SUMMARY

Objectives for 1997

Project objectives were to: (1) transport juvenile and adult salmonids around Elk Creek Dam, (2) determine the proportion of wild adult anadromous salmonids that returned to Elk Creek, (3) determine if transported coho salmon spawn in widely distributed areas upstream of Elk Creek Dam, and (4) determine if juvenile salmonids migrate upstream in Elk Creek during autumn and winter.

Accomplishments in 1997

All objectives were accomplished.

Findings in 1997

Trap catches of mature salmonids at the collection facility in the
1996-97 return year totaled 319 wild and 123 hatchery coho salmon (*Oncorhynchus kisutch*), 497 wild and 22 hatchery steelhead (*O. mykiss*),
37 unmarked and 2 marked chinook salmon (*O. tshawytscha*), and 56 wild cutthroat trout (*O. clarki*). No adult salmonids died prior to release. Fourteen adult salmonids were trapped twice because they moved downstream after transport. We also trapped and transported 45 adult Klamath smallscale suckers (*Catostomus rimiculus*) and trapped 419 juvenile salmonids.

Returns of coho salmon, steelhead, and cutthroat trout to Elk Creek in 1996-97 were greater than indicated by the trap catches. Adult fish passed over the weir during 20-21 November after a freshet damaged the weir. We captured and marked 17 adult fish upstream of the weir. Three of those fish were later captured downstream in the adult fish trap. Some steelhead and cutthroat trout also passed upstream of the weir in the spring, probably when we removed portions of the weir to pass kelts downstream.

We found 19 carcasses of coho salmon that spawned upstream of Elk Creek Dam. Marks indicated that all of these fish had been transported upstream of the dam. This finding indicated that few, if any, coho salmon that passed over the weir migrated through the tunnel in Elk Creek Dam.

Wild adults that returned in 1996-97 represented 9.3% of the wild coho salmon and 3.6% of the wild steelhead that passed the counting station at Gold Ray Dam. This finding suggested that steelhead production remains depressed because the Elk Creek Basin accounts for 9.5% of the area accessible to anadromous salmonids that pass Gold Ray Dam.

Coho salmon spawned in widely distributed areas of the Elk Creek basin. Spawners and redds were observed in five tributaries of Elk Creek and fry were captured in all of the

tributaries that were sampled. These findings suggested that transportation did not have a major impact on the spawning distribution of coho salmon.

Releases of marked fish indicated that juvenile salmonids migrated from the mouth of Elk Creek upstream to the site of Elk Creek Dam. However, the falls at RK 0.6 appeared to be a barrier to the upstream migration of juvenile salmonids less than 15 cm long.

Recommendations

We recommend that the Corps of Engineers develop the means to provide unobstructed passage for 15 cm (six inch) salmonids at the present site of Elk Creek Dam. Construction should take place when the spillway portion of the dam is modified to allow for unobstructed passage of adult salmonids.

INTRODUCTION

Elk Creek enters the Rogue River at River Kilometer (RK) 244. Elk Creek Dam is located 2.6 km upstream from the creek mouth (Figure 1). The basin covers about 351 sq km, of which 343 sq km are upstream of Elk Creek Dam. Mean monthly flow is less than 10 cubic feet per second (cfs) in late summer and is 400-600 cfs in winter. Mean monthly flow in winter peaks between 1,000 and 1,800 cfs.

Coho salmon, steelhead, chinook salmon, and cutthroat trout spawn in the Elk Creek Basin. Coho salmon in southern Oregon and northern California have been listed as threatened by the National Marine Fisheries Service under the Endangered Species Act and steelhead in the same area have also been provisionally listed as threatened. Small numbers of spring chinook salmon and fall chinook salmon spawn in Elk Creek when flow increases enough in autumn to permit upstream migration. Adult cutthroat trout also migrate into Elk Creek, although these fish do not appear to be anadromous.

Elk Creek Dam is one of three dams authorized by the United States Congress and constructed by the United States Army Corps of Engineers (USACE) in the Rogue River Basin of southwestern Oregon. The other dams, Lost Creek and Applegate, are fully operational. A court order halted construction of Elk Creek Dam in 1987 after dam height reached 83 feet.

Blockage of spawning areas used by anadromous fish in the Elk Creek Basin was to be mitigated by the production of coho salmon and steelhead at Cole M. Rivers Hatchery. Mitigation was to begin when the dam was fully constructed. During construction of the dam, the USACE built a diversion tunnel through the dam that was designed to pass juvenile and adult salmonids.

Spawning surveys and trap catches of juveniles suggested that few adult coho salmon or steelhead passed the dam during the 1991-92 run year even though staff with the Oregon Department of Fish and Wildlife (ODFW) observed hundreds of adult salmonids in the pool immediately downstream of the dam. These observations increased concern that adult salmonids were unable to pass Elk Creek Dam.

In response to that concern, a trap-and-haul operation began at Elk Creek Dam in autumn of 1992. Adult salmonids were trapped below the dam and were trucked and released upstream of the dam during the 1992-93 and 1993-94 run years. Trap catches totaled 38 coho salmon and 119 steelhead in 1992-93 and 86 coho salmon and 120 steelhead in 1993-94. Returns in both run years were very low compared with ODFW estimates of historic returns that averaged 1,560 coho salmon, 1,000 summer steelhead, and 2,000 winter steelhead (USACE 1980).

Figure 1. Map of the Elk Creek Basin.

The USACE funded the Elk Creek Dam Fisheries Evaluation Project in spring of 1995. The project goal is to develop strategies to restore the natural production of self-sustaining migratory salmonids to a level appropriate for the habitat available in the Elk Creek Basin. Findings from the first two years of work were reported by Satterthwaite et al. (1996a) and Satterthwaite et al. (1996b).

In autumn of 1995, the USACE announced plans to remove a portion of, or all of, the spillway of Elk Creek Dam to provide unobstructed passage for juvenile and adult salmonids. As a consequence of this decision, ODFW reduced the scope of the Elk Creek Dam Fisheries Evaluation Project. Revised project objectives for 1997 were to: (1) transport juvenile and adult salmonids around Elk Creek Dam, (2) determine the proportion of wild adult anadromous salmonids that returned to Elk Creek, (3) determine if transported coho salmon spawn in widely distributed areas upstream of Elk Creek Dam, and (4) determine if juvenile salmonids migrate upstream in Elk Creek during autumn and early winter.

METHODS

Analytical procedures followed those described by Zar (1984). We selected $P \leq 0.05$ as the criterion for statistical significance.

Collection and Transport of Salmonids

We operated the fish collection facility in Elk Creek from 10 October 1996 through 8 May 1997. The trap was checked a minimum of once daily. We recorded the species, sex, fork length to the nearest 0.5 cm, and looked for marks or tags on each fish. Salmonids longer than 30 cm received left and right opercle punches. We transported and released fish in Elk Creek about one km upstream from the dam.

We attempted to operate the weir continuously during the season. However, we observed that adult salmonids passed upstream over the top of the weir during 20-21 November. We also observed that adult salmonids passed downstream over the top of the weir during the next freshet on 1 December.

We completed two tasks to determine the disposition of the adult fish that passed over the top of the weir and entered the stilling basin below Elk Creek Dam. First, we evaluated whether adult coho salmon passed through the tunnel that runs through Elk Creek Dam. Second, we estimated the proportion of adult salmonids that later passed downstream over the weir and migrated into the adult fish trap.

We tested the hypothesis that adult coho salmon passed through the tunnel at Elk Creek Dam by recovering carcasses of spawned fish in areas upstream of the dam. When a carcass was found, we recorded the presence or absence of any opercle punches, the sex of the fish, and whether female fish had spawned. We classified the spawned status of female fish, by visually estimating the percentage of eggs retained within the body cavity to the nearest 25%. We cut each carcass in half after recording the data. We also checked the weir daily for carcasses.

We estimated the proportion of adult fish that migrated downstream from the stilling basin and later migrated upstream into the adult fish trap by marking adult fish caught in the stilling basin with three opercle punches on each side of the fish. All fish caught in the stilling basin were captured with angling gear. An attempt to install a trap net was not successful and we caught no fish while test fishing a gill net.

Proportion of Fish that Returned to Elk Creek

We estimated the Elk Creek contribution to runs of wild adult coho salmon and steelhead in the upper portion of the Rogue River by dividing the number of fish trapped in Elk Creek by the number of counterparts that passed the fish counting station at Gold Ray Dam on the Rogue River at RK 204. We assumed that catches in the trap below Elk Creek Dam and carcasses of non-transported fish found on the weir reflected the number of fish that attempted to return and spawn in the Elk Creek Basin.

We obtained estimates of the number of wild adult coho salmon and wild adult steelhead that passed Gold Ray Dam from Michael Evenson, ODFW, Central Point. We assumed that coho salmon and steelhead of hatchery origin were all marked with fin clips. This assumption seemed reasonable because cohorts were all marked before release from Cole M. Rivers Hatchery. We did not estimate the proportion of wild chinook salmon that returned to Elk Creek because few juvenile spring chinook salmon released from Cole M. Rivers Hatchery in 1991-95 were marked with fin clips.

Spawning Distribution of Coho Salmon

We surveyed five tributaries of Elk Creek to determine if coho salmon spawned in widely distributed areas upstream of Elk Creek Dam. Areas surveyed included: West Branch (RK 2.4-4.0), Flat Creek (RK 0.8-2.6), Jones Creek (RK 0.0-1.1), Sugarpine Creek (RK 4.6-6.1), and Bitterlick Creek (RK 2.2-4.0). We recorded the number of live fish and the number of redds that were observed. We differentiated spawners as either coho salmon or trout (steelhead or cutthroat trout). We classified coho salmon as jacks if the fish appeared to be less than 50 cm long. We surveyed the areas weekly when water clarity allowed for observation of fish and redds.

We also estimated the upstream limits of coho salmon spawning by determining the upstream limits of coho salmon fry in the Elk Creek Basin. We surveyed those streams where we conducted spawning surveys and we also surveyed the mainstem of Elk Creek. We began surveys at the upstream limits where we observed spawning coho salmon and proceeded upstream. Sampling intervals were about 0.1 km, and we sampled at least 0.3 km upstream of sites that appeared to be the upstream limit of fry distribution.

We used a combination of visual observations and electrofishing to document the presence or absence of fry. We relied on visual observations only if samplers could verify a white leading edge on the anal fin. We electrofished only in the shallow margins of pools. We sampled during the last week of April and the first week of May.

Upstream Migration of Juvenile Salmonids

We captured and uniquely marked fish at five sites to determine if juvenile salmonids migrated upstream in Elk Creek. We used electrofishing gear to capture juvenile salmonids in two areas of Elk Creek (RK 0.1-0.6 and RK 0.6-2.3) and one area of the Rogue River immediately downstream of the mouth of Elk Creek during 14-16 October. We also used a hoop net 10 ft. long with two throats and 1/4 in. square mesh to capture juvenile fish just below the weir in Elk Creek and also captured juvenile salmonids in the adult fish trap. Fish captured in the hoop net and in the adult fish trap were uniquely marked and were released in Elk Creek at RK 0.1 and at RK 2.1.

We marked fish with a partial caudal clip and a freeze brand cooled in liquid nitrogen. Freeze brands were changed every two weeks for fish captured in the hoop net or the adult fish trap. Fish were identified to species except that subyearling steelhead and cutthroat were recorded as trout. We measured the fork length of each fish to the nearest 0.1 cm.

RESULTS AND DISCUSSION

Collection and Transport of Salmonids

Trap catches of adult salmonids at the collection facility in the 1996-97 return year totaled 319 wild and 123 hatchery coho salmon, 497 wild and 22 hatchery steelhead, 37 unmarked and 2 marked chinook salmon, and 56 wild cutthroat trout. Four of the 22 steelhead of hatchery origin entered Elk Creek after being trapped at Cole M. Rivers Hatchery and released in the Rogue River downstream of Elk Creek. Trap catches of adult salmonids are summarized in Table 1 and in Table 2.

No adult salmonids died either in the trap or prior to release above Elk Creek Dam, although we judged that one adult steelhead probably died after release. We also trapped and transported 45 adult Klamath smallscale suckers.

We did not trap all of adult salmonids that returned to Elk Creek. We found, on the upstream side of the weir, 21 carcasses of adult salmonids that had not been transported upstream of Elk Creek Dam. One of the five chinook salmon, two of the ten coho salmon, three of the four cutthroat trout, and 16 of the 36 steelhead, recovered as carcasses on the weir, had not been transported. All non-transported fish were of wild origin.

Some chinook salmon passed upstream prior to installation of the weir. We observed two chinook salmon spawning in the area between the weir and the stilling basin.

Some coho salmon, steelhead, and cutthroat trout passed through the weir in the middle of November. A freshet on 19 November damaged the weir and allowed adult salmonids to pass upstream during the following two days. We first observed upstream passage on the morning of 20 November. Periodic counts, 15 minutes in length, suggested that numerous fish passed through damaged sections of the weir.

Visual counts made at the weir indicated that adult salmonids attempted to pass upstream only during daylight hours (Table 3). Counts of successful passes averaged six fish every 15 minutes during the day (Table 3). Assuming there were 11 hours of daylight each day, we concluded that a minimum of 500 fish passed upstream of the weir on 20-21 November. The weir became functional again on the morning of 22 November.

Table 1. Number of mature coho salmon, steelhead, and cutthroat trout trapped at the fish collection facility on Elk Creek, 1996-97 return year. Coho salmon jacks were less than 50 cm long and half-pounders were less than 41 cm long. All cutthroat trout were longer than 30 cm and none exhibited hatchery marks. Data do not include fish transported multiple times.

Week of capture	Coho salmon						Steelhead	
	Jacks		Adults		Half-pounders		Cutthroat	Adults
	Wild	Hatchery	Wild	Hatchery	Wild	Hatchery	Wild	Hatchery
10/22-10/28	0	0	1	0	0	0	4	0
10/29-11/04	4	1	2	0	0	0	2	1
11/05-11/11	0	0	1	0	0	0	0	0
11/12-11/18	42	7	32	3	0	0	1	0
11/19-11/25	25	0	81	17	1	0	74	2[a]
11/26-12/02	5	9	48	27	0	0	13	5[a]
12/03-12/09	1	4	32	23	0	0	17	0
12/10-12/16	3	1	16	16	0	0	19	1
12/17-12/23	4	1	11	6	0	0	1	0
12/24-12/31	1	0	5	5	0	0	22	1[a]
01/01-01/07	0	0	0	1	0	0	0	0
01/08-01/14	1	0	2	0	0	0	2	2
01/15-01/21	0	0	2	2	0	0	1	0
01/22-01/28	0	0	0	0	0	0	12	1
01/29-02/04	0	0	0	0	1	0	14	1
02/05-02/11	0	0	0	0	0	0	4	2[a]
02/12-02/18	0	0	0	0	0	0	7	0
02/19-02/25	0	0	0	0	0	0	8	0
02/26-03/04	0	0	0	0	0	0	21	0
03/05-03/11	0	0	0	0	0	0	43	1
03/12-03/18	0	0	0	0	0	0	29	2
03/19-03/25	0	0	0	0	0	0	61	0

03/26-04/01	0	0	0	0	0	0	13
0	0						
04/02-04/08	0	0	0	0	0	0	16
0	0						
04/09-04/15	0	0	0	0	0	0	42
0	0						
04/16-04/22	0	0	0	0	1	0	46
0	1						
04/23-04/29	0	0	0	0	1	0	16
0	0						
04/30-05/06	0	0	0	0	0	0	4
1	0						
05/07-05/13	0	0	0	0	0	0	1
2	0						
Annual total	86	23	233	100	4	0	493
22	56						

[a] *Includes one fish released downstream in the Rogue River after capture at Cole M. Rivers hatchery.*

Table 2. Number of mature chinook salmon trapped at the fish collection facility on Elk Creek, 1996-97 return year. Jacks were less than 60 cm long. Data do not include fish transported multiple times.

Week of capture	Jacks		Adults	
	Marked	Unmarked	Marked	Unmarked
10/22-10/28	1	3	0	22
10/29-11/04	0	0	0	4
11/05-11/11	0	0	1	1
11/12-11/18	0	0	0	4
11/19-11/25	0	0	0	0
11/26-12/02	0	0	0	3
Annual total	1	3	1	34

We captured and marked 17 adult salmonids (seven coho salmon, five steelhead, and five cutthroat trout) in the stilling basin below Elk Creek Dam. Three of the marked fish (two coho salmon and one cutthroat trout) were later captured downstream in the adult fish trap. This finding suggested that a minimum of 18% of the fish that passed the weir on 20-21 November later passed downstream over the weir and eventually entered the adult fish trap. Consequently, the total returns of coho salmon, steelhead, and cutthroat trout to Elk Creek in 1996-97 were greater than indicated by catches in the adult fish trap.

Table 3. Counts of adult salmonids that attempted to pass over the weir downstream of Elk Creek Dam during 20-22 November, 1996.

Date	Count period	Passage attempts	Successful attempts
11/20	1230-1245	95	5
11/20	1630-1645	67	5
11/20	1800-1815	3	0
11/20	2300-2315	0	0
11/21	0830-0845	132	7
11/21	1200-1215	61	5
11/21	1430-1445	57	8
11/21	1630-1645	37	6
11/21	1800-1815	4	0
11/21	2300-2315	0	0
11/22	0730-0745	0	0

We found 19 carcasses of coho salmon that spawned in areas upstream of Elk Creek Dam. Marks indicated that all of these fish had been transported upstream of the dam. This finding suggested that few, if any, coho salmon that passed over the weir migrated through the tunnel in Elk Creek Dam.

We also believe that some steelhead and cutthroat trout passed upstream of the weir during late winter and early spring. We examined carcasses found on the upstream side of the weir after 1 March and found that only one of four cutthroat trout, and only 20 of 36 steelhead, had been transported upstream of Elk Creek Dam. These fish probably passed upstream of the weir when we removed sections of the weir to allow for the downstream passage of spawned steelhead.

The total number of adult salmonids that passed upstream of the weir after 1 March could not be estimated. To develop an estimate in future years, we would need to conduct a mark and recapture experiment.

We did not observe any immediate mortality among adult salmonids transported upstream of Elk Creek Dam. However, some transported fish migrated downstream through the dam and over the weir prior to spawning. We trapped 14 adult fish (three coho salmon, ten steelhead, and one cutthroat trout) that had been previously transported upstream of the dam. This finding suggested that some adult fish may be stressed by factors associated with trap, transport, and handling of the fish while sampling to obtain life history information. The number of transported fish that migrated downstream prior to spawning and failed to return to the trap is not known.

Almost all of the fish that passed upstream of the trap, without the aid of transport, appeared to have spawned. We found 26 carcasses of female salmonids on the weir and judged that only one of these fish retained more than 25% of her eggs.

Trap catches of wild juvenile salmonids in the collection facility included two coho salmon, 398 steelhead, and 19 cutthroat trout. All of the juveniles, except for one steelhead, were wild fish.

Juvenile salmonids were captured from October through February with peak catches in November (Table 4). A large proportion of the cutthroat trout were 25-30 cm long and many may have matured in the spring of 1997. Lengths of juvenile steelhead ranged between 9.3 cm and 29.5 cm, and averaged 18.1 cm (95% CI = ± 0.3 cm). Six juvenile salmonids died in the adult fish trap or during transport upstream of Elk Creek Dam.

Proportion of Fish that Returned to Elk Creek

Returns of wild adult coho salmon to the collection facility on Elk Creek accounted for 9.3% of the wild adult coho salmon that passed the fish counting station at Gold Ray Dam in 1996-97 (Table 5). Returns of wild adult steelhead to the collection facility on Elk Creek accounted for 3.6% of the wild adult steelhead that passed Gold Ray Dam in 1996-97 (Table 5).

Table 4. Number of juvenile salmonids trapped at the fish collection facility on Elk Creek, 1996-97.

Month of capture	Coho salmon	Steelhead	Cutthroat trout

October	0	98	0
November	2	253	15
December	0	38	4
January	0	7	0
February	0	2	0
Total catch	2	398	19

In comparison to steelhead, greater proportions of coho salmon have returned to Elk Creek in each of the four years that we have trapped fish.
We estimated that returns to Elk Creek annually accounted for 7-10% of the wild coho salmon that passed Gold Ray Dam (Table 5). In contrast, only 1-3% of the wild steelhead that annually passed Gold Ray Dam returned to Elk Creek (Table 5). Steelhead production in Elk Creek appears to be on the increase. The percentage of wild fish that returned to Elk Creek in 1996-97 (3.5%) was two-fold greater than the percentage return in 1994-95 (1.6%).

The area upstream of Elk Creek Dam accounts for about 9.5% of the area accessible to anadromous salmonids that pass Gold Ray Dam. We believe that the basin should produce at least a comparable percentage of coho salmon and
steelhead because both species spawn in tributaries rather than in the Rogue
River (Rivers 1964, Everest 1973). Historic passage problems at Elk Creek Dam may be responsible for the low returns of adult steelhead in recent years
(Satterthwaite et al. 1996a).

Table 5. Returns of wild adult anadromous salmonids to Elk Creek as compared to those that passed Gold Ray Dam, 1992-93 through 1996-97. Steelhead less than 41 cm (half-pounders) are not included. Passage estimates at Gold Ray Dam were received from Michael Evenson, ODFW, Central Point.

	Coho salmon			Steelhead		
Return year	Elk Creek	Gold Ray Dam	% return	Elk Creek	Gold Ray Dam	% return
1992-93	40	--	--	112	5,541	2.0

1993-94	76	756	10.1	105	8,022
1.3					
1994-95	232	3,265	7.1	201	12,515
1.6					
1995-96	349	3,345	10.4	283	12,344
2.3					
1996-97	319[a]	3,516	9.3	493[b]	14,144
3.6					

[a] *Includes seven fish captured or recovered upstream of the weir.*
[b] *Includes 21 fish captured or recovered upstream of the weir.*

Spawning Distribution of Coho Salmon

We found that coho salmon spawned in widely distributed areas of the Elk Creek basin. Spawners and redds were observed in each of the five tributaries surveyed, except that no spawners were seen in Bitterlick Creek (Table 6). These findings suggested that transportation did not have a major impact on the subsequent spawning distribution of coho salmon.

Freshets in late November, early December, and early January resulted in marginal survey conditions for much of the spawning period. We observed only 15 live spawners and 39 redds, even though we surveyed about one-third of the potential spawning sites in the five tributary streams (Satterthwaite et al. 1996b). Redds were not marked, so some were counted multiple times. We also found about equal numbers of coho salmon carcasses in the mainstem of Elk Creek and in the tributary streams even though we surveyed the tributary streams more frequently. These results suggest that more coho salmon may spawn in the mainstem of Elk Creek as compared to the tributary streams.

We also found coho salmon fry in all of the streams surveyed in 1996 and in 1997. Fry in West Branch and in Flat Creek were distributed farther upstream in 1997 as compared to 1996 (Table 7). In contrast, fry in the other streams were distributed farther downstream in 1997 as compared to 1996 (Table 7). The difference in fry distribution, and thus spawning distribution, may be related to the location of the streams. West Branch and Flat Creek are closer to Elk Creek Dam than the other streams.

Upstream Migration of Juvenile Salmonids

Recaptures of branded fish indicated that juvenile salmonids migrated from the mouth of Elk Creek upstream to the site of Elk Creek Dam. However, the falls at RK 0.6 appeared to be a barrier to the upstream migration of

juvenile salmonids less than 15 cm long. We released 677 juveniles less than 15 cm long downstream of the falls, yet did not recapture any near the dam site. In contrast, we released 253 juveniles less than 15 cm long upstream of the falls and recaptured 11 near the dam site.

Table 6. Numbers of live coho salmon and redds observed during spawning surveys in five tributaries of Elk Creek, 1996-97.

West Branch Bitterlick Creek			Flat Creek			Jones Creek			Sugarpine Creek		
Date	Fish	Redds	Date	Fish	Redds	Date	Fish	Redds	Date	Fish	Redds
11/26	0	0	11/27	1	0	12/03	0	0	11/27	4	3
11/25	0	0									
12/03	1	2	12/03	1	3	12/12	0	0	12/03	3	3
12/20	0	0									
12/15	0	0	12/19	1	6	12/21	1	3	12/18	2	2
12/23	0	3									
12/22	1	7	12/24	0	3	01/06	0	0	12/24	0	4
--	-	-									
01/07	0	0	01/06	0	0	01/13	0	0	01/07	0	0
--	-	-									
01/13	0	0	01/22	0	0	--	-	-	01/11	0	0
--	-	-									
--	-	-	--	-	-	--	-	-	01/22	0	0
--	-	-									

Table 7. Upstream limit (RK) of coho salmon fry electrofished in the Elk Creek Basin, 1996-97.

Year	West Branch Elk Creek	Flat Creek	Jones Creek	Sugarpine Creek	Bitterlick Creek
1996	3.5	3.2	1.1	8.9	4.0
23.0					
1997	3.8	4.1	0.1	6.6	2.0
20.9					

We branded and released 261 juvenile trout captured in the Rogue River on 14-16 October. Lengths of the fish suggested that most, if not all, were in their fish year of life (Table 8). None of these fish were subsequently recaptured in the hoop net or in the adult fish trap near Elk Creek Dam.

We branded and released 573 juvenile trout in Elk Creek between the mouth and the falls at RK 0.6. Of these fish, 560 were initially trapped at RK 2.4 and were released at RK 0.1 after branding. Eight branded trout were recaptured in the hoop net or in the adult fish trap. Lengths of the recaptured fish suggested that only juvenile trout longer than 15 cm migrated upstream past the falls at RK 0.6 to reach the vicinity of Elk Creek Dam (Table 8).

Table 8. Length-frequency distributions of juvenile trout branded and released in downstream areas as compared to length-frequency distributions of branded trout recaptured in the adult fish trap and in the hoop net (RK 2.4). Steelhead and cutthroat trout are included in the data.

Disposition of fish	Mid-point for interval of fork length (cm)											
	6	8	10	12	14	16	18	20	22	24	28	30 Total
FISH RELEASED IN THE ROGUE RIVER												
Released	82	129	38	9	3	0	0	0	0	0	0	0 261
Recaptured	0	0	0	0	0	0	0	0	0	0	0	0 0
FISH RELEASED IN ELK CREEK (RK 0.1-0.6)												
Released[a]	1	30	82	99	45	78	113	66	34	12	8	5 573
Recaptured	0	0	0	0	0	4	2	0	2	0	0	0 8
FISH RELEASED IN ELK CREEK (RK 0.6-2.4)												
Released[b]	19	79	66	36	21	35	52	30	9	0	0	0 347
Recaptured[c]	0	0	2	0	2	2	2	1	0	0	0	0 9

[a] *Includes 560 fish released at RK 0.1.*
[b] *Includes 172 fish released at RK 2.1.*
[c] *Includes 6 fish released at RK 2.1.*

We also branded and released 347 juvenile trout in Elk Creek upstream of the falls at RK 0.6. Of these fish, 172 were initially trapped at RK 2.6 and were released at RK 2.1 after branding. Nine branded trout were recaptured in the hoop net or in the adult fish trap. Lengths of the recaptured fish indicated that some juvenile trout in their first year of life (Table 8) migrated upstream within Elk Creek.

We branded and released 159 coho salmon in Elk Creek between the mouth and the falls at RK 0.6. Almost all of these fish were initially trapped at RK 2.4 and were released at RK 0.1 after branding. None of the coho salmon released below the falls at RK 0.6 were recaptured in the vicinity of Elk Creek Dam (Table 9).

We also branded and released 32 coho salmon in Elk Creek upstream of the falls at RK 0.6. Almost all of these fish were initially trapped at RK 2.4 and were released at RK 2.1 after branding. Two juvenile coho salmon were recaptured in the hoop net (Table 9). Data related to all juvenile salmonids recaptured in 1996-97 are in Table 10.

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Table 9. Length-frequency distributions of juvenile coho salmon branded and released in downstream areas as compared to the lengths of branded coho salmon recaptured in the adult fish trap and in the hoop net (RK 2.4).

	Mid-point for interval of fork length (cm)				
Disposition of fish	6	8	10	12	Total
BRANDED FISH RELEASED IN ELK CREEK AT RK 0.1					

	Released	1	37	111	10
159					
	Recaptured	0	0	0	0
0					
BRANDED FISH RELEASED IN ELK CREEK AT RK 2.1					
	Released[a]	1	11	19	0
31					
	Recaptured	0	0	2	0
2					

[a] *Includes one fish released between RK 0.6 and RK 2.3.*

Table 10. Marked juvenile salmonids recaptured in the hoop net or the adult fish trap at RK 2.4 of Elk Creek, 1996-97. All recaptured fish were released in Elk Creek. No marked fish released in the Rogue River were recaptured.

Site of recapture	Date of recapture	Species	Fork length (cm)	Area of release (RK)	Release date(s)
Adult trap	10/24	Steelhead	16.6	2.1	10/22-11/04
Adult trap	10/24	Steelhead	21.0	0.6-2.3	10/15
Adult trap	10/25	Steelhead	14.1	0.6-2.3	10/15
Adult trap	10/29	Steelhead	17.2	2.1	10/22-11/04
Adult trap	10/30	Steelhead	16.7	2.1	10/22-11/04
Hoop net	11/02	Steelhead	10.1	0.6-2.3	10/15
Hoop net	11/02	Steelhead	10.8	0.6-2.3	10/15
Hoop net	11/11	Steelhead	14.2	2.1	10/22-11/04
Adult trap	11/20	Steelhead	16.7	0.1	10/22-11/04
Adult trap	11/21	Steelhead	21.9	0.1	11/05-11/18
Adult trap	11/21	Steelhead	16.8	0.1	11/05-11/18

Adult trap 11/19-12/02	11/22	Steelhead	18.8	0.1
Adult trap 11/19-12/02	11/24	Steelhead	17.3	0.1
Adult trap 10/22-11/04	11/24	Coho salmon	9.8	2.1
Adult trap 10/22-11/04	11/24	Coho salmon	9.8	2.1
Adult trap 10/22-11/04	12/20	Steelhead	18.8	2.1
Hoop net 11/19-12/02	12/20	Steelhead	21.9	0.1
Hoop net 11/19-12/02	12/20	Steelhead	18.0	0.1
Hoop net 11/19-12/02	01/22	Steelhead	15.1	0.1

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