Toboggan Creek Coho Smolt Enumeration 1998

Prepared by

SKR Consultants Ltd.
Smithers, B.C.

for

Department of Fisheries and Oceans
Smithers, B.C.

August 1998

Executive Summary

Juvenile coho were sampled in Toboggan Creek for the fourth consecutive year. A rotary screw trap was used for smolt enumeration in the spring of 1998, where as a fyke net had been used in the previous three years. Weekly sampling of coho was conducted over two to three sampling periods (10 to 24 hours in length) between May 5 and June 24, 1998. Additional sampling was conducted on July 8-9, 1998, just prior to the removal of the rotary screw trap. Data on discharge, water temperature, ambient temperature, weather conditions and trap performance were collected for each trap setting.

Fish species captured throughout the study period include coho (*Oncorhynchus kisutch*), rainbow trout/steelhead (*O. mykiss*), chinook salmon (*O. tsawytscha*), and lampreys (*Lampetra sp.*). A total of 408 wild coho and 208 hatchery coho were caught in the rotary screw trap in the spring of 1998. In addition, 56 rainbow trout/steelhead, nine chinook, and 20 lampreys were captured.

Trap performance was generally good, and it is felt that catches were a direct indicator of effort and migration rates. The peak of migration of coho smolts appeared to occur between May 25 and June 7, 1998. Water levels were generally moderate to low, and fluctuated relatively little over the study period. The rotary screw trap appeared to be less efficient than the fyke trap used in previous years.

All data collected during the 1998 sampling period is located in Appendices 1 and 2. A general summary of the data and recommendations for the continuation of this sampling program, and trap operation on an annual basis are given.

Table of Contents

List of Tables

List of Figures

Acknowledgments

This study would not have been possible without the help, advice and organization provided by Barry Finnegan (P.B.S.). Barry also aided in the installation of the rotary screw trap. Ken and Kelly Landrock kindly allowed for the use of their driveway and property for access to the sampling site. Mike O'Neill and staff of the Toboggan Creek hatchery readily supplied information required to complete the report, including timing of release of hatchery fish, and temperature and staff gauge readings. Ron Saimoto, Regina Saimoto, Matthew Jessop, and Mark LeRuez aided in the collection of data throughout the field portion of the project. Figures for this report were produced by Darryl Struthers.

1.0 Introduction

Toboggan Creek is a glacial tributary to the Bulkley River, within the Skeena watershed. Toboggan Creek has good spawning habitat, and its low gradient side channels and Toboggan Lake appear to provide a substantial amount of suitable rearing habitat for coho (*Oncorhynchus kisutch*). Adult coho returns have ranged from 394 to 4500 in the past nine years (O'Neill pers. comm.). In addition to coho, steelhead (*O. mykiss*), rocky mountain whitefish (*Prosopium williamsoni)*, Dolly Varden (*Salvelinus malma*), and sculpin (*Cottus sp.*) are known to utilize the system (SISS). Chinook salmon (*O. tsawytscha*) have also been documented to be present (SKR 1995, Taylor 1997, O'Neill pers. com.)

Toboggan Creek is a relatively unique sub-drainage of the Bulkley watershed in that it has a hatchery facility which has augmented the Toboggan Creek coho stock since 1988 (1986 brood year). Smolts released from the hatchery are marked with coded wire tags, and adipose fin clips. An adult counting fence, located approximately 2.5 km upstream of the confluence of the creek with the Bulkley River (Figure 1), has served for a detailed enumeration of adult coho since 1989 and adult steelhead since 1993 (O'Neill pers. comm.). The adult fence is maintained and managed by the Toboggan Creek hatchery staff. Due to the availability of reliable adult escapement data, and the presence of a known number of marked coho smolts in the system, Toboggan Creek lends itself to studies in freshwater survival, age distribution at smoltification, migration timing and recruitment of juvenile coho salmon.

The primary focus of the "Toboggan Creek Smolt Project" is to collect information which can be used for an estimation of the number of wild coho smolts leaving Toboggan Creek. The 1998 juvenile index work will be complimented by adult coho studies conducted in the fall of 1994, 1995, 1996 and 1997. The fall studies provided escapement estimates of 2430, 1762, 1166 and 376 adult coho returns (above the adult fence), respectively (O'Neill pers. comm.). In addition, future adult escapement estimates conducted in 1998, 1999 and 2000 will provide valuable information on smolt to adult survival.

This is the fourth consecutive year of the coho smolt enumeration project in Toboggan Creek. The project was initiated in the spring of 1995 (SKR 1995), and repeated in the spring of 1996 (SKR 1996) and 1997 (SKR 1997). In 1998, sampling techniques were altered to further reduce stress and mortalities on coho salmon in Toboggan Creek. This report summarizes data collected in the 1998 field season. Data will be utilized by the Department of Fisheries to conduct abundance estimates.

The Toboggan Creek rotary screw trap study had the following objectives:

1. To collect data for the estimation wild coho abundance of Toboggan Creek by comparison with recaptures of marked hatchery fish.

2. To attain records of age and condition of wild coho and their time of migration from Toboggan Creek in 1998.

3. To collect information on condition (fork length and weight), migration timing and comparative abundance of other fish species present in Toboggan Creek.

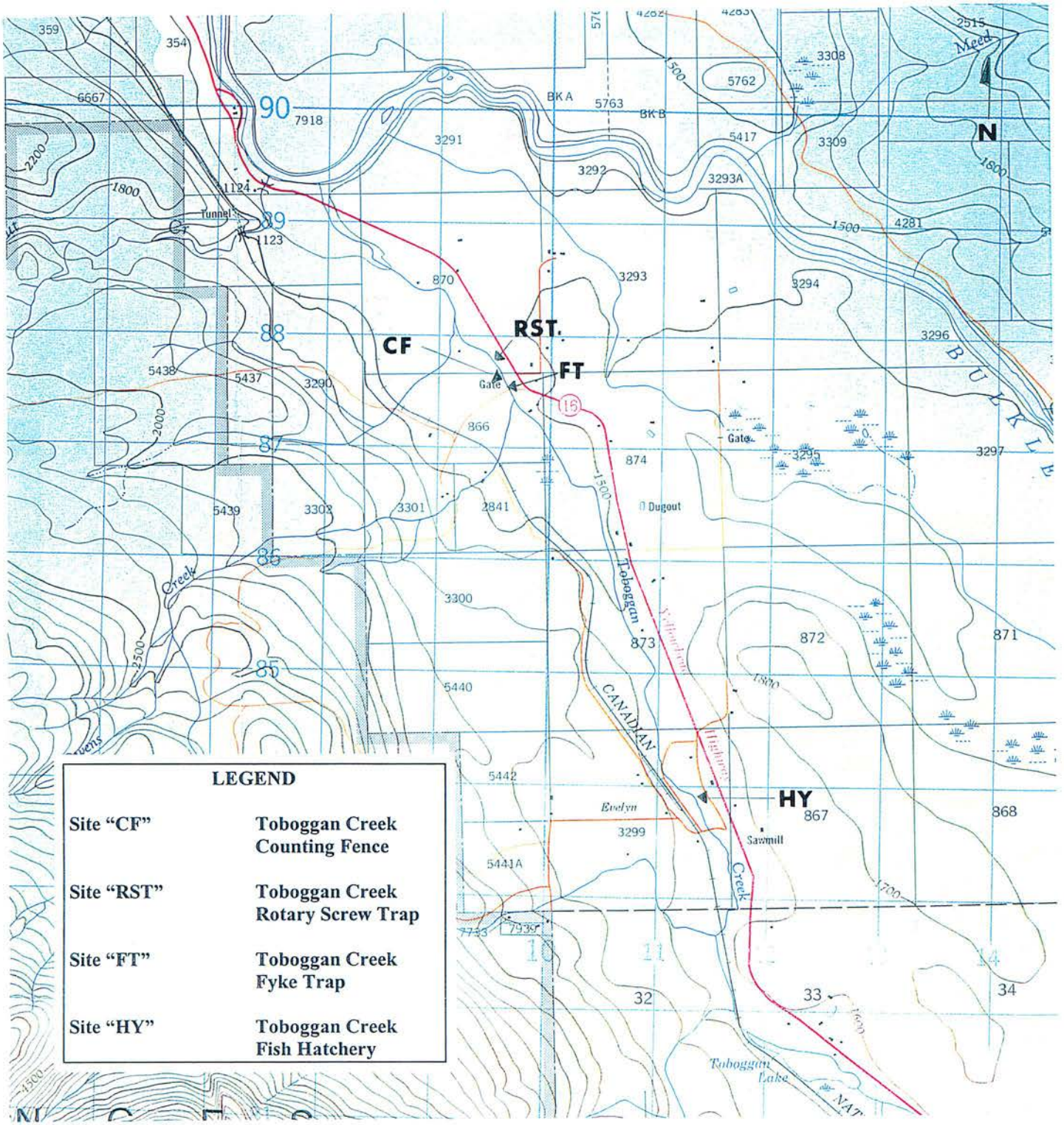

Figure 1. Location of study site (approximate scale = 1:50,000).

2.0 Materials and Methods

2.1 Study Site

A site just downstream from the adult counting fence was chosen for the location of the rotary screw trap (Figure 1). This site facilitated the study due to its accessibility, current pattern, and pool depth. The smolt trap could be set in such a way as to intercept a significant proportion (up to 35%) of the discharge (Figure 2). The capture dynamics of the rotary screw trap decreased current velocity in the live box, and decreased stress (and consequent mortality) of captured fish.

In previous years, a fyke net was installed just upstream of the adult counting fence for the enumeration of coho smolts. However, channel patterns appear to have increased erosion of the stream banks at this site, and a site downstream of the adult counting fence was chosen to minimize water displacement and consequent erosion of the stream bank upstream of the counting fence. The use of a different capture site, and different sampling techniques may make comparisons of capture rates, length, weight and age data less meaningful.

2.2 Rotary Screw Trap

A rotary screw trap was utilized in the spring of 1998 for coho smolt enumeration in Toboggan Creek. The trap was anchored to the shore with a cable and a pulley to allow for the movement of the trap into the main flow for sampling, and onto shore for non-sampling periods. The exact location of the trap during sampling periods was secured via ropes attached to the trap and to the shore (Figure 2). The height of the drum could be adjusted by a hand winch, but was set in its lowest position for all trap settings. The live box, located at the rear of the trap, had a self cleaning drum, but still required occasional cleaning and maintenance.

The rotary screw trap was in operation for a total of 9 weeks (May 5 to July 9, 1998). The trap was fished for approximately two to three sampling periods every week between May 5 and July 9, 1998 (unless otherwise recorded). The trap was usually set by 17:00 hrs, and retrieved by 09:00 the following day. During these settings, the trap was checked periodically (every 3-5 hours) for debris, damage and fishing performance. Due to relatively low catches, the trap was also set during the day during peak migration periods. Daytime settings were used to indicate if migration rates differ between day and night. An attempt was made to concentrate sampling efforts at periods of peak migration of hatchery and/or wild fish. Mike O'Neill (Toboggan Creek hatchery) was consulted in this regard. Temperature and water height were recorded for each trap setting.

Figure 2. Example of common rotary screw trap setting at Toboggan Creek in the spring of 1998. Note trap position which provided good trap performance by intercepting high velocity water.

2.3 Data Collection

Data collected for each trap setting included the time of trap setting and retrieval, water temperature, water height, weather conditions, trap fishing performance (subjective measure), and counts of fish captured by species. In addition, coho were inspected for adipose fin clips, and fish of hatchery and wild origin were enumerated separately. Fork length and weight data were collected for up to 200 fish of each wild species. Fish were dipnetted from the live box into a bucket. All fish in the bucket were measured, even if the required sample size was exceeded to promote a random size/age sample of fish. Scale samples of wild coho and rainbow trout/steelhead in different size categories (5 mm groups) were also taken. Scale samples in each size group did not exceed five fish. Coho scale samples were submitted for analysis to the Pacific Biological Station (DFO, Nanaimo, B.C.), and rainbow trout/steelhead samples were submitted to Dana Atagi (B.C. Environment, Smithers, B.C..).

3.0 Results and Discussion

3.1 Discharge and Temperature

The study period was notably warmer than the sampling period in the previous two years of the study (SKR 1996, 1997), and was similar to water temperatures observed in the initial year of the study (SKR 1995). Particularly May was a relatively warm and dry month. June 1998 remained warm, with some thunder showers. Water height (Figure 3) was slightly

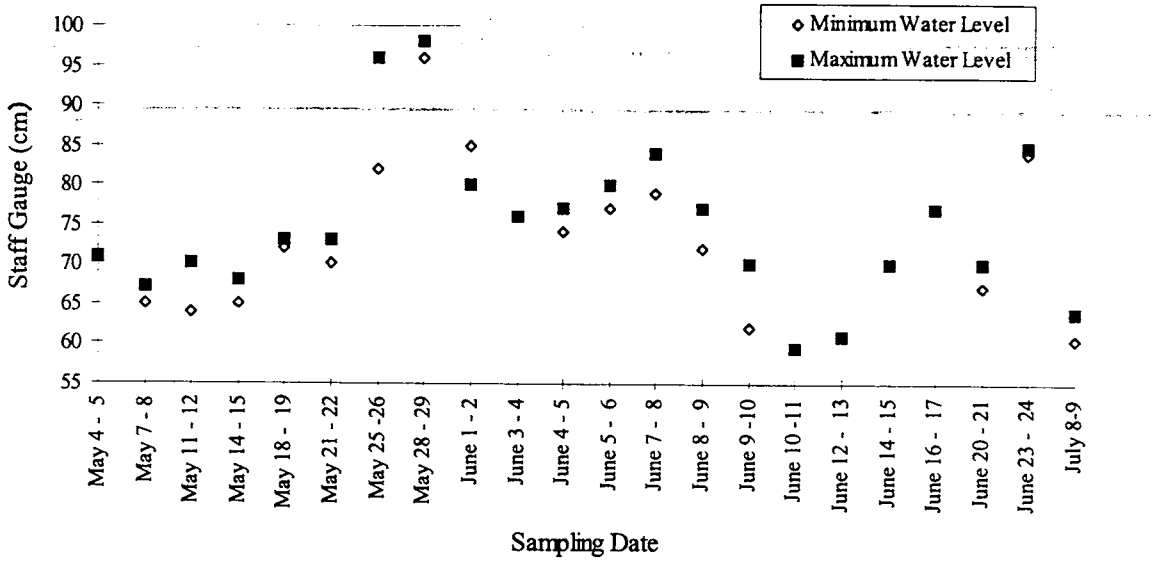

Figure 3. Staff gauge readings (water level) indicating variations in discharge at Toboggan Creek.

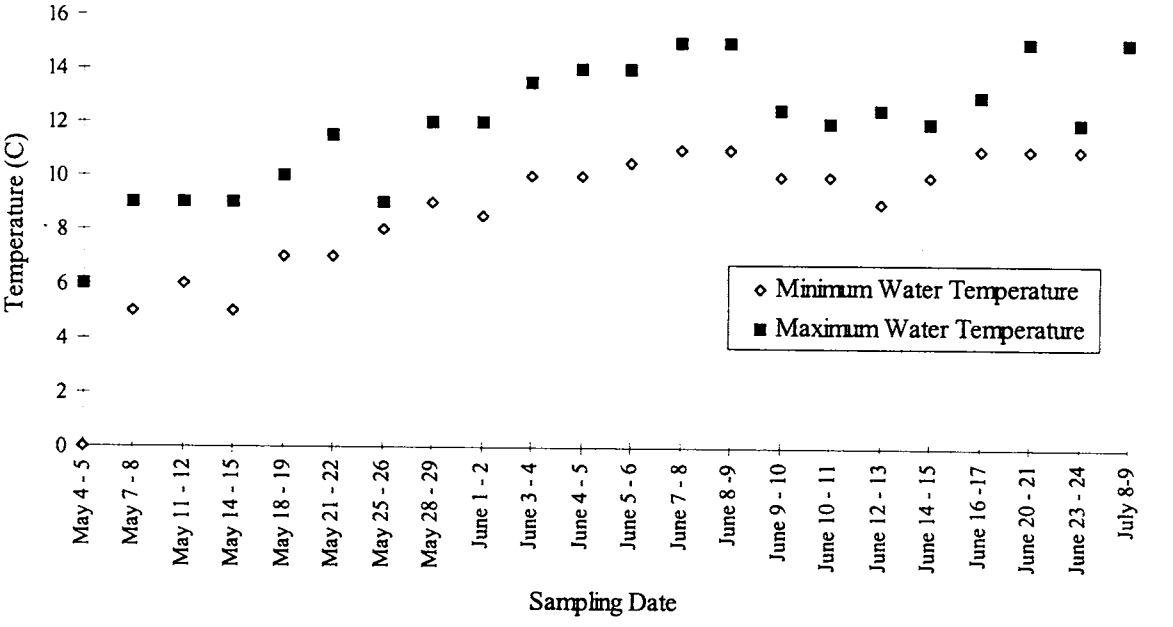

Figure 4. Recorded variation in temperature at sample times described in Appendix 2. Maximum and minimum temperatures do not necessarily refer to maximum and minimum daily temperatures.

lower than in the two previous years, but exceeded water levels documented in 1995. The accumulated snow pack in the winter of 1997/1998 was lower than that for the two previous years. However, an exceptionally early and warm spring caused rapid snow melt, even at higher elevations, resulting in water levels comparable to those found in 1996 and 1997. Rising water levels contributed to some debris movement in the system

The highest discharge, and largest change in flow in a 24 hour period was noted on May 28/29, 1998. Peak water levels appear to have occurred earlier in the sampling season than in 1997 (May 25-29, 1998 compared to June 4, 1997), and peaks were lower than those recorded in 1997. Increased water levels did not appear to affect trap performance, and only had a minor impact on debris accumulation. Some of the larger debris dislodged by higher water levels was caught on the adult fence located upstream of the rotary screw trap, which would account for the relatively small impact of water levels on debris found at the trap.

Water temperatures in 1998 followed similar trends to water temperature data collected for the previous three years of the study. Although there was some fluctuation in water temperature throughout the study, water temperature generally increased over the duration of the study period. The highest water temperatures were observed between June 7 and June 8, 1998. Maximum water temperature recorded in 1998 was 15°C. This is higher than the maximum water temperature recorded in previous years (SKR 1995, 1996, 1997).

3.2 Trap performance

In general, the trap performed well under most flow conditions presented at Toboggan Creek. High water temperatures caused early snow melt of the snow pack at higher elevations. Capture rate of the rotary screw trap was significantly lower than for the fyke trap, and a smaller proportion of marked hatchery fish was captured. Fish were observed escaping from the live box at low flow conditions since the current through the trap was insufficient to deter fish from swimming out of the trap (e.g. May 5, 1998). In addition channel conditions, and flow patterns at the new trap site did not allow for positioning of the trap in a well confined section of high velocity water. It is easily conceivable that a large proportion of coho smolts avoided the trap due to the lack of fast velocity water at the trap site.

The nature of the rotary screw trap can limit settings and catch efficiency at very low water levels at the sample site. On a few occasions, the clearance of the drum from the creek bed was as low as 10 cm. This necessitated frequent monitoring of water levels, trap conditions and trap performance.

The new trap did result in a some reduction of injury and mortality to fish. This difference can partly be attributed to lower water levels at the time of study than those encountered in the previous years, more frequent removal of fish from the trap, and significnatly lower densities of fish in the trap.

3.3 Coho abundance and size

The number of coho caught during each trapping period was enumerated separately for wild and hatchery coho. In general, there was good agreement in the number of wild and hatchery coho throughout the study period (Figure 5). During the early part of the study, no hatchery coho were captured. 33,935 hatchery coho were released just after the initiation of the study (May 11, 1998 O'Neill pers. com.). Upon opening of the hatchery channel, only a few coho left the hatchery. A notable increase in the catch of hatchery coho was observed on June 5-6, 1998. The hatchery completed its release of coho into Toboggan Creek on June 24, 1998 and the frequency of hatchery coho in the rotary screw trap catch decreased after June 20, 1998.

Overall, considerably fewer fish were captured than in previous years. This is mostly due to the different capture method and the trap location used. The fyke net was set in a location where most of the high velocity water could be intercepted. Water velocity at the rotary screw trap location was less variable across the channel, and fish were not funneled into the trap as efficiently as at the location where the fyke trap was set. The ratio of marked to unmarked fish, and the total number of marked fish in the system indicates that the capture efficiency of the rotary screw trap is significantly lower than that of the fyke trap used in previous years. If the ratio of marked to unmarked fish is considered to be a measure of abundance of wild coho smolts, it can be argued that wild coho smolt numbers in Toboggan Creek are similar or higher than those encountered in previous years. This is illustrated by somewhat hihger propotions of wild and hatchery fish, and a similar number of marked hatchery fish in the system (Table 1).

The total number of wild and hatchery coho captured in the rotary screw trap was lower compared to 1995 and 1996 (Table 1). The number of coho captured in 1997 was also lower than those captured in 1995 and 1996, due to difficulties encountered with high water levels, and a consequent reduction in sampling intensity. However, catches in 1997 were still substantially higher than those reported for 1998.

Table 1. Total number of wild and hatchery coho captured in the three years of the Toboggan Creek coho smolt enumeration project.

Year	# wild coho captured	# hatchery coho captured	ratio of wild: hatchery coho	# hatchery coho released
1995	2,867	2,552	1.12 : 1	
1996	1,829	1,692	1.08 : 1	32,638
1997	1,628	1,276	1.27 : 1	33,255
1998	408	208	1.96 : 1	33,935

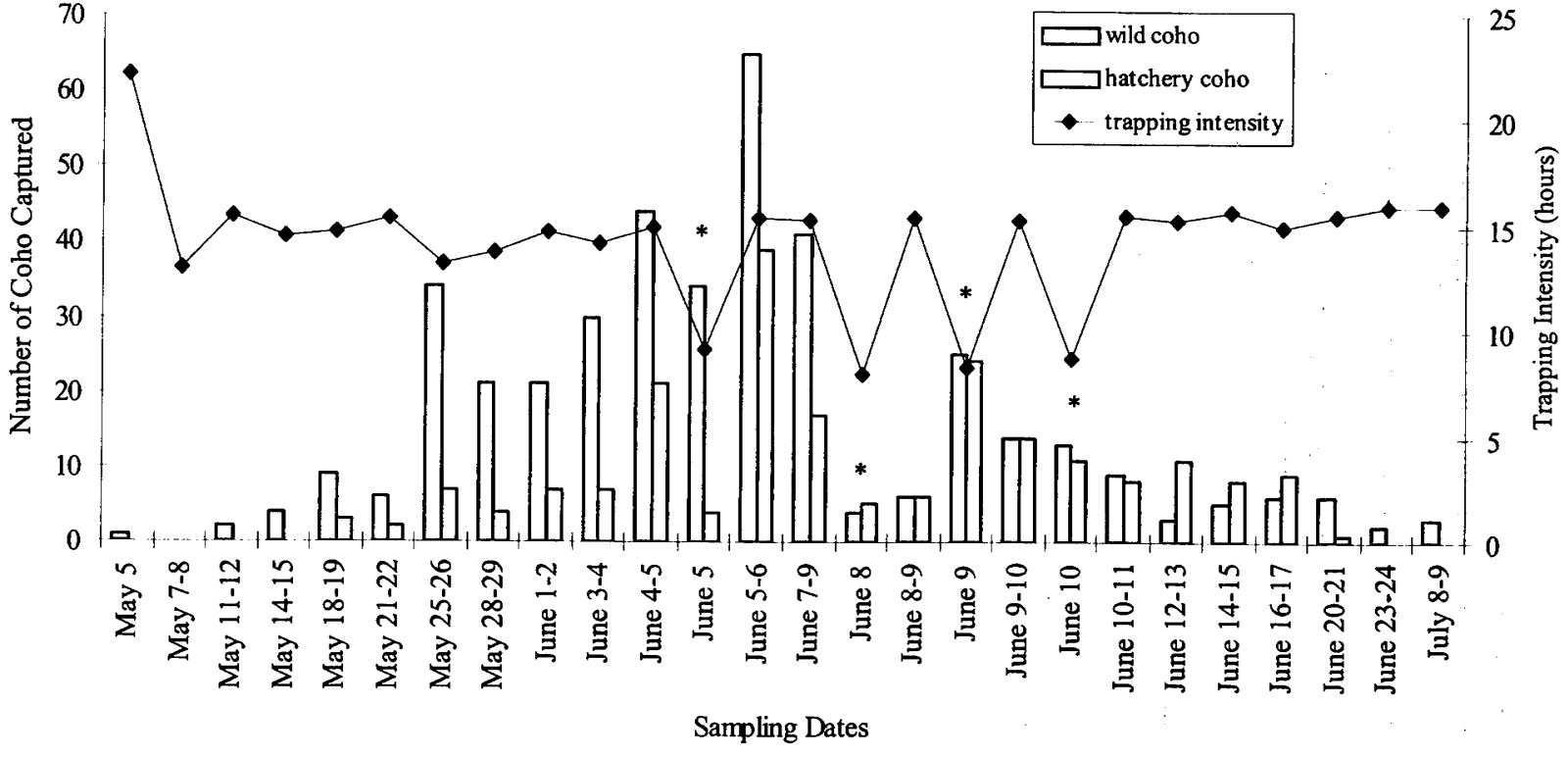

Figure 5. Number of wild and hatchery coho caught in the rotary screw trap at Toboggan Creek during each sampling period. The solid line indicates sampling intensity in number of trap hours, and stars (*) indicate sampling periods where trapping was conducted during daylight hours only.

Lower capture rates may also be due to a lower escapement of adult coho recorded in 1996 than in 1995. Adult coho escapement for 1995, 1996 and 1997 are summarized in Table 2. The escapement of adult coho upstream of the fence in 1996 (producers of 1998 coho smolts) was half that recorded in 1995. The low number of adult coho reported for 1997 is alarming. Coho smolt number in 1999 will likely be depressed further.

Table 2. Adult coho escapement recorded for 1993, 1994, 1995, 1996 and 1997. Numbers are courtesy of Mike O'Neill (pers. comm. 1998).

Year	Total number	# upstream of fence	# females
1993		1700	•
1994		2430	•
1995	1854	1762	• 671 females upstream of fence (25 were used for brood stock • 35 females downstream of fence
1996	1166	866	• 289 females upstream of fence (20 females were hatchery brood stock) • 83 females downstream of fence
1997	394	376	• number of females available

In addition, temperature data recorded by a temperature data logger deployed in Toboggan Creek by the Department of Fisheries in Oceans indicates relatively extensive periods of low water temperatures (near and slightly below 0°C) in Toboggan Creek in the winter of 1996-1997. Extended periods of low water temperatures are tolerated by juvenile coho, but temperatures below 0°C are lethal. Sudden fluctuations in water temperatures near the upper and lower lethal temperatures for coho can also increase mortality substantially (Sandercock 1991). The winter of 1996/1997 was unusually cold, and may have resulted in lower water temperatures, and consequently lower winter survival than in previous years. Coupled with low adult coho escapements in 1996, this may account for some of the decrease in coho smolt capture rates at Toboggan Creek in 1998.

Migration rates of hatchery and wild coho were generally similar. However, the migration of wild coho was protracted compared to the timing of catch of hatchery coho. Wild coho were caught earlier and later in the study than hatchery coho. The same result was observed in the previous three years of the study. The assumption of equal likelihood of capture of marked and un-marked fish in a mark recapture population estimate of population size should therefore be re-evaluated. One is more likely to capture un-marked fish early in the study period than marked fish. Since the study is centered around maximum migration of hatchery fish, and the release of hatchery fish into Toboggan Creek, the overall likelihood of capture of marked fish is higher than for un-marked fish, leading to an under estimate of the wild population size.

No clear correlation between water temperature, discharge and capture rate can be ascertained from the data collected. However, migration rates were low early in the study, coinciding with low water temperatures and low discharges. Peak flows did not result in peak capture, which may be attributable to lower trapping performance (i.e. the trap could not be set to

intercept the majority of flow, the trap could not be set in water conditions, or the trapping intensity was lowered). The largest catch was recorded on June 5-6, 1998, which coincides with relatively high water temperatures.

The rotary screw trap was generally set overnight, but a few daytime settings were conducted during peak migration (Figure 5). The catch appears to be higher for overnight settings, but when considering the relative trapping intensity, capture rate during the day were comparable to overnight capture rates. This indicates that during peak migration periods coho migration may have proceeded throughout the day, unlike observations made on coho migration rates with time of day in 1995 to 1997 (SKR 1995, 1996, 1997).

As in previous years, wild coho smolt size varied throughout the study period. The general trend was somewhat different from trends observed in 1995 and 1996, where coho smolts were generally smaller at the beginning of the study period. Mean length and weight appeared slightly higher at the beginning of the study period, and decreased somewhat throughout the study. A predominance of coho fry was observed towards the end of the study period. These fish are suspected to remain in freshwater for an additional year prior to smoltification. A similar trend was observed for the weight distribution of wild coho (Table 3).

3.4 Other species

Other species caught in the rotary screw trap during the study include rainbow trout / steelhead, Dolly Varden, chinook and lampreys (Table 4). No adult chinook were encountered at the adult counting fence in 1996, which is probably attributable to the timing of fence installation. The fence is generally installed to count coho migrating upstream. Chinook migration is largely completed by the time of initiation of adult coho counts. Mike O'Neill (pers. comm.) reported that the hatchery staff may have dead pitched one or two adult chinook in the fall of 1996. Three adult male chinook were encountered at the counting fence in the fall of 1995. Lampreys and frogs were caught on a regular basis throughout the study. J.A Taylor (1997) also reported the capture of one juvenile chinook in Toboggan Creek in 1996.

Table 3. Summary of length and weight distribution of wild coho throughout the 1998 coho smolt enumeration project.

Date 1998	Number of Coho	Fork Length (mm)		Weight (grams)	
		Mean	SD	Mean	SD
May-5	1	100.00			
May-12	2	79.50	6.36	5.90	1.70
May-15	4	118.50	25.09	19.93	11.06
May-19	9	104.22	20.72	12.76	8.86
May-22	6	120.17	15.00	17.83	5.93
May-26	34	113.71	17.44	15.90	7.68
May-29	21	109.95	11.72	14.99	4.37
June-2	21	103.86	9.03	11.66	2.89
June-4	30	106.70	10.57	12.74	3.77
June-5	78	105.26	9.60	12.05	3.16
June-6	65	102.75	7.61	10.91	2.59
June-8	45	101.67	7.12	10.88	2.48
June-9	17	98.53	7.11	10.11	1.98
June-10	27	97.52	7.93	9.61	2.16
June-11	9	98.78	9.07	10.01	2.77
June-13	3	101.33	5.77	10.80	1.84
June-15	5	96.00	8.51	9.44	2.18
June-17	6	95.67	4.68	9.32	1.55
June-21	6	87.50	20.39	7.48	3.79
June-24	2	98.50	9.19	9.70	2.12
July-9	3	67.33	43.13	5.80	8.27

As in the previous three years, the second most abundant species captured was rainbow trout/steelhead. A total of 51 rainbow trout/steelhead were captured in the 1998 season, as compared to 133 in 1997, 78 in 1996 and 128 in 1995. The capture of rainbow trout/steelhead was sporadic at the beginning of the 1998 coho smolt enumeration program, and appeared to build to a peak in the later portion of the study. This is consistent with migration rates observed for this species in 1995, 1996 and 1997. Dolly Varden abundance remained low, and no Dolly Varden were captured in the rotary screw trap in the spring of 1998. This is comparable to the three Dolly Varden captured in 1997, two Dolly Varden captured in 1996, and four Dolly Varden captured in 1995. No chinook were captured in 1996, but one chinook was captured in 1995, three were captured in 1997 and nine were captured in 1998. It is interesting to note that chinook were captured within the first few weeks of the study in 1995, 1997 and 1998.

Table 4. Summary of the number of juvenile fish caught in the rotary screw trap in Toboggan Creek, by species.

Date 1997	Species					
	Coho		Rainbow Trout/	Dolly		
	Wild	Hatchery	Steelhead	Varden	Chinook	Lamprey
May 5	1					2
May 7 - 8			2		4	
May 11 - 12	2		2		1	
May 14 - 15	4				1	
May 18 - 19	9	3	2			
May 21 - 22	6	2	1		2	
May 25 - 26	34	7			1	1
May 28 - 29	21	4	1			2
June 1 - 2	21	7	1			5
June 3 - 4	30	7				
June 4 - 5	44	21	1			
June 5 - 6	65	39	4			
June 5	34	4				
June 7 - 8	41	17	1			
June 8	4	5	2			
June 8 - 9	6	6	2			
June 9	25	24				2
June 9 - 10	14	14				
June 10	13	11				
June 10 - 11	9	8	3			
June 12 - 13	3	11	4			2
June 14 - 15	5	8	7			
June 16 - 17	6	9	6			
June 20 - 21	6	1	10			
June 23 - 24	2		6			2
July 8 - 9	3		1			6
Totals	408	208	56	0	9	20

4.0 Recommendations

1. Toboggan Creek should be used as an index stream to monitor fluctuations in freshwater productivity, juvenile survival, and possible smolt to adult survival of coho in the Bulkley River watershed.

2. Trapping intensity should be standardized to allow for a consistent level of trapping throughout the migration period. The rotary screw trap may be less effective at catching coho, but the better condition of fish captured in this trap trap as compared to the previously used fyke trap indicates that it is a more adequate capture method in light of the depressed coho stocks in the upper Skeena watershed.

3. A mark - recapture study should be conducted to estimate the efficiency of the rotary screw trap. Such a study could be achieved by obtaining smolts from Toboggan Lake or the hatchery, marking them and releasing them at timed intervals during the migration period. This would allow conservative estimates of the catch efficiency during the sampling period. More accurate estimates of annual smolt counts may provide useful interpretation of the carrying capaciyt of the Toboggan Creek watershed.

4. An alternative mark-recaptured study, in which a sub-sample of the fish caught in the trap could be marked and released immediately upstream of the trap, could also be conducted. This mark - recapture experiment should be repeated at different water levels in order to measure variations of trap performance, and would allow better interpretation of population estimates. The validity of this estimate of population size could then be assessed by comparison to known number of hatchery fish which are released.

5.0 Literature Cited

Donas, B. Community Advisor, Department of Fisheries and Oceans, Smithers, B.C..

Fish Habitat Inventory Summary and Information Program. 1991. Stream Summary Catalogue. Subdistrict 4. Department of Fisheries and Oceans, Vancouver, B.C..

O'Neill, M. Manager of Toboggan Creek Hatchery. Smithers, B.C..

Saimoto, R.K. (SKR Environmental Consultants). 1995. Toboggan Creek Coho Smolt Enumeration 1995. Unpubl. Mscrpt. prepared for Department of Fisheries and Oceans, Pacific Biological Station.

Sandercock, F.K. 1991. Life History of Coho Salmon (*Oncorhynchus mykiss*). in Pacific Salmon Life Histories. C. Groot and L. Margolis (eds.). UBC Press, Vancouver, B.C.

SKR Consultants Ltd. 1996. Toboggan Creek Coho Smolt Enumeration 1996. Unpubl. Mscrpt. prepared for Department of Fisheries and Oceans, Pacific Biological Station.

Taylor, J.A. 1997. Synoptic Surveys of Juvenile Coho Populations and Associated Habitat Characteristics in Selected Lakes and Stream within the Skeena River Watershed, British Columbia, between 10 August and 2 September, 1996. Unpubl. Mscrpt. prepared for Department of Fisheries and Oceans, Pacific Biological Station.

Appendix 1. Length and Weight Data for Salmonids Captured in Toboggan Creek, 1998

Year/Month/Day	SETLINK	F SPECIES	F LENGTH	F WEIGHT	F SAMPLE BOOKLET#	F AGE SAMP#
98/5/5	1	CO	100			
98/5/5	1	L				
98/5/5	1	L				
98/5/8	2	CH	86	7.9		
98/5/8	2	CH	88	8.5	33977	2
98/5/8	2	CH	88	7.3	33977	3
98/5/8	2	CH	81	5.9	33977	1
98/5/8	2	RB/ST	133	26.6	1	1
98/5/8	2	RB/ST	160	43.6	1	2
98/5/12	3	CH	79	6		
98/5/12	3	CO	84	7.1	33977	4
98/5/12	3	CO	75	4.7	33977	5
98/5/12	3	RB/ST	150			
98/5/12	3	RB/ST	99	11.4	1	3
98/5/15	4	CH	82	6.3		
98/5/15	4	CO	88	7.3	33977	8
98/5/15	4	CO	137	28.8	33977	6
98/5/15	4	CO	141	29.6	33977	9
98/5/15	4	CO	108	14	33977	7
98/5/19	5	CO	99	9.2	33977	17
98/5/19	5	CO	99	10.6	33977	15
98/5/19	5	CO	148	34.1	33977	14
98/5/19	5	CO	113	13.5	33977	10
98/5/19	5	CO	84	7.2	33977	13
98/5/19	5	CO	119	17.2	33977	12
98/5/19	5	CO	82	6.2	33977	16
98/5/19	5	CO	88	5	33977	11
98/5/19	5	CO	106	11.8	33977	18
98/5/19	5	CO-h				
98/5/19	5	CO-h				
98/5/19	5	CO-h				
98/5/19	5	RB/ST	149	37.1	1	6
98/5/19	5	RB/ST	153	35	1	5
98/5/22	6	CH	83	6.9		
98/5/22	6	CH	77	5.1		
98/5/22	6	CO	128	20.4	33977	20
98/5/22	6	CO	121	17.4	33977	21
98/5/22	6	CO	105	11.6	33977	23
98/5/22	6	CO	133	23.2	33977	19
98/5/22	6	CO	99	10.1	33977	22
98/5/22	6	CO	135	24.3	33977	24
98/5/22	6	CO-h				
98/5/22	6	CO-h				
98/5/22	6	RB/ST	122	20.3	1	7
98/5/26	7	CH	89	7.4		
98/5/26	7	CO	138	24.9	33977	43
98/5/26	7	CO	120	16.4	33977	33
98/5/26	7	CO	120	17.9	33977	27
98/5/26	7	CO	148	37.7	33977	25
98/5/26	7	CO	121	18.7	33977	44
98/5/26	7	CO	105	11.6	33977	29
98/5/26	7	CO	107	11.8	33977	30
98/5/26	7	CO	120	17.7	33977	31
98/5/26	7	CO	122	20.7	33977	34
98/5/26	7	CO	100	9.8	33977	41
98/5/26	7	CO	94	8.4	33977	36
98/5/26	7	CO	120	16.9		
98/5/26	7	CO	104	11.8	33977	37
98/5/26	7	CO	117	16.7	33977	39
98/5/26	7	CO	103	12.1	33977	35

Year/Month/Day	SETLINK	F SPECIES	F LENGTH	F WEIGHT	F SAMPLE BOOKLET#	F AGE SAMP#
98/5/26	7	CO	142	29.2	33977	28
98/5/26	7	CO	106	12.6	33977	40
98/5/26	7	CO	131	21.6	33977	38
98/5/26	7	CO	109	12.5		
98/5/26	7	CO	68	3.4	33977	42
98/5/26	7	CO	109	12.7		
98/5/26	7	CO	120	16.6	33977	26
98/5/26	7	CO	80	5.7	33977	50
98/5/26	7	CO	109	12.1	33977	46
98/5/26	7	CO	121	17.9	33977	48
98/5/26	7	CO	119	16.5		
98/5/26	7	CO	156	38.7	33977	47
98/5/26	7	CO	100	9.6		
98/5/26	7	CO	105	11.2	33977	45
98/5/26	7	CO	103	10.1		
98/5/26	7	CO	115	14.5	33978	1
98/5/26	7	CO	97	9.1	33977	49
98/5/26	7	CO	117	15.8		
98/5/26	7	CO	120	17.7		
98/5/26	7	CO-h				
98/5/26	7	CO-h				
98/5/26	7	CO-h				
98/5/26	7	CO-h				
98/5/26	7	CO-h				
98/5/26	7	CO-h				
98/5/26	7	CO-h				
98/5/26	7	L				
98/5/29	8	CO	123	19.4	33978	7
98/5/29	8	CO	106	12.3		
98/5/29	8	CO	87	7.2	33978	4
98/5/29	8	CO	122	17.7	33978	3
98/5/29	8	CO	108	13.3	33978	2
98/5/29	8	CO	109	13.5		
98/5/29	8	CO	89		33978	8
98/5/29	8	CO	109	14.2		
98/5/29	8	CO	116	15.7		
98/5/29	8	CO	138	27.3		
98/5/29	8	CO	120	18.9		
98/5/29	8	CO	112	13.8		
98/5/29	8	CO	114	18.2	33978	6
98/5/29	8	CO	103	11.4		
98/5/29	8	CO	108	12		
98/5/29	8	CO	107	16.7		
98/5/29	8	CO	105	12.6		
98/5/29	8	CO	109	13.6		
98/5/29	8	CO	97	10.4		
98/5/29	8	CO	124	19.5	33978	5
98/5/29	8	CO	103	12		
98/5/29	8	CO-h				
98/5/29	8	CO-h				
98/5/29	8	CO-h				
98/5/29	8	CO-h				
98/5/29	8	L				
98/5/29	8	L				
98/5/29	8	RB/ST	90	8.2	1	8
98/6/2	9	CO	96	8.3		
98/6/2	9	CO	104	12		
98/6/2	9	CO	92	7.8	33978	13
98/6/2	9	CO	99	10		
98/6/2	9	CO	108	12.9		

Year/Month/Day	SETLINK	F SPECIES	F LENGTH	F WEIGHT	F SAMPLE BOOKLET#	F AGE SAMP#
98/6/2	9	CO	92	7.8	33978	9
98/6/2	9	CO	115	15.6	33978	11
98/6/2	9	CO	102	10.6		
98/6/2	9	CO	104	12		
98/6/2	9	CO	122	18.6		
98/6/2	9	CO	99	10		
98/6/2	9	CO	106	11.9		
98/6/2	9	CO	116	14.2		
98/6/2	9	CO	107	12.4		
98/6/2	9	CO	94	8.4	33978	12
98/6/2	9	CO	102	12.4		
98/6/2	9	CO	114	13.6	33978	14
98/6/2	9	CO	96	8.9		
98/6/2	9	CO	94	11.5	33978	10
98/6/2	9	CO	119	16.2		
98/6/2	9	CO	100	9.8		
98/6/2	9	CO-h				
98/6/2	9	CO-h				
98/6/2	9	CO-h				
98/6/2	9	CO-h				
98/6/2	9	CO-h				
98/6/2	9	CO-h				
98/6/2	9	CO-h				
98/6/2	9	L				
98/6/2	9	L				
98/6/2	9	L				
98/6/2	9	L				
98/6/2	9	L				
98/6/2	9	RB/ST	156	39.8	1	9
98/6/4	10	CO	121	16.9		
98/6/4	10	CO	104	11.3		
98/6/4	10	CO	95	8.5		
98/6/4	10	CO	104	10.9		
98/6/4	10	CO	112	18.5		
98/6/4	10	CO	101	11.2		
98/6/4	10	CO	91	7.9		
98/6/4	10	CO	118	15		
98/6/4	10	CO	128	20.6		
98/6/4	10	CO	101	10.4		
98/6/4	10	CO	115	15.9	33978	15
98/6/4	10	CO	117	15.6		
98/6/4	10	CO	93	9.1		
98/6/4	10	CO	106	12.4		
98/6/4	10	CO	98	9.2		
98/6/4	10	CO	112	14.4		
98/6/4	10	CO	102	10.9		
98/6/4	10	CO	107	11.8		
98/6/4	10	CO	103	11.9		
98/6/4	10	CO	119	16.5		
98/6/4	10	CO	104	11.4		
98/6/4	10	CO	99	10.1		
98/6/4	10	CO	122	18.1		
98/6/4	10	CO	100	11.2		
98/6/4	10	CO	110	13.5		
98/6/4	10	CO	91	7.8	33978	17
98/6/4	10	CO	130	21.8	33978	16
98/6/4	10	CO	98	9.3		
98/6/4	10	CO	100	9.9		
98/6/4	10	CO	100	10.1		
98/6/4	10	CO-h				

Year/Month/Day	SETLINK	F SPECIES	F LENGTH	F WEIGHT	F SAMPLE BOOKLET#	F AGE SAMP#
98/6/4	10	CO-h				
98/6/4	10	CO-h				
98/6/4	10	CO-h				
98/6/4	10	CO-h				
98/6/4	10	CO-h				
98/6/4	10	CO-h				
98/6/5	111	CO	102	10.1		
98/6/5	111	CO	100	9.8		
98/6/5	111	CO	114	16		
98/6/5	111	CO	109	13.4		
98/6/5	111	CO	99	9.3		
98/6/5	111	CO	101	11		
98/6/5	111	CO	105	11.8		
98/6/5	111	CO	105	11.1		
98/6/5	111	CO	109	12.8		
98/6/5	111	CO	108	12.5		
98/6/5	11	CO	102	10.4		
98/6/5	11	CO	112	14.1		
98/6/5	11	CO	98	9.7		
98/6/5	11	CO	103	11.2		
98/6/5	111	CO	102	12		
98/6/5	11	CO	101	10.3		
98/6/5	111	CO	94	8.5		
98/6/5	11	CO	107	11		
98/6/5	11	CO	109	14.2		
98/6/5	111	CO	107	12.4		
98/6/5	111	CO	94	8.1		
98/6/5	111	CO	104	10.5		
98/6/5	111	CO	101	11.1		
98/6/5	111	CO	86	6.8	33978	21
98/6/5	111	CO	74	4.4	33978	22
98/6/5	111	CO	96	8.6		
98/6/5	111	CO	114	14.8		
98/6/5	111	CO	111	13.8		
98/6/5	111	CO	112	15.1		
98/6/5	111	CO	113	15		
98/6/5	111	CO	106	12.9		
98/6/5	111	CO	98	9.1		
98/6/5	111	CO	105	10.7		
98/6/5	11	CO	96	9.3		
98/6/5	111	CO	75	4.3	33978	23
98/6/5	111	CO	115	15.1		
98/6/5	111	CO	97	8.5		
98/6/5	111	CO	106	11.6		
98/6/5	111	CO	106	12.2		
98/6/5	111	CO	104	10.5		
98/6/5	111	CO	114	14.8		
98/6/5	11	CO	130	20.9	33978	18
98/6/5	11	CO	106	13.1		
98/6/5	11	CO	93	8		
98/6/5	11	CO	95	8.8		
98/6/5	11	CO	100	9.8		
98/6/5	11	CO	113	14.7		
98/6/5	11	CO	85	6	33978	19
98/6/5	11	CO	116	15.4		
98/6/5	11	CO	97	9.7		
98/6/5	11	CO	103	11.7		
98/6/5	11	CO	107	13.2		
98/6/5	11	CO	103	11.1		
98/6/5	11	CO	122	18.6		

Year/Month/Day	SETLINK	F SPECIES	F LENGTH	F WEIGHT	F SAMPLE BOOKLET#	F AGE SAMP#
98/6/5	11	CO	127	20.9	33978	20
98/6/5	11	CO	116	15		
98/6/5	11	CO	111	13		
98/6/5	11	CO	118	15.5		
98/6/5	11	CO	103	10.1		
98/6/5	11	CO	108	14.2		
98/6/5	11	CO	122	18.8		
98/6/5	11	CO	122	18		
98/6/5	11	CO	103	11		
98/6/5	11	CO	100	10.4		
98/6/5	11	CO	109	11.2		
98/6/5	11	CO	109	13.2		
98/6/5	11	CO	113	14.4		
98/6/5	111	CO	112	14.4		
98/6/5	11	CO	103	10.7		
98/6/5	11	CO	107	12.3		
98/6/5	11	CO	101	11.2		
98/6/5	11	CO	106	13.3		
98/6/5	11	CO	109	13.7		
98/6/5	11	CO	103	11		
98/6/5	11	CO	107	12.3		
98/6/5	11	CO	110	13.4		
98/6/5	11	CO	98	9.7		
98/6/5	11	CO	109	12.7		
98/6/5	11	CO-h				
98/6/5	11	CO-h				
98/6/5	11	CO-h				
98/6/5	11	CO-h				
98/6/5	11	CO-h				
98/6/5	111	CO-h				
98/6/5	11	CO-h				
98/6/5	11	CO-h				
98/6/5	11	CO-h				
98/6/5	11	CO-h				
98/6/5	11	CO-h				
98/6/5	11	CO-h				
98/6/5	11	CO-h				
98/6/5	11	CO-h				
98/6/5	11	CO-h				
98/6/5	11	CO-h				
98/6/5	11	CO-h				
98/6/5	11	CO-h				
98/6/5	11	CO-h				
98/6/5	111	CO-h				
98/6/5	11	CO-h				
98/6/5	11	CO-h				
98/6/5	111	CO-h				
98/6/5	111	CO-h				
98/6/5	11	RB/ST	75	4.2	1	10
98/6/6	12	CO	118	15		
98/6/6	12	CO	115	15.3		
98/6/6	12	CO	103	10.7		
98/6/6	12	CO	103	10.6		
98/6/6	12	CO	101	10.4		
98/6/6	12	CO	95	8.9		
98/6/6	12	CO	97	8.3		
98/6/6	12	CO	99	10.2		
98/6/6	12	CO	124	19.5		
98/6/6	12	CO	107	10.6		

Year/Month/Day	SETLINK	F SPECIES	F LENGTH	F WEIGHT	F SAMPLE BOOKLET#	F AGE SAMP#
98/6/6	12	CO	99	9.9		
98/6/6	12	CO	102	12.2		
98/6/6	12	CO	95	8.6		
98/6/6	12	CO	87	6.7	33978	24
98/6/6	12	CO	100	9.7		
98/6/6	12	CO	98	9.3		
98/6/6	12	CO	113	14.7		
98/6/6	12	CO	95	7.9		
98/6/6	12	CO	98	9.4		
98/6/6	12	CO	111	13.3		
98/6/6	12	CO	118	16		
98/6/6	12	CO	106	11.7		
98/6/6	12	CO	101	10.6		
98/6/6	12	CO	119	16.9		
98/6/6	12	CO	109	10.6		
98/6/6	12	CO	100	9.7		
98/6/6	12	CO	95	8.1		
98/6/6	12	CO	98	8.9		
98/6/6	12	CO	96	9		
98/6/6	12	CO	105	12.1		
98/6/6	12	CO	104	11		
98/6/6	12	CO	90	7.9	33978	25
98/6/6	12	CO	104	11		
98/6/6	12	CO	94	8.4		
98/6/6	12	CO	100	9.6		
98/6/6	12	CO	110	12.7		
98/6/6	12	CO	110	14.3		
98/6/6	12	CO	99	9.5		
98/6/6	12	CO	98	9.3		
98/6/6	12	CO	105	11.1		
98/6/6	12	CO	98	10.5		
98/6/6	12	CO	113	15.4		
98/6/6	12	CO	105	11.8		
98/6/6	12	CO	106	11.9		
98/6/6	12	CO	106	11.7		
98/6/6	12	CO	109	12.8		
98/6/6	12	CO	108	11.7		
98/6/6	12	CO	94	7.1		
98/6/6	12	CO	97	9.9		
98/6/6	12	CO	105	11.5		
98/6/6	12	CO	108	13.2		
98/6/6	12	CO	101	9.9		
98/6/6	12	CO	101	10.6		
98/6/6	12	CO	95	8.5		
98/6/6	12	CO	101	10		
98/6/6	12	CO	95	8.4		
98/6/6	12	CO	93	7.8		
98/6/6	12	CO	101	9.7		
98/6/6	12	CO	104	12.5		
98/6/6	12	CO	113	13.9		
98/6/6	12	CO	99	9.1		
98/6/6	12	CO	112	14.8		
98/6/6	12	CO	99	9.1		
98/6/6	12	CO	107	11.7		
98/6/6	12	CO	88	6.3		
98/6/6	12	CO-h				
98/6/6	12	CO-h				
98/6/6	12	CO-h				
98/6/6	12	CO-h				
98/6/6	12	CO-h				

Year/Month/Day	SETLINK	F SPECIES	F LENGTH	F WEIGHT	F SAMPLE BOOKLET#	F AGE SAMP#
98/6/6	12	CO-h				
98/6/6	12	CO-h				
98/6/6	12	CO-h				
98/6/6	12	CO-h				
98/6/6	12	CO-h				
98/6/6	12	CO-h				
98/6/6	12	CO-h				
98/6/6	12	CO-h				
98/6/6	12	CO-h				
98/6/6	12	CO-h				
98/6/6	12	CO-h				
98/6/6	12	CO-h				
98/6/6	12	CO-h				
98/6/6	12	CO-h				
98/6/6	12	CO-h				
98/6/6	12	CO-h				
98/6/6	12	CO-h				
98/6/6	12	CO-h				
98/6/6	12	CO-h				
98/6/6	12	CO-h				
98/6/6	12	CO-h				
98/6/6	12	CO-h				
98/6/6	12	CO-h				
98/6/6	12	CO-h				
98/6/6	12	CO-h				
98/6/6	12	CO-h				
98/6/6	12	CO-h				
98/6/6	12	CO-h				
98/6/6	12	CO-h				
98/6/6	12	CO-h				
98/6/6	12	CO-h				
98/6/6	12	CO-h				
98/6/6	12	CO-h				
98/6/6	12	CO-h				
98/6/6	12	CO-h				
98/6/6	12	CO-h				
98/6/6	12	CO-h				
98/6/6	12	CO-h				
98/6/6	12	CO-h				
98/6/6	12	CO-h				
98/6/6	12	CO-h				
98/6/6	12	CO-h				
98/6/6	12	RB/ST	146	34.7	1	11
98/6/6	12	RB/ST	149	30.9	1	12
98/6/6	12	RB/ST	110	15.5	1	13
98/6/6	12	RB/ST	113	15.2	1	14
98/6/8	13	CO	95	8.9		
98/6/8	13	CO	109	12.3		
98/6/8	13	CO	102	11.3		
98/6/8	13	CO	107	12.4		
98/6/8	13	CO	96	8		
98/6/8	13	CO	100	9.4		
98/6/8	13	CO	102	11.2		
98/6/8	13	CO	95	8.5		
98/6/8	13	CO	108	11.8		
98/6/8	13	CO	97	9.3		
98/6/8	13	CO	115	17.5		
98/6/8	13	CO	99	9.8		
98/6/8	113	CO	101	11.9		
98/6/8	13	CO	91	7.9		
98/6/8	13	CO	98	9.8		
98/6/8	13	CO	110	13.6		
98/6/8	13	CO	108	13.2		
98/6/8	13	CO	98	9.7		
98/6/8	113	CO	100	10.6		
98/6/8	113	CO	91	8.8		
98/6/8	13	CO	103	11.8		
98/6/8	13	CO	110	13.1		

Year/Month/Day	SETLINK	F SPECIES	F LENGTH	F WEIGHT	F SAMPLE BOOKLET#	F AGE SAMP#
98/6/8	13	CO	102	11.6		
98/6/8	13	CO	88	7.5		
98/6/8	13	CO	94	8.4		
98/6/8	13	CO	101	10.6		
98/6/8	13	CO	104	11.9		
98/6/8	13	CO	97	9.2		
98/6/8	13	CO	125	19.7		
98/6/8	13	CO	105	10.5		
98/6/8	113	CO	105	12.1		
98/6/8	13	CO	91	6.6		
98/6/8	13	CO	100	9.4		
98/6/8	13	CO	101	10.3		
98/6/8	13	CO	103	11.4		
98/6/8	13	CO	103	11.3		
98/6/8	13	CO	100	10.5		
98/6/8	13	CO	94	8		
98/6/8	13	CO	112	13.4		
98/6/8	13	CO	93	7.4		
98/6/8	13	CO	96	9.5		
98/6/8	13	CO	108	13.2		
98/6/8	13	CO	108	12.7		
98/6/8	13	CO	104	11.5		
98/6/8	13	CO	106	12.1		
98/6/8	13	CO-h				
98/6/8	13	CO-h				
98/6/8	113	CO-h				
98/6/8	113	CO-h				
98/6/8	113	CO-h				
98/6/8	113	CO-h				
98/6/8	13	CO-h				
98/6/8	113	CO-h				
98/6/8	13	CO-h				
98/6/8	13	CO-h				
98/6/8	13	CO-h				
98/6/8	13	CO-h				
98/6/8	13	CO-h				
98/6/8	13	CO-h				
98/6/8	13	CO-h				
98/6/8	13	CO-h				
98/6/8	13	CO-h				
98/6/8	13	CO-h				
98/6/8	13	CO-h				
98/6/8	13	CO-h				
98/6/8	13	CO-h				
98/6/8	13	RB/ST	103	10.9	1	15
98/6/9	114	CO				
98/6/9	114	CO	98	10		
98/6/9	114	CO				
98/6/9	114	CO	92	8.1		
98/6/9	114	CO	98	10.5		
98/6/9	114	CO	97	9.8		
98/6/9	114	CO	100	9.7		
98/6/9	114	CO				
98/6/9	114	CO				
98/6/9	114	CO				
98/6/9	114	CO				
98/6/9	114	CO				
98/6/9	14	CO	86	7.2		
98/6/9	114	CO				

Year/Month/Day	SETLINK	F SPECIES	F LENGTH	F WEIGHT	F SAMPLE BOOKLET#	F AGE SAMP#
98/6/9	114	CO	102	10.7		
98/6/9	114	CO				
98/6/9	14	CO	112	13.7		
98/6/9	114	CO				
98/6/9	114	CO	105	12		
98/6/9	14	CO	102	11.1		
98/6/9	114	CO	98	9.6		
98/6/9	114	CO				
98/6/9	114	CO	100	10.6		
98/6/9	14	CO	88	7.5		
98/6/9	114	CO	103	12.5		
98/6/9	14	CO	97	9.3		
98/6/9	114	CO	109	12.8		
98/6/9	14	CO	88	6.8		
98/6/9	114	CO				
98/6/9	114	CO				
98/6/9	114	CO				
98/6/9	114	CO-h				
98/6/9	114	CO-h				
98/6/9	114	CO-h				
98/6/9	114	CO-h				
98/6/9	114	CO-h				
98/6/9	114	CO-h				
98/6/9	114	CO-h				
98/6/9	114	CO-h				
98/6/9	114	CO-h				
98/6/9	114	CO-h				
98/6/9	114	CO-h				
98/6/9	114	CO-h				
98/6/9	14	CO-h				
98/6/9	114	CO-h				
98/6/9	114	CO-h				
98/6/9	14	CO-h				
98/6/9	14	CO-h				
98/6/9	14	CO-h				
98/6/9	14	CO-h				
98/6/9	114	CO-h				
98/6/9	114	CO-h				
98/6/9	14	CO-h				
98/6/9	114	CO-h				
98/6/9	114	CO-h				
98/6/9	14	CO-h				
98/6/9	114	CO-h				
98/6/9	114	CO-h				
98/6/9	114	CO-h				
98/6/9	114	CO-h				
98/6/9	14	RB/ST	138	30.6	1	17
98/6/9	14	RB/ST	90	7.8	1	16
98/6/10	115	CO	97	9.1		
98/6/10	115	CO	101	10.3		
98/6/10	115	CO	111	14.3		
98/6/10	115	CO	97	9.5		
98/6/10	115	CO	99	12.2		
98/6/10	115	CO	88	7.1		
98/6/10	15	CO	103	11.1		
98/6/10	115	CO	95	8.5		
98/6/10	115	CO	102	11.3		
98/6/10	115	CO	95	10		
98/6/10	115	CO	107	12.2		

Year/Month/Day	SETLINK	F SPECIES	F LENGTH	F WEIGHT	F SAMPLE BOOKLET#	F AGE SAMP#
98/6/10	115	CO	75	4.6	33978	27
98/6/10	115	CO	99	9.3		
98/6/10	15	CO	90	7.9		
98/6/10	115	CO	101	10.3		
98/6/10	15	CO	106	10.2		
98/6/10	15	CO	104	11.5		
98/6/10	15	CO	89	7		
98/6/10	15	CO	89	7.5		
98/6/10	15	CO	101	10.3		
98/6/10	15	CO	104	11.2		
98/6/10	15	CO	90	7.1		
98/6/10	15	CO	105	11.6		
98/6/10	15	CO	100	10.6		
98/6/10	15	CO	97	8.4		
98/6/10	15	CO	103	10.3		
98/6/10	15	CO	85	6.1	33978	26
98/6/10	15	CO-h				
98/6/10	15	CO-h				
98/6/10	115	CO-h				
98/6/10	115	CO-h				
98/6/10	15	CO-h				
98/6/10	15	CO-h				
98/6/10	115	CO-h				
98/6/10	15	CO-h				
98/6/10	15	CO-h				
98/6/10	115	CO-h				
98/6/10	15	CO-h				
98/6/10	15	CO-h				
98/6/10	115	CO-h				
98/6/10	15	CO-h				
98/6/10	15	CO-h				
98/6/10	15	CO-h				
98/6/10	15	CO-h				
98/6/10	15	CO-h				
98/6/10	115	CO-h				
98/6/10	115	CO-h				
98/6/10	115	CO-h				
98/6/10	115	CO-h				
98/6/10	115	CO-h				
98/6/10	15	CO-h				
98/6/10	115	CO-h				
98/6/11	16	CO	94	8.2		
98/6/11	16	CO	113	13.4		
98/6/11	16	CO	101	9.3		
98/6/11	16	CO	105	12.7		
98/6/11	16	CO	88	7.2		
98/6/11	16	CO	94	8.6		
98/6/11	16	CO	100	10.1		
98/6/11	16	CO	86	6.5		
98/6/11	16	CO	108	14.1		
98/6/11	16	CO-h				
98/6/11	16	CO-h				
98/6/11	16	CO-h				
98/6/11	16	CO-h				
98/6/11	16	CO-h				
98/6/11	16	CO-h				
98/6/11	16	CO-h				
98/6/11	16	CO-h				
98/6/11	16	RB/ST	68	3.5	1	19
98/6/11	16	RB/ST	73	3.9	1	18

Year/Month/Day	SETLINK	F SPECIES	F LENGTH	F WEIGHT	F SAMPLE BOOKLET#	F AGE SAMP#
98/6/11	16	RB/ST	182	62.2	1	20
98/6/13	17	CO	98	10		
98/6/13	17	CO	98	9.5		
98/6/13	17	CO	108	12.9		
98/6/13	17	CO-h				
98/6/13	17	CO-h				
98/6/13	17	CO-h				
98/6/13	17	CO-h				
98/6/13	17	CO-h				
98/6/13	17	CO-h				
98/6/13	17	CO-h				
98/6/13	17	CO-h				
98/6/13	17	CO-h				
98/6/13	17	CO-h				
98/6/13	17	L				
98/6/13	17	L				
98/6/13	17	RB/ST	89	7	1	24
98/6/13	17	RB/ST	114	18.4	1	23
98/6/13	17	RB/ST	139	29.7	1	21
98/6/13	17	RB/ST	117	16.5	1	22
98/6/15	18	CO	96	9.5		
98/6/15	18	CO	90	7.5		
98/6/15	18	CO	87	7.5		
98/6/15	18	CO	109	12.8		
98/6/15	18	CO	98	9.9		
98/6/15	18	CO-h				
98/6/15	18	CO-h				
98/6/15	18	CO-h				
98/6/15	18	CO-h				
98/6/15	18	CO-h				
98/6/15	18	CO-h				
98/6/15	18	CO-h				
98/6/15	18	CO-h				
98/6/15	18	RB/ST	61	2.3	1	26
98/6/15	18	RB/ST	112	14	1	27
98/6/15	18	RB/ST	86	7.2	1	28
98/6/15	18	RB/ST	107	13.6	1	29
98/6/15	18	RB/ST	104	12.7	1	25
98/6/15	18	RB/ST	62	2.5	1	30
98/6/15	18	RB/ST	113	16.7	1	31
98/6/17	19	CO	91	8		
98/6/17	19	CO	93	8.6		
98/6/17	19	CO	104	12.3		
98/6/17	19	CO	94	9.2		
98/6/17	19	CO	94	8.4		
98/6/17	19	CO	98	9.4		
98/6/17	19	CO-h				
98/6/17	19	CO-h				
98/6/17	19	CO-h				
98/6/17	19	CO-h				
98/6/17	19	CO-h				
98/6/17	19	CO-h				
98/6/17	19	CO-h				
98/6/17	19	CO-h				
98/6/17	19	RB/ST	114	16.8	1	34
98/6/17	19	RB/ST	83	7.1	1	35
98/6/17	19	RB/ST	69	3.8	1	36
98/6/17	19	RB/ST	67	3.2	1	37

Year/Month/Day	SETLINK	F SPECIES	F LENGTH	F WEIGHT	F SAMPLE BOOKLET#	F AGE SAMP#
98/6/17	19	RB/ST	120	19.4	1	32
98/6/17	19	RB/ST	109	14.1	1	33
98/6/21	20	CO	52	1.4		
98/6/21	20	CO	74	4.3	33978	28
98/6/21	20	CO	104	11.2		
98/6/21	20	CO	96	9.2		
98/6/21	20	CO	98	8.9		
98/6/21	20	CO	101	9.9		
98/6/21	20	CO-h				
98/6/21	20	RB/ST	65	3	1	45
98/6/21	20	RB/ST	70	3.4		
98/6/21	20	RB/ST	77	4.3	1	46
98/6/21	20	RB/ST	80	5	1	44
98/6/21	20	RB/ST	75	4.1	1	43
98/6/21	20	RB/ST	90	7.9	1	42
98/6/21	20	RB/ST	95	9.6	1	41
98/6/21	20	RB/ST	117	17.2	1	40
98/6/21	20	RB/ST	105	12.5	1	39
98/6/21	20	RB/ST	122	21	1	38
98/6/24	21	CO	105	11.2		
98/6/24	21	CO	92	8.2		
98/6/24	21	L				
98/6/24	21	L				
98/6/24	21	RB/ST	121	19.4	1	49
98/6/24	21	RB/ST	110	14.2	1	48
98/6/24	21	RB/ST	105	13.2	1	50
98/6/24	21	RB/ST	69	2.7	2	2
98/6/24	21	RB/ST	122	18.7	1	47
98/6/24	21	RB/ST	100	10.2	2	1
98/7/9	22	CO	56	1.9	33978	29
98/7/9	22	CO	115	15.3	33978	50
98/7/9	22	CO	31	0.2		
98/7/9	22	L				
98/7/9	22	L				
98/7/9	22	L				
98/7/9	22	L				
98/7/9	22	L				
98/7/9	22	L				
98/7/9	22	RB/ST	78	5.4	2	3

Appendix 2. Field Data Sheets For All Rotary Screw Trap Settings Toboggan Creek, 1998

Toboggan Creek 1998

Set Number 1

Trap Set Data

Set #	Date	Time	Crew	Temp.(C) Air	Temp.(C) Water	Cond.	pH	Turb. (cm)	Staff Gauge (cm)	Water Level	Trap Perform.	Photos
1	98/5/4	10:30	RS/MJ/							M	GOOD	

Comments:

Trap Check Data

Check #	Date	Time	Crew	Temp. (C) Air	Temp. (C) Water	Cond.	pH	Turb. (cm)	Staff Gauge (cm)	Water Level	Trap Perform.	Photos
1	98/5/4	17:00	RS/ML/M.	24	10	60	6.7		68	M	GOOD	

Comments: Observed 1 CO ~100 mm escaped from trap. No other fish observed in trap. Weather sunny; no cloud cover. Several adult ST observed below fish fence. Barry checked trap at 14:30 and found that the trap had drifted to the left bank.

Check #	Date	Time	Crew	Temp. (C) Air	Temp. (C) Water	Cond.	pH	Turb. (cm)	Staff Gauge (cm)	Water Level	Trap Perform.	Photos
2	98/5/4	23:00	RS/MJ/							M	GOOD	

Comments: Very little debris present in box. Removed debris. 2 lampreys captured in trap. 35-40% of main flow intercepted by trap.

Check #	Date	Time	Crew	Temp. (C) Air	Temp. (C) Water	Cond.	pH	Turb. (cm)	Staff Gauge (cm)	Water Level	Trap Perform.	Photos
3	98/5/5	4:00	ML/RS/						78	M	GOOD	

Comments: Very little debris present in box. Removed debris from box and checked the drum.

Trap Pull Data

Date	Time	Crew	Temp. (C) Air	Temp. (C) Water	Cond.	pH	Turb. (cm)	Staff Gauge (cm)	Water Level	Trap Perform.	Photos
98/5/5	8:45	RS/MJ/	13	6	56	7.3	30	71	M	GOOD	

Comments: No fish captured. Weather: sunny, few high clouds, light wind. Trap fishing excellent in main flow.

Fish Information Summary

Species	Count	Fork Length (mm) Minimum	Fork Length (mm) Maximum	Weight (g) Minimum	Weight (g) Maximum
CO	1	100	100		
L	2				

Toboggan Creek 1998

Set Number 2

Trap Set Data

Set #	Date	Time	Crew	Temp.(C) Air	Temp.(C) Water	Cond.	pH	Turb. (cm)	Staff Gauge (cm)	Water Level	Trap Perform.	Photos
2	98/5/7	18:55	ML/RS/M.	11	9	56	7.5		67	M	GOOD	

Comments: 1 pair of ST observed spawning u/s of trap below fish fence.

Trap Check Data

Trap Pull Data

Date	Time	Crew	Temp. (C) Air	Temp. (C) Water	Cond.	pH	Turb. (cm)	Staff Gauge (cm)	Water Level	Trap Perform.	Photos
98/5/8	8:00	RS/ML/M.	5	5	49	7.5	51	65	M	GOOD	

Comments: Trap remained in same position and condition as when it was set.

Fish Information Summary

Species	Count	Fork Length (mm) Minimum	Fork Length (mm) Maximum	Weight (g) Minimum	Weight (g) Maximum
CH	4	81	88	5.9	8.5
RB/ST	2	133	160	26.6	43.6

Toboggan Creek 1998

Set Number 3

Trap Set Data

Set #	Date	Time	Crew	Temp.(C) Air	Temp.(C) Water	Cond.	pH	Turb. (cm)	Staff Gauge (cm)	Water Level	Trap Perform.	Photos
3	98/5/11	17:30	RS/RS/	18	9	79	7.9	40	64	M	GOOD	301: 5, 6, 7

Comments: Trap barrel ~15 cm off bottom in mainflow. Weather: partly cloudy, some showers today but warm. Observed 2 ST redds and 1 ST between trap and fence.

Trap Check Data

Check #	Date	Time	Crew	Temp. (C) Air	Temp. (C) Water	Cond.	pH	Turb. (cm)	Staff Gauge (cm)	Water Level	Trap Perform.	Photos
1	98/5/11	22:35	ML//						68	M	GOOD	

Comments: A minimal amount of woody debris was removed from the trap box. Observed 2 RB and a few CO in the box.

Trap Pull Data

Date	Time	Crew	Temp. (C) Air	Temp. (C) Water	Cond.	pH	Turb. (cm)	Staff Gauge (cm)	Water Level	Trap Perform.	Photos
98/5/12	8:50	ML/RS/	11	6	42	7.7	35	70	M	GOOD	301: 8, 9

Comments: 1 RB ~150 mm that was observed at 22:35 check was no longer in the trap when it was pulled.

Fish Information Summary

Species	Count	Fork Length (mm) Minimum	Fork Length (mm) Maximum	Weight (g) Minimum	Weight (g) Maximum
CH	1	79	79	6	6
CO	2	75	84	4.7	7.1
RB/ST	2	99	150	11.4	11.4

Toboggan Creek 1998 — Set Number 4

Trap Set Data

Set #	Date	Time	Crew	Temp.(C) Air	Temp.(C) Water	Cond.	pH	Turb. (cm)	Staff Gauge (cm)	Water Level	Trap Perform.	Photos
4	98/5/14	17:35	ML/RS/	14	9	51	7.9	45	68	M	GOOD	301: 10

Comments:

Trap Check Data

Check #	Date	Time	Crew	Temp. (C) Air	Temp. (C) Water	Cond.	pH	Turb. (cm)	Staff Gauge (cm)	Water Level	Trap Perform.	Photos
1	98/5/14	22:30	RS//						67	M	GOOD	

Comments: 1 spent female ST found against fence (MOE tag #03871). Lifted over fence (observed 5 cm patch of fungus on nose). Trap box clean; no fish observed. Observed hatchery at 23:00. No fish observed leaving hatchery over 5 minute period.

Trap Pull Data

Date	Time	Crew	Temp. (C) Air	Temp. (C) Water	Cond.	pH	Turb. (cm)	Staff Gauge (cm)	Water Level	Trap Perform.	Photos
98/5/15	8:00	ML/RS/	6	5	77	7.8	58	65	L	GOOD	301: 11, 12

Comments:

Fish Information Summary

Species	Count	Fork Length (mm) Minimum	Fork Length (mm) Maximum	Weight (g) Minimum	Weight (g) Maximum
CH	1	82	82	6.3	6.3
CO	4	88	141	7.3	29.6

Toboggan Creek 1998

Set Number 5

Trap Set Data

Set #	Date	Time	Crew	Temp.(C) Air	Temp.(C) Water	Cond.	pH	Turb. (cm)	Staff Gauge (cm)	Water Level	Trap Perform.	Photos
5	98/5/18	18:00	RS//	18	10	68	7.9	40	72	M	GOOD	301: 13

Comments: Trap set in main flow. Weather: clear with cloud patches (but cloudy most of the day). Moderately clear for fairly high flow.

Trap Check Data

Check #	Date	Time	Crew	Temp. (C) Air	Temp. (C) Water	Cond.	pH	Turb. (cm)	Staff Gauge (cm)	Water Level	Trap Perform.	Photos
1	98/5/18	22:30	RS//						73	M	GOOD	

Comments: Barrel of trap was rotating a little faster causing more turbulence in the box. 3 or 4 CO smolts were in the trap.

Trap Pull Data

Date	Time	Crew	Temp. (C) Air	Temp. (C) Water	Cond.	pH	Turb. (cm)	Staff Gauge (cm)	Water Level	Trap Perform.	Photos
98/5/19	8:45	RS/MJ/	11	7	44	7.9	43	73	M	GOOD	301: 14

Comments: Released 1 spent male ST (tag #03853) over fence. 1 mort. on fence since 18:00 Monday. Saw 3 kelts holding upstream of fence.

Fish Information Summary

Species	Count	Fork Length (mm) Minimum	Fork Length (mm) Maximum	Weight (g) Minimum	Weight (g) Maximum
CO	9	82	148	5	34.1
CO-h	3				
RB/ST	2	149	153	35	37.1

Toboggan Creek 1998 — Set Number 6

Trap Set Data

Set #	Date	Time	Crew	Temp.(C) Air	Temp.(C) Water	Cond.	pH	Turb. (cm)	Staff Gauge (cm)	Water Level	Trap Perform.	Photos
6	98/5/21	17:30	MJ//	17	12	71	7.4	59	70	M	GOOD	

Comments: Weather: sunny, hot, clouding over by 15:00; no rain but heavy clouds.

Trap Check Data

Check #	Date	Time	Crew	Temp. (C) Air	Temp. (C) Water	Cond.	pH	Turb. (cm)	Staff Gauge (cm)	Water Level	Trap Perform.	Photos
1	98/5/21	22:40	MJ/RS/						73	M	GOOD	

Comments: Minimal debris in trap. ~3 CO and 2 RB observed in box. At hatchery, no fish were observed at 23:00 over 5 minute period. Weather: cloudy, warm, light showers, heavy winds.

Trap Pull Data

Date	Time	Crew	Temp. (C) Air	Temp. (C) Water	Cond.	pH	Turb. (cm)	Staff Gauge (cm)	Water Level	Trap Perform.	Photos
98/5/22	8:45	MJ/RS/	12	7	65	7.6	52	73	M	GOOD	301: 18

Comments: Weather: cloudy, sunny patches, warm, light showers overnight. CH looked like CH and BR rays were used to check ID as well as windows in adipose.

Fish Information Summary

Species	Count	Fork Length (mm) Minimum	Fork Length (mm) Maximum	Weight (g) Minimum	Weight (g) Maximum
CH	2	77	83	5.1	6.9
CO	6	99	135	10.1	24.3
CO-h	2				
RB/ST	1	122	122	20.3	20.3

Toboggan Creek 1998 — Set Number 7

Trap Set Data

Set #	Date	Time	Crew	Temp.(C) Air	Temp.(C) Water	Cond.	pH	Turb. (cm)	Staff Gauge (cm)	Water Level	Trap Perform.	Photos
7	98/5/25	17:45	ML/RS/	18	9	61	7.6	34	82	M	GOOD	301: 19, 20

Comments: Rope on right bank shortened ~4 ft to keep trap out of main flow, but trap is still catching a significant amount of flow. Adult fish fence has been removed. Weather: 100% cloud cover and raining.

Trap Check Data

Check #	Date	Time	Crew	Temp. (C) Air	Temp. (C) Water	Cond.	pH	Turb. (cm)	Staff Gauge (cm)	Water Level	Trap Perform.	Photos
1	98/5/25	20:30	RS//						83	H	GOOD	

Comments:

Check #	Date	Time	Crew	Temp. (C) Air	Temp. (C) Water	Cond.	pH	Turb. (cm)	Staff Gauge (cm)	Water Level	Trap Perform.	Photos
2	98/5/26	0:15	MJ//		8				87	H	GOOD	

Comments: No debris in drum; moderate amounts of debris in box. ~25-35 fish observed in box. Counted 6 fish in 5 min. at 23:00 at hatchery. @ 02:30 staff gauge = 87.5 cm; @ 03:30 staff gauge = 91 cm. Periods of light rain all night.

Check #	Date	Time	Crew	Temp. (C) Air	Temp. (C) Water	Cond.	pH	Turb. (cm)	Staff Gauge (cm)	Water Level	Trap Perform.	Photos
3	98/5/26	5:30	ML//						95	H	GOOD	

Comments: @ 04:15 checked fish in trap: 25 wild CO, 2 hatchery CO (released), 1 lamprey. A bit more woody debris than normal was removed from box (5 or 6 good sized dip nets full). @ 05:30 some larger debris was collecting on the adult fish fence.

Trap Pull Data

Date	Time	Crew	Temp. (C) Air	Temp. (C) Water	Cond.	pH	Turb. (cm)	Staff Gauge (cm)	Water Level	Trap Perform.	Photos
98/5/26	7:00	ML/RS/	12	8	54	7.4	5	96	H	GOOD	301: 21, 22

Comments: Due to the collection of large branches in the fish fence upstream, the trap was pulled a bit earlier than normal. Weather: cloud with clear patches. High flood conditions, but not an outrageous amount of debris.

Fish Information Summary

Species	Count	Fork Length (mm) Minimum	Fork Length (mm) Maximum	Weight (g) Minimum	Weight (g) Maximum
CH	1	89	89	7.4	7.4
CO	34	68	156	3.4	38.7
CO-h	7				
L	1				

Toboggan Creek 1998

Set Number 8

Trap Set Data

Set #	Date	Time	Crew	Temp.(C) Air	Temp.(C) Water	Cond.	pH	Turb. (cm)	Staff Gauge (cm)	Water Level	Trap Perform.	Photos
8	98/5/28	18:15	ML/MJ/	25	12	50	7.5	10	96	H	GOOD	301: 23, 24

Comments: Set slightly out of main current , closest to right bank. Weather: sunny, 10% cloud cover.

Trap Check Data

Check #	Date	Time	Crew	Temp. (C) Air	Temp. (C) Water	Cond.	pH	Turb. (cm)	Staff Gauge (cm)	Water Level	Trap Perform.	Photos
1	98/5/28	20:00	RS//						97	H	GOOD	

Comments: 8 fish observed in trap. Minimal debris was floating down despite high flow.

Check #	Date	Time	Crew	Temp. (C) Air	Temp. (C) Water	Cond.	pH	Turb. (cm)	Staff Gauge (cm)	Water Level	Trap Perform.	Photos
2	98/5/29	2:00	ML//						99	H	GOOD	

Comments: Minimal woody debris in box. Weather: evidence of rain earlier in evening but currently no rain and mostly clear sky. Observed 3 fish leave the hatchery at 1:45 over a 5 minute period.

Trap Pull Data

Date	Time	Crew	Temp. (C) Air	Temp. (C) Water	Cond.	pH	Turb. (cm)	Staff Gauge (cm)	Water Level	Trap Perform.	Photos
98/5/29	8:00	MJ//	14	9	48	7.7	10	98	H	GOOD	301: 25

Comments: Weather: cloudy, sunny patches, small amount of rain overnight. Minimal debris in box, none in drum.

Fish Information Summary

Species	Count	Fork Length (mm) Minimum	Fork Length (mm) Maximum	Weight (g) Minimum	Weight (g) Maximum
CO	21	87	138	7.2	27.3
CO-h	4				
L	2				
RB/ST	1	90	90	8.2	8.2

Toboggan Creek 1998

Set Number 9

Trap Set Data

Set #	Date	Time	Crew	Temp.(C) Air	Temp.(C) Water	Cond.	pH	Turb. (cm)	Staff Gauge (cm)	Water Level	Trap Perform.	Photos
9	98/6/1	17:45	ML//	21	12	55	7.6	29	85	H	GOOD	301: 28, 29

Comments: Weather: sunny, 70% cloud cover.

Trap Check Data

Check #	Date	Time	Crew	Temp. (C) Air	Temp. (C) Water	Cond.	pH	Turb. (cm)	Staff Gauge (cm)	Water Level	Trap Perform.	Photos
1	98/6/1	22:30	RS//						83	H	GOOD	

Comments: Water was clearing up. Some debris in trap. Only 1 or 2 fish observed.

Trap Pull Data

Date	Time	Crew	Temp. (C) Air	Temp. (C) Water	Cond.	pH	Turb. (cm)	Staff Gauge (cm)	Water Level	Trap Perform.	Photos
98/6/2	8:30	RS/ML/	12	8.5	55	7.8	27	80	M	GOOD	301: 30, 31

Comments: Weather: sunny. Trap was set a little left of the main flow but was turning fast.

Fish Information Summary

Species	Count	Fork Length (mm) Minimum	Fork Length (mm) Maximum	Weight (g) Minimum	Weight (g) Maximum
CO	21	92	122	7.8	18.6
CO-h	7				
L	5				
RB/ST	1	156	156	39.8	39.8

Toboggan Creek 1998

Set Number 10

Trap Set Data

Set #	Date	Time	Crew	Temp.(C) Air	Temp.(C) Water	Cond.	pH	Turb. (cm)	Staff Gauge (cm)	Water Level	Trap Perform.	Photos
10	98/6/3	17:30	ML//	21	14	58	7.8	44	76	M	GOOD	301: 27, 28

Comments: Weather: 95% cloud cover, light rainfall. Adult fish fence is up again.

Trap Check Data

Check #	Date	Time	Crew	Temp. (C) Air	Temp. (C) Water	Cond.	pH	Turb. (cm)	Staff Gauge (cm)	Water Level	Trap Perform.	Photos
1	98/6/3	23:00	RS//						74	M	GOOD	

Comments: ~20 fish observed in trap.

Trap Pull Data

Date	Time	Crew	Temp. (C) Air	Temp. (C) Water	Cond.	pH	Turb. (cm)	Staff Gauge (cm)	Water Level	Trap Perform.	Photos
98/6/4	7:45	ML/RS/	12	10	58	7.6	51	76	M	GOOD	301: 29, 30

Comments: Weather: 95% cloud cover, sunny, periods of light rain overnight. Very little debris in box. Water conditions appeared to be optimal for this trap location. The hatchery outflow was lower by one or two pieces of 2x6.

Fish Information Summary

Species	Count	Fork Length (mm) Minimum	Fork Length (mm) Maximum	Weight (g) Minimum	Weight (g) Maximum
CO	30	91	130	7.8	21.8
CO-h	7				

Toboggan Creek 1998 — Set Number 11

Trap Set Data

Set #	Date	Time	Crew	Temp.(C) Air	Temp.(C) Water	Cond.	pH	Turb. (cm)	Staff Gauge (cm)	Water Level	Trap Perform.	Photos
11	98/6/4	17:30	ML//	25	14	50	7.6	59	74	M	GOOD	302: 1, 2

Comments: Weather: sunny, 50% cloud cover, moderate breeze. When leaving trap at 18:00 there were already 4 or 5 fish in the trap.

Trap Check Data

Check #	Date	Time	Crew	Temp. (C) Air	Temp. (C) Water	Cond.	pH	Turb. (cm)	Staff Gauge (cm)	Water Level	Trap Perform.	Photos
1	98/6/4	23:15	RS//						76	M	GOOD	

Comments: Weather: clear sky. Water running fairly clear now; low to moderate turbidity. Moved trap ~1 metre into main flow. Approximately 25 fish observed in the trap (none removed).

Trap Pull Data

Date	Time	Crew	Temp. (C) Air	Temp. (C) Water	Cond.	pH	Turb. (cm)	Staff Gauge (cm)	Water Level	Trap Perform.	Photos
98/6/5	8:30	ML/RS/	14	10	58	7.6	49	77	M	GOOD	302: 3, 4

Comments: Weather: sunny, 75% high cloud cover, no breeze. Fish Summary: 44 wild coho, 21 hatchery coho and 1 rainbow trout caught.

Fish Information Summary

Species	Count	Fork Length (mm) Minimum	Fork Length (mm) Maximum	Weight (g) Minimum	Weight (g) Maximum
CO	44	85	130	6	20.9
CO-h	21				
RB/ST	1	75	75	4.2	4.2

Toboggan Creek 1998

Set Number 111

Trap Set Data

Set #	Date	Time	Crew	Temp.(C) Air	Temp.(C) Water	Cond.	pH	Turb. (cm)	Staff Gauge (cm)	Water Level	Trap Perform.	Photos
111	98/6/5	8:30	ML/RS/	14	10	58	7.6	49	77	M	GOOD	302: 3, 4

Comments: 3 or 4 fish in trap at 9:30. Weather: sunny, 75% cloud cover, no breeze.

Trap Check Data

Check #	Date	Time	Crew	Temp. (C) Air	Temp. (C) Water	Cond.	pH	Turb. (cm)	Staff Gauge (cm)	Water Level	Trap Perform.	Photos
1	98/6/5	13:45	ML//	22	13	62	7.5	39	74	M	GOOD	

Comments: ~18 CO in trap; released the 3 that were hatchery CO. Weather: sunny, 5% cloud cover. Minimal debris in box.

Trap Pull Data

Date	Time	Crew	Temp. (C) Air	Temp. (C) Water	Cond.	pH	Turb. (cm)	Staff Gauge (cm)	Water Level	Trap Perform.	Photos
98/6/5	17:30	ML/RS/	22	14	47	7.4	45	77	M	GOOD	

Comments: Trap performance was excellent. Fish appeared to be moving at a fairly consistent rate all day long. 34 wild coho caught and 1 hatchery coho caught.

Fish Information Summary

Species	Count	Fork Length (mm) Minimum	Fork Length (mm) Maximum	Weight (g) Minimum	Weight (g) Maximum
CO	34	74	115	4.3	16
CO-h	4				

Toboggan Creek 1998

Set Number 12

Trap Set Data

Set #	Date	Time	Crew	Temp.(C) Air	Temp.(C) Water	Cond.	pH	Turb. (cm)	Staff Gauge (cm)	Water Level	Trap Perform.	Photos
12	98/6/5	17:30	RS/ML/	22	14	47	7.4	45	77	M	GOOD	302-5,6

Comments:

Trap Check Data

Check #	Date	Time	Crew	Temp. (C) Air	Temp. (C) Water	Cond.	pH	Turb. (cm)	Staff Gauge (cm)	Water Level	Trap Perform.	Photos
1	98/6/6	0:30	RS//						78	M	GOOD	

Comments: Approximately 50 fish observed in trap.

Check #	Date	Time	Crew	Temp. (C) Air	Temp. (C) Water	Cond.	pH	Turb. (cm)	Staff Gauge (cm)	Water Level	Trap Perform.	Photos
0										M	GOOD	

Comments:

Trap Pull Data

Date	Time	Crew	Temp. (C) Air	Temp. (C) Water	Cond.	pH	Turb. (cm)	Staff Gauge (cm)	Water Level	Trap Perform.	Photos
98/6/6	8:45	RS/ML/	16	11	53	7.6	44	80	M	GOOD	302: 7,8

Comments: Fish summmary: 65 wild coho, 39 hatchery coho, 4 rainbow trout/steelhead. Trap performance was set partially in the main flow - with little surface disturbance.

Fish Information Summary

Species	Count	Fork Length (mm) Minimum	Fork Length (mm) Maximum	Weight (g) Minimum	Weight (g) Maximum
CO	65	87	124	6.3	19.5
CO-h	39				
RB/ST	4	110	149	15.2	34.7

Toboggan Creek 1998

Set Number 13

Trap Set Data

Set #	Date	Time	Crew	Temp.(C) Air	Temp.(C) Water	Cond.	pH	Turb. (cm)	Staff Gauge (cm)	Water Level	Trap Perform.	Photos
13	98/6/7	17:00	RS//	25	15	50	7.6	55	78	M	GOOD	302: 9

Comments: Trap was set in the mainflow; where some surface disturbance and relatively fast flow may differ from settitng number 12. Weather: clear, sunny and hot.

Trap Check Data

Check #	Date	Time	Crew	Temp. (C) Air	Temp. (C) Water	Cond.	pH	Turb. (cm)	Staff Gauge (cm)	Water Level	Trap Perform.	Photos
1	98/6/7	23:45	RS//						82	M	GOOD	

Comments: Trap was clean. Approximately 60-80 fish were observed in the trap.

Trap Pull Data

Date	Time	Crew	Temp. (C) Air	Temp. (C) Water	Cond.	pH	Turb. (cm)	Staff Gauge (cm)	Water Level	Trap Perform.	Photos
98/6/8	8:20	RS/ML/	15	11	48	7.6	39	82	M	GOOD	302: 10,11

Comments: 0% cloud cover, very little breeze. 41 wild coho, 17 hatchery coho and 1 rainbow trout/steelhead was caught.

Fish Information Summary

Species	Count	Fork Length (mm) Minimum	Fork Length (mm) Maximum	Weight (g) Minimum	Weight (g) Maximum
CO	41	88	125	6.6	19.7
CO-h	17				
RB/ST	1	103	103	10.9	10.9

Toboggan Creek 1998

Set Number 113

Trap Set Data

Set #	Date	Time	Crew	Temp.(C) Air	Temp.(C) Water	Cond.	pH	Turb. (cm)	Staff Gauge (cm)	Water Level	Trap Perform.	Photos
113	98/6/8	9:00	RS/ML/	18	11	48	7.6	46	82		GOOD	302: 12,13

Comments: Second day time setting. Trap set in slower flow toward the right bank (test migration route). Only about 3000 coho remaining at the hatchery.

Trap Check Data

Trap Pull Data

Date	Time	Crew	Temp. (C) Air	Temp. (C) Water	Cond.	pH	Turb. (cm)	Staff Gauge (cm)	Water Level	Trap Perform.	Photos
98/6/8	17:00	RS/ML/	29	15	40	7.6	54	79	M	GOOD	302: 14

Comments: Summary: 4 wild coho and 5 hatchery coho caught.

Fish Information Summary

Species	Count	Fork Length (mm) Minimum	Fork Length (mm) Maximum	Weight (g) Minimum	Weight (g) Maximum
CO	4	91	105	8.8	12.1
CO-h	5				

Toboggan Creek 1998

Set Number 14

Trap Set Data

Set #	Date	Time	Crew	Temp.(C) Air	Temp.(C) Water	Cond.	pH	Turb. (cm)	Staff Gauge (cm)	Water Level	Trap Perform.	Photos
14	98/6/8	17:00	RS/ML/	29	15	40	7.6	54	79	M	GOOD	302:14

Comments: Trap set in slower moving water (same as set 113)

Trap Check Data

Check #	Date	Time	Crew	Temp. (C) Air	Temp. (C) Water	Cond.	pH	Turb. (cm)	Staff Gauge (cm)	Water Level	Trap Perform.	Photos
1	98/6/8	23:00	RS//						80	M	GOOD	

Comments:

Trap Pull Data

Date	Time	Crew	Temp. (C) Air	Temp. (C) Water	Cond.	pH	Turb. (cm)	Staff Gauge (cm)	Water Level	Trap Perform.	Photos
98/6/9	8:45	ML/RS/	16	11	46	7.6	36	84	H	GOOD	302: 15,16

Comments: Trap preforming good; weather 100% cloud cover and light rain. Minimal debris in box. Summary: 6 wild coho, 6 hatchery coho and two rainbow trout/steelhead caught.

Fish Information Summary

Species	Count	Fork Length (mm) Minimum	Fork Length (mm) Maximum	Weight (g) Minimum	Weight (g) Maximum
CO	6	86	112	6.8	13.7
CO-h	6				
RB/ST	2	90	138	7.8	30.6

Toboggan Creek 1998

Set Number 114

Trap Set Data

Set #	Date	Time	Crew	Temp.(C) Air	Temp.(C) Water	Cond.	pH	Turb. (cm)	Staff Gauge (cm)	Water Level	Trap Perform.	Photos
114	98/6/9	8:45	RS/ML/	16	11	46	7.6	36	84	M	GOOD	302: 17,18

Comments: Trap set in fast flowing water closest to the left bank, similar to set #13

Trap Check Data

Check #	Date	Time	Crew	Temp. (C) Air	Temp. (C) Water	Cond.	pH	Turb. (cm)	Staff Gauge (cm)	Water Level	Trap Perform.	Photos
1	98/6/9	13:00	RS//						84	M	GOOD	

Comments: Adult fish fence down. Released fish in trap. 12 hatchery coho and 14 wild coho caught.

Trap Pull Data

Date	Time	Crew	Temp. (C) Air	Temp. (C) Water	Cond.	pH	Turb. (cm)	Staff Gauge (cm)	Water Level	Trap Perform.	Photos
98/6/9	17:00	RS/ML/	22	13	44	7.6	40	85	M	GOOD	302: 19,20

Comments: Weather 100% cloud with periods of rain. Minimal debris in box. Summary: 24 hatchery coho and 25 wild coho caught (includes fish released at check #1. Note that 14 wild coho from check were not sampled).

Fish Information Summary

Species	Count	Fork Length (mm) Minimum	Fork Length (mm) Maximum	Weight (g) Minimum	Weight (g) Maximum
CO	25	92	109	8.1	12.8
CO-h	24				

Toboggan Creek 1998 — Set Number 15

Trap Set Data

Set #	Date	Time	Crew	Temp.(C) Air	Temp.(C) Water	Cond.	pH	Turb. (cm)	Staff Gauge (cm)	Water Level	Trap Perform.	Photos
15	98/6/9	17:00	ML/RS/	22	13	44	7.6	40	85	H	GOOD	

Comments: Trap left in same position as set #114. See set #114 for photos.

Trap Check Data

Check #	Date	Time	Crew	Temp. (C) Air	Temp. (C) Water	Cond.	pH	Turb. (cm)	Staff Gauge (cm)	Water Level	Trap Perform.	Photos
1	98/6/9	19:20	ML//						85	H	GOOD	

Comments: Approximately 20 fish observed in the trap. Minimal debris in the box.

Check #	Date	Time	Crew	Temp. (C) Air	Temp. (C) Water	Cond.	pH	Turb. (cm)	Staff Gauge (cm)	Water Level	Trap Perform.	Photos
2	98/6/9	20:30							85	H	GOOD	

Comments: Very minimal debris in box.. Released 6 hatchery coho and left 3 wild coho in the trap; only 1/2 of the fish estimated to be in the trap at 19:20 were there at 20:30. Must be escaping somehow.

Check #	Date	Time	Crew	Temp. (C) Air	Temp. (C) Water	Cond.	pH	Turb. (cm)	Staff Gauge (cm)	Water Level	Trap Perform.	Photos
3	98/6/9	22:30	ML/RS/						84			

Comments: Appears fish may be moving into the screw when the box is being fished.

Trap Pull Data

Date	Time	Crew	Temp. (C) Air	Temp. (C) Water	Cond.	pH	Turb. (cm)	Staff Gauge (cm)	Water Level	Trap Perform.	Photos
98/6/10	8:20	ML/RS/	15	10	48	7.6	49	82	H	GOOD	302 21,22

Comments: Weather 100% cloud with a light breeze. Minimal debris in box. Summary: 14 wild coho and 14 hatchery coho caught.

Fish Information Summary

Species	Count	Fork Length (mm) Minimum	Fork Length (mm) Maximum	Weight (g) Minimum	Weight (g) Maximum
CO	14	85	106	6.1	11.6
CO-h	14				

Toboggan Creek 1998

Set Number 115

Trap Set Data

Set #	Date	Time	Crew	Temp.(C) Air	Temp.(C) Water	Cond.	pH	Turb. (cm)	Staff Gauge (cm)	Water Level	Trap Perform.	Photos
115	98/6/10	8:20	ML/RS/	15	10	48	7.6	49	82	H	GOOD	

Comments: See photos 21 and 22 from roll 302 for trap set.

Trap Check Data

Check #	Date	Time	Crew	Temp. (C) Air	Temp. (C) Water	Cond.	pH	Turb. (cm)	Staff Gauge (cm)	Water Level	Trap Perform.	Photos
1	98/6/10	13:15	ML//	17					78	M		

Comments: Weather 99% cloud. Minimal debris in box. 11 wild coho and 7 hatchery coho in trap.

Trap Pull Data

Date	Time	Crew	Temp. (C) Air	Temp. (C) Water	Cond.	pH	Turb. (cm)	Staff Gauge (cm)	Water Level	Trap Perform.	Photos
98/6/10	17:00	ML/RS/	21	12	55	7.6	47	77	M	GOOD	302:23

Comments: Weather: 50% cloud cover, sunny with light breeze. Fish summary: 11 hatchery coho and 13 wild coho caught. Fry have emerged and are moving (2 fry and 1 dolly varden) dip netted out of side channel just up stream of trap location); both fry vouchered.

Fish Information Summary

Species	Count	Fork Length (mm) Minimum	Fork Length (mm) Maximum	Weight (g) Minimum	Weight (g) Maximum
CO	13	75	111	4.6	14.3
CO-h	11				

Toboggan Creek 1998

Set Number 16

Trap Set Data

Set #	Date	Time	Crew	Temp.(C) Air	Temp.(C) Water	Cond.	pH	Turb. (cm)	Staff Gauge (cm)	Water Level	Trap Perform.	Photos
16	98/6/10	17:00	ML/RS/	21	12	55	7.6	47	77	M	GOOD	

Comments: See photo 23 from roll #302 for trap set conditions.

Trap Check Data

Trap Pull Data

Date	Time	Crew	Temp. (C) Air	Temp. (C) Water	Cond.	pH	Turb. (cm)	Staff Gauge (cm)	Water Level	Trap Perform.	Photos
98/6/11	8:30	ML//	15	9	59	7.8	51	72	M	GOOD	302: 24

Comments: Weather: 60% cloud cover, sunny with light breeze. More debris than normal in box (cotton from cottonwood trees and a 3ft log in drum). Fish summary: 9 wild coho, 8 hatchey coho and 3 rainbow trout/steelhead caught in trap.

Fish Information Summary

Species	Count	Fork Length (mm) Minimum	Fork Length (mm) Maximum	Weight (g) Minimum	Weight (g) Maximum
CO	9	86	113	6.5	14.1
CO-h	8				
RB/ST	3	68	182	3.5	62.2

Toboggan Creek 1998

Set Number 17

Trap Set Data

Set #	Date	Time	Crew	Temp.(C) Air	Temp.(C) Water	Cond.	pH	Turb. (cm)	Staff Gauge (cm)	Water Level	Trap Perform.	Photos
17	98/6/12	17:00	ML//	23	13	61	7.7	57	62	M	GOOD	302: 25

Comments: Weather: 100% cloud cover. Drum only has about 10cm of clearance from substrate. Drum is turning noticeably slower than normal, due to lower water level. Fish escapement may occur due to reduced water flow.

Trap Check Data

Check #	Date	Time	Crew	Temp. (C) Air	Temp. (C) Water	Cond.	pH	Turb. (cm)	Staff Gauge (cm)	Water Level	Trap Perform.	Photos
1	98/6/12	17:30	RS//						62	M	POOR	

Comments: Only 1 fish observed in trap. No debris in trap.

Check #	Date	Time	Crew	Temp. (C) Air	Temp. (C) Water	Cond.	pH	Turb. (cm)	Staff Gauge (cm)	Water Level	Trap Perform.	Photos
2	98/6/12	23:00	ML//						63	M	GOOD	

Comments: At least six fish observed in box. Minimal debris in box.

Trap Pull Data

Date	Time	Crew	Temp. (C) Air	Temp. (C) Water	Cond.	pH	Turb. (cm)	Staff Gauge (cm)	Water Level	Trap Perform.	Photos
98/6/13	8:20	ML/RS/	11	9	65	7.7	58	62	M	GOOD	303: 1

Comments: Weather: 5% cloud cover, sunny with a light breeze. Fish Summay: 11 hatchery coho, 3 wild coho, 4 rainbow trout/steelhead and 2 lamprey caught. Flow has dropped to low-moderate discharge and the trap is turning noticealby slower.

Fish Information Summary

Species	Count	Fork Length (mm) Minimum	Fork Length (mm) Maximum	Weight (g) Minimum	Weight (g) Maximum
CO	3	98	108	9.5	12.9
CO-h	11				
L	2				
RB/ST	4	89	139	7	29.7

Toboggan Creek 1998

Set Number 18

Trap Set Data

Set #	Date	Time	Crew	Temp.(C) Air	Temp.(C) Water	Cond.	pH	Turb. (cm)	Staff Gauge (cm)	Water Level	Trap Perform.	Photos
18	98/6/14	17:15	RS//	20	12	62	7.8	44	70	M	GOOD	303: 2,3

Comments: Weather: 95% cloud with showers throughout the day. Drum turning okay - some lateral movement of trap.

Trap Check Data

Check #	Date	Time	Crew	Temp. (C) Air	Temp. (C) Water	Cond.	pH	Turb. (cm)	Staff Gauge (cm)	Water Level	Trap Perform.	Photos
1	98/6/14	21:00	RS//						70	M	GOOD	

Comments: Weather: cloudy with showers (some clear patches). 3 Fish observed in trap.

Trap Pull Data

Date	Time	Crew	Temp. (C) Air	Temp. (C) Water	Cond.	pH	Turb. (cm)	Staff Gauge (cm)	Water Level	Trap Perform.	Photos
98/6/15	9:00	RS/ML/	9	10		8.3	46	62	M	GOOD	

Comments: Weather mainly cloudy, some showers. Fish Summary: 8 hatchery coho, 5 wild coho and 7 rainbow trout/steelhead.

Fish Information Summary

Species	Count	Fork Length (mm) Minimum	Fork Length (mm) Maximum	Weight (g) Minimum	Weight (g) Maximum
CO	5	87	109	7.5	12.8
CO-h	8				
RB/ST	7	61	113	2.3	16.7

Toboggan Creek 1998

Set Number 19

Trap Set Data

Set #	Date	Time	Crew	Temp.(C) Air	Temp.(C) Water	Cond.	pH	Turb. (cm)	Staff Gauge (cm)	Water Level	Trap Perform.	Photos
19	98/6/16	18:00	RS//	23	13	44	7.6	60	59.5	L	GOOD	303: 4

Comments: Trap appears to be collecting from a good portion of the main flow. Clearance from the drum to the bottom substrate is less than 10 cm. Minimal flow into the trap box - juvenile fish could easily swin back into the barrel. Weather: sunny, a few clouds

Trap Check Data

Check #	Date	Time	Crew	Temp. (C) Air	Temp. (C) Water	Cond.	pH	Turb. (cm)	Staff Gauge (cm)	Water Level	Trap Perform.	Photos
1	98/6/16	22:00	RS//								GOOD	

Comments: Only one fish observed in the trap. Minimal amounts of debris in trap.

Trap Pull Data

Date	Time	Crew	Temp. (C) Air	Temp. (C) Water	Cond.	pH	Turb. (cm)	Staff Gauge (cm)	Water Level	Trap Perform.	Photos
98/6/17	9:00	RS/RS/	14	11	44	7.7	65	59.5	L	GOOD	303: 5

Comments: High overcast. Fish Summary: 9 hatchery coho, 6 wild coho and 6 rainbow trout/steelhead.

Fish Information Summary

Species	Count	Fork Length (mm) Minimum	Fork Length (mm) Maximum	Weight (g) Minimum	Weight (g) Maximum
CO	6	91	104	8	12.3
CO-h	9				
RB/ST	6	67	120	3.2	19.4

Toboggan Creek 1998

Set Number 20

Trap Set Data

Set #	Date	Time	Crew	Temp.(C) Air	Temp.(C) Water	Cond.	pH	Turb. (cm)	Staff Gauge (cm)	Water Level	Trap Perform.	Photos
20	98/6/20	17:00	RS//	16	15	66	7.5	48	68	M	GOOD	303: 5

Comments: Weather: sunny and hot, a few cloudy patches. It was rainy on Thursday.

Trap Check Data

Check #	Date	Time	Crew	Temp. (C) Air	Temp. (C) Water	Cond.	pH	Turb. (cm)	Staff Gauge (cm)	Water Level	Trap Perform.	Photos
1	98/6/20	23:00	RS//						70	M	GOOD	

Comments: Fair amount of cotton in trap. No fish observed in trap.

Trap Pull Data

Date	Time	Crew	Temp. (C) Air	Temp. (C) Water	Cond.	pH	Turb. (cm)	Staff Gauge (cm)	Water Level	Trap Perform.	Photos
98/6/21	8:30	RS//	14	11	59	7.5	46	67	M	GOOD	

Comments: No photos taken - trap was in the same position as setting. Fish Summary: 1 hatchery coho, 6 wild coho (2 not smolting) and 10 rainbow trout/steelhead.

Fish Information Summary

Species	Count	Fork Length (mm) Minimum	Fork Length (mm) Maximum	Weight (g) Minimum	Weight (g) Maximum
CO	6	52	104	1.4	11.2
CO-h	1				
RB/ST	10	65	122	3	21

Toboggan Creek 1998

Set Number 21

Trap Set Data

Set #	Date	Time	Crew	Temp.(C) Air	Temp.(C) Water	Cond.	pH	Turb. (cm)	Staff Gauge (cm)	Water Level	Trap Perform.	Photos
21	98/6/23	17:00	ML//	19	12	56	7.8	55	61	M	GOOD	303: 7

Comments: Weather: 100% cloud, moderate breeze with periods of rain

Trap Check Data

Trap Pull Data

Date	Time	Crew	Temp. (C) Air	Temp. (C) Water	Cond.	pH	Turb. (cm)	Staff Gauge (cm)	Water Level	Trap Perform.	Photos
98/6/24	9:00	ML//	13	11	60	7.8	57	61	M	GOOD	303: 8

Comments: Weather: sunny with 25% cloud cover. Moderate amount of debris at the bottom of the box. Fish Summary: 2 wild coho, 6 rainbow trout/steelhead and 2 lamprey caught.

Fish Information Summary

Species	Count	Fork Length (mm) Minimum	Fork Length (mm) Maximum	Weight (g) Minimum	Weight (g) Maximum
CO	2	92	105	8.2	11.2
L	2				
RB/ST	6	69	122	2.7	19.4

Toboggan Creek 1998 — Set Number 22

Trap Set Data

Set #	Date	Time	Crew	Temp.(C) Air	Temp.(C) Water	Cond.	pH	Turb. (cm)	Staff Gauge (cm)	Water Level	Trap Perform.	Photos
22	98/7/8	17:20	ML//	27	15	49	7.2	59	60.5		GOOD	

Comments: Weather: 20% cloud cover.

Trap Check Data

Trap Pull Data

Date	Time	Crew	Temp. (C) Air	Temp. (C) Water	Cond.	pH	Turb. (cm)	Staff Gauge (cm)	Water Level	Trap Perform.	Photos
98/7/9	9:19	DS/ML/	15	15	46	7.5	51	64		GOOD	

Comments: No photos taken. Trap pulled for year. Weather: Partly cloudy, 70% cover. Fish Summary: 3 wild coho, 1 rainbow trout/steelhead and 6 lamprey.

Fish Information Summary

Species	Count	Fork Length (mm) Minimum	Fork Length (mm) Maximum	Weight (g) Minimum	Weight (g) Maximum
CO	3	31	115	0.2	15.3
L	6				
RB/ST	1	78	78	5.4	5.4