

**1996 SOUTH FORK TEN MILE RIVER
AND LITTLE NORTH FORK NOYO
OUTMIGRANT TRAPPING**

FINAL REPORT

FOR

HUMBOLDT COUNTY
RESOURCE CONSERVATION DISTRICT

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BY

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ABSTRACT

As part of a program to employ commercial salmon fisherman impacted by fishery closures a study was initiated to determine the number of juvenile salmon emigrating from rearing areas to migrate to sea or attempt to rear in other areas downstream. Outmigrant traps were installed in the spring of 1996 in the Little North Fork Noyo River (LNF), the South Fork Ten Mile River (SF) and two of its tributaries, Smith and Campbell Creek. Two type of traps were utilized, a fyke net with an attached livecar and a "pipe trap". All four traps were operated until downstream movement of yearling or older fish ceased. The fyke net traps were all located on the Ten Mile system while the pipe trap was utilized in the LNF. Fyke traps were pulled when high flows were expected or experienced while the pipe trap operated continuously. The SF trap was set in late April while all other traps were set in early March. Most yearling or older fish were marked with a caudal clip and released upstream to determine trap efficiency rates. The pipe trap design proved to be much more efficient due to the inability of outmigrants to leave livecar once entering while other trap design allowed fish to move back upstream which allowed fish to find ways get past trap unobserved. To estimate total numbers of fish passing trap sites, the number of yearling or older salmonids trapped were expanded by determining trap efficiency rates and estimates for days where traps were pulled were made by extrapolated from weekly averages or from prior and previous weeks.

The numbers and mortality of all fish, amphibians, snakes, and salamanders are given. Weekly or biweekly length and weights for yearling salmonids are also reported. For the Campbell Creek, SF, LNF and Smith Creek traps the number of Young of the Year (YOY) coho counted were 4,493, 42, 1,341, and 2,479, respectively. Coho smolts numbered 9,42,408, and 40, respectively. YOY steelhead numbered 22, 411, 5,526, 1829, and 32,812 respectively while yearling or older (Y+) steelhead trout numbered 947, 1,728, 556, and 1,216, respectively. The total number of coho smolts to have past trap sites from early March though June were estimated at 34,493, 450, and 89, respectively. Total Y+ steelhead numbers were estimated at 2,379, 15,795, 770, and 3,954, respectively. Trapping data indicated that coho smolt populations were about 25 times higher in 19% than in 1995 in the SF and about twice as high this year in the LNF. Steelhead trout numbers were also up considerably. Improved flow conditions are believed to have contributed to improved production. The number of YOY coho observed leaving tributaries or moving downstream are believed to indicate that habitat above was fully seeded with both coho and steelhead trout this year with the possible exception of the SF. Results of a recent spawning survey and potential impacts of an adult coho trapping program in the SF are discussed in relation to trapping results.

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INTRODUCTION

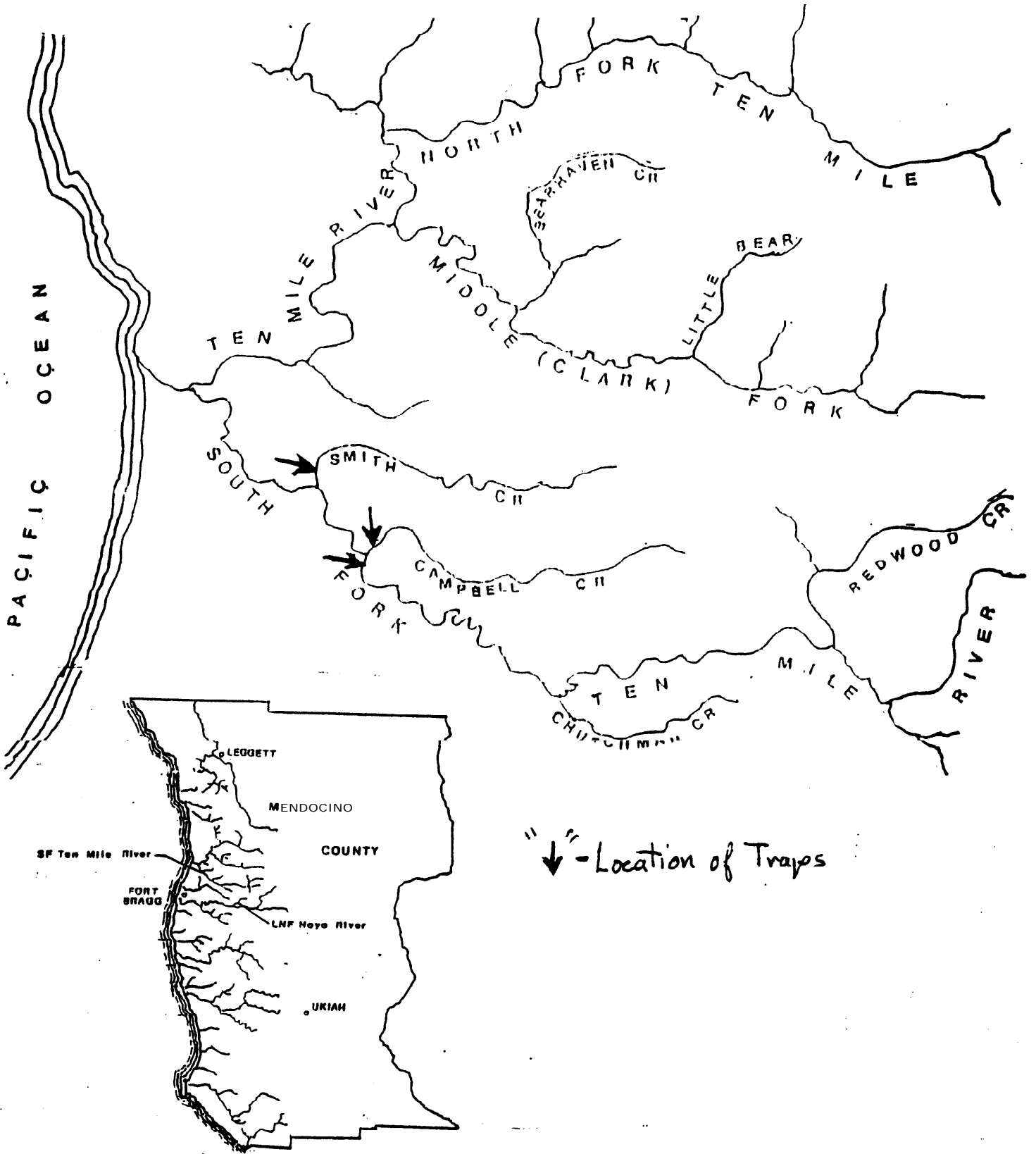
This study was conducted by Salmon Trollers Marketing Association (STMA) as part of the Northwest Emergency Assistance Program (NEAP) to employ commercial fisherman effected by recent fishery closures due to low stock abundance expectations. In this study, outmigrant traps were put into a tributary of the Noyo River, the Little North Fork (LNF), the South Fork Ten Mile River and two of its tributaries, Campbell and Smith Creek (Figure 1). The purpose of the work in the Ten Mile River was to help determine levels of natural coho and steelhead production associated with a adult coho and steelhead trapping and propagation effort conducted by the Salmon Restoration Association. The trapping in the LNF Noyo is done in conjunction with a study conducted through Humboldt State University in association with the Institute for River Ecosystems and the Fish, Farm & Forestry Communities Forum (FFFC) for the purpose of determining relationships between habitat and limiting factors to coho production. The 1996 outmigrant trapping is the second consecutive year that trapping has occurred in both the LNF Noyo and SF Ten Mile River.

This report details the catch of fish and other animals found in outmigrant traps. It compares the findings from this years trapping operation with those from the previous year as well as findings from a salmon and steelhead spawning survey conducted in the Ten Mile River earlier this year by STMA. Survey information is discussed with reference to a ongoing program in the Ten Mile River basin where native coho and steelhead are collected as brood stock in a natural stock propagation/restoration program.

Since most trap operators had previous experience operating outmigrant traps, identification of Young-of-the-Year (YOY) fish to species progressed much better than in the initial year of operation. Since YOY were captured from the onset of emergence, the identification of the later emerging steelhead fry were clearly separable.

All traps were designed to minimize the chance that fish could pass the trap site uncouncted. An unknown portion of young fry were expected to be able to move downstream uncouncted due to the size of the wing-wall mesh but larger fish were

Figure 1. Location of **Streams Surveyed**



expected to enter trap and be counted before being allowed to continue their downstream movement. The exception was during periods of elevated flow where traps were pulled to minimize any potential salmon mortalities or high flows broke open sections of the weir or tore holes in screens. A mark and recapture program was utilized to determine what fraction of fish, yearling or older, were getting through uncounted.

METHODS

Traps were placed in streams to capture outmigrating or downstream moving juvenile salmonids. All three traps on the SF Ten Mile were of the same type consisting of a funnel shaped net which emptied in to a livecar fish holding box at the downstream end of the net. The livecar was constructed out of a plastic pipe frame to which a rectangular shaped net container was fixed. This livecar had a zipper opening utilized to scope out fish and debris that accumulated in the livecar. The funnel shaped net, or fyke net, was held in the stream by connecting the fyke net to metal fence posts that were pounded into the stream bed. Ropes were strung from the upstream end of the net to trees or any other sturdy structure on the bank to prevent loss of the trap during high water events. The lower portion of fyke net and livecar consisted of 1/8" mesh. The upper portion of fyke net varied from 3/16 to 1/2 inch mesh (See Appendix III). Wire wing-walls were strung out from the fyke net to edge of bank. A variety of types of wire mesh screens were used to prevent fish from being able to escape around the trap. 1/4 inch mesh was used for wing-wall construction after having problems with smaller (1/8" mesh) catching too much debris during periods with elevated flow conditions. Various materials were used to secure the edges of wing-wall such as sand bags and rocks to help prevent fish from escaping past the trap.

Where the small end of the fyke net was connected to the livecar there was a section of plastic pipe to which the net and livecar was held together with hose clamps. This pipe (8 inch dia.) was extended into the livecar approximately 3 to 4 inches and a stove pipe elbow was inserted into the lower end of the plastic pipe to discourage fish from exiting the live car and swimming back upstream. This elbow was normally pointed down towards the bottom of livecar but turned upward when the trap was being checked.

In order to reduce flows that any trapped fish would be subjected to, sets of two side-by-side fyke nets and livecars were set. This double trap arrangement worked very well in reducing impacts due to high flow conditions. One other additional precautionary action was taken to reduce any potential mortalities. Whenever forecasts suggested that

significant amounts of rain were expected, traps were pulled and reset when threat ended or flows dropped.

The LNF trap was a “pipe-trap”. This trap was constructed utilizing a perforated metal tray (McBain ramp). Wire-mesh screens across the stream funneled fish and water into a long pipe which spilled out onto this tray about 30 feet downstream. The perforations in the tray allowed much of the water to dissipate before reaching the livecar. The tray with sides and a screen cover directed the water and fish into the livecar at the lower end of the tray. Once fish were in the livecar, there was no way they could escape back upstream. This feature was an improvement compared to the other traps being used which could not prevent fish from escaping out of the livecar to swim back upstream. Once out of the trap, fish can search for other ways around trap which increases the likelihood that fish can escape downstream without being counted. It was also important in that it helped reduce the volume of water that reached the livecar which reduced velocities which the fish were subjected to, reducing potential mortalities. The flow entering the livecar was adjusted by placing a plastic sheet or gunny sack at the upper end where portions of the screen could be covered over or uncovered depending on whether there was need for more or less water to enter the livecar.

Wire mesh separators were installed in all livecars to allow smaller fish to go into lower end of box where larger fish would be excluded. This was done to protect smaller fish from being eaten by the larger fish and other aquatic animals. Other material such as large boulders, twigs & branches were used to give added cover for trapped fish.

The traps were ran once per day by two trap operators. Fish were scooped out of the livecar and placed in buckets. Fish were measured to nearest mm (up to 3 mm error on large fish possible -less for small fish- is likely due to fish movement during measurement.) fork length and a subset weighted by water displacement in a graduated cylinder where one ml was equal to one gram. Occasionally fish were anesthetized utilizing Alka Seltzer but normally fish were measured without its use. Non-salmon& were not normally weighed.

Most steelhead and coho smolts were marked with a caudal fin clip and released upstream to determine trap efficiency rates. Marking of smolts was done throughout trapping period in the LNF Noyo. In the S. F. Ten Mile, marking was not conducted until about three weeks after initiation of trapping because of recommendations from Fish & Game which wanted to avoid, to the greatest degree possible, any mortalities. **This** degree of concern was in part to the low number of yearling (Y+) coho expected in

this system. The marking was initiated once flow dropped to a level where the trap in the SF could be set and used as a recapture site for fish marked in Campbell Creek. This would allow a secondary check on SF trap efficiency. As it turned out, because trap operators didn't mark Campbell fish with just a upper caudal clip as directed but had been also utilizing a lower fin clip there was not a separate mark available for the SF trap so the planned SF trap location was moved to above the confluence of Campbell Creek.

RESULTS

The number and type of fish and other animals trapped in Campbell Creek, the South Fork Ten Mile, LNF Noyo and Smith Creek are shown on Tables 1 - 4. The significance of these numbers are discussed in detail in following sections. The length frequency distributions of the salmonids from the various traps are given on following tables as is information concerning the marking and recapture of salmonids. In Appendix I are given weight and length data and in Appendix II is information on the various physical parameter measurements taken during trapping operations. Flows were estimated from water velocities and cross section measurements in selected stream sections in Ten Mile areas and from water heights on a stream gauge in the LNF.

Tables 1-4 show the number of fish and other animals trapped, days per week traps were operational and the mortality observed. The mortalities of YOY are the number of fish actually observed dead. There were without doubt greater mortalities associated with ingestion by predatory salmonids, sculpins, salamanders and frogs which could not be estimated without inspecting contents of predator stomachs which was not done. It appears that salmon fry can and do at times make up a large part of the diet of fish in such streams. The livecar likely makes fry more available to predators than would occur in the stream even with screen separators in livecar.

It is apparent that by pulling traps when expecting elevated flow conditions, flow related mortalities were greatly reduced if not completely eliminated this trapping season. The mortalities experienced this year were significantly less than experienced in 1995.

Table 1 Weekly Summaries of the number of Fish and Other Animals Trapped in the Campbell Creek Outmigrant Trap in 1996, Number of Days a Week Trap was in operation, and Percent Mortality Observed

	March 4-10	March 11-17	March 18-24	March 25-31	April 1-7	April 8-14	April 15-22	April 23-28	April-May 29-5	May 6-12	May 13-19	May 20-26	May-June 27-2	June 3-9	June 10-16	June 17-23	June-July 24-1	Total	Mortality
Coho YOY	0	378	940	215	1031	926	98	745	49	17	37	26	10	14	4	1	2	4493	0.27%
Coho Y+	0	0	0	0	1	2	0	1	2	2	1	0	0	0	0	0	0	9	0.00%
Steelhead YOY	0	0	41	4260	3609	4931	45	6197	1114	600	695	665	140	47	35	13	19	22411	0.39%
Steelhead Y+	8	25	15	9	62	99	13	50	85	177	196	68	62	46	22	7	3	947	1.06%
Ad.Steelhead	0	0	3	0	1	0	0	0	0	0	0	0	0	0	0	0	0	4	0.00%
Sculpin Sp.	16	61	72	72	51	40	1	17	11	5	24	14	9	11	8	16	11	439	0.00%
Stickleback	1	11	16	7	13	11	0	22	6	15	30	47	17	2	10	16	2	226	0.00%
Juv. Lamprey	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00%
Adult Lamprey	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00%
GP Salamander	1	8	2	3	1	2	0	11	2	3	2	2	0	2	2	2	5	48	0.00%
Frog Sp.	2	2	4	3	7	5	1	0	0	0	0	1	0	0	0	0	0	25	0.00%
Salamander Sp.	0	0	9	5	4	2	0	0	0	0	0	0	0	0	1	0	0	21	0.00%
Snake Sp.	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	2	0.00%
Days Operated	1	4	7	7	7	7	1	7	7	7	7	7	7	7	7	7	8	105	

Table 2 Weekly Summaries of the number of Fish and Other Animals Trapped in the South Fork Ten Mile Outmigrant Trap in 1996, Number of Days a Week Trap was in operation, and Percent Mortality Observed

	March 4-10	March 11-17	March 18-24	March 25-31	April 1-7	April 8-14	April 15-22	April 23-28	April-May 29-5	May 6-12	May 13-19	May 20-26	May-June 27-2	June 3-9	June 10-16	June 17-23	June-July 24-1	Total	Mortality
Coho YOY									4	17	9	2	0	4	4	1	1	42	0.00%
Coho Y+									1	6	20	1	0	1	0	0	0	29	0.00%
Steelhead YOY									6	2791	1427	527	61	132	169	241	172	5526	0.74%
Steelhead Y+									27	187	422	119	240	409	157	133	34	1728	0.29%
Steelhead									0	0	0	0	0	0	0	0	0	0	0.00%
Sculpin Sp.									33	101	115	28	66	48	81	50	36	558	0.00%
Stickleback									54	130	127	85	144	135	79	93	71	918	0.00%
Juv.Lamprey									3	6	3	2	1	3	0	2	0	20	0.00%
Adult Lamprey									1	3	6	6	1	1	0	0	0	18	5.56%
GP Salamander									0	0	1	0	1	0	1	0	0	3	0.00%
Frog Sp.									2	8	1	2	1	1	0	0	0	15	0.00%
Salamander Sp.									1	0	0	0	0	0	0	0	0	1	0.00%
W.Pond Turtle									0	0	1	0	1	0	0	0	2	4	0.00%
Days Operated	0	0	0	0	0	0	0	0	2	7	5	3	7	7	7	7	8	53	

Table 3 Weekly Summaries of the number of Fir and Other Animals Trapped in the Little North Fork Noyo River Outmigrant Trap in 1996, Number of Days a Week Trap was in operation, and Percent Mortality Observed

	March 4-10	March 11-17	March 18-24	March 25-31	April 1-7	April 8-14	April 15-21	April 22-28	April-May 29-5	May 6-12	May 13-19	May 20-26	May-June 27-2	June 3-9	June 10-16	June 17-23	June-July 24-I	Total	Mortality
Coho YOY	104	246	307	181	224	66	33	50	8	17	23	35	15	25	7	0		1341	4.33%
Coho Y+	5	1	6	8	17	67	91	62	59	42	41	6	3	0	0	0		408	1.72%
Steelhead YOY	0	0	0	297	316	144	75	340	141	294	79	31	25	43	41	3		1829	1.37%
Steelhead Y+	2	10	59	56	53	105	99	23	45	32	33	32	4	3	0	0		556	1.08%
Steelhead	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0		2	0.00%
Sculpin Sp.	0	0	1	0	0	0	0	0	0	0	2	0	0	0	0	0		3	0.00%
Stickleback	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00%
Juv. Lamprey	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00%
Adult Lamprey	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0.00%
GP Salamander		6	2	0	3	1	2	1	2	3	8	2	2	3	2	0		38	0.00%
Frog Sp.		2	2	0	11	13	7	7	5	0	0	0	0	0	0	0		48	0.00%
Salamander Sp.	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0			0.00%
Snake Sp.	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0			0.00%
Days Operated	3	7	7	7	7	7	7	7	7	7	7	7	7	7	7	2	0	103	

Table 4 Weekly Summaries of the Number of Fish and Other Animals Trapped in Smith Creek, Ten Mile River Outmigrant Trap in 1996, Number of Days a Week Trap was in operation, and Percent Mortality Observed

	March 4-10	March 11-17	March 18-24	March 25-31	April 1-7	April 8-14	April 15-21	April 22-28	Ap-May 29-5	May 6-12	May 13-19	May 20-26	My-June 27-2	June 3-9	June 10-16	June 17-23	June-July 24-I	Total	Mortality
Coho YOY			152	152	206	1512	58	215	60	39	66	6	7	2	4	0	0	2479	0.16%
Coho Y+			0	0	4	12	1	5	11	5	1	1	0	0	0	0	0	40	0.00%
Steelhead YOY			98	953	10042	8433	158	2070	2308	5783	2416	453	18	30	27	13	10	32812	0.09%
Steelhead Y+			9	17	41	110	13	40	164	195	288	88	71	105	47	13	15	1216	0.33%
Ad. Steelhead			0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	2	0.00%
Sculpin Sp.			92	118	210	161	16	80	27	35	46	49	8	11	13	21	17	904	0.00%
Stickleback			1	3	4	2	0	0	16	4	33	43	17	14	10		2	150	0.00%
Juv. Lamprey			1	1	5	1	0	4	0	0	0	1	0	0	0	0	0	13	0.00%
Adult Lamprey			0	0	0	0	0	1	1	0	1	1	0	0	0	0	0	4	0.00%
GP Salamander			0	4	3	5	0	1	3	5	9	1	0	0	1	3		36	0.00%
Frog Sp.			1	2	1	0	0	3	0	0	0	0	0	0	0	0	0	7	0.00%
Salamander Sp.			0	1	2	0	0	1	0	0	0	0	0	0	0	0	0	4	0.00%
Snake Sp.			0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	4	0.00%
Days Operated	0	0	3	7	7	7	1	3	7	7	7	7	7	7	7	7	8	92	

Ten Mile River Trapping Operations

The Campbell Creek trap was set on March 9th. It was pulled due to high flows from March 13 through March 15. From April 15 through the 22nd, high flows were again experienced and traps were pulled during this period. The trap operated continuously from April 23 through July 1 and in operation a total of 105 days. The trap was located 700 feet above the mouth of Campbell Creek, a short distance below a bridge which crosses the stream. Only nine coho salmon (*Oncorhynchus kisutch*) yearlings were trapped this year while steelhead trout (*O. mykiss*) numbered 947. Coho YOY numbered 4,493 while steelhead YOY numbered 22,411. No Y+ coho mortalities occurred and steelhead Y+ mortality was just over 1 percent. Four adult steelhead were captured in traps and released downstream.

Both prickly and coastrange sculpin (*Cottus asper* and *C. aluticus*) were observed in trap. Most, over 90%, of the 429 captured were prickly sculpin. The other common fish observed was threespine stickleback (*Gasterosteus aculeatus*). Other animals observed were yellow -legged frogs (*Rana boylei*), giant pacific salamander (*Dicamptodon ensatus*) and aquatic garder snake (*Thamnophis couchii*). Others include the red-bellied newt (*Taricha torosa*) and a single northwestern salamander (*Ambystorna gracile*).

Y+ coho were captured between the first week of April and mid-May. Y+ Steelhead emigration peaked in mid-May. The first YOY coho were observed on March 12 and the first YOY steelhead on March 21. **The peak YOY** coho emigration occurred during the first week of April whereas the peak YOY steelhead numbers occurred in the later half of April. Sculpin numbers peaked in mid to late March while stickleback peaked in mid to late May. Frogs and salamanders occurred primarily in the March to mid-April period.

The Smith Creek trap was first set on March 21. As in Campbell, the trap was pulled from April 15 through the 22nd. Smith Creek trap was again pulled on the 24th and reset the 27th. Trap operated continuously from the 28th through July 1 and was in operation a total of 92 days. The trap was located approximately 1500 feet above the mouth. There were 40 Y+ coho trapped and 1,216 Y+ steelhead. There were 2,479 YOY coho and 32,812 YOY steelhead captured in Smith Creek trap. There were no Y+ coho mortalities and the mortality rate of steelhead yearlings was 0.33 percent. Two adult steelhead were also captured and released downstream.

Both prickly and coastrange sculpin were observed. The majority of sculpins were prickly but the portion of coastrange was higher in Smith than Campbell Creek. There also appeared to be a higher proportion of coastrange later in the trapping period. Smith Creek unlike Campbell, had both adult and juvenile pacific lamprey (*Lampetra tridentata*). Aquatic Garter Snakes, one red-legged frog (*Rana aurora*), Pacific treefrogs and yellow-legged frogs were also trapped.

Y+ coho were captured between the first week of April and late May. Steelhead Y+ peaked around mid-May, similar to Campbell Creek. YOY coho were observed on the first day of operation, March 21, and the first YOY steelhead came on March 24. The peak YOY coho emigration occurred the second week of April whereas the peak YOY steelhead numbers occurred a week earlier. A secondary peak in the number of YOY steelhead occurred during second week of May. Sculpin numbers peaked in mid to late March while stickleback peaked in mid to late May. Frog and salamanders occurred primarily in the March to mid-April period.

The South Fork trap was first set on May 3rd. The trap was pulled May 17 and reset on the 19th. The SF trap was pulled again on May 21 and was reset on May 25th. Trap was in operation a total of 53 days. The trap was located approximately 200 yards above the mouth of Campbell Creek. 29 Y+ coho were captured as well as 1,728 Y+ steelhead. Coho YOY captured totaled 42. YOY steelhead numbered 5,526. No Y+ coho mortalities were incurred and the mortality of Steelhead Y+ was 0.29 percent.

A majority of the 558 sculpin, about 83 percent, were prickly sculpin. There were 18 adult Pacific lamprey captured as well as 4 western pond turtles (*Clemmys marmorata*)

With the late date at which the SF trap was installed, no peak timing of emigration period can be determined. The 20 Y+ coho which were counted in mid-May were later than significant numbers of coho were counted in either Smith or Campbell.

Ten Mile Salmonid Lengths

The length frequency of salmonids trapped are shown on Tables 5-10. On these tables, the underlined areas are where YOY and yearling fish have been separated. There is likely some overlap between categories for juvenile steelhead in the later period. Trap operators were able at times to identify fish within the same length category as either YOY or yearling steelhead. Operators did take photos of side by side fish of equal length

Table 5		Length Frequency Distribution of Juvenile Coho Salmon Trapped in Campbell Creek, Ten Mile River Basin in 1996, By Week.															
Fork	March	March	March	April	April	April	April	May	May	May	May	May	June	June	June	June	
Length	10-16	17-23	24-30	31-6	7-13	14-15	23-27	28-4	5-11	12-18	19-25	26-1	2-8	9-15	16-22	23-30	
23-25																	
26-28																	
29-31	18																
32-34	33	169	14	34			4	70	18								
35-37	162	803	184	385	723	118	250	33	2							1	
38-40	43	47	42	251	501	74	350	11	2	5	1						
41-43							40	16	6								
44-46								5	2	13	8	1					
47-49									4	13	5	2	2			1	
50-52										5	9	2	3				
53-55											5	2	6	2			
56-58												1	4	2			
59-61												1					
62-64													3			1	
65-67																	
68-70																	
71-73																	
74-76																	
77-79																	
80-82									1								
83-85																	
86-88																	
89-91																	
92-94																	
95-97																	
98-100								1									
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104-106								1									
107-109									1								
110-112					1												
113-115								1									
116-118																	
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155-157										1							
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161-163																	
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173-175																	
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182-184																	
185-187																	
188-190																	
191-193																	
194-196																	
197-199																	
200-202																	
203-205																	
206-208				1													
SUM Y+	0	0	0	1	2	0	1	2	2	1	0	0	0	0	0	0	
AVE LEN				207	107		114	102	95	156							
SUM YOY	257	1019	240	850	1224	198	710	81	18	38	28	9	18	4	1	2	
AVE LEN	35.6	38.4	36.9	37.2	37.1	37.5	37.1	42.8	42.8	46.1	49.2	52.0	55.0	55.5	48	49.5	

Table 6		Length Frequency Distribution of Juvenile Steelhead Trapped in Campbell Creek, Ten Mile River Basin in 1996															
Fork	March	March	March	April	April	April	April	May	May	May	May	May	June	June	June	June	
Length	10-18	17-23	24-30	31-6	7-13	14-15	23-27	28-4	5-11	12-18	19-25	26-1	2-8	9-15	16-22	23-30	
23-25			38				112					2	1				
26-28		9	1255	896	2088	118	2020	263	106	148	251	48	17	1			
29-31		19	2438	2460	3237	78	3031	1053	438	213	223	76	3		1	1	
32-34		5		49	209			337	228	211	174	77	28	1	3	2	
35-37								19	8	19	58	4	2			1	
38-40									16	13	14		1	1		2	
41-43										13						1	
44-46	1								16	19	7		1			2	
47-49										19	7	2	4	1	1	1	
50-52									8	26	14	4	4	2	2	1	
53-55	1						2		8	26	21	10	7	12	2	1	
56-58	2		1		1		1				14	2	5	3	2	2	
59-61												2	1	5	1		
62-64		2	2	1	4	1	4		2		2	2	1	5			
65-67	1	3		1	3		1		6	6	2		1	1	2	1	
68-70	1	3		2	11	2	2	5	8	9	1		2	1			
71-73	1	2	2	2	3	3	2	1	11	9	4						
74-76	4	2	1	4	14	3	11	5	32	18	7	6	4				
77-79	5	2		3	16	2	2	4	23	18	3	2	4	3		1	
80-82	1				3		3	12	28	14	3	5	6	3	2		
83-85	2				6	2	9	9	19	21	10	10	5	4	1	1	
86-88	3	1	1	2	5	4	3	6	13	13	4	7	5	1			
89-91	2			1	7	1	2	2	20	18	5	6	8	1			
92-94			1		3		1		9	8	1	1	1	2	1		
95-97	1			4	5	1	1	4	11	5	3	4	3				
98-100	2			2	6		5	2	4	6	3	3	2	3	1	1	
101-103		1			2			2	2	2	1		1	1			
104-106				2	2		1	1	3	2	4		1				
107-109		1	1	4	2				3	3	6	2		2		1	
110-112				5	3		2	2	1	4	2		2		3		
113-115				2	3		2			4	4	3	1				
116-118					2			1		1		1		1			
119-121	1			1	4	1			3	2	6	1		1			
122-124					1		1		1	1	2	0					
125-127										3	2	1	1		1		
128-130									1	1	1	1				1	
131-133						1				1	2		2	2			
134-136				1	1				2			1					
137-139							1				1						
140-142	1						1		2			1					
143-145											2		1				
146-148												1			1		
149-151					1												
152-154											1						
155-157											1						
158-160											2						
161-163				1													
164-166					1												
167-169				2													
170-172														1			
173-175					1												
176-178																	
179-181					1												
182-184																	
185-187																	
188-190																	
191-193																	
195-197																	
198-200												1					
SUM Y+	29	17	9	40	111	21	57	56	204	167	85	57	48	24	11	3	
AVE Y+	81.2	75.2	76.7	99.2	89.1	83.4	84.7	85.1	84.6	86.6	99.4	95.5	96.6	98.4	102.0	97.0	
SUM YOY		33	3728	3395	5534	196	5500	1580	812	671	684	181	51	35	14	14	
AVE Y+		29.6	28.9	29.3	29.0	28.2	29.0	30.0	31.3	33.3	32.0	32.6	39.4	51.9	50.1	45.2	

Table 7. 1996 Length Frequency Distribution of Juvenile Coho Salmon in Smith Creek, Ten Mile River Basin															
Fork	March	March	April	April	April	April	May	May	May	May	May	June	June	June	June
Length	22-23	24-30	30-6	7-13	14-20	21-27	28-4	5-11	12-18	19-25	26-1	2-8	9-15	16-22	23-30
28-28															
29-31		4	11							2					
32-34	1	20	15	93		5	6								
35-37	20	171	45	1053	124	90	14	10							
38-40	4	73	23	340	83	98	28	10	23	2			1		
41-43							26	1	24						
44-46								10	23		1				
47-49								10					1		
50-52											2	1	1		
53-55							6								
56-58											1	2	2		
59-61										2					
62-64															
65-67															
68-70												0			1
71-73															
74-76															
77-79															
80-82															
83-85															
86-88			1												
89-91															
92-94									1						
95-97				1		1			1						
98-100			1	2		1	2								
101-103				1		1	1								
104-106							2	1							
107-109				2	2										
110-112				1	1		2	2							
113-115				2			2								
116-118				2											
119-121				1											
122-124							2								
125-127															
128-130															
131-133															
134-136															
137-139															
140-142															
143-145															
146-148									1						
149-151						1									
152-154															
155-157								2		1					
158-160															
161-163															
164-166															
167-169															
170-172															
173-175															
176-178															
179-181															
182-184															
185-187															
188-190															
SUM Y+	0	0	2	12	3	4	11	7	1	1	0	0	0	0	
AVE Y+			93.0	108.8	109.0	111.8	109.6	118.3	147.0	156.0					
SUM YOY	25	268	94	1486	207	191	78	41	70	6	4	4	4	0	1
AVE	36.4	36.5	35.6	36.5	37.2	37.4	40.2	42.0	42.0	43.0	51.0	53.3	51.0		69.0

Table 8 1996 Length Frequency Distribution of Juvenile Steelhead in Smith Creek, Ten Mile River Basin in 1996, By week																
Fork Length	March 10-18	March 22-23	March 24-30	April 30-6	April 7-13	April 14-20	April 21-27	May 28-4	May 5-11	May 12-18	May 19-25	May 26-1	June 2-8	June 9-15	June 16-22	June 23-30
23-25			19													
26-28			371	2436	2247	55	306	298	6	7	10	3				
29-31		2	380	4001	9397	332	785	2115	69	46	55	7	2	2		
32-34			38	87	204	28	102	89	21	23	30	5	3	4		1
35-37				87				30		7	8	3	3	1		
38-40							26	30	2			4	3	2	1	
41-43									1		1	1	1	1		1
44-46										1	1		5	2	1	1
47-49									1			2	2	4	1	2
50-52					1							2	3	7	3	1
53-55											1	1	2	3	3	1
56-58					1								1	2	5	8
59-61					2			1	1	1				1	1	2
62-64					2			1	1	2	1					1
65-67			1		2			1	2	8	4		2			
68-70					2	1	1	2	4	9	4		1		1	
71-73					5		1	7	3	14	4	2	3	4	1	
74-76		1	1	1	2			5	8	31	13	13	7	6		
77-79			1	2	1			6	11	28	10	5	8	6		1
80-82		1	2	1	7		1	8	12	20	13	2	9	6	2	
83-85				4	5	1	1	11	12	27	6	9	16	6	3	
86-88			2	1	6	5		6	16	23	8	2	9	4	2	2
89-91		1			6	3	2	14	11	22	2	4	6	4	1	2
92-94		1	1	3	6	1		8	14	14	2	4	5	3		1
95-97		1			8	3	2	10	12	30	1	6	6	4	1	
98-100			3	3	6	1	2	13	11	17	1	2	3	3		
101-103				1	3			5	7	8	1	2	2		1	
104-106			1	1	3			6	9	12	3	1	2	2		
107-109			1		4	1		7	5	4	1		3	3		1
110-112				2	2	3	1	13	9	7	3	1	4	2	1	
113-115				1	5	1	1	3	5	6	6	4	2	1		2
116-118					2			1	2	1	1	1	2			
119-121					2			2	5	8	2		3			1
122-124		1			1	1		1	1	2			1	1	1	3
125-127		1		2	1		1	1	4	4	3		2	1	1	
128-130				1				1	3	1		2			1	1
131-133					1			2	1	2	1	1				
134-136					1						1		2			1
137-139				1	1			3		1			1			1
140-142			1		2			1	2	2	1				2	1
143-145									3	3						1
146-148				2	1			1							1	
149-151				2			1	1				2				
152-154			1	1												
155-157					2	1	1	1								
158-160					3		1	1								
161-163																
164-166				2	1											1
167-169					2	1										
170-172				1	3											
173-175					1											
176-178								1								
179-181				1									1			
182-184				1			1									
185-187																
188-190					1											
191-193																
252															1	
SUM Y+	0	7	15	34	104	23	17	144	174	307	92	63	100	57	19	19
AVE		97.7	96.6	117.2	103.4	101.7	110.3	93.1	95.2	90.0	86.5	91.9	92.7	90.0	107.4	115.9
SUM YOY	0	2	808	6611	11848	415	1199	2562	100	84	106	28	25	29	15	18
AVE		30	28.1	29.0	29.5	29.8	29.7	29.9	30.9	31.3	31.5	36.2	42.6	45.6	52.8	53.3

Table 9		Length Frequency of Juvenile Coho Salmon Trapped in the South Fork of the Ten Mile River Basin in 1996, by Week															
Fork	March	March	March	April	April	April	April	May	May	May	May	May	June	June	June	June	
Length	10-16	17-23	24-30	31-6	7-13	14-15	23-27	28-4	5-11	12-18	19-25	26-1	2-8	9-15	16-22	23-30	
23-25																	
26-28																	
29-31																	
32-34																	
35-37									1								
38-40																	
41-43									1								
44-46										1							
47-49													1	1			
50-52									1	1			1	3			
53-55									1							1	
56-58															1	1	
59-61															1		
62-64															1		
65-67										1					1		
68-70									1	1							
71-73																	
74-76														1			
77-79																	
80-82																	
83-85																	
86-88																	
89-91																	
92-94																	
95-97																	
98-100																	
101-103																	
104-106																	
107-109																	
110-112																	
113-115																	
116-118											1						
119-121																	
122-124																	
125-127																	
128-130									1								
131-131																	
134-136												2					
137-139												3					
140-142									2			1					
143-145												1					
146-148												2					
149-151									1	1							
152-154													1				
155-157									1	1							
158-160									1	2							
161-163																	
164-166																	
167-169												1					
170-172																	
173-175												1					
176-178																	
179-181																	
182-184																	
185-187																	
188-190																	
191-193																	
194-196																	
197-199																	
200-202																	
203-205																	
206-206																	
SUM Y+	0	0	0	0	0	0	0	0	6	18	0	1	0	0	0	0	
AVE LEN				207	107		114	102	95	156		154					
SUM YOY	0	0	0	0	0	0	0	0	5	4	0	1	3	7	0	2	
AVE LEN									50.4	57.8		47.0	58.0	57.3		54	

Table 10		Length Frequency of Juvenile Steelhead Trapped in the South Fork of the Ten Mile River Basin in 1996, by Week														
Fork	March	March	March	April	April	April	April	May	May	May	May	May	June	June	June	June
Length	10-18	17-23	24-30	31-6	7-13	14-15	23-27	28-4	5-11	12-18	19-25	26-1	2-8	9-15	16-22	23-30
23-25												2			1	1
26-28									284	115	32	36	1			1
29-31								1786	1149	280	93	27	19		5	4
32-34								345	287	64	11	17	24	12		1
35-37								61	29	11	4	9	15	15		3
38-40								20	57	11	2	5	7	14		7
41-43										11	2	6	7	12		8
44-48										29	11		5	12	21	13
47-49								0					8	11	18	28
50-52										2		2	13	22	33	36
53-55								1	0	11			8	11	30	27
56-58									4	0		2	1	12	36	34
59-61								4	7			0	7	7	10	21
62-64								1	7			1	4	4	10	13
65-67								9	27	3	1	9	2	9	7	7
68-70								14	43	4	4	28	8	5	7	7
71-73								11	40	14	11	29	14	5	9	9
74-76								25	60	5	23	49	13	10	4	4
77-79								15	60	8	17	47	25	13	6	6
80-82								11	42	15	24	36	28	8	9	9
83-85								12	42	18	20	49	18	14	11	11
86-88								10	33	11	27	45	12	20	11	11
89-91								9	17	4	12	30	15	16	4	4
92-94								8	20	4	16	26	9	10	3	3
95-97								8	19	8	8	21	13	10	4	4
98-100								5	12	1	3	18	5	6	5	5
101-103								3	6	1	14	9	9	2	1	1
104-106								2	7	3	4	11	2	4	3	3
107-109									8	3	1	9	2	3	3	3
110-112								2	9	1	5	7	2	2		
113-115								2	2	1	4	8	4	3		
116-118									5	1	2	2	1	1	1	1
119-121									2	1	1	2		1	1	1
122-124								1	2		5	3		1		
125-127								2	2	1	2	2	2	1		
128-130								1	1	3	2	2				1
131-133														1	1	
134-136										1		1	3			
137-139									1			1	1			
140-142										1			2	1		
143-145												1	1			
146-148																
149-151													1			
152-154													2			
155-157																
158-160																
161-163																
164-166															1	
167-169																
170-172																
173-175																
176-178																
179-181																
182-184																
185-187																
188-190																
191-193																
194-196																
197-199																
200-202																
203-205																
206-208																
SUM Y+	0	0	0	0	0	0	0	0	157	479	108	208	452	184	132	67
AVE LEN									73.1	73.0	74.7	75.7	75.0	74.8	78.1	75.9
SUM YOY	0	0	0	0	0	0	0	0	2496	1668	431	154	111	153	229	218
AVE LEN									30.3	31.0	31.9	30.5	41.5	44.1	49.8	53.4

to show differences. The separation in these tables is determined from length frequency distributions and not from operator determinations since such observational differences were not always apparent or not made by all trap operators.

What is most interesting is the lengths of Y+ coho. There appear to be three or even four length groups evident. The YOY are clearly separated from older fish. These fish average about 35 mm when first showing up in traps and reached lengths in the mid-50's range by mid-June. Campbell Creek YOY coho appeared to grow slightly faster than those in Smith Creek. The second group of fish had lengths from 90 to 120mm fork length and was represented in both Smith and Campbell Creek but not really represented in the South Fork this year. The third group had lengths from about 130 to 160mm in length and was most heavily represented in the South Fork but in Smith and Campbell as well. The other grouping, represented by a single fish, is a 207mm coho found in Campbell Creek. The second group, from 90 to 120mm, is the length most commonly associated with coho smolts (see Table C-2, NMFS, 1995). This third group is relatively large for Y+ coho which lead to suspicion that they were coho which had spent a second year in fresh water. To determine if this was the case, scales were taken from several individuals for aging. The scale growth patterns were quite even throughout and showed no tight pattern indicative of slow winter growth. Scales did not confirm or discount the possibility that fish spent two years in the stream.

Another perhaps more plausible explanation for this third group's existence is that their parents may have spawned considerably earlier than the other group's. These larger coho tended to be primarily in the South Fork where earlier spawning is more likely to occur due to flow limitations typical in tributary areas. Some of the progeny of early spawning fish may have sought out cooler tributary flows during the summer and may have entered and remained in Smith and Campbell Creek to rear. The last group, represented by the single 207mm coho, would be best explained as a 2nd year freshwater fish. No scales were taken from this fish.

The steelhead YOY start out smaller than coho, averaging around 29mm. There is very little growth apparent through April and then fairly steady growth there forward. Some of this apparent lack of growth may be a long duration of emerging fry which keeps down the average size. There is evident of two groups of emergent fry, early and late emerging fish. This is especially evident in Campbell and to a lesser degree in Smith Creek.

The largest yearling or older steelhead were found in Smith during the early portion of trapping. It appears that the largest and likely oldest fish emigrated early. The late

portion may consist of primarily age 1 and/or slower growing individuals. The average lengths of Y+ steelhead in the South Fork were considerably smaller (about 20mm less) than in either Smith or Campbell Creek.

Populations of Outmigrants

To estimate the total population of outmigrant coho and steelhead two parameters need to be developed: 1) an estimate of the number of fish that would have been trapped on days when traps were not operational, and 2) the efficiency rate of the traps. To estimate the first parameter, the average daily catch for a week where data is missing is multiplied by the fraction of the days in that week that were trapped. For example, during the week from March 11-17 in Campbell Creek, where 4 days of trap operation netted 25 steelhead, the total estimate for the week would be:

$$(25/4) \times 7 \text{ days} = 44 \text{ Steelhead Y+}$$

If only a single day of data was available, the daily average from the previous and following week were averaged to make the week estimate.

With these expansions, the estimated number of fish that would have been captured for the duration of the actual trapping period for Campbell, Smith Creek and the South Fork is shown below. The Smith numbers are for the full duration trapped at Campbell Creek and for SF the estimate shown is for the period from April 29 through July 1. Smith Creek numbers were extrapolated for the first two weeks from Campbell Creek data by comparing Campbell and Smith data in late March and early April period.

	<u>Campbell Creek</u>	<u>Smith Creek</u>	<u>South Fork</u>
Coho YOY	5,493	4,410	59
Coho Y+	10	58	42
Steelhead YOY	27,189	41,387	6,815
Steelhead Y+	1,030	2,428	2,152

Assuming that the outmigration timing in the SF is similar to that in Smith & Campbell Creeks, the fraction of salmonids emigrating after April 28 (averaged for Smith and Campbell Creeks) is used to estimate to total number of salmonids that would have been trapped in the South Fork from March 10 to July 1. This would be:

Table 11

Number of Marked and Recovered Coho and Steelhead in Campbell and Smith Creek and the South Fork Ten Mile River in 1996

Date	CAMPBELL CREEK				SMITH CREEK				SOUTH FORK TEN MILE			
	Coho		Steelhead		Coho		Steelhead		Coho		Steelhead	
	Marked	Recov	Marked	Recov	Marked	Recov	Marked	Recov	Marked	Recov	Marked	Recov
April												
5							3					
6			21	0	1		8					
7			23	10	2		8	1				
8			23	9			13	7				
9			16	8	4		18	7				
10			21	9	2		15	7				
11			9	3		1	18	11				
12	2	0	8	4	2		15	6				
13	0	0	7	3	2	1	12	5				
14	0	0	9	4	2		11	3				
15	0	0	12	9	1		13	3				
16												
17												
18												
19												
20												
21												
22												
23	1	0	13	4	2	2	12	3				
24			27	16				16				
25			11	3								
26			0	3								
27			6	3								
28	0	0	0	0	1		6	1				
29	1		7	0	2		7	6				
30			2	4	2	2	18	8				
May												
1			9	6	2	1	31	14				
2			6	8	2	2	29	17				
3			11	1	1		25	23				
4	1		20	4	1	3	23	20			2	
5		1	29	8	1	2	17	17	1		20	
6	1		28	9	1	1	26	9			1	2
7			34	11		1	29	11			24	
8			8	18	1	1	16	16			12	
9	1	1	25	3	1		18	6	1		19	6
10			9	6	1	2	17	11			5	3
11			15	1	1	1	26	11			8	
12			9	0		1	29	21			18	7
13			7	0		1	33	14	10	1	12	
14			2	4			32	38			19	10
15	0	0	0	0	1	1	39	17	1	2	35	3
16			1	3			25	21	3	1	92	15
17			22	2			16	12	1		28	46
18			80	42			31	8				
19			34	11			11	11				
20			5	6			8	6			30	1
21			7	8			10	10			21	9
22			1	4	1	1	20	24				
23			22	8			6	8				
24			2	10			9	5				
25			0	3			6	6				
26			6	1			5	5	1		28	2
27			7	2			9	1			21	5
28			15	4			1	1			10	3
29			0	4			4	2			4	6
30			5	0			2	3			33	5
31			4	0			7	1			24	10
June												
1			2	2			9	4			9	6
2			10	1			11	7			34	4
3			4	2			9	7			57	6
4			9	4			17	6			11	15
5			2	3			10	6			44	7
6			3	0			20	4			54	11
7			2	0			3	5			6	3
8			2	0			3	2			13	2
9			2	0			3	2			4	2
10			3	0			2	2			18	1
11			6	2			6	2			18	3
12			3	2			6	7			22	7
13			1	1			4	4			17	5
14			4	1			8	5			6	5
15				1			2	5			11	1
16			2				5	1			5	0
17			2	2			0	0			14	1
18			2	2			2	0			12	1
19			1	2			0	1			16	2
20			1				2	1			11	3
21			1	1			4	0			26	2
22				1			2	6			3	8
23							2	2			2	1
24							2	1			5	0
25			1				1	1			2	1
26							3	1			3	0
27							2	2			0	0
28							2	2			0	0
29							0	0			4	0
30			1	1			2	0			2	
July												
1							0	1			0	2
SUM	7	2	700	303	37	24	879	540	19	4	895	232
			28.0%	43.3%			64.9%	81.4%			21.1%	25.9%

Coho YOY	1,685
Coho Y+	104
Steelhead YOY	35,039
Steelhead Y+	4,091

The figures above don't account for the fish that would pass traps uncounted while traps were operational. To account for these fish, the recapture rate of marked Y+ fish is used. Table 11 shows the number marked and recaptured at the South Fork, Campbell, and Smith Creek traps. The recapture rate for Campbell Creek was surprising low. The trap was assumed to be quite efficient due to trap configuration and the small size of the stream. Weir panels were adjusted a couple of times for various reasons, but efficiency remained low until the last two weeks. Smith Creek trap also operated less efficient than expected. Low efficiency was expected in the South Fork trap due to high flow conditions encountered during operations. Using the listed recapture rates at the bottom of the Table, the number of Y+ fish that moved downstream past the trap sites were determined and are shown below:

Total Number of Salmonids Estimated to Travel past Outmigrant Trap Site

	<u>Campbell Creek</u>	<u>Smith Creek</u>	<u>South Fork</u>	<u>Total</u>
Coho Y+	34	89	493	616
Steelhead Y+	2,379	3,954	15,795	22,128

Little North Fork Noyo Trapping Operations

The LNF trap was installed on March 7th. The trap was operated continuously through June 18th for a total of 103 days. The trap was located approximately 1/2 mile above the mouth and about 100 yards above a logging road bridge. The trap was installed by Dave Manning of Humboldt State University with assistance from Georgia Pacific Corp. and Salmon Trollers Marketing Association. There were 408 Y+ **coho** and 556 Y+ steelhead trapped. YOY **coho** numbered 1,341 while YOY steelhead numbered 1,829. The YOY counts are not comparable to the Ten Mile YOY counts due to the larger (1/2") screen used in weir panels. Two adult steelhead were trapped and released this year.

Mortalities were higher at this trap compared to those in Ten Mile due mainly to trapping consistently through changing flow conditions. Rapid changes in flow resulted on a couple of occasions fish becoming stranded on **McBain Ramp**. This was primarily a

problem where flows increased significantly and an insufficient amount of water was able to pass through ramp perforations (upper segment of perforated tray was covered to increase flows into livecar during prior low water condition). This elevated the water level in ramp and allowed fish to jump over and become entrapped in material used to seal upstream end of ramp. About half of the total losses of Y+ fish occurred in a single event.

Only three sculpin were trapped this season, including both a prickly and coastrange specimen. No sticklebacks or lampreys were observed. The number of yellow-legged frogs, 48, were considerable higher here than in other traps. A few giant Pacific salamanders, a single newt and an aquatic garter snake were also trapped.

Relatively low numbers of Y+ coho were observed up through the first week of April and after May 20th. Peak numbers occurred between the first and third week of April. No Y+ coho were trapped in June. For Y+ steelhead, the peak occurred around mid-April. Coho emigration timing was quite similar between the LNF and the SF Ten Mile tributaries but the steelhead were about a month earlier here than in Ten Mile tributaries. Coho YOY were present in trap on first day of operation and peaked from mid-March through the first week of April somewhat earlier than Campbell Creek but similar to coho in Smith Creek. The first steelhead YOY came on March 26, 2 days later than in Smith Creek and 5 days later than Campbell. Pacific giant salamander numbers were fairly consistent throughout the period while frogs were trapped primarily in the Month of April which was a bit later than in Ten Mile.

Little North Fork Salmonid Lengths

The length frequency of LNF juvenile coho and steelhead are shown on Tables 12 & 13, respectively. Y+ coho in LNF tended to be about 1 Omm smaller than those in Campbell. or Smith. There was also a clear difference in the size of emerging steelhead fry in LNF. Here, these fish averaged only about 26mm compared to 29mm in Campbell and Smith.

LNF Populations of Outmigrants

The number of outmigrants in the Little North Fork is estimated here by expanding the number trapped by the fraction recaptured Table 14 gives the number coho and steelhead marked and recaptured. The recovery of marked Y+ coho and steelhead is 90.5 and 72.3 percent, respectively. Utilizing these figures, an estimated 450 Y+ coho and 770 Y+ steelhead moved downstream past the LNF outmigrant trap in 1996.

Table 12		Length Frequency Distribution of Juvenile Coho Salmon Trapped in the LNF														
		Noyo River Basin in 1996 by Week														
Fork	March	March	March	March	April	April	April	April	May	May	May	May	May	June	June	June
Length	8-9	10-16	17-23	24-30	30-6	7-13	14-20	21-27	28-4	5-11	12-18	19-25	26-1	2-8	9-15	16-22
23-25																
26-28																
29-31		8			8											
32-34	11	41	20	14	18	2					1					
35-37	41	107	184	129	71	10	2		1							
38-40	18	47	67	108	138	63	11	18	2	1	2	1	1			
41-43	7	2		14		10	10	23	7	2	7	8	2	2		
44-46							4	9	3	6	6	10	4	2	2	
47-49								1		3	5	6	3	5	2	
50-52							1			1	2	5	5	10	2	
53-55										1	2	1	2	5	3	
56-58													1	1	1	
59-61		1														
62-64		1				1										
65-67	1			1		1										
68-70		1				4	2	1								
71-73		1	2		2	1		1								
74-76				2	1	3	8	3	2	1	1					
77-79			1	1		2	11	2	1	2	6					
80-82			1	1		7	17	11	2	5	1					
83-85					4	7	14	11	6	5	6	1				
86-88			1		1	8	7	5	5	3	3	2				
89-91				1		9	14	12	14	5	5	1	2			
92-94				2	1	3	5	2	10	3	11	1				
95-97						3	5	2	7	8	8	2	1			
98-100			1		1	1	3	2	2	4	2					
101-103							3	1	2	1						
104-106						2		1	1		2					
107-109	1						2	1	1	1	1					
110-112					1	2	2				1					
113-115							1	2	2	1						
116-118						1										
119-121						1					1					
122-124									1							
125-127							1									
128-130																
131-133																
135-137																
138-140								1			1					
SUM Y+	2	4	6	8	11	56	95	56	56	39	49	7	3	0	0	0
AVE LEN	84.0	83.0	78.5	78.4	82.9	83.7	83.8	85.1	89.1	87.6	89.1	87.4	89.0			
SUM YOY	72	203	271	264	231	86	28	51	13	14	25	30	18	25	10	
AVE LEN	35.2	33.0	33.5	34.5	34.4	35.4	38.1	38.6	38.8	42.9	42.0	44.3	45.2	47.0	47.7	

Table 13		Length Frequency Distribution of Juvenile Steelhead Trapped in the LNF, Noyo River Basin in 1996														
Fork	March	March	March	March	April	April	April	April	May	May	May	May	May	June	June	June
Length	8-9	10-16	17-23	24-30	30-6	7-13	14-20	21-27	28-4	5-11	12-18	19-25	26-1	2-8	9-15	16-17
23-25										2		1		1		
26-28				50	213	49	4	12	9	60	13	2			2	
29-31				87	235	140	48	211	132	256	54	12	3	1	2	
32-34							7	53	22	17	19	6	5	3	3	
35-37										4	4	3	4	5	4	
38-40								2					2			2
41-43												1			7	1
44-46									2		2	1	1	11	7	1
47-49		1											4	9	3	
50-52													3	8	9	
53-55								1					1	8	4	
56-58			1						1							1
59-61		1				1										1
62-64							1	1	2					1		
65-67								1				1				
68-70					1		1		1		1					
71-73						2		2					1		1	
74-76	1				1		1	1	1	1						
77-79		2			1	1	1	1	1	1		2			2	
80-82			1	1	1	2	1	1	3	1	1				1	
83-85			4		1	4	2	1	4							
86-88			2	1	2	1	7			1		2	1			
89-91		1	2	5	2	6	3		3	3	2	1	1			
92-94			4	8	2	10	4	2	2	2	2	1	1			
95-97			9	4	2	14	7	1	4	3	4					
98-100		2	4	7	6	15	14	1	3	3	3	5	1			
101-103			5	4	1	4	6	1	1	2		2				
104-106			4	7	3	10	5		2	4	5	2				
107-109		1	1	4	2	3	8	1	2		2					
110-112		1	2	1	3	7	10		2	1	2	4				
113-115			2	3	4	5	8		7	3	4		1			
116-118			8	3	1	3	3		1	1						
119-121			2	1	1	1	7	1	2		4	2				
122-124			2			2	3		1	3	1					
125-127				2	2	4	1			1	1	3				
128-130				1	1	3	1	1				2				
131-133					1		2			1						
134-136			1	1		2	3	1	1		1					
137-139							2	1					1			
140-142					1	1							2			
143-145								2								
146-148								1								
149-151				1												
152-154				1									1			
155-157										1			1			
158-160						1			1				1			
161-163																
164-166						1										
167-169													1			
170-172								2								
173-175																
176-178																
179-181						1				1	1					
182-184																
185-187							3									
188-190								1	1							
191-193																
194-196						1										
197-199				1												
200-202																
203-205		1														
206-208																
233						1										
SUM Y+	2	9	52	56	43	103	110	21	43	32	37	32	6	4	0	0
AVE LEN	137.5	77.7	97.3	94.6	93.1	96.4	93.8	81.4	92.5	94.2	97.1	84.9	78.0	74.3		
SUM YOY	0	0	0	117	448	189	57	278	165	339	92	28	23	48	43	2
AVE LEN				25.7	25.6	26.2	27.2	27.5	26.9	26.5	27.8	28.2	37.0	41.0	41.8	43

Table 14		The Number of Marked and Recaptured Coho and Steelhead Yearlings in the Little North Fork Noyo River in 1996, by Date									
		Coho				Steelhead					
		Coho		Steelhead		Coho		Steelhead			
Date		Marked	recov	Marked	Recov	Date	Marked	Recov	Marked	Recov	
March	8	1				May	16	2	6	0	1
	9	1	0	1	0		17	6	5	4	1
	10	3	1	0	0		18	5	9	5	6
	11	0	0	2	0		19		2	3	2
	12	1	0	0	0		20	3	4	3	1
	13	0	0	0	0		21		1	1	2
	14	0	0	0	0		22	3		15	10
	15	0	0	0	0		23		1	3	5
	16	0	0	5	0		24			1	1
	17	0	0	2	1		25		1		
	18	0	0	5	1		26			2	
	19	4	0	9	4		27	1	1		2
	20	1	2	6	4		28	1			
	21	0	0	5	3		29		1		
	22	1	0	12	3		30	1			
	23	0	2	12	4		31		1		1
	24	0	0	6	5	June	1			2	
	25	1	0	13	2		2			1	
	26	1	1	7	3		3				
	27	0	0	4	1		4				
	28	2	1	10	19		5				
	29	1	0	8	5		6				
	30	1	0	6	0		7				
	31	0	0	4	0		8				
	1	0	1	11	12		9				
	2	1	0	3	2		10				
	3	0	1	5	3		11				
	4	0	0	4	2		12				
	5	0	0	4	3		13				
April	6	3	0	7	4		14				
	7	5	2	11	1		15				
	8	13	3	12	4		16				
	9	5	6	13	2		17				
	10	7	8	17	7		18				
	11	10	2	16	3		19				
	12	7	15	14	13		20				
	13	9	2	13	3		21				
	14	10	7	11	11		22				
	15	8	5	17	7		23				
	16	36	9	50	59		24				
	17	19	10	12	10		25				
	18	7	23	6	23		26				
	19	10	7	3	8		27				
	20	4	7	3	4		28				
	21	4	7	1	1		29				
	22	6	13	3	2		30				
	23	7	7	2	3	July	1				
	24	16	4	4	4	SUM		378	342	492	356
	25	14	15	3	3				90.50%		72.30%
	26	6	14	2	3						
	27	4	8	2	2						
	28	7	4	4	4						
	29	9	6	4	6						
	30	4	10	7	6						
May	1	5	3	8	2						
	2	6	1	7	9						
	3	12	10	4	7						
	4	13	6	6	3						
	5	9	12	8	6						
	6	8	4	4	1						
	7	7	15	2	1						
	8	6	5	6	1						
	9	2	9	5	5						
	10	4	5	5	2						
	11	4	5	2	5						
	12	10	5	5	2						
	13	11	7	7	7						
	14	2	6	4	1						
	15	8	14	0	2						

DISCUSSION

COMPARISONS TO 1995

South Fork Ten Mile

The South Fork trap in 1995 was located below Campbell Creek whereas this year it was above Campbell Creek so the two years data are not comparable unless the South Fork and Campbell data are combined. This year's estimate of 493 coho smolts in the South Fork and 34 coho smolts in Campbell Creek compare to an estimate of 21 in 1995, approximately a 25 fold increase in 1996. The number of Y+ steelhead was also up considerably. Trapping efficiency for steelhead in 1995 was about half of what it was in 1996. There were 211 trapped in 1995 compared to 1,728 this season. There were additionally about 670 Y+ steelhead trapped in Campbell Creek during the same period, indicating there was roughly a 6 fold increase in 1996 compared to 1995. Increased summer flow conditions in 1995, compared to 1994, may have contributed to this apparent increase in production of salmonids.

In 1995, there were no coho in the upper size ranges observed in 1996. The largest coho found was 122 mm in 1995. The steelhead were comparable in size both years.

Little North Fork

The estimate of Y+ coho passing the trap site after April 24, 1995 was 108. The comparable estimate this year is about 215. Coho in 1995 were about 6mm longer than in 1996. This size difference could possibly be due to increased competition due to an increase in population density or a later emergence in 1996. Larger yearlings might have been expected this year due to the improved summer flow conditions in 1995 compared to summer of 1994 but the opposite situation occurred. An increase in the number YOY produced in 1995 compared to 1994 could have played a role here as well although there is no data to show whether or not this was the case. No spawning escapement data is available for either year in this stream nor is there any information on spawning timing.

Spawner Survey Data in Ten Mile in 1995-96

Spawning coho salmon were noted as early as the 23 of December (Maahs, 1996) in the SF. Coho were seen through the second week of January. The population was estimated to be around 52 fish. Spawning activity was found on Smith Creek on December 26 but no activity was noted in Campbell until the third survey on January 6. Spawning coho were evident through mid-February on both tributaries. Coho spawning numbers were estimated at around 14 fish in each of these tributaries.

It would be expected that coho YOY would have emerged earlier in Smith than Campbell but due to the later installation of the trap in Smith Creek this could not be verified. The peak numbers of coho YOY trapped occurred a week later in Smith than Campbell which is the opposite of what would have been expected based on spawning survey information. It is possible the fish in Smith spawned farther upstream and the later trapping peak reflects the distance upstream fish spawned more than when spawning occurred. The numbers of YOY trapped in Campbell were about double that in Smith even though spawning estimates were similar. This could be related to amount of habitat available or possibly that the population estimate in Campbell Creek underestimated the population relative to Smith Creek. One of three methods used to estimate spawner population, the mark/recovery of carcasses estimated twice as many in Campbell while live fish counts suggested 1.5 times as many in Campbell compared to Smith Creek. Redd based estimates suggested less in Campbell Creek.

Steelhead YOY first appeared in Smith and Campbell Creek traps March 24th and 21st, respectively, and generally, about two weeks later than coho. No live steelhead or steelhead carcasses were observed on either Campbell or Smith Creek in 1996. It appears that in early February through mid-March, based on numbers and timing of YOY steelhead in traps, good numbers of steelhead did spawn in Campbell and Smith Creek. Low numbers of redds were observed in Campbell and Smith Creek in February and were primarily found in the first half of February. High flows in the later half on the month limited surveys. It appears from steelhead YOY counts that considerable steelhead spawning did occur in the later half of February and early March that was never detected by either live fish or redd counts. The high flow period limited surveys and likely made redds constructed during this period indiscernible.

Adult Coho Trapping

An adult coho trapping operation carried out by Salmon Restoration Association, Inc. was located in the South Fork Ten Mile River approximately 1/2 mile downstream of the mouth of Campbell Creek and approximately 1 mile above Smith Creek. At this site, 7 females and 5 males were taken for brood stock purposes. These fish were destined for either Campbell, the South Fork or other upstream tributaries to spawn. One of the purposes of this survey was to develop information to help evaluate what impact the trapping program had on natural production in the basin.

It does not appear that the trapping program had a negative impact on Campbell Creek coho production due to large number of YOY coho outmigrating from this relatively small tributary. The fact that thousands of YOY coho were emigrating from Campbell Creek indicates the habitat was fully seeded. The same can not be necessarily be said for Coho YOY in SF Ten Mile. Here, the number of coho YOY were only about 1/4 that in Campbell Creek for the period when the SF trap was in operation. While lower trap efficiency and earlier emergence in the SF might partially explain the lower number of coho YOY trapped in the SF, there was clearly, when considering the relatively large size of the SF, a lower density of coho YOY outmigrants. Whether or not lower coho smolt production will occur next spring through a brood stock collection induced reduction in YOY coho this year, will depend on the amount of suitable summer and winter habitat available in the system. The appearance of YOY outmigrants in the SF does indicate significant numbers were produced

Due to losses suffered at the hatchery facility during storm events this winter, no planting of coho will be made into the SF from this brood. Had progeny of trapped fish survived and been planted into upstream areas, where fish have not been found in recent years and where good habitat is believed to presently exist, there would have significant benefit from trapping operations. While this did not occur this year, the opportunity still remains to increase natural production in the basin by reestablishing runs in the upper basin through fish propagation efforts. This may also occur naturally given sufficient time where large enough spawning runs occur, to allow for straying, and high enough flow conditions occur, to allow passage.

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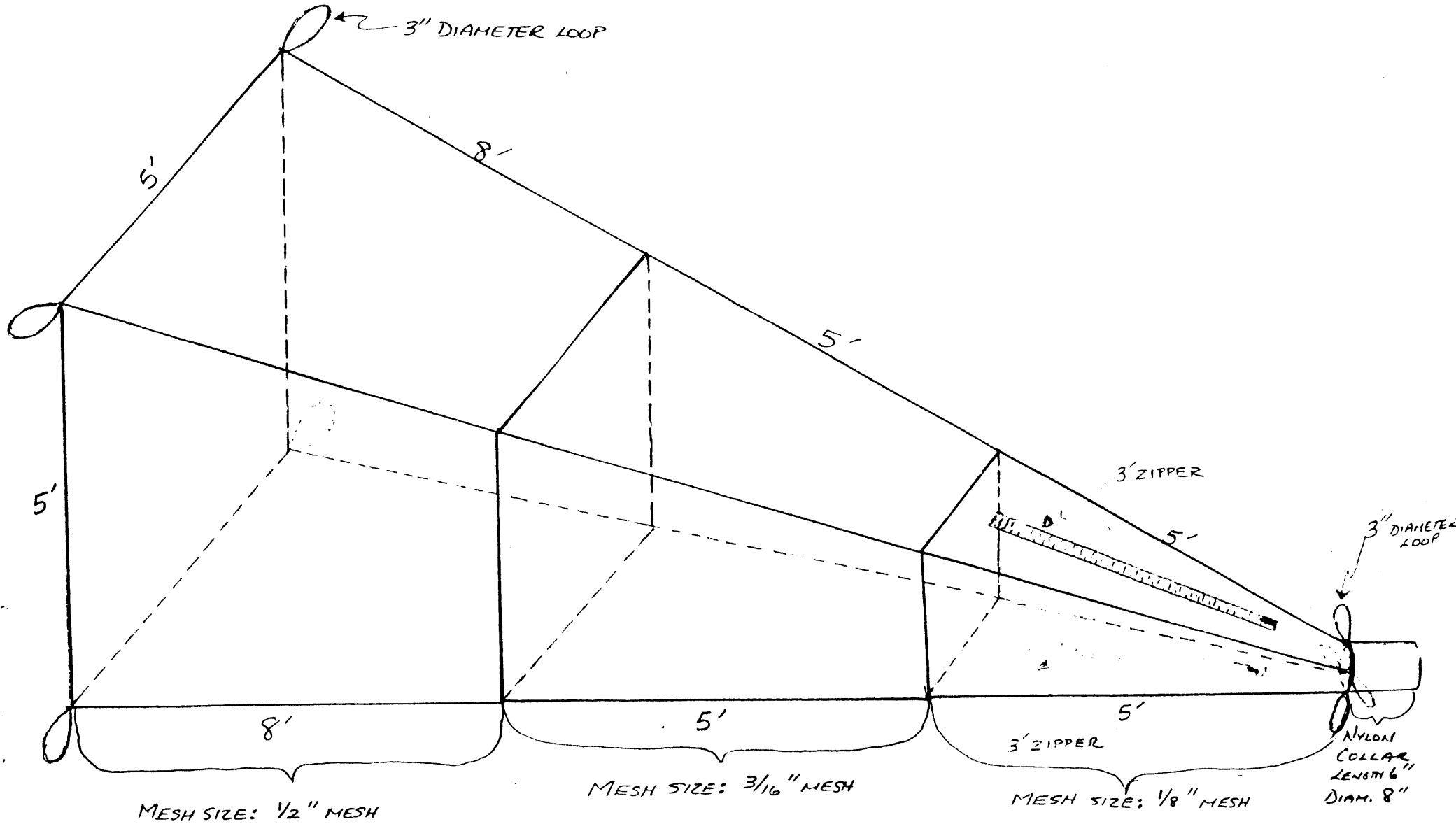
APPENDIX 1 (Continued)
 LENGHT & WEIGHT DATA

SMITH CREEK STEELHEAD YEARLINGS+

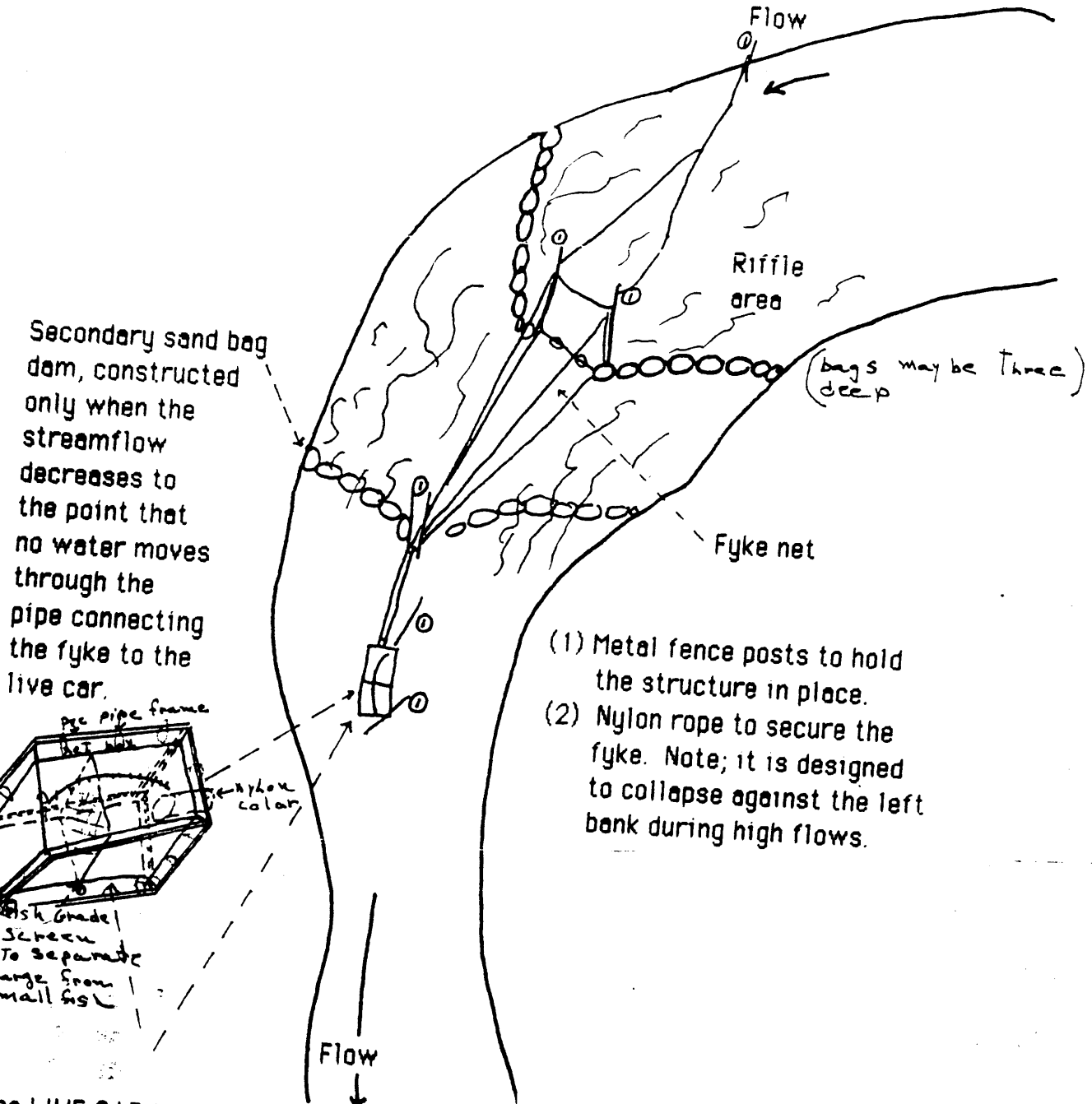
	March 10-23		March 24-April 6		April 7-20		April 21-May 4		May 6-18		May 19-June 1		June 2-15		June 16-July 1	
	Length	Grams	Length	Grams	Length	Grams	Length	Grams	Length	Grams	Length	Grams	Length	Grams	Length	Grams
1	78	4	75	4	61	3	71	4	70	4	79	4	75	4.8	70	4
2	80	5	76	5	68	3.5	72	4	78	5	77	5	78	5	67	4
3	93	6	77	5	73	3.5	75	4	75	5	85	5	78	5.75	78	4
4	90	8	81	5	64	4	72	4	77	5	85	6	79	6.2	72	4
5	97	10	84	5	70	4	72	4	79	6	82	6	82	7	71	4
6	123	19	87	5	73	4	67	4.5	78	6	81	6	88	8	79	4
7	127	22	77	6	80	4	72	4.5	83	6	85	6	87	8	72	4
8			87	6	70	5	76	5	91	6.5	85	6	86	8	70	4
9			85	6	74	5	85	5	88	7	80	8	73	9	72	5
10			66	7	80	5	85	5	86	7	85	6.5	97	9	75	5
11			82	7	80	5	80	5	82	7	86	7	111	10	83	5
12			83	7	82	5	80	5	80	7	87	7	84	10	85	5
13			92	7	87	5	85	5	93	7	90	7	100	10	73	5
14			88	8	90	5	80	5.5	80	7	87	7	105	12	79	5
15			100	9	82	5.5	81	6	90	7	86	8	108	14	69	5
16			94	9	80	8	80	6	85	7	95	8	112	17	78	5.5
17			94	9	81	6	85	6	87	7.5	86	8	120	18	86	6
18			101	10	83	6	85	6	92	8	90	8	126	22	86	6
19			80	11	92	6	85	6	87	8	95	8	138	24	81	6
20			98	11	85	7	83	7	85	8	97	9			82	6
21			99	11	87	7	90	7	85	8	97	9			84	6
22			105	12	87	8	90	7	87	8	95	9			84	6
23			109	14	90	8	98	7	88	8	95	9			78	6
24			110	14	90	8	85	7	95	8	110	9			80	6
25			125	17	90	8	91	7.5	90	8	96	9			85	6
26			142	24	95	8	90	8	96	8.5	95	9			83	6.5
27			153	30	97	8	92	8	91	8.5	97	10			82	6.5
28			138	34	100	8	90	8	88	8.5	99	10			89	7
29			152	35	95	9	88	9	52	8.5	100	11			84	7
30			151	42	97	9	109	9	90	9	102	11			87	7
31			172	45	97	9	96	9	95	9	102	12			88	7
32			180	45	120	9	98	9	92	9	107	12			91	7
33					95	10	95	9	90	9	100	12			80	7
34					98	10	95	9	95	9	102	12			90	7
35					100	10	109	9.5	100	9	114	13			86	7
36					101	10	100	9.5	95	9	112	15			85	7.5
37					102	10	107	9.5	100	9	114	15			82	8
38					93	11	98	10	86	9	113	15			98	8
39					95	11	100	10	96	9	110	15			87	8
40					100	11	102	10	95	10	114	16			90	9
41					105	11	95	10	98	10	115	17			98	9
42					114	12	100	10	96	11	118	17			93	10
43					100	13	98	10	103	11	125	18			96	10
44					101	13	100	10	99	11	129	18			104	10
45					113	13	98	10	100	11					95	10
46					109	14	97	11	110	11					99	11
47					110	14	103	11	100	11					81	11
48					109	15	105	12	113	11					108	12
49					110	15	107	12	103	11					106	12
50					115	15	120	12	110	11					108	12
51					118	15	108	13	102	11					106	13
52					120	15	110	14	100	11.5					97	14
53					113	17	102	15	105	13					111	15.5
54					140	30	115	15	103	13					117	18
55					160	30	130	15	108	15					103	18
56					167	35	110	15	115	15					120	19
57					160	40	110	15.5	115	15.5					127	20
58					168	45	110	16	105	16					122	22
59					155	50	114	17	115	16					129	22
60					170	50	112	17	112	18					142	25
61					174	50	125	18	109	18					141	27
62					138	70	115	20	118	18					252	145
63					160	70	132	23	117	18						
64					170	80	133	25	121	19						
65							147	30	115	19						
66							150	40	120	20						
67							178	45	120	20						
68							155	50	121	21						
69							160	50	126	22						
70									130	25						
71									140	30						
72									143	35						

APPENDIX III

FYKE NET (OR CAPTURE OF
DOWNSTREAM ANADROMOUS FISHES)



APPENDIX III



The LIVE CAR is constructed with a flexible skeleton of rigid PVC pipe and an inner bag of 1/8 inch nylon mesh netting.