

Enumeration of Adult Steelhead
in the
Upper Sustut River
1995

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Skeena Fisheries Report #94
December, 1996

Abstract

The upper Sustut River steelhead (*Oncorhynchus mykiss*) population was enumerated from July 15 to October 16, 1995 for the fourth consecutive year. Two fences, located approximately 4.8 km apart on the Sustut River, were used to count and sample steelhead migrating to the overwintering areas of Sustut and Johanson lakes. We were able to identify the sex, measure fork length and Floy tag 483 steelhead at the lower fence between August 8 and October 16. Fifty percent of the steelhead run passed through the lower fence by September 8. The mean time for passage between the fences was 5 days (median = 4 d, mode = 1 d). At least six percent of steelhead had gillnet marks and there was a four percent mortality rate due to handling at the fences. Between August 30 and September 30, 523 sockeye salmon (*O. nerka*), 24 coho salmon (*O. kisutch*), 14 Dolly Varden/bull trout (*Salvelinus spp.*), 6 rainbow trout (*O. mykiss*) and 1 Rocky Mountain whitefish (*Prosopium williamsoni*) migrated through the lower fence. Between August 30 and September 28, 494 sockeye salmon, 0 coho salmon, 34 Dolly Varden/bull trout, 9 rainbow trout and 4 Rocky Mountain whitefish migrated through the upper fence. At both lower and upper fences no distinction was made between Dolly Varden and bull trout, but these fish were probably bull trout. A steady decline in river level after August 27 did not coincide with fluctuations in steelhead migration through the fences. However, an increase in maximum water temperature coincided with increases in steelhead movement at both the lower and upper fences. Male steelhead (mean = 82.6 cm) were significantly larger than female steelhead (mean = 74.6 cm). In 1995, the fork lengths of male and female steelhead were significantly larger than the 1992 steelhead run but were similar to steelhead in 1993 and 1994. Thirteen steelhead were recaptured: six were repeat spawners from 1993 (2.9 percent of steelhead tagged in 1993) and seven were previously tagged in 1995. At least 1.2 percent of the 1995 steelhead run were repeat spawners as evidenced by Floy tags from 1993. A total of 658 steelhead were estimated in the upper Sustut River population on September 29 when 465 had passed through the lower fence and 193 were observed downstream to the Moosevale Creek confluence. Recommendations were made to continue the enumeration of the upper Sustut River steelhead population and to develop a uniform method of population indexing in order to make more accurate comparisons between years. In addition, representatives from the Ministry of Environment, Lands and Parks should begin enumeration on August 1, before the first steelhead appear to arrive in the upper Sustut River and continue until September 30. Also, Floy anchor tags should be applied to all steelhead passing the fence, and all steelhead should be identified for sex and measured for fork length.

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1.0 Introduction

As part of ongoing steelhead (*Oncorhynchus mykiss*) management in the Skeena Region, selected populations are indexed yearly to reflect the general abundance of Skeena basin steelhead. Knowledge of yearly population index values and time series trends aids fisheries managers' decisions regarding stock status. In the Skeena Region, the criteria for index populations are based primarily on run timing and migration through the commercial and Native fisheries in the Skeena River. One index population is the upper Sustut River steelhead.

Sustut River steelhead are suggested to consist of two populations distinguished by their run timing and overwintering areas (Spence et al. 1990). The upper Sustut River population enters the Skeena River in July and August (Bustard 1993) and overwinters in Sustut and Johanson Lakes (Bustard 1994). In comparison, the lower Sustut River population enters the Skeena River in August and early September and may overwinter in Bear Lake, Bear River and the lower Sustut River (Spence et al. 1990). The upper Sustut River population is the index population for Skeena River steelhead with early run timing.

The upper Sustut River steelhead population enters the Skeena River during the commercial and Native net fisheries for more abundant sockeye (*O. nerka*), and pink salmon (*O. gorbuscha*) (Spence et al. 1990). Because many steelhead are incidentally caught in these fisheries, the strength of the upper Sustut River population may be influenced by the activity of the commercial fishery. Furthermore, the relative abundance of the upper Sustut River population may indicate the strength of other early run Skeena River steelhead. Therefore, the upper Sustut River population is used as an index population.

The objectives of this enumeration program were:

- 1) to enumerate and index the upper Sustut River steelhead population,
- 2) to examine the relationship between steelhead migration through the fences and physical parameters such as water temperature and river height,
- 3) to examine the size distribution of male and female steelhead, and
- 4) to examine the sex, number, and size distribution of previously tagged steelhead.

2.0 Study Area

The Sustut River is an upper Skeena River tributary in northern central British Columbia (Figure 1). From Sustut and Johanson lakes, the Sustut River flows southwest for approximately 100 km to its confluence with the Skeena River. The Sustut River drains approximately 20 000 km² and has seven main tributaries: Birdflat Creek, Bear River, Asitka River, Red Creek, Two Lake Creek, Moosevale Creek and Johanson Creek. The common fish species in the upper Sustut River are steelhead, chinook salmon (*O. tshawytscha*), sockeye salmon, coho salmon (*O. kisutch*), bull trout (*Salvelinus confluentus*), Dolly Varden char (*S. malma*), and Rocky Mountain whitefish (*Prosopium williamsoni*; Bustard 1993, Saimoto 1994, Saimoto 1995).

3.0 Methods

3.1 Steelhead Enumeration

In 1995, two fish counting fences were placed in the Sustut River (Figure 2). The upper fence was made of aluminum mesh screen whereas the lower fence was a floating fence constructed of 3.8 cm P.V.C. piping (Saimoto 1995). The upper fence was located 145 m upstream of the confluence of the Sustut River with Johanson Creek and 11 km downstream of Sustut Lake (Figure 2). The lower fence was located 500 m upstream of the confluence of the Sustut River with Moosevale Creek and 70 km upstream of the confluence with Bear River (Figure 1). Both fences were installed on July 15, 1995 and the upper fence was maintained until September 28 whereas the lower fence was maintained until October 16. On September 29, the Sustut River was snorkeled from the lower fence to the pool downstream of the confluence with Moosevale Creek (approximately 750 m). Fences were inspected for openings and cleaned of debris daily whereas fish traps were emptied at least twice daily.

All fish were identified to species using visual characteristics described in Scott and Crossman (1973). Prior to September 1, personnel for Fisheries and Oceans Canada identified the sex, Floy tagged and measured the fork length of every steelhead. From September 1 through September 30, sex, fork length and the presence of gillnet or predator scars were recorded for all steelhead. Coloured and numbered Floy anchor tags were applied below the dorsal fin on all steelhead. For aging, 10 scales were collected between the lateral line and dorsal fin from steelhead. Steelhead mortalities were recorded at the fence. A chi-square goodness of fit test for the Poisson distribution was performed to examine steelhead migration patterns between the lower and upper fences.

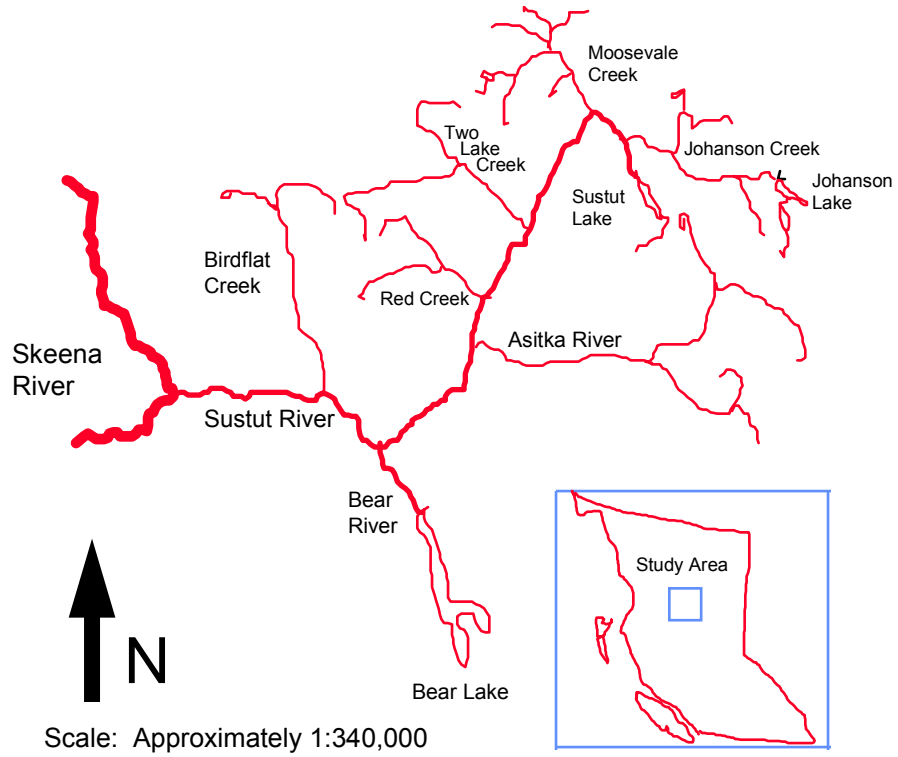


Figure 1. The Sustut River and major tributaries (from Saimoto 1995).

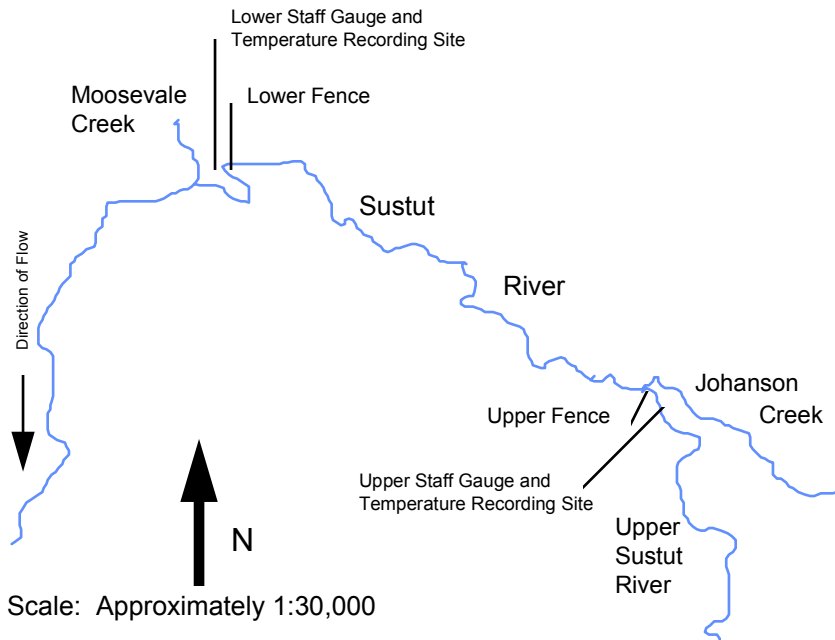


Figure 2. Detailed map of study area (from Saimoto 1995).

a

b

Figure 3. Photographs of the upper (a) and lower (b) fences on the Sustut River, 1995.

3.2 Steelhead Migration and Physical Parameters

The total number of steelhead migrating through the fences was recorded daily and compared to daily maximum water temperatures and staff gauge readings. The lower staff gauge and thermometer (Brannan min-max) were located downstream of the lower fence, whereas the upper staff gauge and thermometer were located upstream of the upper fence (Figure 2). Maximum and minimum water temperature and staff gauge data were provided by Fisheries and Oceans Canada (Barb Snyder, personal communication). From September 1 to September 28, representatives from the Ministry of Environment, Lands and Parks recorded water temperature and staff gauge height.

3.3 Steelhead Length Distributions

Steelhead fork lengths were measured to the nearest 0.5 cm at each fence with an Evazote lined measuring tray. Fork lengths were compared using length-frequency histograms and the mean lengths of male and female steelhead were compared for differences with a t-test. In order to compare fork lengths between years, a Levene test for homogeneity of variances between years was performed and rejected for females. Because the one way ANOVA is so robust, it still operates well even when there is heterogeneity among variances (Zar 1984). Consequently, a one way ANOVA was used to compare the fork lengths of males and females between years. Additional Bonferonni and Tukey HSD post hoc tests were used to determine what years were significantly different from each other.

3.4 Steelhead Recaptures

Sex, fork length and the presence of gillnet marks or predator scars were recorded for previous tagged steelhead (identified by Floy tag presence). Floy tag colour and number was recorded and compared to the Ministry of Environment, Lands and Parks Skeena Region TAGS database.

4.0 Results

4.1 Steelhead Enumeration

Lower Fence

By September 30, 467 steelhead had passed through the lower fence. Fisheries and Oceans staff maintained the fence until October 16 and counted an additional 16 steelhead through the fence after September 30. Figure 3 shows the cumulative percentage of the steelhead run by date for 1994 and 1995. On August 8, 1995, the first steelhead traveled through the lower fence and by September 8, 1995, 50 percent of the steelhead run had passed through the fence. At least six percent of the 1995 steelhead run had gillnet marks. Fisheries and Oceans staff did not check for gill net marks and thus the estimate was a minimum because early run steelhead (prior to September 1) were not examined. The 1995 steelhead suffered a 4.3 percent mortality rate due to handling at the fence.

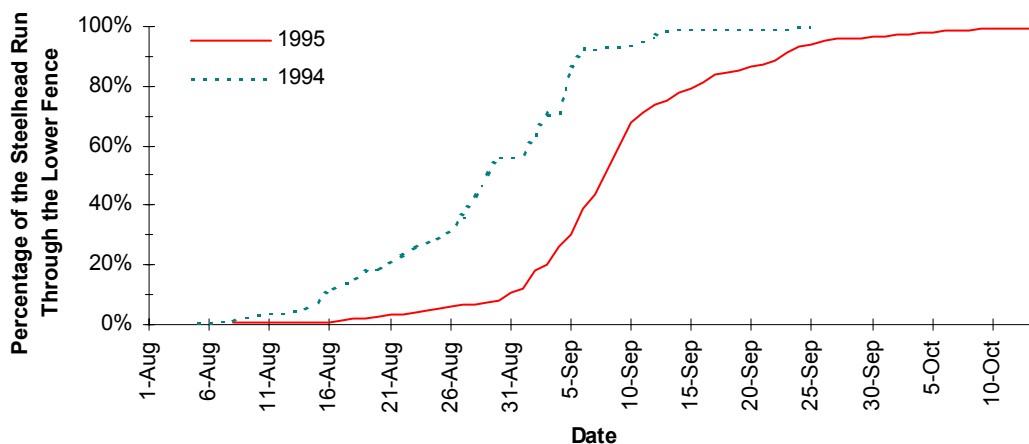


Figure 3. Daily cumulative percentages of the upper Sustut River steelhead run through the lower fence in 1994 and 1995.

Between August 8 and September 30 a total of 523 sockeye salmon, 24 coho salmon, 14 Dolly Varden/bull trout, 6 rainbow trout and 1 Rocky Mountain whitefish were counted at the lower fence. No distinction was made between Dolly Varden and bull trout, but these fish were probably bull trout. Four hundred and sixty-five (465) steelhead passed through the lower fence between August 8 and September 29, 1995. Also, 193 steelhead were observed by snorkeling downstream of the lower fence on September 29th.

Upper Fence

Two hundred and two (202) steelhead passed through the upper fence between July 15 and September 28, 1995. The first steelhead reached the upper fence on August 24 and 50 percent of the run had passed through the upper fence by September 10 (Figure 4). No snorkel surveys occurred downstream of the upper fence in 1995. Of the 202 steelhead that traveled through both fences, 189 (94 percent) had tags from the lower fence which were essential in travel rate analysis. The mean travel time for steelhead to migrate from the lower to the upper fence was 5.07 days (SE = .32 d, mode = 1 d, median = 4 d, range = 0 to 21d; Figure 5). The distribution of steelhead migration rates between the fences had positive asymmetry (skewness = 1.52) and was leptokurtic (kurtosis = 1.67; Figure 5). The data did not follow a Poisson distribution (chi square $\chi^2 = 205.8$, $P < .001$). The distance between the upper and lower fences was approximately 4.8 km and the mean migration rate was 1.0 km/d.

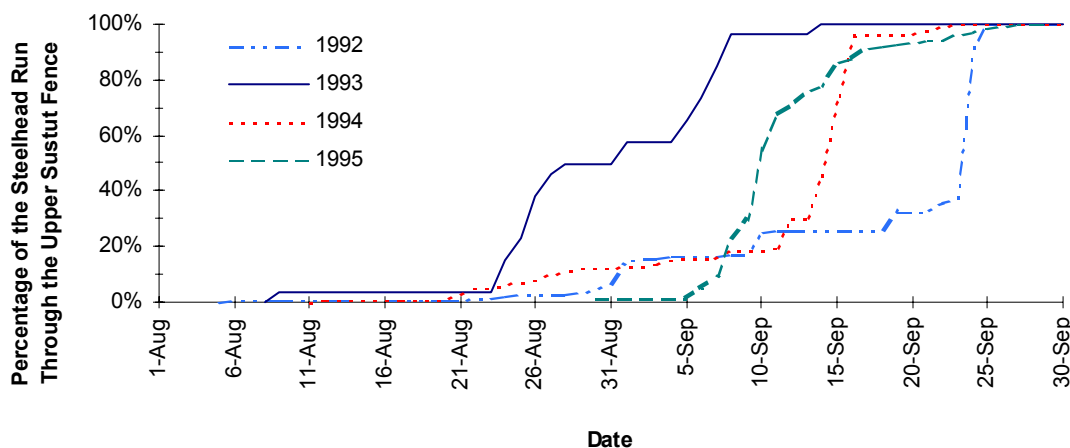


Figure 4. 1992, 1993, 1994 and 1995 daily cumulative percentages of the upper Sustut River steelhead run through the upper fence.

Between August 8 and September 28 a total of 494 sockeye salmon, 0 coho salmon, 34 Dolly Varden/bull trout, 9 rainbow trout and 4 Rocky Mountain whitefish were counted at the lower fence. No distinction was made between Dolly Varden and bull trout, but these fish were probably bull trout.

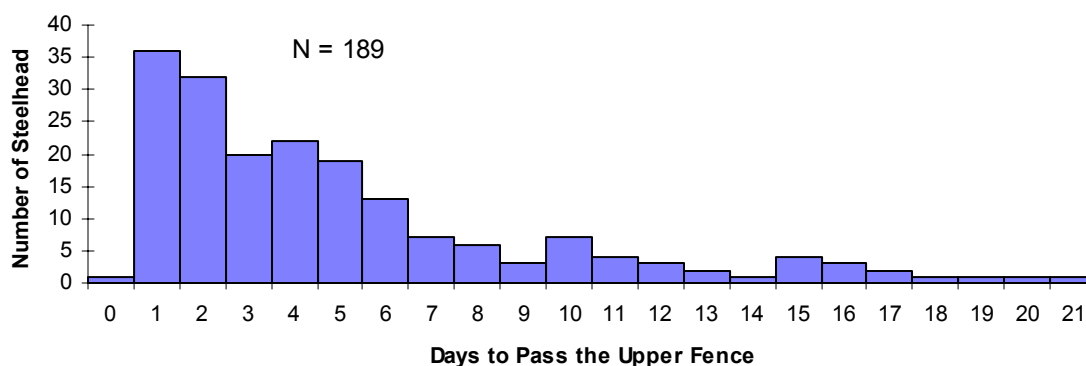


Figure 5. Frequency distribution of the number of days it took for steelhead to migrate from the lower to upper fences.

4.2 Steelhead Migration and Physical Parameters

Lower Fence

Staff gauge height and maximum water temperature were plotted with steelhead migration numbers through the lower fence (Figures 6, 7). Following August 27, a slow decline in river height occurred (Figure 6). This decline and minor fluctuations did not appear to coincide with any changes in the degree of steelhead migration. From August 31 to September 10 there was a rise and a decline in maximum water temperature which appeared to coincide with an increase and decrease in steelhead migration through the lower fence (Figure 7). Steelhead migration was highest when maximum water temperatures rose above 9°C in late August and September (Figure 7). The daily minimum, maximum and mean water temperature for the lower fence are plotted in Appendix Figure 1.

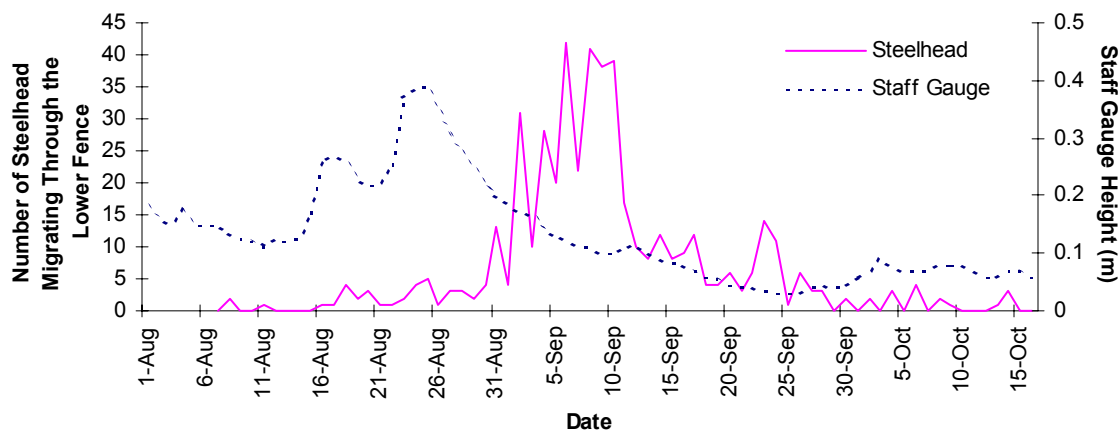


Figure 6. Daily staff gauge height and number of steelhead at lower fence.

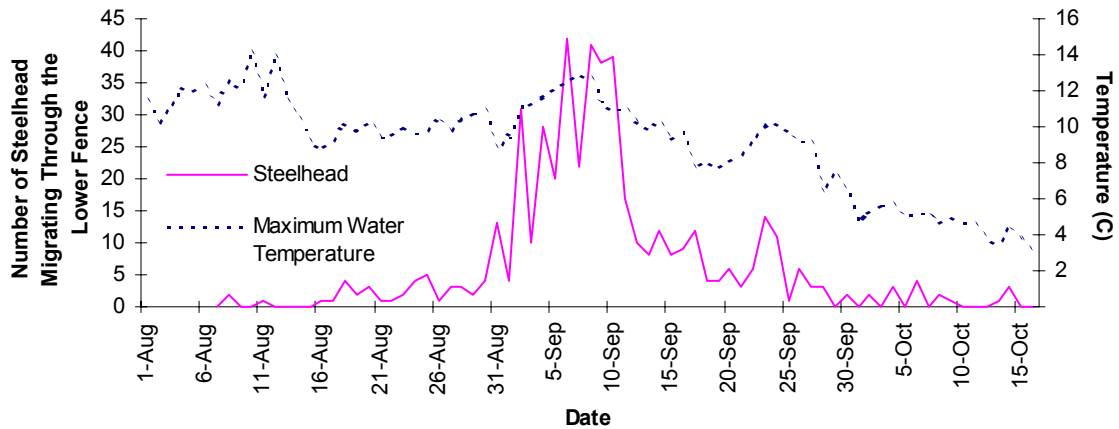


Figure 7. Daily maximum water temperature and number of steelhead at lower fence.

Upper Fence

In 1995, steelhead migration did not appear to coincide with changes in staff gauge height at the upper fence (Figure 8). Maximum water temperature increased and decreased between September 4 and September 10 (Figure 9). Although there was a time lag, an increase and decrease in steelhead migration coincided with an increase and decrease of maximum water temperature (Figure 9). The daily minimum, maximum and mean water temperatures for the upper fence were plotted in Appendix Figure 2 and followed a similar pattern as the lower fence.

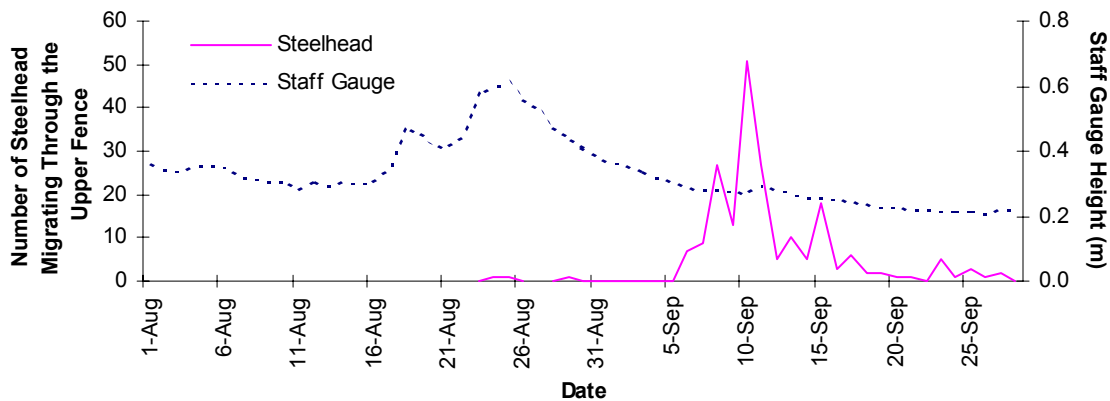


Figure 8. Daily staff gauge height and number of steelhead at upper fence.

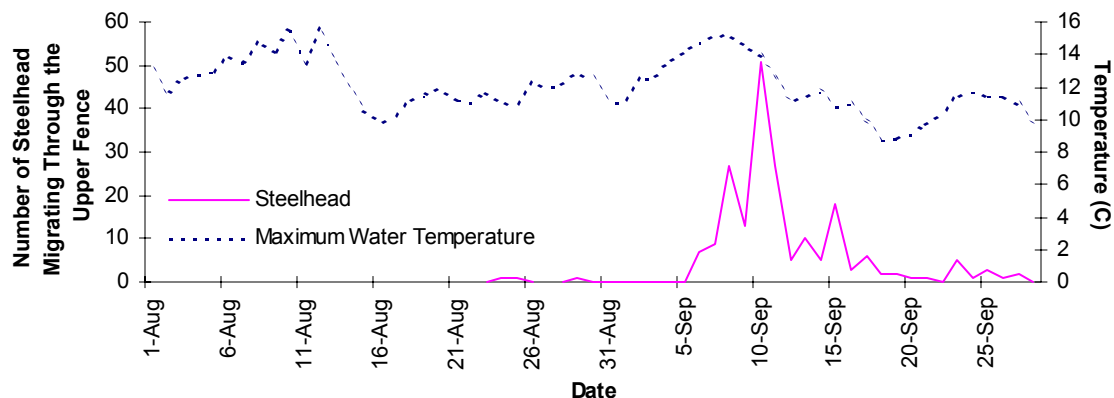


Figure 9. Daily temperature and number of steelhead at upper fence.

4.3 Steelhead Length Distributions

In 1995, 55.2 percent of steelhead ($n = 262$) sampled were female and 45 percent ($n = 213$) were male (Table 1). Thus, the ratio of female to male steelhead was 1.23 : 1. The mean fork length of male steelhead (mean = 82.6 cm) was significantly larger than the mean fork length of female steelhead (mean = 74.6 cm; t -test = 16.513, $P < 0.0005$). The length distribution of male and female steelhead, as grouped by 2 cm categories, illustrated that males were generally larger than females (Figure 10).

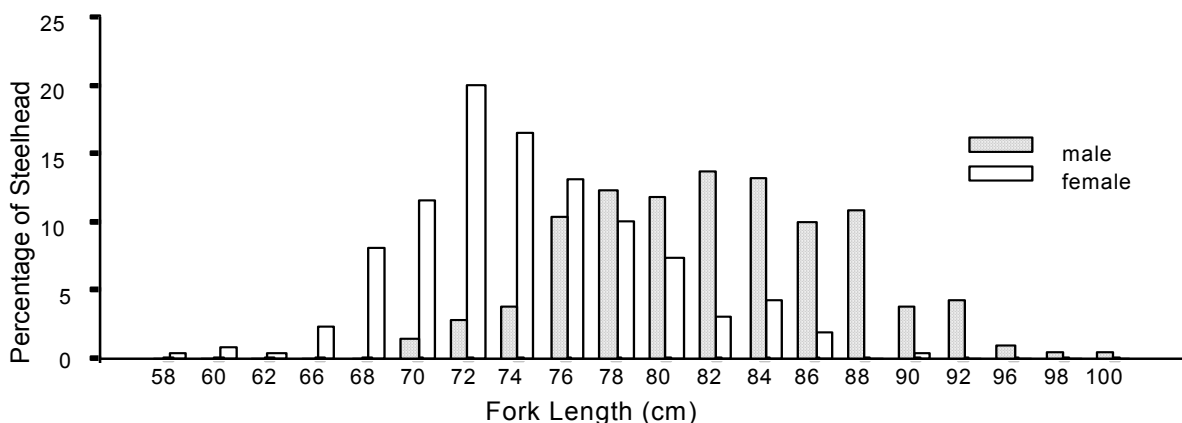


Figure 10. Percentage of male and female steelhead by categories of fork length (cm).

The ranges of fork lengths for 1995 males and females were similar to the ranges established by three previous years of sampling (Table 1). A one way ANOVA determined that male and female¹ fork lengths differed significantly between 1992, 1993, 1994 and 1995 (ANOVA $F = 12.651$, $P < 0.0005$ and ANOVA $F = 11.294$, $P < 0.0005$, respectively). This result indicated at least one of the years (and not necessarily all the years) was different from another year. Further post hoc tests (Bonferonni and Tukey HSD) suggested male and female fork lengths of the 1992 run were significantly smaller than their counter parts in 1993, 1994 and 1995. All other years were not significantly different from each other. Ocean ages were not examined in all years and therefore, the proportion of steelhead of a given ocean age may differ between years. Different proportions of steelhead with different ocean ages may contribute to the variability in steelhead lengths between years.

Table 1. Summary of the number of steelhead, mean fork lengths, standard error and the range in fork lengths for males and females in 1992, 1993, 1994 and 1995.

Year	N (%) ¹	Mean FL (cm)	Standard Error	Range (cm)
Females				
1992	198 (80.2)	72.1	0.193	65-82
1993	135 (64.3)	75.9	0.480	66-87
1994	88 (63.3)	74.0	0.426	65-84
1995	262 (55.2)	74.6	0.307	58-90
Males				
1992	49 (19.8)	77.6	0.663	69-91
1993	75 (35.7)	85.8	0.627	53-94
1994	51 (36.7)	82.9	0.748	71-99
1995	213 (45)	82.6	0.381	71-100

¹ Indicates the percentage of females and males in each sample for each year.

¹ Although the female populations of fork length did not have equal variances, as determined by the Levene statistic, a one way ANOVA was performed because of the robustness of the test when slight departures from the assumption of equal variances exist (Zar 1984).

4.4 Steelhead Recaptures

A total of 13 previously tagged steelhead were recaptured in 1995 (2.7 percent of the run; Table 2). Six of those steelhead were tagged in 1993 and seven were tagged earlier in 1995. A total of 2.9 percent of the steelhead tagged through the fences in 1993 returned in 1995. Thus, at least 1.2 percent of the steelhead in 1995 were repeat spawners. In 1993, an estimated 58 percent of the steelhead remained downstream of the fences and were therefore unavailable for tagging and detection as repeat spawners in 1995. The estimate of repeat spawners in 1995 must be considered minimal. Of the seven steelhead tagged in 1995, four were caught and tagged in tidal fishing nets, two were caught and tagged in the Tyee Test Fishery, and one was tagged in the Kitselas fish wheel. Information from the two fish tagged in the Tyee Test Fishery indicated the upper Sustut River population began moving upstream of Tyee as early as June 25 and continued migrating as late as July 28, 1995. Of the 13 steelhead recaptured, six were male and seven were females. Five of the six repeat spawners were females, although there was a discrepancy between the recorded sex at recapture and the initial tagging of two steelhead.

Table 2. Summary of tag recoveries at the lower fence 1995.

Recaptures at Sustut Fence 1995			Tagging Information			
Date (yy/mm/dd)	Sex	Length (cm)	Date (yy/mm/dd)	Length (cm)	Sex	Location
950906	m	77.0	95????	caught in salt water by a tidal seine		
950906	f	77.0	930907	70.0	f	Johanson fence
950908	m	79.0	9508??	caught at Smith and Kennedy Is. (4-12) by a tidal seine		
950910	m	89.0	9508??	caught at west side of Stephens Is. (4-02) by a tidal gillnet		
950911	f	81.0	930907	78.5	f	Johanson fence
950913	f	73	950726	caught at west side of Stephens Is. (4-02) by a tidal gillnet		
950913	m	77.5	930907	77.0	f	Johanson fence
950910	f	70.0	930906	69.0	f	Johanson fence
950915	?	?	950625	caught in Tyee Test Fishery		
950922	f	70.0	930902	77.0	m	Sustut River
950926	f	73.0	950728	caught in Tyee Test Fishery		
950904*	m	86.0	950723	Kitselas Fish Wheel		
950906	f	77.0	930908	68.0	f	Johanson fence

*This steelhead was radiotracked at Bear River Confluence on the date of 950823.

5.0 Discussion

As in 1994, two fences were used to enumerate the upper Sustut River steelhead population. The lower and upper fences provided data on the size and timing of the upper Sustut River steelhead run and thus, provided yearly population index values for fisheries managers of the Skeena Region. The total number of steelhead to pass through the lower fence by September 30, 1995, was 467. On September 29, 1995, the total number of steelhead counted through the fence (465) and downstream of the fence (193) was 658. The 1995 population index value was higher than the results reported for 1994 (598 steelhead; Saimoto 1995). It is difficult to make comparisons between the other years (1986, 1992 and 1993) because different enumeration methods were used in each year.

The run timing of upper Sustut River steelhead in 1995 was similar to the results of previous studies of upper Sustut River steelhead. In 1995, the first steelhead passed through the lower fence on August 8 and 50 percent of the steelhead run had passed by September 8. In 1994, the first steelhead passed through the lower fence on August 5 and 50 percent of the run had passed by August 29 (Saimoto 1995). Also in 1995, the first steelhead reached the upper fence on August 24, and 50 percent of the run had passed through the upper fence by September 10. In past studies, a large range in the date that 50 percent of the run had passed the upper fence can be attributed to both water temperature and river height. In 1992, the movement of fish coincided with heavy rains and rising water levels on September 18 (Bustard 1993). In 1993, an early 50 percent run date (August 28) can be attributed to a rise in river height on August 24 (Saimoto 1994). A steady water temperature and a peak in river height on September 15, provided a later 50 percent run date of September 15, in 1994 (Saimoto 1995). In 1995, a steady decline in river height and a slight increase in water temperature on September 4-5 coincided with a 50 percent run date of September 10.

The extended operation of the lower fence permitted evaluation of the effectiveness of indexing the upper Sustut River population into late September and early October. On September 29, 193 steelhead were observed downstream of the fence, but by October 16 only 18 more steelhead had migrated through the fence. Thus, if the indexing was ended on September 30, 96 percent of the run (that passed the fence by October 16) would be included in the index value. Furthermore, the day for 50 percent of the run to pass the fence remained the same whether the enumeration ended on September 30 or October 16. Therefore by operating the lower fence until September 30, the upper Sustut River steelhead population would be adequately indexed and its run timing would be sufficiently estimated.

The range in travel time between the Sustut River fences was similar for 1995 (0 to 21 days) and 1994 (1 to 29 days; Saimoto 1995). The migration rates for steelhead traveling between the Sustut River fences in 1995 (1.0 km/d) were higher than the range previously reported by Spence et al. (1990; -0.5 to 0 km/d). In 1994

and 1995, the fences almost certainly impeded migration in the upper Sustut River. The migration rates in the upper Sustut River were low compared to results for the lower Skeena River and tributaries reported by Lough 1981; 8.6 km/d), by Beere (1991; 7 km/d), by Spence and Hooton (1992; 10.4 to 20.2 km/d) and by Koski et al. (1995; 14.4 to 15.3 km/d). Similar low migration rates in the upper Sustut River for 1995 and 1986 (Spence et al. 1990) may be a result of steelhead slowing their migration rates as they approach their overwintering areas of Sustut and Johanson lakes (Bustard 1994).

The mortality rate of steelhead from handling at the fence was higher in 1995 (4.3 percent) than reported for previous years. In 1992, the mortality rate was two percent (Bustard 1993) and in 1994 the mortality rate was 0.5 percent (Saimoto 1995). Relatively high water temperatures may have contributed to the higher mortality rate observed in 1995.

Staff gauge height at the upper and lower fences decreased slowly following August 25, 1995. This decline in river height did not seem to coincide with a change in steelhead migration rates. In contrast, Bustard (1992) found an increase in river height increased steelhead movement. In 1995, temperature changes were similar at the upper and lower fences. The increases in temperature (August 31 to September 10 and September 23 to September 24) seemed to coincide with more steelhead movement at the lower fence, similar to the results of Saimoto (1994) in 1993. Steelhead movement at the upper fence did not immediately coincide with an increase in temperature as it did on the lower fence. The time lag may be a result of steelhead holding below the lower fence until an environmental cue to migrate occurred (in this case water temperature). The lag observed was apparently close to the median travel time (median = 4, mode = 1) for fish to travel from the lower to the upper fence.

In 1995, 55 percent of steelhead were females and 45 percent were males (1.23 females : 1 male). From 1992 to 1994, the sex ratio was strongly skewed towards females, which composed 63 to 80 percent of steelhead sampled (Bustard 1993, Saimoto 1994, Saimoto 1995). The skewed sex ratios were strongly influenced by the disproportionate sampling throughout the run. In other years, the under representation of males may be a result of only a few steelhead being identified for sex before September 1. Past research has found that males dominate in the beginning of the run and females dominate near the end of the run. Therefore, a difference in run timing could account for the increase in male steelhead sampled.

The sex ratio for female to male steelhead in the upper Sustut River (1.23 : 1) was within the ranges of sex ratios reported for other Skeena River steelhead populations. The upper Sustut River population was similar to the ratios reported for steelhead populations in the Bulkley River (1.26 : 1; O'Neill and Whately 1984), Babine River (1.25 : 1; Narver 1969, Whately and Chudyk 1979) and Morice River (1.20 : 1; Whately et al. 1978). However, the upper Sustut River population differed

from the Kispiox River (1.12 : 1; Whately 1977) and Suskwa River (1 : 1; Chudyk 1978) where males and females were more closely balanced. The upper Sustut population also differed from the Kitsumkalum River (0.81 : 1; Lough and Whately 1989) where males were more abundant, and differed from the Zymoetz River (1.42 : 1; Chudyk and Whately 1980) where females were much more abundant than males.

The upper Sustut River population had a low percentage of repeat spawners. In 1995, at least 1.2 percent of steelhead passing through the fences were tagged in 1993 and were repeat spawners. Saimoto (1995) found six percent of the 1994 upper Sustut River population to consist of repeat spawners by examining scales. Fewer repeat spawners in 1995 than 1994 may be a result of tag loss at gill nets or by other means. The low percentage of repeat spawners in the upper Sustut River was similar to the results found for other Skeena River steelhead populations in the Kitsumkalum River (2.6%; Lough and Whately 1984), Bulkley River (3.4%; O'Neill and Whately 1984), Suskwa River (4%; Chudyk 1978), Morice River (6.6%; Whately et al. 1978) and Babine River (6.9%; Narver 1969, Whately and Chudyk 1979). However, the percentage of repeat spawners was reported to be substantially higher in the Kispiox River (17.6%; Whately 1977) and the Zymoetz River (29%; Chudyk and Whately 1980).

The range in the percentage of repeat spawners may be related to the distance and timing of steelhead migration to and from the spawning grounds. Thus, upper Skeena River steelhead populations may be subject to higher mortality rates involved with migrating during commercial and Native gill net fisheries as well as the additional stress of having to swim farther than lower Skeena River populations. In the Queen Charlotte Islands, the percentage of repeat spawners in winter run steelhead populations ranges from 4.5 percent in the Mamin River (de Leeuw 1986a), to 12.1 percent in the Yakoun River (de Leeuw 1987) and to 25.6 percent in Deena Creek (de Leeuw 1986b). The high percentages of repeat winter spawners suggests lower mortality rates resulting from their close proximity to the ocean and from the absence of large gill net fisheries. Therefore, the low percentage of repeat spawners in the upper Sustut River seems consistent with the notion that steelhead with early run timing and long migration distances to and from the spawning grounds are subject to higher mortality rates than steelhead with later run timing and shorter migration distances.

6.0 Recommendations

1. Enumeration of the upper Sustut River steelhead population should continue to be used as an index of early run Skeena River steelhead. Data collected over a number of years will provide insight to steelhead population trends in the Skeena River as well as biological and physical factors impacting the upper Sustut River population, provided methods are standardized.
2. Representatives from the Ministry of Environment, Lands and Parks should begin enumeration of steelhead on August 1 in order to observe the first steelhead that pass through the lower fence. Data from 1992, 1993, 1994 and 1995 all indicate the first steelhead migrate past the lower fence shortly after this time.
3. The lower fence should continue to be used for enumeration until September 30, when the majority of steelhead have passed the fence. At this time, a snorkel survey should be conducted downstream of the fence to the pool downstream of the Moosevale Creek confluence (approximately 750 m). Bustard (1993) and Saimoto (1995) reported few steelhead arrived in the upper Sustut River during late September and early October. The snorkel survey must be able to differentiate between tagged and untagged steelhead to prevent double counting of steelhead that are released downstream of the fences or of steelhead that are able swim downstream over the lower fence during high river discharge.
5. The enumeration dates and methods should be standardized to make better comparisons of abundance trends, the effects of physical parameters and dates of the 50 percent cumulative proportion.
4. Coloured and numbered Floy anchor tags should be applied to all steelhead passing the fence to help determine run timing through the commercial and Native fisheries. This would also help prevent double counting of steelhead that are released downstream of the fences or of steelhead that are able swim downstream over the lower fence during periods of high river discharge.
5. All steelhead passing through the fence should be identified for sex and measured for fork length, provided they are Floy tagged.
6. We recommend analysis of repeat spawning be limited to Floy tagged steelhead that passed through the fences. We suggest scale samples be used as a secondary method to examine repeat spawning in addition to comparing the results of both methods.
7. Otoliths should be removed for aging analysis from all dead trout and char that are recovered at the fence.

7.0 Acknowledgments

We thank Jordan Beblow, Ian Bergsma, Pierre Dubeau, Heather Steffey, Oak Steffey, Ron Steffey and Ron Tetreau for collecting the data and maintaining the enumeration fence. We also thank the Steffey family for removing the enumeration fence. We thank Barb Snyder for providing staff gauge and water temperature data for 1995, Dave Bustard for providing data from research in 1992, Ron Saimoto for providing data from research in 1993 and Regina Saimoto for providing data from research in 1994. We thank Mark Beere for technical assistance. We also thank Dana Atagi, Mark Beere and Bob Hooton for critical reviews.



The field component for this project was funded by BC Environment's Habitat Conservation Trust Fund and developed by personnel of BC Environment. Data analysis and manuscript preparation was funded by the Forest Renewal BC Inventory Program. The Habitat Conservation Trust Fund was created by an act of the legislature to preserve, restore and enhance key areas of habitat for fish and wildlife throughout British Columbia. Hunters, anglers, trappers and guides contribute to HCTF enhancement projects through license surcharges. Tax deductible donations to assist in the work of HCTF are welcome.

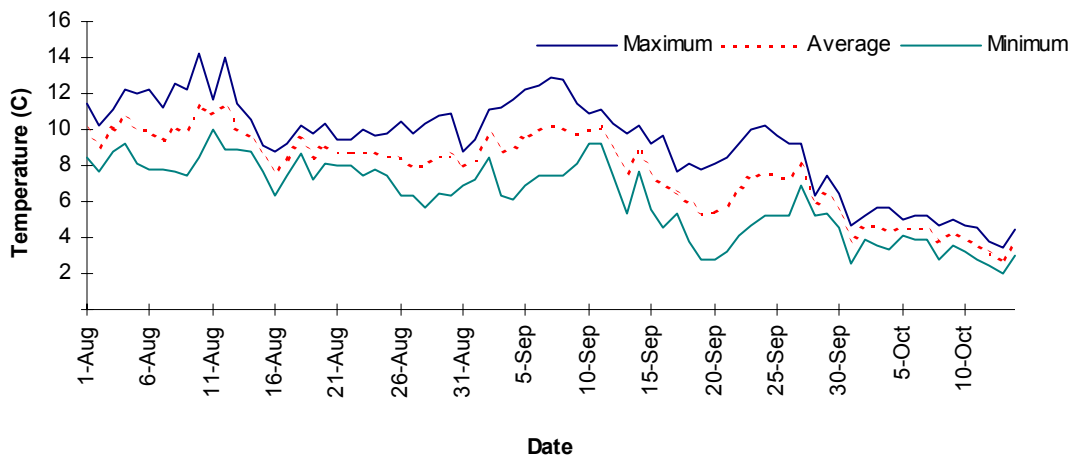
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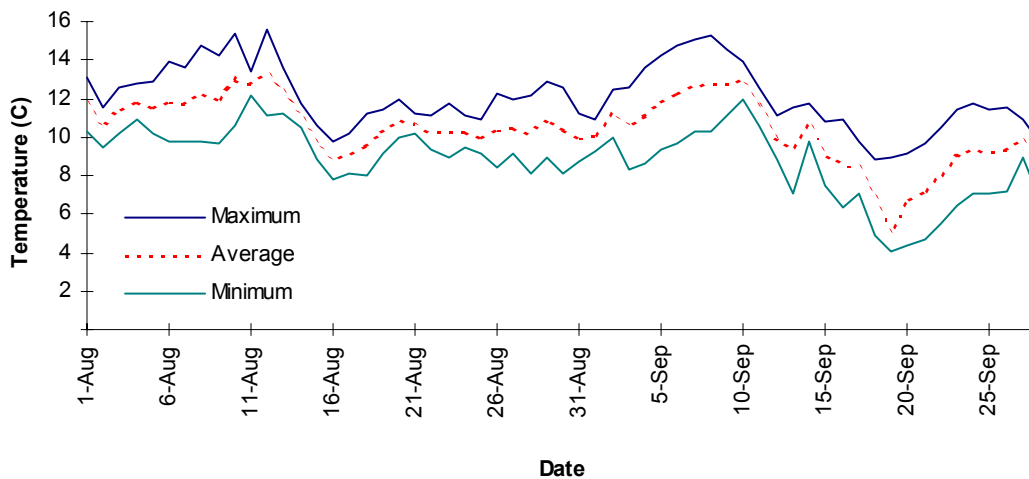
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Appendix Figures



Appendix Figure 1. Maximum, average and minimum water temperatures at the lower fence.



Appendix Figure 2. Maximum, average and minimum water temperatures at the upper fence.

Appendix Tables

Appendix Table 1. Daily and cumulative totals for fish passing through the lower fence in 1995.

Date	Steelhead		Sockeye		Coho		Other
	Daily	Cumulative	Daily	Cumulative	Daily	Cumulative	
8-Aug	2	2					
11-Aug	1	3					
16-Aug	1	4					
17-Aug	1	5					
18-Aug	4	9					
19-Aug	2	11			Sockeye and coho data		
20-Aug	3	14					
21-Aug	1	15			not available prior to		
22-Aug	1	16					
23-Aug	2	18			August 30.		
24-Aug	4	22					
25-Aug	5	27					
26-Aug	1	28					
27-Aug	3	31					
28-Aug	3	34					
29-Aug	2	36					
30-Aug	4	40	2	602		3	
31-Aug	13	53	1	603	0	3	
1-Sep	4	57	3	606	1	4	2 dollies
2-Sep	31	88	37	643	0	4	1 Dolly - 1rainbow 6"
3-Sep	10	98	24	667	0	4	1Dolly
4-Sep	28	126	44	711	1	5	
5-Sep	20	146	55	766	2	7	
6-Sep	42	188	15	781	1	8	1Dolly - 1whitefish
7-Sep	22	210	59	840	0	8	
8-Sep	41	251	70	910	2	10	1Dolly
9-Sep	38	289	78	988	1	11	1Dolly
10-Sep	39	328	32	1020	1	12	
11-Sep	17	345	23	1043	0	12	1Dolly
12-Sep	10	355	18	1061	2	14	
13-Sep	8	363	8	1069	1	15	
14-Sep	12	375	11	1080	0	15	2Dollies
15-Sep	8	383	7	1087	0	15	3Dollies
16-Sep	9	392	5	1092	0	15	1rainbow - 1Dolly
17-Sep	12	404	4	1096	2	17	
18-Sep	4	408	4	1100	0	17	
19-Sep	4	412	4	1104	0	17	

Date	Steelhead		Sockeye		Coho		Other
	Daily	Cumulative	Daily	Cumulative	Daily	Cumulative	
20-Sep	6	418	2	1106	0	17	1rainbow
21-Sep	3	421	1	1107	0	17	
22-Sep	6	427	4	1111	1	18	
23-Sep	14	441	4	1115	1	19	
24-Sep	11	452	5	1120	0	19	
25-Sep	1	453	1	1121	0	19	1rainbow
26-Sep	6	459	2	1123	1	20	2rainbow
27-Sep	3	462	0	1123	4	24	
28-Sep	3	465	0	1123	3	27	
29-Sep	0	465	0	1123	0	27	
30-Sep	2	467					
1-Oct	0	467					
2-Oct	2	469					
3-Oct	0	469					
4-Oct	3	472					
5-Oct	0	472					
6-Oct	4	476					
7-Oct	0	476					
8-Oct	2	478					
9-Oct	1	479					
10-Oct	0	479					
11-Oct	0	479					
12-Oct	0	479					
13-Oct	1	480					
14-Oct	3	483					

Sockeye and coho data

not available for

September 30 to October 14.

Appendix Table 2. Daily and cumulative totals for fish passing through the upper fence in 1995.

Date	Steelhead		Sockeye		Coho		Other
	Daily	Cumulative	Daily	Cumulative	Daily	Cumulative	
30-Aug	0	3		43	0	0	
31-Aug	0	3	6	49	0	0	
1-Sep	0	3	0	49	0	0	
2-Sep	0	3	0	49	0	0	
3-Sep	0	3	0	49	0	0	1 Dolly
4-Sep	0	3	3	52	0	0	
5-Sep	0	3	5	57	0	0	
6-Sep	7	10	66	123	0	0	
7-Sep	9	19	48	171	0	0	5 Dolly
8-Sep	27	46	49	220	0	0	11 Dollys
9-Sep	13	59	66	286	0	0	
10-Sep	51	110	93	373	0	0	6 Dolly
11-Sep	27	137	21	400	0	0	3 Dollys - 1 whitefish
12-Sep	5	142	5	405	0	0	1 Dolly
13-Sep	10	152	43	448	0	0	
14-Sep	5	157	20	468	0	0	1 rainbow -1 whitefish -2 Dolly
15-Sep	18	175	11	479	0	0	2 whitefish - 1 Chinook
16-Sep	3	178	6	485	0	0	1 dead rainbow - 2 Dolly
17-Sep	6	184	2	487	0	0	2 Dolly
18-Sep	2	186	0	487	0	0	
19-Sep	2	188	4	491	0	0	1 rainbow
20-Sep	1	189	2	493	0	0	
21-Sep	1	190	10	503	0	0	1 rainbow
22-Sep	0	190	3	506	0	0	
23-Sep	5	195	3	509	0	0	
24-Sep	1	196	8	517	0	0	
25-Sep	3	199	10	527	0	0	1 rainbow
26-Sep	1	200	2	529	0	0	
27-Sep	2	202	7	536	0	0	1 rainbow
28-Sep	0	202	1	537	0	0	1 Dolly - 4 rainbows (1 dead)

Appendix Table 3. Lower Sustut River and Johanson Creek staff gauge, water temperature and precipitation data.

Lower fence staff gauge and temperature data					Johanson Creek staff gauge and temperature data			
Date	Time (hrs)	Water Level (m)	Precipitation (mm)	Water Temperature (C)	Date	Time (hrs)	Water Level (cm)	Water Temperature (C)
30-Aug		0.12	0	6.6	30-Aug		47.5	5.9
31-Aug	820	0.1	0	7.2	31-Aug	935	44.5	6.1
1-Sep	845	0.085	0	7.5	1-Sep	1000	44	6.7
2-Sep	840	0.07	0	8.8	2-Sep	940	43	8.3
3-Sep	900	0.065	0	6.55	3-Sep	1015	42.5	6.2
4-Sep	900	0.045	0	6.6	4-Sep	950	40.5	5.85
5-Sep	900	0.03	0	7.4	5-Sep	950	39	6.7
6-Sep	900	0.025	0	7.8	6-Sep	1020	38	7.3
7-Sep	950	0.015	0	7.8	7-Sep	935	37.5	7.4
8-Sep	850	0.01	0	7.8	8-Sep	1000	37	7.5
9-Sep	900	0	0	8.55	9-Sep	1050	36	8.5
10-Sep	855	0	1	8.8	10-Sep	935	36	8.8
11-Sep	850	0.01	1.5	9.55	11-Sep	950	37.5	9.1
12-Sep	850	0.015	2.5	7.8	12-Sep	940	37	7.5
13-Sep	855	0	0	5.6	13-Sep	950	35.5	4.95
14-Sep	835	-0.01	0	8.6	14-Sep	915	34	7.45
15-Sep	915	-0.015	0	6.1	15-Sep	945	34.5	5.03
16-Sep	1035	-0.02	0	5.8	16-Sep	1050	33.5	5.15
17-Sep	920	-0.03	0	5.75	17-Sep	945	32	5.3
18-Sep	1005	-0.04	0	4.3	18-Sep	1025	31.5	3.65
19-Sep	935	-0.045	0	3.2	19-Sep	1000	30	2.5
20-Sep	900	-0.055	0	3.2	20-Sep	1010	30	3.15
21-Sep	900	-0.06	0	3.45	21-Sep	930	28	2.85
22-Sep	855	-0.06	0	4.2	22-Sep	940	29	3.85
23-Sep	950	-0.065	0	5.3	23-Sep	1020	28	5.1
24-Sep	930	-0.07	0	5.6	24-Sep	950	28	5.25
25-Sep	950	-0.07	0	5.7	25-Sep	1010	27.5	5.1
26-Sep	920	-0.07	0	5.45	26-Sep	940	27	4.85
27-Sep	930	-0.06	7.5	7.2	27-Sep	1015	29	6.9
28-Sep	930	-0.055	0	5.35	28-Sep	950	29	4.8
29-Sep	845	-0.06	trace	5.5	29-Sep	930	28	4.9
30-Sep	1000	-0.06	9	5.25				

Appendix Table 4. Upper Sustut River staff gauge and water temperature data, and water level downstream of the Junction Pool.

Upper Fence Staff Gauge and Temperature Data				Water Level Downstream of Junction Pool		
Date	Time (hrs)	Water Level (cm)	Water Temperature (C)	Date	Time (hrs)	Water Level (cm)
30-Aug		41	9.7	30-Aug		26.5
31-Aug	1000	39	10.4	31	1000	24.5
1-Sep	1005	36.5	9.55	1-Sep	1005	22
2-Sep	950	35.5	10.4	2	1000	21
3-Sep	1025	34	9.15	3	1030	20
4-Sep	1010	32	9.2	4	1020	18
5-Sep	1010	30.5	10.2	5	1020	16
6-Sep	1045	29	10.9	6	1055	15
7-Sep	1015	20.5	11	7	1025	14.5
8-Sep	1035	28	11.5	8	1040	13
9-Sep	1030	27.5	12.3	9	1030	13
10-Sep	1030	27	12.3	10	1040	12.5
11-Sep	1030	29.5	11.35	11	1040	14.5
12-Sep	955	28.5	9.2	12	1000	14
13-Sep	945	27	7.5	13	1000	11.5
14-Sep	930	26	10.1	14	940	10
15-Sep	950	26	8.05	15	1020	10.5
16-Sep	1115	25	7.75	16	1120	9.5
17-Sep	1000	24.5	7.85	17	1010	8
18-Sep	1035	24	5.8	18	1045	7
19-Sep	1010	23	4.9	19	1000	6
20-Sep	1025	22.5	5.2	20	1030	5
21-Sep	940	22	5.1	21	945	4.5
22-Sep	945	22	6.1	22	1000	3
23-Sep	1030	21.5	7.35	23	1040	3.5
24-Sep	1005	21.5	7.85	24	1010	3.5
25-Sep	1025	21.5	7.7	25	1030	3.5
26-Sep	955	21	7.65	26	1000	3.5
27-Sep	1030	22	9.4	27	1035	5
28-Sep	1010	22	7.3	28	1015	5.5
29-Sep	940	21	7.6	29	940	4.5

Appendix Table 5. Weather condition at the upper camp.

Date	Air Temp (C)		Precipitation	Weather
	Min	Max	(mm)	
30-Aug	-3.5	12	0	p. cloudy
31-Aug	-1.5	15	trace	cloudy showers
1-Sep	1.5	11	0	cloudy showers
2-Sep	7	13	trace	p. cloudy
3-Sep	-3	16	0	clear
4-Sep	-4	17.5	0	clear
5-Sep	-2.5	20.5	0	p. cloudy
6-Sep	-2	21.5	0	clear
7-Sep	-1.5	22	0	clear
8-Sep	-2	23	0	p. cloudy
9-Sep	1	22	0	cloudy
10-Sep	7	19	trace	cloudy showers
11-Sep	8	14.5	2	windy & rainy w. sunny breaks
12-Sep	4	16	1	cloudy w. sunny breaks
13-Sep	-5	16	0	p. cloudy
14-Sep	1	17	0	cloudy
15-Sep	-3.5	15	0	p. cloudy
16-Sep	-6	15	0	clear
17-Sep	-4	17.5	0	cloudy
18-Sep	-8	12.5	0	clear
19-Sep	-10	13	0	clear
20-Sep	-9	16.5	0	clear
21-Sep	-7.5	18.5	0	clear
22-Sep	-5	20	0	clear
23-Sep	-4	24	0	clear
24-Sep	-3.5	24.5	0	clear
25-Sep	-4.5	24	0	clear
26-Sep	-3	21	0	cloudy w. sunny breaks
27-Sep	2.5	18	7	cloudy
28-Sep	-2.5	14	0	cloudy
29-Sep	0	14.5	trace	p. cloudy
30-Sep				snow and rain

Appendix Table 6. Summary of steelhead tagging data at lower fence.

Date	Time	Sex	Fork. Length (cm)	Tag Colour	Tag Letter	Tag Number	Comments
8 Aug	1105	f	86.0	NA	NA	685 pink	scale bk 3618-1
8 Aug	2000	f	77.0	NA	NA	201 blue	sbk 3619-6
11 Aug	835	m	84.0	NA	NA	NA	sbk4336-1
16 Aug	820	NA	NA	NA	NA	NA	slipped through fence
17 Aug	2345	f	NA	NA	NA	NA	
18 Aug	845	m	76.0	orange	c	c05701 0	sbk4336-2
18 Aug	1700	m	84.0	orange	c	c05702 0	sbk4336-3
18 Aug	1705	f	74.0	orange	c	c05703 0	sbk 4336-4
18 Aug	1940	f	81.0	orange	c	c05704 0	sbk4336-5
19 Aug	1930	m	88.0	orange	c	c05705 0	sbk4336-6
19 Aug	1930	f	77.0	orange	c	c05706 0	sbk4336-7
20 Aug	1615	m	87.0	orange	c	c05707 0	sbk4336-8
20 Aug	1625	m	87.0	orange	c	c05708 0	sbk4336-9
20 Aug	1635	f	79.5	orange	c	c05709 0	sbk4336-10
21 Aug	845	f	87.0	orange	c	c05710 0	sbk4337-1
22 Aug	2115	f	81.0	orange	c	c05711 0	sbk4337-2
23 Aug	900	m	81.5	orange	c	c05712 0	sbk4337-3
23 Aug	1645	m	88.0	orange	c	c05713 0	4337-4
24 Aug	1700	m	87.5	orange	c	c05714 0	4337-5
24 Aug	1730	f	71.5	orange	c	c05715 0	4337-6
24 Aug	1800	m	74.0	orange	c	c05716 0	4337-7
24 Aug	1945	f	73.0	orange	c	c05717 0	4337-8
25 Aug	845	f	74.0	orange	c	c05718 0	4337-9
25 Aug	1445	f	73.0	orange	c	c05719 0	4337-10
25 Aug	1545	f	74.0	orange	c	c05721 0	4338-1
25 Aug	1700	f	80.5	orange	c	c05722 0	4338-2
25 Aug	1825	f	82.0	orange	c	c05723 0	4338-3
26 Aug	1955	m	82.0	orange	c	c05724 0	4338-4
27 Aug	1630	f	82.0	orange	c	c05725 0	4338-5
27 Aug	1635	f	74.5	orange	c	c05727 0	4338-6
27 Aug	1640	f	73.5	orange	c	c05728 0	4338-7
28 Aug	1400	f	73.0	orange	c	c05729 0	4338-8
28 Aug	1715	m	86.0	orange	c	c05730 0	4338-9
28 Aug	1745	m	84.0	orange	c	c05732 0	
29 Aug	1920	m	84.5	orange	c	c05733 0	
29 Aug	1920	m	82.0	orange	c	c05735 0	
30 Aug	825	m	85.0				tag fell out - not retagged
30 Aug	825	f	71.0	orange	c	c05737 0	
30 Aug	825	f	70.0	orange	c	c05738 0	
30 Aug	825	m	81.0	orange	c	c05739 0	scar right side
31 Aug	825	f	69.0	orange	c	c05740 0	
31 Aug	825	f	86.0	orange	c	c05741 0	
31 Aug	825	m	74.0	orange	c	c05745 0	
31 Aug	825	m	88.0	orange	c	c05746 0	
31 Aug	2045	f	69.0	orange	c	c05747 0	
31 Aug	2045	m	70.5	orange	c	c05748 0	
31 Aug	2045	m	83.0	orange	c	c05750 0	
31 Aug	2045	f	78.0	orange	c	c05751 0	

Date	Time	Sex	Fork. Length (cm)	Tag Colour	Tag Letter	Tag Number	Comments
31 Aug	2045	m	76.0	orange	c	c05752	0
31 Aug	2045	m	85.0	orange	c	c05753	0
31 Aug	2045	f	74.0	orange	c	c05754	0 dead on fence Sept. 1
31 Aug	2045	m	78.0	orange	c	c05755	0
31 Aug	2045	m	77.0	orange	c	c05756	0
1 Sep	845	f	71.0	orange	c	c05757	0
1 Sep	845	m	85.0	orange	c	c05759	0
1 Sep	845	m	85.0	orange	c	c05760	0
1 Sep	1945	m	84.0	orange	c	c05761	0
2 Sep	845	m	82.0	orange	c	c05762	0
2 Sep	845	m	78.0	orange	c	c05764	0
2 Sep	845	m	82.0	orange	c	c05766	0
2 Sep	845	f	78.0	orange	c	c05767	0
2 Sep	845	m	84.0	orange	c	c05768	0
2 Sep	845	f	74.0	orange	c	c05769	0
2 Sep	1300	f	72.0	orange	c	c05770	0
2 Sep	1300	m	90.0	orange	c	c05771	0
2 Sep	1300	f	84.0	orange	c	c05772	0
2 Sep	1925	m	83.5	orange	c	c05775	0
2 Sep	1925	f	78.0	orange	c	c05776	0
2 Sep	1925	f	68.0	orange	c	c05801	0 scars both sides
2 Sep	1925	f	68.0	orange	c	c05805	0
2 Sep	1925	m	76.0	orange	c	c05809	0
2 Sep	1925	m	80.0	orange	c	c05810	0
2 Sep	1925	f	70.5	orange	c	c05811	0
2 Sep	1925	f	75.0	orange	c	c05812	0 scar right side
2 Sep	1925	m	73.0	orange	c	c05813	0
2 Sep	1925	m	78.0	orange	c	c05815	0
2 Sep	1925	f	70.0	orange	c	c05816	0 gillnet marks
2 Sep	1925	m	86.0	orange	c	c05817	0 big fish 25lbs
2 Sep	1925	m	84.0	orange	c	c05818	0 big fish
2 Sep	1935	f	76.0	orange	c	c05819	0 scar right side
2 Sep	1925	m	83.0	orange	c	c05822	o
2 Sep	1925	m	84.5	orange	c	c05823	0
2 Sep	1925	m	82.0	orange	c	c05825	0
2 Sep	1925	m	76.5	orange	c	c05827	0
2 Sep	1925	m	74.0	orange	c	c05828	0 gillnet
2 Sep	1925	f	69.5	orange	c	c05829	0
2 Sep	1925	f	68.0	orange	c	c05830	0 gillnet
2 Sep	1925	m	86.0	orange	c	c05831	0 marks right side
3 Sep	910	f	71.5	orange	c	c05833	0
3 Sep	910	m	82.0	orange	c	c05834	0 scar right side
3 Sep	1545	m	76.5	orange	c	c05835	0
3 Sep	1545	f	73.0	orange	c	c05836	0
3 Sep	1845	m	83.0	orange	c	c05837	0
3 Sep	1845	m	80.0	orange	c	c05838	0 scar left side
3 Sep	1845	m	85.0	orange	c	c05837	0
3 Sep	1845	f	74.0	orange	c	c05840	0 dead
3 Sep	1845	f	70.0	orange	c	c05841	0
3 Sep	1845	m	76.0	orange	c	c05842	0 gillnet, dead

Date	Time	Sex	Fork. Length (cm)	Tag Colour	Tag Letter	Tag Number	Comments
4 Sep	910	f	69.0	orange	c	c05843 0	
4 Sep	1540	m	82.0	orange	c	c05846 0	bleeding from tag hole
4 Sep	1845	f	68.0	orange	c	c05848 0	scar right side
4 Sep	1845	f	72.0	orange	c	c05850 0	scar on right side
4 Sep	1845	f	70.0	orange	c	co5851 0	both sides scarred
4 Sep	1845	f	82.5	orange	c	c05852 0	
4 Sep	1845	f	82.5	orange	c	c05854 0	
4 Sep	1845	m	85.0	orange	c	c05855 0	both sides scared - big fish
4 Sep	1845	f	73.5	orange	c	c05856 0	marks right side
4 Sep	1845	f	76.0	orange	c	c05857 0	gillnet
4 Sep	1845	m	88.0	orange	c	c5860 0	scar left side
4 Sep	1845	f	71.5	orange	c	c5861 0	
4 Sep	1845	m	79.0	orange	c	c5862 0	
4 Sep	1845	f	81.0	orange	c	c5863 0	marks left side
4 Sep	1845	m	78.0	orange	c	c5864 0	
4 Sep	1845	f	77.0	orange	c	c5865 0	scar left side - gillnet
4 Sep	1845	m	84.5	orange	c	c5866 0	
4 Sep	1845	f	74.0	orange	c	c5867 0	dead
4 Sep	1845	m	78.5	orange	c	c5868 0	
4 Sep	1845	m	79.0	orange	c	c5869 0	
4 Sep	1845	f	79.0	orange	c	c5872 0	scar right side
4 Sep	1845	m	78.5	orange	c	c5873 0	
4 Sep	1845	m	97.0	orange	c	c5874 0	scar right side - big fish
4 Sep	1845	f	84.0	orange	c	c5875 0	scar left side - gillnet
4 Sep	1845	m	86.0	orange	c	c07177 0	tag recovery
4 Sep	1845	f	84.0	orange	c	c5876 0	scar right side
4 Sep	1845	f	75.5	orange	c	c05877 0	scar R. side
4 Sep	1845	f	69.0	orange	c	c05878 0	scar R. side
5 Sep	900	f	79.5	orange	c	c05879 0	mark on nose, dead
5 Sep	900	m	90.5	orange	c	c05880 0	scar right side
5 Sep	900	f	63.0	orange	c	c05881 0	
5 Sep	900	m	78.0	orange	c	c03657 0	MOE tag recovery
5 Sep	900	f	71.5	orange	c	c05882 0	
5 Sep	900	f	73.0	orange	c	c05883 0	
5 Sep	900	f	79.5	orange	c	c05887 0	
5 Sep	900	m	85.0	orange	c	c05893 0	
5 Sep	900	m	81.0	orange	c	c05894 0	
5 Sep	1150	f	72.0	orange	c	c05895 0	
5 Sep	1600	m	77.0	orange	c	c05897 0	
5 Sep	1600	f	78.0	orange	c	c05898 0	
5 Sep	1600	m	72.0	orange	c	c05899 0	scar L. side - gillnet
5 Sep	1715	m	89.0	orange	c	c05901 0	
5 Sep	1800	f	79.0	orange	c	c05902 0	scar left side
5 Sep	1800	f	75.0	orange	c	c05904 0	
5 Sep	1900	f	72.0	orange	c	c5905 0	scar L. side
5 Sep	1900	m	80.0	orange	c	c5906 0	
5 Sep	1900	m	92.0	orange	c	c5908 0	mark L. side
5 Sep	1900	f	?				escaped upstream
6 Sep	910	f	74.0	orange	c	c05910 0	
6 Sep	910	f	74.0	orange	c	c5911 0	

Date	Time	Sex	Fork. Length (cm)	Tag Colour	Tag Letter	Tag Number	Comments
6 Sep	910	f	80.0	orange	c	c5912 0	
6 Sep	910	f	82.0	orange	c	c5913 0	
6 Sep	910	f	74.0	orange	c	c5914 0	scar R. side - scar at base of dorsal
6 Sep	910	m	89.0	orange	c	c05915 0	tag fell out, not retagged
6 Sep	910	m	73.0	orange	c	c05916 0	
6 Sep	910	m	77.0	orange	c	c05917 0	slashed yellow tag PRFVOA 0666
6 Sep	910	f	68.0	orange	c	c05918 0	
6 Sep	910	m	84.0	orange	c	c05919 0	
6 Sep	1510	f	70.0	orange	c	c05920 0	
6 Sep	1510	f	70.0	orange	c	c05921 0	
6 Sep	1510	f	75.0	orange	c	c05922 0	
6 Sep	1510	m	84.0	orange	c	c05923 0	
6 Sep	1510	f	72.0	orange	c	c05924 0	
6 Sep	1510	m	85.0	orange	c	c05925 0	
6 Sep	1510	f	76.0	orange	c	c05926 0	
6 Sep	1510	m	92.0	orange	c	c05927 0	big fish
6 Sep	1510	m	81.0	orange	c	c05928 0	
6 Sep	1510	m	82.0	orange	c	c05929 0	mark on nose
6 Sep	1510	f	75.0	orange	c	c05930 0	
6 Sep	1510	f	77.0	orange	c	c05931 0	moe blue tag 02976
6 Sep	1510	m	88.0	orange	c	c05932 0	
6 Sep	1510	f	60.0	orange	c	c05933 0	
6 Sep	1750	m	85.0	orange	c	c05935 0	notch on dorsal
6 Sep	1750	m	77.0	orange	c	c05838 0	
6 Sep	1750	f	72.0	orange	c	c05839 0	
6 Sep	1750	m	83.0	orange	c	c05940 0	scars both sides
6 Sep	1750	m	71.0	orange	c	c05941 0	
6 Sep	1800	f	78.0	orange	c	c05934 0	
6 Sep	1925	f	84.0	orange	c	c05944 0	gillnet
6 Sep	1925	f	80.0	orange	c	c05945 0	
6 Sep	1925	m	78.0	orange	c	c05949 0	
6 Sep	1925	f	76.0	orange	c	c05950 0	scar left side
6 Sep	1925	m	86.0	orange	c	c05951 0	marks right side
6 Sep	1925	f	78.0	orange	c	c05952 0	gill net
6 Sep	1925	m	78.0	orange	c	c05953/4	double tagged
6 Sep	1925	m	81.0	orange	c	c05955 0	
6 Sep	1925	f	76.5	orange	c	c05956 0	
6 Sep	1925	m	87.5	orange	c	c05958 0	
6 Sep	1925	m	76.5	orange	c	c05957 0	scar left side
6 Sep	1925	m	76.0	orange	c	c05960 0	mark right side
7 Sep	850	m	100.0	orange	c	c05961 0	big fish, dead
7 Sep	850	m	91.0	orange	c	c05963 0	
7 Sep	850	f	79.0	orange	c	c05964 0	
7 Sep	1430	f	68.0	orange	c	c05965 0	
7 Sep	1430	f	67.0	orange	c	c05966 0	
7 Sep	1430	f	79.5	orange	c	c05967 0	
7 Sep	1430	m	73.5	orange	c	c05968 0	
7 Sep	1430	?					escaped upstream
7 Sep	1725	m	88.0	orange	c	c05969 0	
7 Sep	1725	m	82.5	orange	c	c05970 0	

Date	Time	Sex	Fork. Length (cm)	Tag Colour	Tag Letter	Tag Number	Comments
7 Sep	1725	f	69.0	orange	c	c05973 0	bad gill net scar
7 Sep	1725	f	71.5	orange	c	c05976 0	
7 Sep	1725	m	81.0	orange	c	c05977 0	bad gillnet scar
7 Sep	1725	m	81.0	orange	c	c5979 0	big scar left side
7 Sep	1725	f	78.0	orange	c	c5980 0	
7 Sep	1725	f	72.0	orange	c	c5982 0	
7 Sep	1725	m	90.0				tagging gun jammed up
7 Sep	1905	f	76.0	orange	c	c05983 0	
7 Sep	1905	m	83.0	orange	c	c05984 0	
7 Sep	1905	m	89.0	orange	c	c05985 0	
7 Sep	1905	f	76.0	orange	c	c5986 0	
7 Sep	1905	m	75.0	orange	c	c5987 0	
8 Sep	855	m	78.0	orange	c	c05988 0	scar right side
8 Sep	855	f	70.0	orange	c	c5989 0	
8 Sep	855	m	80.0	orange	c	c5990 0	
8 Sep	855	f	72.0	orange	c	c5991 0	
8 Sep	855	m	80.0	orange	c	c5993 0	torn right lip
8 Sep	855	m	83.0	orange	c	c5994 0	scar right side
8 Sep	855	f	70.0	orange	c	c5995 0	
8 Sep	855	m	76.0	orange	c	c5996 0	mark right side - gill net
8 Sep	855	m	88.0	orange	c	c05998 0	
8 Sep	855	m	89.0	orange	c	c05999 0	dead
8 Sep	855	f	80.0	orange	c	c06000 0	scar right side
8 Sep	855	f	70.0	orange	c	c06001 0	scar both sides
8 Sep	1400	m	86.0	orange	c	c6002 0	mark on head
8 Sep	1400	m	78.0	orange	c	c6003 0	
8 Sep	1810	f	67.0	orange	c	c6004 0	
8 Sep	1810	f	81.0	orange	c	c6005 0	
8 Sep	1810	f	58.0	orange	c	c6007 0	
8 Sep	1810	f	90.0	orange	c	c6008 0	
8 Sep	1810	f	72.0	orange	c	c6010 0	
8 Sep	1810	f	71.0	orange	c	c6011 0	
8 Sep	1810	f	76.0	orange	c	c6013 0	marks left side
8 Sep	1810	m	81.0	orange	c	c6014 0	marks left gill plate
8 Sep	1810	f	76.0	orange	c	c6015 0	
8 Sep	1810	m	89.0	orange	c	c6016 0	
8 Sep	1810	m	86.0	orange	c	c6017 0	
8 Sep	1810	m	83.0	orange	c	c6019 0	
8 Sep	1810	m	82.0	orange	c	c6020 0	
8 Sep	1810	m	83.0	orange	c	c6021 0	
8 Sep	1810	f	78.0	orange	c	c6023 0	scar right side
8 Sep	1810	m	88.0	orange	c	c6024 0	
8 Sep	1810	f	78.0	orange	c	c6025 0	
8 Sep	1810	m	81.0	orange	c	c6026 0	
8 Sep	1810	m	82.0	orange	c	c6028/29	double tagged
8 Sep	1810	m	91.0	orange	c	c6030 0	
8 Sep	1810	m	84.0	orange	c	c6031 0	missing part of dorsal
8 Sep	1810	f	84.0	orange	c	c6032 0	scar right side
8 Sep	1810	f	86.0	orange	c	c6033 0	scar right side
8 Sep	1810	m	78.0	orange	c	c6035 0	

Date	Time	Sex	Fork. Length (cm)	Tag Colour	Tag Letter	Tag Number	Comments
8 Sep	1810	f	74.0	orange	c	c6036 0	
8 Sep	1810	f	74.5	blue		blue MOE tag 02984	
8 Sep	1810	m	79.0	yellow		yellow 1518 PRFVOA	
9 Sep	900	f	78.0	orange	c	c6037 0	scar right side
9 Sep	900	f	73.0	orange	c	c6038 0	
9 Sep	900	f	84.5	orange	c	c6040 0	
9 Sep	900	f	72.0	orange	c	c6041 0	
9 Sep	900	f	74.0	orange	c	c6043 0	
9 Sep	900	m	82.0	orange	c	c6044 0	
9 Sep	900	f	87.0	orange	c	c6046 0	scar left side
9 Sep	900	f	75.0	orange	c	c6047 0	gillnet - lamprey? open sore, dead
9 Sep	900	m	79.0	orange	c	5788	tag replaced with C05788
9 Sep	900	f	79.0	orange	c	c6049 0	dead
9 Sep	900	m	91.5	orange	c	c6050 0	
9 Sep	900	f	77.0	orange	c	c6051 0	
9 Sep	900	f	67.0	orange	c	c6052 0	scar right side
9 Sep	900	f	73.0	orange	c	c6053 0	
9 Sep	900	m	81.0	orange	c	c6054 0	dead
9 Sep	900	f	74.0	orange	c	c6055 0	
9 Sep	1340	m	79.5	orange	c	c6056 0	
9 Sep	1340	m	84.0	orange	c	c6057 0	
9 Sep	1340	m	77.0	orange	c	c6058 0	
9 Sep	1340	f	73.0	orange	c	c6059 0	gillnet
9 Sep	1340	m	83.0	orange	c	c6060 0	
9 Sep	1340	m	80.0	orange	c	c6061 0	
9 Sep	1340	f	73.0	orange	c	c6062 0	
9 Sep	1600	m	82.0	orange	c	c6063 0	
9 Sep	1600	f	74.0	orange	c	c6064 0	
9 Sep	1600	m	78.0	orange	c	c6066 0	
9 Sep	1600	f	78.0	orange	c	c6068 0	
9 Sep	1600	f	75.0	orange	c	c6069 0	mark right side
9 Sep	1600	f	83.5	orange	c	c6070 0	
9 Sep	1600	m	76.0	orange	c	c6071 0	mark on nose
9 Sep	1800	m	86.0	orange	c	c6072 0	
9 Sep	1800	m	79.0	orange	c	c6073 0	
9 Sep	1800	f	70.5	orange	c	c6074 0	
9 Sep	1800	f	69.5	orange	c	c6075 0	scar right side
9 Sep	1800	f	74.0	orange	c	c6077 0	gillnet
9 Sep	1800	m	86.0	orange	c	c6078 0	dead
9 Sep	1800	f	81.0	orange	c	c6079 0	scars on head
9 Sep	1800	f	75.0	orange	c	c6080 0	
10 Sep	900	f	60.0	orange	c	c6081 0	
10 Sep	900	f	67.5	orange	c	c6082 0	
10 Sep	900	m	75.5	orange	c	c6083 0	
10 Sep	900	f	84.0	orange	c	c6084 0	scar left side
10 Sep	900	m	85.5	orange	c	c6085 0	
10 Sep	900	m	92.0	orange	c	c6086 0	
10 Sep	900	m	85.0	orange	c	c6087 0	
10 Sep	900	m	96.0	orange	c	c6091 0	
10 Sep	900	f	72.5	orange	c	c6092 0	gillnet

Date	Time	Sex	Fork. Length (cm)	Tag Colour	Tag Letter	Tag Number	Comments
10 Sep	900	m	78.0	orange	c	c6093 0	
10 Sep	1540	m	89.0	orange	c	c00126 0	tag fell out
10 Sep	1540	f	70.0	orange	c	c6094 0	gillnet
10 Sep	1540	f	78.0	orange	c	c6095 0	dead
10 Sep	1540	m	80.0	orange	c	c6096 0	dead
10 Sep	1540	f	70.0	blue		blue tag MOE # 02643	
10 Sep	1540	f	70.0	orange	c	c6097 0	scar right side
10 Sep	1540	m	83.0	orange	c	c6098/99	scar right side
10 Sep	1540	m	88.0	orange	c	c6100 0	
10 Sep	1540	f	73.5	orange	c	c6101 0	scar right side
10 Sep	1540	f	73.0	orange	c	c6102 0	
10 Sep	1540	m	76.0	orange	c	c6103 0	
10 Sep	1540	f	70.0	orange	c	c6106 0	
10 Sep	1820	m	92.0	orange	c	c6108 0	
10 Sep	1820	f	85.0	orange	c	c6109 0	
10 Sep	1820	f	78.0	orange	c	c6110 0	mark right side
10 Sep	1820	m	88.0	orange	c	c6111 0	gone d/s - see log for explanation
10 Sep	1820	f	78.0	orange	c	c6112 0	
10 Sep	1820	m	79.0	orange	c	c6113 0	
10 Sep	1820	f	83.0	orange	c	c6114 0	
10 Sep	1820	f	70.0	orange	c	c6115 0	scar left side
10 Sep	1820	f	76.0	orange	c	c6116 0	
10 Sep	1820	f	79.0	orange	c	c6118 0	scar on head
10 Sep	1820	f	70.0	orange	c	c6119 0	
10 Sep	1820	m	92.0	orange	c	c6120 0	
10 Sep	1820	f	69.0	orange	c	c6121 0	
10 Sep	1820	f	72.0	orange	c	c6122 0	
10 Sep	1820	f	76.0	orange	c	c6123 0	
10 Sep	1820	f	83.0	orange	c	c6124 0	
10 Sep	1820	m	92.0	orange	c	c6125 0	
11 Sep	900	m	85.5	orange	c	c6126 0	
11 Sep	900	f	76.0	orange	c	c6127 0	scar left side
11 Sep	900	m	87.0	orange	c	c6128 0	scar left side
11 Sep	900	m	88.0	orange	c	c6129 0	scar both sides, dead
11 Sep	900	m	78.0	orange	c	c6130 0	marks on head
11 Sep	1500	f	73.0	orange	c	c6131 0	
11 Sep	1500	f	75.0	orange	c	c6132 0	gillnet
11 Sep	1500	f	72.5	orange	c	c6134 0	
11 Sep	1500	f	68.0	orange	c	c6135 0	mark right side, dead
11 Sep	1500	f	78.0	orange	c	c6137 0	
11 Sep	1500	f	69.0	orange	c	c6138 0	
11 Sep	1540	f	81.0	blue		blue MOE tag #02965, recapture	
11 Sep	1740	m	87.0	orange	c	c6139 0	
11 Sep	1740	f	66.5	orange	c	c6140 0	
11 Sep	1740	f	79.0	orange	c	c6141 0	
11 Sep	1740	f	73.0	orange	c	c6142 0	
11 Sep	1740	m	73.5	orange	c	c6143 0	
12 Sep	1625	f	75.0	orange	c	c6145 0	gill net - scar right side
12 Sep	1625	f	72.0	orange	c	c6146 0	
12 Sep	1625	f	72.0	orange	c	c6148 0	

Date	Time	Sex	Fork. Length (cm)	Tag Colour	Tag Letter	Tag Number	Comments
12 Sep	1625	f	71.0	orange	c	c6149 0	
12 Sep	1625	m	93.0	orange	c	c6153 0	scar right side
12 Sep	1625	f	76.0	orange	c	c6154 0	scar right side
12 Sep	1625	f	77.0	orange	c	c6158 0	
12 Sep	1625	m	77.0	orange	c	c6159 0	
12 Sep	1910	f	73.0	orange	c	c6160 0	scar both sides
12 Sep	1910	f	84.0	orange	c	c6161 0	
13 Sep	1800	f	83.5	orange	c	c6162 0	scar right side
13 Sep	1800	f	74.5	orange	c	c6164 0	
13 Sep	1800	m	87.0	orange	c	c6165 0	
13 Sep	1800	f	71.5	orange	c	c6166 0	
13 Sep	1800	f	73.0	orange	c	c1173 0	tag recovery - gillnet - chunk of operc missing
13 Sep	1800	f	69.5	orange	c	c6167 0	scar on head
13 Sep	1800	f	72.0	orange	c	c6168 0	
13 Sep	1800	m	77.5	blue			02983 blue MOE tag recovery, dead
14 Sep	845	f	75.0	orange	c	c6169 0	mark left side
14 Sep	1800	m	77.0	orange	c	c6170 0	
14 Sep	1800	m	81.0	orange	c	c6172 0	gillnet, dead
14 Sep	1800	m	81.0	orange	c	c6173 0	
14 Sep	1800	m	83.0	orange	c	c6174 0	scar left right and back sides
14 Sep	1800	m	85.5	orange	c	c6175 0	
14 Sep	1800	m	77.0	orange	c	c6176 0	
14 Sep	1800	m	82.0	orange	c	c6177 0	gill net - chunk of gill plate missing, dead
14 Sep	1800	m	90.0	orange	c	c6178 0	
14 Sep	1800	m	78.0	orange	c	c6179 0	
14 Sep	1800	f	75.0	orange	c	c6180 0	mark left side
14 Sep	1800	f	75.5	orange	c	c6181 0	
15 Sep	920	f	72.0	orange	c	c6183 0	
15 Sep	1755	m	80.0	orange	c	c6184 0	
15 Sep	1755	m	92.0	orange	c	c6185 0	
15 Sep	1755	f	76.5	orange	c	c6186 0	
15 Sep	1755	f	77.0	orange	c	c6187 0	
15 Sep	1755	f	83.0	orange	c	c6188 0	
15 Sep	1755	m	88.0	orange	c	c6189 0	
15 Sep	1755	f	79.5	orange	c	c6190 0	
16 Sep	1040	m	86.0	orange	c	c6191 0	mark left side
16 Sep	1740	f	71.5	orange	c	c6192 0	mark right side
16 Sep	1740	f	71.0	orange	c	c6193 0	scar on dorsal
16 Sep	1740	f	72.0	orange	c	c6195 0	scars both sides
16 Sep	1740	f	74.0	orange	c	c6195 0	
16 Sep	1740	f	75.0	orange	c	c6197 0	scar on right side and head, dead
16 Sep	1740	f	75.0	orange	c	c6198 0	
16 Sep	1745	f	69.0	orange	c	c6199 0	
16 Sep	1745	f	NA				escapee
17 Sep	920	f	76.0	orange	c	c6200 0	
17 Sep	920	m	84.0	orange	c	c6201 0	
17 Sep	920	m	77.0	orange	c	c6202 0	
17 Sep	920	f	75.0	orange	c	c6203	scar right side - gash on back
17 Sep	920	f	81.0	orange	c	c6204 0	
17 Sep	920	m	84.5	orange	c	c6205 0	

Date	Time	Sex	Fork. Length (cm)	Tag Colour	Tag Letter	Tag Number	Comments
17 Sep	920	f	77.0	orange	c	c6207 0	scar right side
17 Sep	920	m	92.0	orange	c	c6208 0	dirty
17 Sep	920	f	79.0	orange	c	c6210 0	
17 Sep	920	f	80.0	orange	c	c6211 0	
17 Sep	920	f	78.0	orange	c	c6212 0	
17 Sep	1710	f	67.0	orange	c	c6213 0	gash left side
18 Sep	1015	f	69.0	orange	c	6214	gill net marks on head
18 Sep	1900	f	76.5	orange	c	6215	marks right side
18 Sep	1900	f	70.5	orange	c	6216	
18 Sep	1900	m	NA				big fish, 25lbs, escaped
19 Sep	940	f	70.0	orange	c	6217	
19 Sep	940	f	70.0	orange	c	6218	marks right side
19 Sep	1730	f	78.0	orange	c	6219	marks both sides
19 Sep	1730	f	78.5	orange	c	6220	
20 Sep	900	f	71.5	orange	c	6221	
20 Sep	900	f	69.0	orange	c	6224	
20 Sep	900	m	98.5	orange	c	6225	holy huge steelhead Batman
20 Sep	1820	f	68.5	orange	c	6226	marks right side
20 Sep	1820	m	73.5	orange	c	6227	marks both sides
20 Sep	1820	f	76.0	orange	c	6228	
21 Sep	910	f	72.0	orange	c	6229	
21 Sep	910	m	76.0	orange	c	6230	
21 Sep	910	f	80.0	orange	c	6231	mark left side
22 Sep	900	m	78.0	yellow		6305	recap
22 Sep	900	m	87.0	orange	c	6233	
22 Sep	900	m	78.0	orange	c	6234	
22 Sep	900	f	73.0	orange	c	6235	mark right side, eye damaged badly-blind
22 Sep	900	f	70.0	orange	c	6236	mark on side
22 Sep	1735	m	87.0	orange	c	6237	big fish
23 Sep	950	f	86.0	orange	c	6238	
23 Sep	1800	m	82.0	orange	c	6239	
23 Sep	1800	m	86.0	orange	c	6240	big mark left side
23 Sep	1800	f	76.0	orange	c	6241	
23 Sep	1800	f	74.0	orange	c	6242	
23 Sep	1800	f	72.0	orange	c	6243	
23 Sep	1800	f	73.0	orange	c	6244	
23 Sep	1800	f	72.5	orange	c	6246	mark right side
23 Sep	1800	f	75.0	orange	c	6247	
23 Sep	1800	m	88.0	orange	c	6248	big fish
23 Sep	1800	m	80.0	orange	c	6249	
23 Sep	1800	m	89.0	orange	c	6250	
23 Sep	1800	m	85.0	orange	c	6252	P.R. yellow tag #1103
23 Sep	1800	m	91.0	orange	c	6253	mark right side big fish
24 Sep	930	f	74.0	orange	c	6254	mark left side
24 Sep	930	f	69.0	orange	c	6255	
24 Sep	1750	f	75.0	orange	c	6256	
24 Sep	1750	f	72.0	orange	c	6257	
24 Sep	1750	m	90.0	orange	c	6258	
24 Sep	1750	f	73.0	orange	c	6260	marks right side
24 Sep	1750	f	77.0	orange	c	6262	

Date	Time	Sex	Fork. Length (cm)	Tag Colour	Tag Letter	Tag Number	Comments
24 Sep	1750	f	71.5	orange	c	6264	
24 Sep	1750	m	72.5	orange	c	6265	
24 Sep	1750	m	89.0	orange	c	6266	
24 Sep	1750	m	80.0	orange	c	6267	
25 Sep	950	f	77.0	orange	c	6268	marks right side
26 Sep	930	f	73.0	orange	c	3008	
26 Sep	930	f	67.5	orange	c	6269	marks right side
26 Sep	1725	m	84.0	orange	c	6270	
26 Sep	1725	f	75.0	orange	c	6271	marks right side
26 Sep	1725	f	66.5	orange	c	6272	
26 Sep	1725	f	72.0	orange	c	6273	marks on back, lamprey mark under head
27 Sep	1800	m	82.0	orange	c	6274	marks both sides
27 Sep	1800	m	82.0	orange	c	6275	
27 Sep	1800	m	80.0	orange	c	6276	
28 Sep	1810	f	75..5	orange	c	6277	
28 Sep	1810	f	73.0	orange	c	6278	
28 Sep	1810	f	76.0	orange	c	6279	
30 Sep	1045	f	78.0	orange	c	6283	
30 Sep	1645	f	76.0	orange	c	6284	
2 Oct	945	f	75.0	orange	c	6285	
2 Oct	945	m	78.0	orange	c	6288	
4 Oct	945	f	72.0	orange	c	6289	
4 Oct	945	f	69.0	orange	c	6290	gill net marks
4 Oct	945	m	72.0	orange	c	6292	
6 Oct	945	m	80.0	orange	c	6293	
6 Oct	945	f	77.0	orange	c	6294	
6 Oct	945	f	70.0	orange	c	6295	
6 Oct	945	m	75.0	orange	c	6296	
8 Oct	945	m	70.0	orange	c	6298	
8 Oct	945	f	81.0	orange	c		fungus on head
9 Oct	945	f	70.0	orange	c	6402	
13 Oct	945	f	73.0	orange	c	6405	
14 Oct	1845	m	80.0	orange	c	6406	
14 Oct	1845	m	83.0	orange	c	6407	
14 Oct	1845	f	77.0	orange	c	6408	sore on right side behind dorsal fin

Appendix Table 7. Summary of steelhead tagging data at the upper fence

Recapture		Fork			Tagging			Travel			
Date	Time	Sex	Length (cm)	Recovered	Tag Colour	Tag Letter	Tag Number	Month	Day	Time (hrs)	Time (d)
6 Sep	1025	m		r	orange	c	5759	Sept	1	845	5
6 Sep	1025	m		r	orange	c	5746	Aug	31	825	6
6 Sep	1700	m		r	orange	c	5823	Sept.	2	1925	4
6 Sep	1700	m		r	orange	c	5764	Sept.	2	845	4
6 Sep	1700	f		r	orange	c	5850	Sept.	4	1845	2
6 Sep	1700	f		r	orange	c	5863	Sept.	4	1845	2
6 Sep	1700	m	82	applied	orange	c	5781	Sept.			
7 Sep	1645	f		r	orange	c	5895	Sept.	5	1150	2
7 Sep	1645	f		r	orange	c	5924	Sept.	6	1510	1
7 Sep	1645	m		r	orange	c	5908	Sept.	5	1900	2
7 Sep	1645	f		r	orange	c	5706	Aug	19	1930	19
7 Sep	1645	f		r	orange	c	5728	Aug	27	1640	11
7 Sep	1645	f		r	orange	c	5729	Aug	28	1400	10
7 Sep	1645	m		r	orange	c	5822	Sept.	2	1925	5
7 Sep	1645	f		r	orange	c	5740	Aug	31	825	8
7 Sep	1645	f		r	orange	c	5883	Sept.	5	900	2
8 Sep	1010	f		r	orange	c	5891	Sept.	2	1925	6
8 Sep	1010	f		r	orange	c	5833	Sept.	3	910	5
8 Sep	1010	f		r	orange	c	5737	Aug	30	825	9
8 Sep	1715	m		r	orange	c	5958	Sept.	6	1925	2
8 Sep	1715	f		r	orange	c	5865	Sept.	4	1845	4
8 Sep	1715	f		r	orange	c	5856	Sept.	4	1845	4
8 Sep	1715	m		r	orange	c	5928	Sept.	6	1510	2
8 Sep	1715	f		r	orange	c	5939	Sept.	6	1750	2
8 Sep	1715	f		applied	orange	c	5782	Sept.			
8 Sep	1715	m		r	orange	c	5834	Sept.	3	910	5
8 Sep	1715	m		r	orange	c	5935	Sept.	6	1750	2
8 Sep	1715	f		r	orange	c	5704	Aug	18	1940	21
8 Sep	1715	m		r	orange	c	5916	Sept.	6	910	2
8 Sep	1715	m		r	orange	c	5839	Sept.	3	1845	5
8 Sep	1715	m		r	orange	c	5957	Sept.	6	4925	2
8 Sep	1715	f		r	orange	c	5819	Sept.	2	1925	6
8 Sep	1715	m		r	orange	c	5979	Sept.	7	1725	1
8 Sep	1715	m		r	orange	c	5873	Sept.	4	1845	4
8 Sep	1715	f		r	orange	c	5967	Sept.	7	1430	1
8 Sep	1715	f		r	orange	c	5881	Sept.	5	900	3
8 Sep	1715	m		r	orange	c	5987	Sept.	7	1905	1
8 Sep	1715			r	orange	c	5934	no tag number applied, wrong number			
8 Sep	1715	f	73.5	applied	orange	c	5783				
8 Sep	1715	m		r	orange	c	5996	Sept.	8	855	0
8 Sep	1715	f		r	orange	c	5867	Sept.	4	1845	4
8 Sep	1715	f		r	orange	c	5872	Sept.	4	1845	4
8 Sep	1715	f		r	orange	c	5709	Aug	20	1635	18
9 Sep	1040	f		r	orange	c	5723	Aug	25	1825	15
9 Sep	1040	m		r	orange	c	5959	Sept.	6	1925	3
9 Sep	1700	f		r	orange	c	5991	Sept.	8	855	1

Recapture Date	Time	Sex	Fork		Tag Colour	Tag Letter	Tag Number	Tagging		Time (hrs)	Travel Time (d)
			Length (cm)	Recovered				Month	Day		
9 Sep	1700	m		r	orange	c	5999	Sept.	8	855	1
9 Sep	1700	m		r	orange	c	5707	Aug	20	1615	20
9 Sep	1700	m		r	orange	c	5768	Sept.	2	845	7
9 Sep	1700	f		r	orange	c	5717	Aug	24	1945	16
9 Sep	1700	m		r	orange	c	5716	Aug	24	1800	16
9 Sep	1700	f		r	orange	c	5902	Sept.	5	1800	4
9 Sep	1700	f		r	orange	c	5918	Sept.	6	910	3
9 Sep	1700	m		r	orange	c	6021	Sept.	8	18110	1
9 Sep	1700	f		r	orange	c	5887	Sept.	5	900	4
9 Sep	1700	m		applied			5784	looks like he lost his tag			
9 Sep	1700				orange	c	5867	mort on upper fence			
10 Sep	945	m		r	orange	c	5961	Sept.	7	850	3
10 Sep	945	m		r	orange	c	5963	Sept.	7	850	3
10 Sep	945	m		r	orange	c	5990	Sept.	8	855	2
10 Sep	945	m		r	orange	c	6050	Sept.	9	900	1
10 Sep	945	m		r	orange	c	5750	Aug	31	2045	10
10 Sep	945	m		r	orange	c	5846	Sept.	4	1540	6
10 Sep	945	f		r	orange	c	6043	Sept.	9	900	1
10 Sep	945	m		r	orange	c	5923	Sept.	6	1510	4
10 Sep	945	f		r	orange	c	5921	Sept.	6	1510	4
10 Sep	945	f		r	orange	c	6013	Sept.	8	1820	2
10 Sep	945	f		r	orange	c	5861	Sept.	4	1845	6
10 Sep	945	f		r	orange	c	5914	Sept.	6	910	4
10 Sep	945	m		r	orange	c	5932	Sept.	6	1510	4
10 Sep	945	m		r	orange	c	6063	Sept.	9	1600	1
10 Sep	945	m		r	orange	c	5874	Sept.	4	1845	6
10 Sep	945	f		r	orange	c	6037	Sept.	9	900	1
10 Sep	945	f		r	orange	c	5776	Sept.	2	1925	8
10 Sep	945	m		r	orange	c	5985	Sept.	7	1905	3
10 Sep	945	m		r	orange	c	6044	Sept.	9	900	1
10 Sep	945	f		r	orange	c	6015	Sept.	8	1810	2
10 Sep	945	m		r	orange	c	6014	Sept.	8	1810	2
10 Sep	945	f		r	orange	c	6038	Sept.	9	900	1
10 Sep	945	f		r	orange	c	5829	Sept.	2	1925	8
10 Sep	945	m		r	orange	c	6054	Sept.	9	900	1
10 Sep	945	m		r	orange	c	6017	Sept.	8	1810	2
10 Sep	945	f		r	orange	c	6070	Sept.	9	1600	1
10 Sep	945	f		r	orange	c	6010	Sept.	8	1820	2
10 Sep	945	m		r	orange	c	6066	Sept.	9	1600	1
10 Sep	945	f		r	orange	c	5950	Sept.	6	1925	4
10 Sep	945	m		r	orange	c	6078	Sept.	9	1800	1
10 Sep	945	f		r	orange	c	5911	Sept.	6	910	4
10 Sep	945	m		r	orange	c	6019	Sept.	8	1810	2
10 Sep	945	f		r	orange	c	9041	Sept.	9	900	1
10 Sep	945	m		r	orange	c	6061	Sept.	9	1340	1
10 Sep	945	m	80	applied	orange	c	5786				
10 Sep	945	f	84	applied	orange	c	5788				
10 Sep	1700	f		r	orange	c	5857	Sept.	4	1845	6
10 Sep	1700	m		r	orange	c	6073	Sept.	9	1800	1

Recapture Date	Time	Sex	Fork		Tag Colour	Tag Letter	Tag Number	Tagging		Time (hrs)	Travel Time (d)
			Length (cm)	Recovered				Month	Day		
10 Sep	1700	f		r	orange	c	5852	Sept.	4	1845	6
10 Sep	1700	f		r	orange	c	6075	Sept.	9	1800	1
10 Sep	1700	f		r	orange	c	5801	Sept.	2	1925	8
10 Sep	1700	f		r	orange	c	6008	Sept.	8	1810	2
10 Sep	1700	m		r	orange	c	5775	Sept.	2	1925	8
10 Sep	1700	m		r	orange	c	5988	Sept.	8	855	2
10 Sep	1700	f		r	orange	c	5986	Sept.	7	1910	3
10 Sep	1700	m		r	orange	c	5745	Aug	31	825	10
10 Sep	1700	f		r	orange	c	6049	Sept.	9	900	1
10 Sep	1700	m		r	orange	c	5897	Sept.	5	1600	5
10 Sep	1700	m		r	orange	c	6058	Sept.	9	1340	1
10 Sep	1700	f		r	orange	c	5878	Sept.	4	1845	6
10 Sep	1700	m		r	orange	c	5732	Aug	28	1745	13
11 Sep	1000	m		r	orange	c	6126	Sept.	10	1540	1
11 Sep	1000	f		r	orange	blue	2984	Sept.	8	1810	3
11 Sep	1000	m		r	orange	c	6108	Sept.	10	1820	1
11 Sep	1000	m		r	orange	c	6086	Sept.	10	900	1
11 Sep	1000	m		r	orange	c	5736	Aug	30	825	12
11 Sep	1000	f		r	orange	c	6102	Sept.	10	1540	1
11 Sep	1000	f		r	orange	c	6007	Sept.	8	1810	3
11 Sep	1000	f		r	orange	c	6123	Sept.	10	1820	1
11 Sep	1000	f		r	orange	c	6059	Sept.	9	1340	2
11 Sep	1000	f		r	orange	c	6005	Sept.	8	1810	3
11 Sep	1000	f		r	orange	c	5944	Sept.	6	1925	5
11 Sep	1000	f		r	orange	c	6124	Sept.	10	1820	1
11 Sep	1000	m		r	orange	c	5915	Sept.	6	940	5
11 Sep	1000	f		r	orange	c	5913	Sept.	6	910	5
11 Sep	1000	m		r	orange	c	6093	Sept.	10	900	1
11 Sep	1000	f		r	orange	c	6000	Sept.	8	855	3
11 Sep	1700	m		r	orange	c	6071	Sept.	9	1600	2
11 Sep	1700	m		r	orange	c	6024	Sept.	8	1810	3
11 Sep	1700	f		r	orange	c	6040	Sept.	9	900	2
11 Sep	1700	m		r	orange	c	5993	Sept.	8	855	3
11 Sep	1700	f		r	orange	c	6115	Sept.	10	1820	1
11 Sep	1700	m		r	orange	c	5761	Sept.	1	1945	10
11 Sep	1700	m		r	orange	c	5970	Sept.	7	1725	4
11 Sep	1700	m		r	orange	c	5860	Sept.	4	1845	7
11 Sep	1700	f		r	orange	c	6077	Sept.	9	1800	2
11 Sep	1700	f		r	orange	c	6118	Sept.	10	1820	1
11 Sep	1700	m		applied	orange	c	5788	Sept.	9	900	2
12 Sep	945	f		r	orange	c	6052	Sept.	9	900	3
12 Sep	945	m		r	orange	c	6026	Sept.	8	1810	4
12 Sep	945	f		r	orange	c	6122	Sept.	10	1820	2
12 Sep	1700	m		r	orange	c	5984	Sept.	7	1905	5
12 Sep	1700	f		r	orange	c	6033	Sept.	8	1810	4
13 Sep	940	f		r	orange	c	5740	Aug	31	825	13
13 Sep	1700	m		r	orange	c	6120	Sept.	10	1820	3
13 Sep	1700	m		r	orange	c	6129	Sept.	11	900	2
13 Sep	1700	m		r	orange	c	6091	Sept.	10	900	3

Recapture Date	Time	Sex	Fork		Tag Colour	Tag Letter	Tag Number	Tagging		Time (hrs)	Travel Time (d)
			Length (cm)	Recovered				Month	Day		
13 Sep	1700	f		r	orange	c	6161	Sept.	12	1910	1
13 Sep	1700	m		r	orange	c	5817	Sept.	2	1925	11
13 Sep	1700	f		r	orange	c	6069	Sept.	9	1600	4
13 Sep	1700	m		r	orange	c	6028/29	Sept.	8	1810	5
13 Sep	1700	f			blue		2643	Sept.	10	1540	3
13 Sep	1700	f		r	orange	c	6106	Sept.	10	1540	3
14 Sep	920	m		r	orange	c	6056	Sept.	9	1340	5
15 Sep	1000	f		r	orange	c	6032	Sept.	8	1810	7
15 Sep	1000	f		r	orange	c	6138	Sept.	11	1500	4
15 Sep	1000	m		r	orange	c	6087	Sept.	10	900	5
15 Sep	1000	m			blue		2983	Sept.	13	1800	2
15 Sep	1000	f		r	orange	c	6127	Sept.	11	900	4
15 Sep	1000	m		r	orange	c	6103	Sept.	10	1540	5
15 Sep	1000	f		r	orange	c	5910	Sept.	6	910	9
15 Sep	1000	m		r	orange	c	6030	Sept.	8	1810	7
15 Sep	1000	f		r	orange	c	6097	Sept.	10	1540	5
15 Sep	1000	f		r	orange	c	6079	Sept.	9	1800	6
15 Sep	1000	m		r	orange	c	6098	Sept.	10	1540	5
15 Sep	1000	f		r	orange	c	5877	Sept.	4	1845	11
15 Sep	1000	m		r	orange	c	6159	Sept.	12	1625	3
15 Sep	1715	f		r	orange	c	5851	Sept.	4	1845	11
15 Sep	1715	m		r	orange	c	6116	Sept.	8	1810	7
15 Sep	1715	?		r	orange	c	3021	no record of it through fence			
15 Sep	1715	f		r	orange	c	5945	Sept.	6	1925	9
15 Sep	1715	m		r	orange	c	6173	Sept.	14	1800	1
15 Sep	1715	m		r	orange	c	6172	Sept.	14	1800	1
15 Sep	1715	m		r	orange	c	5838	Sept.	3	1845	12
15 Sep	1715	f		r	orange	c	6084	Sept.	10	900	5
15 Sep	1715	m		r	orange	c	5733	Aug	29	1920	17
16 Sep	1105	m		r	orange	c	6096	Sept.	10	1540	6
16 Sep	1725	m		r	orange	c	6177	Sept.	14	1800	2
16 Sep	1725	m		r	orange	c	6176	Sept.	14	1800	2
17 Sep	955	f		r	orange	c	6160	Sept.	12	191	5
17 Sep	955	f		r	orange	c	6135	Sept.	11	1500	6
17 Sep	1650	f		r	orange	c	6118	Sept.	10	1820	7
17 Sep	1650	f		r	orange	c	5770	Sept.	2	1300	15
17 Sep	1650	f		r	orange	c	6186	Sept.	15	1755	2
17 Sep	1650	f	75	applied	orange	c	5789	no evidence of previous tagging			
18 Sep	1700	f		r	orange	c	6132	Sept.	11	1500	7
18 Sep	1700	f		r	orange	c	5840	Sept.	3	1845	15
19 Sep	1010	f		r	orange	c	6062	Sept.	9	1340	10
19 Sep	1010	m		r	orange	c	5842	Sept.	3	1845	16
20 Sep	1800	?		r	orange	c	7177	no record of fish through lower fence			
21 Sep	1720	f		r	orange	c	6198	Sept.	16	1745	5
23 Sep	1025	m		r	orange	c	6208	Sept.	17	1710	6
23 Sep	1025	f		r	orange	c	1173	Sept.	13	1800	10
23 Sep	1025	m		r	orange	c	6165	Sept.	13	1800	10
23 Sep	1025	m		r	orange	c	6185	Sept.	15	1755	8
23 Sep	1025	m		r	orange	c	5705	Aug	19	1930	4

Recapture Date	Time	Sex	Fork		Tag Colour	Tag Letter	Tag Number	Tagging		Time (hrs)	Travel Time (d)
			Length (cm)	Recovered				Month	Day		
24 Sep	1000	f		r	orange	c	6158	Sept.	12	1625	12
25 Sep	1015	m		r	orange	c	6248	Sept.	23	1800	2
25 Sep	1015	m		r	orange	c	6100	Sept.	10	1540	15
25 Sep	1015	m		r	orange	c	6139	Sept.	11	1740	14
26 Sep	950	f		r	orange	c	6064	Sept.	9	1500	17
27 Sep	1020	f		r	orange	c	6264	Sept.	24	1750	3
27 Sep	1020	?		r	orange	c	6182	no record of fish through lower fence			

Appendix Table 8. Summary of data collected from coho at lower fence.

Date	Time (hrs)	Sex	Fork		Genetic Scale (#)	Age Scale (#)	Tag Colour	Tag Number	DNA Sample Number	Comments
			Length (cm)	Weight (kg)						
1 Sep	845	f	64.0	*6	4323-3	3445-4	blue	206	3L	bright fish
4 Sep	1845	m	43.5	*3	4323-4	3445-5	blue	207	4L	
5 Sep	1600	m	66.0	*8	4323-5	3445-6	blue	208	5L	
5 Sep	1900	m	68.0	*9	4323-6	3445-7	blue	209	6L	
6 Sep	1925	m	63.0	3.5	4323-7	3445-8	blue	210	7L	
8 Sep	1810	m	46.0	1.5	4323-8	3445-9	blue	215	8L	
8 Sep	1810	m	66.0	3.8	4323-9	3445-10	blue	216	9L	
9 Sep	900	m	61.0	2.85	4323-10	5014-1	blue	217	10L	
10 Sep	1540	m	67.0	3.7	4324-1	5014-2	not tagged		11L	
12 Sep	900	m	50.0	1.2	4324-2	5014-3	blue	218	12L	
12 Sep	1625	m	69.0	4	4324-3	5014-4	blue	219	13L	mark on head, tar baby
13 Sep	900	m	46.5	1	4324-4	5014-5	blue	220	14L	mark right side
17 Sep	1710	m	60.0	3.7	4324-5	5014-6	blue	221	15L	tar baby
17 Sep	1710	m	69.0	4.2	4324-6	5014-7	blue	222	16L	tar baby
22 Sep	900	m	50.0	2.8	4324-7	5014-8	blue	223	17L	
23 Sep	1800	m	74.0	4.7	NA	5014-9	blue	224	18L	boot
26 Sep	1800	m	68.5	4.2	4324-8	6014-10	blue	226	19L	
27 Sep	930	m	52.0	2.2	4324-9	5015-1	blue	227	20L	
27 Sep	930	m	75.0	5	4324-10	5015-2	blue	228	21L	
27 Sep	930	m	71.0	5	4329-1	50155-3	blue	229	22L	
27 Sep	930	m	66.0	5.1	4329-2	5015-4	blue	230	23L	
28 Sep	1810	f	71.0	4.3	4329-3	-5020	blue	231	24L	
28 Sep	1810	m	71.0	5.4	4329-4	5015-6	blue	233	25L	
28 Sep	1810	f	71.0	4.5	4329-5	5015-7	blue	234	26L	

*: approximated weight in pounds

Appendix Table 9. Summary of data collected from sockeye.

Lower Fence					Upper Fence			
Date	Time	# m	# f	Total	Date	Time	Sex	Fork Length (cm)
31 Aug	815	1	1	2	30-Aug	1020	m	62.5
31 Aug	825	1	0	1	30-Aug	1020	f	59
1 Sep	845	0	1	1	30-Aug	1020	f	59
1 Sep	1945	1	1	2	30-Aug	1020	m	66
2 Sep	845	2	0	2	30-Aug	1020	m	68
2 Sep	1300	3	2	5	30-Aug	1020	m	68.5
2 Sep	1425	2	1	3	30-Aug	1020	m	66
2 Sep	1615	1	1	2	30-Aug	1020	f	56.5
2 Sep	1925	9	14	23	30-Aug	1020	f	56.5
2 Sep	2140	1	1	2	30-Aug	1020	m	68.5
3 Sep	910	1	1	2	30-Aug	1020	m	65
3 Sep	1845	9	13	22	30-Aug	1020	m	68
4 Sep	910	0	2	2	30-Aug	1020	f	56
4 Sep	1340	1	0	1	30-Aug	1020	f	59.5
4 Sep	1415	4	0	4	30-Aug	1020	m	67
4 Sep	1530	2	1	3	30-Aug	1020	f	59.5
4 Sep	1540	2	0	2	30-Aug	1020	m	59
4 Sep	1630	5	3	8	30-Aug	1020	f	55.5
4 Sep	1845	11	13	24	30-Aug	1020	f	58
5 Sep	900	8	10	18	30-Aug	1020	m	59
5 Sep	1150	1	0	1	30-Aug	1020	f	51
5 Sep	1350	1	1	2	30-Aug	1020	f	57
5 Sep	1600	12	16	28	30-Aug	1020	m	57
5 Sep	1715	1	0	1	30-Aug	1020	f	45.5
5 Sep	1800	2	1	3	30-Aug	1020	m	64.5
5 Sep	1900	1	1	2	30-Aug	1020	f	55.5
6 Sep	910	3	0	3	30-Aug	1020	f	66
6 Sep	1510	3	1	4	30-Aug	1020	f	60.5
6 Sep	1750	2	1	3	30-Aug	1020	f	62.5
6 Sep	1925	1	4	5	30-Aug	1020	f	65.5
7 Sep	850	6	1	7	30-Aug	1020	m	65
7 Sep	1230	2	2	4	30-Aug	1020	f	56
7 Sep	1340	5	6	11	30-Aug	1020	f	58
7 Sep	1430	5	4	9	30-Aug	1020	f	61
7 Sep	1605	5	1	6	30-Aug	1020	m	66
7 Sep	1725	6	9	15	30-Aug	1020	m	61
7 Sep	1905	3	4	7	30-Aug	1020	f	56
8 Sep	855	6	1	7	30-Aug	1020	f	60
8 Sep	1230	5	9	14	30-Aug	1020	f	59.5
8 Sep	1400	17	4	21	30-Aug	1020	m	60.5
8 Sep	1810	7	7	14	31-Aug	1641	m	67.5
9 Sep	900	9	5	14	31-Aug	1641	f	58
9 Sep	1200	2	8	10	31-Aug	1641	f	61
9 Sep	1340	6	15	21	31-Aug	1641	f	64
9 Sep	1600	5	16	21	31-Aug	1641	f	59.5
9 Sep	1640	3	3	6	31-Aug	1641	f	57.5
9 Sep	1800	3	12	15	31-Aug	1641	m	65.5
10 Sep	900	1	9	10	31-Aug	1641	f	62.5
10 Sep	1540	8	1	9	1-Sep			no fish
10 Sep	1820	2	9	11	2-Sep			no fish
11 Sep	1300	1	1	2	3-Sep			no fish
11 Sep	1500	9	15	24	4-Sep	1000	m	71
11 Sep	1540	1	5	6	4-Sep	1000	m	67
11 Sep	1740	0	1	1	4-Sep	1700	m	67

Lower Fence					Upper Fence			
Date	Time	# m	# f	Total	Date	Time	Sex	Fork Length (cm)
12 Sep	900	1	10	11	5-Sep	1005	m	?
12 Sep	1625	6	0	6	5-Sep	1700	m	69
12 Sep	1910	4	1	5	5-Sep	1900	f	70
13 Sep	900	0	2	2	5-Sep	1900	m	60
13 Sep	1800	3	1	4	5-Sep	1900	m	65
14 Sep	845	0	4	4	6-Sep	1025	m	61
14 Sep	1800	8	2	10	6-Sep	1025	f	59
15 Sep	920	0	3	3	6-Sep	1025	m	60
15 Sep	1855	1	1	2	6-Sep	1025	m	64
16 Sep	1040	1	2	3	6-Sep	1025	m	65
16 Sep	1745	2	1	3	6-Sep	1025	f	60
17 Sep	920	2	5	7	6-Sep	1025	f	62
17 Sep	1710	1	1	2	6-Sep	1025	m	67
18 Sep	1725	1	1	2	6-Sep	1025	m	64
18 Sep	1900	2	0	2	6-Sep	1025	m	69.5
19 Sep	1730	3	1	4	6-Sep	1025	m	68.5
20 Sep	1820	1	1	2	6-Sep	1025	f	61.5
21 Sep	910	1	0	1	6-Sep	1025	f	65
22 Sep	900	1	1	2	6-Sep	1025	f	55
22 Sep	1735	2	0	2	6-Sep	1025	f	60
23 Sep	950	2	1	3	6-Sep	1025	f	58
23 Sep	1800	0	1	1	6-Sep	1025	m	58
24 Sep	930	1	2	3	6-Sep	1025	f	67
25 Sep	1750	1	1	2	6-Sep	1025	m	59.5
25 Sep	1750	0	1	1	6-Sep	1025	f	55.5
26 Sep	1725	2	0	2	6-Sep	1025	f	57
27 Sep	1725	0	0	0	6-Sep	1025	m	66
					6-Sep	1025	f	59
					6-Sep	1025	f	52
					6-Sep	1025	m	58
					6-Sep	1025	f	58
					6-Sep	1025	f	56
					6-Sep	1025	m	67
					6-Sep	1025	m	58
					6-Sep	1025	m	66
					6-Sep	1700	f	59
					6-Sep	1700	f	55
					6-Sep	1700	m	56
					6-Sep	1700	f	58
					6-Sep	1700	m	69
					6-Sep	1700	f	58
					6-Sep	1700	f	58
					6-Sep	1700	f	64
					6-Sep	1700	m	62
					6-Sep	1700	m	59
					6-Sep	1700	m	66
					6-Sep	1700	m	64
					6-Sep	1700	f	56
					6-Sep	1700	m	60
					6-Sep	1700	m	65
					6-Sep	1700	f	64
					6-Sep	1700	m	64
					6-Sep	1700	f	59
					6-Sep	1700	f	56
					6-Sep	1700	m	67
					6-Sep	1700	f	60
					6-Sep	1700	f	55

Lower Fence					Upper Fence			
Date	Time	# m	# f	Total	Date	Time	Sex	Fork Length (cm)
					6-Sep	1700	f	56
					6-Sep	1700	m	61
					6-Sep	1700	m	62
					6-Sep	1700	f	58
					6-Sep	1700	m	68
					6-Sep	1700	f	58
					6-Sep	1700	f	56
					6-Sep	1700	f	64
					6-Sep	1700	m	64
					6-Sep	1700	m	61
					6-Sep	1700	m	60
					6-Sep	1700	f	67
					6-Sep	1700	m	67
					7-Sep	950	f	60
					7-Sep	950	f	55
					7-Sep	950	f	62
					7-Sep	950	f	64
					7-Sep	950	f	63
					7-Sep	950	f	56
					7-Sep	950	f	56
					7-Sep	950	m	64
					7-Sep	950	f	57.5
					7-Sep	950	f	54
					7-Sep	950	f	55
					7-Sep	950	m	64
					7-Sep	950	f	64
					7-Sep	950	f	57
					7-Sep	950	f	59
					7-Sep	950	f	63
					7-Sep	950	f	56.5
					7-Sep	950	m	65.5
					7-Sep	950	f	59.5
					7-Sep	950	f	54
					7-Sep	950	f	58.5
					7-Sep	950	m	60.5
					7-Sep	950	m	57.5
					7-Sep	950	f	62
					7-Sep	950	m	69
					7-Sep	950	m	67.5
					7-Sep	950	f	55.5
					7-Sep	950	f	64
					7-Sep	950	m	67
					7-Sep	950	f	57
					7-Sep	950	f	57
					7-Sep	950	f	52.5
					7-Sep	950	f	59
					7-Sep	950	f	58
					7-Sep	950	m	56
					7-Sep	950	f	57
					7-Sep	950	f	53
					7-Sep	950	f	54.5
					7-Sep	950	f	54
					7-Sep	1645	f	51.5
					7-Sep	1645	m	71
					7-Sep	1645	m	54
					7-Sep	1645	m	70.5
					7-Sep	1645	f	61

Lower Fence					Upper Fence			
Date	Time	# m	# f	Total	Date	Time	Sex	Fork Length (cm)
					7-Sep	1645	f	58.5
					7-Sep	1645	f	55
					7-Sep	1645	f	54
					7-Sep	1645	f	59
					7-Sep	1645	f	64
					8-Sep	1010	f	56.5
					8-Sep	1010	f	57
					8-Sep	1010	m	66
					8-Sep	1010	m	66.5
					8-Sep	1010	f	58.5
					8-Sep	1010	f	53
					8-Sep	1010	m	66
					8-Sep	1010	m	68.5
					8-Sep	1010	f	63.5
					8-Sep	1010	f	62.5
					8-Sep	1010	f	54
					8-Sep	1010	f	58
					8-Sep	1010	f	54.5
					8-Sep	1010	m	58
					8-Sep	1010	m	56
					8-Sep	1010	f	55
					8-Sep	1010	m	68.5
					8-Sep	1010	f	61.5
					8-Sep	1010	f	56
					8-Sep	1010	m	62
					8-Sep	1010	f	56
					8-Sep	1010	f	56
					8-Sep	1010	f	57.5
					8-Sep	1010	f	57.5
					8-Sep	1010	f	55.5
					8-Sep	1010	m	60
					8-Sep	1010	m	57
					8-Sep	1010	m	65
					8-Sep	1010	m	69
					8-Sep	1010	m	58.5
					8-Sep	1010	f	56
					8-Sep	1715	f	55
					8-Sep	1715	m	69
					8-Sep	1715	m	62
					8-Sep	1715	f	59
					8-Sep	1715	m	66
					8-Sep	1715	f	58
					8-Sep	1715	f	56
					8-Sep	1715	m	67
					8-Sep	1715	f	64
					8-Sep	1715	m	55
					8-Sep	1715	f	58
					8-Sep	1715	f	55
					8-Sep	1715	f	58
					8-Sep	1715	m	68
					8-Sep	1715	f	64
					8-Sep	1715	m	70
					8-Sep	1715	f	60
					8-Sep	1715	f	64
					9-Sep	1040	m	68
					9-Sep	1040	m	57
					9-Sep	1040	m	63

Lower Fence					Upper Fence			
Date	Time	# m	# f	Total	Date	Time	Sex	Fork Length (cm)
					9-Sep	1040	m	69
					9-Sep	1040	m	60
					9-Sep	1040	m	60
					9-Sep	1040	m	57.5
					9-Sep	1040	m	58.5
					9-Sep	1040	f	57
					9-Sep	1040	f	58
					9-Sep	1040	f	59.5
					9-Sep	1040	f	54.5
					9-Sep	1040	f	57.5
					9-Sep	1040	f	53
					9-Sep	1040	f	56.5
					9-Sep	1040	f	57.5
					9-Sep	1700	m	64
					9-Sep	1700	m	58.5
					9-Sep	1700	f	63
					9-Sep	1700	m	66
					9-Sep	1700	f	54.5
					9-Sep	1700	f	54.5
					9-Sep	1700	f	57
					9-Sep	1700	m	67.5
					9-Sep	1700	f	54
					9-Sep	1700	f	65.5
					9-Sep	1700	f	64
					9-Sep	1700	m	67.5
					9-Sep	1700	m	57
					9-Sep	1700	f	67.5
					9-Sep	1700	f	52
					9-Sep	1700	m	60.5
					9-Sep	1700	m	62
					9-Sep	1700	f	57
					9-Sep	1700	m	67
					9-Sep	1700	f	68
					9-Sep	1700	f	53
					9-Sep	1700	f	63.5
					9-Sep	1700	f	58
					9-Sep	1700	f	58
					9-Sep	1700	m	58.5
					9-Sep	1700	f	57
					9-Sep	1700	f	59
					9-Sep	1700	m	67.5
					9-Sep	1700	f	53
					9-Sep	1700	m	66
					9-Sep	1700	f	56.5
					9-Sep	1700	m	50.5
					9-Sep	1700	m	66.5
					9-Sep	1700	f	59
					9-Sep	1700	f	56.5
					9-Sep	1700	f	55
					9-Sep	1700	f	56.5
					9-Sep	1700	m	67
					9-Sep	1700	f	61.5
					9-Sep	1700	f	54.5
					9-Sep	1700	m	65.5
					9-Sep	1700	m	71.5
					9-Sep	1700	f	52
					9-Sep	1700	f	57.5

Lower Fence					Upper Fence				
Date	Time	# m	# f	Total	Date	Time	Sex	Fork Length (cm)	
					9-Sep	1700	f	59	
					9-Sep	1700	f	61	
					9-Sep	1700	f	52.5	
					9-Sep	1700	m	69	
					9-Sep	1700	f	53.5	
					9-Sep	1700	f	60	
					10-Sep	945	m	64	
					10-Sep	945	m	66.5	
					10-Sep	945	f	56	
					10-Sep	945	m	65.5	
					10-Sep	945	m	53.5	
					10-Sep	945	f	55.5	
					10-Sep	945	m	56.5	
					10-Sep	945	f	63	
					10-Sep	945	m	60	
					10-Sep	945	f	55	
					10-Sep	945	f	57	
					10-Sep	945	f	64	
					10-Sep	945	f	54.5	
					10-Sep	945	f	51	
					10-Sep	945	m	60.5	
					10-Sep	945	f	55.5	
					10-Sep	945	f	56	
					10-Sep	945	m	56	
					10-Sep	945	m	60	
					10-Sep	945	m	64.5	
					10-Sep	945	f	59	
					10-Sep	945	f	60	
					10-Sep	945	f	58	
					10-Sep	945	f	56	
					10-Sep	945	m	59	
					10-Sep	945	f	56	
					10-Sep	945	m	63	
					10-Sep	945	f	55	
					10-Sep	945	m	66	
					10-Sep	945	f	54	
					10-Sep	945	f	61.5	
					10-Sep	945	f	53	
					10-Sep	945	m	61	
					10-Sep	945	f	56.5	
					10-Sep	945	f	63.5	
					10-Sep	945	m	64.5	
					10-Sep	945	m	68	
					10-Sep	945	f	56	
					10-Sep	945	m	57.5	
					10-Sep	945	m	56.5	
					10-Sep	945	f	59	
					10-Sep	945	m	68	
					10-Sep	945	f	54	
					10-Sep	945	f	54	
					10-Sep	945	f	56	
					10-Sep	945	f	55	
					10-Sep	945	f	59.5	
					10-Sep	945	f	57	
					10-Sep	945	f	62	
					10-Sep	945	m	61	
					10-Sep	945	f	54	

Lower Fence					Upper Fence			
Date	Time	# m	# f	Total	Date	Time	Sex	Fork Length (cm)
					10-Sep	945	f	55
					10-Sep	945	f	57
					10-Sep	945	f	61
					10-Sep	945	f	53.5
					10-Sep	945	f	62.5
					10-Sep	945	f	58.5
					10-Sep	945	f	55
					10-Sep	945	f	57
					10-Sep	945	f	55.5
					10-Sep	945	f	55.5
					10-Sep	1700	f	60
					10-Sep	1700	f	58
					10-Sep	1700	f	56
					10-Sep	1700	f	56.5
					10-Sep	1700	f	64
					10-Sep	1700	f	57
					10-Sep	1700	m	57.5
					10-Sep	1700	f	55
					10-Sep	1700	m	55
					10-Sep	1700	f	54
					10-Sep	1700	f	58.5
					10-Sep	1700	f	54
					10-Sep	1700	f	59
					10-Sep	1700	f	55.5
					10-Sep	1700	f	57
					10-Sep	1700	f	62
					10-Sep	1700	m	59
					10-Sep	1700	f	59
					10-Sep	1700	f	57.5
					10-Sep	1700	f	58.5
					10-Sep	1700	f	58.5
					10-Sep	1700	m	62.5
					10-Sep	1700	f	58
					10-Sep	1700	f	54
					10-Sep	1700	m	70.5
					10-Sep	1700	m	59
					10-Sep	1700	f	64.5
					10-Sep	1700	f	53
					10-Sep	1700	m	62
					10-Sep	1700	f	54.5
					10-Sep	1700	m	54.5
					10-Sep	1700	f	65
					11-Sep	1000	m	61.5
					11-Sep	1000	f	55
					11-Sep	1000	f	54.5
					11-Sep	1000	f	51.5
					11-Sep	1000	m	68.5
					11-Sep	1000	f	61.5
					11-Sep	1000	m	58
					11-Sep	1000	m	64.5
					11-Sep	1000	f	56.5
					11-Sep	1000	f	57
					11-Sep	1000	f	60.5
					11-Sep	1000	m	58.5
					11-Sep	1000	f	58.5
					11-Sep	1000	f	54.5
					11-Sep	1000	f	65.5

Lower Fence					Upper Fence			
Date	Time	# m	# f	Total	Date	Time	Sex	Fork Length (cm)
					11-Sep	1000	m	67
					11-Sep	1000	f	54.5
					11-Sep	1000	f	55.5
					11-Sep	1000	f	55
					11-Sep	1700	f	52.5
					11-Sep	1700	f	60
					12-Sep	945	f	60.5
					12-Sep	945	m	54
					12-Sep	1700	m	66
					12-Sep	1700	m	66
					12-Sep	1700	m	54
					13-Sep	940	f	56
					13-Sep	940	f	55
					13-Sep	940	f	57
					13-Sep	940	f	56.5
					13-Sep	940	f	54
					13-Sep	940	f	58
					13-Sep	940	m	66
					13-Sep	940	m	69.5
					13-Sep	940	f	58
					13-Sep	940	f	57.5
					13-Sep	940	f	54.5
					13-Sep	940	m	64
					13-Sep	940	f	57
					13-Sep	940	m	57
					13-Sep	940	f	57
					13-Sep	940	f	54
					13-Sep	940	m	69.5
					13-Sep	940	f	62
					13-Sep	940	f	56
					13-Sep	940	m	69
					13-Sep	940	f	64
					13-Sep	940	f	54
					13-Sep	940	f	62.5
					13-Sep	940	f	54
					13-Sep	940	m	66.5
					13-Sep	940	f	54
					13-Sep	940	f	53.5
					13-Sep	940	f	55
					13-Sep	940	f	56.5
					13-Sep	940	m	59
					13-Sep	940	m	59
					13-Sep	940	f	57.5
					13-Sep	940	f	58.5
					13-Sep	1720	f	54.5
					13-Sep	1720	f	63
					13-Sep	1720	m	55
					13-Sep	1720	f	54
					13-Sep	1720	m	58
					13-Sep	1720	f	49
					13-Sep	1720	m	68
					13-Sep	1720	f	61
					13-Sep	1720	f	55.5
					13-Sep	1720	m	through the wire
					14-Sep	920	f	57.5
					14-Sep	920	f	57
					14-Sep	920	m	66

Lower Fence					Upper Fence			
Date	Time	# m	# f	Total	Date	Time	Sex	Fork Length (cm)
					14-Sep	920	f	56
					14-Sep	920	m	62
					14-Sep	920	f	55.5
					14-Sep	920	m	59
					14-Sep	920	f	56
					14-Sep	920	m	56
					14-Sep	920	f	57
					14-Sep	920	f	56
					14-Sep	920	f	63
					14-Sep	920	f	53
					14-Sep	920	f	53.5
					14-Sep	920	f	58
					14-Sep	920	m	66
					14-Sep	920	f	54
					14-Sep	920	f	57.5
					14-Sep	920	f	53.5
					14-Sep	920	m	59.5
					15-Sep	1000	f	56
					15-Sep	1000	f	62
					15-Sep	1000	f	53
					15-Sep	1000	m	67.5
					15-Sep	1000	f	67
					15-Sep	1715	m	68
					15-Sep	1715	f	62.5
					15-Sep	1715	f	56
					15-Sep	1715	m	?
					15-Sep	1715	m	61
					15-Sep	1715	f	55
					16-Sep	1105	m	57
					16-Sep	1105	f	53
					16-Sep	1105	f	65
					16-Sep	1105	f	52.5
					16-Sep	1105	f	51.5
					16-Sep	1725	f	54.5
					17-Sep	955	m	56.5
					17-Sep	955	f	64
					18-Sep			no fish
					19-Sep	1010	f	56
					19-Sep	1010	f	56
					19-Sep	1010	f	63
					19-Sep	1010	f	53.5
					20-Sep	1000	f	53
					20-Sep	1800	f	53
					21-Sep	940	m	60
					21-Sep	1720	f	61.5
					21-Sep	1720	f	57
					21-Sep	1720	m	65.8
					21-Sep	1720	m	65
					21-Sep	1720	m	63
					21-Sep	1720	f	63.5
					21-Sep	1720	f	63
					21-Sep	1720	f	56
					21-Sep	1720	m	56
					21-Sep	1720	f	54
					22-Sep	945	f	63
					22-Sep	945	f	55
					22-Sep	945	m	68

Lower Fence					Upper Fence			
Date	Time	# m	# f	Total	Date	Time	Sex	Fork Length (cm)
					23-Sep	1740	m	66.5
					23-Sep	1740	m	58
					23-Sep	1740	m	67
					24-Sep	930	f	58.5
					24-Sep	930	f	56.5
					24-Sep	930	f	56
					24-Sep	930	f	54
					24-Sep	930	f	57
					24-Sep	930	f	53.5
					24-Sep	930	f	65
					24-Sep	930	f	57
					25-Sep	1015	m	57.5
					25-Sep	1015	m	58
					25-Sep	1015	f	60.5
					25-Sep	1015	f	53
					25-Sep	1015	f	64
					25-Sep	1015	f	64
					25-Sep	1015	f	56
					25-Sep	1015	f	54
					25-Sep	1730	m	60
					25-Sep	1730	m	58
					26-Sep	950	f	56.5
					26-Sep	950	f	52
					27-Sep	1020	f	61
					27-Sep	1020	f	63.5
					27-Sep	1020	f	63
					27-Sep	1020	m	67
					27-Sep	1020	m	56
					27-Sep	1020	m	58.5
					27-Sep	1020	f	59.5