THE OREGON PLAN *for* *Salmon and Watersheds*





OREGON
Fish & Wildlife

Klamath Mountains Province Steelhead Project, 2001-02 Annual Report

Report Number: OPSW-ODFW-2004-08

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Thomas D. Satterthwaite

Oregon Department of Fish and Wildlife
3406 Cherry Avenue NE
Salem, Oregon 97303

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CONTENTS

SUMMARY

Objective for 2001-02

Determine the status of wild steelhead in relation to population health goals for the final year of the project.

Findings in 2001-02

Sampling to evaluate steelhead status was completed as related to six of the eight population health goals. Goals for fish distribution and numbers of returning adults were met, but the goals for production rates of fry in summer steelhead streams and the relative abundance of hatchery fish among winter steelhead were not met. Goals for juvenile fish densities and production rates of wild smolts were partially met.

INTRODUCTION

The steelhead supplement to the Oregon Plan for Salmon and Watersheds (OSPW) is intended to maintain wild steelhead populations in Oregon at sustainable and productive levels that provide substantial environmental, cultural, and economic benefits. The OSPW attempts to better define "sustainable and productive" by committing the Oregon Department of Fish and Wildlife (ODFW) to establish "Population Health Goals" for each Evolutionary Significant Unit (ESU) of wild steelhead within the state. In addition, section ODFW IB1S of the plan calls for ODFW to assess adult escapement and juvenile production of wild steelhead in each ESU.

The National Marine Fisheries Service identified seven ESUs for steelhead in Oregon and concluded that steelhead produced in coastal basins between Cape Blanco in southern Oregon and the Klamath River Basin in northern California constitutes one ESU. This area closely corresponds to the geologic boundaries of the Klamath Mountains Province (KMP). Steelhead in the KMP differ from those in adjoining areas because of distinctive life history and genetic characteristics (Busby et al. 1994).

Primary differences in life history parameters have been identified for wild KMP steelhead. Summer steelhead and winter steelhead differ in time of return as adults, tendency to return to fresh water on a false spawning migration (the "half-pounder" run), age at ocean entry, growth rate and migration patterns of juveniles in fresh water (ODFW 1990; ODFW 1994). As a result of these differences, separate health goals seem warranted for summer and winter steelhead populations. Winter steelhead inhabit streams throughout the KMP, while summer steelhead are found only in a portion of the Rogue River Basin. However, the distribution of summer and winter steelhead overlap in major areas of the Rogue River Basin (Everest 1973) and, as juveniles of the respective races cannot be differentiated, some population health goals have to apply to both races.

The status of wild steelhead in the Klamath Mountains Province ESU is not readily apparent from historic sources of information. Uncertainty about resource status, coupled with a comprehensive conservation plan developed by Oregon and the termination of wild fish harvest in almost all KMP streams, lead the National Marine Fisheries Service (NMFS), in 1998, to defer a listing of KMP steelhead under the Endangered Species Act.

On 30 March, 2001, NMFS announced that, after a review of new information, that an Endangered Species Act listing was not warranted for KMP steelhead. In 2002, ODFW adopted new methods to monitor steelhead populations on the Oregon coast. Allied with the decision, ODFW decided to terminate the KMP steelhead project. Consequently, this report presents findings from the third, and final, year of the project.

The goal of the project was to develop and implement assessment methods to determine the status of wild steelhead in the Oregon portion of the KMP. Project objectives included (1) develop population health goals and allied monitoring methods and (2) determine resource status in relation to health goals Satterthwaite (2002a). Directed sampling began in 1999 and findings from the first two years of the project were reported by Satterthwaite (2002b) and Satterthwaite (2003).

METHODS

Unless otherwise described, methods followed those outlined by Satterthwaite (2002b) and Satterthwaite (2003). Analytical methods followed those described by Zar (1984).

Rearing Densities of Juveniles (Goal 2)

Juvenile trout captured in the Rogue River Basin were not measured during 2003. Samplers differentiated age 0+ trout from age ≥ 1+ trout based on the size of captured fish. Large (older) trout were enumerated and released first. Small trout that remained were enumerated and classified as age 0+ fish.

Run Composition (Goal 7)

Sampling was similar to that conducted during the 2001-02 return year, except that the Chetco River was divided into two sampling areas: Social Security Bar to the North Fork (RK 3-9) and Nook Creek to the South Fork (RK 23-29). Survey areas in the Chetco River changed on successive sampling trips.

RESULTS AND DISCUSSION

Summary of Population Health Goals

A complete listing of the eight goals follows.

Goal 1: Characteristics of fresh water habitat in areas accessible to steelhead should become more similar to ODFW benchmarks of habitat quality established for streams in western Oregon.

Goal 2: During late summer and autumn, the mean density of trout fry should be at least 0.50 fish/m^2 and the mean density of age $\geq$ 1+ steelhead should be at least 0.10 fish/m^2 (0.05 fish/m^2 in riffles).

Goal 3: Juvenile steelhead should be present in at least 80% of sites accessible to spawners, or the percentage of sites inhabited by juvenile steelhead should increase through time.

Goal 4: Mean production rates in intermittent streams used by spawning summer steelhead should be a minimum of 7,000 trout fry per kilometer.

Goal 5: Annual returns to Gold Ray Dam should be a minimum of 4,000 wild summer steelhead and 4,000 wild winter steelhead, while annual returns to the Rogue River should be a minimum of 10,000 wild late-run adult summer steelhead.

Goal 6: Fish with half-pounder life histories should compose at least 95% of the late-run adult summer steelhead in the Rogue River.

Goal 7: Wild fish should compose at least 50% of the winter steelhead that return to the Chetco River and at least 90% of the winter steelhead that return to other coastal streams.

Goal 8: Mean production rates in coastal streams should be a minimum of 300 wild smolts per kilometer.

Determine Resource Status in Relation to Population Health Goals

Habitat Characteristics (Goal 1)

Survey data from 2001 have yet to be summarized (Aquatic Habitat Survey Project, ODFW, Corvallis). Thus, I could not evaluate habitat conditions relative to ODFW benchmarks.

Rearing Densities of Juveniles (Goal 2)

Survey crews completed density sampling for juvenile trout at 38 of the 50 EMAP sites in the Rogue River Basin and at 46 of the 50 EMAP sites in other coastal basins. Five sites were not sampled because crews found natural barriers to fish migration downstream of the EMAP locations (Appendix Table 1). Nine other sites, all in the Rogue River Basin, were not sampled because the streams were dry at the EMAP locations (Appendix Table 1). In addition, samplers did not estimate at two sites in the coastal basins because the habitat units were too large to effectively sample.

Cutthroat trout inhabited numerous sites. However, as in 1999 and 2000, steelhead predominated the electrofishing catches. Cutthroat trout composed only 4% (39/1,041) of the age ≥ 1+ trout captured in the Rogue River basin and composed 13% (187/1,495) of the age ≥ 1+ trout captured in other coastal basins. The predominance of steelhead among older trout suggested that juvenile steelhead also predominated the catches of age 0+ trout.

I assumed that all age ≥ 1+ *O. mykiss* captured during the density surveys were juvenile steelhead. Length data appeared to support the assumption that few, if any, resident rainbow trout inhabited any of the sampling sites. Samplers captured only ten *O. mykiss* that were longer than 20 cm in fork length (Table 1). Electrofishing catches of *O. mykiss* were dominated by fish in the 10-15 cm length interval (Table 1). The length distributions of *O. mykiss* appear to be appropriate for juvenile steelhead prior to the formation of the second or third freshwater annulus on their scales (ODFW 1990; ODFW 1994).

Results indicated that densities of juvenile trout varied greatly among sampling sites. Density estimates of age 0+ trout ranged between 0 and 4.0 fish/m^2 (Appendix Tables 2 and 3), while density estimates of age ≥ 1+ steelhead ranged between 0 and 1.3 fish/m^2 (Appendix Tables 2 and 3).

As in previous years, rearing densities of age 0+ trout and age ≥ 1+ steelhead in the Rogue River Basin and in the coastal basins exhibited non-normal distributions. Most age 0+ trout reared in pools and riffles at densities of less than 1.0 fish/m^2 (Figure 1). Few age 0+ trout reared at densities greater than 1.5 fish/m^2 (Figure 1). Similarly, most age ≥ 1+ steelhead reared at densities of less than 0.1 fish/m^2, while only a few reared at

Table 1. Length frequency distributions of age ≥ 1+ trout captured at EMAP sites sampled in the Klamath Mountains Province, 2001. Coastal basins include those other than the Rogue River Basin.

		Fork length interval (cm)					
Basin	Species	<10	10-15	15-20	20-25	25-30	>30
Coastal	*O. mykiss*	213	808	108	10	0	0
Coastal	*O. clarki*	24	101	32	13	5	0

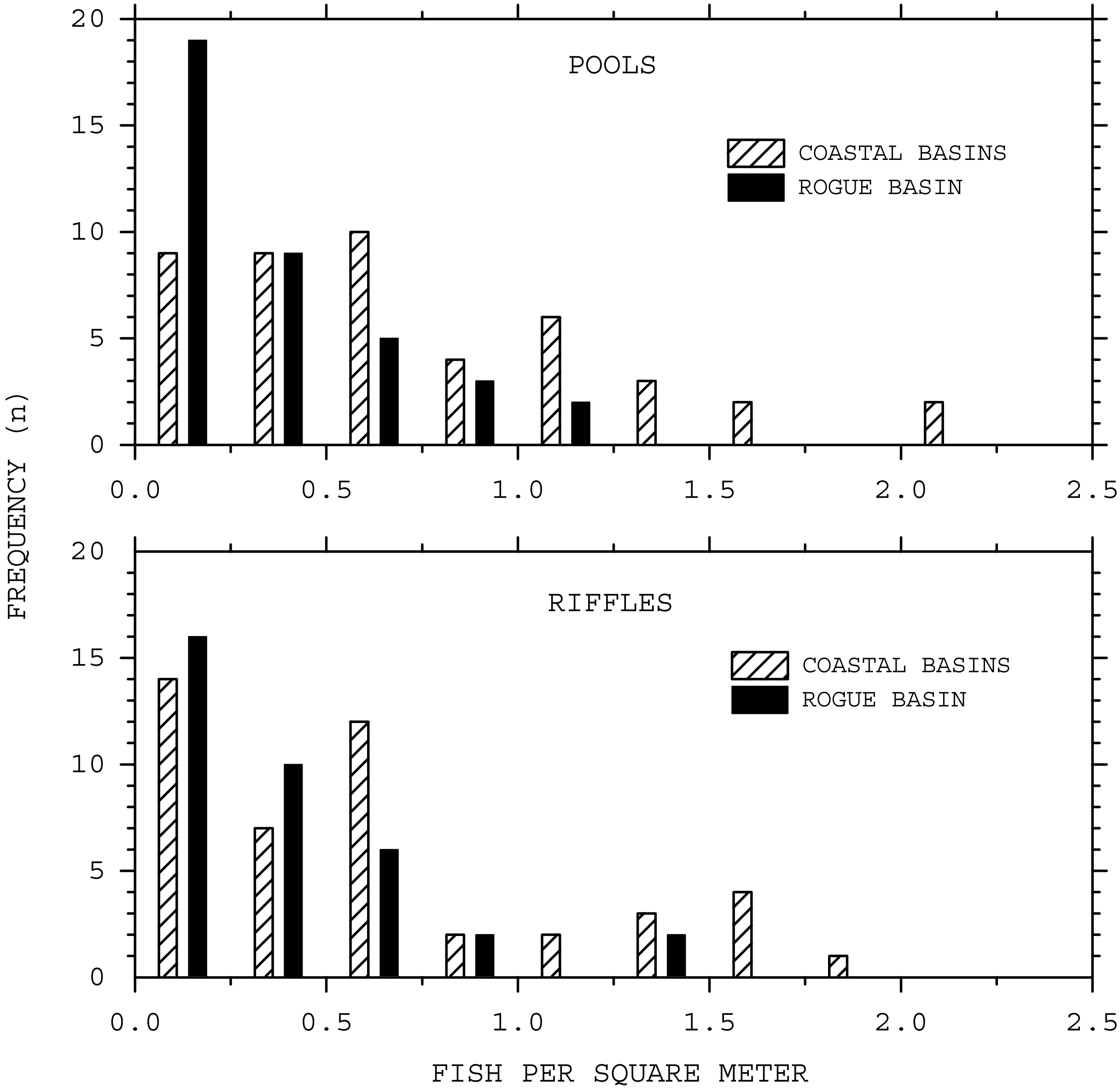

Figure 1. Estimated densities of age 0+ trout in KMP streams, 2001. Densities exceeded 2.5 fish/m^2 at two sites that are not shown.

densities greater than 0.3 fish/m^2 (Figure 2). Various types of data transformations failed to produce data arrays that could be appropriately analyzed with parametric statistics.

Mean densities of age 0+ trout averaged more than 0.50 fish/m^2 in pools and riffles of the coastal basins (Table 2). However, the mean density of age 0+ averaged less than 0.40 fish/m^2 in pools and riffles of the Rogue River Basin (Table 2).

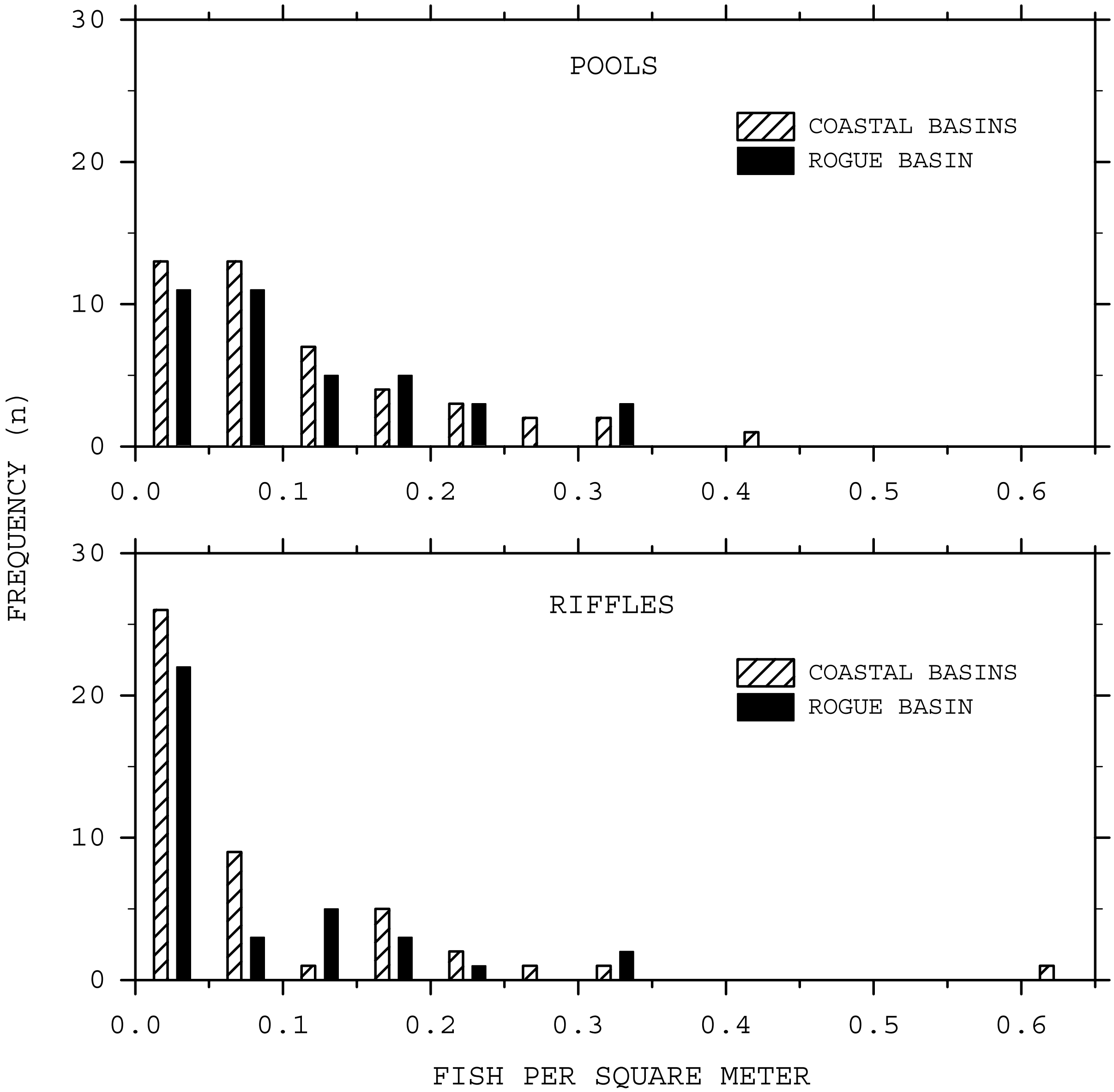

Figure 2. Estimated densities of age ≥ 1+ steelhead in KMP streams, 2001.

These results indicate that the population health goal of 0.50 fish/m^2 for subyearling trout was not reached in the Rogue River Basin portion of the KMP in 2001.

In contrast, density goals for age ≥ 1+ steelhead were attained throughout the KMP in 2001. Mean densities in pools, within both survey areas, exceeded the population health goal of 0.10 fish/m^2 (Table 3). In addition, mean densities in riffles, both in the Rogue River Basin and in the coastal basins, exceeded the population health goal of 0.05 fish/m^2 (Table 3).

Table 2. Summary statistics associated with the estimated densities (fish/m^2) of age 0+ trout resident in streams of the Klamath Mountains Province, 2001.

Basin	Habitat type	N	Median	Quartiles 25%	Quartiles 75%	Mean	SD	P for normality
Rogue	pool	38	0.17	0.03	0.50	0.31	0.322	0.003
Other	pool	46	0.66	0.33	1.04	0.77	0.636	0.024
Rogue	riffle	36	0.27	0.05	0.64	0.37	0.363	0.026
Other	riffle	46	0.59	0.24	0.89	0.70	0.697	<0.001

As with age 0+ trout, the densities of age ≥ 1+ steelhead exhibited distributions that differed significantly from normal (Table 3).

Table 3. Summary statistics for the estimated densities (fish/m^2) of age ≥ 1+ steelhead resident in streams of the Klamath Mountains Province, 2001.

Basin	Habitat type	N	Median	Quartiles 25%	Quartiles 75%	Mean	SD	P for normality
Rogue	pool	38	0.091	0.032	0.177	0.111	0.090	0.061
Other	pool	46	0.082	0.044	0.168	0.139	0.196	<0.001
Rogue	riffle	36	0.024	0.000	0.111	0.067	0.087	<0.001
Other	riffle	46	0.044	0.019	0.090	0.083	0.113	<0.001

Fish Distribution (Goal 3)

Juvenile steelhead inhabited 35 of 36 (97%) EMAP sites judged to be accessible to adult steelhead in the Rogue River Basin (Appendix Tables 1 and 3). The associated 95% confidence interval was 85%-99%. Two sites were excluded from this assessment because only age 0+ trout were present and samplers could not determine if the fish were juvenile steelhead. Natural barriers blocked adult steelhead from reaching three sites that were randomly selected through EMAP. No artificial barriers were encountered during the surveys (Appendix Table 1).

Juvenile steelhead inhabited all of the 45 (100%) EMAP sites judged to be accessible to adult steelhead in coastal basins (Appendix Tables 1 and 2). I excluded three sites from the analysis because subyearlings were the only age class of trout in residence. Natural barriers blocked adult steelhead from reaching two other sites that were randomly selected with EMAP. No artificial barriers were encountered during the surveys (Appendix Table 1).

These findings indicated that steelhead were widely distributed and that they inhabited almost all areas accessible to adult spawners in the KMP. Thus, the population health goal of at least 80% habitation of rearing sites by juvenile steelhead, was attained in 2001.

Production Rates of Fry (Goal 4)

Production rates of age 0+ steelhead (fish produced per km of habitat) were estimated in five small streams in the vicinity of Grants Pass during 2001. All of these streams provide spawning habitat for summer steelhead (Everest 1973).

Traps operated from sometime during April until age 0+ salmonids ceased to migrate downstream. Termination of downstream migration ranged between the middle of June and late July (Table 4). Subsequent sampling indicated that subyearling trout inhabited areas that were 0.2 - 5.8 km upstream of the trap sites (Table 4). The short distances of habitation upstream of the trap sites may have been the result of an inability of adult steelhead to reach upstream spawning areas. Tributary flows to the Rogue River during winter and early spring of 2001 were some of the lowest on record (Herrett et al. 2002).

Findings indicated that production rates failed to meet the population health goal of 7,000 fry per km. Estimates of production rates for individual streams ranged between about 300 and 4,700 fry per km (Table 5). These findings suggest that the natural production of summer steelhead fry was very low in the middle portion of the Rogue River Basin as compared to production rates reported by Everest (1973) and Satterthwaite et al. (1996).

Table 4. Description of streams sampled to estimate production rates of age 0+ steelhead, 2001.

Creek	Trap location	Trapping period	km inhabited[a]
Quartz	RK 0.1	04/04-07/03	3.674
Cheney	RK 0.3	04/06-06/28	5.800
Pleasant	RK 0.2	04/04-06/22	2.702
Foots	RK 0.1	04/05-06/19	0.900
Galls	RK 0.1	04/21-06/20	0.152

[a] Stream length inhabited by age 0+ steelhead upstream of traps.

Adult Abundance (Goal 5)

ODFW estimated that 10,301 wild late-run summer steelhead passed the sampling site at Huntley Park in 2001. This estimate represented 103% of the 10,000 fish goal at river entry.

Table 5. Estimated production rates of age 0+ steelhead, 2001.

Creek	Number of trout fry		Production rates
	Migrants	Residents ± 95% CI	Fish/km ± 95% CI
Quartz	353	847 ± 779	327 ± 212
Cheney	70	3,010 ± 2,060	531 ± 355
Pleasant	2,176	1,251 ± 1,394	1,268 ± 516
Foots	3,807	458 ± 545	4,739 ± 606
Galls	5	94 ± 43	651 ± 283

In addition, ODFW estimated that 6,235 wild adult summer steelhead passed the counting station at Gold Ray Dam during 2001. This return represented 156% of the 4,000 fish goal for this location in the upper portion of the Rogue River. The 2001 return exceeded the average return of 4,200 wild summer steelhead for the period of record (1943-2001).

Estimates derived from both sampling sites indicate that returns of summer steelhead were relatively low in recent years as compared to the 1970s and 1980s (Figures 3 and 4). Returns in the 1990s appeared to be roughly comparable to returns in the 1950s (Figures 3 and 4). Such low returns do not necessarily indicate declining freshwater production because variations in ocean survival rates complicate the interpretation of trend

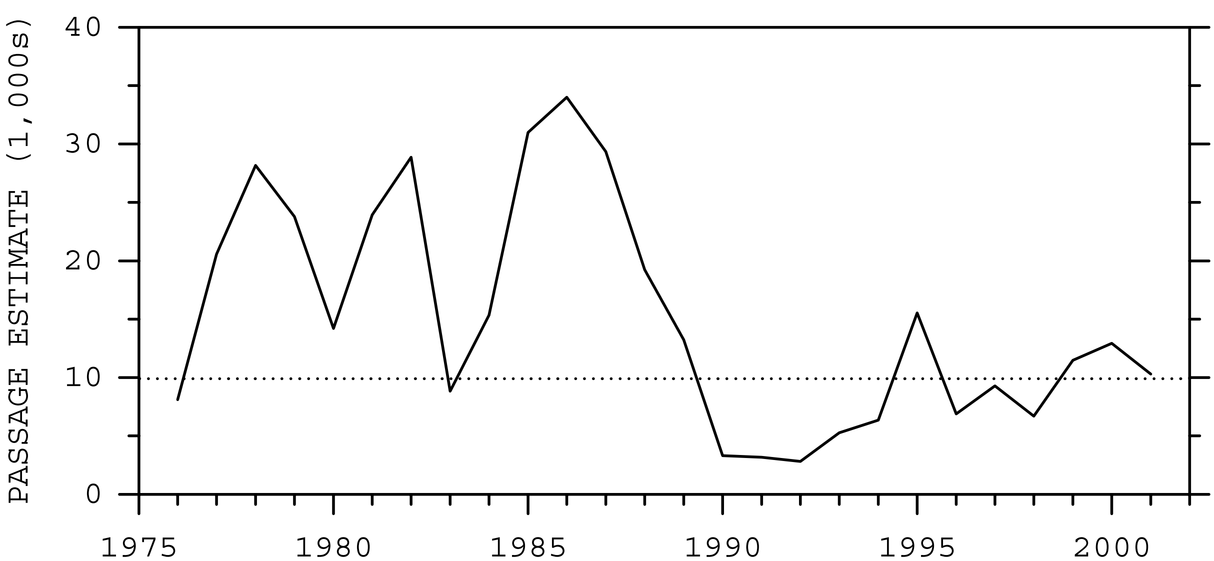

Figure 3. Estimated freshwater return of wild late-run adult summer steelhead in the Rogue River. Dotted line represents the population health goal.

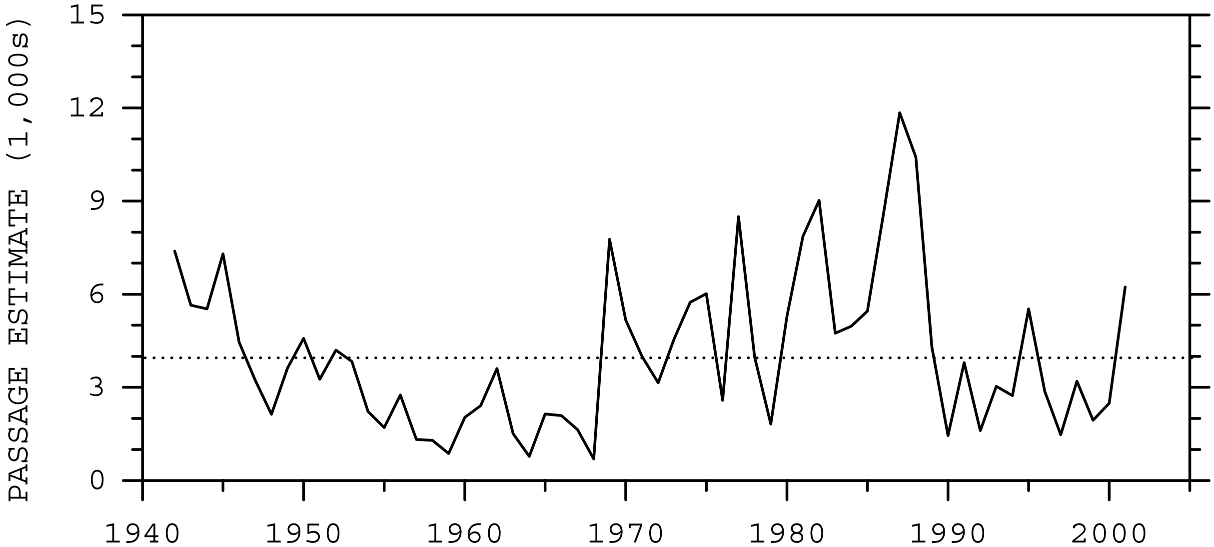

Figure 4. Estimated passage of wild adult summer steelhead at Gold Ray Dam on the Rogue River. Dotted line represents the population health goal.

analyses for numbers of adult salmonids (Hare et al. 1999; Smith and Ward 2000).

In the case of summer steelhead of Rogue River origin, ODFW (1994) noted that survival rates of juvenile steelhead released from Cole M. Rivers Hatchery sharply decreased in the late 1980s. Survival rates between the smolt and half-pounder life history stages averaged 15% for juveniles released in 1976-87 and averaged 5% for juveniles released in 1988-91 (ODFW 1994). Thus, the low returns of adults in recent years may be related to low ocean survival rates rather than being indicative of low freshwater production.

Similar to summer steelhead, the return of winter steelhead to Gold Ray Dam was excellent good in 2002. ODFW estimated that 10,582 wild adults passed the counting station, which represented 265% of the 4,000 fish goal for the upper portion of the Rogue River. The 2002 return exceeded the average return of 8,400 wild winter steelhead for the period of record (1943-2001). However, as with summer steelhead, returns of winter steelhead to the upper portion of the Rogue River have increased since the early 1990s (Figure 5).

Life History (Goal 6)

Scale samples were collected from wild adult late-run that returned to the Rogue River in 2001. However, the scales have yet to be interpreted.

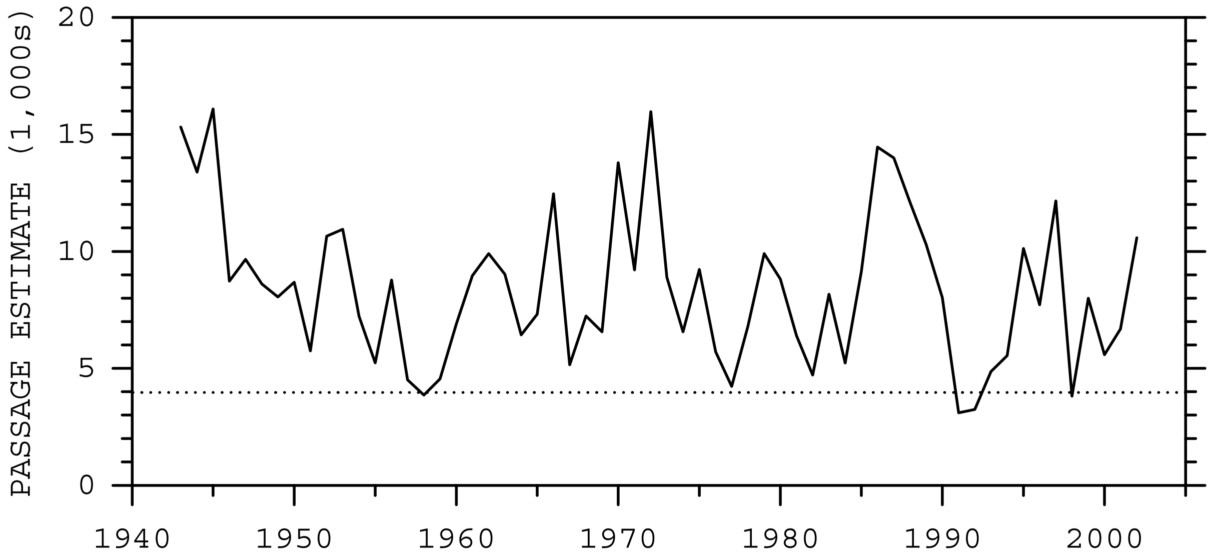

Figure 5. Estimated passage of wild adult winter steelhead at Gold Ray Dam on the Rogue River. Dotted line represents the population health goal.

Run Composition (Goal 7)

Samplers collected 328 steelhead in the Chetco River, and 336 steelhead in other coastal streams, during the 2001-02 return year. Some of these fish were classified as half-pounders. Half-pounders are mostly immature fish that generally enter the Rogue and Klamath rivers (Everest 1973). Half-pounders accounted for eight (2%) of the steelhead caught in the Chetco River and 45 (13%) of the steelhead caught in other coastal streams.

Similar to the previous year, wild fish predominated the returns of winter steelhead in coastal streams other than the Chetco River. Wild fish accounted for 86% of the unspawned adults, and 90% of the spawned adults (kelts) caught while fishing gillnets in coastal streams (Table 6). These findings indicate that the population health goal of at least 90% wild fish, among winter steelhead runs in small coastal streams of the KMP, was not met during the 2001-02 return year.

Sampling in the Chetco River during the 2001-02 return year was not designed to estimate run composition. Instead, sampling was designed to determine if winter steelhead could be randomly sampled in the lower portion of the river.

Findings from 2001-02 indicated that sampling location influenced estimates of run composition in the Chetco River. Among unspawned adult winter steelhead, wild fish composed 19% of the fish caught in the RK 3-9 sampling area and 64% of the

Table 6. Composition of adult winter steelhead caught in the Chetco River and in other coastal rivers of the KMP, 2001-2002 return year.

Basin	Unspawned			Spawned (kelts)		
	Wild	Hatchery	% wild (95%CI)	Wild	Hatchery	% wild (95%CI)
Chetco[a]	32	138	19% (13-25%)	6	22	21% (8-41%)
Chetco[b]	53	30	64% (52-73%)	30	9	77% (62-85%)
Other	187	31	86% (80-90%)	66	7	90% (81-96%)

[a] RK 3-9.
[b] RK 23-29.

fish caught in RK 23-29 sampling area (Table 6). A contingency table analysis indicated that the catch composition of unspawned adult fish differed significantly (chi-square = 48.7, $P < 0.001$). Among kelts, wild fish composed 21% of the fish caught in the RK 3-9 sampling area and 77% of the fish caught in RK 23-29 sampling area (Table 6). A contingency table analysis indicated that the catch composition of unspawned adult fish also differed significantly (chi-square = 18.0, $P < 0.001$) between the two areas.

The marked difference in catch composition between the two areas probably reflects a tendency by hatchery fish to hold downstream of the North Fork of the Chetco River. Release of hatchery smolts at the mouth of the North Fork is the likely causative factor that accounts for the spatial difference in catch composition. These findings indicate that findings from sampling in 2000-01 were biased because hatchery fish were likely caught at higher rates, per returning adult, than were wild fish. As a result, some other sampling method must be developed in order to appropriately estimate the proportion of hatchery fish among winter steelhead that return to the Chetco River.

Production Rates of Smolts (Goal 8)

Rotary traps were fished in the lower portions of Euchre Creek and Hunter Creek in 2001 and in 2002. The trap in Euchre Creek operated from 6 March through 1 June in 2001, and from 4 March through 25 May in 2002. The trap in Hunter Creek operated from 7 March through 1 June in 2001, and from 20 March through 24 May in 2002. As in earlier years, steelhead smolts were captured on the first night that both traps fished in 2001 and in 2002. Thus, the following production estimates of smolts are underestimated to some degree.

Findings indicated that annual production rates met the population health goal of 300 smolts per km in Hunter Creek, but not Euchre Creek (Table 7). Annual estimates of production rates ranged between 205 and 274 smolts/km in Euchre Creek and

Table 7. Estimated production rates of wild steelhead smolts in two coastal streams of the Klamath Mountains Province, 2001 and 2002. Estimates of steelhead habitat represent areas upstream of traps. No smolts of hatchery origin were captured.

Stream	Year	Steelhead habitat(km)	Smolts produced Mean	Smolts produced 95% CI	Smolts produced/km Mean	Smolts produced/km 95% CI
Euchre	2001	27.5	7,537	6,636-8,438	274	242-307
Euchre	2002	27.5	5,643	4,029-7,257	205	147-264
Hunter	2001	20.2	10,596	8,406-12,786	525	416-633
Hunter	2002	20.2	13,581	10,278-16,884	672	509-836

ranged between 525 and 672 smolts/km in Hunter Creek. Similar to results from sampling in 1999 and in 2000, these findings suggest that rearing habitat may be more optimal for steelhead in Hunter Creek as compared to Euchre Creek.

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APPENDIX

Data from sites sampled in 2001-02

Appendix Table 1. Sampling sites where densities of juvenile steelhead were not estimated in 2001.

Stream	EMAP #	UTM-E	UTM-N	Site description
				ROGUE RIVER BASIN
Dead Indian Creek tributary	116	543889	4677220	Natural barrier present downstream of site
Lobster Creek (South Fork)	120	402847	4715438	Natural barrier present downstream of site
Dailey Creek	126	433652	4684033	Natural barrier present downstream of site
Brush Creek	131	518280	4721720	No water in stream channel (30 May)
Slagle Creek	147	480302	4683828	No water in stream channel (24 May)
Dodes Creek	151	529454	4734968	No water in stream channel (11 July)
Forest Creek	157	497690	4677740	No water in stream channel (24 May)
Foots Creek	163	488060	4690268	No water in stream channel (20 June)
Dodes Creek	176	528386	4735994	No water in stream channel (11 July)
Salt Creek	178	455124	4690493	No water in stream channel (8 June)
Kane Creek	188	497285	4695179	No water in stream channel (23 May)
Dry Creek	196	513053	4711396	No water in stream channel (30 May)
				COASTAL BASINS
Bald Mountain Creek	123	388763	4727709	Natural barrier present downstream of site
Winchuck River	140	400787	4650719	Channel too large to effectively sample (steelhead present)
Chetco River	141	424797	4673033	Channel too large to effectively sample (steelhead present)
Little Chetco River	166	431934	4668379	Natural barrier present downstream of site

Appendix Table 2. Estimated densities (fish/m^2) of juvenile salmonids that reared in coastal basins (Rogue River Basin excepted) of the Klamath Mountains Province, 2001. Fish are yearlings of older, unless otherwise noted.

Stream	EMAP #	NAD-27 location		Age 0^+ trout		Steelhead		Cutthroat		Age 0^+ coho	
		UTM-E	UTM-N	Pools	Riffles	Pools	Riffles	Pools	Riffles	Pools	Riffles
Fourth of July Creek	102	411120	4655655	0.74	0.62	0.026	0.042	0.002	0.009	0.000	0.000
Red Cedar Creek	103	392156	4729869	0.73	0.75	0.070	0.006	0.009	0.000	0.036	0.000
Mislatnah Creek	104	411045	4682422	0.33	0.36	0.068	0.021	0.005	0.005	0.000	0.000
Red Mountain Creek	107	414480	4666560	0.54	0.32	0.058	0.029	0.008	0.000	0.000	0.000
Meyers Creek	109	386677	4684967	0.44	0.45	0.301	0.343	0.064	0.024	0.000	0.000
Bear Creek	112	409252	4651929	1.04	0.70	0.039	0.009	0.037	0.000	0.000	0.000
Pistol River	114	400238	4687899	0.74	0.63	0.168	0.159	0.000	0.000	0.000	0.000
Chetco River (North Fork)	115	394357	4669340	1.67	1.38	0.110	0.023	0.000	0.000	0.000	0.000
Red Mountain Creek tributary	117	415231	4667169	0.60	0.56	0.059	0.030	0.015	0.015	0.000	0.000
Conn Creek	119	387423	4690321	0.09	0.05	0.197	0.000	0.011	0.000	0.000	0.000
Chetco River (South Fork)	122	419185	4666028	0.21	0.08	0.100	0.075	0.000	0.000	0.000	0.000
Eagle Creek	124	405822	4674190	0.27	0.20	0.080	0.073	0.000	0.000	0.006	0.000
Slide Creek	129	429068	4679022	0.31	0.30	0.090	0.038	0.000	0.000	0.000	0.000
Emily Creek tributary	132	408095	4664900	0.67	0.64	0.000	0.000	0.241	0.000	0.000	0.000
Bull Gulch	134	392250	4677477	0.81	1.20	0.043	0.019	0.000	0.000	0.000	0.000
Chetco River	136	425491	4668437	0.10	0.19	0.034	0.026	0.000	0.000	0.000	0.000
Myrtle Creek	138	385582	4718658	1.04	0.43	0.161	0.019	0.051	0.000	0.000	0.000
Chetco River (South Fork)	139	413335	4667470	1.00	0.89	0.082	0.059	0.000	0.000	0.000	0.000
Cedar Creek	143	387940	4707125	0.07	0.24	0.000	0.000	0.227	0.000	0.000	0.000
Fresno Creek	144	422281	4669526	0.06	0.03	0.042	0.045	0.000	0.000	0.000	0.000
Little Chetco River	146	425876	4673637	0.66	0.47	0.096	0.045	0.000	0.006	0.000	0.000
Crew Canyon Creek	148	390036	4714994	0.48	0.24	0.012	0.000	0.254	0.000	0.000	0.000
Tincup Creek	149	418455	4688579	0.97	0.63	0.149	0.090	0.000	0.000	0.000	0.000
Hubbard Creek (North Fork)	154	379292	4734350	0.41	0.25	0.000	0.000	0.359	0.190	0.000	0.000
Emily Creek	155	404363	4663996	0.66	0.25	0.107	0.061	0.000	0.000	0.000	0.000
Nook Creek	159	410371	4674811	1.34	1.40	0.211	0.074	0.027	0.011	0.000	0.000

Appendix Table 2. Continued.

Stream	EMAP #	NAD-27 location		Age 0^+ trout		Steelhead		Cutthroat		Age 0^+ coho	
		UTM-E	UTM-N	Pools	Riffles	Pools	Riffles	Pools	Riffles	Pools	Riffles
Jack Creek	162	403416	4655199	1.44	1.17	0.059	0.000	0.116	0.000	0.000	0.000
Panther Creek	164	394497	4727642	0.54	0.36	0.045	0.048	0.000	0.005	0.000	0.000
Pistol River (South Fork)	165	393538	4675308	2.18	1.58	0.131	0.161	0.007	0.008	0.000	0.000
Brush Creek	168	384198	4724226	0.39	0.22	0.056	0.022	0.122	0.012	0.000	0.000
Mineral Hill Creek	169	405563	4679436	0.00	0.00	1.277	0.127	0.000	0.000	0.000	0.000
Wheeler Creek	172	406044	4659861	1.64	1.57	0.075	0.177	0.010	0.000	0.000	0.000
Chetco River (North Fork)	175	397372	4672144	0.16	0.09	0.325	0.083	0.000	0.000	0.000	0.000
Little Chetco River	177	428653	4670683	0.45	0.62	0.119	0.064	0.000	0.000	0.000	0.000
Bald Mountain Creek	179	386345	4730164	1.02	1.28	0.202	0.065	0.003	0.000	0.000	0.000
Jack Creek	180	399222	4657155	1.32	1.76	0.044	0.015	0.001	0.000	0.000	0.000
Butler Creek	184	395806	4732923	0.14	0.02	0.074	0.038	0.000	0.000	0.000	0.000
Chetco River (North Fork)	185	395379	4665865	1.22	0.86	0.036	0.012	0.000	0.000	0.000	0.000
Salmon Creek	187	407998	4651081	0.56	0.56	0.044	0.035	0.207	0.051	0.000	0.000
Elk River (South Fork)	189	401329	4729860	1.04	1.51	0.183	0.257	0.022	0.000	0.000	0.000
Thomas Creek	190	389315	4669231	0.38	0.66	0.278	0.618	0.000	0.000	0.000	0.000
Wheeler Creek	192	409194	4660343	1.04	0.70	0.081	0.012	0.022	0.000	0.000	0.000
Bald Mountain Creek	193	386487	4728834	0.79	0.63	0.224	0.185	0.027	0.000	0.000	0.000
Fall Creek	194	415605	4684491	0.00	0.00	0.143	0.241	0.000	0.000	0.000	0.000
Jack Creek	197	399873	4656369	3.03	3.95	0.271	0.169	0.006	0.000	0.000	0.000
Deep Creek	199	391342	4682773	2.20	1.55	0.420	0.202	0.015	0.000	0.000	0.000

Appendix Table 3. Estimated densities (fish/m^2) of juvenile salmonids that reared in the Rogue River Basin of the Klamath Mountains Province, 2001. Fish are yearlings of older, unless otherwise noted. Dashed lines indicate that there was no water in the units were not sampled.

		NAD-27 location		Age 0^+ trout		Steelhead		Cutthroat		Age 0^+ coho	
Stream	EMAP #	UTM-E	UTM-N	Pools	Riffles	Pools	Riffles	Pools	Riffles	Pools	Riffles
Little Applegate River	101	511569	4665094	0.95	0.83	0.209	0.203	0.000	0.000	0.000	0.000
Bummer Creek	105	465778	4713825	0.00	0.00	0.137	0.000	0.005	0.000	0.000	0.000
Grizzly Canyon Creek	106	543898	4688872	0.53	0.68	0.017	0.000	0.256	0.000	0.000	0.000
Pleasant Creek	108	487290	4719500	0.06	0.26	0.149	0.007	0.009	0.000	0.000	0.000
Taylor Creek	110	452780	4709246	0.15	0.19	0.007	0.000	0.000	0.000	0.123	0.018
Trail Creek (West Fork)	111	510239	4726871	0.38	--	0.038	--	0.000	--	0.130	--
Sardine Creek	113	494164	4703016	0.00	0.02	0.118	0.000	0.000	0.000	0.000	0.000
Grave Creek	118	471627	4719218	0.31	0.12	0.075	0.005	0.000	0.000	0.033	0.035
Illinois River (East Fork)	121	448163	4650956	0.18	0.15	0.067	0.101	0.000	0.000	0.448	0.247
Mule Creek (West Fork)	125	428445	4730634	0.03	0.05	0.103	0.129	0.000	0.000	0.000	0.000
Williams Creek (East Fork)	127	478606	4668041	0.36	0.63	0.312	0.095	0.051	0.005	0.000	0.000
Lobster Creek (North Fork)	128	398082	4720718	0.39	0.34	0.080	0.022	0.011	0.008	0.000	0.000
Missouri Creek	130	432350	4728090	1.02	1.34	0.092	0.173	0.000	0.000	0.014	0.000
Grave Creek	133	487635	4728691	0.00	0.00	0.233	0.015	0.004	0.000	0.000	0.000
Quosatana Creek	135	400571	4699690	0.78	0.48	0.180	0.321	0.000	0.000	0.000	0.000
Deer Creek (North Fork)	137	463887	4681179	0.00	0.00	0.177	0.000	0.079	0.033	0.073	0.000
Slate Creek	142	453301	4688797	0.03	0.26	0.090	0.070	0.011	0.006	0.993	0.246
Silver Creek	145	432665	4701338	0.54	0.66	0.072	0.041	0.000	0.000	0.000	0.000
Pine Creek	150	429223	4694382	0.04	0.06	0.000	0.000	0.000	0.000	0.000	0.000
Sucker Creek	152	460649	4662523	0.11	0.20	0.098	0.120	0.000	0.000	0.287	0.062
Cheney Creek	153	462529	4689409	0.64	--	0.096	--	0.000	--	0.000	--
Elk Creek	156	439963	4650762	0.47	0.87	0.021	0.303	0.000	0.000	0.889	0.341
Lobster Creek	158	396332	4713301	0.16	0.46	0.027	0.048	0.000	0.000	0.002	0.000
Mule Creek	160	437986	4735495	0.14	0.21	0.081	0.127	0.000	0.000	0.000	0.000
Evans Creek (West Fork)	161	494098	4722081	0.16	0.28	0.032	0.014	0.000	0.000	1.015	0.413
Thompson Creek	167	454965	4678665	0.00	0.00	0.012	0.000	0.000	0.000	0.730	0.887

Appendix Table 3. Continued.

Stream	EMAP #	NAD-27 location		Age 0^+ trout		Steelhead		Cutthroat		Age 0^+ coho	
		UTM-E	UTM-N	Pools	Riffles	Pools	Riffles	Pools	Riffles	Pools	Riffles
Briggs Creek	170	443832	4699501	0.55	0.71	0.303	0.048	0.000	0.000	0.000	0.000
Evans Creek	171	504181	4721698	1.11	0.48	0.308	0.183	0.000	0.000	0.000	0.000
Sykes Creek	173	488919	4712419	0.00	0.00	0.087	0.000	0.019	0.000	0.000	0.000
Edson Creek	174	385260	4699064	0.26	0.72	0.000	0.000	0.085	0.091	0.000	0.000
Little Butte Creek (N. Fork)	181	533235	4696890	0.96	0.67	0.169	0.058	0.000	0.000	0.702	0.139
Sucker Creek (Left Fork)	182	467482	4656313	0.35	0.40	0.243	0.185	0.000	0.000	0.371	0.036
Antelope Creek	183	521150	4694358	0.00	0.00	0.000	0.000	0.000	0.000	0.000	0.000
Reese Creek (South Fork)	186	521430	4710154	0.00	0.00	0.128	0.021	0.000	0.000	0.000	0.000
Anderson Creek	191	513866	4673644	0.50	1.38	0.178	0.000	0.027	0.000	0.000	0.000
Pickett Creek	195	458916	4705310	0.13	0.10	0.016	0.014	0.000	0.000	0.034	0.033
Beaver Creek	198	496197	4662495	0.10	0.32	0.197	0.100	0.005	0.000	0.000	0.000
Indigo Creek (North Fork)	200	419092	4708013	0.36	0.31	0.052	0.025	0.000	0.000	0.000	0.000

Appendix Table 4. Daily catches of steelhead with gillnets fished in the lower portion of the Chetco River, 2001-02.

	UNSPAWNED						SPAWNED (KELTS)				
	WILD			HATCHERY			WILD		HATCHERY		
Date	Male	Female	Half-pounders	Male	Female	Half-pounders	Male	Female	Male	Female	Total
RK 3-9											
12/11	1	1	1	9	4	1	0	1	0	0	18
12/19	1	1	0	3	0	1	0	0	0	0	6
12/26	5	5	0	14	14	0	0	0	0	0	38
01/11	1	0	0	13	4	0	0	0	0	0	18
01/16	4	1	0	5	13	0	0	0	0	0	23
01/22	2	1	0	13	4	0	0	1	1	1	23
02/05	0	3	0	6	6	0	0	0	0	2	17
02/13	0	2	0	3	5	0	0	0	0	0	10
02/21	1	0	0	2	6	0	0	1	1	1	12
03/04	0	1	0	1	9	2	0	1	3	3	20
03/14	0	0	0	0	4	0	0	1	0	3	8
03/21	0	0	0	0	0	0	0	0	0	1	1
04/01	0	0	0	0	0	0	0	0	1	1	2
04/10	1	1	0	0	0	0	0	0	1	3	6
04/17	0	0	0	0	0	0	1	0	0	0	1
RK 23-29											
12/10	0	0	0	0	0	2	0	0	0	0	2
12/26	0	1	1	0	0	0	0	0	0	0	2
01/02	3	1	0	1	1	0	0	0	0	0	6
01/09	1	4	0	1	2	0	0	0	0	0	8
01/24	3	6	0	4	0	0	0	0	0	0	13
01/30	4	8	0	4	4	0	0	0	0	0	20
02/05	4	5	0	5	1	0	0	2	0	0	17
02/21	0	0	0	1	0	0	0	2	0	0	3
02/27	3	0	0	0	3	0	2	2	1	2	13
03/04	2	2	0	1	1	0	0	5	0	1	12
03/21	3	1	0	1	0	0	0	10	0	2	17
03/27	1	0	0	0	0	0	0	1	0	3	5
04/01	0	0	0	0	0	0	2	4	0	0	6
04/17	0	1	0	0	0	0	0	0	0	0	1

Appendix Table 5. Daily catches of steelhead with gillnets fished in the lower portions (RK 0-6) of coastal streams of the KMP, 2001-02.

		UNSPAWNED						SPAWNED (KELTS)				
		WILD			HATCHERY			WILD		HATCHERY		
Stream	Date	Male	Female	Half-pounders	Male	Female	Half-pounders	Male	Female	Male	Female	Total
Pistol River	12/12	1	2	1	0	1	3	0	0	0	0	8
Hunter Creek	12/20	0	0	0	0	0	0	0	0	0	0	0
Elk River	12/21	2	1	1	1	0	1	0	0	0	0	6
Winchuck River	12/27	4	9	2	1	2	0	0	0	0	0	18
Euchre Creek	12/31	4	1	0	0	0	0	0	0	0	0	5
Pistol River	01/03	0	2	0	0	2	2	0	0	0	0	6
Elk River	01/10	3	1	0	0	1	1	0	0	0	0	6
Pistol River	01/14	2	5	3	1	0	3	0	0	0	0	14
Winchuck River	01/17	6	14	1	4	3	0	0	0	0	1	29
Elk River	01/23	5	5	0	0	1	0	1	1	1	0	14
Hunter Creek	01/28	4	4	1	0	1	2	0	0	0	0	12
Pistol River	01/29	3	7	3	1	0	8	0	0	0	1	23
Elk River	02/04	7	6	0	0	1	0	0	2	0	0	16
Pistol River	02/11	0	2	1	0	2	0	0	0	0	0	5
Winchuck River	02/12	1	3	0	0	0	0	0	1	0	1	6
Winchuck River	02/19	1	10	0	3	1	0	0	1	0	0	16
Pistol River	02/25	0	1	1	0	1	3	0	1	0	1	8
Euchre Creek	02/26	2	3	1	1	0	0	1	5	0	0	13
Elk River	03/05	11	18	1	1	0	0	0	7	0	0	38
Pistol River	03/13	0	1	0	0	0	1	0	0	0	0	2
Winchuck River	03/14	0	0	0	0	0	0	0	0	0	0	0
Elk River	03/20	3	7	0	1	0	0	2	8	0	0	21
Hunter Creek	03/26	5	5	2	1	0	1	5	0	0	0	19
Winchuck River	03/28	1	1	0	0	0	2	0	2	0	1	7
Winchuck River	04/04	0	2	0	0	0	0	1	2	0	1	6
Hunter Creek	04/08	2	1	0	0	0	0	0	2	0	0	5
Elk River	04/08	4	4	0	0	0	0	2	14	0	0	24
Pistol River	04/16	0	0	0	0	0	0	0	0	0	0	0
Winchuck River	04/22	0	0	0	0	0	0	1	0	0	0	1
Elk River	04/23	1	0	0	0	0	0	1	6	0	0	8