

Coho Spawning Escapements to Louis and Lemieux Creeks (North Thompson River), 1995 to 1998

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LEMIEUX CREEKS (NORTH THOMPSON RIVER), 1995 TO 1998

by

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ABSTRACT

Irvine, J. R., M. K. Farwell, A. E. Tisdale, and L. C. Walther. 2000. Coho spawning escapements to Louis and Lemieux creeks (North Thompson River), 1995 to 1998. Can. Manuscr. Rep. Fish. Aquat. Sci. 2521: 76 p.

Adult coho spawner numbers in Louis and Lemieux creeks, tributaries to the North Thompson River, were estimated in 1995 through 1998 using the Petersen mark-recovery method. Adult coho escapement estimates by year were: 750 to Louis Creek and 1002 to Lemieux Creek in 1995; 284 to Louis Creek and 188 to Lemieux Creek in 1996; 193 to Louis Creek and 525 to Lemieux Creek in 1997; and, 195 to Louis Creek and 605 to Lemieux Creek in 1998. No significant systematic biases were detected. Estimates of the escapement of adipose fin clipped within the total spawning escapements were also determined.

RÉSUMÉ

Irvine, J. R., M. K. Farwell, A. E. Tisdale, and L. C. Walther. 2000. Coho spawning escapements to Louis and Lemieux creeks (North Thompson River), 1995 to 1998. Can. Manuscr. Rep. Fish. Aquat. Sci. 2521: 76 p.

De 1995 à 1998, le nombre de cohos géniteurs adultes dans les criques Louis et Lemieux, affluents de la Thompson Nord, a été évalué à l'aide de la méthode Petersen de récupération des marques. Les estimations annuelles de l'échappée de cohos adultes s'établissent comme suit : 750 vers le crique Louis et 1 002 vers le crique Lemieux en 1995; 284 vers le crique Louis et 188 vers le crique Lemieux en 1996; 193 vers le crique Louis et 525 vers le crique Lemieux en 1997, et finalement, 195 vers le crique Louis et 605 vers le crique Lemieux en 1998. Aucun biais systématique important n'a été décelé. On a également estimé la proportion d'échappées de saumons marqués par ablation de la nageoire adipeuse dans l'échappée totale de géniteurs.

INTRODUCTION

The North Thompson River and many of its tributaries support populations of coho salmon (*Oncorhynchus kisutch*). Coho in two tributaries to the North Thompson, Louis and Lemieux creeks, have been assessed since 1993 (Atagi *et al.* 1999). This report documents the 1995 through 1998 adult escapement enumeration projects for Louis and Lemieux creek coho.

STUDY AREA

The North Thompson River flows east from its origins in the Caribou Mountains, and drains an area approximately 13,200 km² before joining with the South Thompson River at Kamloops, British Columbia (Fig. 1). The mean annual flow of the North Thompson River, as measured at McLure, is approximately 452 m³/s with an average 7 day low flow, based on a 30 year record, of 57.7 m³/s (Sigma Engineering Ltd. 1991).

Louis and Lemieux creeks are in the southern portion of the North Thompson watershed and characterized by moderate to low gradients with headwaters originating in the lower elevations of the Shuswap Highlands (Stewart *et al.* 1983). Louis Creek flows approximately 66 km north to join the east side of the North Thompson River at the settlement of Louis Creek (Fig. 1). Lemieux Creek originates near Mount Heger (elevation 2000 m) and flows 33 km in a southerly direction before merging on the west side of the North Thompson River approximately 100 km north of Kamloops at the settlement of Little Fort.

LOUIS CREEK

Louis Creek drains an area of 512 km² including six main tributaries: Fraser, Fadear, Cahilty, McGillivray, Christian, and Dominion creeks (Fig. 2). Significant flow has been noted in four of these streams (Fadear, Cahilty, McGillivray, and Christian) but high gradients limit their contribution to the coho spawning and rearing potential of the system. Most salmon spawning and rearing occurs in the Louis Creek mainstem, particularly downstream of Dominion Creek.

The majority of Louis Creek is a meandering, single channel bordered by agricultural land. Extensive agricultural and recreational use of Louis Creek has resulted in silting and streambank erosion in some areas (Berry and Kahl 1982). Louis Creek has an average wetted width of 8 m, a mean depth of 50 cm and is accessible from the north through Louis Creek Road and by the Heffley Creek Road to the west. A permanent adult fence structure exists approximately 10 km upstream of the confluence of Louis Creek with the North Thompson River. The Louis Creek mainstem has been divided into three sections:

Lower

From the adult fence upstream to the confluence of Fadear Creek. This section of stream has an average gradient of 1.5%, and consists mainly of large boulder/cobble substrate with limited spawning gravel in the sidechannel areas. There are several large debris jams in

this section that provide excellent coho juvenile rearing habitat. Much of the riparian habitat is still intact along either bank.

Middle

From the confluence of Fadear Creek upstream to the confluence of Cahilty Creek. Cattle heavily graze much of the riparian vegetation and bank erosion is common. This section of stream is low gradient (<1%) with a predominantly compacted sand and fines substrate. The limited spawning area has little cover and eagle predation on spawning fish is common. Juvenile coho occur mainly in areas with large woody debris and/or debris jams.

Upper

Upstream of the confluence of Cahilty Creek. This section has slightly higher gradient (1%) but a substrate similar to that in the middle section. Grazing cattle have impacted the riparian habitat. There are good areas of spawning gravel in this section; however, downstream of McGillivray the gravel is cemented by fine sediments. In some years, access to the area upstream of McGillivray Creek has been limited by beaver activity. Good juvenile rearing habitat is found throughout this section.

LEMIEUX CREEK

The drainage area of Lemieux Creek encompasses 282 km², including Taweel Lake and three main tributaries: Eakin, Nehalliston, and Demers creeks (Fig. 3). Lemieux Creek has abundant sidechannel habitat, a gravel and cobble substrate, numerous beaver dams, and abundant large woody debris (Hutton *et al.* 1983). Much of the valley surrounding the lower reaches of Lemieux Creek has been cleared for agricultural use (Stewart *et al.* 1983).

The majority of the mainstem is easily accessible from Highway 24 and Lemieux Creek Road. A waterfall at km 12.5 makes the upper reaches of the creek inaccessible to anadromous fish. A permanent adult fence structure exists near the Highway 24 bridge crossing, about 1.5 km upstream of the confluence with the North Thompson River.

The portion of Lemieux Creek accessible to salmon has been divided into three:

Lower

From the adult fence upstream to the confluence of Eakin Creek. The lower section consists of a deep main channel with several sidechannels. Spawning and rearing potential in this section is limited (Hutton *et al.* 1983). This lower section has an average gradient of less than 1%, is 8-10 m wide, a sand and gravel substrate, and minimal cover.

Middle

From the confluence of Eakin Creek upstream to the confluence of Nehalliston Creek. This section has an average gradient of 1.5% and the stream substrate consists mainly of cobbles and boulders in the lower portion and cobbles and gravel higher up. Portions of this

section are braided. Areas with beaver dams or logjams have created channel widths of up to 20 m (Hutton *et al.* 1983). Rearing and spawning habitat are relatively abundant.

Upper

From the confluence of Nehalliston Creek upstream to the falls. The area adjacent to the outlet of Demers Creek has silt and sand substrate while the remainder of the section has a cobble and gravel substrate with sections of pools and riffles. Salmon rearing potential and spawning activity is concentrated in the lower portion of this section (Stewart *et al.* 1983).

FIELD METHODS

ADULT COHO CAPTURE

Coho were captured at fences in the lower portions of both Lemieux and Louis creeks. Both fences were constructed of 2.4 m long aluminum channel panels with 1.2 m high, 2.5 cm diameter aluminum dowels. The panels were attached to wooden bulkheads on either shoreline and rested on a 1 m wide wooden sill. All panels were supported at 1 m intervals with 1.6 cm re-bar pounded into the substrate. A holding box was also constructed of aluminum panels and had a removable, lockable lid which was fitted with a 10 cm wide opening.

The Louis Creek fence operated from October 14 to December 24 in 1995, September 29 to January 6 in 1996/1997, September 29 to December 22 in 1997, and September 29 to December 22 in 1998. The Lemieux Creek fence was in operation between October 9 and January 9 in 1995/1996, September 29 and January 6 in 1996/1997, October 1 and January 15 in 1997/1998, and September 29 and January 13 in 1998/1999. Most captured fish were Petersen disk tagged (described below) and released immediately upstream of the fences. Others were removed by the Dunn Creek Hatchery facility operators as brood stock, while a small number died at the fence.

DISK TAG CAPTURE

Coho adults were Petersen disc tagged in a wooden tray (10 cm X 10 cm X 100 cm) constructed with a flexible material bottom and a meter stick recessed along one side. The tags consisted of two 2.2 cm diameter laminated cellulose acetate disks and one 0.7 cm diameter transparent plastic buffer disk threaded through centrally punched holes onto a 7.7 cm long nickel pin. The pin was inserted with pliers through the musculature and pterygiophore bones approximately 1.2 cm below the anterior portion of the dorsal fin insertion. The disc tags, arranged with one on each side of the fish and with a buffer disk on the pinhead side, were secured by twisting the pin into double knot. One disk per pair was numbered with a unique code.

Each disk tagged fish received a secondary mark to allow the assessment of disk tag loss. Females were given a single 0.7 cm diameter hole through the left operculum using a paper punch. Males received two holes. Care was taken to avoid gill tissue damage.

Date of capture, disk tag number, fork (NF) length (to the nearest 0.5 cm), sex, and adipose fin status were recorded for each fish released with a disk tag. Release condition was categorized as 1 (swam away vigorously), 2 (swam away sluggishly), or 3 (required ventilation).

SPAWNING GROUND SURVEYS

Weekly stream surveys were conducted in Louis and Lemieux creeks from mid-October to mid-January. A two person crew conducted a complete survey of the upper, middle, and lower sections of each creek, generally three times a week.

Carcasses were sampled and recorded by date, location, sex (confirmed by abdominal incision), and mark type (disk tag, secondary mark, or absent adipose fin). Heads were removed from coho with absent adipose fins (AFC) for later coded wire tag (CWT) identification. Every carcass was sampled, cut in two with a machete, and returned to the river. Sample data included a scale sample, postorbital-hypural plate (POH) length (to the nearest 0.5 cm), sex, and female spawning completion (0%, 50% or 100 % spawned). AFC condition was recorded as 1 (complete = flush with dorsal surface), 2 (partial = nub present), or 3 (questionable = appeared clipped but fungus or decomposition obscured area). The condition of carcasses was recorded as 1 (fresh = gill red) 2 (fresh = gill mottled), 3 (moderately fresh = gills white, body firm) or 4 (rotten = body barely intact, flesh soft) and the absence of one or both eyes was recorded.

ANALYTIC PROCEDURES

TESTS FOR SAMPLING SELECTIVITY

Temporal, spatial, sex, and size biases in the disk tag application and spawning ground recovery portions of the study were assessed to determine if sampling was non-random. Selective sampling, if detected, was corrected by stratifying the sample or removal of the atypical data from further analyses.

Period

Temporal biases in the application and recovery samples were assessed using chi-square tests (Sokal and Rohlf 1981). Application bias was examined by comparing, among periods, marked and unmarked portions of the recovery sample with their respective expected values. Mark incidences were based on the presence of either a disk tag or a secondary mark.

Recovery bias was examined by stratifying the application sample by period and comparing recovered and unrecovered portions with their respective expected values. Mark recoveries were based on the presence of a disk tag from a known application period.

Location

Spatial bias in the application sample was assessed using a chi-square test. Application bias was assessed by comparing the marked and unmarked components of the recovery sample stratified by river section with the expected values. Mark incidences were based on the presence of either a disk tag or a secondary mark.

All marks were applied at the fences; therefore, recovery sample bias could not be assessed.

Fish Size

Size related biases were assessed with a Kolmogorov-Smirnov two-sample test (Sokal and Rohlf 1981). Application biases were examined by comparing the POH length frequency distributions of marked and unmarked spawning ground recoveries.

Recovery sample biases were examined by partitioning the application sample into recovered and non-recovered components and comparing the NF length frequency distributions.

Fish Sex

Sex related biases were assessed using the chi-square test. Application bias was examined by comparing the sex ratio of the marked and unmarked spawning ground recoveries with their respective expected values.

Recovery bias was examined by partitioning the application sample into recovered and non-recovered components and comparing the sex composition in each with the expected values.

ESCAPEMENT ESTIMATION

Total Escapement

The 1995 through 1998 escapements of Louis and Lemieux creek coho were calculated from the mark-recovery data using the Petersen formula (Chapman modification) (Ricker 1975). In each year, escapement was the sum of escapement by sex:

- 1) Estimated coho escapement for each system (N_t):

$$N_t = N_m + N_f$$

where:

$$\begin{aligned} N_m &= \text{estimated escapement of adult males;} \\ &= \frac{(M_m + 1)(C_m + 1)}{(R_m + 1)} - 1 \end{aligned}$$

N_f = estimated escapement of females, analogous to above.

2) Estimated 95% confidence limits of N_t :

$$N_t \pm 1.96\sqrt{v_t}$$

where:

v_t = variance of the escapement estimate;
 $= v_m + v_f$
 v_m = variance of the adult male escapement estimate;
 $= \frac{(N_m^2)(C_m - R_m)}{(C_m + 1)(R_m + 2)}$
 C_m = number of adult male carcasses examined for disk tags;
 R_m = number of disk tagged/secondary marked adult males recovered; and
 v_f = variance of female escapement estimate, analogous to above.

Sex Identification Correction

The disk tag application data were corrected for errors that occurred in sex identification during tagging. Sex identification error was corrected as described by Staley (1990):

3) Estimated true number of males released with disk tags and secondary marks (M_m):

$$M_m = \frac{M_m^* - (M_t R_{m,f}) / R_f}{1 - (R_{m,f} / R_f) - (R_{f,m} / R_m)}$$

where:

M_m^* = field estimate of number of males released with disk tags and secondary marks;
 M_t = total number of coho adults released with disk tags and secondary marks;
 $R_{m,f}$ = number of females recovered with disk tags which were released as males;
 R_f = number of females recovered with disk tags;
 R_m = number of males recovered with disk tags.

4) Estimated true number of females released with disk tags and secondary marks (M_f):

$$M_f = M_t - M_m$$

Adipose Fin Clipped Escapement

Spawning escapement estimates for adipose fin clipped (AFC) coho (N_t) were derived by multiplying the total escapement (N_t) by the incidence of AFCs observed in the fence mark application and release sample. This sample was used as it was the largest available sample that was deemed to be representative of the spawning population.

RESULTS

DISK TAG APPLICATION

Louis Creek

In 1995, 401 disk tagged and secondary marked coho adults were released into the Louis Creek system between October 9 and December 1 (Table 1; Appendix 1). In addition, there were 66 coho removed for use as hatchery brood stock and 8 mortalities (Appendix 2). In 1996, 193 marked coho were released between October 5 and November 27. During that period an additional 2 coho of undetermined sex were released, 5 coho died at the fence, and 41 coho were taken for hatchery brood purposes. In 1997, 56 coho were marked and released into the Louis Creek system between October 15 and December 22. As well, 54 coho were taken for hatchery brood stock and there were 9 fence mortalities. In 1998, 178 adult coho were marked and released upstream of the fence site between October 2 and December 15. During that period 2 tags were applied to spawned out females and 29 coho were taken for hatchery brood purposes. There were no fence mortalities recorded in 1998.

Of the fish tagged and released at the adult fence, all swam away vigorously except for 5 coho that swam away sluggishly in 1998. The recovery rate in the sluggish fish (40%) was not significantly higher than that observed in the fish that were vigorous (19%) (chi-square; $p > 0.05$) and the sluggish fish were left in the mark application sample.

No errors in sex identification were detected in any of the sample years. The mean fork (NF) length of tagged females and males in 1995 was 51.3 cm and 49.8 cm, with a significantly different frequency distribution between sexes (Kolmogorov-Smirnov; $p < 0.05$). In 1996, female (average 51.3 cm) and male (average 49.2 cm) length frequencies were significantly different, as was also observed in 1998 (female average 53.5 cm and male average 52.2 cm). In 1997, the data did not show a significant difference between the length frequency distribution of females (average 45.7 cm) and males (average 45.6 cm) (Kolmogorov-Smirnov; $p > 0.05$).

Lemieux Creek

Disk tags and secondary marks were applied to 290 coho adults in the Lemieux Creek system from October 9 to January 9, 1996 (Table 2; Appendix 3). In addition, there were 96 coho removed for hatchery brood purposes and one mortality was recorded at the fence (Appendix 3). In 1996/1997, between September 29 and January 6, 129 marked coho were

released upstream of the fence, 21 were taken for brood stock, and three fence mortalities were noted. In 1997, marked coho released between October 1 and January 15, 1998, totaled 296 while an additional 70 coho were removed for hatchery brood purposes. There was one mortality at the fence and one marked fish recovered below the fence site and removed from the mark application sample. Between September 29 and January 13, 1999, 581 coho were marked and released. An additional 34 were taken for hatchery brood, and 7 were noted as fence related mortalities. In addition, two spawned out fish were marked and released into the river but were not included in the mark application sample.

In each of 1995 and 1996 there were no recoveries from three fish that required ventilation assistance or were sluggish after mark application. Although the recovery rate was lower than that in the fish which swam vigorously the difference was not significant (chi-square; $p > 0.05$). The sluggish fish were left in the mark application sample. In 1998, the recovery rate in the six sluggish coho (33.3%) was not significantly different than that in the vigorously swimming fish (34.4%). All fish released in 1997 swam away vigorously.

In 1995 and 1996, there were no sex identification errors detected. In 1997 there were 4 fish (1.4% error rate) misidentified while in 1998, there were 11 fish misidentified (1.9% error rate). When adjusted for the observed errors, it was estimated that there were 109 females (36.8%) and 187 males (63.2%) in the 1997 mark application sample. There were 249 females (42.9%) and 332 (57.1%) males were in the sexed mark application sample in 1998. The 1995 fork length frequency distributions of Lemieux Creek females (average 49.7 cm) and males (average 48.2 cm) were significantly different (Kolmogorov-Smirnov; $p < 0.05$). In 1996, female (average 51.8 cm) and male (average 50.4 cm) fork length frequency distributions were not significantly different (Kolmogorov-Smirnov; $p > 0.05$). Significant differences in length frequency distributions were observed in 1997 (female average 48.4 cm and male average 46.5 cm) and 1998 (female average 51.0 cm and male average 47.7 cm).

SPAWNING GROUND RECOVERY

Louis Creek

A total of 67 adult carcasses were recovered upstream of the Louis Creek fence between October 13 and December 22, 1995 (Appendix 5). Forty-one (61.2%) of the carcasses were male, 26 (38.8%) were female, and 35 (52.2%) bore primary or secondary marks. Most (55.2%) of the carcasses were recovered in the lower section of Louis Creek. In 1996, 11 adult carcasses were recovered between October 31 and December 16. Six (54.5%) were male, 5 (45.5%) were female, and 6 bore primary or secondary marks. The majority of carcasses (81.8%) were recovered in the lower section. In 1997, 40 coho carcasses were recovered between October 16 and December 15. Twenty-five (62.5%) were male, 15 (37.5%) were female, and 7 (17.5%) bore primary or secondary marks. The majority of carcasses (90.0%) were recovered in the lower section. In 1998, 41 coho carcasses were recovered between November 5 and December 15. Twenty-three (56.1%) were male, 18 (43.9%) were female, and 37 (90.2%) bore primary or secondary marks. The majority of carcasses (63.4%) were recovered in the middle section of Louis Creek.

In 1995, 61 of the 62 aged carcasses were age 3₂ (98.4%) and one coho carcass was age 4₂ (Appendix 7). The 1995 POH length frequency distribution in female carcasses

(average 42.3 cm) was significantly different than that observed in males (average 39.8 cm) (Kolmogorov-Smirnov; $p < 0.05$). Of the 19 aged carcasses in 1996, 42.1% were age 3₂, 47.4% were age 4₃, and 2 fish (10.5%) were aged as 5₄ coho. There was no significant difference between the 1996 length frequency distribution in female (average 40.5 cm) and male (average 43.2 cm) carcasses (Kolmogorov-Smirnov; $p > 0.05$). In 1997, of the 72 aged coho carcasses 73.0% were age 3₂ and 27.0% were age 4₃. The 1997 female (average 39.1 cm) and male (average 37.4 cm) carcasses had significantly different length frequency distributions. In 1998, there were 66 aged carcasses, all of which were aged as 3₂ coho. The 1998 female (average 43.7 cm) length frequency distribution was not significantly different than that in males (average 44.5 cm).

Lemieux Creek

A total of 225 adult carcasses were recovered upstream, and 3 downstream, of the Lemieux Creek fence between October 9, 1995 and January 10, 1996 (Appendix 6). Of the upstream carcasses 126 (56.0%) of the carcasses were male, 99 (44.0%) were female, and 64 (28.4%) bore primary or secondary marks. Most (53.3%) of the carcasses were recovered in the upper section of Lemieux Creek. In 1996, 34 adult coho carcasses were recovered, 4 of which were recovered downstream of the fence, between October 29 and December 17. Nineteen (63.3%) were male, 11 (36.7%) were female, and 20 (66.7%) bore primary or secondary marks. The majority of carcasses (65.0%) were recovered in the lower section. Between October 19, 1997 and January 9, 1998; 182 coho carcasses were recovered upstream of the fence and 11 downstream of the fence. Of the upstream carcasses, 118 (64.8%) were male, 64 (35.2%) were female, and 103 (56.6%) bore primary or secondary marks. The largest proportion of the carcasses (44.0%) was recovered in the lower section. Between November 3, 1998 and January 13, 1999; 222 coho carcasses were recovered, of which 6 were recovered downstream of the fence. Of the upstream carcasses, 110 (50.9%) were male, 106 (49.1%) were female, and 207 (95.8%) bore primary or secondary marks. The largest portion of the carcasses (45.8%) was recovered in the upper section of Lemieux Creek.

In 1995, all 183 aged carcasses were age 3₂ while in 1996, of the 50 aged carcasses, 72% were age 3₂ and 28% were age 4₃ (Appendix 8). The 1995 POH length frequency distribution in female carcasses (average 41.4 cm) was significantly different than that observed in males (average 39.5 cm) (Kolmogorov-Smirnov; $p < 0.05$). In 1996 a significantly different length frequency distribution between females (average 44.0 cm) and males (average 39.3 cm) was not detected (Kolmogorov-Smirnov; $p > 0.05$). In 1997, 180 carcasses were aged, 1 of which was identified from scale patterns as an age 5₂ chinook. Of the 179 remaining aged coho carcasses 98.9% were age 3₂ and 1.1% were age 4₃. In 1997, female (average 39.1 cm) and male (average 36.7 cm) carcasses had significantly different length frequency distributions. In 1998, there were 220 aged carcasses, 3 of which were identified as chinook from their scales (two age 4₂ and one age 5₂). Of the 217 remaining aged coho carcasses 85.7% were age 3₂ and 14.3% were age 4₃. In 1998, females (average 43.7 cm) showed a significantly different length frequency distribution than males (average 40.6 cm).

SAMPLING SELECTIVITY

Period

Bias between sampling periods was assessed by stratifying the tag application and carcass recovery samples into two periods containing approximately equal total sample sizes. Individual day's application and recovery samples were not subdivided, resulting in unequal sample sizes among periods.

Temporal bias in the Louis Creek application samples was examined by comparing mark incidences in the early and late recovery periods. In 1995, mark incidences in Louis Creek ranged between 30.0% and 66.7% (Table 3). There was a significant difference between periods in the mark incidence in males (chi-square; $p > 0.05$) but not in females. The significant bias in males was toward the late time period. In 1996, mark incidences ranged from 20.0% to 100%. The differences were not significant; however, bias may have been present as the tests were based on small sample sizes. The 1997 mark incidences ranged from 8.3% to 23.1% and the differences were not significant in either sex. However, undetected bias may have been present as the tests were based on small sample sizes. In 1998, the incidence of marks ranged from 57.1% to 100%; however, the observed values were not significantly different from those expected.

Temporal bias in the Lemieux Creek application samples was examined by comparing mark incidences in the early and late recovery periods. In 1995/1996, mark incidences in Lemieux Creek ranged between 23.9% and 34.0% (Table 4). There was no significant difference between periods in the mark incidence in either sex (chi-square; $p > 0.05$). In 1996, mark incidences ranged from 25.0% to 90.9%. The difference between early and late periods was significant in males (chi-square; $p < 0.05$) with a bias toward the late recovery period. There was no significant difference detected in females; however, bias may have been present as the test was based on small sample sizes. The 1997/1998 mark incidences ranged from 43.8% to 72.4%; the differences were not significant in either sex. In 1998/1999, the incidence of marks ranged from 87.8% to 100% with a significant bias toward the early period in females. There was no significant difference observed in males.

Temporal bias in the Louis Creek recovery samples was examined by comparing the proportion of carcasses recovered from the early and late application periods. In 1995, the percentage of fish marked in Louis Creek that were recovered as carcasses ranged from 4.7% to 13.4% (Table 5). The observed differences were not significantly different from that expected (chi-square; $p > 0.05$). In 1996, the proportion of carcasses recovered ranged from 1.2% to 7.4%; the differences between periods were not significant in either sex. Undetected bias may be present, as the sample sizes were small. The 1997 percentage recovery of marked carcasses between periods ranged between 0.0% and 42.9%. Differences were not significant; however, small sample size may affect these results. In 1998, the percentage recovery of marks ranged from 10.4% to 26.9%. The differences were not significantly different than expected.

Temporal bias in the Lemieux Creek recovery samples was examined by comparing the proportions of carcasses recovered from the early and late application periods. In 1995, the percentage of fish marked in Lemieux Creek that were recovered as carcasses ranged from 16.7% to 24.1% (Table 6). The observed differences were not significantly different from that expected (chi-square; $p > 0.05$). In 1996, the proportion of carcasses recovered ranged from

6.9% to 23.1%; the differences between periods were not significant in either sex. Undetected bias may be present, as the sample sizes were small. The 1997 percentage recovery of marked carcasses between periods ranged between 26.0% and 41.1% and the differences were not significant. In 1998, the percentage recovery of marks ranged from 30.2% to 44.7%. The differences were not significantly different than expected.

Location

Biases in sampling location were examined by dividing both creeks into three sections: upper, middle, and lower, as defined in the Methods section. Spatial biases in the application samples were examined by comparing mark incidences in fish recovered in these sections. Spatial bias in recovery rates could not be assessed as all fish were tagged at the fence sites.

In 1995 and 1996, no carcasses were recovered in the upper section of Louis Creek (Table 7). In 1995, the mark incidences in the remaining two sections ranged between 46.2% and 63.6%. No significant difference in mark incidences was noted in either sex (chi-square; $p > 0.05$). In 1996, mark incidences ranged from 33.3% to 100.0%; no significant differences were detected. However, undetected bias, resulting from small sample sizes, may be present. The mark incidences in 1997 ranged from 0.0% in the upper and middle sections to 25.0% in the lower section. No significant differences were detected; however, undetected bias may be present, as sample sizes were small. The majority of the 1998 mark incidences ranged from 90.9% to 100.0% with one incidence of 0.0% outside that range. The absence of marks in females in the lower section was significant (chi-square; $p < 0.05$) while the observed differences in males was not significant.

In 1995, the incidence of marked carcasses ranged from 25.0% to 50.0% but the observed differences were not significantly different than expected in either sex (chi-square; $p > 0.05$) (Table 8). In 1996, mark incidences ranged from 0.0% to 100.0% and no significant differences were detected; however, the tests may not have detected biases because of the small sample sizes. The mark incidences in 1997 ranged from 42.1% to 76.9%. No significant differences were detected. The 1998 mark incidences ranged from 90.6% to 100.0% and the observed differences among sections were not significant.

Fish Size

Size related biases in the 1995 through 1998 application samples were examined by comparing sex specific POH length frequency distributions of marked and unmarked spawners. In Louis Creek in 1995, there was a significant difference between marked and unmarked samples with a bias toward larger males and females in the marked fish sample (Kolmogorov-Smirnov; $p < 0.05$). The 1996, 1997, and 1998 Louis Creek samples did not show a significant difference (Kolmogorov-Smirnov; $p > 0.05$). In Lemieux Creek, no significant differences were detected in the 1995, 1997, and 1998 samples; however, in 1996, there was a bias toward larger males in the marked sample.

Size related biases in the recovery sample were examined by dividing the application sample into recovered and unrecovered fish, and comparing the NF length frequency distributions in each sex. In Louis and Lemieux creeks, there were no significant differences detected in either sex in any of the sample years (Kolmogorov-Smirnov; $p > 0.05$).

Fish Sex

Sex-related biases in the application samples were assessed by comparing the sex composition of marked and unmarked spawning ground carcass recoveries. In the years 1995 through 1998 in Louis Creek, males comprised between 33.3% and 59.5% of the marked samples and between 25.0% and 80.0% in the unmarked samples (Table 9). None of the differences were significant (chi-square; $p > 0.05$). In Lemieux Creek in the years 1995 through 1998, males comprised between 51.7% and 60.0% of the marked samples and between 33.3% and 72.2% in the unmarked samples (Table 10). None of the observed differences were different from that expected.

Biases in the sex composition of the recovery samples were examined by comparing the number of male and female marked coho that were recovered or not recovered. In the years 1995 through 1998 in Louis Creek, males comprised between 33.3% and 59.5% of the recovered marked coho and between 56.8% and 79.6% in those marked fish that were not recovered (Table 9). None of the differences were significant (chi-square; $p > 0.05$). In Lemieux Creek, in the years 1995 through 1998, males comprised between 51.7% and 60.0% of the recovered marked fish and between 53.1% and 61.7% in the marked fish that were not recovered (Table 10). None of the observed differences were different from that expected.

Spawning Success

Apparent spawning success was estimated from the internal examination of female carcasses that were upstream of the fence excluding those carcasses recovered within 5 days of mark application. The influence of the mark application process was assessed by comparing the spawning success in marked and unmarked carcass recoveries. In the years 1995 through 1998, in Louis Creek, spawning success of marked females ranged from 66.7% to 100.0% while unmarked females ranged from 80.0% to 100.0% (Table 11). Significant differences between complete success (100%) and incomplete spawning (0% and 50% categories pooled) were not detected in any of the years (chi-square; $p > 0.05$); however, small sample sizes may not have allowed bias to be detected. In Lemieux Creek, in the years 1995 through 1998, the apparent spawning success of marked females ranged between 94.4% and 100.0% while the unmarked females ranged from 75.0% to 100%. Significant differences between complete success (100%) and incomplete spawning (0% and 50% categories pooled) were not detected in any of the years; however, undetected bias reflecting small sample sizes may be present.

ESTIMATION OF SPAWNER POPULATION

Total Escapement

Total spawning escapement was estimated using the Petersen population estimator. In most years the data were sufficiently large to permit the total escapement to be calculated by addition of the sex specific estimates. In Louis Creek, in 1996 and 1997, the recovery sample sizes were too small to produce unbiased sex specific Petersen estimates and therefore the total escapements were derived from pooled male and female data.

The total escapement estimates for Louis Creek descended from a high of 750 in 1995 to 284 coho in 1996 to a low of 193 in 1997 and 195 coho in 1998 (Table 12). Ninety-five

percent confidence limits about the estimates indicated relatively imprecise estimates in 1995 through 1997 (a range of 22% to 37% about the estimates) while the 1998 population estimate was relatively precise (9% of the estimate). The analyses of potential sources of bias in the Louis Creek data revealed few detectable biases (Table 13). The statistical biases were corrected by pooling the male and female data and calculating a total escapement estimate. The fish size and spatial biases were only present in one of the samples; thus no overall biases in the population estimates were expected.

The total escapement estimates for Lemieux Creek descended from a high of 1002 in 1995 to a low of 188 coho in 1996 then rose to an escapement of 525 in 1997 and 605 coho in 1998 (Table 14). Ninety-five percent confidence limits about the estimates indicated relatively imprecise estimates in 1995 (20% of the estimate) and 1996 (22% about the estimate) while the 1997 and 1998 population estimates were relatively precise (13% and 3% of the respective estimates). The analyses of potential sources of bias in the Lemieux Creek data revealed only one detectable bias (Table 15). The temporal bias was only present in one of the samples; thus no overall bias in the population estimate was expected.

AFC Escapement

The escapement of AFC coho within the Louis Creek total escapement ranged from a high of 115 in 1995 to a low of 2 coho in 1998 (Table 12). The year with the highest proportion of AFCs in the escapement was 1997 (41%) while in 1998 the proportion was the lowest (1%). In 1995 and 1996 all of the AFC carcasses contained CWTs that were from marked juvenile coho released in Louis Creek (Appendix 9). In 1997, there were two recoveries in Louis Creek of juvenile coho released in Lemieux Creek while in 1998 the single CWT recovery was a stray from a marked juvenile release in the North Thompson River. In 1996, 10 of the 11 CWT bearing carcasses were assigned scale based ages that disagreed with the known age of the hatchery reared fish (Appendix 9). There were no scale reading errors in the other three years of data.

The escapement of AFC coho within the Lemieux Creek total escapement ranged from a high of 388 in 1995 to a low of 38 coho in 1998 (Table 14). The year with the highest proportion of AFCs in the escapement was 1995 (39%) while in 1998 the proportion was the lowest (6%). In 1995, 1997, and 1998 all of the CWTs recovered in Lemieux Creek were from marked juvenile releases in Lemieux Creek (Appendix 10). In 1996, there was one recovery of a stray from a release of marked juveniles in Louis Creek. Also in 1996, 4 of the 19 scale aged CWT fish were assigned ages that disagreed with the known age of the hatchery reared fish. In 1997, one CWT coho was assigned a different age than that of the CWT release and the scale pattern was identified as that of a chinook (Appendix 10). All other scale ages agreed with the CWT ages.

DISCUSSION

Results of the 1995 through 1998 Louis and Lemieux creek adult enumeration projects provide estimates of the spawning populations in those two creeks. The accuracy of the individual estimates is influenced by a number of factors. The Petersen method requires that the population is closed, the mark application is not selective and does not affect the marked individuals, marked individuals do not lose their marks, all recovered marks are reported and

the recovery sample is not selective (Seber 1982). Ricker (1975) states that if either the application or recovery sample is taken at random then an unbiased population estimate is derived. No significant biases were detected in any of the recovery samples.

There were occasional records of marked carcasses recovered downstream of the Lemieux fence site. No downstream marks were observed in Louis Creek. The two populations are assumed to be closed but it is apparent this assumption was violated, at least to a small degree.

The application of marks to all coho that were trapped at the fence sites reduced the probability of selectivity in the mark application sample. Impact of marking on released fish was assessed by comparing apparent spawning success in females. No significant impact was detected in either creek. There were occasional biases detected in the application sample; however, these biases were not repeated in the recovery sample. It is concluded that the mark application sample did not introduce a significant bias in the population estimates.

Two distinct mark types were applied to all released fish to minimize the impact of tag loss. The majority of the recovered carcasses were categorized as fresh or moderately fresh and the observed rate of primary tag loss was less than 5.0%. To correct for the observed tag losses we included fish with only secondary marks in the calculation of population estimates. We conclude that the loss of marks was insignificant in Louis and Lemieux creeks.

The sole source of bias that is of concern is derived from the presence of small sample sizes in some of the years. To overcome this deficiency, we pooled the data for two of the years in Louis Creek. Small sample sizes also influenced some of the statistical tests used to detect biases. Again, to increase the power of some of the tests, pooling of data was done. The small sizes of the populations in these two creeks dictate that small sample sizes will occur.

Since these streams have been enhanced, trends in adult coho abundance (Tables 16 and 17) must be interpreted with caution and are beyond the scope of this report.

SUMMARY

The numbers of coho spawning in Louis and Lemieux creeks were estimated by a mark application and recovery study. Instream fences were utilized to apply Petersen disk tags and secondary opercular marks. Marked and unmarked carcass recovery and sampling was done throughout the accessible portions of the two creeks.

No significant or systematic biases were detected in the application or recovery samples and there was no evidence that marked fish behaved differently than unmarked fish. We conclude that the population estimates were not biased; however, the estimates in both creeks were relatively imprecise in 1995 and 1996 and in Louis Creek in 1997. Imprecision was reflective of small sample sizes in those years.

In all years age 3₂ fish were predominant; however, a significant portion of age 4₃ coho were observed in 1996. A significant portion of the scale derived ages did not agree with known ages of CWT coho in both 1996 and 1998.

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Table 1. Tag application, carcass examination, and mark recovery, by sex, of Louis Creek coho, 1995 through 1998.

Year	Sex	Tags applied	Carcasses examined	Marks recovered			Total	Percentage recovered
				Tag and secondary mark	Tag only	Secondary mark only		
1995 a	Female	173	26	14	0	1	15	8.7%
	Male	228	41	20	0	0	20	8.8%
	Other b	8	8	6	0	0	6	-
	Total	409	75	40	0	1	41	10.0%
1996 a	Female	62	5	4	0	0	4	6.5%
	Male	131	6	1	1	0	2	1.5%
	Other c	7	5	4	1	0	5	-
	Total	200	16	9	2	0	11	5.5%
1997 a	Female	13	15	3	0	0	3	23.1%
	Male	43	25	4	0	0	4	9.3%
	Other b	9	9	9	0	0	9	-
	Total	65	49	16	0	0	16	24.6%
1998 a	Female	65	18	14	0	1	15	23.1%
	Male e	113	23	20	0	2	22	19.5%
	Other d	2	0	0	0	0	0	-
	Total	180	41	34	0	3	37	20.6%

a. No sex identification errors observed.

b. Fence mortalities up to 4 days after mark application.

c. Two of unknown sex and five fence mortalities up to 4 days after mark application.

d. Spawned out females.

e. One male released without a tag but with a secondary mark.

Table 2. Tag application, carcass examination, and mark recovery, by sex, of Lemieux Creek coho, 1995 through 1998.

Year	Sex	Tags applied	Carcasses examined	Marks recovered			Total	Percentage recovered
				Tag and secondary mark	Tag only	Secondary mark only		
1995 a	Female	135	99 f	27	0	2	29	21.5%
	Male	155	126 g	32	0	3	35	22.6%
	Other b	1	2	1	0	0	1	-
	Total	291	227	60	0	5	65	22.3%
1996 a	Female	55	11 f	8	0	0	8	14.5%
	Male	74	19 h	11	0	1	12	16.2%
	Other c	1	1	1	0	0	1	-
	Total	130	31	20	0	1	21	16.2%
1997 e	Female l	109	64 h	38	0	4	42	38.5%
	Male	187	118 i	59	0	2	61	32.6%
	Other j	2	1	1	0	0	1	-
	Total	298	183	98	0	6	104	34.9%
1998 e	Female	249	106 h,k	96	0	4	100	40.2%
	Male	332	110 h,k	104	0	3	107	32.2%
	Other d	9	9	9	0	0	9	-
	Total	590	225	209	0	7	216	36.6%

a. No sex identification errors identified

b. One marked male recovered dead 2 days after tag application and one carcass of unknown sex

c. One marked female recovered 2 days after tag application.

d. 7 fish recovered within 5 days of tag application and 2 marked "spawned out" fish and 2 unknown sex recoveries.

e. Corrected for observed sex identification errors

f. Excludes one carcass recovered below the fence

g. Excludes two carcasses recovered below the fence.

h. Excludes three carcasses recovered below the fence.

i. Excludes eight carcasses recovered below the fence

j. Excludes one marked female recovered below the fence.

k. Excludes one secondary marked carcass recovered below the fence.

l. Excludes one female recovered within 5 days of tag application.

Table 3. Mark incidence in the Louis Creek carcass recovery sample, by recovery period and sex, 1995 through 1998.

Year	Recovery period	Carcasses examined			Marked carcasses			Mark incidence		
		Female	Male	Total	Female	Male	Total	Female	Male	Total
1995	Oct 13 to Nov 24	11	20	31	6	6	12	54.5%	30.0%	38.7%
	Nov 25 to Dec 22	15	21	36	9	14	23	60.0%	66.7%	63.9%
	Total	26	41	67	15	20	35	57.7%	48.8%	52.2%
1996	Oct 31 to Nov 24	1	5	6	1	1	2	100.0%	20.0%	33.3%
	Nov 25 to Dec 16	4	1	5	3	1	4	75.0%	100.0%	80.0%
	Total	5	6	11	4	2	6	80.0%	33.3%	54.5%
1997	Oct 16 to Nov 24	9	12	21	2	1	3	22.2%	8.3%	14.3%
	Nov 25 to Dec 15	6	13	19	1	3	4	16.7%	23.1%	21.1%
	Total	15	25	40	3	4	7	20.0%	16.0%	17.5%
1998	Nov 4 to Nov 24	7	12	19	4	11	15	57.1%	91.7%	78.9%
	Nov 25 to Dec 15	11	11	22	11	11	22	100.0%	100.0%	100.0%
	Total	18	23	41	15	22	37	83.3%	95.7%	90.2%

Table 4. Mark incidence in the Lemieux Creek carcass recovery sample, by recovery period and sex, 1995 through 1998.

Year	Recovery period	Carcasses examined			Marked carcasses			Mark incidence		
		Female	Male	Total	Female	Male	Total	Female	Male	Total
1995/ 1996	Oct 9 to Dec 4	52	59	111	13	19	32	25.0%	32.2%	28.8%
	Dec 5 to Jan 10	47	67	114	16	16	32	34.0%	23.9%	28.1%
	Total	99	126	225	29	35	64	29.3%	27.8%	28.4%
1996	Oct 29 to Nov 30	5	8	13	3	2	5	60.0%	25.0%	38.5%
	Dec 1 to Dec 17	6	11	17	5	10	15	83.3%	90.9%	88.2%
	Total	11	19	30	8	12	20	72.7%	63.2%	66.7%
1997/ 1998	Oct 19 to Nov 30	29	54	83	21	33	54	72.4%	61.1%	65.1%
	Dec 1 to Jan 9	35	64	99	21	28	49	60.0%	43.8%	49.5%
	Total	64	118	182	42	61	103	65.6%	51.7%	56.6%
1998/ 1999	Nov 3 to Nov 26	57	45	102	57	44	101	100.0%	97.8%	99.0%
	Nov 27 to Jan 13	49	65	114	43	63	106	87.8%	96.9%	93.0%
	Total	106	110	216	100	107	207	94.3%	97.3%	95.8%

a. Excludes carcasses recovered below the fence.

Table 5. Proportion of the Louis Creek mark application sample recovered, by application period and sex, 1995 through 1998.

Year	Application period	Marks applied			Marked carcasses			Percentage recovered		
		Female	Male	Total	Female	Male	Total	Female	Male	Total
1995 a	9 Oct to 10 Nov	67	108	175	9	14	23	13.4%	13.0%	13.1%
	11 Nov to 1 Dec	106	120	226	5	6	11	4.7%	5.0%	4.9%
	Total	173	228	401	14	20	34	8.1%	8.8%	8.5%
1996 a	5 Oct to 29 Oct	27	86	113	2	1	3	7.4%	1.2%	2.7%
	30 Oct to Nov 27	35	45	80	2	1	3	5.7%	2.2%	3.8%
	Total	62	131	193	4	2	6	6.5%	1.5%	3.1%
1997 a	15 Oct to 18 Oct	6	22	28	0	1	1	0.0%	4.5%	3.6%
	19 Oct to Dec 22	7	21	28	3	3	6	42.9%	14.3%	21.4%
	Total	13	43	56	3	4	7	23.1%	9.3%	12.5%
1998 a	2 Oct to 10 Nov	26	65	91	7	15	22	26.9%	23.1%	24.2%
	11 Nov to Dec 15	39	48	87	7	5	12	17.9%	10.4%	13.8%
	Total	65	113	178	14	20	34	21.5%	17.7%	19.1%

a. No sex identification errors observed.

Table 6. Proportion of the Lemieux Creek mark application sample recovered, by application period and sex, 1995 through 1998.

Year	Application period	Marks applied			Marked carcasses			Percentage recovered		
		Female	Male	Total	Female	Male	Total	Female	Male	Total
1995/ 1996 a	9 Oct to 14 Nov	54	95	149	13	22	35	24.1%	23.2%	23.5%
	15 Nov to Dec 28	81	60	141	14	10	24	17.3%	16.7%	17.0%
	Total	135	155	290	27	32	59	20.0%	20.6%	20.3%
1996/ 1997 a	04 Oct to 13 Nov	26	35	61	6	8	14	23.1%	22.9%	23.0%
	14 Nov to 17 Dec	29	39	68	2	3	5	6.9%	7.7%	7.4%
	Total	55	74	129	8	11	19	14.5%	14.9%	14.7%
1997/ 1998 b	15 Oct to 3 Nov	46	88	134	12	23	35	26.3%	26.0%	26.1%
	4 Nov to 8 Jan	63	99	162	26	36	62	41.1%	36.4%	38.3%
	Total	109	187	296	38	59	97	34.9%	31.5%	32.8%
1998/ 1999 b	10 Oct to 5 Nov	103	185	288	46	56	102	44.7%	30.2%	35.4%
	6 Nov to 31 Dec	146	147	293	50	48	98	34.2%	32.7%	33.4%
	Total	249	332	581	96	104	200	38.5%	31.3%	34.4%

a. No sex identification errors observed.

b. Corrected for sex identification errors

Table 7. Mark incidence in the Louis Creek carcass recovery sample, by recovery area and sex, 1995 through 1998. ^a

Year	Recovery area	Carcasses examined			Marked carcasses			Mark incidence		
		Female	Male	Total	Female	Male	Total	Female	Male	Total
1995	Upper	0	0	0	0	0	0	-	-	-
	Middle	15	15	30	8	8	16	53.3%	53.3%	53.3%
	Lower	11	26	37	7	12	19	63.6%	46.2%	51.4%
	Total	26	41	67	15	20	35	57.7%	48.8%	52.2%
1996	Upper	0	0	0	0	0	0	-	-	-
	Middle	2	0	2	2	0	2	100.0%	-	-
	Lower	3	6	9	2	2	4	66.7%	33.3%	44.4%
	Total	5	6	11	4	2	6	80.0%	33.3%	54.5%
1997	Upper	1	0	1	0	0	0	0.0%	-	0.0%
	Middle	2	1	3	0	0	0	0.0%	0.0%	0.0%
	Lower	12	24	36	3	4	7	25.0%	16.7%	19.4%
	Total	15	25	40	3	4	7	20.0%	16.0%	17.5%
1998	Upper	5	4	9	5	4	9	100.0%	100.0%	100.0%
	Middle	11	15	26	10	14	24	90.9%	93.3%	92.3%
	Lower	2	4	6	0	4	4	0.0%	100.0%	66.7%
	Total	18	23	41	15	22	37	83.3%	95.7%	90.2%

a. Excludes carcasses recovered below the fence.

Table 8. Mark incidence in the Lemieux Creek carcass recovery sample, by recovery area and sex, 1995 through 1998. ^a

Year	Recovery area	Carcasses examined			Marked carcasses			Mark incidence		
		Female	Male	Total	Female	Male	Total	Female	Male	Total
1995/ 1996	Upper	58	62	120	16	19	35	27.6%	30.6%	29.2%
	Middle	2	4	6	1	1	2	50.0%	25.0%	33.3%
	Lower	39	60	99	12	15	27	30.8%	25.0%	27.3%
	Total	99	126	225	29	35	64	29.3%	27.8%	28.4%
1996	Upper	3	5	8	2	4	6	66.7%	80.0%	75.0%
	Middle	1	1	2	0	1	1	0.0%	100.0%	50.0%
	Lower	7	13	20	6	7	13	85.7%	53.8%	65.0%
	Total	11	19	30	8	12	20	72.7%	63.2%	66.7%
1997/ 1998	Upper	28	42	70	18	21	39	64.3%	50.0%	55.7%
	Middle	13	19	32	10	8	18	76.9%	42.1%	56.3%
	Lower	23	57	80	14	32	46	60.9%	56.1%	57.5%
	Total	64	118	182	42	61	103	65.6%	51.7%	56.6%
1998/ 1999	Upper	48	51	99	46	50	96	95.8%	98.0%	97.0%
	Middle	26	20	46	25	20	45	96.2%	100.0%	97.8%
	Lower	32	39	71	29	37	66	90.6%	94.9%	93.0%
	Total	106	110	216	100	107	207	94.3%	97.3%	95.8%

a. Excludes carcasses recovered below the fence.

Table 9. Sex composition in the Louis Creek application and recovery samples, 1995 through 1998

Year	Sex	Application sample					Recovery sample				
		Sample size	Recovered		Not recovered		Sample size	Marked		Not marked	
1995	Female	173	15	42.9%	158	43.2%	26	15	42.9%	11	34.4%
	Male	228	20	57.1%	208	56.8%	41	20	57.1%	21	65.6%
1996	Female	62	4	66.7%	58	31.0%	5	4	66.7%	1	20.0%
	Male	131	2	33.3%	129	69.0%	6	2	33.3%	4	80.0%
1997	Female	13	3	42.9%	10	20.4%	15	3	42.9%	12	36.4%
	Male	43	4	57.1%	39	79.6%	25	4	57.1%	21	63.6%
1998	Female	65	15	40.5%	50	35.5%	18	15	40.5%	3	75.0%
	Male	113	22	59.5%	91	64.5%	23	22	59.5%	1	25.0%

Table 10. Sex composition in the Lemieux Creek application and recovery samples, 1995 through 1998.

Year	Sex	Application sample					Recovery sample				
		Sample size	Recovered		Not recovered		Sample size	Marked		Not marked	
1995	Female	135	29	45.3%	106	46.9%	99	29	45.3%	70	43.5%
	Male	155	35	54.7%	120	53.1%	126	35	54.7%	91	56.5%
1996	Female	55	8	40.0%	47	43.1%	11	8	40.0%	3	30.0%
	Male	74	12	60.0%	62	56.9%	19	12	60.0%	7	70.0%
1997 a	Female	116	42	40.8%	74	38.3%	64	42	40.8%	22	27.8%
	Male	180	61	59.2%	119	61.7%	118	61	59.2%	57	72.2%
1998 a	Female	249	100	48.3%	149	39.8%	106	100	48.3%	6	66.7%
	Male	332	107	51.7%	225	60.2%	110	107	51.7%	3	33.3%

a. Application sample corrected for observed sex identification errors.

Table 11. Apparent spawning success of female coho in Louis and Lemieux creeks, by mark status, 1995 through 1998.

Creek	Year	Mark status	Sample size	Spawning success			Weighted average
				0%	50%	100%	
Louis	1995	Marked	16	0	2	14	93.8%
		Not Marked	10	2	0	8	80.0%
	1996	Marked	4	0	0	4	100.0%
		Not Marked	1	0	0	1	100.0%
	1997	Marked	3	1	0	2	66.7%
		Not Marked	11	2	0	9	81.8%
	1998	Marked	15	0	0	15	100.0%
		Not Marked	3	0	0	3	100.0%
Lemieux	1995	Marked	26	0	0	26	100.0%
		Not Marked	71	8	1	62	88.0%
	1996	Marked	9	0	1	8	94.4%
		Not Marked	4	1	0	3	75.0%
	1997	Marked	41	0	2	39	97.6%
		Not Marked	21	0	0	21	100.0%
	1998	Marked	101	0	2	99	99.0%
		Not Marked	8	0	1	7	93.8%

Table 12. Spawning population estimates for Louis Creek coho, 1995 through 1998. ^a

Adipose status	Year	Sex	Population estimate	95% Confidence limit	Lower estimate	Upper estimate
All Fish						
	1995	Female	293	89	204	381
		Male	457	135	322	592
		Total	750	162	588	911
	1996	Female	(75)	(24)	(50)	(99)
		Male	(307)	(227)	(80)	(534)
		Total	284	84	200	367
	1997	Female	(55)	(42)	(13)	(97)
		Male	(228)	(164)	(64)	(392)
		Total	193	72	121	266
	1998	Female	77	15	63	92
		Male	118	10	108	128
		Total	195	18	178	213
Adipose Fin Clipped Fish						
	1995	Female	41	-	-	-
		Male	74	-	-	-
		Total	115	-	-	-
	1996	Female	(30)	-	-	-
		Male	(101)	-	-	-
		Total	100	-	-	-
	1997	Female	(17)	-	-	-
		Male	(101)	-	-	-
		Total	79	-	-	-
	1998	Female	0	-	-	-
		Male	2	-	-	-
		Total	2	-	-	-

a. Bracketed estimates are biased by small sample sizes; total estimates derived from pooled male and female data.

Table 13. Results of statistical tests to detect bias in the Louis Creek coho population estimates, 1995 through 1998. a

Year	Bias type	Application sample	Recovery sample
1995	Statistical b	-	No bias
	Period	Bias to late period in males	No bias
	Location	No bias	c
	Fish size	Bias to large fish in both sexes	No bias
	Fish sex	No bias	No bias
1996	Statistical b	-	Bias in both sexes
	Period	No bias	No bias
	Location	No bias	c
	Fish size	No bias	No bias
	Fish sex	No bias	No bias
1997	Statistical b	-	Bias in both sexes
	Period	No bias	No bias
	Location	No bias	c
	Fish size	No bias	No bias
	Fish sex	No bias	No bias
1998	Statistical b	-	No bias
	Period	No bias	No bias
	Location	Negative bias in lower section females	c
	Fish size	No bias	No bias
	Fish size	No bias	No bias

a. No bias indicates that bias was not detected; undetected bias may be present.

b. Bias present when recoveries total 4 or less.

c. All tags applied at the fence

Table 14. Spawning population estimates for Lemieux Creek coho, 1995 through 1998.

Adipose status	Year	Sex	Population estimate	95% Confidence limit	Lower estimate	Upper estimate
All Fish						
	1995	Female	452	133	319	586
		Male	549	150	399	699
		Total	1002	200	801	1202
	1996	Female	74	23	51	96
		Male	114	35	79	150
		Total	188	42	146	230
	1997	Female	165	28	137	194
		Male	360	61	298	421
		Total	525	68	457	593
	1998	Female	264	12	252	276
		Male	341	11	331	352
		Total	605	16	589	621
Adipose Fin Clipped Fish						
	1995	Female	154	-	-	-
		Male	234	-	-	-
		Total	388	-	-	-
	1996	Female	23	-	-	-
		Male	28	-	-	-
		Total	51	-	-	-
	1997	Female	11	-	-	-
		Male	30	-	-	-
		Total	41	-	-	-
	1998	Female	16	-	-	-
		Male	22	-	-	-
		Total	38	-	-	-

Table 15. Results of statistical tests to detect bias in the Lemieux Creek coho population estimates, 1995 through 1998. ^a

Year	Bias type	Application sample	Recovery sample
1995	Statistical ^b	-	No bias
	Period	No bias	No bias
	Location	No bias	^c
	Fish size	No bias	No bias
	Fish sex	No bias	No bias
1996	Statistical ^b	-	No bias
	Period	Bias to late period in males	No bias
	Location	No bias	^c
	Fish size	No bias	No bias
	Fish sex	No bias	No bias
1997	Statistical ^b	-	No bias
	Period	No bias	No bias
	Location	No bias	^c
	Fish size	No bias	No bias
	Fish sex	No bias	No bias
1998	Statistical ^b	-	No bias
	Period	Bias to early period in females	No bias
	Location	No bias	^c
	Fish size	No bias	No bias
	Fish sex	No bias	No bias

- a. No bias indicates that bias was not detected; undetected bias may be present.
b. Bias present when recoveries total 4 or less.
c. All tags applied at the fence.

Table 16. Escapement Statistics for Louis and Lemieux creeks, North Thompson, 1995-1998.

Year	Louis Creek				Lemieux Creek			
	Male	Female	Total	95% C.L.	Male	Female	Total	95% C.L.
1998								
Spawning escapement above the fence (m/r)	118	77	195	+/- 18	341	264	605	+/- 16
AFC incidence	1.7%	0.0%	1.0%		6.5%	6.1%	6.3%	
AFC Spawning escapement	2	0	2		22	16	38	
Fish taken for brood	15	14	29		18	16	34	
AFC incidence	0.0%	0.0%	0.0%		5.6%	18.8%	11.8%	
Number of AFCs in brood fish	0	0	0		1	3	4	
Fence induced mortalities	0	2	2		5	2	7	
AFC incidence	-	0.0%	0.0%		20.0%	0.0%	14.3%	
Number of AFC mortalities	0	0	0		1	0	1	
Carcasses (spawners) recovered below the fence	0	0	0		3	3	6	
Total escapement (spawners+brood+mortalities)	133	93	226		364	282	646	
Database (fence count) (b)	113	67	180		251	333	584	e
Overall AFC Incidence	1.8%	0.0%	1.1%		16.0%	9.7%	6.7%	
AFC Total escapement	2	0	2		24	19	43	
Male:Female ratio (using total esc. sample)			1.43 :1				1.29 :1	
Spawning Escapement:Database ratio			1.08 :1				1.04 :1	
1997								
Spawning escapement above the fence (m/r)	228 a	55 a	193	+/- 72	360	165	525	+/- 68
AFC incidence	-	-	40.9%		8.3%	6.7%	7.8%	
AFC Spawning escapement	c	c	79		30	11	41	
Fish taken for brood	36	18	54		37	33	70	
AFC incidence	38.9%	33.3%	37.0%		13.5%	12.1%	12.9%	
Number of AFCs in brood fish	14	6	20		5	4	9	
Fence induced mortalities	9	0	9		0	1	1	
AFC incidence	22.2%	-	22.2%		-	100%	100%	
Number of AFC mortalities	2	0	2		0	1	1	
Carcasses (spawners) recovered below the fence	0	0	0		8	3	11	
Total escapement (spawners+brood+mortalities)	273	73	256		397	199	596	
Database (fence count) (b)	52	13	65		180	116	296	
Overall AFC Incidence	-	-	36.1%		19.8%	22.8%	8.6%	
AFC Total escapement	b	b	101		35	16	51	
Male:Female ratio (using total esc. sample)			3.74 :1d				1.99 :1	
Spawning Escapement:Database ratio			2.97 :1				1.77 :1	
1996								
Spawning escapement above the fence (m/r)	307 a	75 a	284	+/- 84	114	74	188	+/- 42
AFC incidence	-	-	35%		23.7%	25.7%	24.5%	
AFC Spawning escapement	c	c	100		27	19	46	
Fish taken for brood	24	17	41		11	10	21	
AFC incidence	41.7%	58.8%	48.8%		36.4%	70%	52.4%	
Number of AFCs in brood fish	10	10	20		4	7	11	
Fence induced mortalities	5	0	5		1	2	3	
AFC incidence	20.0%	-	20.0%		0.0%	50%	33.3%	
Number of AFC mortalities	1	0	1		0	1	1	
Carcasses (spawners) recovered below the fence	0	0	0		3	1	4	
Total escapement (spawners+brood+mortalities)	336	92	330		126	86	212	
Database (fence count) (b)	136	62	198		75	57	132	
Overall AFC Incidence	-	-	61%		41%	47%	44%	
AFC Total escapement	b	b	121		31	27	58	
Male:Female ratio (using total esc. sample)			3.65 :1d				1.47 :1	
Spawning Escapement:Database ratio			1.43 :1				1.42 :1	

Table 16 (cont'd)

Year		Louis Creek			95% C.L.	Lemieux Creek			95% C.L.
		Male	Female	Total		Male	Female	Total	
1995	Spawning escapement above the fence (m/r)	457	293	750	+/- 162	549	452	1001	+/- 200
	AFC incidence	16.2%	14.0%	15.3%		42.6%	34.1%	38.8%	
	AFC Spawning escapement	74	41	115		234	154	388	
	Fish taken for brood	39	27	66		52	44	96	
	AFC incidence	2.6%	0.0%	1.5%		9.6%	22.7%	15.6%	
	Number of AFCs in brood fish	1	0	1		5	10	15	
	Brood Escapees	18	9	27		-	-	-	
	Fence induced mortalities	7	1	8		1	0	1	
	AFC incidence	14.3%	0.0%	12.5%		0.0%	-	0.0%	
	Number of AFC mortalities	1	0	1		0	0	0	
	Carcasses (spawners) recovered below the fence	0	0	0		2	1	3	
	Total escapement (spawners+brood+mortalities)	503	321	824		824	824	1648	
	Database (fence count) (b)	235	174	409		156	135	291	
	Overall AFC Incidence	32.3%	23.6%	28.6%		153.2%	121.5%	138.5%	
	AFC Total escapement	76	41	117		239	164	403	
	Male:Female ratio (using total esc. sample)			1.57 :1				1.00 :1	
	Spawning Escapement:Database ratio			1.83 :1				3.44 :1	

- a. Less than 7 marked fish in each sex category so sex based estimates are biased.
b. Sex based estimates biased; pooled AFC incidence applied to total.
c. Total escapement calculated from the pooled male and female data.
d. Biased by small sample sizes.
e. Fence count sex totals corrected for observed sex identification errors

Table 17. Spawning escapement estimates, marks applied and recovered, and carcasses recovered in Louis and Lemieux creeks, 1995 through 1998.

Creek	Year	Spawning escapement	Application sample		Recovery sample		
			Number of marks applied	Percentage of spawning escapement	Number of carcasses in recovery sample	Number of marks recovered	Percentage of spawning escapement
Louis	1993	554	239	43%	44	18	8%
	1994	288	235	82%	31	25	11%
	1995	750	409	55%	75	41	10%
	1996	284	200	70%	16	11	6%
	1997	193	65	34%	49	16	25%
	1998	195	180	92%	41	37	21%
Lemieux	1993	535	465	87%	118	103	22%
	1994	936	772	82%	351	291	38%
	1995	1002	291	29%	227	65	23%
	1996	188	130	69%	31	21	16%
	1997	525	298	57%	183	104	35%
	1998	605	590	98%	225	216	37%

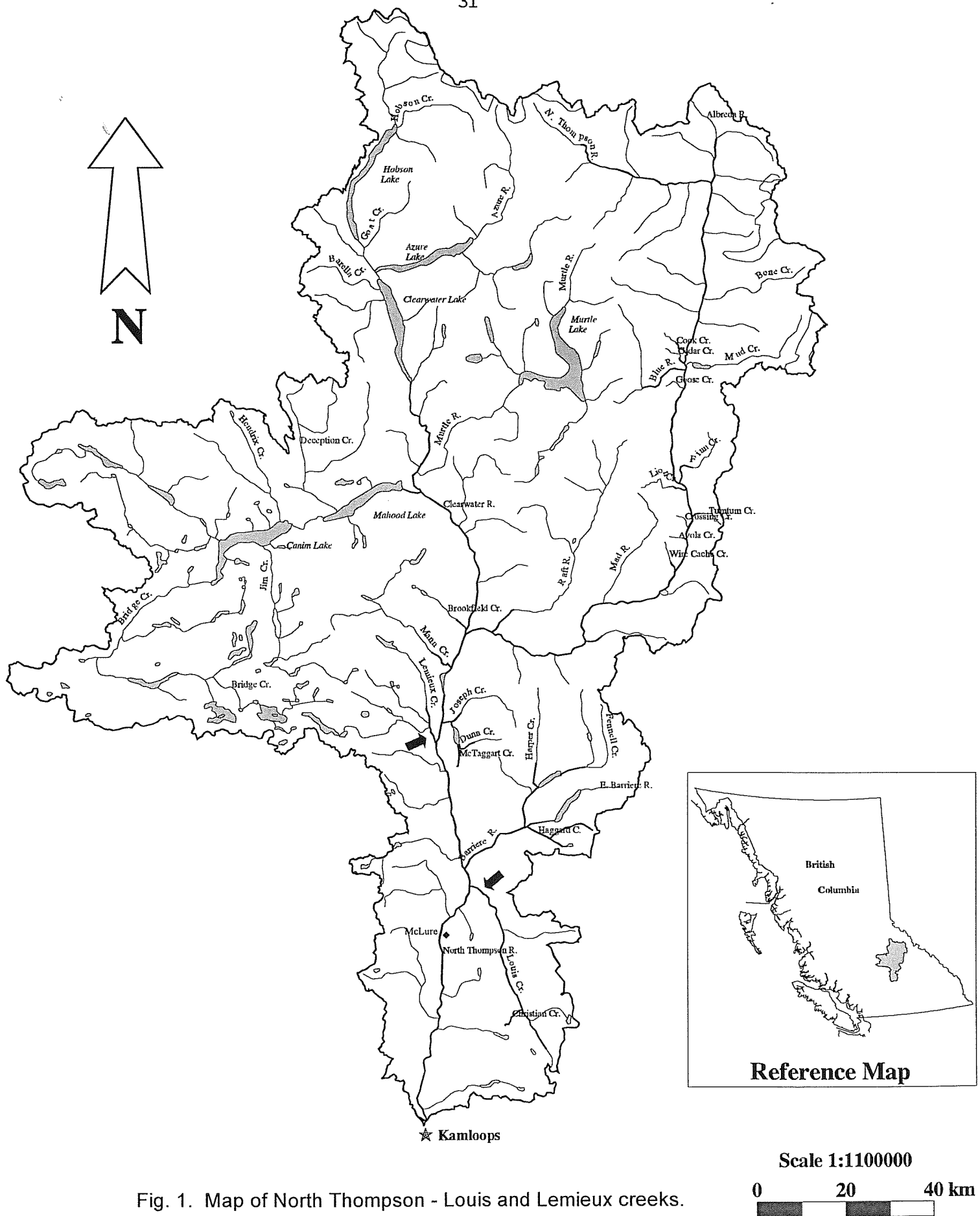


Fig. 1. Map of North Thompson - Louis and Lemieux creeks.

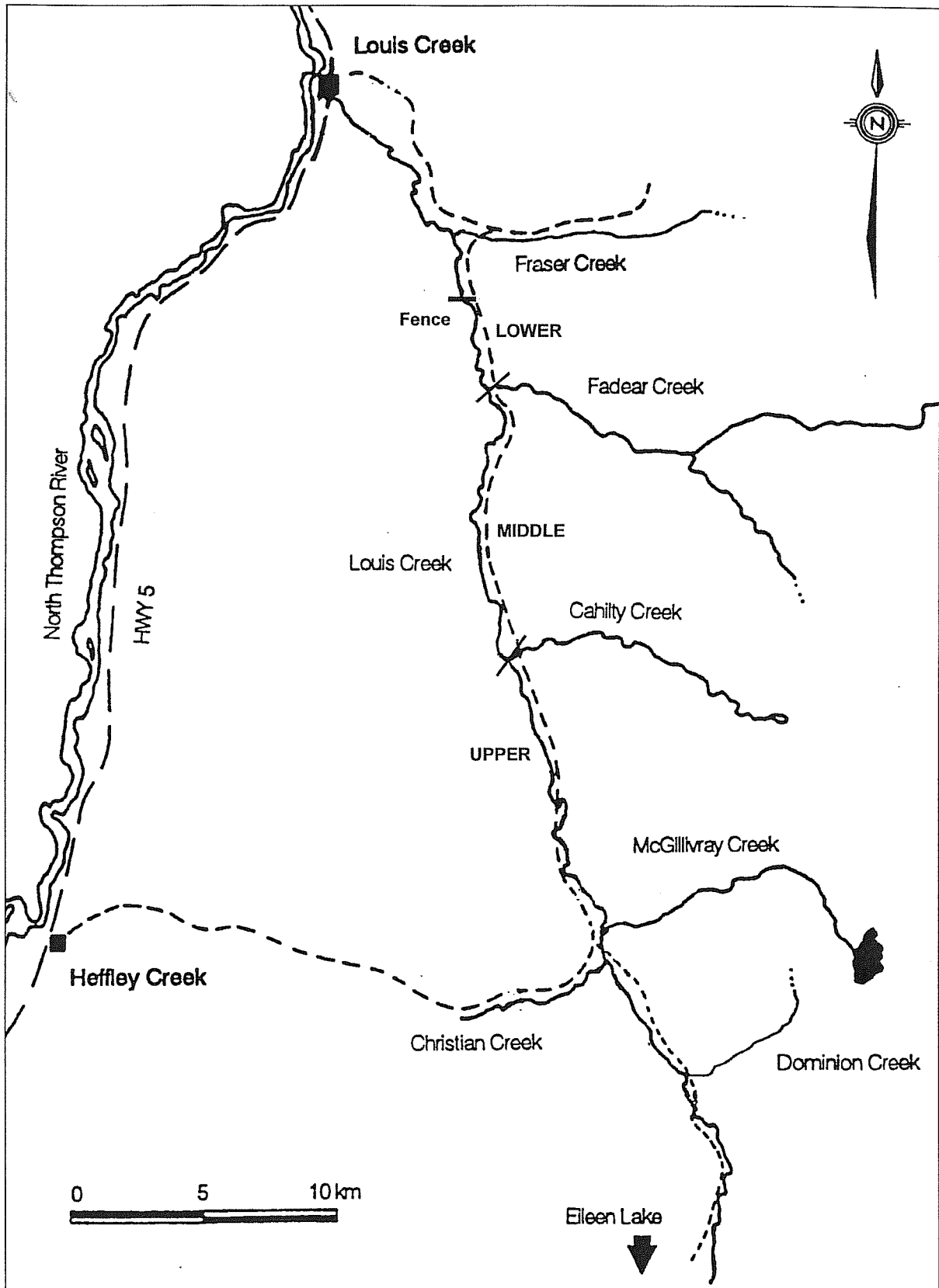


Fig. 2. Map of Louis Creek showing study sections.

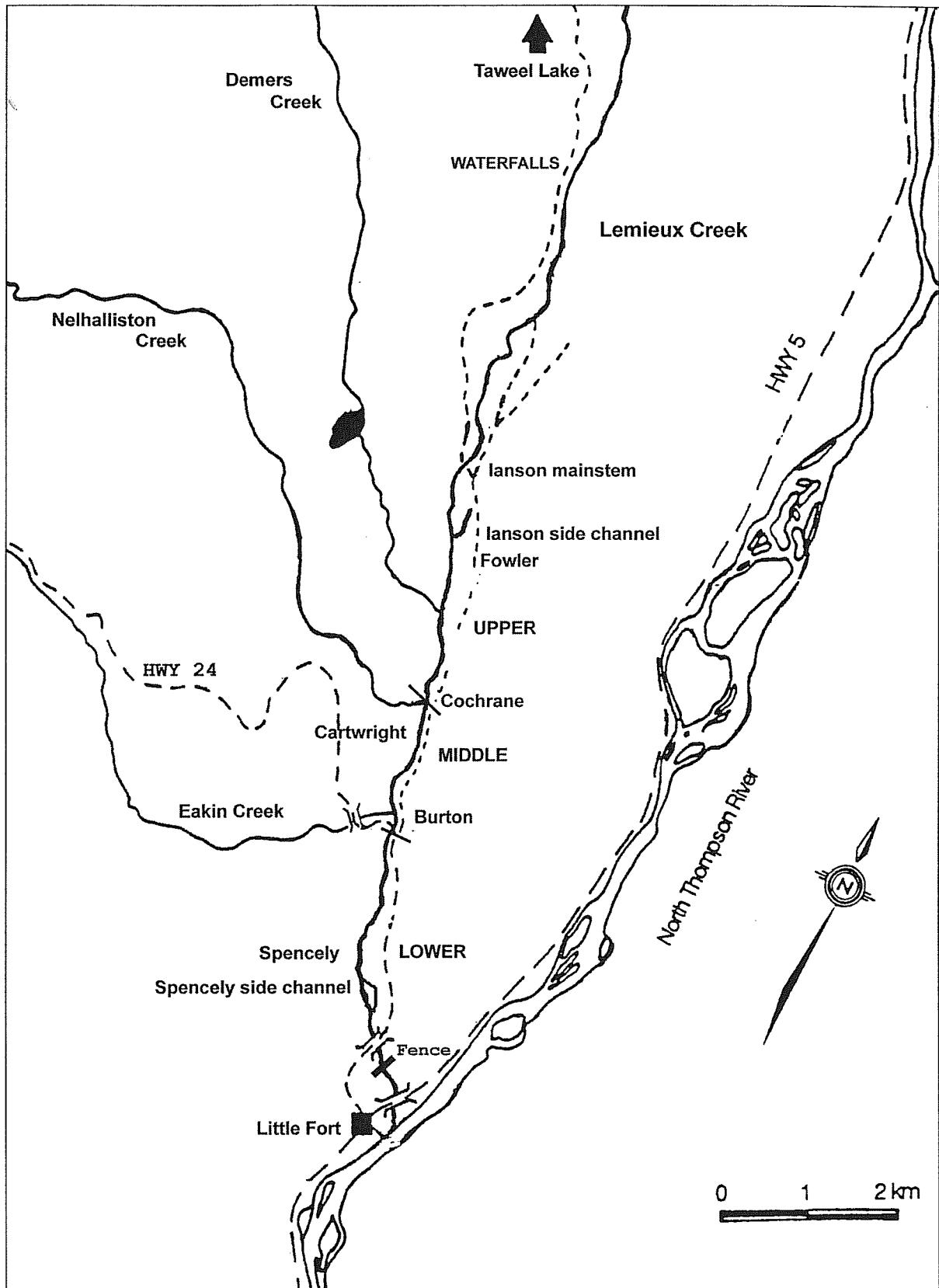


Fig. 3. Map of Lemieux Creek showing study sections.

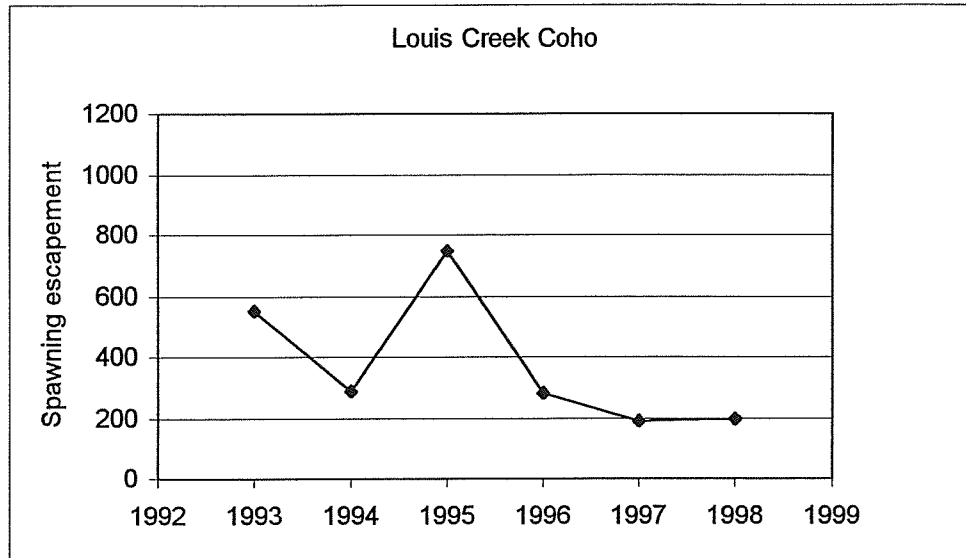


Fig. 4. Spawning population estimates for Louis Creek, 1993-1998.

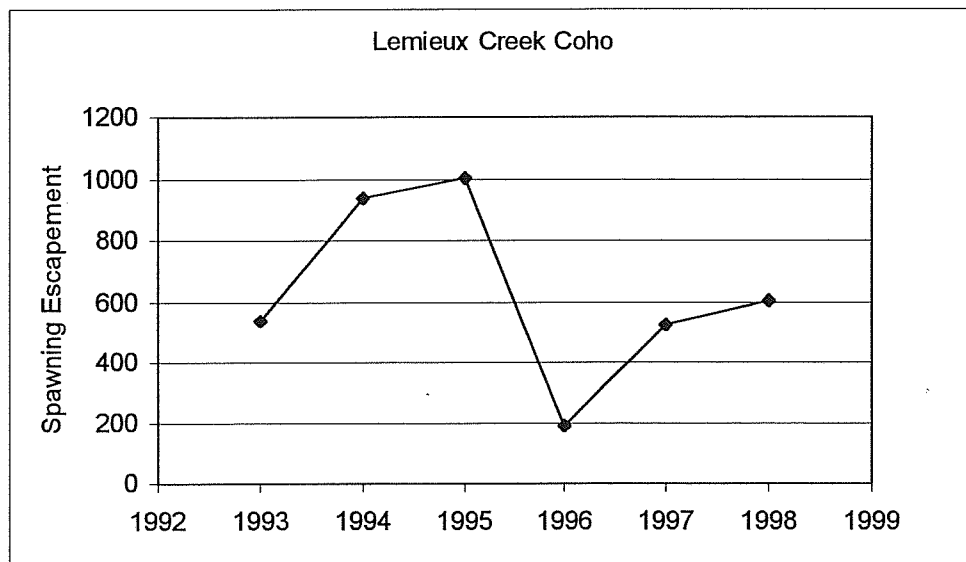


Fig. 5. Spawning population estimates for Lemieux Creek, 1993-1998.

Appendix 1. Petersen Disc tags applied and released in Louis Creek, 1995 through 1998.

Year	Date	Adipose Fin Present		Adipose Fin Absent		Total	
		Female	Male	Female	Male	Female	Male
1995 a	9-Oct	1	3	0	0	1	3
	10-Oct	0	5	0	1	0	6
	11-Oct	4	6	0	1	4	7
	12-Oct	7	13	2	0	9	13
	13-Oct	4	14 b	1	1	5	15
	16-Oct	12	36 b	1	2	13	38
	17-Oct	16	11	1	3	17	14
	18-Oct	8	0	2	5	10	5
	19-Oct	1	2	1	0	2	2
	26-Oct	1	0	0	0	1	0
	6-Nov	1	0	0	0	1	0
	9-Nov	2	4	0	0	2	4
	10-Nov	2	1	0	0	2	1
	15-Nov	40	44	1	13	41	57
	16-Nov	17	24	3	5	20	29
	17-Nov	13	15	4	1	17	16
	18-Nov	13	8	8	3	21	11
	20-Nov	2	2	0	2	2	4
	22-Nov	0	1	0	0	0	1
	24-Nov	1	0	0	0	1	0
	28-Nov	1	1	0	0	1	1
	30-Nov	2	1	0	0	2	1
	1-Dec	1	0	0	0	1	0
	Total	149	191	24	37	173	228

a. Excludes 6 males recovered dead on the fence less than 3 days after application.

b. Excludes 1 mortality during tag application.

Year	Date	Adipose Fin Present		Adipose Fin Absent		Total	
		Female	Male	Female	Male	Female	Male
1996	5-Oct	0	3	0	0	0	3
	7-Oct	0	3	0	1	0	4
	8-Oct	2	5	0	1	2	6
	9-Oct	1	0	0	0	1	0
	10-Oct	0	1	0	0	0	1
	11-Oct	0	2	0	0	0	2
	12-Oct	1	6	0	1	1	7
	15-Oct	0	0	2	2	2	2
	25-Oct	8	11	3	2	11	13
	29-Oct a	7	36	3	12	10	48
	30-Oct	1	3	0	2	1	5
	3-Nov	0	0	1	1	1	1

Appendix 1 (cont'd)

Year	Date	Adipose Fin Present		Adipose Fin Absent		Total	
		Female	Male	Female	Male	Female	Male
1996	4-Nov	0	0	0	1	0	1
(cont.)	12-Nov	6	8	3	3	9	11
	13-Nov	5	7	5	12	10	19
	14-Nov a	5	2	5	4	10	6
	15-Nov	0	1	2	1 b	2	2
	26-Nov	0	0	1	0	1	0
	27-Nov	1	0	0	0	1	0
	Total	37	88	25	43	62	131

a. Excludes one fish of unknown sex and adipose fin status at release.

b. Excludes 5 males recovered on the fence within 4 days of tag application.

Year	Date	Adipose Fin Present		Adipose Fin Absent		Total	
		Female	Male	Female	Male	Female	Male
1997 a	15-Oct	0	3	0	1	0	4
	16-Oct	1	2	1	3	2	5
	17-Oct	3	3	0	1	3	4
	18-Oct	1	5	0	4	1	9
	19-Oct	1	1	2	4	3	5
	20-Oct	1	0	0	0	1	0
	22-Oct	0	1	0	0	0	1
	23-Oct	0	3	0	0	0	3
	24-Oct	2	1	0	1	2	2
	27-Oct	0	0	0	1	0	1
	10-Nov	0	0	0	2	0	2
	11-Nov	0	1	0	0	0	1
	22-Nov	0	1	0	0	0	1
	25-Nov	0	2	0	1	0	3
	26-Nov	0	1	0	0	0	1
	17-Dec	0	0	0	1	0	1
	22-Dec	0	0	1	0	1	0
	Total	9	24	4	19	13	43

a. Excludes 9 males recovered on the fence within 4 days of tag application.

Appendix 1 (cont'd)

Year	Date	Adipose Fin Present		Adipose Fin Absent		Total	
		Female	Male	Female	Male	Female	Male
1998 a	2-Oct	0	1 b	0	0	0	1
	3-Oct	1	3	0	0	1	3
	4-Oct	0	1	0	0	0	1
	9-Oct	0	1	0	0	0	1
	10-Oct	0	1	0	0	0	1
	13-Oct	0	1	0	0	0	1
	28-Oct	9	12	0	0	9	12
	29-Oct	1	2	0	1	1	3
	30-Oct	1	4	0	0	1	4
	31-Oct	0	1	0	0	0	1
	2-Nov	0	2	0	0	0	2
	3-Nov	0	1	0	0	0	1
	4-Nov	1	2	0	0	1	2
	5-Nov	3	10	0	0	3	10
	6-Nov	3	8	0	0	3	8
	7-Nov	3	3	0	0	3	3
	8-Nov	1	2	0	0	1	2
	9-Nov	2	5	0	0	2	5
	10-Nov	1	4	0	0	1	4
	12-Nov	1	1	0	0	1	1
	13-Nov	1	2	0	0	1	2
	14-Nov	0	1	0	0	0	1
	15-Nov	3	4	0	1	3	5
	16-Nov	16	14	0	0	16	14
	17-Nov	7	7	0	0	7	7
	18-Nov	1	2	0	0	1	2
	20-Nov	1	0	0	0	1	0
	22-Nov	0	1	0	0	0	1
	25-Nov	2	3	0	0	2	3
	26-Nov	3	4	0	0	3	4
	27-Nov	4	3	0	0	4	3
	28-Nov	0	1	0	0	0	1
	29-Nov	0	1	0	0	0	1
	13-Dec	0	1	0	0	0	1
	14-Dec	0	1	0	0	0	1
	15-Dec	0	1	0	0	0	1
	Total	65	111	0	2	65	113

a. Excludes 2 tags applied to spawned out females.

b. Released with secondary mark only.

Appendix 2a. Daily brood stock removals from, and mortalities of coho at, Louis Creek, 1995 through 1998.

Brood Stock Removals

Year	Tag Date	Adipose Fin Present		Adipose Fin Absent		Total	
		Female	Male	Female	Male	Female	Male
1995	17-Oct	5	9	0	9	5	18
	18-Oct	3	8	0	8	3	16
	19-Oct	1	0	0	0	1	0
	20-Oct	0	1	0	1	0	2
	25-Oct	0	2	0	2	0	4
	26-Oct	8	2	0	2	8	4
	27-Oct	13	4	0	4	13	8
	28-Oct	7	0	0	0	7	0
	29-Oct	1	0	0	0	1	0
	6-Nov	1	1	0	0	1	1
	Total	39	27	0	26	39	53
Brood Stock (escaped back to river above fence)							
	14-Oct	-	-	-	-	3	3
	15-Oct	-	-	-	-	6	15
	Total					9	18
1996	9-Oct	0	0	0	1	0	1
	25-Oct	0	3	1	1	1	4
	28-Oct	1	0	2	2	3	2
	29-Oct	3	7	0	1	3	8
	30-Oct	1	0	0	0	1	0
	3-Nov	0	2	1	0	1	2
	12-Nov	0	2	4	1	4	3
	13-Nov	2	0	1	4	3	4
	3-Dec	0	0	1	0	1	0
	Total	7	14	10	10	17	24
1997	28-Oct	0	1	0	0	0	1
	29-Oct	1	0	0	0	1	0
	30-Oct	1	1	0	1	1	2
	31-Oct	0	2	0	1	0	3
	1-Nov	0	2	0	1	0	3
	4-Nov	1	2	1	1	2	3
	6-Nov	1	3	2	0	3	3
	7-Nov	5	11	2	10	7	21
	11-Nov	0	0	1	0	1	0
	16-Nov	1	0	0	0	1	0
	19-Nov	1	0	0	0	1	0
	25-Nov	1	0	0	0	1	0
	Total	12	22	6	14	18	36

Appendix 2a (cont'd)

Brood Stock Removals							
Year	Tag Date	Adipose Fin Present		Adipose Fin Absent		Total	
		Female	Male	Female	Male	Female	Male
1998	4-Nov	2	1	0	0	2	1
	5-Nov	1	2	0	0	1	2
	6-Nov	5	5	0	0	5	5
	7-Nov	1	2	0	0	1	2
	8-Nov	1	1	0	0	1	1
	9-Nov	1	1	0	0	1	1
	11-Nov	1	1	0	0	1	1
	15-Nov	2	2	0	0	2	2
	Total	14	15	0	0	14	15

Appendix 2b. Daily brood stock removals from, and mortalities of coho at, Louis Creek, 1995 to 1998.

Mortalities at Fence a							
Year	Tag Date	Adipose Fin Present		Adipose Fin Absent		Total	
		Female	Male	Female	Male	Female	Male
1995	13-Oct	0	1	0	0	0	1
	16-Oct	1	0	0	0	1	0
	17-Nov	0	1	0	1	0	2
	20-Nov	0	2	0	0	0	2
	29-Nov	0	1	0	0	0	1
	1-Dec	0	1	0	0	0	1
	Total	1	6	0	1	1	7
1996	29-Oct	0	1	0	0	0	1
	3-Nov	0	1	0	0	0	1
	14-Nov	0	2	0	0	0	2
	15-Nov	0	0	0	1	0	1
	Total	0	4	0	1	0	5
1997	10-Nov	0	1	0	1	0	2
	19-Nov	0	1	0	0	0	1
	20-Nov	0	1	0	0	0	1
	22-Nov	0	1	0	0	0	1
	29-Nov	0	2	0	0	0	2
	11-Dec	0	1	0	1	0	2
	Total	0	7	0	2	0	9

a. Tagged fish immediate mortalities or recovered less than 4 days after tag application.

Appendix 3. Petersen Disc tags applied and released in Lemieux Creek, 1995 through 1998

Year	Date	Adipose Fin Present		Adipose Fin Absent		Total	
		Female	Male	Female	Male	Female	Male
1995 a	9-Oct	1	3	0	2	1	5
	11-Oct	1	1	0	0	1	1
	12-Oct	7	10	3	5	10	15
	13-Oct	0	2	0	0	0	2
	16-Oct	3	2	0	3	3	5
	17-Oct	3	11	1	10	4	21
	18-Oct	1	1	0	0	1	1
	19-Oct	0	0	1	0	1	0
	20-Oct	0	1	1	0	1	1
	23-Oct	0	1	0	0	0	1
	24-Oct	3	1	0	3	3	4
	25-Oct	0	0	0	1	0	1
	8-Nov	1	0	0	2	1	2
	9-Nov	8	15	6	6	14	21
	14-Nov	8	9	6	6	14	15
	15-Nov	7	1	8	5	15	6
	16-Nov	8	9	2	6	10	15
	17-Nov	2	0	4	2	6	2
	18-Nov	6	1	1	3	7	4
	20-Nov	3	0	3	3	6	3
	21-Nov	1	1	0	0	1	1
	22-Nov	1	0	0	0	1	0
	23-Nov	3	0	2	1	5	1
	24-Nov	7	2	2	1	9	3
	26-Nov	2	2	2	1	4	3
	27-Nov	1	1	0	0	1	1
	28-Nov	1	2	0	0	1	2
	29-Nov	2	4	2	3	4	7
	30-Nov	7	3	1	3	8	6
	1-Dec	1	3	1	0	2	3
	22-Dec	0	1	0	0	0	1
	28-Dec	1	2	0	0	1	2
	Total	89	89	46	66	135	155

a. Excludes one male marked October 10 and recovered 2 days later dead on the fence.

Year	Date	Adipose Fin Present		Adipose Fin Absent		Total	
		Female	Male	Female	Male	Female	Male
1996 a	4-Oct	0	0	0	1	0	1
	7-Oct	0	3	0	0	0	3
	11-Oct	1	2	0	0	1	2
	12-Oct	0	1	0	0	0	1
	16-Oct	0	0	1	0	1	0

Appendix 3 (cont'd)

Year	Date	Adipose Fin Present		Adipose Fin Absent		Total	
		Female	Male	Female	Male	Female	Male
1996 a (cont.)	21-Oct	0	0	0	2	0	2
	25-Oct	0	3	0	1	0	4
	3-Nov	0	2	2	1	2	3
	4-Nov	1	1	1	2	2	3
	5-Nov	2	1	1	2	3	3
	6-Nov	2	5	3	2	5	7
	8-Nov	3	1	3	2	6	3
	12-Nov	0	1	0	0	0	1
	13-Nov	2	1	4	1	6	2
	14-Nov	4	2	5	2	9	4
	15-Nov	5	0	0	1	5	1
	19-Nov	0	1	0	0	0	1
	25-Nov	0	2	0	1	0	3
	26-Nov	2	3	0	0	2	3
	27-Nov	2	4	0	0	2	4
	28-Nov	4	4	2	1	6	5
	2-Dec	1	0	0	0	1	0
	3-Dec	0	2	2	1	2	3
	4-Dec	0	1	0	3	0	4
	12-Dec	0	2	1	0	1	2
	16-Dec	0	4	0	2	0	6
	17-Dec	1	1	0	2	1	3
	Total	30	47	25	27	55	74

a. Excludes one female recovered 2 days after application.

Year	Date	Adipose Fin Present		Adipose Fin Absent		Total	
		Female	Male	Female	Male	Female	Male
1997 a,b	15-Oct	0	2	0	0	0	2
	16-Oct	2	2	0	0	2	2
	17-Oct	2	9	1	2	3	11
	18-Oct	2	2	0	0	2	2
	19-Oct	0	1	0	0	0	1
	20-Oct	0	3	0	1	0	4
	21-Oct	1	2	0	0	1	2
	22-Oct	3	11	1	0	4	11
	23-Oct	2	9	0	1	2	10
	24-Oct	2	2	0	1	2	3
	26-Oct	1	2	0	0	1	2
	30-Oct	0	8	0	1	0	9
	31-Oct	13	8	0	0	13	8
	1-Nov	7	5	0	1	7	6

Appendix 3 (cont'd)

Year	Date	Adipose Fin Present		Adipose Fin Absent		Total	
		Female	Male	Female	Male	Female	Male
1997 a,b (cont.)	2-Nov	2	4	0	0	2	4
	3-Nov	10	8	0	0	10	8
	4-Nov	23	45	3	6	26	51
	6-Nov	3	6	3	0	6	6
	7-Nov	11	6	0	2	11	8
	8-Nov	3	3	0	0	3	3
	9-Nov	1	0	0	0	1	0
	10-Nov	2	4	0	0	2	4
	11-Nov	1	0	0	0	1	0
	12-Nov	1	2	0	0	1	2
	13-Nov	1	0	0	0	1	0
	19-Nov	1	0	0	0	1	0
	20-Nov	0	3	0	0	0	3
	21-Nov	1	0	0	0	1	0
	24-Nov	1	0	0	0	1	0
	25-Nov	4	4	0	0	4	4
	27-Nov	1	0	0	0	1	0
	28-Nov	1	0	0	0	1	0
	29-Nov	1	3	0	0	1	3
	30-Nov	1	1	0	0	1	1
	1-Dec	0	1	0	0	0	1
	3-Dec	0	1	0	0	0	1
	11-Dec	0	2	0	0	0	2
	15-Dec	3	1	0	0	3	1
	17-Dec	1	2	0	0	1	2
	30-Dec	0	1	0	0	0	1
	7-Jan	0	1	0	0	0	1
	8-Jan	0	1	0	0	0	1
	Total	108	165	8	15	116	180

a. Excludes one marked, adipose present female recovered below the fence.

b. Excludes one adipose absent female recovered within 5 days of release.

Year	Date	Adipose Fin Present		Adipose Fin Absent		Total	
		Female	Male	Female	Male	Female	Male
1998 a,b	10-Oct	0	1	0	0	0	1
	11-Oct	0	4	0	0	0	4
	14-Oct	0	2	0	0	0	2
	15-Oct	1	3	0	0	1	3
	16-Oct	1	2	0	0	1	2
	17-Oct	1	2	0	0	1	2
	18-Oct	4	3	0	1	4	4

Appendix 3 (cont'd)

Year	Date	Adipose Fin Present		Adipose Fin Absent		Total	
		Female	Male	Female	Male	Female	Male
1998 a,b (cont.)	20-Oct	0	1	0	0	0	1
	22-Oct	3	3	0	1	3	4
	23-Oct	1	0	0	0	1	0
	24-Oct	1	2	0	0	1	2
	25-Oct	0	1	0	2	0	3
	26-Oct	6	6	0	1	6	7
	27-Oct	3	15	3	2	6	17
	28-Oct	23	36	2	6	25	42
	29-Oct	9	15	1	6	10	21
	30-Oct	15	21	3	3	18	24
	31-Oct	8	8	2	4	10	12
	1-Nov	4	6	0	0	4	6
	2-Nov	2	5	0	0	2	5
	3-Nov	2	5	0	0	2	5
	4-Nov	2	3	0	1	2	4
	5-Nov	11	6	3	0	14	6
	6-Nov	4	3	0	0	4	3
	7-Nov	10	11	6	2	16	13
	8-Nov	6	11	0	0	6	11
	9-Nov	14	6	0	0	14	6
	10-Nov	8	7	1	1	9	8
	11-Nov	4	7	0	1	4	8
	12-Nov	6	4	1	0	7	4
	13-Nov	1	2	1	0	2	2
	14-Nov	3	1	0	0	3	1
	15-Nov	4	2	0	0	4	2
	16-Nov	7	8	0	0	7	8
	17-Nov	13	10	1	1	14	11
	18-Nov	10	2	1	3	11	5
	19-Nov	2	7	0	1	2	8
	20-Nov	5	3	0	1	5	4
	21-Nov	4	2	2	1	6	3
	22-Nov	8	8	1	0	9	8
	23-Nov	2	6	2	0	4	6
	24-Nov	0	2	1	0	1	2
	25-Nov	3	3	0	0	3	3
	26-Nov	3	2	0	0	3	2
	27-Nov	2	0	0	1	2	1
	28-Nov	1	0	0	0	1	0
	29-Nov	4	2	0	0	4	2
	30-Nov	1	5	0	0	1	5
	1-Dec	2	1	0	0	2	1
	4-Dec c	0	3	1	0	1	3
	5-Dec	0	0	0	2	0	2

Appendix 3 (cont'd)

Year	Date	Adipose Fin Present		Adipose Fin Absent		Total	
		Female	Male	Female	Male	Female	Male
1998 a,b (cont.)	6-Dec	1	2	0	0	1	2
	7-Dec	0	1	0	0	0	1
	8-Dec	0	1	0	0	0	1
	9-Dec	0	1	0	0	0	1
	12-Dec	0	1	0	0	0	1
	13-Dec	2	3	0	0	2	3
	17-Dec	0	1	0	0	0	1
	29-Dec	1	0	0	0	1	0
	30-Dec	0	1	0	0	0	1
	31-Dec	1	0	0	0	1	0
	Total	229	279	32	41	261	320

- a. Excludes 7 marked fish recovered within 5 days of tag application and 2 spawned out females.
b. Not Corrected for sex identification errors.
c. Fish were released with secondary marks only.

Appendix 4a. Daily brood stock removals from, and mortalities of coho at, Lemieux Creek, 1995 through 1998.

Brood Stock Removals							
Year	Tag Date	Adipose Fin Present		Adipose Fin Absent		Total	
		Female	Male	Female	Male	Female	Male
1995	25-Oct	0	1	0	0	0	1
	26-Oct	1	1	0	0	1	1
	31-Oct	2	2	1	2	3	4
	6-Nov	5	5	4	0	9	5
	7-Nov	6	5	1	1	7	6
	14-Nov	3	6	0	0	3	6
	15-Nov	6	11	0	0	6	11
	16-Nov	4	4	3	2	7	6
	17-Nov	2	0	1	0	3	0
	18-Nov	2	5	0	0	2	5
	20-Nov	2	2	0	0	2	2
	22-Nov	1	2	0	0	1	2
	23-Nov	0	3	0	0	0	3
	Total	34	47	10	5	44	52
1996	25-Nov	0	1	1	0	1	1
	26-Nov	0	0	1	0	1	0
	27-Nov	0	1	0	1	0	2
	28-Nov	2	0	1	0	3	0
	2-Dec	0	2	1	3	1	5
	4-Dec	0	1	0	0	0	1
	12-Dec	1	1	1	0	2	1
	16-Dec	0	1	1	0	1	1
	17-Dec	0	0	1	0	1	0
	Total	3	7	7	4	10	11
1997	25-Oct	0	2	0	1	0	3
	26-Oct	1	0	0	0	1	0
	27-Oct	6	4	0	0	6	4
	28-Oct	0	2	1	1	1	3
	29-Oct	4	8	1	1	5	9
	30-Oct	6	0	0	1	6	1
	31-Oct	1	0	0	0	1	0
	5-Nov	5	7	1	0	6	7
	6-Nov	4	2	0	1	4	3
	7-Nov	0	4	0	0	0	4
	9-Nov	2	3	1	0	3	3
	Total	29	32	4	5	33	37

Appendix 4a (cont'd)

Brood Stock Removals							
Year	Tag Date	Adipose Fin Present		Adipose Fin Absent		Total	
		Female	Male	Female	Male	Female	Male
1998	1-Nov	2	2	1	1	3	3
	2-Nov	1	3	2	0	3	3
	3-Nov	1	2	0	0	1	2
	4-Nov	1	2	0	0	1	2
	5-Nov	5	5	0	0	5	5
	6-Nov	3	3	0	0	3	3
	Total	13	17	3	1	16	18

Appendix 4b. Daily brood stock removals from, and mortalities of coho at, Lemieux Creek, 1995 to 1998.

Mortalities at Fence							
Year	Tag Date	Adipose Fin Present		Adipose Fin Absent		Total	
		Female	Male	Female	Male	Female	Male
1995	10-Oct	0	1	0	0	0	1
	Total	0	1	0	0	0	1
1996	2-Dec	0	0	1	0	1	0
	4-Dec	1	1	0	0	1	1
	Total	1	1	1	0	2	1

a. Includes one marked female recovered 2 days after tag application.

Mortalities at Fence							
Year	Tag Date	Adipose Fin Present		Adipose Fin Absent		Total	
		Female	Male	Female	Male	Female	Male
1997 a	11-Nov	0	0	1	0	1	0
	Total	0	0	1	0	1	0

a. Recovered within 5 days of release.

Appendix 4b (cont'd)

Mortalities at Fence		Adipose Fin Present		Adipose Fin Absent		Total	
Year	Tag Date	Female	Male	Female	Male	Female	Male
1998 a,b	29-Oct	1	1	0	0	1	1
	10-Nov	0	1	0	0	0	1
	19-Nov	1	0	0	0	1	0
	25-Nov	0	1	0	0	0	1
	28-Nov	0	1	0	0	0	1
	30-Nov	0	0	0	1	0	1
	Total	2	4	0	1	2	5

- a. Fish recovered on or near the fence within 5 days of tag application.
 b. Excludes four fish tagged and released at the fence.

Appendix 5. Daily recoveries of marked and unmarked carcasses by sex and adipose fin status, Louis Creek, 1995 through 1998.

Year	Date	Section	Adipose Fin Present				Adipose Fin Absent				Total	
			Unmarked		Marked		Unmarked		Marked		Total	
			Femal e	Male	Femal e	Male	Femal e	Male	Femal e	Male	Femal e	Male
1995	13-Oct	Lower	0	1	0	0	0	0	0	0	0	1
	16-Oct	Lower	1	0	0	0	0	0	0	0	1	0
	20-Oct	Lower	1	0	0	0	0	0	0	0	1	0
	23-Oct	Lower	0	1	0	0	0	0	0	0	0	1
	26-Oct	Lower	1	0	0	0	0	0	0	0	1	0
	31-Oct	Lower	0	0	1	0	0	0	0	0	1	0
	3-Nov	Middle (lower)	0	2	1	0	0	0	0	0	1	2
	6-Nov	Lower	0	1	0	0	0	0	0	0	0	1
	7-Nov	Lower	0	1	0	1	0	1	0	0	0	3
	9-Nov	Middle (lower)	0	0	2	1	0	0	1	0	3	1
	"	Middle (lower)	1	3	0	4	0	0	0	0	1	7
	15-Nov	Lower	0	1	0	0	0	1	0	0	0	2
	17-Nov	Lower	0	1	0	0 c	0	0	0	0 c	0	1
	20-Nov	Lower	0	0	1	0 d	0	0	0	0	1	0
	21-Nov	Lower	0	1	0	0	1	0	0	0	1	1
	22-Nov	Lower	0	1	1	1	0	0	0	0	1	2
	"	Middle (upper)	0	0	0	0	0	0	1	0	1	0
	"	Middle (lower)	1	1	0	1	0	0	0	0	1	2
	24-Nov	Lower	0	0	1	0	0	0	0	1	1	1
	26-Nov	Lower	0	0	0	0	0	0	0	1	0	1
	27-Nov	Lower	0	1	1	0	0	0	0	0	1	1
	29-Nov	Lower	0	0	0	1 c	0	0	0	1	0	2
	"	Middle (upper)	2	0	1	1 b	0	0	0	0	3	1
	"	Middle (lower)	3	1	1	0	0	0	0	0	4	1
	30-Nov	Lower	0	1	0	0	0	0	0	0	0	2 a
	1-Dec	Lower	0	0	1	0	0	0	0	0	1	0
	4-Dec	Lower	0	0	1	1 c	0	0	0	2	1	3
	18-Dec	Lower	0	0	0	1	0	0	0	1	0	2
	20-Dec	Lower	0	0	0	1	0	0	0	0	0	1
	"	Middle (upper)	0	0	1	1	0	0	0	0	1	1
	22-Dec	Lower	0	1	0	0	0	0	0	0	0	1
	Total		10	18	13	14	1	2	2	6	26	41

- a. Includes 1 unmarked male of unknown adipose fin status.
b. Includes one adipose present female with secondary mark only.
c. Excludes one male fence mortality within 3 days of release.
d. Excludes two male fence mortality within 3 days of release.

Appendix 5 (cont'd)

Year	Date	Section	Adipose Fin Present				Adipose Fin Absent				Total	
			Unmarked		Marked		Unmarked		Marked		Total	
			Femal e	Male	Femal e	Male	Femal e	Male	Femal e	Male	Femal e	Male
1996 a	31-Oct	Lower	0	0	0	0	0	1	0	0	0	1
	5-Nov	Lower	0	1	0	0	0	0	0	0	0	1
	6-Nov	Lower	0	0	0	0	0	1	0	0	0	1
	15-Nov	Lower	0	0	0	0	0	0	0	0	0	0
	16-Nov	Lower	0	1	1	0	0	0	0	0	1	1
	18-Nov	Lower	0	0	0	0	0	0	0	0	0	0
	21-Nov	Lower	0	0	0	1 b	0	0	0	0	0	1
	6-Dec	Middle (upper)	0	0	1	0	0	0	0	0	1	0
	"	Middle (lower)	0	0	1	0	0	0	0	0	1	0
	9-Dec	Lower	0	0	0	0	1	0	1	0	2	0
	16-Dec	Lower	0	0	0	0	0	0	0	1	0	1
	Total		0	2	3	1	1	2	1	1	5	6

a. Excludes males recovered on the fence within 4 days of tag application.

b. Includes one male without a secondary mark.

Year	Date	Section	Adipose Fin Present				Adipose Fin Absent				Total	
			Unmarked		Marked		Unmarked		Marked		Total	
			Femal e	Male	Femal e	Male	Femal e	Male	Femal e	Male	Femal e	Male
1997 a	16-Oct	Lower	1	0	0	0	0	0	0	0	1	0
	19-Oct	Lower	0	0	0	0	1	0	0	0	1	0
	23-Oct	Lower	1	0	0	0	0	0	0	0	1	0
	24-Oct	Lower	1	0	0	0	0	1	0	0	1	1
	28-Oct	Lower	0	1	0	0	0	0	1	0	1	1
	6-Nov	Lower	0	1	0	0	0	0	0	0	0	1
	7-Nov	Lower	0	2	0	0	0	0	0	0	0	2
	9-Nov	Lower	2	0	0	0	0	0	0	0	2	0
	10-Nov	Lower	0	0	1	0	0	0	0	0	1	0
	11-Nov	Lower	0	1	0	0	0	1	0	0	0	2
	12-Nov	Upper	1	0	0	0	0	0	0	0	1	0
	14-Nov	Lower	0	1	0	0	0	0	0	0	0	1
	15-Nov	Lower	0	1	0	0	0	0	0	0	0	1
	16-Nov	Lower	0	1	0	0	0	0	0	0	0	1
	17-Nov	Lower	0	0	0	1	0	0	0	0	0	1
	18-Nov	Lower	0	1	0	0	0	0	0	0	0	1
	20-Nov	Lower	0	0	0	0	0	0	0	1	0	1
	"	Middle (lower)	1	0	0	0	0	0	0	0	1	0
	21-Nov	Lower	0	0	0	0	0	0	1	0	1	0
	24-Nov	Lower	1	1	0	0	1	0	0	0	2	1
	26-Nov	Lower	0	0	0	0	0	1	0	0	0	1
	30-Nov	Lower	0	1	0	0	0	0	0	0	0	1

Appendix 5 (cont'd)

Year	Date	Section	Adipose Fin Present				Adipose Fin Absent				Total	
			Unmarked		Marked		Unmarked		Marked		Femal e	Male
			Femal e	Male	Femal e	Male	Femal e	Male	Femal e	Male		
1997 a (cont.)	1-Dec	Lower	0	1	0	0	0	1	0	0	0	2
	2-Dec	Lower	0	0	0	0	0	1	0	0	0	1
	3-Dec	Lower	0	1	0	1	0	1	0	0	0	3
	"	Middle (lower)	0	0	0	0	0	1	0	0	0	1
	11-Dec	Lower	0	0	0	0	0	0	0	1	0	1
	"	Middle (lower)	1	0	0	0	0	0	0	0	1	0
	12-Dec	Lower	0	1	0	0	0	0	0	0	0	1
	15-Dec	Lower	0	0	0	0	1	0	0	0	1	0
	Total		9	14	1	2	3	7	2	2	15	25

a. Excludes 9 males recovered on the fence within 4 days of tag application.

Year	Date	Section	Adipose Fin Present				Adipose Fin Absent				Total	
			Unmarked		Marked		Unmarked		Marked		Femal e	Male
			Femal e	Male	Femal e	Male	Female	Male	Femal e	Male		
1998	5-Nov	Lower	0	0	0	0	0	0	0	0	0	0
	6-Nov	Lower	0	0	0	0	0	0	0	0	0	0
	"	Middle (lower)	0	1	0	0	0	0	0	0	0	1
	7-Nov	Lower	0	0	0	0	0	0	0	0	0	0
	8-Nov	Lower	0	0	0	0	0	0	0	0	0	0
	9-Nov	Lower	0	0	0	0	0	0	0	0	0	0
	11-Nov	Lower	0	0	0	0	0	0	0	0	0	0
	12-Nov	Lower	1	0	0	0	0	0	0	0	1	0
	14-Nov	Lower	0	0	0	1	0	0	0	0	0	1
	15-Nov	Lower	0	0	0	0	0	0	0	0	0	0
	16-Nov	Lower	1	0	0	0	0	0	0	0	1	0
	17-Nov	Middle (lower)	0	0	1	4	0	0	0	0	2 a	4
	18-Nov	Lower	0	0	0	1	0	0	0	0	0	1
	22-Nov	Upper	0	0	1	2	0	0	0	0	1	2
	28-Nov	Middle (lower)	0	0	1	2	0	0	0	0	1	2
	"	Middle (lower)	0	0	1	1	0	0	0	0	1	1
	30-Nov	Upper	0	0	1	1	0	0	0	0	1	1
	3-Dec	Middle (upper)	0	0	0	1	0	0	0	0	0	1
	6-Dec	Upper	0	0	2	0	0	0	1	0	3	0
	8-Dec	Middle (upper)	0	0	2	2	0	0	0	0	2	2
	"	Middle (lower)	0	0	0	1 b	0	0	0	0	0	1
	12-Dec	Lower	0	0	0	2	0	0	0	0	0	2
	13-Dec	Upper	0	0	0	1	0	0	0	0	0	1
	15-Dec	Middle (upper)	0	0	5	3 c	0	0	0	0	5	3
	Total		2	1	14	22	0	0	1	0	18	23

a. Includes 1 female with unknown adipose status.

b. Includes 1 secondary mark only male.

c. Includes 1 secondary mark only male and 1 secondary mark only female.

Appendix 6. Daily recoveries of marked and unmarked carcasses by sex and adipose fin status, Lemieux Creek, 1995 through 1998.

Year	Date	Section	Reach	Adipose Fin Present				Adipose Fin Absent				Total	
				Unmarked		Marked		Unmarked		Marked		Female	Male
				Female	Male	Female	Male	Female	Male	Female	Male		
1995	9-Oct	Lower	6	0	0	0	0	0	2	0	0	0	2
	11-Oct	Lower	6	0	0	0	0	0	1	0	0	0	1
	12-Oct	Lower	6	0	0	0	0	0	1	0	0	0	1
	13-Oct	Lower	6 a	0	0	0	0	0	0	0	0	0	0
	17-Oct	Lower	6	0	1	0	0	0	1	0	0	0	2
	20-Oct	Lower	6	0	0	0	1	0	0	0	0	0	1
	26-Oct	Upper	1	0	0	0	0	0	1	0	0	0	1
	3-Nov	Lower	6	0	1	0	0	0	0	0	0	0	1
	6-Nov	Upper	1	1	0	0	1	0	0	0	0	1	0
	"	Lower	6	1	0	0	0	0	0	0	0	1	1
	"	Below Fence	7	0	1	0	0	0	0	0	0	0	1
	7-Nov	Lower	6 a	0	0	0	1	0	0	0	0	0	1
	9-Nov	Lower	6	0	0	2	0	0	0	0	0	2	0
	10-Nov	Below Fence	7	1	0	0	0	0	0	0	0	1	0
	16-Nov	Upper	3	1	0	0	1	0	0	0	0	0	1
	"	Middle	4	0	0	1	0	0	0	0	0	2	0
	17-Nov	Lower	6	0	0	1	0	0	0	0	0	1	0
	20-Nov	Upper	1	1	0	0	0	0	0	0	1	1	1
	"	Lower	6	0	3	1	0	0	0	0	0	1	3
	21-Nov	Lower	6	0	0	0	1	0	1	0	0	0	2
	22-Nov	Lower	6	0	1	0	0	0	0	0	0	0	1
	23-Nov	Lower	6	0	0	0	2	0	0	0	1	0	3
	24-Nov	Upper	1	7	0	1	1	0	0	2	0	10	1
	"	Upper	2	0	0	0	1	0	0	0	0	0	1
	"	Upper	3	0	0	0	1	0	1	0	0	0	2
	"	Lower	6	0	1	0	0	0	0	0	0	0	1
	"	Below Fence	7	0	1	0	0	0	0	0	0	0	1
	26-Nov	Upper	1	1	0	1	0	1	0	0	0	3	0
	"	Lower	6	0	1	1	2	1	2	0	1	1	3
	27-Nov	Upper	1	0	0	0	0	1	0	0	0	1	0
	"	Upper	3	0	1	0	0	0	0	0	0	0	1
	"	Lower	6	1	3	0	0	2	0	0	0	4	6
	"	Lower	6A	1	0	0	0	0	0	0	0	1	0
	28-Nov	Lower	6	2	0	0	0	0	0	0	0	2	0
	29-Nov	Lower	6	1	0	0	1	1	2	0	0	2	3
	30-Nov	Upper	1	1	3	1	0	2	0	1	0	5	3
	"	Upper	2	0	0	0	1	1	0	0	1	1	2
	"	Upper	3	1	2	0	1	0	1	0	0	1	4
	"	Middle	4	0	1	0	0	0	0	0	0	0	1

Appendix 6 (cont'd)

Year	Date	Section	Reach	Adipose Fin Present				Adipose Fin Absent				Total	
				Unmarked		Marked		Unmarked		Marked		Female	Male
				Female	Male	Female	Male	Female	Male	Female	Male	Female	Male
1995	30-Nov	Lower	6	4	0	1	0	0	1	0	0	5	1
(cont.)	1-Dec	Lower	6	1	2	0	0	0	0	0	0	1	2
	4-Dec	Lower	6	2	3	1	0	1	3	2	0	6	6
	5-Dec	Upper	1	0	0	0	1	1	0	0	0	3 b	8 c
	"	Upper	2	1	1	0	0	0	0	0	0	1	1
	"	Middle	4	0	0	0	0	0	1	0	0	0	1
	"	Lower	6	0	1	0	0	1	1	0	0	1	2
	"	Lower	6A	0	2	1	0	0	0	0	0	1	2
	6-Dec	Upper	1	2	2	1	1	3	1	1	0	7	4
	8-Dec	Upper	1	0	0	1	0	0	0	0	0	1	0
	11-Dec	Upper	1	0	0	0	0	0	1	0	0	0	1
	"	Upper	2	0	0	0	0	0	2	0	0	0	2
	"	Upper	3	0	1	0	0	0	0	0	0	0	1
	14-Dec	Upper	1	1	5	1	0	4	2	0	1	6	8
	"	Upper	2	0	1	0	0	0	0	1	1	1	2
	"	Upper	3	1	1	0	0	1	0	1	0	3	1
	15-Dec	Upper	1	0	1	0	0	1	0	1	0	2	1
	16-Dec	Upper	1	0	1	0	0	0	1	0	0	0	2
	17-Dec	Upper	1	1	0	0	0	0	1	0	1	1	2
	"	Lower	6A	1	0	0	0	0	0	0	0	1	0
	18-Dec	Upper	1	0	1	0	0	0	1	0	0	0	2
	19-Dec	Upper	1	0	0	1	0	0	1	0	0	1	1
	"	Upper	2 d	1	0	0	0	0	1	0	0	1	1
	"	Upper	3	3	0	0	1	0	0	0	0	3	1
	21-Dec	Upper	3	1	1	0	0	0	0	1	1	2	2
	23-Dec	Upper	1	1	0	0	0	1	0	0	0	2	0
	27-Dec	Upper	1	0	1	0	0	0	1	0	0	0	2
	"	Lower	6	2	0	1	2	1	1	1	0	5	3
	28-Dec	Lower	6A	1	0	0	0	1	0	0	0	2	0
	29-Dec	Middle	4	0	0	0	1	0	0	0	0	0	1
	"	Lower	6	0	1	0	0	0	1	0	0	0	2
	30-Dec	Lower	6	1	2	0	0	0	1	0	0	1	3
	3-Jan	Upper	1	0	1	0	0	0	0	0	0	0	1
	"	Upper	2	0	0	0	1	0	0	0	0	0	1
	"	Upper	3	0	0	0	0	0	1	0	0	0	1
	"	Middle	5	0	1	0	0	0	0	0	0	0	1
	"	Lower	6	0	0	0	0	0	1	0	1	0	2
	4-Jan	Lower	6	0	1	0	0	0	0	0	0	0	1
	9-Jan	Lower	6	1	1	0	1	0	1	0	1	1	4
	10-Jan	Upper	2	0	0	1	0	0	0	0	0	1	0
	Total			45	51	18	23	24	37	11	10	100	128

- a. Excludes one of unknown sex and adipose status and one marked male recovered on the fence 2 days after tag application.
b. Includes 2 unmarked females of unknown adipose status.
c. Includes 7 males of unknown adipose status (2 marked and 5 unmarked).
d. Excludes one of unknown sex and adipose status.

Appendix 6 (cont'd)

Year	Date	Section	Reach	Adipose Fin Present				Adipose Fin Absent				Total	
				Unmarked		Marked		Unmarked		Marked		Female	Male
				Female	Male	Female	Male	Female	Male	Female	Male		
1996	29-Oct	Lower	6	0	1	0	0	0	0	0	0	0	1
	1-Nov	Lower	6	0	1	0	0	0	0	0	0	0	1
	5-Nov	Lower	6	0	1	0	0	0	1	0	0	0	2
	12-Nov	Lower	6	0	0	1	0	0	0	0	0	1	0
	13-Nov	Lower	6	0	1	0	0	0	0	0	0	0	1
	"	Below Fence	7	1	0	0	0	0	0	0	0	1	0
	14-Nov	Lower	6	1	0	0	0	0	0	0	0	1	0
	18-Nov	Lower	6	0	0	0	0	0	0	1	0	1	0
	"	Below Fence	7	0	1	0	0	0	2	0	0	0	3
	22-Nov	Lower	6	0	0	0	0	0	0	0	1	0	1
	25-Nov	Upper	1	0	0	0	1	0	0	0	0	0	1
	"	Upper	2	0	0	0	0	0	1	0	0	0	1
	"	Middle	4	0	0	0	0	1	0	0	0	1	0
	"	Lower	6	0	0	0	0	0	0	1	0	1	0
	2-Dec	Upper	1	0	0	0	0	0	0	0	1	0	1
	"	Upper	2	0	0	1	0	0	0	0	0	1	0
	"	Middle	5	0	0	0	0	0	0	0	1 a	0	1
	"	Lower	6	0	0	0	1	0	0	0	0	0	1
	4-Dec	Lower	6	0	0	0	0	0	0	0	0	0	0
	5-Dec	Lower	6	0	0	0	0	0	0	1	0	1	0
	6-Dec	Lower	6	0	0	0	1 b	0	1	0	1	0	3
	9-Dec	Lower	6	0	0	1	1	0	0	0	0	1	1
	11-Dec	Upper	1	0	0	0	0	1	0	0	0	1	0
	"	Upper	3	0	0	0	0	0	0	1	0	1	0
	"	Lower	6	0	0	1	2	0	0	0	0	1	2
	16-Dec	Upper	1	0	0	0	0	0	0	0	1	0	1
	17-Dec	Upper	1	0	0	0	1	0	0	0	0	0	1
	Total			2	5	4	7	2	5	4	5	12	22

a. Carcass with secondary mark only.

b. Excludes one marked female dead on the fence 2 days after tag application.

Year	Date	Section	Reach	Adipose Fin Present				Adipose Fin Absent				Total	
				Unmarked		Marked		Unmarked		Marked		Female	Male
				Female	Male	Female	Male	Female	Male	Female	Male		
1997	19-Oct	Below Fence	7	0	0	0	0	0	1	0	0	0	1
	24-Oct	Below Fence	7	0	0	0	0	0	1	0	0	0	1
	25-Oct	Below Fence	7	1	0	0	0	0	0	0	0	1	0
	31-Oct	Lower	6	0	0	0	1	0	0	0	0	0	1
	2-Nov	Middle	3	0	0	0	1	0	0	0	0	0	1
	3-Nov	Lower	6	0	0	1	0	0	0	0	0	1	0
	6-Nov	Lower	6	2	0	0	0	0	0	0	0	2	0
	6-Nov	Below Fence	7	0	1	0	0	0	1	0	0	0	2

Appendix 6 (cont'd)

Year	Date	Section	Reach	Adipose Fin Present				Adipose Fin Absent				Total	
				Unmarked		Marked		Unmarked		Marked		Female	Male
				Female	Male	Female	Male	Female	Male	Female	Male		
1997	7-Nov	Below Fence	7	0	1	0	0	0	0	0	0	0	1
(cont.)	8-Nov	Lower	6	0	0	0	0	0	0	0	1	0	1
	8-Nov	Below Fence	7	0	1	0	0	0	0	0	0	0	1
	9-Nov	Upper	1	0	0	0	0	1	0	0	0	1	0
	9-Nov	Upper	2	0	0	0 d	0	0	0	0	0	0 d	0
	9-Nov	Lower	6	0	0	1	0	0	0	0	0	1	0
	9-Nov	Below Fence	7	0	1	0	0	0	0	0	0	0	1
	11-Nov	Middle	4	0	0	0	0	0	1	0	0	0	1
	11-Nov	Below Fence	7	0	1	0	0	0	0	0	0	0	1
	11-Nov	Lower	8	0	0	0	1	0	0	0	0	0	1
	14-Nov	Lower	6	0	0	0	1	0	0	0	0	0	1
	16-Nov	Middle	4	0	0	1	0	0	0	0	0	1	0
	16-Nov	Lower	6	1	0	1	0	0	0	0	0	2	0
	17-Nov	Lower	6	0	0	0	0	0	0	0	1	0	1
	18-Nov	Upper	2	0	0	0	1	0	0	0	0	0	1
	18-Nov	Middle	4	0	0	1	0	0	0	0	0	1	0
	18-Nov	Middle	5	0	1	0	0	0	0	0	0	0	1
	18-Nov	Lower	6	1	0	0	0	0	0	0	0	1	0
	19-Nov	Upper	2	0	0	0	0	0	0	1	0	1	0
	19-Nov	Lower	6	0	0	0	1	0	0	0	1	0	2
	21-Nov	Upper	1	0	0	0	2	0	0	0	0	0	2
	21-Nov	Lower	6	0	0	1	2	0	0	0	0	1	2
	22-Nov	Lower	6	0	1	0	2	0	0	0	0	0	3
	23-Nov	Lower	6	0	0	1	2	0	0	0	0	1	2
	24-Nov	Upper	1	1	0	0	0	0	0	0	0	1	0
	24-Nov	Upper	3	0	3	0	3	0	0	0	0	0	6
	24-Nov	Middle	4	0	0	1	1	0	0	0	0	1	1
	24-Nov	Middle	5	0	0	1 a	0	0	0	0	0	1	0
	24-Nov	Lower	6	0	1	1	1 a	0	1	0	1	1	4
	24-Nov	Lower	8	0	0	0	0	0	0	1	0	1	0
	25-Nov	Upper	1	0	4	0	1	0	0	0	0	0	5
	25-Nov	Lower	6	0	1	3 b	0	0	0	0	0	3	1
	26-Nov	Upper	1	1	0	2	1	0	0	0	0	3	1
	27-Nov	Upper	1	0	1	0	1	0	0	0	0	0	2
	27-Nov	Upper	3	0	0	1	0	0	0	0	0	1	0
	27-Nov	Middle	4	0	2	0	0	0	0	0	0	0	2
	27-Nov	Middle	5	0	1	0	2	0	0	0	0	0	3
	27-Nov	Lower	6	0	0	1 a	2	0	0	0	0	1	2
	28-Nov	Upper	1	0	0	1	1	0	0	0	0	1	1
	28-Nov	Lower	6	0	1	0	0	0	0	0	1	0	2
	29-Nov	Lower	6	1	1	0	1	0	1	0	0	1	3
	30-Nov	Lower	6	1	1	0	0	0	0	0	0	1	1
	1-Dec	Upper	1	1	1	0	1	0	2	0	0	1	4
	1-Dec	Upper	2	0	0	0	1	0	0	0	0	0	1

Appendix 6 (cont'd)

Year	Date	Section	Reach	Adipose Fin Present				Adipose Fin Absent				Total	
				Unmarked		Marked		Unmarked		Marked		Female	Male
				Female	Male	Female	Male	Female	Male	Female	Male		
1997	1-Dec	Upper	3	0	0	0	1	0	0	0	0	0	1
(cont.)	1-Dec	Middle	4	1	0	1	0	0	0	0	0	2	0
	1-Dec	Middle	5	0	2	0	1	0	1	0	0	0	4
	1-Dec	Lower	6	0	1	0	0	0	0	0	0	0	1
	1-Dec	Lower	8	0	1	0	1	0	0	0	0	0	2
	2-Dec	Upper	1	2	1	4	1	0	0	0	0	6	2
	3-Dec	Lower	6	0	1	0	0	0	0	1	0	1	1
	4-Dec	Upper	1	0	2	0	0	0	1	0	0	0	3
	4-Dec	Lower	6	1	2	0	0	0	0	0	0	1	2
	5-Dec	Upper	1	0	0	0	1	0	0	0	0	0	1
	5-Dec	Upper	2	1	1	1	1	0	0	0	0	2	2
	5-Dec	Upper	3	0	0	0	1	0	0	0	0	0	1
	5-Dec	Middle	4	0	0	0	2	0	0	0	0	0	2
	5-Dec	Middle	5	0	0	0	1	0	1	1	0	1	2
	5-Dec	Lower	6	0	1	0	1	0	1	0	1	0	4
	5-Dec	Lower	8	0	0	1	0	0	0	0	0	1	0
	7-Dec	Upper	1	1	1	0	1	0	0	0	0	1	2
	8-Dec	Lower	6	0	1	0	0	0	0	0	0	0	1
	9-Dec	Upper	2	0	0	1	0	0	0	0	0	1	0
	9-Dec	Upper	3	0	0	1	0	0	0	0	0	1	0
	9-Dec	Middle	4	2	0	0	0	0	0	1	0	3	0
	9-Dec	Lower	6	0	1	0	1	0	0	0	0	0	2
	9-Dec	Lower	8	1	1	0	0	0	0	0	0	1	1
	11-Dec	Lower	6	0	0	0	1	0	0	0	0	0	1
	13-Dec	Lower	6	0	1	1	1	0	0	0	0	1	2
	14-Dec	Lower	6	0	0	0	1	0	0	0	0	0	1
	15-Dec	Upper	1	0	1	1	0	0	0	0	0	1	1
	15-Dec	Upper	3	0	1	0	0	0	0	0	0	0	1
	15-Dec	Middle	4	0	0	1	0	0	0	1	0	2	0
	15-Dec	Middle	5	0	0	0	1 a	0	0	0	0	0	1
	15-Dec	Lower	6	0	0	0	1	0	0	0	0	0	1
	15-Dec	Upper	9	1	0	0	0	0	0	0	0	1	0
	17-Dec	Upper	1	0	0	0	1	0	0	0	0	0	1
	17-Dec	Upper	2	1	2	0	1	0	0	0	0	1	3
	17-Dec	Upper	3	0	0	1	0	0	0	0	0	1	0
	17-Dec	Middle	4	0	1	0	0	0	1	0	0	0	2
	17-Dec	Below Fence	7	0	0	0	0	0	0	0	0	1 c	0
	18-Dec	Lower	6	0	1	0	0	0	0	0	0	0	1
	19-Dec	Upper	3	0	0	1	0	0	0	0	0	1	0
	19-Dec	Below Fence	7	1	0	0	0	0	0	0	0	1	0
	19-Dec	Lower	8	0	0	0	1	0	0	0	0	0	1
	24-Dec	Lower	6	0	0	0	0	0	1	0	0	0	1
	26-Dec	Lower	6	0	1	0	1	0	0	0	0	0	2
	27-Dec	Lower	6	0	0	0	1	0	0	0	0	0	1

Appendix 6 (cont'd)

Year	Date	Section	Reach	Adipose Fin Present				Adipose Fin Absent				Total	
				Unmarked		Marked		Unmarked		Marked		Total	
				Female	Male	Female	Male	Female	Male	Female	Male	Female	Male
1997	28-Dec	Lower	6	0	0	0	0	1	0	0	0	1	0
(cont.)	29-Dec	Upper	3	1	0	0	0	0	0	0	0	1	0
	29-Dec	Lower	8	0	0	0	1	0	0	0	0	0	1
	1-Jan	Lower	6	0	1	0	1	0	0	0	0	0	2
	2-Jan	Upper	3	0	0	1	0	0	0	0	0	1	0
	6-Jan	Lower	6	0	1	0	0	0	0	0	0	0	1
	7-Jan	Upper	3	0	0	1	0	0	0	0	0	1	0
	7-Jan	Middle	5	0	0	1	0	0	0	0	0	1	0
	9-Jan	Lower	6	0	1	0	0	0	0	0	0	0	1
	Total			23	51	35	55	2	14	6	6	67	126

a. Carcass with secondary mark only.

b. Two carcasses with secondary mark only.

c. Includes one marked female with unknown adipose fin status.

d. Excludes one marked female carcass recovered less than 5 days after tag application.

Year	Date	Section	Reach	Adipose Fin Present				Adipose Fin Absent				Total	
				Unmarked		Marked		Unmarked		Marked		Total	
				Female	Male	Female	Male	Female	Male	Female	Male	Female	Male
1998 a	3-Nov	Lower	6B	0	0	0	1	0	0	0	0	0	1
	4-Nov	Lower	6B	0	1	0	0	0	0	0	0	0	1
	5-Nov	Upper	3	0	0	0	0	0	0	0	0	0	0 d
	5-Nov	Middle	5	0	0	1	0	0	0	0	0	1	0
	5-Nov	Lower	6C	0	0	0	0	0	0	1	0	1	0
	8-Nov	Upper	2	0	0	1	0	0	0	0	0	1	0
	8-Nov	Upper	3	0	0	0	1	0	0	0	0	0	1
	8-Nov	Middle	4	0	0	0	1	0	0	0	0	0	1
	11-Nov	Upper	1	0	0	0	1	0	0	0	0	0	1
	11-Nov	Upper	2	0	0	1	0	0	0	0	0	1	0
	12-Nov	Lower	6B	0	0	1	0	0	0	0	0	1	0
	12-Nov	Lower	6C	0	0	1	0	0	0	0	0	1	0
	13-Nov	Upper	1	0	0	0	1	0	0	0	0	0	1
	13-Nov	Upper	2	0	0	0	3	0	0	1	0	1	3
	13-Nov	Upper	3	0	0	1	0	0	0	0	1	1	1
	13-Nov	Lower	6B	0	0	1	0	0	0	0	0	1	0
	14-Nov	Lower	6B	0	0	1	0	0	0	0	0	1	0
	15-Nov	Upper	2	0	0	2	3	0	0	3	1	5	4
	15-Nov	Upper	3	0	0	1	0	0	0	0	0	1	0
	15-Nov	Middle	4	0	0	1	1	0	0	0	1	1	2
	15-Nov	Below Fence	7	1	0	0	0	0	0	0	0	1	0
	15-Nov	Lower	10	0	0	0	1	0	0	0	0	0	1
	16-Nov	Upper	2	0	0	2	0	0	0	0	0	2	0
	16-Nov	Middle	4	0	0	1	0	0	0	0	0	1	0

Appendix 6 (cont'd)

Year	Date	Section	Reach	Adipose Fin Present				Adipose Fin Absent				Total	
				Unmarked		Marked		Unmarked		Marked		Female	Male
				Female	Male	Female	Male	Female	Male	Female	Male		
1998 a (cont.)	17-Nov	Lower	6B	0	0	1	0	0	0	0	0	1	0
	18-Nov	Upper	2	0	0	0	4	0	0	0	1	0	5
	18-Nov	Upper	3	0	0	2	0	0	0	0	0	2	0
	18-Nov	Middle	4	0	0	1	3	0	0	0	0	1	3
	18-Nov	Lower	8	0	0	1	0	0	0	0	0	1	0
	18-Nov	Lower	6C	0	0	0	1	0	0	0	0	0	1
	19-Nov	Lower	6B	0	0	0	1	0	0	0	0	0	1
	20-Nov	Lower	6B	0	0	1	0	0	0	0	1	1	1
	21-Nov	Upper	1	0	0	1	2	0	0	0	0	1	2
	21-Nov	Upper	2	0	0	2	1	0	0	1	1	3	2
	21-Nov	Upper	3	0	0	2	1	0	0	0	0	2	1
	21-Nov	Middle	4	0	0	3	1	0	0	0	0	3	1
	21-Nov	Middle	5	0	0	0	0	0	0	1	0	1	0
	21-Nov	Lower	10	0	0	0	0	0	0	0	0 e	0	0
	21-Nov	Lower	6B	0	0	1	0	0	0	0	0	1	0
	22-Nov	Lower	6B	0	0	1	2	0	0	0	0	1	2
	23-Nov	Upper	1	0	0	2	0	0	0	0	0	2	0
	23-Nov	Upper	2	0	0	0	1	0	0	0	1	0	2
	23-Nov	Upper	3	0	0	0	2	0	0	1	0	1	2
	23-Nov	Middle	4	0	0	1	0	0	0	0	0	1	0
	23-Nov	Lower	8	0	0	1	0	0	0	0	0	1	0
	23-Nov	Lower	6C	0	0	1	0	0	0	0	0	1	0
	25-Nov	Upper	1	0	0	1	0	0	0	0	0	1	0
	25-Nov	Upper	2	0	0	5 b	0	0	0	0	0	5	0
	25-Nov	Upper	3	0	0	3	2	0	0	1	0	4	2
	25-Nov	Middle	4	0	0	1	2	0	0	0	0	1	2
	25-Nov	Lower	6B	0	0	1	1	0	0	0	0	1	1
	26-Nov	Lower	6B	0	0	0	0	0	0	1	0	1	0
	27-Nov	Upper	1	0	0	2	2	0	0	0	0	2	2
	27-Nov	Upper	2	0	1	0	0	1	0	0	0	1	1
	27-Nov	Upper	3	1	0	0	2	0	0	0	0	1	2
	27-Nov	Middle	4	0	0	5 b	2	0	0	0	0	5	2
	27-Nov	Middle	5	0	0	0	2	0	0	0	0	0	2
	27-Nov	Lower	6B	0	0	3	1	0	0	0	0	3	1
	27-Nov	Lower	6C	1	1	1	2	0	0	1	0	3	3
	28-Nov	Lower	6B	1	0	0	0	0	0	0	0	1	0
	28-Nov	Lower	6C	0	0	0	1	0	0	0	0	0	1
	29-Nov	Upper	1	0	0	1	0	0	0	0	0	1	0
	29-Nov	Upper	2	0	0	1	1	0	0	0	0	1	1
	29-Nov	Upper	3	0	0	1	0	0	0	0	0	1	0
	29-Nov	Middle	4	0	0	2 b	2	0	0	0	0	2	2
	29-Nov	Middle	5	0	0	1	0	0	0	0	0	1	0
	29-Nov	Below Fence	7	0	0	1 b	0	1	0	0	0	2	0
	29-Nov	Lower	8	0	0	2	0	0	0	0	0	2	0

Appendix 6 (cont'd)

Year	Date	Section	Reach	Adipose Fin Present				Adipose Fin Absent				Total	
				Unmarked		Marked		Unmarked		Marked		Female	Male
				Female	Male	Female	Male	Female	Male	Female	Male		
1998 a	29-Nov	Lower	6B	0	0	0	3	0	0	0	0	0	3
(cont.)	30-Nov	Lower	6B	0	0	1	0	0	0	0	0	1	0
	1-Dec	Lower	6B	0	0	0	1	0	0	0	0	0	1
	2-Dec	Upper	1	0	0	0	1	0	0	0	0	0	1
	2-Dec	Upper	2	0	0	1	2	0	0	0	0	1	2
	2-Dec	Upper	3	0	0	1	3	0	0	0	0	1	3
	2-Dec	Middle	4	0	0	3	2	0	0	1	0	4	2
	2-Dec	Lower	8	0	0	1	1	0	0	0	0	1	1
	2-Dec	Lower	6B	0	0	1	2	0	0	0	0	1	2
	3-Dec	Lower	6B	0	0	1	0	0	0	0	1	1	1
	5-Dec	Upper	2	0	0	1	2	0	0	0	0	1	2
	5-Dec	Upper	3	0	0	1	0	0	0	0	0	1	0
	5-Dec	Middle	4	0	0	0	1	0	0	0	0	0	1
	5-Dec	Below Fence	7	0	0	0	1 b	0	0	0	0	0	1
	5-Dec	Lower	6B	0	0	0	3 b	0	0	0	0	0	3
	6-Dec	Lower	6B	0	0	0	1	0	0	0	0	0	1
	7-Dec	Upper	2	0	0	0	2	0	0	0	0	0	3 c
	7-Dec	Upper	3	0	0	0	1 b	0	0	0	0	0	1
	7-Dec	Middle	4	1	0	1 b	0	0	0	0	0	2	0
	7-Dec	Middle	5	0	0	2	0	0	0	0	0	2	0
	7-Dec	Lower	6B	0	0	0	1	0	0	0	0	0	1
	8-Dec	Lower	6B	0	0	1	2	0	0	0	0	1	2
	9-Dec	Upper	1	0	0	0	1	0	0	1	0	1	1
	9-Dec	Upper	2	0	0	1	1	0	0	0	0	1	1
	9-Dec	Upper	3	0	0	0	1	0	0	0	0	0	1
	9-Dec	Middle	4	0	0	0	1	0	0	0	0	0	1
	9-Dec	Lower	6B	0	0	2	1	0	0	0	1	2	2
	10-Dec	Lower	6B	0	0	0	0	0	0	0	1 b	0	1
	12-Dec	Upper	1	0	0	1	0	0	0	0	0	1	0
	12-Dec	Upper	2	0	0	0	2	0	0	0	0	0	2
	12-Dec	Below Fence	7	0	1	0	0	0	0	0	0	0	1
	12-Dec	Lower	6B	0	0	0	0	0	0	0	0	0	1 c
	13-Dec	Lower	6C	1	0	0	0	0	0	0	0	1	0
	14-Dec	Upper	3	0	0	0	0	0	0	0	0	0	1 c
	14-Dec	Lower	6B	0	0	1	1	0	0	0	0	1	1
	15-Dec	Lower	6B	0	0	0	0	0	0	0	1	0	1
	16-Dec	Lower	6B	0	0	0	1	0	0	0	0	0	1
	18-Dec	Lower	6B	0	0	0	2	0	0	0	0	0	2
	29-Dec	Below Fence	7	0	1	0	0	0	0	0	0	0	1
	7-Jan	Lower	6B	0	0	0	1	0	0	0	0	0	1
	8-Jan	Upper	3	0	0	1	0	0	0	0	0	1	0
	13-Jan	Middle	4	0	0	0	0	0	0	0	0	0	1 c
	Total			6	5	88	93	2	0	13	11	109	113

a. Excludes 7 marked carcass recovered within 5 days of tag application.

b. Includes 1 carcass with secondary mark only.

c. Includes one marked male with unknown adipose fin status.

d. Excludes one fish of unknown sex and adipose status.

e. Excludes one adipose clipped fish of unknown sex.

Appendix 7. Post-orbital hypural lengths and ages of carcasses sampled in Louis Creek, 1995 through 1998.

Year	Females		Males			
	POHL (cm)	AGE	POHL (cm)	AGE	POHL (cm)	AGE
1995	36.5	rg	33	3 ₂	40.5	3 ₂
	37.5	3 ₂	33	3 ₂	40.5	3 ₂
	39	3 ₂	34	1m	41	3 ₂
	39	3 ₂	34	3 ₂	41	3 ₂
	39	3 ₂	35	3 ₂	41	3 ₂
	40	3 ₂	35	-	42	3 ₂
	40.5	1m	36	3 ₂	42	3 ₂
	41	-	36	4 ₃	42	3 ₂
	41	3 ₂	37	3 ₂	42	3 ₂
	41.5	3 ₂	37	3 ₂	42.5	3 ₂
	41.5	3 ₂	37.5	3 ₂	42.5	3 ₂
	42	3 ₂	37.5	3 ₂	43	3 ₂
	42	3 ₂	38	3 ₂	43	3 ₂
	43	3 ₂	38	3 ₂	43	3 ₂
	43	3 ₂	38.5	3 ₂	43	3 ₂
	43	3 ₂	38.5	3 ₂	43.5	3 ₂
	43	3 ₂	38.5	3 ₂	43.5	3 ₂
	43	3 ₂	39	3 ₂	44.5	3 ₂
	44	3 ₂	39	3 ₂	45	3 ₂
	44	3 ₂	39	3 ₂	45.5	3 ₂
	44	3 ₂	39.5	-	46	-
	44.5	3 ₂	39.5	3 ₂	-	-
	45	-	40	1m	-	-
	46.5	-	40	1m	-	-
	47.5	3 ₂	40	3 ₂	-	-
	48	3 ₂	40	3 ₂	-	-
1996	36.5	4 ₃	36	1m	-	-
	39.5	3 ₂	36.5	3 ₂	-	-
	39.5	-	36.5	4 ₃	-	-
	40.5	-	37	4 ₃	-	-
	43	3 ₂	38	5 ₄	-	-
	43	4 ₃	38	4 ₃	-	-
	45	3 ₂	39	3 ₂	-	-
	46.5	5 ₄	40	1m	-	-
	48	4 ₃	42	4 ₃	-	-
	50	3 ₂	42.5	3 ₂	-	-
	-	-	44	4 ₃	-	-
	-	-	46	4 ₃	-	-
	-	-	50.5	3 ₂	-	-

Appendix 7 (cont'd)

Year	Females		Males			
	POHL (cm)	AGE	POHL (cm)	AGE	POHL (cm)	AGE
1997	32	3 ₂	30	3 ₂	37	3 ₂
	34	3 ₂	32	3 ₂	37	3 ₂
	35	3 ₂	32.5	3 ₂	37	3 ₂
	36	3 ₂	33.5	3 ₂	37	3 ₂
	36	3 ₂	34	3 ₂	37	3 ₂
	36.5	3 ₂	34	3 ₂	37	3 ₂
	37.5	3 ₂	34	3 ₂	37.5	3 ₂
	38	3 ₂	34.5	3 ₂	38	3 ₂
	38	1m	35	3 ₂	38	3 ₂
	38	3 ₂	35	3 ₂	38	3 ₂
	38	3 ₂	35	3 ₂	38	3 ₂
	38.5	4 ₃	35	3 ₂	38.5	3 ₂
	38.5	3 ₂	35.5	3 ₂	38.5	3 ₂
	38.5	3 ₂	35.5	3 ₂	38.5	3 ₂
	39	3 ₂	35.5	3 ₂	39	3 ₂
	39	3 ₂	35.5	3 ₂	39	3 ₂
	39.5	rg	36	3 ₂	39	3 ₂
	40.5	3 ₂	36	3 ₂	39	1m
	40.5	3 ₂	36	3 ₂	39.5	3 ₂
	41	3 ₂	36	3 ₂	39.5	3 ₂
	42	1m	36	3 ₂	40.5	3 ₂
	42	1m	36	3 ₂	41.5	3 ₂
	42.5	4 ₃	36.5	3 ₂	41.5	3 ₂
	44	3 ₂	36.5	3 ₂	42	3 ₂
	44	3 ₂	36.5	3 ₂	43	1m
	47	3 ₂	37	3 ₂	45.5	3 ₂
	-	-	-	-	46	3 ₂
	-	-	-	-	48.5	3 ₂
1998	36	3 ₂	29	1m	56	3 ₂
	39.2	3 ₂	36	3 ₂	57	3 ₂
	40	3 ₂	36.5	3 ₂	59.5	3 ₂
	40	3 ₂	38	3 ₂	-	3 ₂
	40.5	3 ₂	38	3 ₂	-	3 ₂
	40.5	3 ₂	38	3 ₂	-	-
	40.5	3 ₂	38	3 ₂	-	-
	41	3 ₂	38.4	3 ₂	-	-
	41	3 ₂	38.5	3 ₂	-	-
	41	1m	39.5	3 ₂	-	-
	42	3 ₂	39.5	-	-	-
	42	1m	40.3	3 ₂	-	-
	42	3 ₂	41.5	-	-	-
	42	3 ₂	41.5	3 ₂	-	-
	42	3 ₂	42	1m	-	-

Appendix 7 (cont'd)

Year	Females		Males			
	POHL (cm)	AGE	POHL (cm)	AGE	POHL (cm)	AGE
1998	43	3 ₂	42	3 ₂	-	-
(cont.)	43	3 ₂	43	3 ₂	-	-
	43	1m	44	1m	-	-
	43.5	3 ₂	44	3 ₂	-	-
	44	3 ₂	45	3 ₂	-	-
	44	3 ₂	45	3 ₂	-	-
	45	1m	46	3 ₂	-	-
	45	3 ₂	46	3 ₂	-	-
	45	3 ₂	47	3 ₂	-	-
	46	3 ₂	48	3 ₂	-	-
	46	3 ₂	48	-	-	-
	46	3 ₂	48.2	3 ₂	-	-
	47	3 ₂	49	3 ₂	-	-
	47.5	3 ₂	50.5	3 ₂	-	-
	48.5	3 ₂	51.5	3 ₂	-	-
	49	3 ₂	52	3 ₂	-	-
	52	3 ₂	52	3 ₂	-	-
	54	3 ₂	54.5	3 ₂	-	-

Age 1m is a fish with unknown freshwater age and one year in marine environment.

Age rg is an unageable fish with regenerated scales.

Appendix 8. Post-orbital hypural lengths and ages of carcasses sampled in Lemieux Creek, 1995 through 1998.

Year	Females				Males			
	POHL (cm)	AGE	POHL (cm)	AGE	POHL (cm)	AGE	POHL (cm)	AGE
1995	33	3 ₂	42	3 ₂	32	3 ₂	39	3 ₂
	34	3 ₂	42.5	3 ₂	32.5	1M	39	3 ₂
	34.5	3 ₂	42.5	3 ₂	33	3 ₂	39	3 ₂
	35.5	3 ₂	42.5	3 ₂	33	3 ₂	39.5	3 ₂
	36	3 ₂	43	3 ₂	33.5	3 ₂	40	3 ₂
	36	3 ₂	43	3 ₂	33.5	3 ₂	40	3 ₂
	36.5	3 ₂	43	3 ₂	34	3 ₂	40	1M
	37	3 ₂	43	3 ₂	34	-	40	-
	37	3 ₂	43	1M	34.5	3 ₂	40	3 ₂
	37	3 ₂	43	-	35	1M	40	3 ₂
	37	3 ₂	43	3 ₂	35	3 ₂	40	1M
	37	3 ₂	43	-	35	3 ₂	40	3 ₂
	37	-	43.5	3 ₂	35	1M	40	3 ₂
	37	3 ₂	43.5	3 ₂	35.5	3 ₂	40.5	RG
	37.5	3 ₂	44	-	35.5	3 ₂	40.5	3 ₂
	38	3 ₂	44	3 ₂	35.5	3 ₂	40.5	1M
	38	3 ₂	44	3 ₂	35.5	-	40.5	3 ₂
	39	1M	44	3 ₂	36	3 ₂	40.5	3 ₂
	39	3 ₂	44	3 ₂	36	3 ₂	41	3 ₂
	39	3 ₂	44.5	3 ₂	36	3 ₂	41	3 ₂
	39	3 ₂	44.5	3 ₂	36	3 ₂	41	3 ₂
	39	3 ₂	45	3 ₂	36	3 ₂	41	3 ₂
	39	3 ₂	45	3 ₂	36	3 ₂	41	3 ₂
	39	3 ₂	46	1M	36	3 ₂	41	1M
	39	3 ₂	46	3 ₂	36	3 ₂	41	1M
	39	3 ₂	46	3 ₂	36	3 ₂	41.5	1M
	39	3 ₂	47	1M	36	3 ₂	41.5	3 ₂
	39	1M	47	3 ₂	36	3 ₂	42	1M
	39	1M	47	1M	36	3 ₂	42	3 ₂
	39	3 ₂	47	3 ₂	36	3 ₂	42	3 ₂
	39.5	3 ₂	47	3 ₂	36	3 ₂	42	3 ₂
	39.5	3 ₂	48	3 ₂	36	3 ₂	42	3 ₂
	39.5	1M	48	3 ₂	36	3 ₂	42	3 ₂
	39.5	3 ₂	48	3 ₂	36	-	42	3 ₂
	40	3 ₂	49	1M	36.5	1M	42	1M
	40	3 ₂	50	3 ₂	36.5	3 ₂	42	1M
	40	3 ₂	50	3 ₂	36.5	3 ₂	42	3 ₂
	40	1M	51	3 ₂	36.5	RG	42	3 ₂
	40	3 ₂	-	-	37	3 ₂	42.5	3 ₂
	40	3 ₂	-	-	37	3 ₂	43	3 ₂
	40	3 ₂	-	-	37.5	3 ₂	43	3 ₂
	40	3 ₂	-	-	37.5	3 ₂	43	3 ₂
	40	3 ₂	-	-	37.5	1M	43.5	1M

Appendix 8 (cont'd)

Year	Females				Males			
	POHL (cm)	AGE	POHL (cm)	AGE	POHL (cm)	AGE	POHL (cm)	AGE
1995	40	3 ₂	-	-	37.5	3 ₂	43.5	RG
(cont.)	40.5	3 ₂	-	-	37.5	1M	43.5	3 ₂
	41	-	-	-	38	3 ₂	44	3 ₂
	41	3 ₂	-	-	38	1M	44	3 ₂
	41	1M	-	-	38	3 ₂	44	-
	41	1M	-	-	38	-	44.5	3 ₂
	41	3 ₂	-	-	38	3 ₂	44.5	-
	41	1M	-	-	38	RG	45	3 ₂
	41	3 ₂	-	-	38	3 ₂	45	3 ₂
	41	3 ₂	-	-	38	3 ₂	45	3 ₂
	41	3 ₂	-	-	38.5	3 ₂	45	3 ₂
	41	1M	-	-	38.5	3 ₂	45	3 ₂
	41	3 ₂	-	-	38.5	3 ₂	45	1M
	41	3 ₂	-	-	38.5	3 ₂	45.5	3 ₂
	41	3 ₂	-	-	39	1M	46	-
	41.5	1M	-	-	39	3 ₂	47	3 ₂
	41.5	3 ₂	-	-	39	3 ₂	47	3 ₂
	42	3 ₂	-	-	39	3 ₂	47	3 ₂
	42	3 ₂	-	-	39	3 ₂	47.5	3 ₂
	42	3 ₂	-	-	39	3 ₂	48	3 ₂
	42	3 ₂	-	-	39	1M	49	3 ₂
	42	3 ₂	-	-	39	3 ₂	50	3 ₂
	42	3 ₂	-	-	39	3 ₂	-	-
1996	33	1M	-	-	33	3 ₂	41.5	4 ₃
	37	3 ₂	-	-	34.5	3 ₂	42	4 ₃
	37	4 ₃	-	-	35	1M	42	3 ₂
	39	3 ₂	-	-	35	3 ₂	42.5	3 ₂
	39.5	4 ₃	-	-	35	3 ₂	43	3 ₂
	40	4 ₃	-	-	35	3 ₂	43	3 ₂
	41.5	3 ₂	-	-	35	3 ₂	43.5	3 ₂
	43	4 ₃	-	-	35	3 ₂	44	3 ₂
	43.5	3 ₂	-	-	36.5	3 ₂	45	3 ₂
	44.5	4 ₃	-	-	38	1M	46	3 ₂
	45	4 ₃	-	-	38	3 ₂	47	4 ₃
	45	3 ₂	-	-	38.5	1M	47	3 ₂
	45.5	3 ₂	-	-	38.5	1M	47.5	4 ₃
	46	3 ₂	-	-	38.5	3 ₂	53	3 ₂
	46.5	3 ₂	-	-	40.5	4 ₃	54	3 ₂
	47.5	3 ₂	-	-	40.5	4 ₃	54	3 ₂
	52	3 ₂	-	-	40.5	4 ₃	-	-
	52	3 ₂	-	-	40.5	3 ₂	-	-
	52.5	3 ₂	-	-	41	1M	-	-
	54	3 ₂	-	-	41	4 ₃	-	-

Appendix 8 (cont'd)

Year	Females				Males			
	POHL (cm)	AGE	POHL (cm)	AGE	POHL (cm)	AGE	POHL (cm)	AGE
1997	31	3 ₂	40	3 ₂	27	-	37	3 ₂
	33.5	3 ₂	40	3 ₂	29.5	1m	37	3 ₂
	33.5	1m	40	3 ₂	30	3 ₂	37	3 ₂
	34	3 ₂	40	3 ₂	31.5	3 ₂	37	3 ₂
	34	3 ₂	40	3 ₂	31.5	3 ₂	37	3 ₂
	34.5	3 ₂	40	3 ₂	32	1m	37	3 ₂
	34.5	3 ₂	40.5	1m	32	3 ₂	37.5	3 ₂
	35	3 ₂	40.5	3 ₂	32	3 ₂	37.5	3 ₂
	35	1m	40.5	3 ₂	32	3 ₂	37.5	3 ₂
	35	1m	40.5	3 ₂	32.5	3 ₂	37.5	3 ₂
	35.5	3 ₂	41	3 ₂	32.5	3 ₂	37.5	3 ₂
	35.5	3 ₂	41	3 ₂	32.5	3 ₂	37.5	3 ₂
	35.5	3 ₂	41	3 ₂	33	3 ₂	37.5	3 ₂
	36	3 ₂	41.5	3 ₂	33	3 ₂	37.5	3 ₂
	36	3 ₂	42	3 ₂	33	3 ₂	38	3 ₂
	36.5	3 ₂	42	1m	33	3 ₂	38	3 ₂
	36.5	3 ₂	42	3 ₂	33	4 ₃	38	3 ₂
	36.5	3 ₂	42.5	3 ₂	33	3 ₂	38	3 ₂
	36.5	3 ₂	42.5	3 ₂	33	3 ₂	38	3 ₂
	36.5	3 ₂	43	3 ₂	33	3 ₂	38	3 ₂
	37	3 ₂	43.5	3 ₂	33.5	1m	38	3 ₂
	37	3 ₂	43.5	3 ₂	33.5	3 ₂	38.5	3 ₂
	37	3 ₂	43.5	3 ₂	34	3 ₂	38.5	3 ₂
	37	1m	43.5	3 ₂	34	3 ₂	38.5	3 ₂
	37.5	3 ₂	43.5	3 ₂	34	3 ₂	38.5	3 ₂
	37.5	1m	43.5	3 ₂	34	3 ₂	38.5	1m
	38	3 ₂	44	3 ₂	34	3 ₂	38.5	3 ₂
	38	3 ₂	44.5	3 ₂	34	3 ₂	38.5	3 ₂
	38		44.5		34	-	38.5	3 ₂
	38	3 ₂	45	3 ₂	34	3 ₂	38.5	3 ₂
	38	3 ₂	45	3 ₂	34	-	39	3 ₂
	38	3 ₂	47.5	3 ₂	34.5	3 ₂	39	4 ₃
	38.5	3 ₂	47.5	3 ₂	34.5	3 ₂	39.5	1m
	38.5	3 ₂	48	5 ₂ (Chinook)	34.5	3 ₂	39.5	1m
	39	3 ₂	-	-	35	3 ₂	39.5	3 ₂
	39	3 ₂	-	-	35	3 ₂	40	3 ₂
	39	3 ₂	-	-	35	rg	40	3 ₂
	39	3 ₂	-	-	35	1m	40	3 ₂
	39.5	3 ₂	-	-	35	3 ₂	40	1m
	39.5	3 ₂	-	-	35	3 ₂	40	3 ₂
	39.5	1m	-	-	35	3 ₂	40.5	3 ₂
	39.5	3 ₂	-	-	35	rg	40.5	3 ₂
	-	-	-	-	35	3 ₂	40.5	3 ₂
	-	-	-	-	35	3 ₂	40.5	4 ₃
	-	-	-	-	35	3 ₂	40.5	3 ₂

Appendix 8 (cont'd)

Year	Females				Males			
	POHL (cm)	AGE	POHL (cm)	AGE	POHL (cm)	AGE	POHL (cm)	AGE
1997	-	-	-	-	35.5	1m	41	3 ₂
(cont.)	-	-	-	-	35.5	3 ₂	41	3 ₂
	-	-	-	-	35.5	3 ₂	41	3 ₂
	-	-	-	-	35.5	3 ₂	41.5	3 ₂
	-	-	-	-	35.5	3 ₂	41.5	3 ₂
	-	-	-	-	35.5	-	41.5	3 ₂
	-	-	-	-	35.5	3 ₂	41.5	3 ₂
	-	-	-	-	35.5	3 ₂	42	1m
	-	-	-	-	36	3 ₂	42	3 ₂
	-	-	-	-	36	3 ₂	42.5	4 ₃
	-	-	-	-	36	3 ₂	42.5	3 ₂
	-	-	-	-	36.5	3 ₂	43	4 ₃
	-	-	-	-	36.5	3 ₂	43	3 ₂
	-	-	-	-	36.5	1m	43	3 ₂
	-	-	-	-	36.5	3 ₂	43.5	3 ₂
	-	-	-	-	36.5	3 ₂	44	3 ₂
	-	-	-	-	36.5	3 ₂	44	3 ₂
	-	-	-	-	37	3 ₂	44	3 ₂
	-	-	-	-	37	3 ₂	44.5	1m
	-	-	-	-	37	3 ₂	45	3 ₂
	-	-	-	-	37	1m	45.5	-
	-	-	-	-	37	3 ₂	46	3 ₂
	-	-	-	-	37	3 ₂	-	1m
1998	34	3 ₂	43	3 ₂	31	3 ₂	39	3 ₂
	34.5	4 ₃	43	3 ₂	32	3 ₂	39	4 ₃
	35	3 ₂	43	4 ₃	33	3 ₂	39	3 ₂
	35	3 ₂	43	3 ₂	33	4 ₃	39.5	4 ₃
	35	3 ₂	43	3 ₂	33	3 ₂	40	4 ₃
	35.5	3 ₂	43	3 ₂	33	3 ₂	40	1m
	35.5	3 ₂	43.2	3 ₂	33	1m	40	3 ₂
	37	3 ₂	43.5	3 ₂	33	1m	40	1m
	37	1m	43.5	4 ₃	33.5	3 ₂	40	1m
	37	4 ₃	43.5	3 ₂	34	1m	40	4 ₃
	37	1m	44	1m	34	3 ₂	40	-
	37	4 ₃	44	3 ₂	34.3	1m	40	4 ₃
	37.2	3 ₂	44	3 ₂	34.5	3 ₂	40	3 ₂
	37.4	1m	44	3 ₂	35	3 ₂	40.4	3 ₂
	37.5	1m	44.3	3 ₂	35	3 ₂	40.5	3 ₂
	37.5	3 ₂	45	3 ₂	35	4 ₃	40.5	3 ₂
	37.5	3 ₂	45	3 ₂	35	4 ₃	40.5	3 ₂
	38	3 ₂	45	-	35	-	40.5	3 ₂
	38	4 ₃	45	3 ₂	35	3 ₂	40.5	3 ₂
	38	3 ₂	45	3 ₂	35	1m	40.5	3 ₂
	38	3 ₂	45.1	3 ₂	35	3 ₂	41	3 ₂
	38	3 ₂	45.5	1m	35.5	3 ₂	41	3 ₂

Appendix 8 (cont'd)

Year	Females				Males			
	POHL (cm)	AGE	POHL (cm)	AGE	POHL (cm)	AGE	POHL (cm)	AGE
1998	38.5	3 ₂	45.5	3 ₂	36	3 ₂	41	3 ₂
(cont.)	39	4 ₃	46	4 ₃	36	3 ₂	41	3 ₂
	39	1m	46	4 ₂	36	3 ₂	41	3 ₂
	39	3 ₂	46	4 ₂	36.3	3 ₂	41	-
	39	3 ₂	46	3 ₂	36.5	3 ₂	41	4 ₃
	39	1m	46	3 ₂	36.5	3 ₂	41.5	3 ₂
	39.4	3 ₂	46.5	4 ₃	36.5	3 ₂	41.5	3 ₂
	39.5	3 ₂	46.5	3 ₂	36.5	4 ₂	42	3 ₂
	39.5	1m	46.5	3 ₂	36.5	-	42.3	3 ₂
	39.5	4 ₃	46.5	3 ₂	36.5	3 ₂	43.5	3 ₂
	40	3 ₂	47	3 ₂	37	3 ₂	43.5	3 ₂
	40	3 ₂	47	1m	37	3 ₂	43.5	3 ₂
	40	3 ₂	47	3 ₂	37	3 ₂	44	3 ₂
	40.2	4 ₃	47	3 ₂	37	3 ₂	44	3 ₂
	40.5	3 ₂	47	3 ₂	37	3 ₂	44	3 ₂
	40.5	3 ₂	47	3 ₂	37	1m	44	3 ₂
	40.5	3 ₂	47.5	3 ₂	37	4 ₃	44.5	1m
	40.5	3 ₂	47.5	3 ₂	37	3 ₂	44.5	3 ₂
	40.5	3 ₂	47.5	-	37	3 ₂	45	3 ₂
	40.5	1m	48	3 ₂	37		45	4 ₃
	40.5	3 ₂	48	3 ₂	37.1	3 ₂	45.5	3 ₂
	40.5	3 ₂	48	4 ₃	37.4	rg	45.5	1m
	41	3 ₂	48	3 ₂	37.5	1m	45.5	1m
	41	3 ₂	48	3 ₂	37.5	3 ₂	46	1m
	41	3 ₂	48.5	3 ₂	37.9	3 ₂	46	-
	41	1m	49	3 ₂	38	3 ₂	46.5	3 ₂
	41	3 ₂	50	5 ₂	38	3 ₂	47	3 ₂
	41.1	4 ₃	50.5	3 ₂	38	3 ₂	47	-
	41.4	3 ₂	50.5	3 ₂	38	3 ₂	47.5	1m
	41.5	3 ₂	50.5	3 ₂	38	3 ₂	48	3 ₂
	41.5	3 ₂	52	3 ₂	38	3 ₂	48	3 ₂
	42	3 ₂	52.5	3 ₂	38	3 ₂	48	3 ₂
	42	4 ₃	53	3 ₂	38	3 ₂	49	3 ₂
	42	3 ₂	55	3 ₂	38.5	1m	49	3 ₂
	42	4 ₃	56	3 ₂	38.5	3 ₂	49	3 ₂
	42	4 ₃	56	1m	38.5	3 ₂	49.5	3 ₂
	42	3 ₂	56.5	3 ₂	39	3 ₂	50	3 ₂
	42	4 ₃	58	3 ₂	39	4 ₃	50	3 ₂
	42	3 ₂	58.5	3m	39	3 ₂	55.5	1m
	42.2	3 ₂	60.5	3 ₂	39	3 ₂	55.5	3 ₂
	42.5	3 ₂	-	1m	39	4 ₃	57	3 ₂
	42.5	1m	-	-	39	3 ₂	59	3 ₂
	-	-	-	-	39	3 ₂	-	3 ₂
	-	-	-	-	39	3 ₂	-	3 ₂
	-	-	-	-	39	3 ₂	-	-

Age 1m is a fish with unknown freshwater age and one year in marine environment.

Age 3m is a fish with unknown freshwater age and three years in marine environment.

Age rg is an unageable fish with regenerated scales.

Appendix 9. Condition and CWT status of adipose fin clipped carcasses recovered in Louis Creek, 1995 through 1998.

Year	Clip condition	Carcass condition	No. of eyes in carcass	CWT recovered	Release site	CWT brood year	Scale age
1995	Complete	Fresh	2	02-59-26	Louis	1992	-
	Unknown	Fresh	2	02-59-26	Louis	1992	3 ₂
	Unknown	Fresh	2	02-59-26	Louis	1992	3 ₂
	Complete	Fresh	2	02-59-26	Louis	1992	3 ₂
	Complete	Fresh	2	02-59-26	Louis	1992	3 ₂
	Complete	Fresh	2	02-59-26	Louis	1992	3 ₂
	Complete	Rotten	2	02-59-26	Louis	1992	3 ₂
	Complete	Fresh	2	02-59-26	Louis	1992	3 ₂
	Complete	Fresh	2	02-59-26	Louis	1992	3 ₂
	Complete	Moderately Fresh	2	02-59-26	Louis	1992	3 ₂
	Complete	Rotten	2	02-59-26	Louis	1992	3 ₂
	Unknown	Fresh	2	02-59-26	Louis	1992	3 ₂
1996	Complete	Fresh	2	18-13-10	Louis	-	4 ₃ a
	Complete	Moderately Fresh	2	18-13-10	Louis	-	4 ₃ a
	Complete	Moderately Fresh	2	18-13-10	Louis	-	4 ₃ a
	Complete	Moderately Fresh	2	18-13-10	Louis	-	-
	Complete	Fresh	2	18-13-10	Louis	-	4 ₃ a
	Complete	Fresh	2	18-13-10	Louis	-	5 ₄ a
	Complete	Fresh	2	18-13-10	Louis	-	5 ₄ a
	Complete	Fresh	2	18-13-10	Louis	-	3 ₂
	Unknown	Fresh	2	18-13-10	Louis	-	4 ₃ a
	Complete	Fresh	2	18-13-10	Louis	-	4 ₃ a
	Complete	Fresh	2	18-13-10	Louis	-	4 ₃ a
	Complete	Fresh	2	18-13-10	Louis	-	4 ₃ a
1997	Complete	Fresh	2	18-12-62	Louis	1994	3 ₂
	Complete	Fresh	2	18-12-62	Louis	1994	3 ₂
	Complete	Fresh	2	18-12-62	Louis	1994	3 ₂
	Complete	Fresh	2	18-12-62	Louis	1994	3 ₂
	Complete	Fresh	2	18-12-62	Louis	1994	3 ₂
	Complete	Fresh	2	18-12-62	Louis	1994	3 ₂
	Complete	Fresh	2	18-12-62	Louis	1994	3 ₂
	Complete	Fresh	2	18-12-62	Louis	1994	3 ₂
	Complete	Fresh	2	18-12-62	Louis	1994	3 ₂
	Complete	Fresh	2	18-12-62	Louis	1994	3 ₂
	Complete	Fresh	2	18-12-63	Lemieux	1994	3 ₂
	Complete	Fresh	2	18-12-62	Louis	1994	3 ₂
	Complete	Fresh	2	Duplicate	-	-	3 ₂
	Complete	Fresh	2	18-12-62	Louis	1994	3 ₂
	Complete	Fresh	2	No pin	-	-	3 ₂
	Complete	Fresh	2	18-12-62	Louis	1994	3 ₂
	Complete	Fresh	2	18-12-62	Louis	1994	3 ₂
	Complete	Fresh	2	18-12-62	Louis	1994	3 ₂
	Complete	Fresh	2	18-12-62	Louis	1994	3 ₂
	Complete	Fresh	2	18-12-62	Louis	1994	3 ₂
	Complete	Fresh	2	18-12-62	Louis	1994	3 ₂
	Complete	Fresh	2	18-12-62	Louis	1994	3 ₂
	Complete	Fresh	2	18-12-62	Louis	1994	-
	Complete	Fresh	2	18-12-63	Lemieux	1994	-

Appendix 9 (cont'd)

Year	Clip condition	Carcass condition	No. of eyes in carcass	CWT recovered	Release site	CWT brood year	Scale age
1997 (cont.)	Complete	Fresh	2	18-12-62	Louis	1994	3 ₂
	Complete	Fresh	2	18-12-62	Louis	1994	3 ₂
	Complete	Fresh	2	18-12-62	Louis	1994	-
	Complete	Fresh	2	18-12-62	Louis	1994	3 ₂
	Complete	Fresh	2	18-12-62	Louis	1994	3 ₂
	Complete	Fresh	2	18-12-62	Louis	1994	3 ₂
	Complete	Fresh	2	18-12-62	Louis	1994	3 ₂
	Complete	Fresh	2	Unknown	-	-	3 ₂
	Complete	Fresh	2	18-12-62	Louis	1994	3 ₂
1998	Partial	Moderately Fresh	2	08-29-08	North Thompson	1995	3 ₂

a. Age from scale reading does not agree with CWT data.

Appendix 10. Condition and CWT status of adipose fin clipped carcasses recovered in Lemieux Creek, 1995 through 1998.

Year	Clip condition	Carcass condition	No. of eyes in carcass	CWT recovered	Release site	CWT brood year	Scale age
1995	Complete	Fresh	2	18-06-49	Lemieux	1992	-
	Complete	Fresh	2	18-06-49	Lemieux	1992	-
	Complete	Fresh	2	18-09-53	Lemieux	1992	3 ₂
	Complete	Fresh	2	18-06-50	Lemieux	1992	3 ₂
	Complete	Fresh	2	18-06-49	Lemieux	1992	3 ₂
	Complete	Fresh	2	18-06-49	Lemieux	1992	-
	Complete	Fresh	2	18-06-49	Lemieux	1992	3 ₂
	Complete	Fresh	2	18-06-49	Lemieux	1992	3 ₂
	Complete	Fresh	2	18-06-49	Lemieux	1992	3 ₂
	unknown	Fresh	1	18-06-49	Lemieux	1992	3 ₂
	Complete	Fresh	2	No Pin	-	-	3 ₂
	Complete	Moderately Fresh	2	18-06-50	Lemieux	1992	3 ₂
	Complete	Rotten	2	18-06-50	Lemieux	1992	3 ₂
	Complete	Fresh	2	18-06-50	Lemieux	1992	-
	Complete	Fresh	2	18-06-50	Lemieux	1992	3 ₂
	Complete	Fresh	1	18-06-50	Lemieux	1992	3 ₂
	Complete	Fresh	2	18-06-50	Lemieux	1992	3 ₂
	unknown	Fresh	2	18-06-50	Lemieux	1992	3 ₂
	unknown	Fresh	2	18-06-49	Lemieux	1992	3 ₂
	unknown	Fresh	2	18-06-50	Lemieux	1992	3 ₂
	Complete	Moderately Fresh	2	18-06-49	Lemieux	1992	3 ₂
	Complete	Fresh	2	18-06-50	Lemieux	1992	3 ₂
	Complete	Fresh	2	18-06-49	Lemieux	1992	-
	Complete	Fresh	2	18-06-49	Lemieux	1992	3 ₂
	Complete	Fresh	2	18-06-49	Lemieux	1992	3 ₂
	Complete	Fresh	2	18-06-49	Lemieux	1992	-
	Complete	Fresh	2	18-06-50	Lemieux	1992	-
	Complete	Moderately Fresh	2	No Pin	-	-	3 ₂
	Complete	Rotten	2	18-06-50	Lemieux	1992	-
	Complete	Fresh	2	18-06-49	Lemieux	1992	3 ₂
	Complete	Moderately Fresh	2	18-09-53	Lemieux	1992	3 ₂
	Complete	Moderately Fresh	2	18-06-50	Lemieux	1992	3 ₂
	Complete	Fresh	2	18-06-50	Lemieux	1992	-
	Complete	Fresh	2	18-06-49	Lemieux	1992	3 ₂
	Complete	Fresh	2	18-06-49	Lemieux	1992	3 ₂
	Complete	Fresh	2	18-06-49	Lemieux	1992	-
	Complete	Fresh	2	18-09-53	Lemieux	1992	3 ₂
	unknown	Fresh	2	18-09-53	Lemieux	1992	3 ₂
	Complete	Fresh	2	No Pin	-	-	3 ₂
	Complete	Fresh	2	18-09-53	Lemieux	1992	3 ₂
	Complete	Moderately Fresh	2	18-09-53	Lemieux	1992	3 ₂
	Complete	Moderately Fresh	2	18-06-50	Lemieux	1992	3 ₂
	Complete	Fresh	2	18-06-49	Lemieux	1992	-
	Partial	Fresh	2	Lost Pin	-	-	3 ₂
	Complete	Fresh	2	18-09-53	Lemieux	1992	3 ₂
	Complete	Fresh	2	Lost Pin	-	-	3 ₂
	Complete	Fresh	2	18-06-49	Lemieux	1992	3 ₂
	Complete	Fresh	2	18-06-49	Lemieux	1992	3 ₂
	Complete	Fresh	2	18-06-50	Lemieux	1992	3 ₂

Appendix 10 (cont'd)

Year	Clip Condition	Carcass Condition	No. of Eyes in Carcass	CWT Recovered	Release Site	CWT Brood year	Scale Age
1995 (cont.)	Complete	Moderately Fresh	2	18-09-53	Lemieux	1992	3 ₂
	Complete	Rotten	2	18-06-49	Lemieux	1992	-
	Complete	Rotten	2	18-06-50	Lemieux	1992	-
	Complete	Moderately Fresh	2	18-09-53	Lemieux	1992	-
	Complete	Fresh	2	18-06-49	Lemieux	1992	-
	Complete	Moderately Fresh	2	18-06-49	Lemieux	1992	3 ₂
	Complete	Moderately Fresh	2	18-06-49	Lemieux	1992	3 ₂
	Complete	Moderately Fresh	2	18-06-50	Lemieux	1992	3 ₂
	Complete	Fresh	2	18-06-53	Lemieux	1992	3 ₂
	Complete	Rotten	2	18-06-50	Lemieux	1992	3 ₂
	Complete	Fresh	2	18-09-53	Lemieux	1992	3 ₂
	Partial	Rotten	2	18-06-49	Lemieux	1992	3 ₂
	Complete	Moderately Fresh	2	18-06-49	Lemieux	1992	-
	Complete	Fresh	2	18-06-50	Lemieux	1992	3 ₂
	Complete	Fresh	2	18-06-50	Lemieux	1992	3 ₂
	Complete	Fresh	2	18-06-50	Lemieux	1992	-
	Complete	Fresh	2	18-06-49	Lemieux	1992	3 ₂
	Complete	Moderately Fresh	2	18-06-49	Lemieux	1992	3 ₂
	Complete	Moderately Fresh	2	No Pin	-	-	3 ₂
	Complete	Fresh	2	18-06-50	Lemieux	1992	3 ₂
	Complete	Fresh	2	18-09-53	Lemieux	1992	3 ₂
	Complete	Moderately Fresh	2	18-06-50	Lemieux	1992	-
	Complete	Moderately Fresh	2	18-06-50	Lemieux	1992	-
	Complete	Moderately Fresh	2	18-09-53	Lemieux	1992	3 ₂
	Complete	Moderately Fresh	2	18-09-53	Lemieux	1992	3 ₂
	Complete	Moderately Fresh	2	18-06-49	Lemieux	1992	3 ₂
	Complete	Fresh	2	18-06-50	Lemieux	1992	3 ₂
	Complete	Fresh	2	18-06-50	Lemieux	1992	-
	Complete	Moderately Fresh	2	18-09-53	Lemieux	1992	3 ₂
	Complete	Fresh	2	18-06-49	Lemieux	1992	3 ₂
	Complete	Fresh	2	18-06-50	Lemieux	1992	3 ₂
1996	Unknown	Fresh	2	18-18-52	Lemieux	1993	4 ₃ a
	Unknown	Fresh	2	No Head	-	-	3 ₂
	Complete	Moderately Fresh	2	18-12-49	Lemieux	1993	4 ₃ a
	Unknown	Fresh	2	18-18-52	Lemieux	1993	3 ₂
	Complete	Fresh	2	18-12-49	Lemieux	1993	3 ₂
	Complete	Fresh	2	18-18-52	Lemieux	1993	4 ₃ a
	Unknown	Fresh	2	18-18-52	Lemieux	1993	-
	Complete	Moderately Fresh	2	18-06-49	Lemieux	1992	4 ₃
	Unknown	Fresh	2	18-12-49	Lemieux	1993	-
	Complete	Moderately Fresh	2	No Pin	-	-	-
	Unknown	Moderately Fresh	2	18-12-49	Lemieux	1993	4 ₃ a
	Complete	Moderately Fresh	2	Pin Lost	-	-	-
	Unknown	Fresh	2	18-18-52	Lemieux	1993	3 ₂
	Complete	Fresh	2	18-18-52	Lemieux	1993	3 ₂
	Complete	Moderately Fresh	2	Head Lost	-	-	3 ₂
	Complete	Fresh	2	18-13-10	Louis	1993	3 ₂
	Unknown	Fresh	2	18-18-52	Lemieux	1993	3 ₂
	Unknown	Moderately Fresh	2	18-06-50	Lemieux	1992	3 ₂

Appendix 10 (cont'd)

Year	Clip Condition	Carcass Condition	No. of Eyes in Carcass	CWT Recovered	Release Site	CWT Brood year	Scale Age
1996 (cont.)	Unknown	Fresh	2	No Pin	-	-	3 ₂
	Unknown	Fresh	2	No Pin	-	-	3 ₂
	Complete	Fresh	2	18-12-49	Lemieux	1993	3 ₂
	Unknown	Fresh	2	18-18-52	Lemieux	1993	3 ₂
	Unknown	Fresh	2	18-18-52	Lemieux	1993	-
	Unknown	Fresh	2	18-18-52	Lemieux	1993	3 ₂
1997	Complete	Fresh	2	No pin	-	-	3 ₂
	Complete	Fresh	2	No pin	-	-	3 ₂
	Complete	Fresh	2	18-12-63	Lemieux	1994	3 ₂
	Partial	Moderately Fresh	2	No pin	-	-	-
	Questionable	Fresh	2	18-12-63	Lemieux	1994	3 ₂
	Complete	Fresh	2	18-12-63	Lemieux	1994	3 ₂
	Complete	Fresh	2	18-12-63	Lemieux	1994	3 ₂
	Complete	Fresh	2	18-12-63	Lemieux	1994	3 ₂
	Complete	Fresh	2	18-12-63	Lemieux	1994	3 ₂
	Complete	Fresh	2	No pin	-	-	3 ₂
	Complete	Moderately Fresh	2	18-12-63	Lemieux	1994	3 ₂
	Complete	Moderately Fresh	2	No pin	-	-	3 ₂
	Complete	Fresh	2	No pin	-	-	3 ₂
	Complete	Moderately Fresh	2	18-12-63	Lemieux	1994	3 ₂
	Complete	Fresh	2	18-12-63	Lemieux	1994	3 ₂
	Complete	Fresh	2	18-18-52	Lemieux	1993	- b
	Complete	Fresh	2	18-12-63	Lemieux	1994	3 ₂
	Complete	Fresh	2	18-12-63	Lemieux	1994	3 ₂
	Complete	Fresh	2	18-12-63	Lemieux	1994	3 ₂
	Complete	Fresh	2	Duplicate	-	-	3 ₂
	Complete	Fresh	2	18-12-63	Lemieux	1994	3 ₂
	Complete	Fresh	2	No pin	-	-	3 ₂
	Complete	Fresh	2	18-12-63	Lemieux	1994	3 ₂
	Complete	Fresh	2	18-12-63	Lemieux	1994	3 ₂
	Complete	Fresh	2	18-12-63	Lemieux	1994	3 ₂
	Complete	Fresh	2	No pin	-	-	3 ₂
	Complete	Moderately Fresh	2	18-12-63	Lemieux	1994	3 ₂
	Complete	Moderately Fresh	2	18-12-63	Lemieux	1994	3 ₂
	Complete	Fresh	2	18-12-63	Lemieux	1994	3 ₂
	Complete	Moderately Fresh	2	18-12-63	Lemieux	1994	3 ₂
	Complete	Rotten	2	18-12-63	Lemieux	1994	3 ₂
	Complete	Rotten	2	No pin	-	-	3 ₂
	Complete	Fresh	2	No pin	-	-	3 ₂

a. Age from scale reading does not agree with CWT age.

b. Age reading identified this as a chinook scale, age 5 sub 2.

Appendix 10 (cont'd)

Year	Clip Condition	Carcass Condition	No. of Eyes in Carcass	CWT Recovered	Release Site	CWT Brood year	Scale Age
1998	-	-	-	18-34-39	Lemieux	1995	4 ₃ a
	-	-	-	18-34-39	Lemieux	1995	3 ₂
	-	-	-	18-34-39	Lemieux	1995	3 ₂
	-	-	-	18-34-39	Lemieux	1995	4 ₃ a
	Complete	Moderately Fresh	2	08-29-08	-	1995	3 ₂
	Complete	Fresh	2	18-34-39	Lemieux	1995	3 ₂
	Complete	Fresh	2	18-34-39	Lemieux	1995	4 ₃ a
	Complete	Fresh	2	18-34-39	Lemieux	1995	4 ₃ a
	Complete	Fresh	2	08-29-08	-	1995	3 ₂
	Complete	Moderately Fresh	2	18-34-39	Lemieux	1995	4 ₃ a
	Partial	Fresh	2	No Pin	-	-	3 ₂
	Complete	Fresh	2	08-29-08	-	1995	3 ₂
	Complete	Fresh	2	18-34-39	Lemieux	1995	3 ₂
	Complete	Fresh	2	18-34-39	Lemieux	1995	3 ₂
	Complete	Moderately Fresh	2	08-29-08	-	1995	3 ₂
	Complete	Fresh	2	18-34-39	Lemieux	1995	4 ₃ a
	Complete	Fresh	2	18-34-39	Lemieux	1995	4 ₃ a
	Complete	Moderately Fresh	2	18-34-39	Lemieux	1995	4 ₃ a
	-	Fresh	2	No Pin	-	-	3 ₂
	-	Fresh	2	18-34-39	Lemieux	1995	4 ₃ a
	Complete	Fresh	2	18-34-39	Lemieux	1995	4 ₃ a
	Complete	Moderately Fresh	2	18-34-39	Lemieux	1995	4 ₃ a
	Partial	Fresh	2	No Pin	-	-	3 ₂
	-	Moderately Fresh	2	18-34-39	Lemieux	1995	3 ₂
	-	Fresh	2	18-34-39	Lemieux	1995	4 ₃ a
	Complete	Fresh	2	18-34-39	Lemieux	1995	4 ₃ a
	Complete	Fresh	2	18-34-39	Lemieux	1995	4 ₃ a
	Complete	Moderately Fresh	2	18-34-39	Lemieux	1995	3 ₂
	-	Fresh	-	18-34-39	Lemieux	1995	3 ₂

a. Age from scale reading does not agree with CWT age.