.2			124.9	122.0	110.4	108.0	110.4	110.3	110.3	110.3	157.0	

NOTE: Periods prior to release, suspected and confirmed shed tags, or tags no longer functioning are denoted by shading. [S] = Shore; [B] = Boat; [A] = Aerial; [G] = Fixed Ground Station.

Continued…

[1] Lotek high frequency radio transmitter = Frequency-Channel-Code (eg. 149.620-16-106 = Frequency 149.620; Channel 16; Code 106).

[2] (St) Represents Stuart River Kilometre.

Table C3 Continued.

Radio Tag	Release Date	Sexual Maturity	Water Body	Location Released (km)	1999											
					03-Jun [B]	05-Jun [B]	06-Jun [B]	07-Jun [B]	08-Jun [A]	10-Jun [B]	11-Jun [B]	12-Jun [B]	13-Jun [B]	14-Jun [B]	15-Jun [B]	16-Jun [B]	17-Jun [B]
149.578-14-116	27-Sep-97	03	Fraser R.	888.6													
149.620-16-106[1]	14-Sep-95	04	Nechako R.	124.6													
149.500-10-111	14-Sep-95	02		124.6													
149.620-16-111	15-Sep-95	03		124.6													
149.740-22-106	15-Sep-95	12		124.6													
149.740-22-111	15-Sep-95	04		116.2													
149.560-13-109	16-Sep-95	13		124.6													
149.500-10-105	16-Sep-95	13		116.2													
149.560-13-111	19-Sep-95	12		116.2													
149.680-19-106	19-Sep-95	02		115.2													
149.500-10-109	13-Jun-96	01		0.1													
149.680-19-108	15-Jun-96	03		179.6					170.0								
149.620-16-109	18-Jun-96	02		129.3													
149.740-22-109	18-Jun-96	05		126.5													
149.620-16-110	20-Jun-96	13		116.2													
149.500-10-108	23-Jun-96	03		92.1													
149.740-22-107	26-Jun-96	03		76.4													
149.620-16-107	26-Jun-96	02		88.2													
149.460-08-33	07-Sep-96	02		124.9													
149.480-09-57	07-Sep-96	02		116.2													
149.460-08-32	07-Sep-96	03		124.5													
149.460-08-31	08-Sep-96	12		116.2													
149.460-08-35	09-Sep-96	14		111.2													
149.560-13-110	09-Sep-96	14		109.4													
149.480-09-56	12-Sep-96	01		90.2								103.4			103.5		
149.620-16-105	16-Sep-96	02		79.1													
149.740-22-105	16-Sep-96	02		72.6					38.5								
149.500-10-110	20-Sep-96	12		126.5													
149.658-18-112	04-May-97	12		91.5	92.1				93.0								
149.658-18-116	07-May-97	04		129.5					132.2								
149.658-18-110	10-May-97	14		66.5					76.8								
149.680-19-109	16-Sep-97	03		98.2					116.2								
149.500-10-114	17-Sep-97	03		125.2													
149.480-09-52	19-Sep-97	02		110.0					175.7								
149.480-09-53	19-Sep-97	12		115.2					117.1								
149.500-10-113	19-Sep-97	03		116.2													
149.560-13-107	29-Sep-97	02		124.7	98.3				98.0								
149.578-14-118	29-Sep-97	04		116.0					124.9								
149.500-10-107	21-Jun-98	12		110.2					116.2								
149.658-18-115	22-Jun-98	14		115.2					116.2								
149.578-14-117	28-Aug-98	03		66.1					116.2								
149.740-22-13	01-Sep-98	12		111.2					116.2								
149.740-22-15	03-Sep-98	04		114.9					116.2								
149.578-14-119	03-Sep-98	13		115.2		52.0	51.8	51.8	51.7	51.8	51.8		51.8	51.8		50.7	50.7
149.658-18-111	03-Sep-98	12		116.8					108.0								
149.740-22-14	05-Sep-98	04		124.9					128.5								
149.500-10-115	06-Sep-98	12		124.9	92.6				94.5								
149.740-22-11	07-Sep-98	04		124.9					116.2								
149.578-14-121	07-Sep-98	12		125.1					141.5								
149.658-18-114	13-Sep-98	12		68.2					160.2								

NOTE: Periods prior to release, suspected and confirmed shed tags, or tags no longer functioning are denoted by shading. [S] = Shore; [B] = Boat; [A] = Aerial; [G] = Fixed Ground Station.

Continued…

[1] Lotek high frequency radio transmitter = Frequency-Channel-Code (eg. 149.620-16-106 = Frequency 149.620; Channel 16; Code 106).

[2] (St) Represents Stuart River Kilometre.

Table C3 Concluded.

Radio Tag	Release Date	Sexual Maturity	Water Body	Location Released (km)	1999												
					22-Jun [A]	03-Jul [B]	04-Jul [B]	05-Jul [B]	06-Jul [B]	09-Jul [A]	13-Jul [B]	04-Aug [A]	05-Sep [B]	08-Sep [B]	09-Sep [B]	10-Sep [B]	14-Sep [B]
149.578-14-116	27-Sep-97	03	Fraser R.	888.6													
149.620-16-106[1]	14-Sep-95	04	Nechako R.	124.6													
149.500-10-111	14-Sep-95	02		124.6													
149.620-16-111	15-Sep-95	03		124.6			120.2										
149.740-22-106	15-Sep-95	12		124.6													
149.740-22-111	15-Sep-95	04		116.2													
149.560-13-109	16-Sep-95	13		124.6							116.2						
149.500-10-105	16-Sep-95	13		116.2													
149.560-13-111	19-Sep-95	12		116.2		116.2					116.2						
149.680-19-106	19-Sep-95	02		115.2		116.2					116.2						
149.500-10-109	13-Jun-96	01		0.1									826.6 (FR Tag Confirmed Shed)				
149.680-19-108	15-Jun-96	03		179.6	170.0					170.0		170.0					
149.620-16-109	18-Jun-96	02		129.3													
149.740-22-109	18-Jun-96	05		126.5				124.7									
149.620-16-110	20-Jun-96	13		116.2													
149.500-10-108	23-Jun-96	03		92.1													
149.740-22-107	26-Jun-96	03		76.4							116.2						
149.620-16-107	26-Jun-96	02		88.2		115.2											
149.460-08-33	07-Sep-96	02		124.9													
149.480-09-57	07-Sep-96	02		116.2													
149.460-08-32	07-Sep-96	03		124.5													
149.460-08-31	08-Sep-96	12		116.2													
149.460-08-35	09-Sep-96	14		111.2					131.8								
149.560-13-110	09-Sep-96	14		109.4													
149.480-09-56	12-Sep-96	01		90.2													(Tag Confirmed Shed) 72.7
149.620-16-105	16-Sep-96	02		79.1													
149.740-22-105	16-Sep-96	02		72.6	39.0					39.0		38.5					
149.500-10-110	20-Sep-96	12		126.5													
149.658-18-112	04-May-97	12		91.5	93.0					92.0		92.0					
149.658-18-116	07-May-97	04		129.5	132.2				132.0	132.1		132.1		131.9			
149.658-18-110	10-May-97	14		66.5	75.5					75.5		75.5					
149.680-19-109	16-Sep-97	03		98.2	116.2					115.3	116.2						
149.500-10-114	17-Sep-97	03		125.2							116.2						
149.480-09-52	19-Sep-97	02		110.0	175.9					175.7		175.8					
149.480-09-53	19-Sep-97	12		115.2	117.1	117.3				117.1	117.3	117.1					
149.500-10-113	19-Sep-97	03		116.2	116.2							116.2					
149.560-13-107	29-Sep-97	02		124.7	98.0					98.4		98.4					
149.578-14-118	29-Sep-97	04		116.0	124.9			124.9		124.9		124.9			125.2	124.6	
149.500-10-107	21-Jun-98	12		110.2	116.2	116.2				116.2	116.2	116.2					
149.658-18-115	22-Jun-98	14		115.2	116.2	116.2					116.2	116.7					
149.578-14-117	28-Aug-98	03		66.1	116.2	116.2				116.2	116.2	116.2					
149.740-22-13	01-Sep-98	12		111.2	116.2												
149.740-22-15	03-Sep-98	04		114.9	116.2					116.2		116.2					
149.578-14-119	03-Sep-98	13		115.2	50.0					44.1		40.8					
149.658-18-111	03-Sep-98	12		116.8	108.0					107.3		107.7					
149.740-22-14	05-Sep-98	04		124.9	128.5					128.3		128.3					
149.500-10-115	06-Sep-98	12		124.9	92.0					92.2							
149.740-22-11	07-Sep-98	04		124.9	116.2	116.2											
149.578-14-121	07-Sep-98	12		125.1	141.5					141.3		141.5					
149.658-18-114	13-Sep-98	12		68.2	160.2					160.2		160.2					
149.480-09-54	09-Sep-99	13		124.6									124.6	124.6			

NOTE: Periods prior to release, suspected and confirmed shed tags, or tags no longer functioning are denoted by shading. [S] = Shore; [B] = Boat; [A] = Aerial; [G] = Fixed Ground Station.

[1] Lotek high frequency radio transmitter = Frequency-Channel-Code (eg. 149.620-16-106 = Frequency 149.620; Channel 16; Code 106).

[2] (St) Represents Stuart River Kilometre.

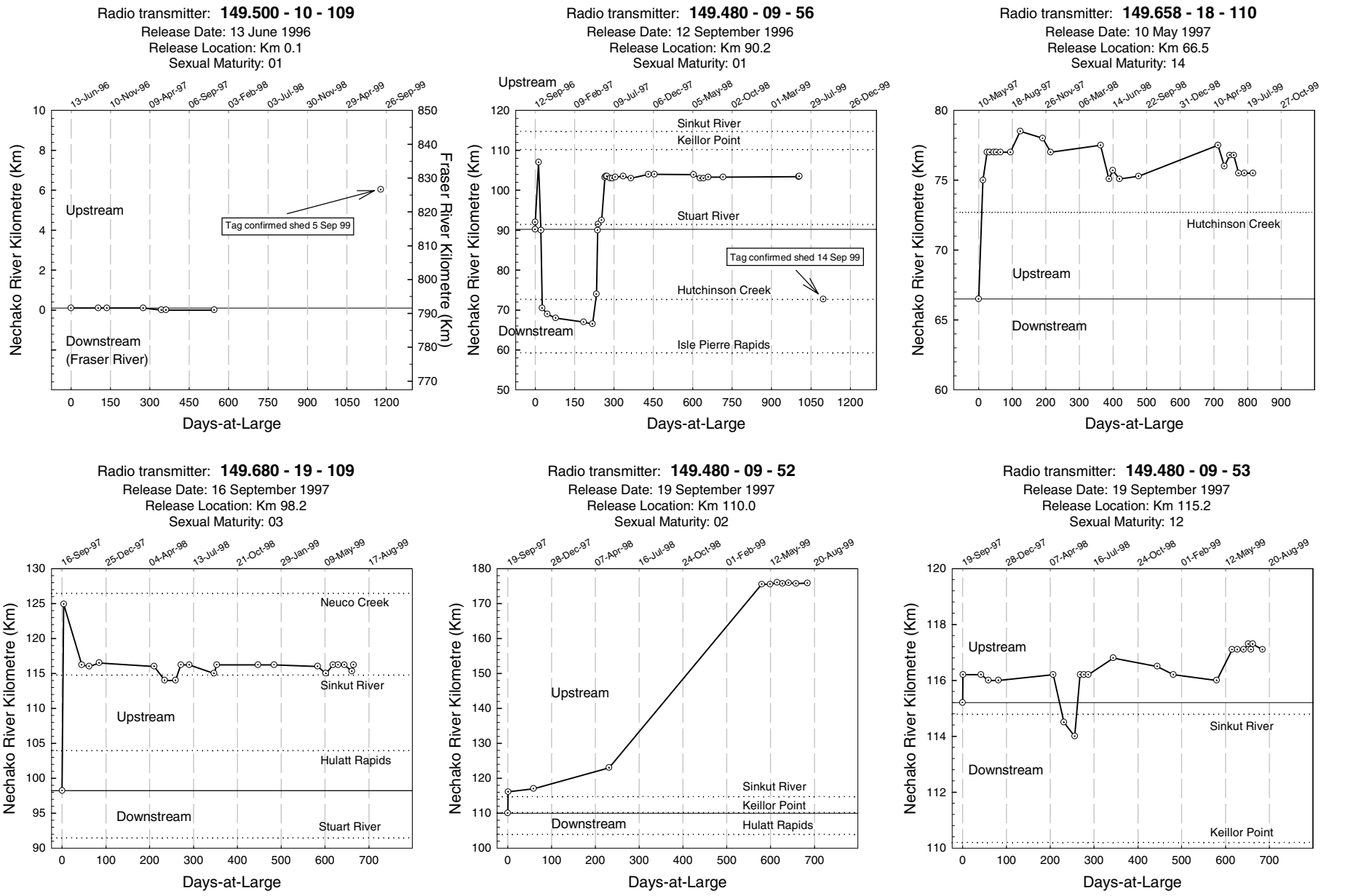

Figure C1 Summary of movements in 1999, for white sturgeon equipped with a radio transmitter in the study area.

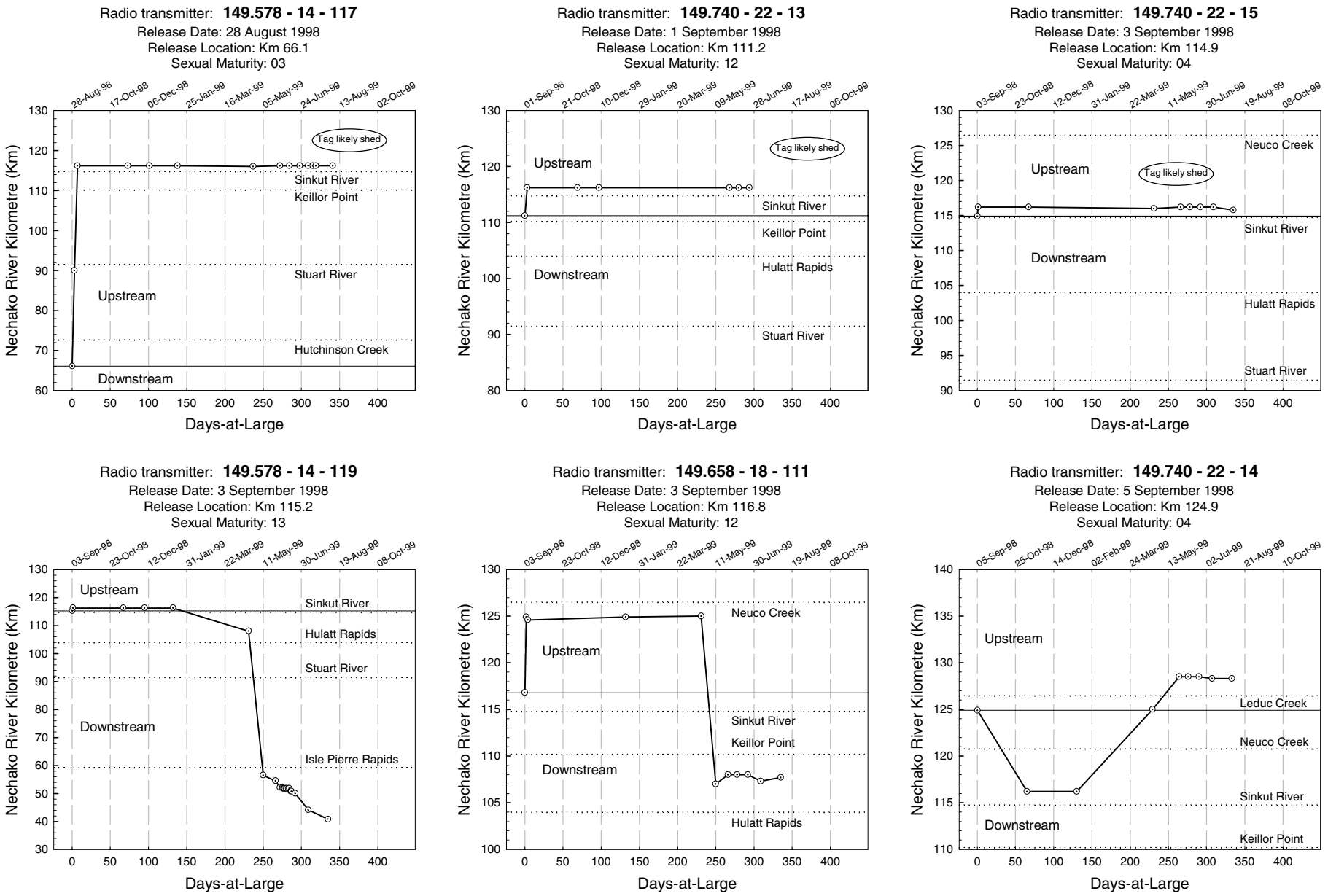

Figure C2 Summary of movements in 1999, for white sturgeon equipped with a radio transmitter in the study area.

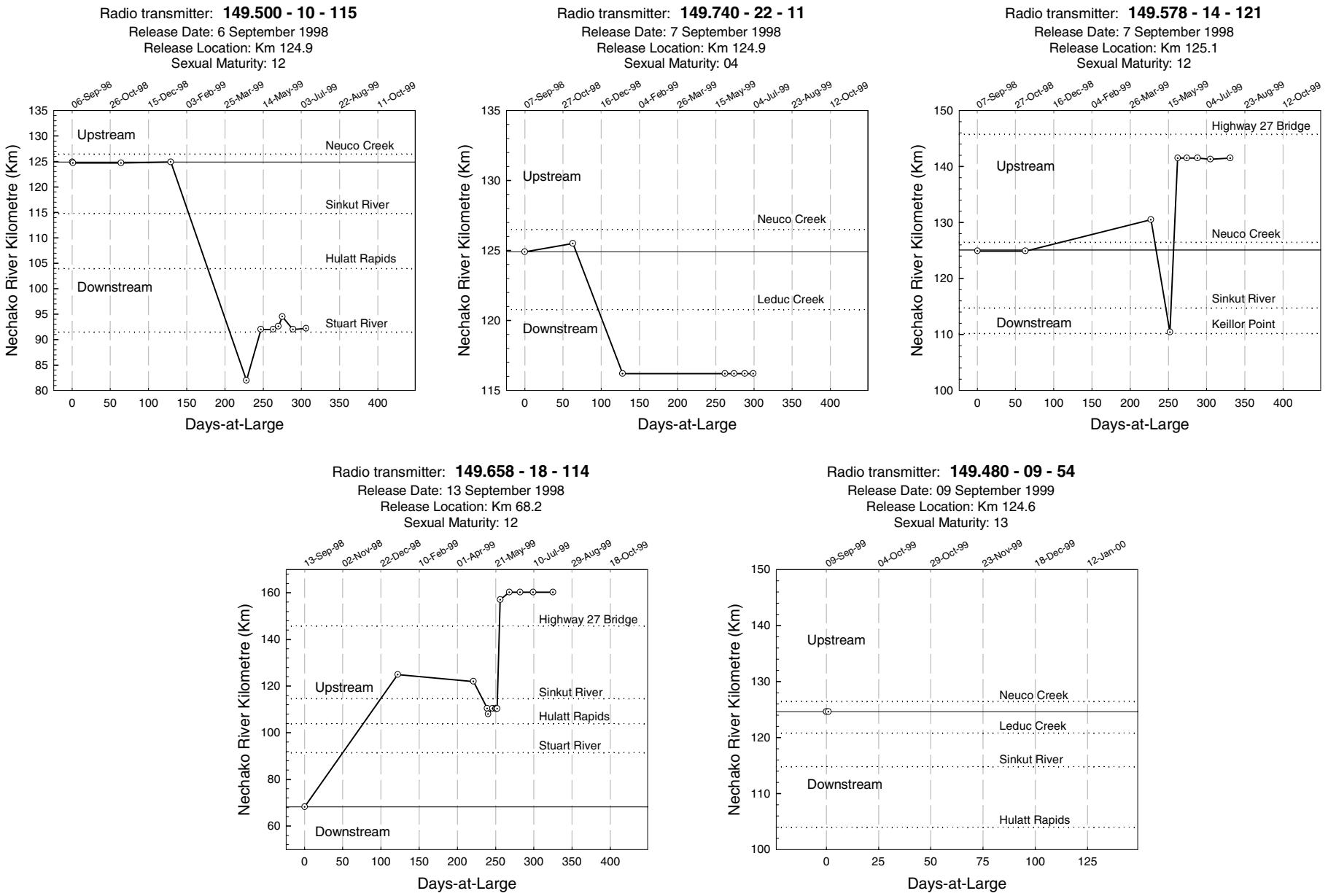

Figure C3 Summary of movements in 1999, for white sturgeon equipped with a radio transmitter in the study area.

APPENDIX D

LIFE HISTORY DATA

Table D1 Descriptive summary of sexual maturity of white sturgeon sampled in the study area, 1999.

Maturity Code[1]	Fork Length (cm)	Total Length (cm)	Post-orbital Length (cm)	Post-opercular Length (cm)	Girth (cm)	Weight (kg)	Waterbody	Sample Site	Date	Dart/T-Anchor Tag		PIT Tag No.	Radio Tag[3]			General Description
										Color[2]	No.		Frequency	Channel	Code	
12	166.5	187.5	21.0	45.5	63.5	33.1	Nechako	SSL-125.0R	09-Sep-99	Y	1473	4125010F3C				**Female:** Ovaries cream colour, filling 1/2 ventral cavity. Eggs visible on the left ventral surface, embedded in ovarian tissue, <1.0 mm diameter. Few larger white eggs present. Folding in ovarian tissue, Some fluid in body cavity. Surgical biopsy completed.
12	137.0	155.0	16.5	34.5	52.0	20.0	Nechako	SSL-124.6L	09-Sep-99	Y	1468	4124735E01				**Female:** Ovaries cream to yellow coloured, filling 2/3 of ventral cavity. Eggs embedded in ovarian tissue, white and >0.5 mm diameter. Some folding in dorsal portion of ventral cavity. Surgical biopsy completed.
13	162.0	185.0	19.5	42.5	63.5	32.7	Nechako	SSL-124.6L	09-Sep-99	Y	1470	412472515E	149.480	9	54	**Female:** Ovaries heavily vienated, creamy white with smoky pigmentation filling 3/4 of ventral cavity. Some folding in anterior dorsal surface. Eggs are white, < 1.0mm in diameter. Surgical biopsy completed.
02	141.5	160.5	17.0	36.0	52.5	19.5	Nechako	SSL-124.6L	10-Sep-99	Y	1474	4124747221				**Male:** Testes white with grey speckling, filling 1/3 of ventral cavity. Folds forming lobes in anterior portion. Fluid in body cavity, difficult to see dorsal surface. Surgical biopsy completed.
02	98.5	114.0	11.0	23.5	34.5	8.2	Nechako	SSL-125.0R	10-Sep-99	Y	1475	413931641C				**Male:** Testes cream coloured with smoky pigmentation, filling 1/3 of the ventral cavity. Some folds in anterior portion, beginning to form lobes on left side. Some fluid in body cavity. Surgical biopsy completed.
12	217.0	242.5	24.0	56.0	86.5	59.4	Nechako	SSL-116.2R	10-Sep-99	Y	1477	4124667D61				**Female:** Ovaries white with smoky pigmentation, filling 1/2 of the ventral cavity. Eggs embedded in ovarian tissue, translucent, few white < 0.5 mm in diameter. Lobing throughout. Surgical biopsy completed.
13	222.5	247.0	24.0	56.0	89.5	87.5	Nechako	SSL-114.9L	11-Sep-99	Y	1483	7F7D7A6A1E				**Female:** Ovaries filling 1/2 ventral cavity. Eggs white, <1.0 mm in diameter, embedded in ovarian tissue. Surgical biopsy completed.
97	179.0	200.0	21.0	47.5	68.0	40.8	Nechako	SSL-116.2R	11-Sep-99	Y	1479	4125005E0C				**Unknown:** Considerable amount of fluid in ventral cavity - could not assess sexual maturity.
04	194.5	217.0	23.5	50.5	76.5	59.4	Nechako	SSL-116.7R	11-Sep-99	Y	1478	7F7B0C5E5C				**Male:** Testes white with light smoky pigmentation, filling 3/4 ventral cavity. Folds forming lobes in anterior portion, extending into posterior.
03	145.0	165.0	16.5	38.5	57.0	22.7	Nechako	SSL-107.9L	12-Sep-99	Y	1487	41246C3057				**Male:** Testes cream coloured with grey speckling, filling 1/2 of the ventral cavity. Folding apparent in anterior portion. Small amount of fluid in body cavity. Surgical biopsy completed.
03	151.5	171.0	18.0	38.5	56.5	25.9	Nechako	SSL-110.0R	12-Sep-99	Y	1485	4124692877				**Male:** Testes cream to white with light speckling, filling 2/3 of the ventral cavity. Folds forming lobes in anterior portion. Surgical biopsy completed.
97	182.0	204.0	25.0	52.5	71.0	40.8	Nechako	SSL-107.6L	12-Sep-99	Y	1490	4124707E71				**Unknown:** Considerable amount of fluid in ventral cavity - could not assess sexual maturity.
03	160.0	180.0	18.0	40.5	61.0	29.5	Nechako	SSL-67.4R	14-Sep-99	Y	1495	4139333903				**Male:** Testes more white than cream with light pigmentation, filling 1/3 ventral cavity. Lobes forming in anterior portion and in the mid-ventral cavity on the right side.
03	140.5	160.0	16.5	36.0	52.5	20.4	Nechako	SSL-67.4R	14-Sep-99	Y	1494	41390D643C				**Male:** Testes cream coloured with grey pigmentation, filling 1/2 ventral cavity. Folds forming lobes in anterior portion, folds present in the posterior portion. Some fluid in the body cavity.

[1] For a description of sexual maturity codes, see Appendix E.

[2] Tag colour Y = "Yellow"

[3] Lotek Engineering Inc. hi-frequency radio transmitter.

Table D2 Length, weight, and age data for sexual maturity stages of white sturgeon sampled in the study area, 1999.

Sex Code[1]	Length Data			Weight Data			Age Data		
	n	Mean Fork Length (cm) and (S.D.)[2]	Range of Fork Length (cm)	*n*	Mean Weight (kg) and (S.D.)	Range of Weight (kg)	*n*	Mean Age (yrs.) and (S.D.)	Range of Age (yrs.)
Males									
20	-[3]	-	-	-	-	-		-	-
01	-	-	-	-	-	-		-	-
02	2	120.0 (30.4)	98.5 - 141.5	2	13.9 (8.0)	8.2 - 19.5	2	20.0 (2.8)	18 - 22
03	4	149.3 (8.5)	140.5 - 160.0	4	24.6 (4.0)	20.4 - 29.5	4	36.5 (1.7)	34 - 38
04	1	194.5	-	1	59.4	-		-	-
05	-	-	-	-	-	-		-	-
06	-	-	-	-	-	-		-	-
07	-	-	-	-	-	-		-	-
Females									
10	-	-	-	-	-	-	-	-	-
11	-	-	-	-	-	-	-	-	-
12	3	173.5 (40.5)	137.0 - 217.0	3	37.5 (20.1)	20.0 - 59.4	3	43.0 (17.1)	29 - 62
13	2	192.3 (42.8)	162.0 - 222.5	2	60.1 (38.7)	32.7 - 87.5	1	42.0	-
14	-	-	-	-	-	-	-	-	-
15	-	-	-	-	-	-	-	-	-
16	-	-	-	-	-	-	-	-	-
17	-	-	-	-	-	-	-	-	-
Unknown[4] 97/98	25	149.9 (25.5)	77.0 - 200.5	25	25.0 (13.0)	3.5 - 64.5	21	33.3 (10.8)	9 - 58

[1] For a description of sexual maturity codes, see Appendix E.

[2] S.D. = standard deviation

[3] Data not available.

[4] These fish were not surgically examined to assess state of sexual maturity.

Table D3 Summary of life history and tag information for white sturgeon sampled for DNA analysis in the study area, 1999.

Waterbody	Fork Length (cm)	Weight (kg)	Tag Colour[1]	Tag Number	PIT Tag Number	Date	Bio-sample Code[2]
Nechako R.	77.0	3.5	Y	1456	41392C0A2D	5-Jul	1
	162.0	36.8	Y	1457	4124705139	5-Aug	1
	200.5	64.5	Y	1459	4124731A62	5-Aug	1
	156.0	23.2	Y	1461	4124711077	5-Aug	1
	133.0	16.8	Y	1462	41247D310C	5-Aug	1
	160.5	26.3	Y	1463	420E616F33	5-Aug	1
	168.5	33.1	Y	1465	41247F0738	5-Aug	1
	162.0	26.3	Y	1467	41246B7817	5-Aug	1
	137.0	20.0	Y	1468	4124735E01	9-Sep	1
	84.0	4.1	Y	1469	41493F7C14	9-Sep	1
	162.0	32.7	Y	1470	412472515E	9-Sep	1
	142.5	20.4	Y	1471	4124777903	9-Sep	1
	166.5	33.1	Y	1473	4125010F3C	9-Sep	1
	141.5	19.5	Y	1474	4124747221	10-Sep	1
	98.5	8.2	Y	1475	413931641C	10-Sep	1
	217.0	59.4	Y	1477	4124667D61	10-Sep	1
	179.0	40.8	Y	1479	4125005E0C	11-Sep	1
	153.0	24.0	Y	1480	412469273C	11-Sep	1
	148.5	20.4	Y	1481	4124665E75	11-Sep	1
	138.5	20.0	Y	1482	4124751461	11-Sep	1
	180.5	42.6	Y	1484	4124721004	12-Sep	1
	151.5	25.9	Y	1485	4124692877	12-Sep	1
	153.5	24.5	Y	1486	4125062840	12-Sep	1
	145.0	22.7	Y	1487	41246C3057	12-Sep	1
	122.5	14.1	Y	1488	4139256371	12-Sep	1
	132.5	18.1	Y	1489	4124792E35	12-Sep	1
	182.0	40.8	Y	1490	4124707E71	12-Sep	1
	143.5	22.2	Y	1491	4124671F3B	12-Sep	1
	143.0	19.6	Y	1493	4139666A06	14-Sep	1
	140.5	20.4	Y	1494	41390D643C	14-Sep	1
	160.0	29.5	Y	1495	4139333903	14-Sep	1

Note: Does not include DNA samples collected and submitted by Lheidli T'enneh First Nations.

[1] Tag Colour Y = Yellow

[2] 1 = Tissue sample from distal end of pectoral fin; 2 = Blood sample; 3 = Tissue and blood sample.

APPENDIX E

DESCRIPTION OF MATURITY STATE CLASSIFICATIONS

Table E1 Descriptive summary of sexual maturity codes for white sturgeon sampled in the study area.

CODE	SEX	DEVELOPMENT STATE DESCRIPTION[1]
98	Unknown	Gonad undifferentiated or not visible; juvenile based on size
97	Unknown	Gonad not visible; adult based on size
01	Male	Non-reproductive, testes appear as thin strips with no pigmentation
11	Female	Non-reproductive; ovaries small, folded with no visible oocytes; tissue color white to yellowish
02	Male	Maturing; small testes; some folding may be apparent; translucent, smoky pigmentation
12	Female	Pre-vitellogenic, moderate size ovary with small eggs present (0.2 to 0.5 mm diameter); may have "salt and pepper" appearance
03	Male	Early reproductive; large testes, folds beginning to form lobes; some pigmentation still present. Testes more white than cream colored
13	Female	Early vitellogenic; large ovary varying in color from white to yellowish-cream to light grey; eggs 0.6 to 2.1 mm in diameter
04	Male	Late reproductive; testes large, often filling posterior of body cavity; white with little or no pigmentation
14	Female	Late vitellogenic; ovaries large with pigmented oocytes still attached to ovarian tissue; eggs 2.2 to 2.9 mm in diameter; sometimes with salt and pepper appearance
05	Male	Ripe; milt flowing; large white lobular testes; no pigmentation
15	Female	Ripe; eggs fully pigmented and easily detached from ovarian tissue; eggs 3.0 to 3.4 mm in diameter
06	Male	Spent; testes pinkish-white, flaccid, and strongly lobed
16	Female	Spent; ovaries are flaccid with some residual fully developed eggs
17	Female	Pre-vitellogenic with attritic oocytes; small eggs (<0.5 mm diameter) present; dark pigmented tissue present that may be reabsorbed eggs.
10	Male	General unknown maturity
20	Female	General unknown maturity

[1]Descriptions of maturity state classifications adapted from Conte et al. (1988).