# Enumeration of Adult Steelhead in the Upper Sustut River 1995 

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#### 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 $=4 \mathrm{~d}$, mode $=1 \mathrm{~d}$ ). 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 $=82.6 \mathrm{~cm}$ ) 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 $20000 \mathrm{~km}^{2}$ 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 lengthfrequency 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 $=1 \mathrm{~d}$, median $=4 \mathrm{~d}$, 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 $1.0 \mathrm{~km} / \mathrm{d}$.


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 $9^{\circ} \mathrm{C}$ 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 $(\mathrm{n}=262)$ 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 $=82.6 \mathrm{~cm}$ ) was significantly larger than the mean fork length of female steelhead (mean $=74.6 \mathrm{~cm}$; 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 female ${ }^{1}$ 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 | $\mathbf{N}(\%)^{1}$ | Mean FL (cm) | Standard Error | Range (cm) |
| :---: | :---: | :---: | :---: | :---: |
| Females |  |  |  |  |
| $\mathbf{1 9 9 2}$ | $198(80.2)$ | 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 | $\mathbf{2 6 2 ( 5 5 . 2 )}$ | $\mathbf{7 4 . 6}$ | $\mathbf{0 . 3 0 7}$ | $\mathbf{5 8 - 9 0}$ |
| Males |  |  |  |  |
| $\mathbf{1 9 9 2}$ | $49(19.8)$ | 77.6 | 0.663 | $69-91$ |
| 1993 | $75(35.7)$ | 85.8 | 0.627 | $53-94$ |
| 1994 | $51(36.7)$ | 82.9 | 0.748 | $71-99$ |
| $\mathbf{1 9 9 5}$ | $\mathbf{2 1 3 ( 4 5 )}$ | $\mathbf{8 2 . 6}$ | $\mathbf{0 . 3 8 1}$ | $\mathbf{7 1 - 1 0 0}$ |

${ }^{1}$ Indicates the percentage of females and males in each sample for each year.

[^0]
### 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 |  | 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 | , | 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 |

[^1]
### 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 $1995(1.0 \mathrm{~km} / \mathrm{d})$ 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; $7 \mathrm{~km} / \mathrm{d}$ ), by Spence and Hooton (1992; 10.4 to $20.2 \mathrm{~km} / \mathrm{d}$ ) and by Koski et al. (1995; 14.4 to $15.3 \mathrm{~km} / \mathrm{d}$ ). Similar low migration rates in the upper Sustut River for 1995 and 1986 (Spence et al. 19990) 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.
4. 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.
5. 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.
6. All steelhead passing through the fence should be identified for sex and measured for fork length, provided they are Floy tagged.
7. 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.
8. Otoliths should be removed for aging analysis from all dead trout and char that are recovered at the fence.

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### 8.0 Literature Cited

Beere, M.C. 1991. Steelhead migration behaviour and timing as evaluated from radio tagging at the Skeena River test fishery, 1989. British Columbia Ministry of Environment, Lands and Parks. Fisheries Branch. Skeena Fisheries Report SK\#69.

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

Bustard, D. 1994. Steelhead spawning studies in the upper Sustut River 1993. Unpublished manuscript prepared for British Columbia Ministry of Environment, Lands and Parks. Smithers, B.C.

Chudyk, W.E. 1978. Suskwa River steelhead trout: the 1977 inventory, creel survey and life history characteristics study leading to the removal of a barrier on Harold-Price Creek. British Columbia Ministry of Environment, Lands and Parks. Fish and Wildlife Branch. Skeena Fisheries Report SK\#15.

Chudyk, W.E. and M.R. Whately. 1980. Zymoetz and Clore River steelhead trout: a report on the 1978 and 1979 sport fishery and some aspects of their life history. British Columbia Ministry of Environment, Lands and Parks. Fish and Wildlife Branch. Skeena Fisheries Report SK\#27.

De Leeuw, A.D. 1986a. Mamin River steelhead: a study on a limited tagging study undertaken during winter, 1984. British Columbia Ministry of Environment, Lands and Parks. Fisheries Branch. Skeena Fisheries Report SK\#54.

De Leeuw, A.D. 1986b. Deena Creek steelhead: some aspects of their life history, population size and sport fishery, spring 1983. British Columbia Ministry of Environment, Lands and Parks. Fisheries Branch. Skeena Fisheries Report SK\#53.

De Leeuw, A.D. 1987. Yakoun River steelhead: some aspects of their life history, population size and sport fishery, 1982-83. British Columbia Ministry of Environment and Parks. Fish and Wildlife Branch. Skeena Fisheries Report SK\#55.

Koski, W.R., R.F. Alexander and K.K. English. 1995. Distribution, timing, fate and numbers of coho salmon and steelhead returning to the Skeena watershed in 1994. Report by LGL Limited, Sidney, B.C., for Fisheries Branch, British Columbia Ministry of Environment, Lands and Parks, Victoria, B.C.

Lough, M.J. 1981. Commercial interceptions of steelhead trout in the Skeena River--radio telemetry studies of stock identification and rates of migration. British Columbia Ministry of Environment, Lands and Parks. Fish and Wildlife Branch. Skeena Fisheries Report SK\#32.

Lough, M.J. and M.R. Whately. 1984. A preliminary investigation of Kitsumkalum River steelhead trout, 1980-81. British Columbia Ministry of Environment, Lands and Parks. Fisheries Branch. Skeena Fisheries Report SK\#38.

Narver, D.W. 1969. Age and size of steelhead trout in the Babine River, British Columbia. Journal of the Research Board of Canada. 26:2754-2760.

O'Neill, M.J. and M.R. Whately. 1984. Bulkley River steelhead trout: a report on angler use, tagging, and life history studies conducted in 1982 and 1983. British Columbia Ministry of Environment, Lands and Parks. Fisheries Branch. Skeena Fisheries Report SK\#43.

Ott, R.L. 1993. An Introduction to statistical methods and data analysis. Duxbury Press. Belmont, California. 1051 p.

Saimoto, R.S. 1994. Enumeration of adult steelhead in the upper Sustut River 1993. British Columbia Ministry of Environment, Lands and Parks. Smithers, B.C., Skeena Fisheries Report Series SK\#87.

Saimoto, R.K. 1995. Enumeration of adult steelhead in the upper Sustut River 1994. Unpublished Manuscript prepared for British Columbia Ministry of Environment, Lands and Parks. Smithers, B.C.

Scott, W.B. and E.J. Crossman. 1973. Freshwater fishes of Canada. Fisheries Research Board of Canada, Bulletin 184, Ottawa, Ontario.

Snyder, B. 1996. (Personal Communication; Fisheries Biologist, Fisheries and Oceans Canada; 555 West Hastings Street, Vancouver, B.C.)

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 Series SK\#64.

Spence, C.R. and R.S. Hooton. 1992. Rates of movement of steelhead trout to and within the Skeena River, 1988. British Columbia Ministry of Environment, Lands and Parks, Smithers, B.C.

Whately, M.R. 1977. Kispiox River steelhead trout: the 1975 sport fishery and life history characteristics from anglers' catches. British Columbia Ministry of Recreation and Conservation. Skeena Fisheries Report SK\#10.

Whately, M.R. 1978. Babine steelhead: a future. British Columbia Fish and Wildlife Branch. Skeena Fisheries Report SK\#17.

Whately, M.R. and W.E. Chudyk. 1979. An estimate of the number of steelhead trout spawning in Babine River near Babine Lake, spring, 1978. British Columbia Fish and Wildlife Branch. Skeena Fisheries Report SK\#23.

Whately, M.R., W.E. Chudyk and M.C. Morris. 1978. Morice River Steelhead trout: the 1976 and 1977 sport fishery and life history characteristics from anglers' catches. British Columbia Ministry of Environment, Lands and Parks. Fish and Wildlife Branch. Skeena Fisheries Report SK\#14.

Zar, J.H. 1984. Biostatistical analysis. 2nd edition. Prentice-Hall Inc., New Jersey, 718 p.

## 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.

|  | Steelhead |  | Sockeye |  | Coho |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Date | Daily | Cumulative | Daily | Cumulative | Daily | Cumulative | Other |
| 8-Aug | 2 | 2 |  |  |  |  |  |
| 11-Aug | 1 | 3 |  |  |  |  |  |
| 16-Aug | 1 | 4 |  |  |  |  |  |
| 17-Aug | 1 | 5 |  |  |  |  |  |
| 18-Aug | 4 | 9 |  |  |  |  |  |
| 19-Aug | 2 | 11 |  | Sockey | e and cond | ho data |  |
| 20-Aug | 3 | 14 |  |  |  |  |  |
| 21-Aug | 1 | 15 |  | not av | vailable | rior to |  |
| 22-Aug | 1 | 16 |  |  |  |  |  |
| 23-Aug | 2 | 18 |  |  | August |  |  |
| 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 - 1 rainbow 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 | 2Dollys |
| 15-Sep | 8 | 383 | 7 | 1087 | 0 | 15 | 3Dollys |
| 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 |  |


|  | Steelhead |  | Sockeye |  | Coho |  | Other |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Date | 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 | 1 rainbow |
| 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 |  | Sockey | and | ho data |  |
| 4-Oct | 3 | 472 |  |  |  |  |  |
| 5-Oct | 0 | 472 |  |  | availab | for |  |
| 6-Oct | 4 | 476 |  |  |  |  |  |
| 7-Oct | 0 | 476 |  | Septembe | 30 to | ctober 14. |  |
| 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 |  |  |  |  |  |

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

|  | Steelhead |  | Sockeye |  | Coho |  | Other |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Date | 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 1whitefish |
| 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 | $\begin{aligned} & 1 \text { dead rainbow - } \\ & 2 \text { Dolly } \end{aligned}$ |
| 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 |
| $5-\mathrm{Sep}$ | 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.

|  | Air Temp (C) |  | Precipitation |  |
| :---: | :---: | :---: | :---: | :--- |
| Date | Min | Max | (mm) | . Weather |
| 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 |
| 3-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 | c057070 | 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 | c057110 | sbk4337-2 |
| 23 Aug | 900 | m | 81.5 | orange | c | c057120 | 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 | c057170 | 4337-8 |
| 25 Aug | 845 | f | 74.0 | orange | c | c057180 | 4337-9 |
| 25 Aug | 1445 | f | 73.0 | orange | c | c05719 0 | 4337-10 |
| 25 Aug | 1545 | f | 74.0 | orange | c | c057210 | 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. <br> 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 | c057530 |  |
| 31 Aug | 2045 | f | 74.0 | orange | C | c05754 0 | dead on fence Sept. 1 |
| 31 Aug | 2045 | m | 78.0 | orange | c | c057550 |  |
| 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 | c057620 |  |
| 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. <br> Length (cm) | Tag Colour | Tag Letter | Tag Number | Comments |
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| 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 | c058480 | 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 | c058520 |  |
| 4 Sep | 1845 | f | 82.5 | orange | c | c05854 0 |  |
| 4 Sep | 1845 | m | 85.0 | orange | c | c058550 | 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 | c058570 | 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 | c071770 | 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 | c058780 | 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 | c059010 |  |
| 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 | c059670 |  |
| 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. <br> 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 | taggin | g gun jam | med 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 |  |


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| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 8 Sep | 1810 | $f$ | 74.0 | orange | C | c6036 0 |  |
| 8 Sep | 1810 | f | 74.5 | blue |  | blue MOE ta | g 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. <br> 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 MO | E \# 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 ta | g \#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 | c61410 |  |
| 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 Date |  |  |  |  | Tag Colour | Tag Letter | Tag Number | Tagging |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | Time | Sex | Length (cm) | Recovered |  |  |  | Month | Day | Time (hrs) | Time <br> (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 | $\underbrace{$ Fork  <br>  Length  <br> $(\mathrm{cm})$} |  | Recovered | Tag Colour | Tag Letter | Tag Number | Tagging |  | Time (hrs) | Travel Time (d) |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  |  | 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 los | is tag |  |
| 9 Sep | 1700 |  |  |  | orange | c | 5867 | mort on u | upper fe |  |  |
| 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 SexFork <br> Length <br> $(\mathrm{cm})$ |  |  | Recovered | Tag Colour | Tag Letter | Tag Number | Tagging |  | Time (hrs) | Travel Time (d) |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  |  | 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 | Fork <br> Length <br> Sex (cm) |  | Recovered | Tag Colour | Tag Letter | Tag Number | Tagging |  | Time (hrs) | Travel Time (d) |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  |  | 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 re | cord of | it throug | ence |
| 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 eviden | nce of $p$ | evious t | ging |
| 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 | d of fish | through | ver 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 |  |  |  |  | Tag Colour | Tag Letter | Tag Number | Tagging |  | Travel |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | Time | Sex | Length (cm) | Recovered |  |  |  | Month | Day | Time (hrs) | Time <br> (d) |
| 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 | er fence |

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

| Date | Time (hrs) | Sex | Fork Length (cm) | Weight <br> (kg) | Genetic Scale (\#) | Age Scale (\#) | Tag Colour | Tag <br> Number | DNA <br> Sample <br> Number | Comments |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 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 ta | 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.

| Date | Lower Fence |  |  | Total | Upper Fence |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | Time | \# m | \# f |  | 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 | 595 |
| 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 |  | 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 |  | 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 |  | 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 |  | 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 |  | 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 |


[^0]:    ${ }^{1}$ 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).

[^1]:    *This steelhead was radiotracked at Bear River Confluence on the date of 950823.

