

# Gwa'sala-'Nakwaxda'xw Nation Fisheries Program

## NEKITE RIVER SALMON ENUMERATION AND ASSESSMENT PROGRAM



**Gwa'sala-'Nakwaxda'xw Nation**  
*Fisheries Department*

PO Box 110, Port Hardy, B.C. V0N 2P0

Band Office: Tel (250) 949-8343

Treaty Office: Tel (250) 949-8424

Fax (250) 949-7402

# Gwa'sala-'Nakwaxda'xw Nation Fisheries Program

NEKITE RIVER SALMON ENUMERATION AND ASSESSMENT PROGRAM

**Prepared for:**

Rivers and Smith Inlet Salmon Ecosystem Planning Society

Comox, BC

## ***Table of Contents***

<b>INTRODUCTION.....</b>	<b>2</b>
<b>METHODOLOGY.....</b>	<b>4</b>
<b>DATA AND ANALYSIS.....</b>	<b>7</b>
<b>RESULTS AND DISCUSSION.....</b>	<b>7</b>
<b><i>Stream Inspection Logs</i>.....</b>	<b>10</b>
<b>SUMMARY.....</b>	<b>10</b>

## **INTRODUCTION**

The Nekite River is located at the head of Smith Inlet on the Central Coast of B.C. (Figure 1). This river system has long been recognized for its high fisheries values, especially for chum salmon (*Oncorhynchus keta*). Fisheries and Oceans Canada (DFO) has allocated significant resources in previous years for enumeration and habitat creation within the Nekite Watershed. In 1986, DFO constructed a spawning channel located approximately 10km upstream of the Nekite River estuary in an effort to improve chum production levels that were inadequate to support a commercial fishery (Winther et al, 1988). DFO maintained and enumerated the channel for seven years, but finally abandoned it in 1990 when funding restrictions prevented further involvement.

As the Nekite River is within the traditional territory of the Gwa'sala-'Nakwaxda'xw Nation, involvement in the project was natural and convened in 1995 for the Band. For several years now, the Gwa'sala-'Nakwaxda'xw Fisheries Department has worked in the Nekite River watershed, with an ever-expanding program taking place. This year, a chum enumeration project was carried out by selected field staff over a period of approximately six weeks. The program included a mark-recapture trial on chum salmon, stream inspections on the mainstem Nekite River, enumeration of fish utilizing the spawning channel, and biological sampling of coho and chum salmon.

The following report summarizes activities undertaken by the Gwa'sala-'Nakwaxda'xw Nation Fisheries Department in the Nekite River for the 2009 field season.

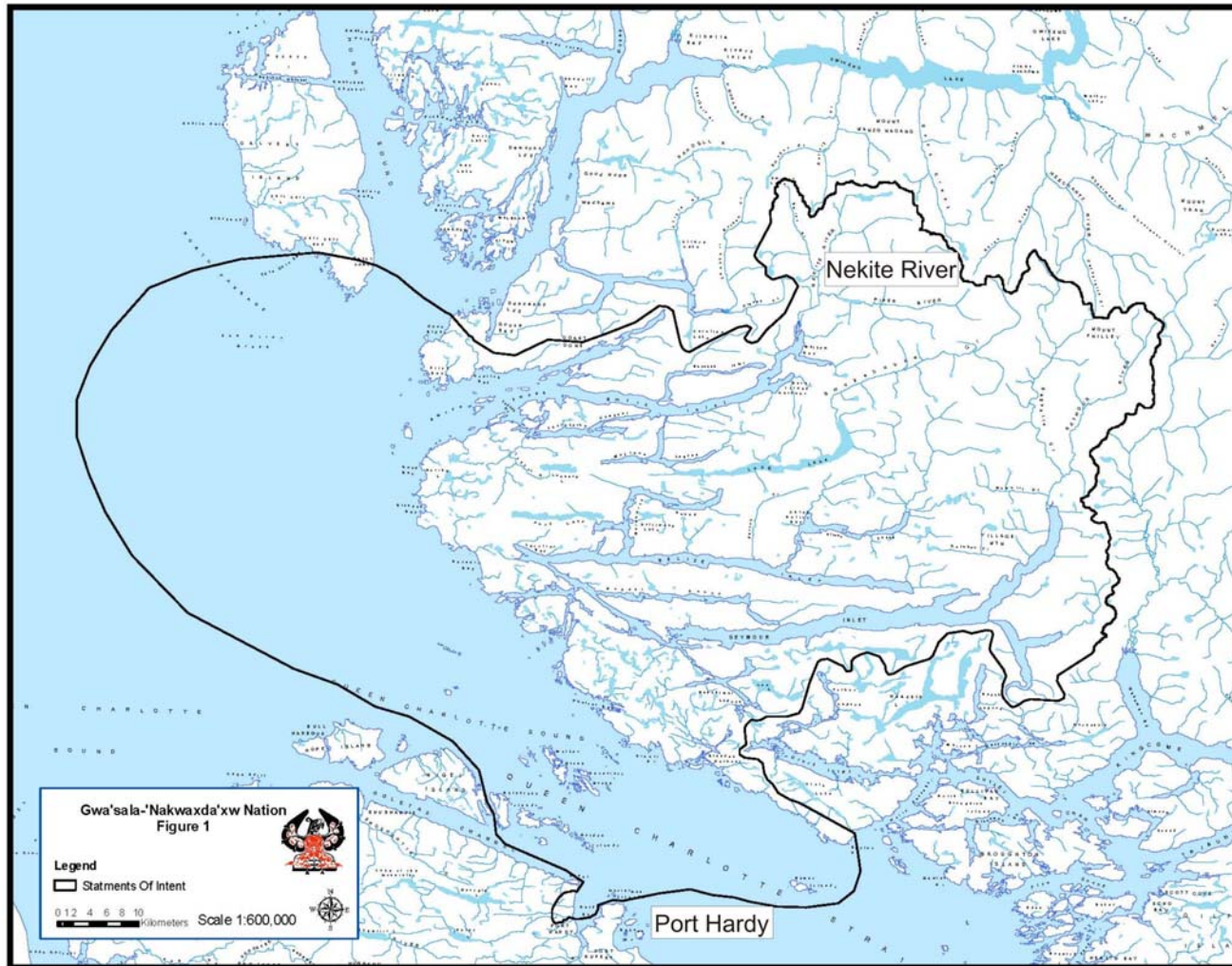


Figure 1. G-N territorial map indicating the location of the Nekite River within the traditional territories.

## **METHODOLOGY**

### *Preparation*

The Nekite River is located at the head of Smith Inlet, several miles from any settlement or town. This isolated location requires that careful project planning and preparation be carried out prior to the commencement of field activities. At the spawning channel, a cabin was constructed for use by DFO operations personnel. Since DFO is no longer maintaining the channel, the Gwa'sala-'Nakwaxda'xw Nation made arrangements to use the facility for the duration of the program. On August 18, 2009 members of the field crew flew into the Nekite River with basic supplies and spent approximately one week preparing the cabin and spawning channel for upcoming work.

Once set-up of the cabin was complete, preparation of the spawning channel was initiated. Minor clearing of riparian vegetation was conducted along the banks to provide a clear line of sight into the channel. The channel was then separated into 50m increments and marked with flagging tape. A staff gauge and thermometer were placed at the spawning channel intake to provide a means for sampling daily water levels and water temperatures, and an additional thermometer was placed at the cabin to measure ambient temperatures.

On August 25, 2009 a crew change occurred and the new crew arrived to conduct the first round of chum marking and complete set-up of the facility for the season. A truck was used to transport the crew and supplies to the cabin.

*Spawning Channel Data Collection*

The Nekite River spawning channel was sampled once daily (usually at 7:30am) for the duration of the project, starting August 27, 2009 and continuing until October 7, 2009. Water levels and water temperatures were collected at the spawning channel intake, and ambient temperature and weather were also recorded. Enumeration of fish utilizing the spawning channel occurred once a day. All fish utilizing the channel were recorded by gender and species within each 50m section of the channel.

Dead-pitching was also conducted on the spawning channel once daily, or more frequently if water levels prevented crews access to the mainstem. All fish dead-pitched were examined for the presence of a Floy tag and secondary opercular punch. Random samples of chum were sampled for post-orbital hypural length, gender, and scale samples.

*Nekite River Mainstem Data Collection*

Various projects were conducted on the Nekite River mainstem as part of the overall enumeration program. The mark-recapture program, a procedure used for collecting escapement data, was initiated on August 26. Marking on this occasion occurred using beach seine nets in a tidally influenced area within the Lower Nekite River. Fish were marked using Floy tag and received an opercular punch as a secondary mark, and had their sex and condition recorded. All fish were released after marking in roughly the same location as where they were captured. A total of 1,172 chum salmon were marked over 17 separate tagging events.

Recapture of the marked chum salmon was conducted by dead-pitching of the entire anadromous portion of the Nekite River mainstem, the Nekite River spawning channel, and the Piper River (a major tributary of the Nekite River) mainstem. Dead-pitching began on September 3 and was conducted until October 6, once the chum salmon run had subsided. All fish dead-pitched were examined for the presence of a tag or secondary mark, and random samples of chum salmon were sampled for post-orbital hypural length, gender, and scale samples.

### *Stream Inspection Logs*

This year DFO continued to encourage the Gwa'sala-'Nakwaxda'xw Nation Fisheries Crew to carry out stream walks according to their Stream Inspection Log (SIL) format. These inspections require detailed information about water and weather conditions, reach specific observations of live and dead salmon, the number and age of bears and other wildlife, and any observations regarding unusual conditions within the stream segment examined. Stream inspections were carried out by the Fisheries Crew who are now very comfortable with the SIL format utilized by DFO. A total of seven SILs were completed for the Nekite River and the Piper River between August 22, 2009 and October 3, 2009. A total of three SIL's were completed on the Walkum River on the days of August 30, September 10 and 21, 2009. The Walkum River and the Nekite River are located in close proximity to each other. Similar run timing of the two stocks has also been noted. Weekly stream walks were conducted on the Walkum River to better address the issue of tag loss. Stream walks of the Walkum River ensured that there was not a significant number of fish tagged in the Nekite estuary migrating into the Walkum River.

*Biological Data*

The Fisheries Crew also gathered biological data on chum and coho salmon this year. The salmonids were sampled for post-orbital hypural length, gender, and scale samples. DNA was also taken via an opercular punch. Standard data collection methods were employed with proper records maintained. These samples have already been sent to DFO Stock Assessment for analysis.

**DATA AND ANALYSIS**

The programs conducted by the Gwa'sala-'Nakwaxda'xw Nation on the Nekite River have the overall objective of assessing the returning chum salmon population abundance. An abundance estimate for the chum run in the Nekite River was produced through the analysis of several direct data sets. These included the Stream Inspection Logs that were conducted, dead-pitch information for the system by species, daily channel counts, and the aerial count estimates.

**RESULTS AND DISCUSSION**

*Spawning Channel*

The daily counts for the spawning channel collected from August 27, 2009 to October 7, 2009 are presented in Appendix 1, Table 1. Channel utilization peaked on September 20, 2009 for chum salmon with 225 fish observed (124 female, 101 male) (Figure 2). The highest number of pink salmon observed in the channel was 277 on September 23, 2009 (149 male, 128 female) (Figure 3).

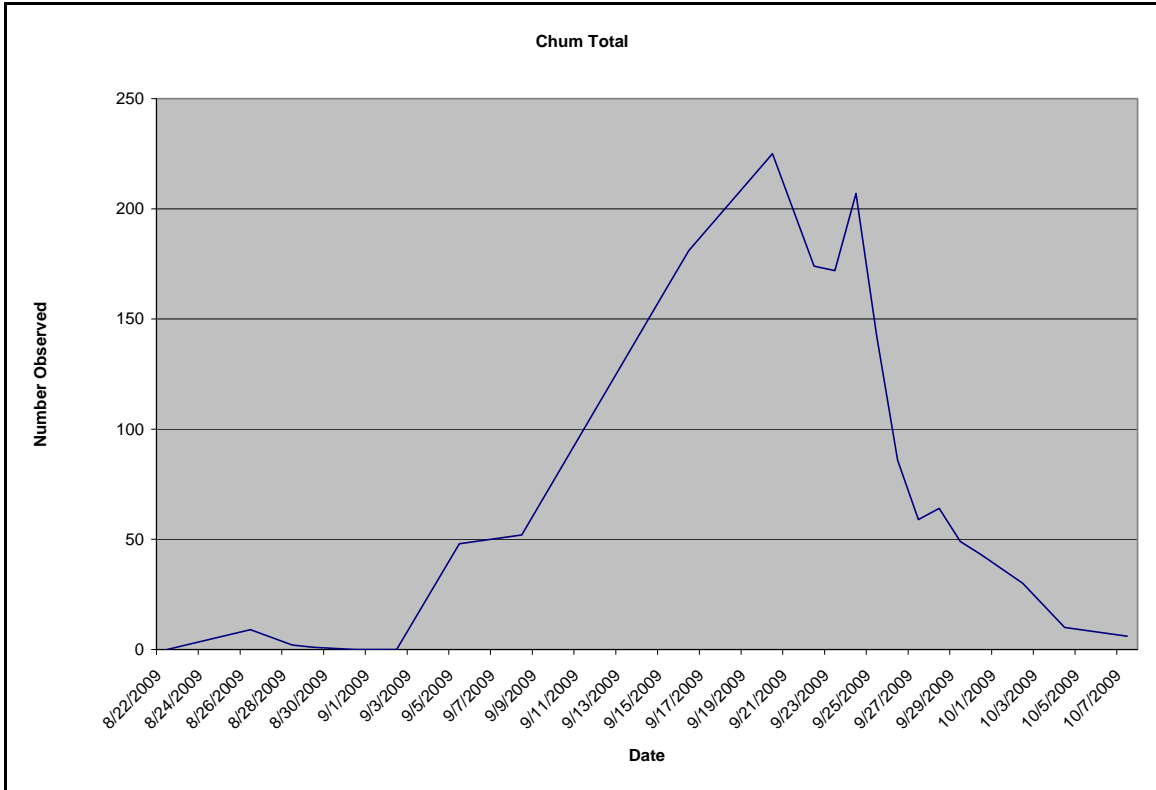


Figure 2. Graphed results of daily chum salmon enumeration activities on the Nekite River spawning channel for the 2009 field season.

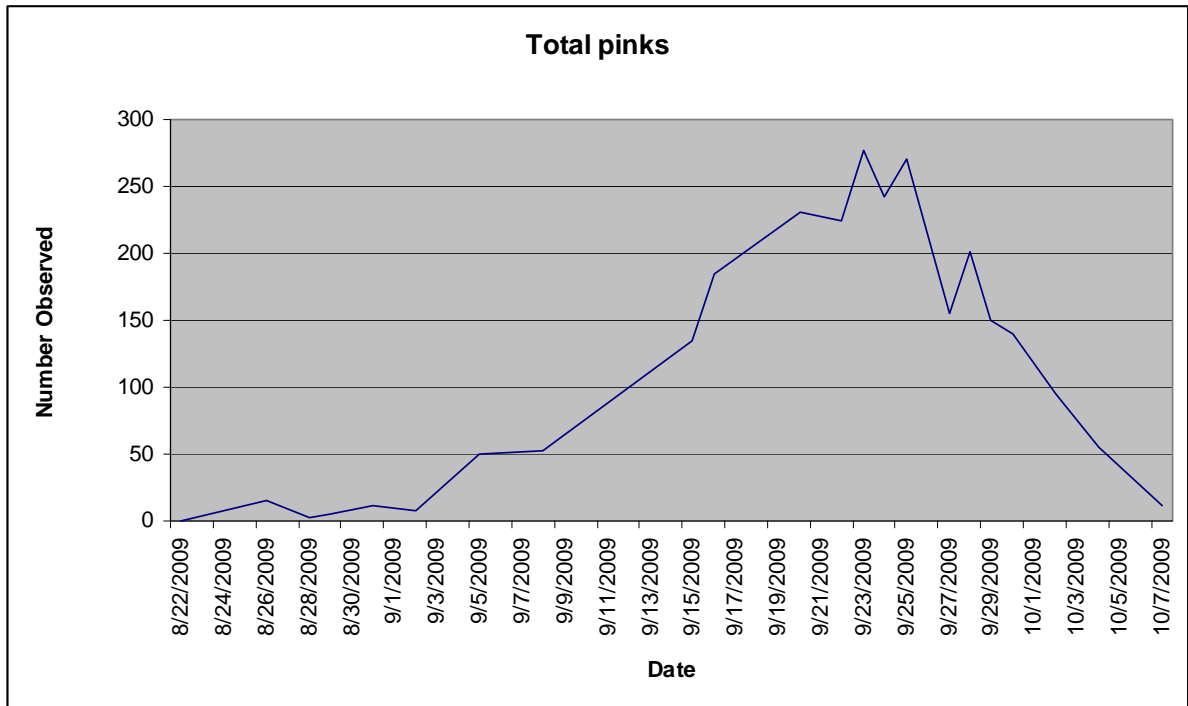


Figure 3. Graphed results of daily pink salmon enumeration activities on the Nekite River spawning channel for the 2009 field season.

*Nekite River Mark-Recapture Program*

The estimated number of total adult chum salmon returning to the Nekite River in 2009 was 13,847 with an upper 95% confidence limit of 16,690 and a lower 95% confidence limit of 11,960. as a result of the mark recapture methodology (Appendix 1, Table 5). In general, mark-recapture trials have improved confidence limits when the total number of marks (in this case tagged fish) is a significant portion of the population and when the total number of captures is high enough to capture significant number of the marks (identified as recaptured). A total of 1,510 adult chum salmon were dead pitched, with 66 female recaptures and 61 male recaptures. Adult female chum salmon were recaptured at a rate of 6%, while males were recaptured at a rate of 5%. The sex ratio for adult chum salmon was found to be 0.94:1 female to male.

This year the total number of tagged chum salmon was 1,172 adults (Appendix 1, Table 2). This compares to 1,575 adults during the 2008 field season. The total number of tagged fish in this year's program, therefore, decreased by 26%. The decrease in the number of fish tagged was due to low flow conditions and short sampling windows due to tides. The number of captures, which for this experiment is dead-pitched fish, was 1,510 compared with 629 during 2008 (Appendix 1, Table 3) (an increase of 58%). The increase in the number of fish dead-pitched was contributed to an overall increase in run size and effort put forth by the sampling crew.

Due to the substantial effort of the Gwa'sala-'Nakwaxda'xw Nation Fisheries Crew this year, a large proportion of returning adult chum were sampled, tagged, and dead-pitched. It was determined that the majority of fish tagged had been in the river a

short period of time. This was evident as many individuals were noted to be in good condition. Tag loss was also believed to be minimal.

Due to the effort exerted by the G-N Fisheries Crew it is likely that the chum that were dead pitched had been deceased for a short period of time. The residency times of chum within the Nekite River ranged between 19 and 38 days. Residency times were calculated from dead-pitched fish and are believed to be accurate.

### *Stream Inspection Logs*

Seven separate Stream Inspection Logs were collected by the Fisheries Crew. The SILs indicate that the run peaked between September 12 and 13 with approximately 10580 chum estimated. The last SIL conducted on October 2 and 3, 2009 indicated that the run was finished with less than 66 fish observed within the Nekite River.

### *Enumeration Flight*

An enumeration flight conducted on September 28, 2009 returned an estimate of between 3,500 and 4,000 live chum salmon utilizing the Nekite River on that date. This estimate corresponded with observations made by the Fisheries Crew while dead-pitching.

## **SUMMARY**

Field activities undertaken by the Gwa'sala-'Nakwaxda'xw Nation this year were extensive. Long-term program objectives such as spawning channel enumeration were carried out as well as a mark-recapture program that involved the tagging of a significant portion of the reproductive stock.

Environmental conditions were problematic for the G-N field crew this season. Low flows and awkwardly timed tides made tagging fish problematic, however, the

determination of the field crews led to 58% more fish being dead-pitched during the 2009 field season compared with the 2008 season. As a result of the data collected by the field crews during the 2009 season, an accurate escapement of adult chum to the Nekite River was able to be calculated. Other data collected during the course of the program including run timing, spawning channel utilization, and biological traits (DNA, lengths, etc.) were collected and will form part of the management plan for the area.

The modest increase in the escapement of adult chum salmon to the Nekite River watershed in 2009 was encouraging when compared to the dismal returns of 2008. Utilizing the data collected by the GN Band, a run of approximately 13, 847 adult chum returned to the Nekite River in 2009 compared to 8,072 adults in 2008. This estimate was generated by utilizing the SIL data, dead-pitch data, and historical residency times. While the 2009 return is still a fraction the size of historical returns recorded in this system, the increased return in 2009 is cause for optimism.

This program continues to be important source of training for the G-N Fisheries field staff. It is hoped that this important baseline data collected from the Nekite River is used to guide appropriate management decisions that will ultimately conserve this culturally and economically important stock.

**Appendix – Data gathered during field activities on the Nekite River.**

Table 1. Daily counts of chum and pink salmon observed in the Nekite River spawning channel during the 2008 field season.

Date	Chum			Pink		
	Female	Male	Total	Female	Male	Total
22-Aug-09	0	0	0	0	0	0
26-Aug-09	5	4	9	6	9	15
28-Aug-09	1	1	2	2	1	3
29-Aug-09	1		1	3	2	5
31-Aug-09	0	0	0	4	7	11
2-Sep-09	0	0	0	4	4	8
5-Sep-09	14	34	48	14	36	50
8-Sep-09	25	27	52	26	27	53
15-Sep-09	88	77	165	53	81	134
16-Sep-09	99	82	181	103	82	185
20-Sep-09	124	101	225	88	143	231
22-Sep-09	83	91	174	106	118	224
23-Sep-09	82	90	172	128	149	277
24-Sep-09	107	100	207	127	115	242
25-Sep-09	88	54	142	135	136	271
26-Sep-09	56	30	86	97	119	216
27-Sep-09	38	21	59	83	72	155
28-Sep-09	43	21	64	118	83	201
29-Sep-09	30	19	49	91	59	150
30-Sep-09	21	22	43	89	51	140
2-Oct-09	18	12	30	51	44	95
4-Oct-09	3	7	10	37	18	55
7-Oct-09	0	6	6	11		11
<b>Total</b>	926	799	1725	1376	1356	2732

Table 2. Nekite River tagging summary for chum salmon.

Date	# Fish Tagged	Species	# Female	# Male
26-Aug-09	6	Chum	2	4
27-Aug-09	31	Chum	18	13
28-Aug-09	143	Chum	83	60
29-Aug-09	168	Chum	78	90
30-Aug-09	206	Chum	88	118
1-Sep-09	64	Chum	33	31
2-Sep-09	42	Chum	20	22
3-Sep-09	129	Chum	68	61
4-Sep-09	91	Chum	39	52
5-Sep-09	72	Chum	31	41
6-Sep-09	40	Chum	24	16
7-Sep-09	28	Chum	11	17
8-Sep-09	97	Chum	46	51
10-Sep-09	10	Chum	4	6
11-Sep-09	8	Chum	5	3
12-Sep-09	1	Chum	0	1
14-Sep-09	8	Chum	3	5
15-Sep-09	28	Chum	13	15
<b>Totals</b>	<b>1172</b>		<b>566</b>	<b>606</b>

Table 3. Nekite River dead-pitch data for the 2009 field season.

Daily Totals for Dead Pitches							
Date	Dead Pitch		Dead Pitch Total	Bear Kill		Bear Kill Total	Reach
	MC	FC		MC	FC		
3-Sep-09	0	0	0	6	1	7	
6-Sep-09	0	0	0	3	1	4	
7-Sep-09	0	0	0	5	1	6	
14-Sep-09	0	0	0	44	12	56	
18-Sep-09	1	0	1	18	7	25	
19-Sep-09	0	0	0	9	3	12	
19-Sep-09	1	0	1	9	4	13	
20-Sep-09	10	9	19	28	12	40	

*Nekite River Salmon Enumeration and Assessment Program Report for 2009*

20-Sep-09	0	0	<b>0</b>	4	3	<b>7</b>	
21-Sep-09	0	0	<b>0</b>	8	1	<b>9</b>	
21-Sep-09	0	2	<b>2</b>	43	26	<b>69</b>	
21-Sep-09	10	9	<b>19</b>	15	3	<b>18</b>	
22-Sep-09	11	16	<b>27</b>	4	4	<b>8</b>	
22-Sep-09	48	38	<b>86</b>	23	21	<b>44</b>	
23-Sep-09	0	0	<b>0</b>	0	0	<b>0</b>	
24-Sep-09	26	25	<b>51</b>	22	8	<b>30</b>	<b>2,3</b>
25-Sep-09	82	230	<b>312</b>	70	57	<b>127</b>	<b>7</b>
25-Sep-09	21	41	<b>62</b>	8	17	<b>25</b>	<b>Seine Spot</b>
26-Sep-09	4	60	<b>64</b>	27	17	<b>44</b>	
27-Sep-09	7	10	<b>17</b>	0	0	<b>0</b>	<b>Spawning Channel</b>
29-Sep-09	67	216	<b>283</b>	23	37	<b>60</b>	<b>7</b>
1-Oct-09	0	0	<b>0</b>	3	0	<b>3</b>	<b>Reserve Site</b>
1-Oct-09	27	48	<b>75</b>	44	46	<b>90</b>	<b>7</b>
2-Oct-09	4	19	<b>23</b>	16	33	<b>49</b>	<b>2,3,4</b>
2-Oct-09	81	118	<b>199</b>	70	87	<b>157</b>	<b>Below 7</b>
3-Oct-09	0	2	<b>2</b>	4	7	<b>11</b>	<b>5</b>
3-Oct-09	0	3	<b>3</b>	4	4	<b>8</b>	<b>6</b>
3-Oct-09	12	27	<b>39</b>	46	68	<b>114</b>	<b>7</b>
3-Oct-09	30	24	<b>54</b>	40	40	<b>80</b>	<b>7</b>
4-Oct-09	3	16	<b>19</b>	13	26	<b>39</b>	<b>7</b>
5-Oct-09	3	8	<b>11</b>	4	6	<b>10</b>	<b>2</b>
5-Oct-09	2	6	<b>8</b>	3	5	<b>8</b>	<b>3</b>
5-Oct-09	2	1	<b>3</b>	2	4	<b>6</b>	<b>5</b>
5-Oct-09	0	2	<b>2</b>	2	3	<b>5</b>	<b>6</b>
5-Oct-09	1	5	<b>6</b>	2	7	<b>9</b>	<b>7</b>
6-Oct-09	47	75	<b>122</b>	37	68	<b>105</b>	<b>Below 7</b>
Totals	500	1010	1510	659	639	1298	

Table 4. Daily record of climatic conditions at the Nekite River during the field operations in 2009.

<b>Nekite Weather and Water Conditions</b>						
Date	Time	Water		Air	Condition	Initial
		Level (m)	Temp (oc)	Temp (oc)		

*Nekite River Salmon Enumeration and Assessment Program Report for 2009*

22-Aug-09	10:00	0.48	n/a	n/a	Raining so water level is rising	AT
	n/a	n/a	n/a	n/a		
23-Aug-09	10:00	0.8	n/a	n/a	Raining for last couple days	AT
	n/a	n/a	n/a	n/a		
24-Aug-09	9:45	0.42	n/a	n/a		AT
	n/a	n/a	n/a	n/a		
25-Aug-09	1:00	0.9	10	n/a	Heavy Rain all day	DP
	19:00	0.92	9.9	14	Overcast	DP
26-Aug-09	8:00	0.6	8.5	9	Overcast	DP
	20:00	0.55	12.8	12.8	Overcast	DP
27-Aug-09	7:00	0.4	10.1	10	Overcast	DP
	20:00	0.39	13.1	15	Overcast	DP
28-Aug-09	7:00	0.35	11	9		CW
	18:30	0.3	10.5	18		CW
29-Aug-09	7:00	0.3	9.8	9	Overcast	CW
	17:30	0.25	13.3	15	Clear Sky	CW
30-Aug-09	7:00	0.25	13.3	9	Foggy	CW
	20:05	0.23	13.8	12	Clear Sky	CW
31-Aug-09	7:30	0.22	12.5	13		CW
	n/a	n/a	n/a	n/a		
1-Sep-09	7:00	0.2	12.9	13	Clear Sky	DL
	18:00	0.2	13	17	Clear Sky	DL
2-Sep-09	7:50	0.2	12.9	13	High Fog	DL
	18:30	0.2	13	16	Overcast	DL
3-Sep-09	8:00	0.22	11.5	12	Light Rain	DL
	18:30	0.23	12.9	15.5	Sporadic Rain	DL
4-Sep-09	8:30	0.28	13.4	13	Rain overnight	DL
	5:00	0.26	12.5	16	Clear Sky	DL
5-Sep-09	9:00	0.28	13.5	13	moderate rain	DL
	18:30	0.8	13.5	14	Clear Sky	DL
6-Sep-09	7:30	0.46	13	13	rain	DL
	16:00	0.48	12.7	13	Clear Sky	DL
7-Sep-09	8:00	0.42	11.6	12	Foggy	DL
	18:00	0.46	12	13	Clear Sky	DL
8-Sep-09	7:30	0.56	11.6	11	overcast	DL
	16:30	0.47	12.1	13	rain	DL
9-Sep-09	7:00	1.3	12.1	6	Heavy Rain all day	DL
	19:00	1.3	12.7	14	overcast/light rain	CW
10-Sep-09	7:15	0.8	10	11	overcast	CW
	17:30	0.6	12.1	15	Clear Sky	CW
11-	8:00	0.5	12.1	11	overcast	CW

*Nekite River Salmon Enumeration and Assessment Program Report for 2009*

---

Sep-09	18:05	0.46	16.1	16	Clear Sky	CW
12-Sep-09	7:00	0.38	16.2	10	foggy	CW
Sep-09	18:15	0.38	15.7	20	Clear Sky	CW
13-Sep-09	7:20	0.32	13.7	9	Foggy	CW
Sep-09	19:00	0.3	14.9	15	Clear Sky	CW
14-Sep-09	7:30	0.28	12.1	8	overcast/light rain	CW
Sep-09	17:10	1.3	10.1	14	Heavy Rain all day	CW
15-Sep-09	7:00	0.8	12.3	8	Light Rain	CW
Sep-09	18:05	0.7	13.4	15	overcast/light rain	CW
16-Sep-09	7:30	0.56	12.1	11	overcast	CW
Sep-09	19:00	0.58	n/a	16	overcast	CW
17-Sep-09	7:00	0.56	n/a	8	Light Rain	CW
Sep-09	18:30	0.58	n/a	15	Light Rain	CW
18-Sep-09	7:00	0.58	n/a	8	Light Rain	CW
Sep-09	19:00	1	n/a	16	Light Rain	CW
19-Sep-09	7:00	1.2	n/a	9	Light Rain	CW
Sep-09	18:30	1	n/a	15	Heavy Rain all day	CW
20-Sep-09	7:30	0.94	n/a	8	Light Rain	CW
Sep-09	18:00	1.3	n/a	14	Light Rain	CW
21-Sep-09	7:00	1	n/a	8	Clear Sky	CW
Sep-09	18:30	0.72	n/a	14	Clear Sky	CW
22-Sep-09	7:15	0.58	n/a	10	Clear Sky	CW
Sep-09	19:00	0.54	n/a	14	Clear Sky	PS
23-Sep-09	7:30	0.45	n/a	8	Clear Sky	PS
Sep-09	16:30	0.4	n/a	10	Light Rain	PS
24-Sep-09	7:30	0.5	n/a	9	Clear Sky	PS
Sep-09	16:00	0.4	n/a	9	Clear Sky	PS
25-Sep-09	7:45	0.32	n/a	10	Overcast	PS
Sep-09	17:00	0.3	n/a	12	Rain	PS
26-Sep-09	7:30	0.45	n/a	8	Lght Rain	JT
Sep-09	19:00	0.4	n/a	8	Overcast	JT
27-Sep-09	7:30	0.31	n/a	3	Clear Sky	PS
Sep-09	18:00	0.38	n/a	14	Overcast	PS
28-Sep-09	9:55	0.23	n/a	9	Overcast	JT
Sep-09	16:45	0.22	n/a	10	Overcast	CW
29-Sep-09	7:45	0.4	n/a	5	Overcast	CW
Sep-09	17:00	0.39	n/a	5	Light Rain	CW

*Nekite River Salmon Enumeration and Assessment Program Report for 2009*

---

09						
30-Sep-09	7:45	0.39	n/a	3	Foggy	CW
	19:00	0.62	n/a	9	Light Rain	CW
1-Oct-09	7:30	0.9	n/a	6	Light Rain	CW
	19:40	0.68	n/a	2	Clear Sky	CW
2-Oct-09	7:45	0.68	n/a	2	Clear Sky	CW
	18:00	0.54	n/a	5	Clear Sky	CW
3-Oct-09	7:30	0.42	n/a	2	Clear Sky	CW
	18:00	0.4	n/a	2	Clear Sky	CW
4-Oct-09	7:30	0.3	n/a	2	Clear Sky	CW
	18:30	0.28	n/a	3	Clear Sky	CW
5-Oct-09	8:00	0.24	n/a	16	Clear Sky	CW
	18:00	0.2	n/a	16	Clear Sky	CW
6-Oct-09	7:30	0.2	n/a	16	Clear Sky	CW
	17:05	0.35	n/a	10	Clear Sky	CW
7-Oct-09	7:30	0.22	n/a	2	Clear Sky	CW
	17:30	0.2	n/a	16	Clear Sky	PS
8-Oct-09	7:30	0.2	n/a	2	Clear Sky	PS

Table 5. Population estimate based on the Petersen Mark-Recapture Method.

	<b>Tagged</b>	<b>Recaptured</b>	<b>Captured</b>
<b>Female</b>	569	66	1010
<b>Male</b>	603	61	500
<b>Total</b>	1172	127	1510

**Calculations**

$$N = (M+1) (C+1) / (R+1)$$

$$N = 13846.9$$

**Variance of N**

$$= \frac{(M+1)^2(C+1)(C-R)}{(R+1)^2(R+2)}$$

$$1360420.035$$

**Standard Error**

Sqrt of Variance	1166.370453
------------------	-------------

**95% confidence interval =**

$$N \pm t(\text{standard error})$$

$$2290.751571$$

Lower Limit	11556.15
Upper Limit	16137.65