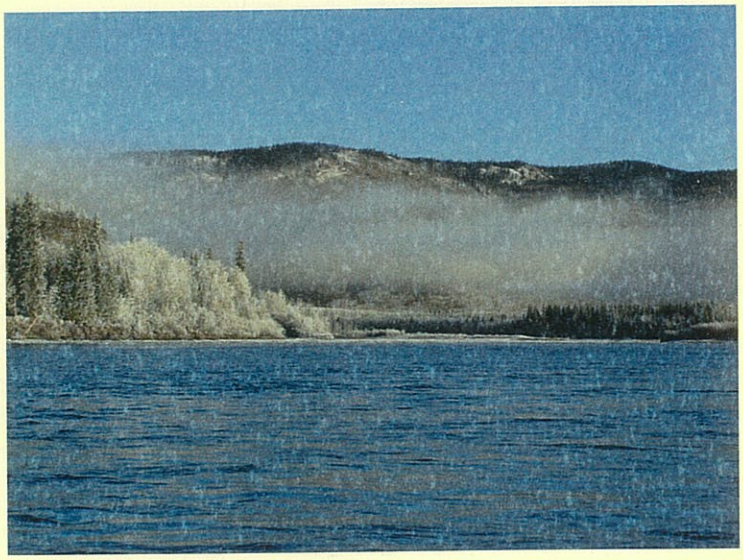
2003 CHUM SALMON TAG RECOVERY PROJECT YUKON RIVER *(MINTO TO FORT SELKIRK)* CRE-29-03



Prepared for:

YUKON RIVER PANEL
and
FISHERIES AND OCEANS CANADA

Prepared by:

SELKIRK FIRST NATION
LANDS AND RESOURCES DEPARTMENT

with
Can-nic-a-nick Environmental Sciences

DECEMBER, 2003

ABSTRACT

The Department of Fisheries and Oceans Canada has conducted tagging programs on migratory pacific salmon populations in the upper Yukon River drainage since 1982. Chum salmon are marked with spaghetti tags at two fish wheels located near the United States - Canadian border. The purpose of the tagging and subsequent tag recovery is to estimate the amount of salmon crossing the border into Canada.

During October of 2003, the Selkirk First Nation recovered spaghetti tags from post-spawn chum salmon in the Minto index area of the Yukon River near Pelly Crossing, Yukon. Spaghetti tags were recovered through foot surveys and the use of a seine net at several known chum spawning locations. A total of 17 spaghetti tags were recovered, 14 orange Canadian tags and 3 white tags of origin in the United States. The chum tag ratio in the Minto index area was determined to be 31.1 fish for each Canadian tag. This represents an increase of 22 percent from 2002 and corresponds to a higher border escapement estimate for chum salmon in 2003.

TABLE OF CONTENTS

ABSTRACT i

TABLE OF CONTENTS ii

1.0 INTRODUCTION 1

2.0 METHODS 1

3.0 RESULTS 2

4.0 DISCUSSION 4

4.1 Chum Tag Recovery Timing 4
4.2 Chum Salmon Spawning Sites 5
4.3 Chum Salmon Tag and Sex Ratios 5

REFERENCES 6

PERSONAL COMMUNICATION 6

ACKNOWLEDGEMENTS 7

LIST OF FIGURES

Figure 1 Yukon River (Minto Index Area) chum salmon tag recovery sites 3

LIST OF TABLES

Table 1 Summary of the results from chum salmon enumeration surveys and tag recoveries from the Minto index area, 2003. 4

APPENDIX I Chum Salmon Biological Data 2003. 8

APPENDIX II Chum Salmon Recovery Data 2003 10

APPENDIX III Updated Survey Waypoints 13

1.0 INTRODUCTION

The Chum Spawning Ground Tag Recovery program is conducted annually on the Yukon River between Minto and Fort Selkirk, Yukon. It is one of several chum assessment programs that are annually conducted within Canadian portion of the Yukon River basin. As in the previous years this project continues to be administered and managed by the Selkirk First Nation (SFN) located in Pelly Crossing, Yukon. The involvement of SFN people in fisheries management projects within their Traditional Territory has recently increased as a result of the finalization of the SFN land claim agreement. Together with the Habitat Conservation and Stewardship Program initiated by Fisheries and Oceans Canada (DFO) the SFN have increased their capacity to initiate and participate in various fisheries management projects throughout their Traditional Territory.

The primary objective of the Chum Spawning Ground Tag Recovery program was to gather in-season mark recapture data to assist DFO fisheries management biologists to estimate run abundance on the mainstem of the Yukon River. Abundance estimates are achieved through the recovery of spaghetti tags to determine the ratio of tagged to untagged chum salmon in the Minto index area that extends from Minto Landing downstream to Fort Selkirk. Chum stocks have been weak since 1997 although in 2003 stock strength was sufficient to allow for a more intensive tag recovery effort by the commercial fishery in Dawson City, Yukon.

A stock rebuilding program for Canadian origin chum on the Yukon River continues to be a management goal of DFO. The means of measuring success or failure of this program is the mark-recapture estimates that are determined through these types of projects. In addition, projects like this also provide local jobs and benefits, while identifying important chum spawning habitat for future land use planning initiatives in the area.

2.0 METHODS

Spaghetti tags applied by DFO at fish wheels near the Yukon-Alaska border were recovered through foot surveys and seining of known chum spawning locations on the

Yukon River between Minto and the confluence of the Pelly River at Fort Selkirk (Figure 1). An initial reconnaissance was made on October 2nd to determine spawn timing and condition of the fish. Tag recovery work was conducted between October 23rd and 27th, a period considered to be suitable for sampling and well after peak spawn to avoid disturbing salmon actively engaged in spawning activity. Spawning locations were located using a hand held GPS and previously referenced coordinates (SFN 2001). All previously established waypoints that indicated spawning locations were foot surveyed. All sites were accessed using a boat and outboard jet drive motor. The three and sometimes four person crew collected tags by walking the perimeter of the spawning area in addition to enumerating carcasses on the shore. At locations where significant numbers of chum were observed in the water seine nets were used to capture fish. Both live post-spawn fish and carcasses in the sloughs were enumerated and marked by hole punching the operculum. Seining at each site continued until previously captured fish became disproportionate in the sample or when the field personal considered the disturbance excessive. The sex, spawning condition and a visual inspection for marks of all seine captured chum salmon were recorded. All captured fish were released after sampling.

3.0 RESULTS

The reconnaissance of three key sites (W51, W52 and W58) in the Minto Index area on October 2nd revealed no spawning redds, with very few chum salmon visually observed in these sloughs. During the same survey, a commercial gillnet catch of 120 chum was observed in the Yukon River mainstem.

Between October 23rd and October 27th a total of 9 spawning sites were inspected for chum salmon and spaghetti tags (Figure 1). At 3 of these sites a seine was used to capture live fish and carcasses that were contained in the sloughs or in areas with extensive spawning dunes. During the survey a total of 17 spaghetti tags were recovered, 14 orange Canadian tags and 3 white tags of US origin. Of the 14 orange spaghetti tags recovered, 12 were from the current tagging year with 5 removed from whole fish (Table 1).

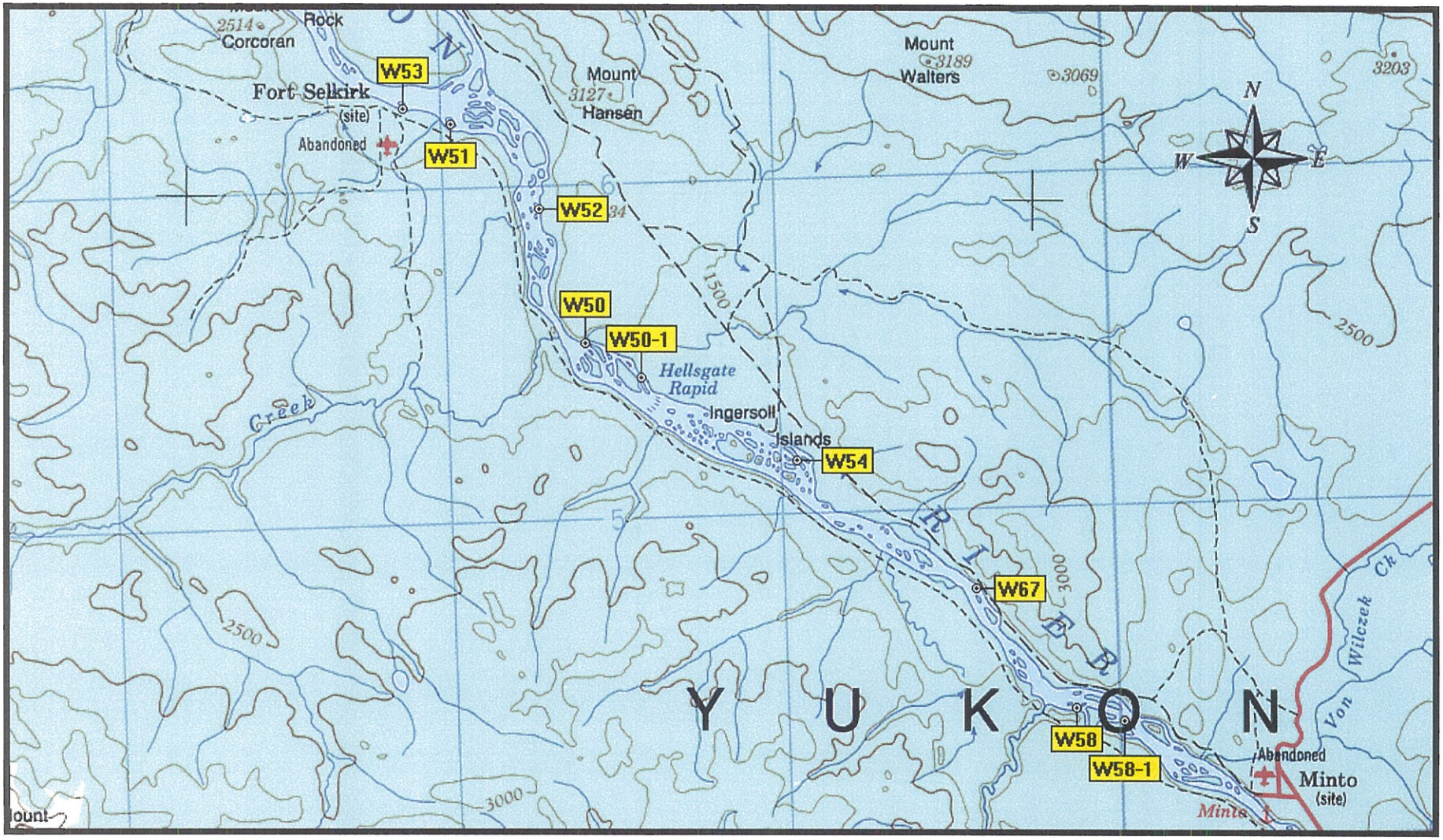


FIGURE 1: YUKON RIVER (MINTO INDEX AREA) CHUM SALMON TAG RECOVERY SITES

5 0 5 10 15 km

SCALE 1 : 250,000

Altogether the 9 surveyed sites resulted in the enumeration of 436 chum salmon in varying condition. Of the 436 enumerated, 198 were live chum salmon that were captured and enumerated using a seine at 3 of these sites (W51, W52 and W58). All seined fish were visually inspected for upper and lower caudal punches as well as an adipose clip or punch (Appendix I). No caudal markings were observed and all Canadian tagged fish had an adipose clip. The balance or 238 fish were nearly all carcasses and represent a cumulative total of all chum salmon enumerated along spawning site shorelines. In most cases these carcasses were not whole fish, having been scavenged by eagles, ravens and bears. The remnants were mainly in the form of carcass heads that were frozen into the gravel bars.

The reasonably good body condition of most of the captured fish enabled sexual determination and visual inspection for fin clips or hole-punches. Of a sub-sample of 118 chum salmon the male to female sex ratio was calculated to be .97 males to each female fish (58 males: 60 females).

Table 1 Summary of the results from chum salmon enumeration surveys and tag recoveries from the Minto index area, 2003.

Enumeration Method	Count	Canadian 2003 Spaghetti Tags Recovered or Observed	Tag Ratio
Chum Carcasses on Shore	283	9***	31.4 fish per tag
Chum in Slough**	198	5	39.6 fish per tag
Total	436	14	31.1 fish per tag

** includes seined carcasses
*** includes 3 tags found on slough bottom

4.0 DISCUSSION

4.1 Chum Tag Recovery Timing

October 23rd to the 27th was the target period to conduct this year's project. This allowed for tag recoveries along gravel bars before snow accumulations obscured tags. However unlike the unseasonably warm temperatures during the fall of 2002, the weather

preceding this years survey was colder, making accessing some of the sites difficult due to ice cover. With the project conducted a week earlier than in previous years, it was apparent that spawning chum salmon were more prevalent over redds rather than in the deeper waters of the sloughs where they typically concentrate post-spawning. Female fish that were seined from areas with extensive spawning dunes were largely spent and in noticeably much better condition than in previous sampling years. This was especially evident at the Big Creek Slough spawning site (W58) where sampling was discontinued after several seining sweeps to avoid disturbing those fish in their final stages of spawning. These observations combined with the earlier reconnaissance on October 2nd would suggest that peak spawning in the Minto index area was between the 5th and 18th of October in 2003.

4.2 Chum Salmon Spawning Sites

The section of the Yukon River between Minto and Fort Selkirk has long been known as an important chum spawning area. Chum salmon have been harvested here by Selkirk First Nation people for hundreds, if not thousands of years (Gotthardt, pers. com.). Today a small fishery for chum salmon continues however, the earlier run of chinook salmon is a more popular fishery for the residents of Pelly Crossing.

As in previous years the sloughs at sites W58 (Big Creek Slough), W52 (warm spring location) and W51 at Fort Selkirk again represented the largest concentrations of spawning chum salmon in the Minto index area as determined from foot surveys. The most notable exception was site W50-1, across the river from Wolverine Creek, that contained significant densities of spawning dunes, spent fish and carcasses. All previous foot surveys at this site have resulted in few observations of spawning chum salmon. This year the enumeration of live fish at all of these sites was made difficult due to ice conditions. A summary of the 2003 site waypoints are presented in Appendix III.

4.3 Chum Salmon Tag and Sex Ratios

It was noted in previous years that the lack of snow cover on the ground may have resulted in an increase in tag recoveries and shoreline carcass enumeration estimates when compared to years that were conducted with a snow base. In 2001, only 6 spaghetti tags were found unattached to fish either in the water or along the snow covered shoreline

compared to 17 unattached tags (including US origin tags) that were collected in 2003. A ground cover of snow in any particular year can significantly skew calculated ratios of unmarked to marked fish. With the lack of snow base in both 2002 and 2003 survey years, a more objective comparison between these years. The chum tag ratio in the Minto index area in 2003 (31.1 fish per tag) increased by 22 percent compared to the previous year (24.2 fish per tag). This appears to be consistent with an estimated increase in border escapement in 2003 (140,000 fish in 2003; 91,808 fish in 2002) and not related to the number of tags available for recovery between years (5,206 tagged in 2002; 5,394 tagged in 2003).

As in the 2002 survey, the use of a seine greatly aided in the tag recovery efforts and sex determination of fish contained in the sloughs. Large areas could be "swept" with the seine catching both live fish and carcasses that would normally be out of reach with a gaff. Fish were again captured, marked and then released with recaptures noted in each subsequent seine. This sampling strategy enabled the survey crew to confidently sample the majority of fish contained in each respective slough however many of the fish were released without being measured to reduce capture stress.

The weather was seasonally. As with the 2001 survey, enumeration conditions were poor in 2003 for enumeration due to poor water visibility combined with ice cover which prevented some locations from being thoroughly sampled.

REFERENCES

Selkirk First Nation. 2001. *2001 Chum Spawning Ground Recoveries-Minto Area.* Prepared for the Yukon River Panel under the Yukon Restoration and Enhancement Fund. 19 p.

Selkirk First Nation. 2002. *2002 Chum Salmon Tag Recovery Project, Yukon River (Minto to Fort Selkirk).* Prepared for the Yukon River Panel under the Yukon Restoration and Enhancement Fund.

PERSONAL COMMUNICATION

Ruth Gotthardt
Yukon Archaeologist
Department of Tourism an Culture
Government of Yukon

Pat Milligan
Stock Assessment Biologist
Fisheries and Oceans Canada
Whitehorse, Yukon

ACKNOWLEDGEMENTS

The Selkirk First Nation gratefully acknowledges the efforts of Styd Klugie and Darin Isaac of the Selkirk First Nation and Hugh Monaghan, the Executive Secretary of the Yukon River Panel, for financial administration of the project. The efforts of Pat Milligan and Rick Ferguson are also acknowledged for technical support and review of this manuscript on behalf of Fisheries and Oceans Canada. Recognition and thanks are also extended to the field assistance of Bob Curry, Robin Sam, David Silas and Nick de Graff.

APPENDIX I

CHUM SALMON BIOLOGICAL DATA

APPENDIX I CHUM SALMON BIOLOGICAL DATA 2003

Sample	Date	Site	Sex	Tag Color / Number	Condition*	POHL (mm)	MEF (mm)
1	25-Oct-03	W58	M	no caudal fin markings	SC	325	595
2	25-Oct-03	W58	M	no caudal fin markings	SC	583	655
3	25-Oct-03	W58	F	no caudal fin markings	SC	472	525
4	25-Oct-03	W58	F	no caudal fin markings	SC	488	540
5	25-Oct-03	W58	M	no caudal fin markings	S	508	583
6	25-Oct-03	W58	M	no caudal fin markings	S	556	620
7	25-Oct-03	W58	M	no caudal fin markings	S	515	570
8	25-Oct-03	W58	F	no caudal fin markings	S	490	555
9	25-Oct-03	W58	M	Orange - T008279 - adipose clip	S	495	560
10	25-Oct-03	W58	F	no caudal fin markings	S	480	535
11	25-Oct-03	W58	M	no caudal fin markings	S	575	640
12	25-Oct-03	W58	M	no caudal fin markings	S	555	615
13	25-Oct-03	W58	M	no caudal fin markings	S	515	577
14	25-Oct-03	W58	M	no caudal fin markings	S	540	583
15	25-Oct-03	W58	M	no caudal fin markings	S	510	565
16	25-Oct-03	W58	M	no caudal fin markings	S	525	583
17	25-Oct-03	W58	F	no caudal fin markings	R	538	610
18	25-Oct-03	W58	M	no caudal fin markings	S	547	615
19	26-Oct-03	W52	F	no caudal fin markings	S	515	560
20	26-Oct-03	W52	F	no caudal fin markings	S	485	545
21	26-Oct-03	W52	F	no caudal fin markings	S	535	585
22	26-Oct-03	W52	M	no caudal fin markings	S	520	580
23	26-Oct-03	W52	M	no caudal fin markings	S	520	580
24	26-Oct-03	W52	F	no caudal fin markings	S	480	555
25	26-Oct-03	W52	F	no caudal fin markings	S	495	555
26	26-Oct-03	W52	F	no caudal fin markings	S	475	530
27	26-Oct-03	W52	F	no caudal fin markings	S	490	545
28	26-Oct-03	W52	F	no caudal fin markings	SC	505	560

APPENDIX I CHUM SALMON BIOLOGICAL DATA 2003

Sample	Date	Site	Sex	Tag Color / Number	Condition*	POHL (mm)	MEF (mm)
29	26-Oct-03	W52	F	no caudal fin markings	S	485	520
30	26-Oct-03	W50-1	F	no caudal fin markings	SC	505	550
31	26-Oct-03	W54	F	no caudal fin markings	SC	460	500
32	27-Oct-03	W67	M	no caudal fin markings	SC	500	560
33	27-Oct-03	W67	F	no caudal fin markings	SC	495	540
34	27-Oct-03	W67	M	no caudal fin markings	SC	485	550
35	27-Oct-03	W67	F	no caudal fin markings	SC	545	600
36	27-Oct-03	W53	F	no caudal fin markings	SC	490	540
37	27-Oct-03	W53	F	no caudal fin markings	SC	530	580
38	27-Oct-03	W53	F	no caudal fin markings	SC	475	530
39	27-Oct-03	W53	F	no caudal fin markings	SC	510	545
40	27-Oct-03	W53	M	Orange - T007916 - adipose clip	SC	590	660
41	27-Oct-03	W53	M	no caudal fin markings	SC	580	650
42	27-Oct-03	W53	F	no caudal fin markings	SC	530	585
43	27-Oct-03	W53	M	no caudal fin markings	SC	570	645
44	27-Oct-03	W53	M	no caudal fin markings	SC	590	670
45	27-Oct-03	W53	F	no caudal fin markings	SC	545	580
46	27-Oct-03	W53	M	no caudal fin markings	SC	500	570
47	27-Oct-03	W53	M	no caudal fin markings	SC	575	635
48	27-Oct-03	W53	M	no caudal fin markings	SC	565	630
49	27-Oct-03	W53	F	no caudal fin markings	SC	530	600
50	27-Oct-03	W53	M	no caudal fin markings	SC	555	630
51	27-Oct-03	W53	M	no caudal fin markings	SC	610	690
52	27-Oct-03	W53	M	no caudal fin markings	SC	580	660
53	27-Oct-03	W53	M	no caudal fin markings	SC	545	610
54	27-Oct-03	W53	F	no caudal fin markings	SC	515	560
55	27-Oct-03	W53	F	no caudal fin markings	SC	555	610

R = ripe live fish
S = spent live fish
SC = spent carcass

APPENDIX II

CHUM SALMON TAG RECOVERY DATA

APPENDIX II CHUM SALMON TAG RECOVERY DATA 2003

Sample	Date	Tag Location	Tag Color	Tag Origin	Tag Number	Recovery Location
1	25-Oct-03	W58	Orange	Canada	T008077	On Fish in Slough
2	25-Oct-03	W58	Orange	Canada	T008279	On Fish in Slough
3	26-Oct-03	W54	Orange	Canada	T005056	On Shore
4	26-Oct-03	W50-1	Orange	Canada	T007916	On Carcass in Slough
5	26-Oct-03	W50-1	Orange	Canada	S027736	On Shore
6	26-Oct-03	W50-1	Orange	Canada	T006082	On Carcass in Slough
7	26-Oct-03	W50	Orange	Canada	T006471	On Shore
8	26-Oct-03	W50	Orange	Canada	T007557	On Shore
9	26-Oct-03	W52	Orange	Canada	T007159	On Shore
10	26-Oct-03	W52	White	US	28941	Found in Slough
11	26-Oct-03	W52	Orange	Canada	T008049	On Fish in Slough
12	27-Oct-03	W67	Orange	Canada	T004062	On Shore
13	27-Oct-03	W53	Orange	Canada	A 2781	Found in Slough
14	27-Oct-03	W53	Orange	Canada	T003312	Found in Slough
15	27-Oct-03	W53	Orange	Canada	T007957	Found in Slough
16	27-Oct-03	W53	White	US	29023	Found in Slough
17	27-Oct-03	W53	White	US	62056	On Fish in Slough

APPENDIX III

UPDATED SURVEY WAYPOINTS 2003

APPENDIX III UPDATED SURVEY WAYPOINTS 2003

Waypoints	Updated Map Reference*	Description
W50	N 62° 42' 40.3" W 137° 15' 56.6"	Rock Face Slough - downstream outlet
W50.1	N 62° 42' 08.6" W 137° 13' 55.4"	Rock Face Slough – near upstream inlet – Chum Spawning Area
W51	N 62° 46' 10.8" W 137° 20' 45.8"	Islands just above Fort Selkirk on left bank of Yukon River
W52	N 62° 44' 48.8" W 137° 17' 35.3"	Warmsprings above confluence of Pelly River on right bank of Yukon River - Chum Spawning Area
W53	N 62° 46' 25.0" W 137° 22' 27.5"	Slough in front of Fort Selkirk – Chum Spawning Area
W54	N 62° 40' 48.7" W 137° 8' 24.4"	Ingersoll Islands - Chum Spawning Area
W58	N 62° 36' 50.8" W 136° 58' 32.5"	Big Creek Slough - Chum Spawning Area
W58.1	N 62° 36' 38.6" W 136° 56' 51.0"	Big Creek Slough - upstream inlet – Chum Spawning Area
W67	N 62° 38' 45.0" W 137° 2' 2.2"	Downstream of Big Creek right bank of Yukon River at downstream outlet – Chum Spawning Area

***Position Format: hddd° mm' ss.s" (NAD 27)**