Results of the Upper Sustut River Weir Steelhead Assessment Project 2009

Dean Peard[1]

British Columbia
Ministry of Environment
Fisheries Branch
Skeena Region
PO Box 5000
Smithers, B.C.
V0J 2N0

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Executive Summary

In 2009, a floating PVC fish fence was in operation on the upper Sustut River from August 1 to September 30. The fish fence has been used in conjunction with a trap box, since 1992, as an annual indicator of upper Sustut River adult steelhead (*Oncorhynchus mykiss*) abundance. The fence has been in its current location since 1994. During site visits, general weather conditions, water level, air temperature and water temperature were recorded between 0800 hrs and 0900 hrs and 1900 hrs and 2100 hrs. Hourly water temperature was also collected via temperature data loggers located near the fence. Water levels ranged from 0.12 m to 0.35 m with a mean level of 0.20 m. Water temperatures ranged from 3.75°C to 17.41°C with a mean of 9.61°C.

One thousand one hundred and sixty two adult steelhead were enumerated between August 1 and September 30, 2009. This is the highest recorded value for steelhead since the fence location and method was standardized in 1994. Three fence counts conducted prior to 1994 were greater than 400 steelhead. The mean number of steelhead from1994 to 2008 is 594. The lowest recorded count was 133 in 2006. The steelhead fence count in 2009 represents a significant increase compared to counts in 2005 (268), 2006 (133), 2007 (263) and 2008 (193). On October 1, the fence crew conducted a visual count of the fence pool and approximately 10 steelhead were observed. One thousand one hundred and sixty two represents 112% of the estimated adult carrying capacity (1036) of the upper Sustut River (Tautz *et al.* 1992). Other species enumerated in 2009 include: rainbow trout (n =6), bull trout (*Salvelinus confluentus*) (n =3), Rocky Mountain whitefish (*Prosopium williamsoni*) (n =34), chinook salmon (*O. tshawytscha*) (n =273), sockeye salmon (*O. nerka*) (n =540) and coho salmon (*O. kisutch*) (n =223). The first steelhead was captured on August 6, and the last steelhead was enumerated on September 29.

Gillnet marks were observed on 1.2% of all steelhead enumerated during the 2009 project. The ratio of female to male steelhead that migrated past the fence was 1.66:1. In a typical year, approximately 20% of the steelhead migrating past the fence are handled to collect length data, genetic samples and scale samples for annual comparisons. Biological parameters and steelhead scale samples for annual ageing analysis were not collected in 2009.

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1.0 Introduction

Upper Sustut River steelhead are a unique population within the Skeena River watershed. Over-wintering, spawning and rearing occur at high elevations: Sustut Lake (1306m); Johanson Lake (1448m). The short growth season in this region prolongs the rearing component of their life-history. The mean smolt age for upper Sustut River steelhead is 4.5 years (Tautz *et al*. 1992). In comparison, most British Columbia steelhead populations produce smolts that range from two to three years of age (McPhail 2007).

Since 1994, adult upper Sustut River summer-run steelhead index has been used as an annual indicator of stock status for all early run Skeena River summer steelhead. The early run Skeena River steelhead stocks are susceptible to marine commercial fisheries for sockeye (*O. nerka*) and pink (*O. gorbuscha*) salmon where they susceptible to capture in a mixed stock fishery (Ward *et al.* 1993; Cox-Rogers 1994). Due to their long freshwater migration Sustut River steelhead are also intercepted in First Nations food fisheries and catch and release recreational fisheries on the Skeena River and lower Sustut River. Access to the fishable portion of the Sustut River is limited to helicopter, or jet boat access from the two angling lodges on the lower river.

The Sustut River is designated as a Class 1 Classified Water from September 1 to October 31. The river is closed to angling from January 1 to May 31, and the portion of river upstream of the BC Railway Bridge is closed to angling throughout the year.

The objectives of the Sustut River enumeration program are:

1. to enumerate the upper Sustut River summer-run steelhead population,
2. to examine the sex ratio of steelhead throughout the run,
3. to examine the effect of water level and temperature on steelhead migration
4. to examine the number of gillnet marked steelhead and the distribution of gillnet marked fish throughout the run,
5. to examine the relative run timing of male and female steelhead

Although the objectives of the project are related to steelhead, other species are captured during fence operation. Data for chinook, sockeye, coho salmon, bull trout, Rocky Mountain whitefish and rainbow trout are recorded concurrently. Salmon data is forwarded to Fisheries and Oceans Canada for analysis and archiving.

2.0 Study Area

The Sustut River is located in north central British Columbia and is a tributary to the upper Skeena River (Figure 1). It originates in the Omineca Mountains approximately 220 km north of Smithers, B.C. The Sustut River flows for 8 km northwest from Sustut and Mud lakes where it joins Johanson Creek near the main spawning area for upper Sustut steelhead (Bustard 1993). The river then flows 3 km west to it's confluence with Moosevale Creek before turning southwest for approximately 100 km and flows into the Skeena River. The Sustut River drains approximately 3,574 km^2 and has seven main tributaries: Birdflat Creek, Bear River, Asitka River, Red Creek, Two Lake Creek, Moosevale Creek and Johanson Creek. Fish species known to inhabit the upper Sustut River include summer-run steelhead, chinook salmon, sockeye salmon, coho salmon, bull trout, Dolly Varden, Rocky Mountain whitefish, and burbot [2] (Bustard 1993). The physical area that defines the upper Sustut River steelhead population is the Sustut River upstream of the Bear River confluence including Johanson Creek and Sustut and Johanson lakes (Spence *et al*. 1990) (Figure 2). The physical area that defines the lower Sustut River steelhead population is the Sustut River downstream of the Bear River confluence, including Bear River and Bear Lake (Spence *et al*. 1990) (Figure 2).

3.0 Methods

3.1 Steelhead Enumeration

A floating fish fence constructed from 3.8 cm PVC pipe was installed in the Sustut River 500 m upstream of the confluence with Moosevale Creek and 70 km upstream of the confluence with the Bear River (Figure 2). The fence was in operation between August 1 and September 30. Fish are directed into an aluminum trap box where they remain until a gate is opened allowing upstream migration to continue.

The total number of steelhead migrating past the fence between August 1 and September 30 is used as an estimate of adult upper Sustut River steelhead abundance. The Sustut River count is hypothesized to indicate steelhead abundance for upper Skeena River summer-run steelhead stocks. Fish holding immediately downstream of the fence were visually counted on October 1 after the fence was removed. The pool downstream of the fence contains multiple species which makes an accurate visual count of steelhead difficult. Therefore, the visual count is considered a rough estimate.

The fence was inspected a minimum of three times a day. During site visits debris was removed and repairs made as necessary. The fence trap box was

[2] In August, 1999 a single juvenile burbot (<10 cm fork-length) was found in a beaver impoundment by Ministry Staff on the Sustut River approximately 800 meters upstream of its confluence with Johanson Creek.

checked in the morning, afternoon and evening during low levels of fish migration. At peak migration the fence was checked in the morning and a member of the project crew remained on site throughout the afternoon and evening. Experience indicates that human activity around the fence often halts or delays migration. Therefore, the removal of debris and carcasses from the fence were limited to avoid affecting fish migration.

The fence monitors used the visual characteristics described in Scott and Crossman (1973) and McPhail and Carveth (1994), to identify the species of all fish captured during the project. For data collection purposes, a plexiglass viewing box was used to identify and record fish by species, sex, presence of gillnet marks, tags, wounds and general condition.

Figure 1. Location of Sustut River

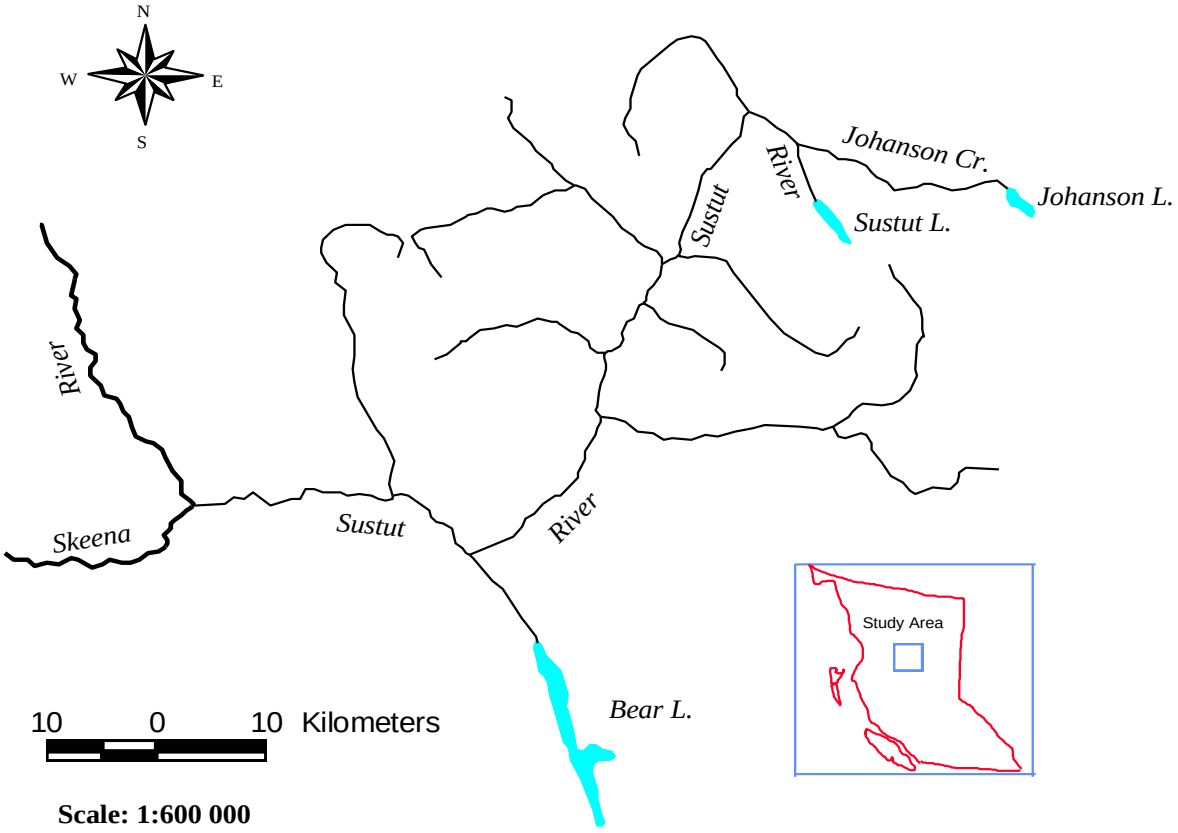

Figure 2. Map of Sustut River and tributaries.

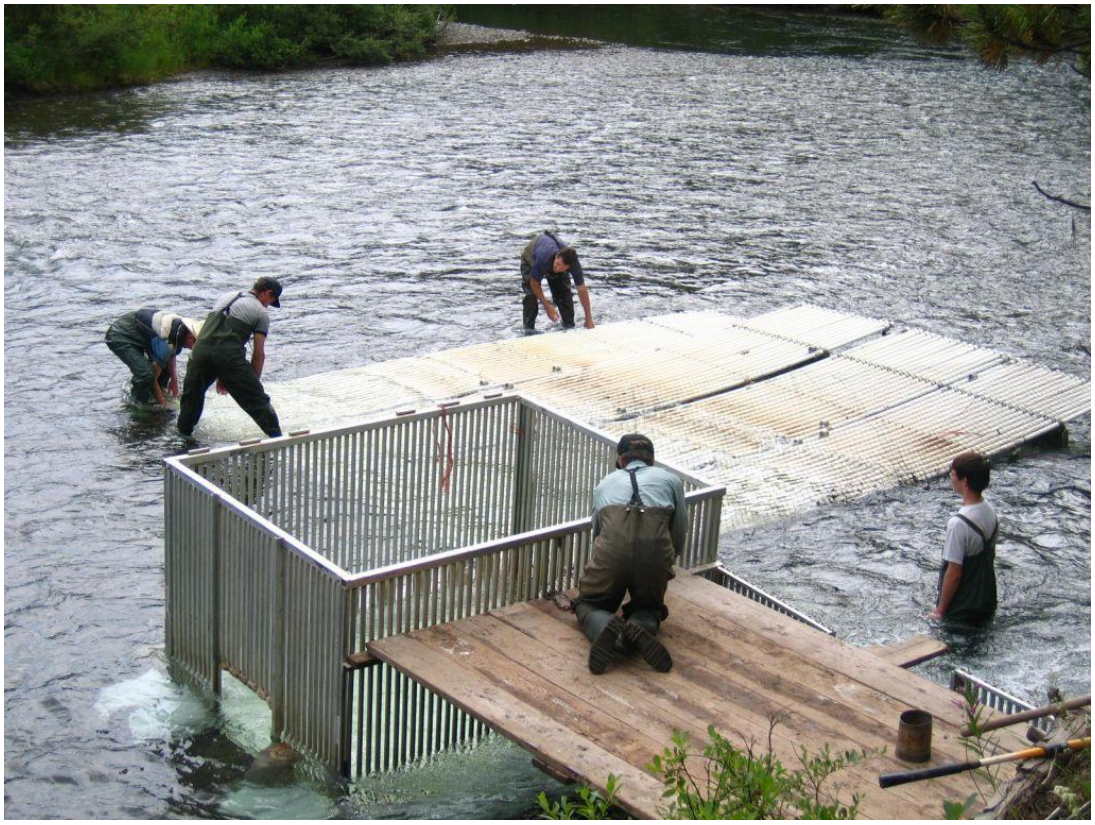

Figure 3. Photograph steelhead enumeration fence assembly (a) and fence in operation. (b), 2008. Courtesy of Brome and Leaf Steffey.

3.2 Steelhead Migration and Physical Data

Stream water temperatures were recorded manually each day using a minimum-maximum thermometer (Brannon Ltd). Also, Optic Stowaway temperature data loggers (Onset Computer Corporation, Pocasset, MA) were deployed in the river and in the air near the fence site to record water and air temperatures hourly. Water levels were recorded in the morning and the evening using a metric staff gauge. Fence staff also recorded air temperature and weather conditions daily. Mean daily water temperature and level were compared against steelhead migration to measure potential links between the two variables and daily steelhead migration. Annual steelhead abundance was also compared to mean annual water level and mean annual temperature to investigate potential relationships between steelhead abundance and the two environmental variables.

3.3 Steelhead Gillnet Marks

The presence or absence of gillnet marks was noted for all steelhead as they migrated past the fence. This was facilitated by the use of a viewing box, avoiding the need to handle fish. Gillnet marks are easily identified using this method.

3.4 Male and Female Steelhead Run Timing

The run timing of male and female steelhead was examined by plotting cumulative percent male and female steelhead by date over the duration of fence operation. The date of first arrival and median migration date past the fence for male and female steelhead was also compared.

4.0 Results

4.1 Steelhead Results

Between August 1 and September 30, 2008, 1,162 steelhead migrated past the upper Sustut River fence (Table 1; Appendix Table 1). Approximately 10 steelhead were in the pool immediately downstream of the fence, immediately after removal, resulting in a total count of 1,172 steelhead. The standardized count of 1,162 represents the highest recorded value since the current fence location was established in 1994. One thousand one hundred and sixty two represents 112% of the estimated adult carrying capacity (1036) for the upper

Sustut River (Tautz *et al*. 1992). The lowest recorded fence count was 133 in 2006 (Fig 4). The 13 year mean fence count (1994-2008) is 594. The fence count in 2009 represents a significant increase compared to the previous four years when the results were at or below the minimum spawning requirement described by Johnston *et al.* 2002 (Fig.5).

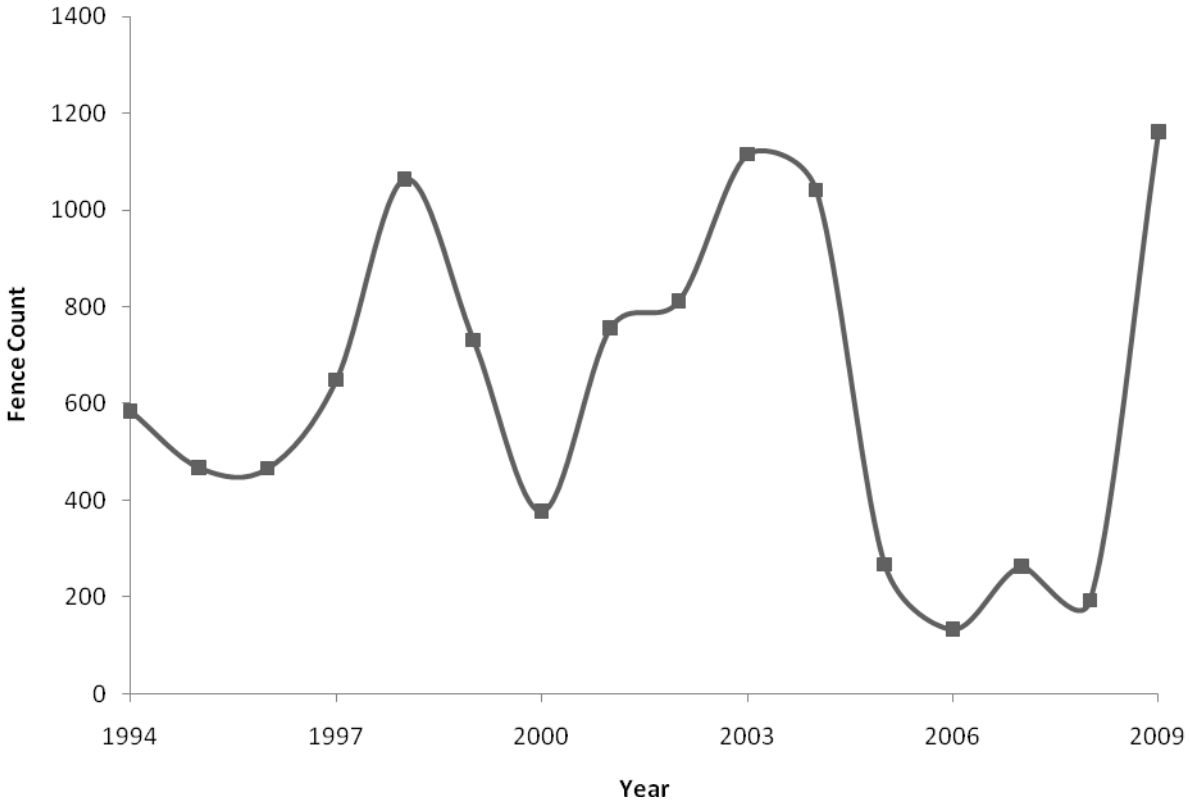

Figure 4. Annual fence count of steelhead at the upper Sustut River weir 1994-2009.

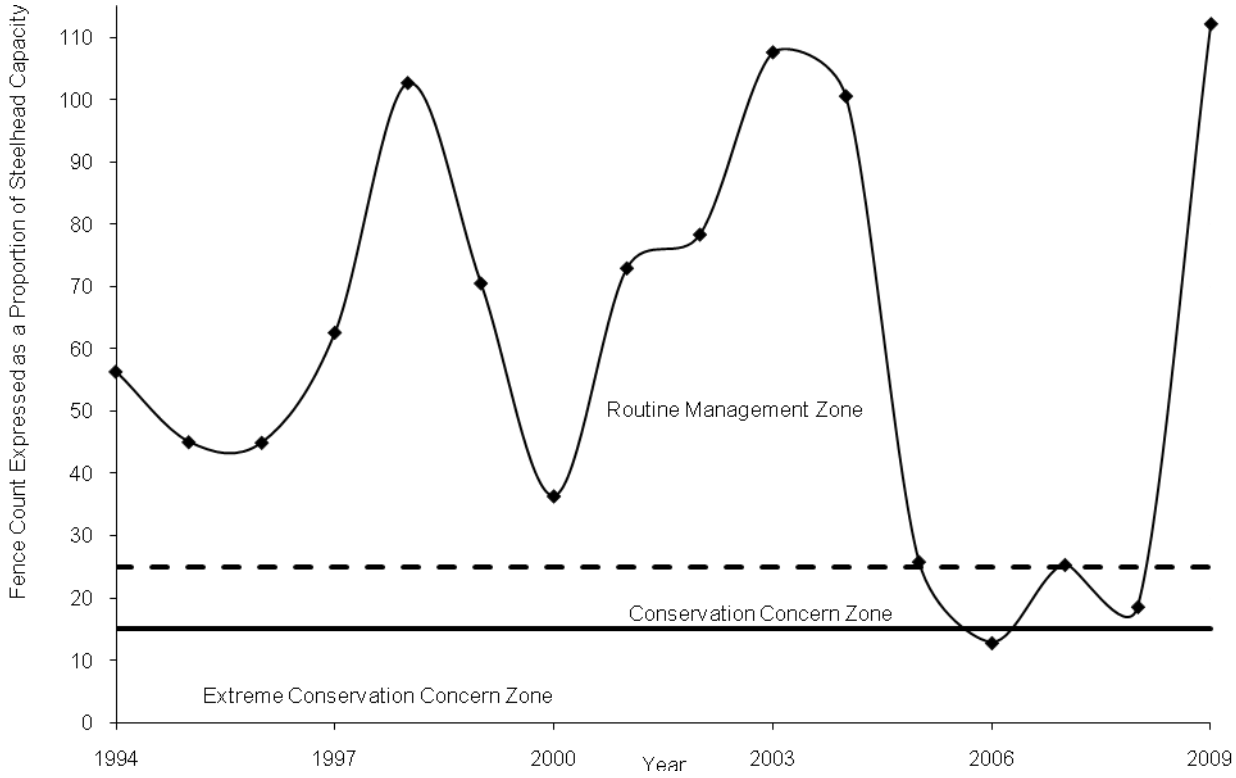

Figure 5. Annual steelhead fence count expressed as a proportion of adult steelhead capacity.

The first steelhead migrated through the fence on August 6 and by September 3, 50% of the steelhead enumerated in 2009 had passed the fence (n=581) (Fig 6). For annual comparison, the previous dates by which 50% of the migration had occurred along with the corresponding total fence counts to September 30 are recorded in Table 1 for the years 1994 to 2009. Since 1994, the date on which the first steelhead arrived has ranged between July 28 (2004) and August 17 (1999). The mean date of first arrival is August 8 (SD 5.5) Information collected prior to 1994 was not included due to the variation in fence design and location.

Since 1994, the mean date at which 50% of the steelhead run had passed the fence is September 7 (SD 5.2). In comparison, since 2002, the 50% migration date has been relatively consistent. The mean 50% migration date during this time period is September 4 (SD 2.5) (Table 1).

Table 1. Dates when 50% of the steelhead migrated through the fence and the total count to September 30, for the years 1994 to 2009.

Year	Date of 50% Migration	50% Fence Count	Aggregate Fence Count	Rank
1994	Aug-29	292	584	9
1995	Sep-08	234	467	10
1996	Sep-07	233	466	11
1997	Sep-13	325	649	8
1998	Sep-07	532	1064	3
1999	Sep-17	366	731	7
2000	Sep-07	186	377	12
2001	Sep-16	378	756	6
2002	Sep-02	406	812	5
2003	Sep-02	558	1115	2
2004	Sep-03	521	1042	4
2005	Sep-03	134	268	13
2006	Sep-04	66	133	16
2007	Sep-09	132	263	14
2008	Sep-07	97	193	15
2009	Sept-03	581	1162	1
Earliest 50% Migration Date	Aug-29	Minimum Count	133	
Latest 50% Migration Date	Sep-17	Maximum Count	1162	
		Mean Count	630	

Graphical analysis of the cumulative proportional distribution of steelhead over time shows that, in 2010, slightly greater than half of the steelhead migration occurred in a four day period (Fig 6). On September 1 (n=169), September 2 (n=151) September 3 (n=107) and September 5 (n=174) a total of 601or 51% of the total index was counted. The daily steelhead count ranged from 0 to 174 in this time period, and steelhead were counted on 47days of the 61 day project. In comparison, from 2002 through 2008, the mean number of days steelhead were counted during the 61 day project was 38.4 (SD 10.89). During this time period the fence count ranged from 133 to 1115 (Table 1).

After the fence was dismantled on September 30 the fence crew estimated that 10 steelhead were present in the fence pool located downstream of the fence.

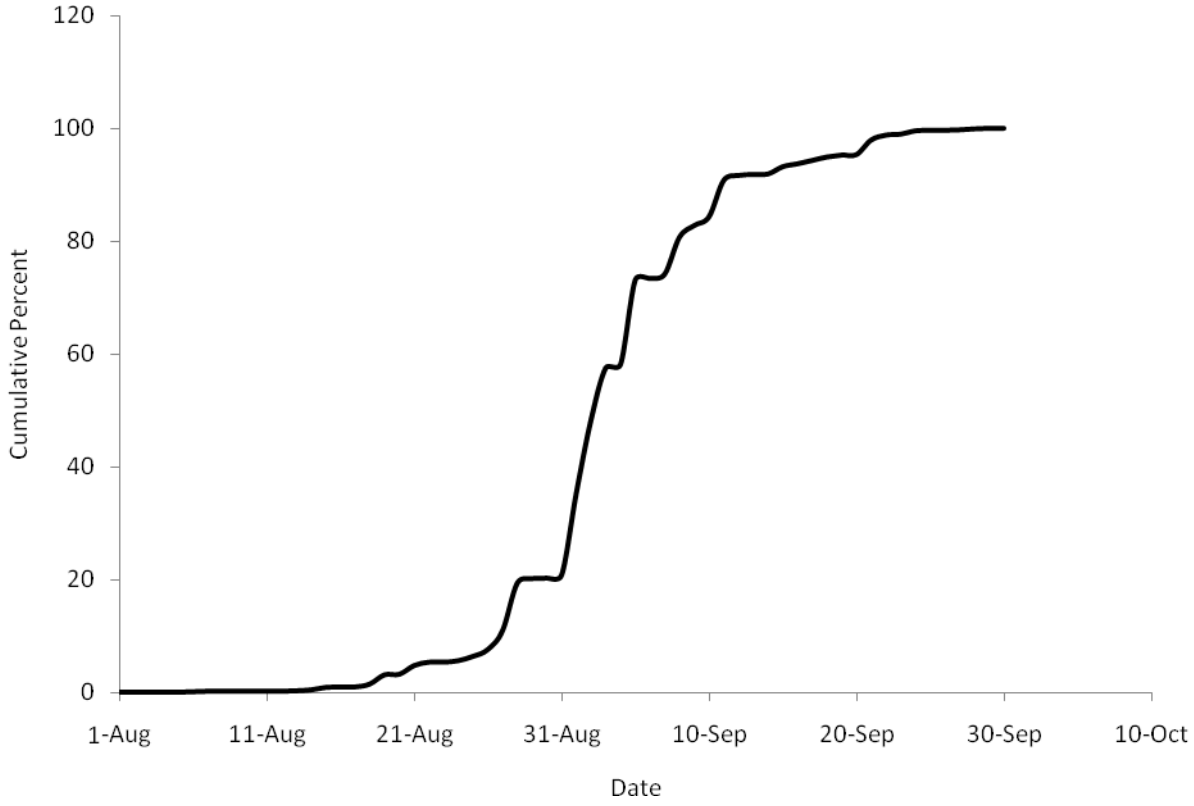

Figure 6. Daily cumulative percentage of upper Sustut River steelhead migrating past the fence for 2009.

4.2 Steelhead Ageing and Tagging Information

Prior to 2002, all steelhead captured in the trap box were marked via Anchor-T tag (Floy Seattle, U.S.A) before being released upstream of the fence. Since 2002, the tagging component of the program has been discontinued. Steelhead captured and released in Alaskan commercial fisheries, Canadian commercial fisheries, First Nation fisheries programs and the Tyee Test Fishery are sometimes tagged or marked prior to release. Steelhead enumerated at the fence are checked for marks or tags. There were no tagged or marked fish observed at the fence in 2009.

Until 2006 the fence staff attempted to collect biological samples from approximately 20% of all steelhead captured at the fence. This information included length data and scale samples for ageing purposes. Since 2006 steelhead abundance has been below minimum requirements. Therefore, the decision had been made to suspend steelhead handling until such a time that abundance levels increase. If steelhead abundance remains well above the precautionary threshold in 2010 the biological sampling component of the program may be reinstated.

4.3 Steelhead Migration and Physical Data

Daily environmental data recorded by the fence monitors are presented in Appendix Table 4. For purposes of analysis, water temperatures collected via Stowaway data loggers were utilized. The data logger recorded water temperatures from August 2 to September 30, 2009. Water temperature was recorded hourly providing 1,440 data points for analysis. Overall, the highest temperature was recorded on August 2 (17.41°C) and the lowest was recorded on September 30 (3.75°C). The mean temperature during the 2009 project was 9.61°C. The lowest mean daily water temperature recorded when a steelhead was captured was 4.06°C on September 29. Daily minimum water temperatures are shown graphically in Appendix Figure 1. Mean water temperatures in 2005, 2006, 2007, 2008 and 2009 were 8.81°C, 8.71°C, 8.81°C ,9.11°C and 9.61° C (SD 0.37) respectively. In this time period, the fence count ranged from 1162 in 2009 to 133 in 2006.

Stratified by hour, the warmest water temperatures were recorded between 17:00:00 and 18:00:00 (Fig 7). During the study period 85% (n=990) of the steelhead entering the trap box did so between 1000 hrs and 2000 hrs. The remainder, 15% (n=171), entered the trap box after the crew left in the evening and before the morning site visit the following day. Since the fence staff are not at the site on a continual basis the exact hour steelhead entered the trap box cannot be determined. However, the data indicates that the majority of steelhead that entered the trap box did so in the afternoon and evening hours. This coincides with the daily time period when water temperatures are increasing or have reached their daily maximum (Fig 7).

Accumulated thermal units are defined as the cumulative daily water temperature (degrees Celsius) stratified by hour from August 2 to September 30.

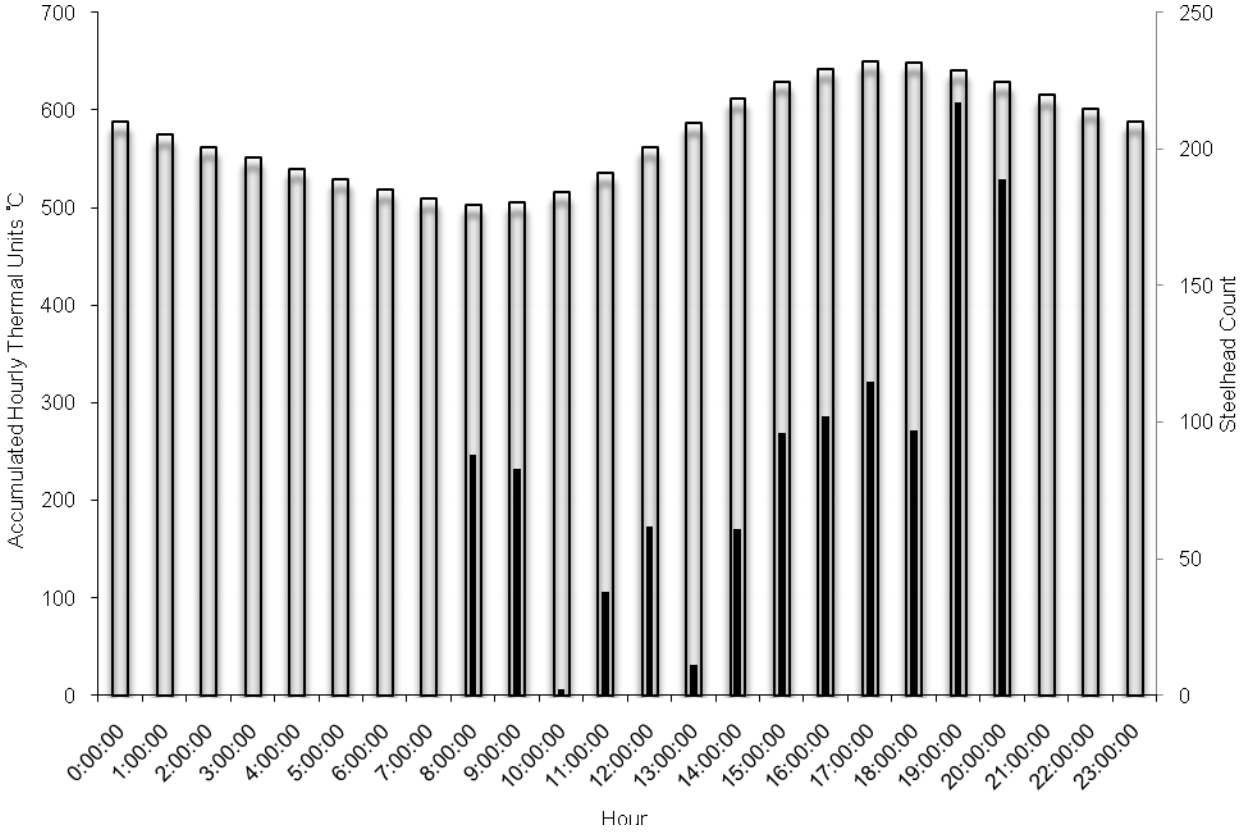

Figure 7. Water temperatures and steelhead migration stratified by hour
August 2- September 30, 2009

Water levels were recorded by fence staff twice a day. The two measurements were averaged to determine a daily level (Fig 8). Measurements were recorded from a metric staff gauge located immediately upstream of the fence. In 2009, water levels ranged between 0.12m and 0.34m. Steelhead entered the trap box in water levels ranging between 0.12m and 0.34m. The mean level was 0.20m and the standard deviation was 0.05. The highest water level was 0.34m measured on September 22, and the lowest level was 0.12m measured on August 20. Figure 8 shows the combined 2009 daily water levels and steelhead migration at the fence from August 1 to September 30.

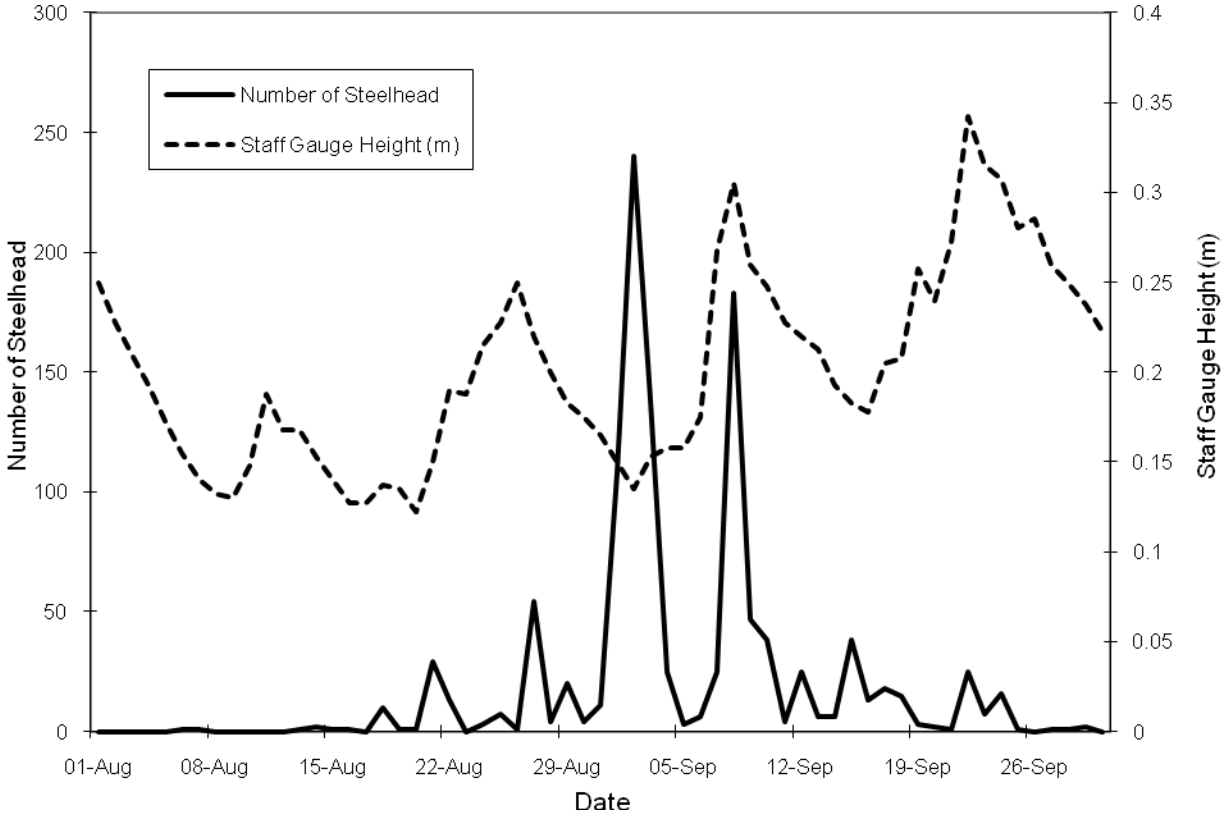

Figure 8. Daily mean staff gauge height and the number of steelhead migrating past the fence in 2009.

A regression comparing 2009 daily water level to steelhead migration into the trap box indicated a poor relationship between the variables R^2=0.0011 (Fig.9). In 2009, the median water level was 0.19m. During the project (43% n=495) steelhead entered the trap box when water levels were below 0.19m, and (57% n=667) entered the trap box when water levels were above 0.19m.

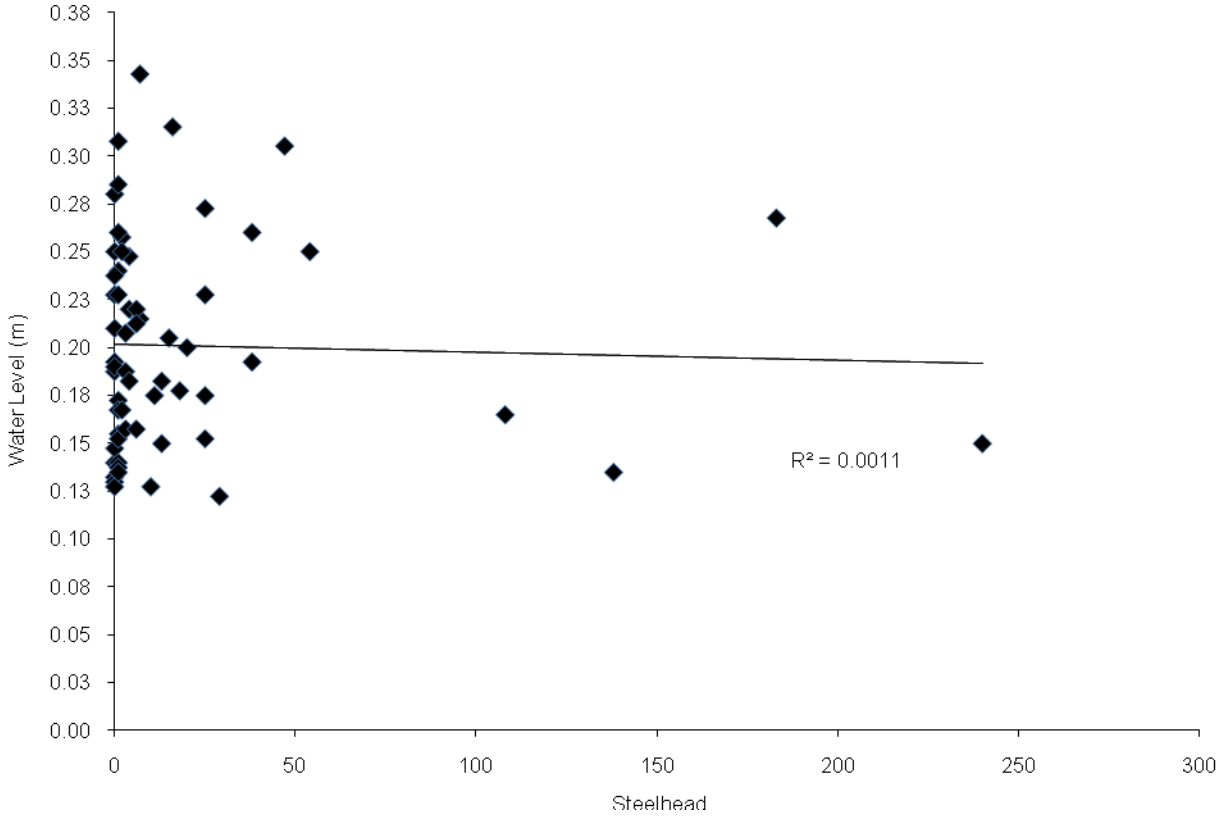

Figure 9. Water level vs. steelhead migration past the upper Sustut River enumeration weir 2009

Water level data are available for eleven of the last twelve years. Since 1998 the annual mean level from August 1 to September 30 has ranged between 0.34m (2004) and 0.16m (2007). The aggregate mean water level is 0.26m (SD 0.08) (n=667). Figure 10 compares the mean annual water level and fence count. The R^2 value (0.11) indicates that there is not a significant linear relationship between annual water level and steelhead fence count.

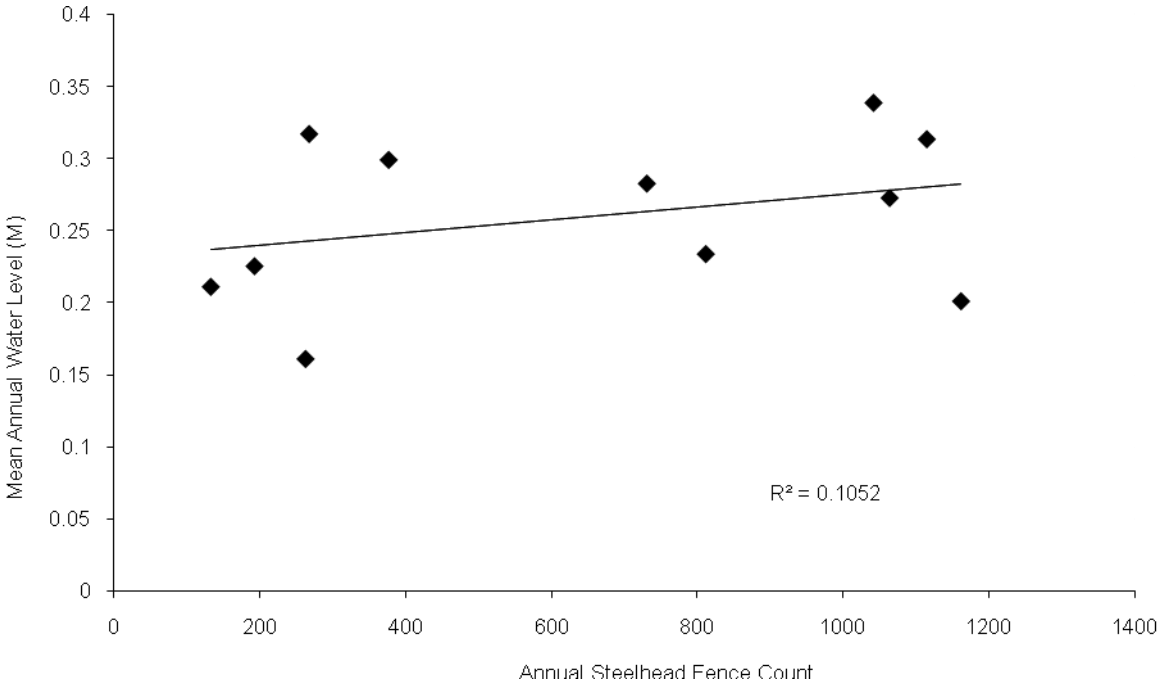

Figure 10. Annual water level vs. steelhead fence count 1998-2009.

4.4 Steelhead Sex Ratio

Of the 1,161 steelhead counted migrating through the fence, 427 (38%) were male and 724 (62%) were female resulting in a female to male ratio of 1.66:1. Since 1998, the female to male sex ratio has ranged between 1.27:1 (2002) and 2.01:1 (2004). The mean female to male ratio is 1.61:1 and the standard deviation was 0.21 during this time period.

4.5 Steelhead Gillnet Marks

Fence observers recorded the presence of gillnet marks on steelhead that were handled during the project. Gillnet marks were present on 1.2% (n=14) of all steelhead that migrated past the fence. Eleven of the steelhead observed with net marks were female and three were male.

4.6 Male and Female Steelhead Run Timing

The first female steelhead passed through the fence on August 7, and the first male steelhead migrated upstream on August 6 (Fig 11). The median migration date for males was September 1 and the median date for females was September 3. The plot of daily cumulative percentage of male and female steelhead arriving at the fence revealed a similar migration pattern for both sexes (Fig 11).

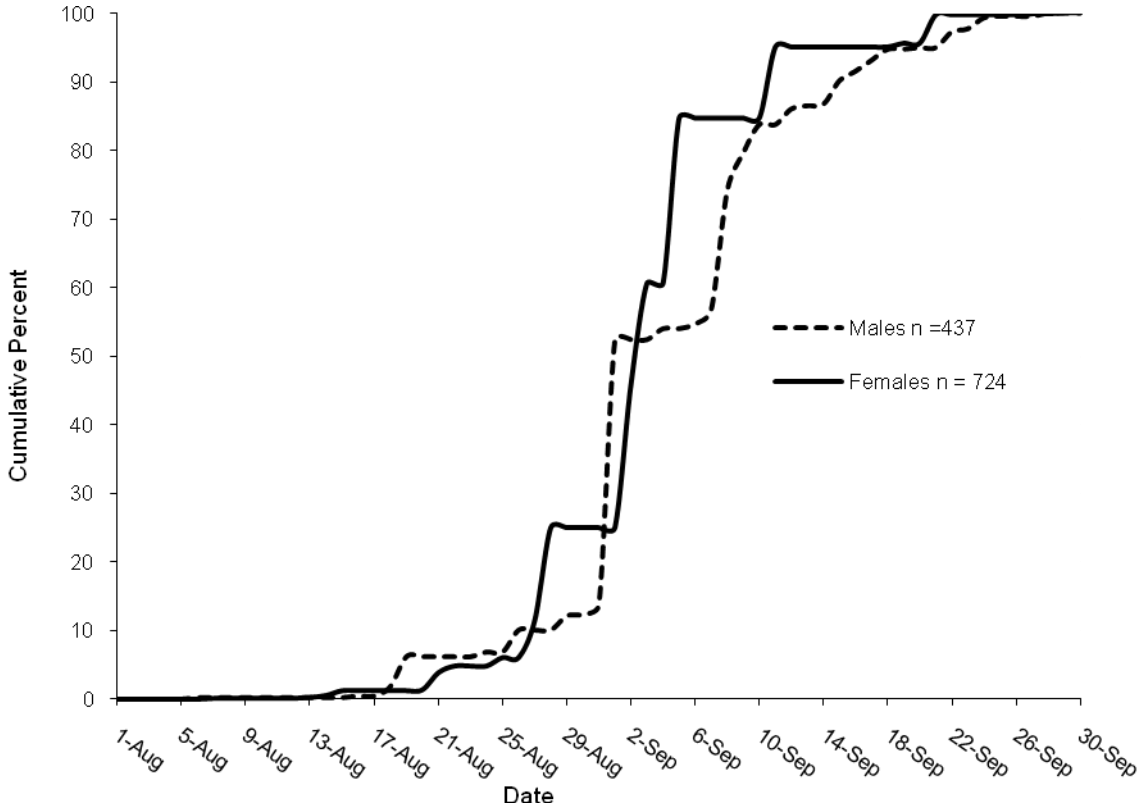

Figure 11. Daily cumulative percent of male and female steelhead migrating past the fence 2009.

5.0 Discussion

Johnston *et al.* 2002 describes a framework that establishes benchmarks to represent steelhead stock status. For the purposes of this report, 25% of spawner capacity was used as the precautionary threshold, or minimum target reference point (TRP). The operational limit reference point (LRP), or 15% of

spawner capacity, is defined as the spawner abundance from which a model population recovered to the minimum TRP within one generation in the absence of harvest. Twenty-five per cent percent was identified as the minimum TRP for this population in this report. An annual target reference point that maintains the population at levels well above the minimum TRP and sustains the Sustut River's reputation as a world class recreational steelhead fishery should be determined. The annual TRP should likely range between 50% (518) and 70% (752) of estimated adult capacity (1036) to account for the uncertainty in marine survival rates. The conservation concern threshold (CCT), or precautionary threshold (PT) is identified as spawner abundance levels at or below 25% of adult capacity. In 2005, 2006, 2007 and 2008 annual fence counts combined with visual counts resulted in aggregate counts at or near the PT. The results in 2009 were significantly higher and were well above the PT. Spawner abundance below the PT is described as a conservation concern and the productivity of the population is impaired.

Since the upper Susut fence is near the geographic end of the annual steelhead run it is difficult to make in season recommendations and changes that will mitigate impacts on the population until the annual status is known. However, in the latter part of this decade multiple fence counts at or near the precautionary threshold did not result in the development of any plans or agreements that would mitigate anthropogenic affects on this population. Plans and agreements, to maintain the steelhead population, should be developed should the population fall to levels below the precautionary threshold prior to the occurrence of such events.

Table 2. Historical upper Sustut River steelhead data for the years 1994 to 2009[3].

Year	Date of First Steelhead	Date of 50% Migration	Count	Average Length (cm) M	Average Length (cm) F	Repeat Spawner	% Handling Mortalities	% Gillnet Marked M	% Gillnet Marked F	% Gillnet Marked Total
1994	8-Aug	29-Aug	584	824	737					2.0
1995	8-Aug	8-Sep	467	826	746	1.2	4.0			6.0
1996	17-Aug	7-Sep	466	829	739	1.3	2.8			14.0
1997	9-Aug	13-Sep	649	814	733	0.6	1.5	9.2	17.8	15.4
1998	3-Aug	7-Sep	1064	827	749		0.8	13.4	13.8	13.7
1999	17-Aug	17-Sep	731	848	756	2.5	0.3	6.1	9.9	8.5
2000	8-Aug	7-Sep	377	827	741	0.4	0.5	10.6	16.2	14.1
2001	15-Aug	16-Sep	756	864	771	2.5	1.9	10.1	14.5	12.8
2002	9-Aug	2-Sep	812			1.9	0.5	3.6	8.4	6.3
2003	3-Aug	2-Sep	1115	780	730	1.2	0.3	8.3	14.2	11.8
2004	28-Jul	3-Sep	1042	818	745		0.3	6.0	8.8	7.7
2005	31-Jul	3-Sep	269	859	741	19	0	3.3	5.5	4.8
2006	9-Aug	4-Sep	133	N/A*	N/A*	N/A*	0	0.53	1.6	2.25
2007	9-Aug	9-Sep	263	N/A*	N/A*	N/A*	0.004	2.7	4.6	3.8
2008	8-Aug	7-Sep	193	N/A*	N/A*	N/A*	0.01	4.5	2.3	3.1
2009	6-Aug	3-Sep	1162	N/A*	N/A*	N/A*	0.3	0.3	0.9	1.2
Minimum			133	780	730	0.4	0.0	0.53	1.6	1.2
Maximum			1162	864	771	19.0	4.0	13.4	17.8	15.4

Four steelhead were found deceased in 2008. It is uncertain if the mortalities were associated with handling or the result of natural causes.

In 2009, 62% of the steelhead migrating past the fence were female and 38% were male. These results suggested a sex ratio of 1.66:1 females to males. The sex ratio in favour of females is similar to that found in previous years (Parken *et al.* 1997; Williamson 1998, 1999a, 2000; Diewert 2001, 2002, 2003, 2004; Peard 2005, 2006, 2007, 2008). The mean ratio during this time period is 1.61: 1 (SD 0.21).

In 2009, 1.2% of all steelhead migrating past the fence exhibited gillnet marks. This is below the previously recorded low value of 2.0%. The highest value recorded was to 15.4% in 1997 (Table 2).

[3] Due to the low numbers of steelhead in 2006 and 2007 and 2008 length, ageing and genetic information was not collected.

5.1 The Importance of Continued Monitoring.

The upper Sustut River fence is one of two long term indexes used to estimate summer run steelhead abundance in the Skeena River watershed. It is also the only index available to monitor the abundance of upper Skeena River steelhead stocks. The long term data set collected at the site allows fisheries managers to compare annual abundance, run timing, sex ratios and age composition of adult steelhead in the upper Sustut. The ability of fisheries managers to monitor steelhead stock abundance and other important biological parameters would be severely affected if this project were to discontinue. The social, economic and ecological benefits created by the Skeena summer run steelhead stocks make this project both cost efficient and important component of the long term viability of this stock.

6.0 Recommendations

1. Enumeration of the upper Sustut River steelhead population should continue to be carried out annually. The valuable time series of data that results from this project provides fisheries managers with information on abundance trends for all early run Skeena steelhead populations and provides feedback on the impact of fisheries on these stocks.

2. Efforts to visually enumerate steelhead below the fence prior to fence removal should continue. These counts provide the basis for estimating total steelhead spawning escapement to the upper Sustut River allowing for an evaluation of stock status relative to carrying capacity. Surveys should take place bi weekly for the last two weeks of September to ensure that a count of steelhead below the fence is always available. A final count should be carried immediately prior to fence removal. How the count occurs should be standardized to maintain the long term consistency of the data.

3. Develop a plan or agreement with other management agencies to determine management actions when abundance estimates are at or below the precautionary threshold for successive years.

7.0 Acknowledgments

Ron, Wanda, Clayton, Leaf, Brome and Hawk Steffey repaired, installed and maintained the fence. Their dedication to the project was above and beyond what is asked of them; both fish and fisheries managers benefited from their hard work and thoughtful approach.

Mark Beere directed this study and provided editorial reviews and valuable comments for the final draft.

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8.0 Literature Cited

Cox-Rogers, S. 1994. Description of daily simulation model for the Area 4 (Skeena) commercial gillnet fishery. Canadian Manuscript Report of Fisheries and Aquatic Sciences No. 2256.

Bustard, D. 1993. Adult steelhead studies in the upper Sustut River 1992. Unpublished manuscript prepared for British Columbia Ministry of Environment, Lands and Parks, Smithers, B.C.

Diewert, R.E. 2001. Enumeration of adult steelhead in the upper Sustut River 2000. British Columbia Ministry of Water, Land and Air Protection. Fisheries Branch. Skeena Fisheries Report SK#128.

Diewert, R.E. 2002. Enumeration of adult steelhead in the upper Sustut River 2001. British Columbia Ministry of Water, Land and Air Protection. Fisheries Branch. Skeena Fisheries Report SK#130.

Diewert, R.E. 2003. Enumeration of adult steelhead in the upper Sustut River 2002. British Columbia Ministry of Water, Land and Air Protection. Fisheries Branch. Skeena Fisheries Report SK#134

Diewert, R.E. 2004. Enumeration of adult steelhead in the upper Sustut River 2003. British Columbia Ministry of Water, Land and Air Protection. Fisheries Branch. Skeena Fisheries Report SK#138

McPhail, J.D. 2007. The freshwater fishes of British Columbia. The University of Alberta Press. Edmonton, Alberta, Canada. Pg 281.

McPhail, J.D. and R. Carveth. 1994. Field key. The freshwater fishes of British Columbia. British Columbia Resource Inventory Committee Publication #44.

Johnston N.T., Parkinson., E.A., Tautz., A.F. and Ward B.R 2002. A Conceptual Framework for the Management of Steelhead, Oncorhynchus mykiss. Ministry of Water, Land and Air Protection. BC Fisheries Branch Report No. RD101.

Parken, C.K., K.L. Morten, and D.Y. Atagi. 1997. Review of the escapement of adult steelhead to the upper Sustut River 1986, 1992-1996. British Columbia Ministry of Environment, Lands and Parks. Fisheries Branch. Skeena Fisheries Report SK#107.

Peard, D.A. 2006. Enumeration of adult steelhead in the upper Sustut River, 2005. BC Min. of Environment, Fish & Wildlife Section, Skeena Region, Smithers, BC. Skeena Fisheries Report SK#147.

Peard, D.A. 2008. Enumeration of adult steelhead in the upper Sustut River, 2006. BC Min. of Environment, Fish & Wildlife Section, Skeena Region, Smithers, BC. Skeena Fisheries Report SK#150.

Peard, D.A. 2008. Enumeration of adult steelhead in the upper Sustut River, 2007. BC Min. of Environment, Fish & Wildlife Section, Skeena Region, Smithers, BC.

Peard, D.A. 2009. Enumeration of adult steelhead in the upper Sustut River, 2008. BC Min. of Environment, Fish & Wildlife Section, Skeena Region, Smithers, BC

Peard, D.A. 2010. Enumeration of adult steelhead in the upper Sustut River, 2009. BC Min. of Environment, Fish & Wildlife Section, Skeena Region, Smithers, BC

Scott, W.B. and E.J. Crossman. 1973. Freshwater fishes of Canada. Fisheries Research Board of Canada, Bulletin No. 184, Ottawa, Ontario.

Spence, C.R., M.C. Beere and M.J. Lough. 1990. Sustut River steelhead investigations 1986. British Columbia Ministry of Environment, Lands and Parks. Smithers, B.C., Skeena Fisheries Report SK#64.

Tautz, A.F., Ward , B.R., and R.A Ptolemy. 1992. Steelhead trout productivity and stream carrying capacity for rivers of the Skeena drainage. PSARC Working Paper S92-6 and 8

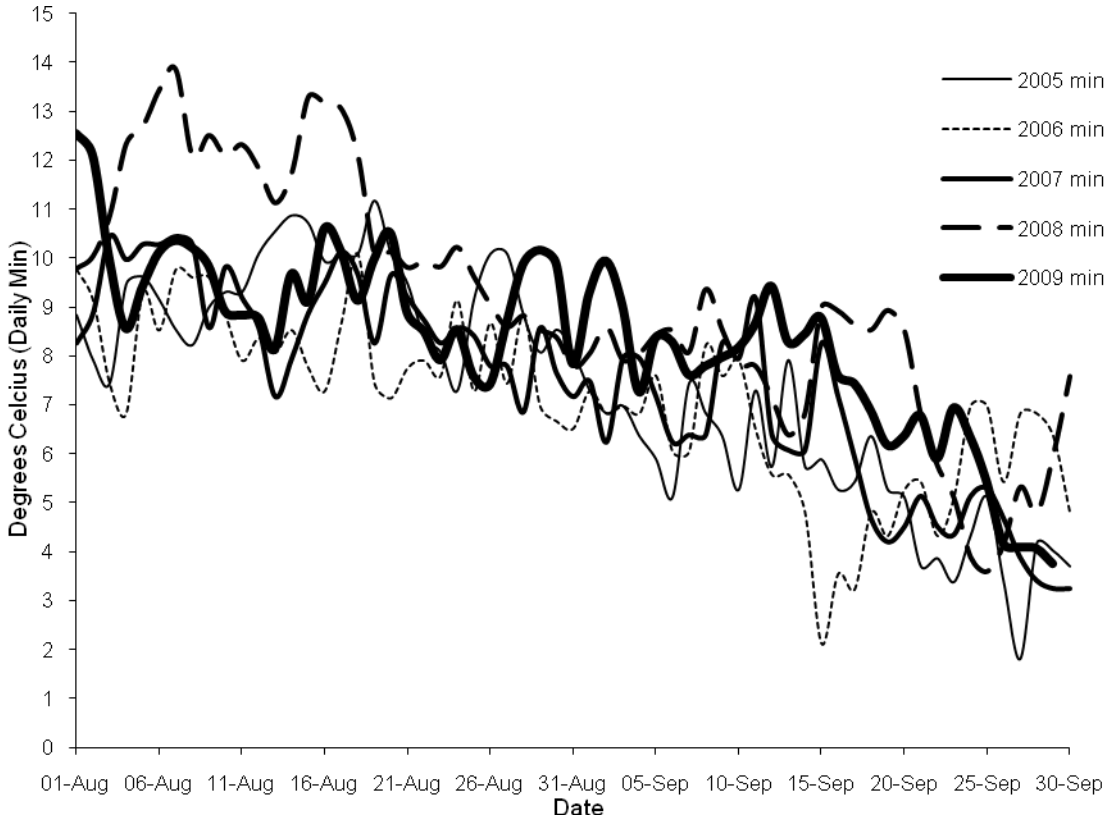
Ward, B.R., A.F. Tautz, S. Cox-Rogers and R.S. Hooton. 1993. Migration timing and harvest rates of the steelhead trout populations of the Skeena River system. PSARC Working Paper S93-06.

Williamson, C.J. 1998. Enumeration of Adult Steelhead in the Upper Sustut River 1997. British Columbia Ministry of Environment, Lands and Parks. Fisheries Branch. Skeena Fisheries Report SK #112.

Williamson, C.J. 1999a. Enumeration of Adult Steelhead in the Upper Sustut River 1998. British Columbia Ministry of Environment, Lands and Parks. Fisheries Branch. Skeena Fisheries Report SK #120.

Williamson, C.J. 2000. Enumeration of Adult Steelhead in the Upper Sustut River 1999. British Columbia Ministry of Environment, Lands and Parks. Fisheries Branch. Skeena Fisheries Report SK #126

Appendix Figures



Appendix Figure 1. Daily minimum water temperatures at the Sustut River fence 2005, 2006, 2007, 2008 and 2009.

Appendix Tables

Appendix Table 1. Daily and cumulative totals for non salmon species, 2009.

Date	ST Daily	ST Cumulative	RB Daily	RB Cumulative	BT Daily	BT Cumulative	WF Daily	WF Cumulative
1-Aug	0	0	0	0	1	1	2	2
2-Aug	0	0	0	0	0	1	1	3
3-Aug	0	0	0	0	0	1	0	3
4-Aug	0	0	0	0	0	1	1	4
5-Aug	0	0	0	0	0	1	0	4
6-Aug	1	1	0	0	0	1	0	4
7-Aug	1	2	0	0	0	1	0	4
8-Aug	0	2	0	0	0	1	0	4
9-Aug	0	2	0	0	0	1	0	4
10-Aug	0	2	0	0	0	1	0	4
11-Aug	0	2	1	1	0	1	0	4
12-Aug	0	2	0	1	0	1	0	4
13-Aug	1	3	0	1	0	1	0	4
14-Aug	2	5	0	1	0	1	0	4
15-Aug	1	6	0	1	0	1	0	4
16-Aug	1	7	0	1	0	1	1	5
17-Aug	0	7	0	1	0	1	0	5
18-Aug	10	17	0	1	0	1	3	8
19-Aug	1	18	0	1	0	1	0	8
20-Aug	1	19	0	1	0	1	2	10
21-Aug	29	48	0	1	0	1	0	10
22-Aug	13	61	0	1	0	1	0	10
23-Aug	0	61	0	1	0	1	0	10
24-Aug	3	64	0	1	1	2	1	11
25-Aug	7	71	0	1	0	2	0	11
26-Aug	1	72	0	1	0	2	0	11
27-Aug	54	126	0	1	0	2	0	11
28-Aug	4	130	0	1	0	2	0	11
29-Aug	20	150	0	1	0	2	0	11
30-Aug	4	154	0	1	0	2	0	11
31-Aug	11	165	0	1	0	2	2	13
1-Sep	108	273	1	2	0	2	0	13
2-Sep	240	513	1	3	0	2	1	14
3-Sep	138	651	0	3	0	2	1	15
4-Sep	25	676	0	3	0	2	1	16
5-Sep	3	679	0	3	0	2	0	16
6-Sep	6	685	0	3	0	2	0	16
7-Sep	25	710	0	3	0	2	3	19
8-Sep	183	893	0	3	0	2	0	19
9-Sep	47	940	0	3	0	2	0	19

Date	ST Daily	ST Cumulative	RB Daily	RB Cumulative	BT Daily	BT Cumulative	WF Daily	WF Cumulative
10-Sep	38	978	0	3	0	2	2	21
11-Sep	4	982	1	4	0	2	2	23
12-Sep	25	1007	0	4	0	2	1	24
13-Sep	6	1013	0	4	0	2	3	27
14-Sep	6	1019	0	4	0	2	0	27
15-Sep	38	1057	0	4	0	2	2	29
16-Sep	13	1070	1	5	0	2	0	29
17-Sep	18	1088	0	5	0	2	1	30
18-Sep	15	1103	0	5	0	2	0	30
19-Sep	3	1106	0	5	0	2	1	31
20-Sep	2	1108	0	5	0	2	0	31
21-Sep	1	1109	0	5	0	2	0	31
22-Sep	25	1134	0	5	0	2	0	31
23-Sep	7	1141	0	5	0	2	0	31
24-Sep	16	1157	1	6	1	3	0	31
25-Sep	1	1158	0	6	0	3	1	32
26-Sep	0	1158	0	6	0	3	0	32
27-Sep	1	1159	0	6	0	3	0	32
28-Sep	1	1160	0	6	0	3	0	32
29-Sep	2	1162	0	6	0	3	0	32
30-Sep	0	1162	0	6	0	3	2	34

Appendix Table 2. Steelhead sampling data from the Sustut River fence, 2009.

Date	Time	Sex	GN Marks
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2009-08-15	8:15	F	
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2009-08-18	8:15	M	
2009-08-18	8:15	M	
2009-08-18	8:15	M	
2009-08-18	8:15	F	
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2009-08-21	16:45	F	
2009-08-21	16:45	F	
2009-08-21	16:45	F	
2009-08-21	16:45	F	
2009-08-21	16:45	F	

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2009-09-14	12:15	F
2009-09-14	12:45	F
2009-09-14	13:00	F
2009-09-15	8:30	M
2009-09-15	8:30	M
2009-09-15	8:30	M
2009-09-15	8:30	F
2009-09-15	16:00	M
2009-09-15	16:00	M
2009-09-15	16:00	F
2009-09-15	16:00	F
2009-09-15	16:00	F
2009-09-15	16:00	F
2009-09-15	16:00	F
2009-09-15	16:30	M
2009-09-15	16:30	M
2009-09-15	16:30	M
2009-09-15	16:30	M
2009-09-15	16:30	M
2009-09-15	16:30	F
2009-09-15	16:30	F
2009-09-15	16:30	F
2009-09-15	16:30	F
2009-09-15	16:30	F
2009-09-15	17:30	M
2009-09-15	17:30	M
2009-09-15	17:30	M
2009-09-15	17:30	M
2009-09-15	17:30	M
2009-09-15	17:30	F
2009-09-15	17:30	F
2009-09-15	17:30	F
2009-09-15	17:30	F
2009-09-15	17:30	F
2009-09-15	17:30	F
2009-09-15	17:30	F
2009-09-15	17:30	F
2009-09-15	17:30	F
2009-09-15	17:30	F
2009-09-15	17:30	F

2009-09-15	17:30	F
2009-09-16	8:15	M
2009-09-16	8:15	M
2009-09-16	8:15	M
2009-09-16	8:15	F
2009-09-16	8:15	F
2009-09-16	8:15	F
2009-09-16	8:15	F
2009-09-16	12:30	M
2009-09-16	12:30	F
2009-09-16	12:30	F
2009-09-16	12:30	F
2009-09-16	17:15	M
2009-09-16	17:15	M
2009-09-17	8:30	M
2009-09-17	11:30	M
2009-09-17	11:30	F
2009-09-17	11:30	F
2009-09-17	13:00	F
2009-09-17	15:45	M
2009-09-17	16:30	F
2009-09-17	17:15	M
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2009-09-17	17:15	F
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2009-09-17	19:30	M
2009-09-17	19:30	F
2009-09-17	19:30	F
2009-09-18	8:30	M
2009-09-18	8:30	F
2009-09-18	12:30	F
2009-09-18	16:15	M
2009-09-18	16:15	M
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2009-09-18	16:15	F
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2009-09-18	16:15	F
2009-09-18	17:15	M
2009-09-18	17:15	M
2009-09-18	17:15	M
2009-09-18	17:15	F
2009-09-18	17:15	F
2009-09-18	17:15	F
2009-09-19	9:00	F
2009-09-19	9:00	F
2009-09-19	15:00	F
2009-09-20	19:45	M
2009-09-20	19:45	F
2009-09-21	19:30	F

2009-09-22	9:00	M
2009-09-22	9:00	F
2009-09-22	12:30	M
2009-09-22	19:00	M
2009-09-22	19:00	M
2009-09-22	19:00	M
2009-09-22	19:00	M
2009-09-22	19:00	M
2009-09-22	19:00	M
2009-09-22	19:00	M
2009-09-22	19:00	M
2009-09-22	19:00	F
2009-09-22	19:00	F
2009-09-22	19:00	F
2009-09-22	19:00	F
2009-09-22	19:00	F
2009-09-22	19:00	F
2009-09-22	19:00	F
2009-09-22	19:00	F
2009-09-22	19:00	F
2009-09-22	19:00	F
2009-09-22	19:00	F
2009-09-22	19:00	F
2009-09-22	19:00	F
2009-09-22	19:00	F
2009-09-23	14:15	M
2009-09-23	14:15	F
2009-09-23	14:15	F
2009-09-23	14:15	F
2009-09-23	18:00	M
2009-09-23	18:00	F
2009-09-23	18:00	F
2009-09-24	9:30	M
2009-09-24	9:30	M
2009-09-24	9:30	F
2009-09-24	9:30	F
2009-09-24	9:30	F
2009-09-24	14:30	F
2009-09-24	15:30	M
2009-09-24	15:30	M
2009-09-24	15:30	F
2009-09-24	15:30	F
2009-09-24	19:00	M
2009-09-24	19:00	M
2009-09-24	19:00	M
2009-09-24	19:00	F
2009-09-24	19:00	F
2009-09-24	19:30	F
2009-09-25	9:30	M
2009-09-27	9:30	F
2009-09-28	9:30	M
2009-09-29	14:00	F
2009-09-29	15:00	M

Appendix Table 3. Daily and cumulative total of chinook, sockeye and coho salmon migrating past the Sustut River fence, 2009.

Date	Chinook		Sockeye		Coho	
	Daily	Cum	Daily	Cum	Daily	Cum
01-Aug	28	28	0	0	0	0
02-Aug	43	71	1	1	0	0
03-Aug	42	113	0	1	0	0
04-Aug	35	148	6	7	0	0
05-Aug	13	161	31	38	0	0
06-Aug	15	176	41	79	0	0
07-Aug	17	193	8	87	0	0
08-Aug	4	197	9	96	0	0
09-Aug	0	197	4	100	0	0
10-Aug	13	210	8	108	0	0
11-Aug	20	230	14	122	0	0
12-Aug	7	237	0	122	0	0
13-Aug	8	245	34	156	0	0
14-Aug	2	247	2	158	0	0
15-Aug	2	249	2	160	0	0
16-Aug	0	249	7	167	0	0
17-Aug	2	251	0	167	0	0
18-Aug	2	253	37	204	4	4
19-Aug	6	259	13	217	1	5
20-Aug	5	264	0	217	0	5
21-Aug	0	264	70	287	15	20
22-Aug	0	264	11	298	4	24
23-Aug	2	266	0	298	0	24
24-Aug	0	266	27	325	2	26
25-Aug	1	267	17	342	4	30
26-Aug	1	268	15	357	2	32
27-Aug	2	270	42	399	11	43
28-Aug	3	273	2	401	5	48
29-Aug	0	273	4	405	4	52
30-Aug	0	273	2	407	0	52
31-Aug	0	273	0	407	5	57
01-Sep	0	273	0	407	6	63
02-Sep	0	273	12	419	14	77
03-Sep	0	273	15	434	6	83
04-Sep	0	273	7	441	8	91
05-Sep	0	273	0	441	1	92
06-Sep	0	273	1	442	6	98
07-Sep	0	273	13	455	19	117
08-Sep	0	273	61	516	38	155
09-Sep	0	273	1	517	4	159
10-Sep	0	273	2	519	0	159
11-Sep	0	273	1	520	3	162
12-Sep	0	273	2	522	4	166

continued	**Chinook**		**Sockeye**		**Coho**	
	Daily	Cum	Daily	Cum	Daily	Cum
13-Sep	0	273	1	523	4	170
14-Sep	0	273	0	523	2	172
15-Sep	0	273	0	523	16	188
16-Sep	0	273	2	525	6	194
17-Sep	0	273	0	525	12	206
18-Sep	0	273	1	526	0	206
19-Sep	0	273	3	529	4	210
20-Sep	0	273	0	529	1	211
21-Sep	0	273	1	530	2	213
22-Sep	0	273	4	534	5	218
23-Sep	0	273	4	538	4	222
24-Sep	0	273	2	540	0	222
25-Sep	0	273	0	540	0	222
26-Sep	0	273	0	540	0	222
27-Sep	0	273	0	540	0	222
28-Sep	0	273	0	540	0	222
29-Sep	0	273	0	540	1	223
30-Sep	0	273	0	540	0	223

Appendix Table 4. Daily staff gauge height, air and water temperature and weather conditions for the upper Sustut River, 2009.

Date	Time	Staff Gauge	Air Temp Max	Air Temp Min	Weather
01-Aug-09	10:00	0.255			clear
	20:00	0.245	30		clear and hot
02-Aug-09	10:00	0.235			mostly cloudy
	20:00	0.22	28	3	clear
03-Aug-09	8:15	0.215			cloudy
	20:00	0.205	17	7	cloudy
04-Aug-09	8:30	0.2			clear
	20:00	0.185	19	2	clear
05-Aug-09	8:00	0.175			clear
	19:45	0.17	24	-4	clear
06-Aug-09	8:30	0.16			clear
	19:45	0.15	26	-3	clear, very smoky
07-Aug-09	8:30	0.145			high clouds
	20:00	0.135	23	-1	overcast
08-Aug-09	8:30	0.135			mostly cloudy
	21:30	0.13	22	2	clear
09-Aug-09	9:00	0.13			cloudy
	20:00	0.13	16	4	rain
10-Aug-09	9:00	0.14			rain
	20:00	0.155	13	6	drizzling rain
11-Aug-09	9:00	0.195			overcast
	20:00	0.18	11.5	4	overcast, light rain
12-Aug-09	9:15	0.16			overcast, drizzle
	20:00	0.175	12	4.5	partly clear
13-Aug-09	9:00	0.17			foggy
	21:00	0.165	18.9	2.9	mostly cloudy, isolated showers
14-Aug-09	8:15	0.155			clear
	19:45	0.15	19	-1	mostly cloudy
15-Aug-09	8:15	0.145			mostly cloudy, light rain
	19:45	0.135	14	6	partly clear
16-Aug-09	8:30	0.13			clear
	19:30	0.125	20	6	mostly cloudy
17-Aug-09	8:45	0.125			cloudy
	19:30	0.13	15	10	cloudy
18-Aug-09	8:15	0.135			partly clear, light rain
	21:00	0.14	23.5	6	clear
19-Aug-09	9:00	0.14			clear
	20:15	0.13	24	-1	high clouds
20-Aug-09	8:30	0.125			high clouds
	19:30	0.12	18	3	mostly cloudy
21-Aug-09	8:45	0.145			high clouds
	20:15	0.155	18	3	mostly cloudy
22-Aug-09	9:00	0.195			cloudy
	20:00	0.185	14	3	partly clear
23-Aug-09	8:30	0.185			overcast, light rain
	19:45	0.19	7.5	4.5	cloudy, light rain
24-Aug-09	8:45	0.22			partly clear

	19:45	0.21	12	3	overcast, rain
25-Aug-09	8:45	0.22			partly clear
	19:30	0.235	13	5	overcast, drizzling rain
26-Aug-09	8:45	0.255			foggy
	20:00	0.245	17	2	clear
27-Aug-09	8:45	0.225			overcast
	20:00	0.215	16	-2	overcast
28-Aug-09	8:45	0.205			clear
	20:00	0.195	24	3	mostly clear
29-Aug-09	9:00	0.185			clear
	20:30	0.18	25.5	4.2	mostly clear
30-Aug-09	8:45	0.175			mostly cloudy
	20:00	0.175	20.5	5.5	partly cloudy
31-Aug-09	9:00	0.165			foggy
	20:00	0.165	24.8	5.5	clear
01-Sep-09	9:00	0.155			clear
	19:30	0.145	27	-4	clear
02-Sep-09	9:00	0.135			partly clear
	20:00	0.135	23	1	cloudy
03-Sep-09	8:00	0.15			foggy
	19:30	0.155	15	5	clear
04-Sep-09	8:30	0.155			cloudy, rained last night
	19:30	0.16	19	4	clear
05-Sep-09	8:30	0.16			clear
	19:15	0.155	14	-3	overcast
06-Sep-09	8:30	0.165			drizzle
	19:15	0.185	12	6	drizzle
07-Sep-09	9:00	0.225			drizzle
	19:00	0.31	8	5	overcast, rain
08-Sep-09	8:30	0.325			partly clear
	20:30	0.285	19	-2.5	mostly cloudy
09-Sep-09	8:30	0.265			rainy
	20:00	0.255	12	2	mostly cloudy
10-Sep-09	8:15	0.25			mostly cloudy
	20:15	0.245	9	5	light rain and overcast
11-Sep-09	8:30	0.23			mostly cloudy, some clearing
	20:15	0.225	16	7	overcast
12-Sep-09	8:15	0.22			mostly clear
	20:00	0.22	22	4	partly clear
13-Sep-09	8:30	0.215			mostly clear
	20:00	0.21	19	5.5	overcast
14-Sep-09	8:15	0.195			overcast
	19:30	0.19	15	1	mostly cloudy
15-Sep-09	8:30	0.185			foggy
	20:00	0.18	16.5	5	rain
16-Sep-09	8:15	0.175			partly clear
	19:45	0.18	18	4.5	drizzling rain
17-Sep-09	8:30	0.2			partly sunny
	19:45	0.21	9	2	cloudy
18-Sep-09	8:30	0.205			mostly clear
	19:30	0.21	8.5	3.5	raining
19-Sep-09	9:00	0.26			partly clear
	19:00	0.255	8	2	mostly cloudy

20-Sep-09	8:30	0.25			mostly cloudy
	19:45	0.23	9	2	mostly cloudy
21-Sep-09	9:15	0.26			light rain
	19:30	0.285	7.5	3.5	light rain
22-Sep-09	9:00	0.35			cloudy
	20:00	0.335	12	4.5	mostly clear
23-Sep-09	9:00	0.32			clear
	19:30	0.31	18	-2	light rain
24-Sep-09	9:00	0.31			mostly cloudy
	19:30	0.305	10.5	3.5	cloudy
25-Sep-09	9:30	0.285			mostly cloudy
	19:00	0.275	5.5	2	light rain
26-Sep-09	9:30	0.285			snowing
	19:00	0.285	8	0	mostly cloudy, drizzle
27-Sep-09	9:30	0.265			mostly clear
	19:00	0.255	4.5	-3.5	overcast
28-Sep-09	9:00	0.25			snowing
	18:00	0.25	2.5	-1	light snow and drizzle
29-Sep-09	9:30	0.24			snowing
	19:30	0.235	4.5	-1	mostly cloudy
30-Sep-09	9:00	0.225			mostly cloudy
	19:30	0.22	3	-2	cloudy