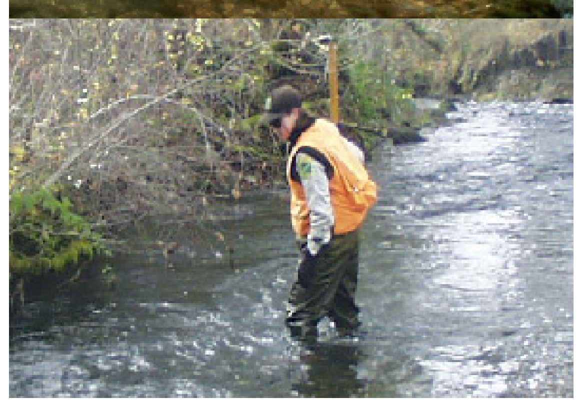
THE OREGON PLAN *for Salmon and Watersheds*



Klamath Mountains Province Steelhead Project, 2000-01 Annual Report

Report Number: OPSW-ODFW-2003-08

Klamath Mountains Province Steelhead Project
2000-01 Annual Report

Oregon Plan for Salmon and Watersheds

Monitoring Report No. OPSW-ODFW-2003-08

December 15, 2003

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Citation: Satterthwaite, T.D. 2003. Klamath Mountains Province Steelhead Project, 2000 Annual Report. Monitoring Program Report Number OPSW-ODFW-2003-08, Oregon Department of Fish and Wildlife, Portland.

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SUMMARY

Objectives for 2000-01

Project objectives were: (1) develop population health goals and allied monitoring methods for wild steelhead populations in the Klamath Mountains Province, and (2) sample to determine the status of wild steelhead in relation to population health goals.

Accomplishments in 2000-01

Both objectives were accomplished.

Findings in 2000-01

Two additional population health goals were developed. Sampling to evaluate steelhead status was completed as related to seven of the eight population health goals. The goal related to fish distribution was met, but the goal related to production rates of fry in summer steelhead streams was not met. Goals for fish habitat, juvenile fish densities, numbers of returning adults, the relative abundance of hatchery fish among winter steelhead, 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 will have to apply to both races.

The status of wild steelhead in the Klamath Mountains Province ESU is not readily apparent. Busby et al. (1994) concluded that the steelhead in this ESU "is not now at risk of extinction, but if present trends continue, it is likely to become so in the foreseeable future". In contrast, Chilcote (1998) concluded that almost all steelhead populations in the Oregon portion of the ESU "are relatively healthy and certainly do not warrant listing as threatened under the ESA". Uncertainty as to the status of the resource, coupled with the comprehensive conservation plan developed by Oregon and the termination of wild fish harvest in all streams except the Rogue River, lead the National Marine Fisheries Service to defer a listing of KMP steelhead under the Endangered Species Act. However, KMP steelhead remained a candidate species during 2000.

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

METHODS

Develop Population Health Goals and Allied Monitoring

Six population health goals were initially developed for KMP steelhead (Satterthwaite 2002b), and were subsequently adopted by ODFW. These goals encompass some of the key elements associated with steelhead life history including quality and quantity of habitat (Goal 1), rearing densities of juvenile fish (Goal 2), distribution of juvenile fish (Goal 3), production rates of juvenile fish in nursery streams (Goal 4), abundance of adult fish (Goal 5), and life history diversity (Goal 6).

Other population attributes, that were subsequently identified by fishery managers as important for resource management, included (1) the abundance of adult winter steelhead in basins other than only the Rogue River Basin, (2) the relative abundance of hatchery fish in basins other than only the Rogue River Basin, and (3) production rates of wild steelhead smolts. I investigated whether quantitative population health goals could be developed for these particular attributes of KMP steelhead.

Determine Resource Status in Relation to Population Health Goals

Sampling sites for habitat characteristics (Goal 1), rearing densities of juvenile fish (Goal 2), and fish distribution (Goal 3) were selected with the Environmental Monitoring and Assessment Program (EMAP) developed by the Environmental Protection Agency (Stevens and Olsen 1999). EMAP selects sample sites at random within each template by laying a grid of templates over a digital map of the resource to be surveyed. However, portions of KMP streams were excluded from the site selection process.

Potential sampling sites included first, second, and third order streams embedded in a hydrography layer developed by the United States Geological Survey on a 1:100,000 scale. Sites drawn to characterize habitat features excluded those stream segments in areas upstream of large dams that block the passage of anadromous fish. Sites drawn to estimate the rearing densities and distribution of juvenile steelhead included only those stream segments that are within the known or suspected spawning distribution of anadromous fish.

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

Juvenile Density and Distribution (Goals 2+3)

Similar to 1999, separate sample draws were made for sites in the Rogue River Basin, and for sites in other coastal basins within the Oregon portion of the KMP. Estimates of steelhead distribution and abundance in non-Rogue streams were identified as primary needs by ODFW fishery managers (Satterthwaite 2002a). As in 1999, subyearling trout were differentiated from older trout based on length distributions specific to each site.

In contrast to 1999, sampling draws for juvenile steelhead sites were limited to only those stream segments located in subbasins smaller than 150 km^2 in the Rogue River Basin, and smaller than 80 km^2 in other coastal basins. Surveys completed in 1999 indicated that it was often not possible to estimate densities of juvenile steelhead at sites within larger third order streams (Satterthwaite 2002a). The change in selection strategy effectively excluded those sites with a bank-full channel width that exceeded 20 m (personal communication dated 23 March 2000, from Barry Thom, ODFW, Corvallis).

Production Rates of Fry (Goal 4)

Production rates of subyearling salmonids were estimated in five small streams in the vicinity of Grants Pass. Production rates were defined as the number of trout fry produced per kilometer of stream. Production estimates included those fish which migrated from streams and those fish that maintained residence in areas upstream of the traps.

Migrants were enumerated with weir traps located at or near the mouth of each stream. Weir panels with 1/8-inch mesh screen directed fish into trap boxes. Baffles were installed in trap boxes to reduce fry predation by older salmonids. Traps were checked daily while salmonids migrated downstream and traps operated until streams stopped flowing. I assumed that traps collected all downstream migrants because the entire flow passed through the screens and trap boxes.

Trapped fish were identified to the lowest possible taxon. Salmonids smaller than 3.2 cm were classified as trout, and larger fry were classified as coho salmon if a dark band along the posterior edge of the anal fin was present (Satterthwaite et al. 1996). Criteria described by Hartman and Gill (1968) were used to differentiate cutthroat trout and steelhead that were yearlings or older. Samplers did not attempt to differentiate subyearling trout.

To estimate the number of salmonids that resided upstream, I divided streams into sampling units of equal length that were systematically sampled. Sampling rates varied between every sixth unit (17% sampling rate) and every ninth unit (11% sampling rate), and sampling units were 50 m long. Sampling terminated upon reaching the upstream limits of coho salmon and subyearlings that I believed to be the progeny of steelhead. I developed three criteria to define the upstream limits of steelhead distribution: absence of fish, presence of a barrier, or an absence of age ≥ 1+ steelhead coupled with the presence of age ≥ 1+ cutthroat trout. Sampling to estimate the number of resident fish began only after flow ceased at trap sites.

Samplers installed block nets with 3/16-inch mesh at each end of the sampling unit and used backpack electrofishers to collect fish. Fish were identified to the lowest possible taxon and subyearlings were be differentiated from older fish based on length. The two-pass removal method was used to estimate the number of fish in a sampling unit. When the catch of subyearling trout or coho salmon on the second pass was greater than 50% of the catch of cohorts on the first pass, samplers made two more passes. I used the methods of Bohlin (1981) to estimate the number and density of fish in the length of a stream and the confidence intervals associated with the estimates.

Run Composition (Goal 7)

Samplers used gillnets to capture winter steelhead in coastal streams between Elk River and the Winchuck River, except for Rogue River. The Chetco River was sampled once weekly, except that it was sampled twice every third week. The other streams were sampled twice weekly, but only once every third week. These streams included: Winchuck River, Pistol River, Hunter Creek, Euchre Creek, and Elk River. The frequency of sampling in these streams was dependent on the size of each basin, and dates of sampling were randomly selected.

Gillnets with two inch square mesh, 75’ to 240’ in length, were fished as close as possible to the mouth of each river for about three hours daily. Collections began on 11 December and ended on 24 April. Samplers recorded the following data for each fish: species, fin clips, sex, maturity stage (spawned vs. unspawned), and any tags or other identifying marks.

Smolt Production (Goal 8)

Production rates (fish produced per km of habitat) of steelhead smolts were estimated for Euchre Creek and for Hunter Creek. Numbers of smolts were estimated by fishing rotary fish traps near the mouth of each creek and by conducting mark-recapture experiments. Each day, trapped fish were identified to the lowest possible taxon and were enumerated. Juvenile steelhead that exhibited smolt characteristics (Ewing et al. 1984) were marked with a partial clip of either lobe of the caudal fin. Samplers alternated marks on a weekly basis. Marked smolts were transported and released approximately 200 m upstream from the traps. Samplers measured the fork length, to the nearest mm, of all marked and unmarked smolts captured in the traps. Methods followed those outlined by Thedinga et al. (1994) to estimate the number of steelhead smolts that passed the traps and the confidence intervals associated with each estimate.

RESULTS AND DISCUSSION

Develop Population Health Goals and Allied Monitoring

I investigated the possibility that population health goals could be developed for three additional attributes of KMP steelhead: (1) the abundance of adult winter steelhead in coastal basins, (2) the relative abundance of hatchery fish among winter steelhead in coastal basins, and (3) production rates of wild steelhead smolts.

Abundance of Adult Steelhead

Numbers of adult steelhead are difficult to estimate unless the fish can be trapped at a barrier, or can be counted at a passage facility. In the KMP, steelhead numbers can be estimated at three sites in the Rogue River Basin (Satterthwaite 2002b). There are no sites in other coastal streams of the KMP where the number of adult steelhead can be estimated.

Steelhead returns to freshwater can be estimated with a mark-recapture experiment. However, this method is very costly in time and effort and could probably be accomplished in only one, or possibly, two small coastal streams. While these estimates would be of value for monitoring adult abundance in specific streams, it is unknown whether the trend in abundance would be representative for other coastal streams. Even if the findings were representative, development of a population health goal that was related to freshwater return or spawning escapement, would require some other knowledge of the number of adult steelhead needed to seed the available habitat.

Other methods that have been employed to estimate the abundance of adult steelhead include visual counts of spawners and visual counts of redds. However, errors associated with visual counts of spawning steelhead and steelhead redds have yet to be rigorously assessed in the Pacific Northwest. ODFW has begun work to determine if spawner counts or redd counts can be used to estimate the spawning escapement of winter steelhead in the West Fork of Smith River (Jacobs et al. 2000). Findings from this project may lead to the development of methods that can be used to estimate, or index, the abundance of winter steelhead in coastal streams. Until that time, it is not possible to develop a population health goal associated with this type of monitoring.

Run Composition

Busby et al. (1994) concluded that hatchery fish accounted for 10-81% of the winter steelhead that return to KMP streams, and thus, opportunities to harvest hatchery fish are available to anglers fishing for winter steelhead along the south coast of Oregon. These estimates raised a concern that the proportion of hatchery fish in the runs may exceed guidelines outlined by ODFW's Wild Fish Policy that was current in 2000.

The proportion of hatchery fish in a run can be estimated with various sampling techniques (Schroeder 1996). In the KMP, run composition can be estimated at only one site, located in the upper portion of the Rogue River (Satterthwaite 2002b). There are no sites on other coastal streams of the KMP where the proportion of hatchery fish can be estimated within runs of winter steelhead.

With the exception of the Rogue River Basin, winter steelhead are released only in the Chetco River with an annual release goal of 50,000 smolts. As a result, some ODFW biologists suspected that hatchery fish account for no more than 10% of the adult winter steelhead that return to most KMP streams outside of the Rogue River Basin.

Guidelines that were embedded in the wild fish policy of ODFW indicated that hatchery fish should account for no more than 10% of the spawners within populations that inhabit areas where no hatchery fish are released and should account for no more than 50% of the spawners in the Chetco River, where hatchery smolts are produced from wild broodstock. Thus, a seventh population health goal was developed to address this issue:

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.

Smolt Abundance

As previously discussed, a population health goal related to the abundance of wild winter steelhead could not be developed for coastal streams of the KMP. As a result, there was interest in whether it was possible to establish a production goal for wild smolts that could act as a surrogate indicator of the abundance of adult steelhead. Such an indicator would be of value if assumptions are made about the ocean survival rates of smolts.

Smolt-to-adult survival rates have been estimated for some populations of wild steelhead in the Pacific Northwest. Survival rates of smolts produced in Snow Creek, Washington during 1978-83 ranged between 2.4% and 12.4%, and averaged 7.3% (cited in Bley and Moring 1988). Raymond (1988) estimated that smolt-to-adult survival rates averaged 6% at Ice Harbor Dam on the Columbia River during the mid-1960s. Survival rates of wild steelhead produced in the Keogh River, British Columbia, during 1977-83 averaged 16% and ranged between 7% and 26% (Ward and Slaney 1988). For the purposes of the following discussion, I assumed a smolt-to-adult survival rate of 10%.

Freshwater returns of adult steelhead to the Rogue River are known for some years. ODFW (1990) estimated that freshwater returns of wild winter steelhead averaged 43,000 adults during the 1977/78 through 1979/80 return years. In addition, ODFW (1994) estimated that freshwater returns of wild summer steelhead in the late 1970s through the early 1990s averaged about 21,000 adults (2,000 early-run adults and 19,000 late-run adults). Annual returns of both races thus averaged about 63,000 wild adult steelhead. Assuming that ocean survival rates averaged 10%, then about 630,000 smolts were produced annually in the Rogue River Basin. With 2,200 km of steelhead habitat in basin, then the production rates were about 286 smolts/km.

ODFW estimated the production of wild steelhead smolts in about twenty coastal streams during 1998 and 1999. Smolt production in KMP streams averaged 538 smolts/km in 1998 and 464 smolts/km in 1999. Smolt production in streams farther north along the Oregon coast averaged 136 smolts/km in 1998 and 51 smolts/km in 1999. These findings suggested that production rates of wild steelhead smolts are greater in KMP streams as compared to other streams of coastal Oregon.

ODFW estimated that there is approximately 600 km of steelhead habitat in the coastal streams of the KMP in Oregon (Rogue River Basin excluded). If these streams produce 300 smolts/km, then the total production of wild winter steelhead would be 180,000 smolts. Assuming that ocean survival rates average 10%, then the average annual return of wild winter steelhead to KMP streams other than the Rogue River would be about 18,000 adults. In comparison, population estimates developed from angler catch records approximated about 4,600 wild winter steelhead (Busby et al. 1994).

Production rates of wild steelhead smolts can be estimated in Euchre Creek and in Hunter Creek, both of which drain directly into the Pacific Ocean. Each stream has a good trap site near the mouth, making it possible to estimate total smolt production. ODFW estimated that there is about 39 km of steelhead habitat in these basins, or approximately 7% of the habitat available to winter steelhead in KMP streams other than those in the Rogue River Basin. Standard ODFW methods can be used to estimate the number of smolts that migrate from each stream. An eighth population health goal is associated with this proposed sampling:

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

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)

Surveys of each habitat unit produced estimates for numerous parameters associated with aquatic and riparian habitats. Findings associated with those parameters initially chosen to represent key indicators of the quality and quantity of habitat for KMP steelhead are listed in Table 1. I did not assess whether habitat goals were met in 2000 because there were insufficient data for trend analyses. However, it should be noted that habitat characteristics did not meet ODFW benchmarks, with the exception that gravel was more prevalent in KMP riffles as compared to the ODFW benchmark (Table 1).

Relative to other coastal streams in Oregon, KMP streams can be characterized as having a high density of streamside conifers and adequate gravel of appropriate quality for spawning salmonids (Flitcroft et al. 2002). However, KMP streams appear to be lacking in pool area and instream wood. The relative paucity of pools may be

Table 1. Summary statistics associated with key habitat parameters estimated at randomly selected sites in the South Coast Monitoring Area, 2000. Data were reported by Flitcroft et al. (2002).

Habitat parameter	ODFW benchmarks	n	Mean(SD)	Quartiles 25th	50th	75th
% pool habitat	>35	43	21(17)	8	18	28
Deep pools/km	--	43	1.6(2.9)	0	0	1.8
Wood pieces/0.1 km	>20	43	11(9)	4	8	16
Conifers[a]/0.33 km	--	43	53(69)	0	30	71
% fines in riffles	<10	31	27(17)	13	28	35
% gravel in riffles	≥35	31	40(15)	27	38	46

[a] those >0.5 m dbh.

limiting steelhead production in the KMP because the densities of age ≥ 1+ steelhead are greater in pool habitat as compared to riffle habitat (*see* **Rearing Densities of Juveniles (Goal 2)**.

Rearing Densities of Juveniles (Goal 2)

Survey crews completed density sampling for juvenile trout at 47 of the 49 EMAP sites in the Rogue River Basin and at 44 of the 51 EMAP sites in other coastal basins. A total of 9 sites were not sampled, mostly because samplers found natural barriers to fish migration downstream of the EMAP sites (Appendix Table 1). In addition, samplers did not estimate numbers of age 0+ trout resident in pools at one site in the Rogue River Basin because those pools were too large to effectively sample.

Cutthroat trout inhabited numerous sites. However, as in 1999, steelhead predominated the electrofishing catches. Cutthroat trout composed 10% (86/844) of the age ≥ 1+ trout captured in the Rogue River basin and composed 14% (138/982) 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 nine *O. mykiss* that were longer than 25 cm in fork length (Table 2). Electrofishing catches of *O. mykiss* were dominated by fish in the 10-15 cm length interval. 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).

Survey findings indicated that densities of juvenile trout varied greatly among sampling sites. Density estimates of age 0+ trout ranged between 0 and 2.8 fish/m^2 (Appendix Tables 2 and 3), while

Table 2. Length frequency distributions of age ≥ 1+ trout captured at EMAP sites sampled in the Klamath Mountains Province, 2000.

Basin	Species	Fork length interval (cm) <10	10-15	15-20	20-25	25-30	30-35	35-40
Rogue	*O. mykiss*	113	480	129	21	5	1	0
Other	*O. mykiss*	169	566	92	7	0	0	0
Rogue	*O. clarki*	8	50	12	3	2	0	1
Other	*O. clarki*	10	113	28	8	0	0	0

density estimates of age ≥ 1+ steelhead ranged between 0 and 0.6 fish/m^2 (Appendix Tables 2 and 3).

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 in a few pools and riffles at densities of 1-3 fish/m^2

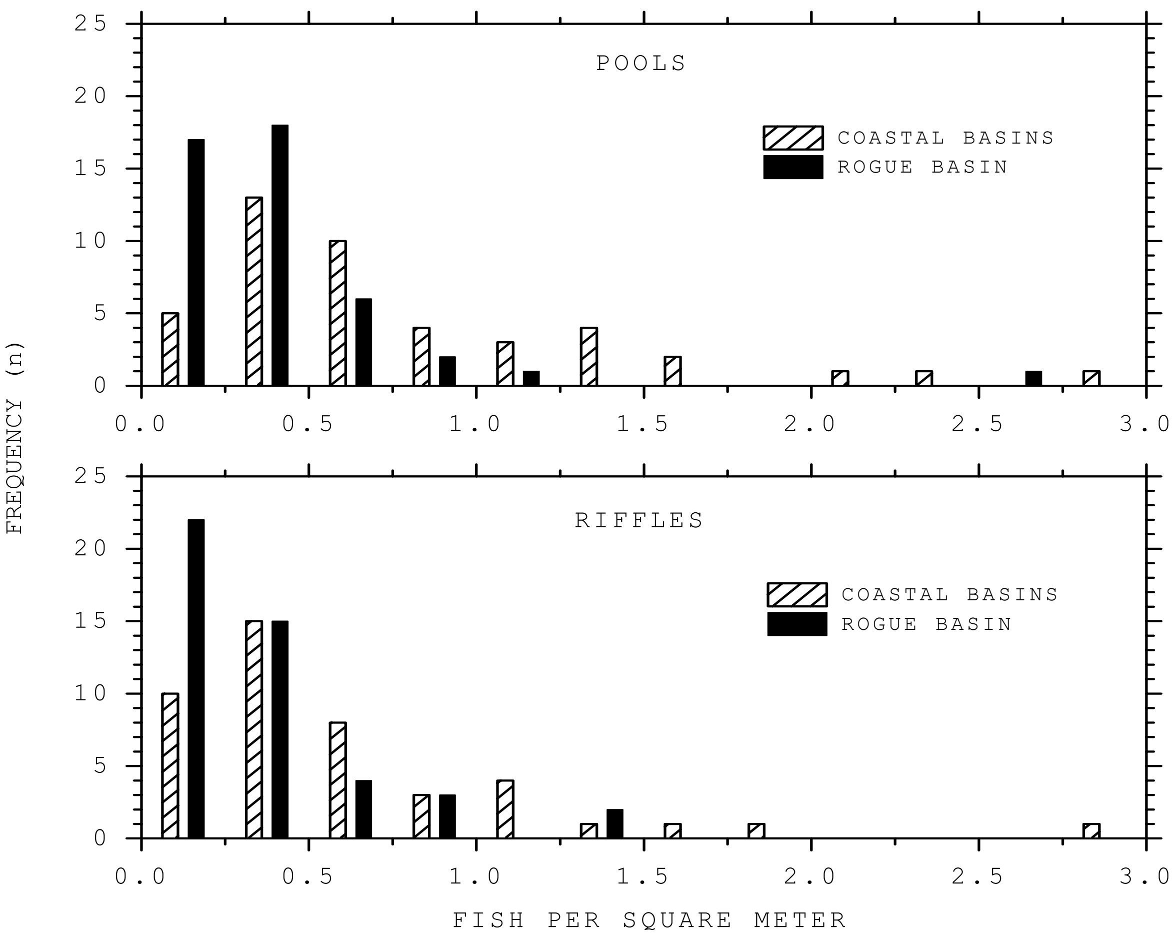

Figure 1. Estimated densities of age 0+ trout in KMP streams, 2000.

(Figure 1). Similarly, most age ≥ 1+ steelhead reared at densities of less than 0.1 fish/m^2, while only a few reared at densities of 0.1-0.6 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 3). 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 3). 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 during 2000.

Similarly, density goals for age ≥ 1+ steelhead were also partially attained in 2000. Mean densities averaged less than 0.10 fish/m^2 in pools and averaged less than 0.05 fish/m^2 in riffles in the Rogue River Basin portion of the KMP (Table 4). However, the density of age ≥ 1+ steelhead in riffles of streams in the coastal basins exceeded the population health goal of 0.05 fish/m^2 (Table 4). As

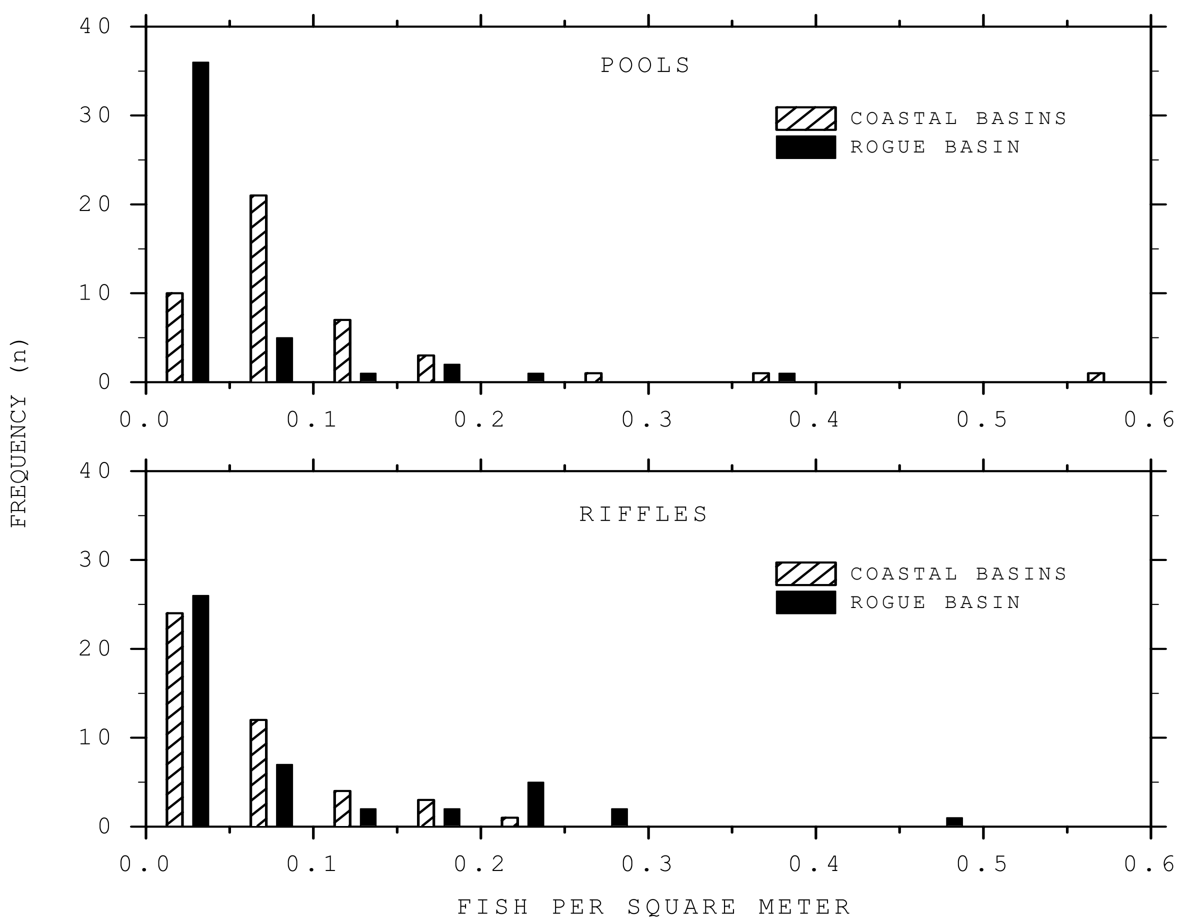

Figure 2. Estimated densities of age ≥ 1+ steelhead in KMP streams, 2000.

Table 3. Summary statistics associated with the estimated densities (fish/m^2) of age 0+ trout resident in streams of the Klamath Mountains Province, 2000.

Basin	Habitat type	N	Median	Quartiles 25%	Quartiles 75%	Mean	SD	P for normality
Rogue	pool	47	0.29	0.06	0.49	0.37	0.447	<0.001
Other	pool	44	0.57	0.35	1.15	0.77	0.621	<0.001
Rogue	riffle	47	0.27	0.09	0.39	0.32	0.317	0.002
Other	riffle	44	0.42	0.26	0.79	0.60	0.531	<0.001

Table 4. Summary statistics for the estimated densities (fish/m^2) of age ≥ 1+ steelhead resident in streams of the Klamath Mountains Province, 2000.

Basin	Habitat type	N	Median	Quartiles 25%	Quartiles 75%	Mean	SD	P for normality
Rogue	pool	47	0.026	0.008	0.098	0.075	0.100	<0.001
Other	pool	44	0.080	0.052	0.108	0.097	0.098	<0.001
Rogue	riffle	47	0.010	0.000	0.043	0.037	0.070	<0.001
Other	riffle	44	0.049	0.011	0.072	0.056	0.056	<0.001

with age 0+ trout, the densities of age ≥ 1+ steelhead exhibited distributions that differed significantly from normal (Table 4).

Fish Distribution (Goal 3)

Age ≥ 1+ steelhead inhabited 42 of 44 (95%) 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 84%-99%. Three sites were excluded from this assessment because only age 0+ trout were present and samplers could not determine whether those fish were juvenile steelhead. A natural barrier blocked adult steelhead from reaching one site randomly selected through EMAP. In addition, an artificial barrier was found downstream of one site (Appendix Table 1).

Age ≥ 1+ steelhead inhabited all of the 43 (100%) EMAP sites judged to be accessible to adult steelhead in coastal basins (Appendix Tables 1 and 2). I excluded one site from the analysis because subyearlings were the only age class of trout in residence. Natural barriers blocked adult steelhead from reaching seven 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.

Thus, the population health goal of at least 80% habitation of rearing sites by juvenile steelhead was attained in 2000.

Production Rates of Fry (Goal 4)

Production rates of subyearling steelhead (fish produced per km of habitat) were estimated in five small streams in the vicinity of Grants Pass (Table 5). All of these streams provide spawning habitat for summer steelhead (Everest 1973).

Traps operated from about 1 April until subyearling salmonids ceased to migrate downstream. Termination of downstream migration ranged between late May and the middle of August (Table 5). Subsequent sampling indicated that subyearling trout inhabited areas that were 1.2 – 5.3 km upstream of the trap sites (Table 5).

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 0 and 1,400 fry per km (Table 6). The rate of trout fry production was lowest in Round Prairie Creek, which was the first stream in which flow became intermittent. 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 5. Description of streams sampled to estimate production rates of subyearling steelhead, 2000.

Creek	Trap location	Trapping period	km inhabited[a]
Quartz	RK 0.0	04/04-07/13	5.284
Limpy	RK 0.5	04/04-08/14	4.078
Dutcher	RK 0.1	03/30-06/16	4.046
Round Prairie	RK 0.2	03/30-05/28	1.154
Cheney	RK 2.6	03/31-07/10	4.749

[a] Stream length inhabited by subyearling steelhead upstream of traps.

Table 6. Estimated production rates of subyearling steelhead, 2000.

	Number of trout fry		Production rates
Creek	Migrants	Residents ± 95% CI	Fish/km ± 95% CI
Quartz	774	4,176 ± 943	937 ± 178
Limpy	691	1,830 ± 512	618 ± 151
Dutcher	27	1,586 ± 512	399 ± 127
Round Prairie	1	1 ± 0	2 ± 0
Cheney	2,753	3,976 ± 1,479	1,417 ± 216

Adult Abundance (Goal 5)

ODFW estimated that 12,934 wild late-run summer steelhead passed the sampling site at Huntley Park in 2000. This estimate represented 129% of the 10,000 fish goal at river entry. In addition, ODFW estimated that 2,489 wild summer steelhead passed the counting station at Gold Ray Dam during 2000. This return represented only 62% of the 4,000 fish goal for this location in the upper portion of the Rogue River.

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 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.

In contrast to summer steelhead, the return of winter steelhead to Gold Ray Dam was relatively good in 2000. ODFW estimated that 5,585 wild fish passed the counting station, which represented 140% of

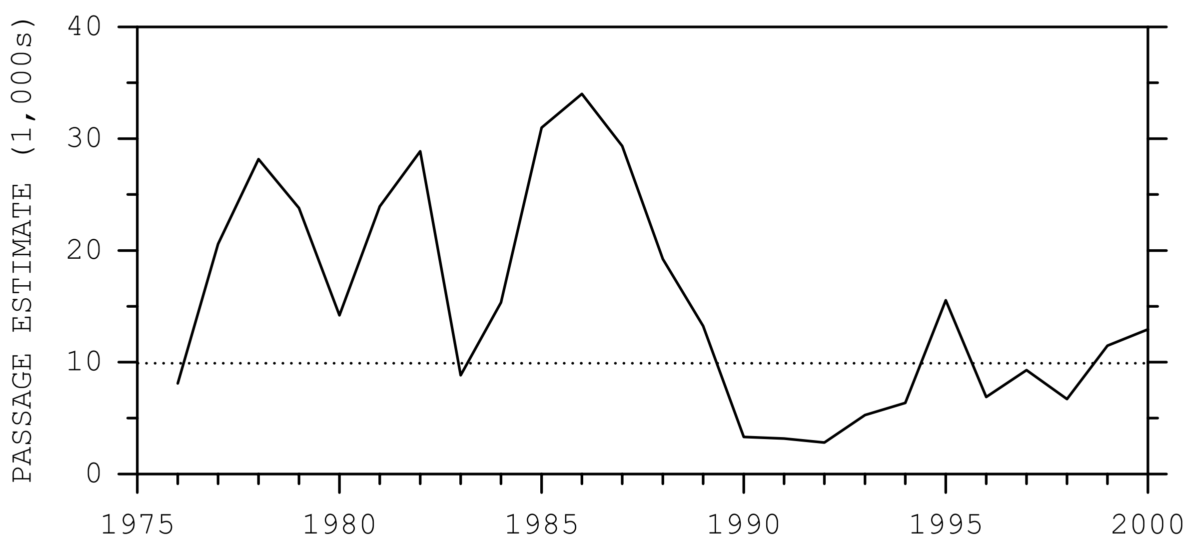

Figure 3. Estimated freshwater return of wild late-run adult summer steelhead in the Rogue River. Dotted line represents the population health goal.

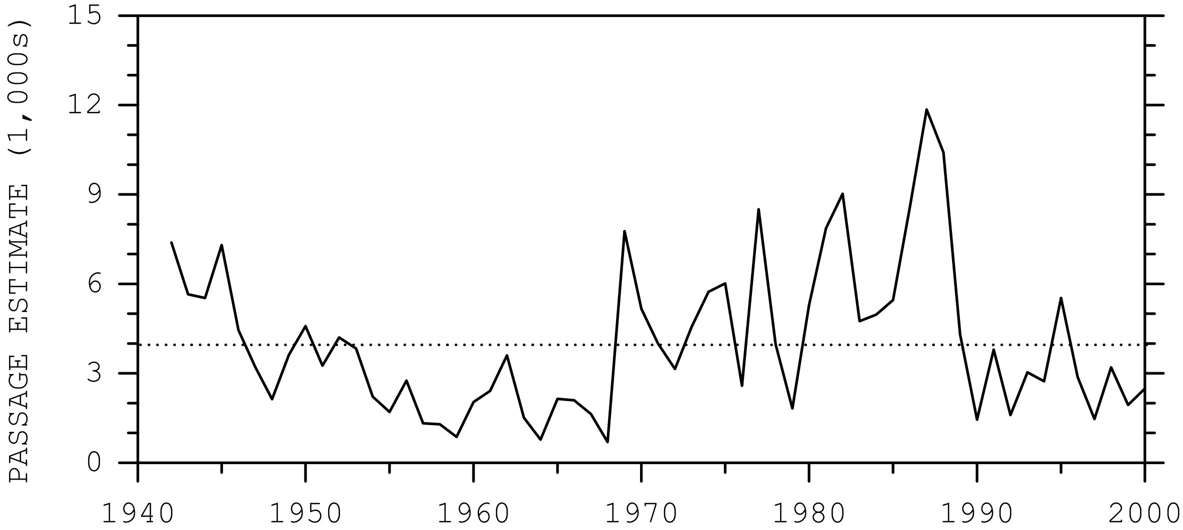

Figure 4. Estimated passage of wild adult summer steelhead at Gold Ray Dam on the Rogue River. Dotted line represents the population health goal.

the 4,000 fish goal for the upper portion of the Rogue River. The 2000 return was lower than the average return of 8,400 fish for the period of record (1943-99). 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).

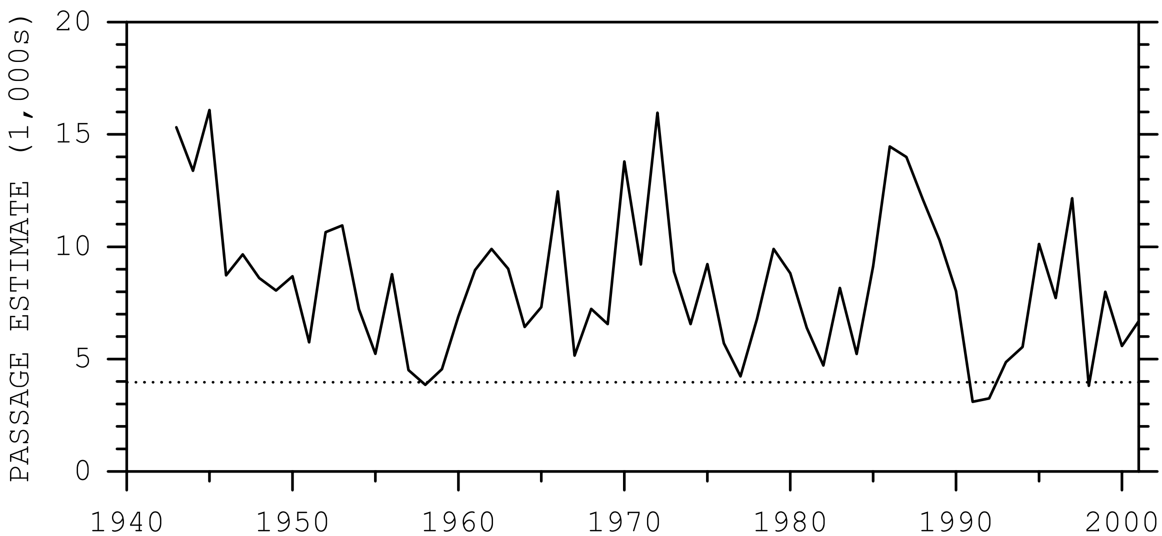

Figure 5. Estimated passage of wild adult winter steelhead at Gold Ray Dam on the Rogue River. Dotted line represents the population health goal.

Life History (Goal 6)

Scale samples were collected from wild adult late-run that returned to the Rogue River in 2000. However, the scales have yet to be interpreted.

Run Composition (Goal 7)

Samplers collected 402 steelhead in the Chetco River, and 632 steelhead in other coastal streams, during the 2000-01 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 33 (8%) of the steelhead caught in the Chetco River and 46 (7%) of the steelhead caught in other coastal streams.

Mature winter steelhead entered freshwater during the entire period of sampling, December through April. Entry appeared to peak during January (Figure 6). However, there was an indication that winter steelhead may enter the Chetco River earlier than winter steelhead in other coastal streams (Figure 6). In contrast, there was no readily apparent difference in the time of freshwater entry between wild and hatchery fish (Figure 6).

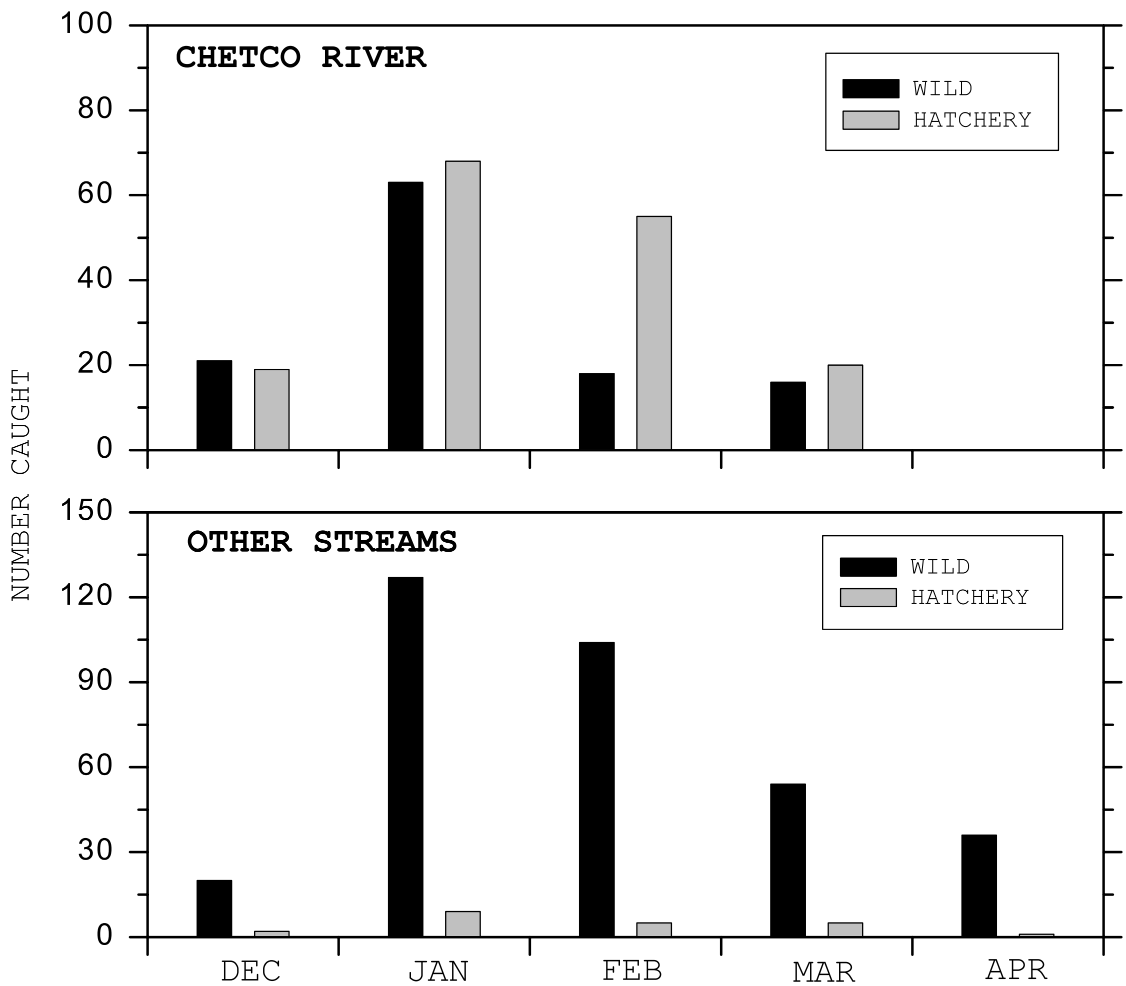

Figure 6. Catch timing of unspawned adult winter steelhead in KMP coastal streams, 2000-01.

Among mature winter steelhead, unspawned and spawned fish (kelts) contributed to the catch. Kelts accounted for 89 of the 369 (24%) of the winter steelhead caught in the Chetco River, and accounted for 223 of the 586 (38%) of the winter steelhead caught in the other coastal streams. The relative abundance of hatchery fish appeared to be greater among kelts as compared to unspawned fish (Table 7). This difference may indicate that the spawning distribution differs between wild and hatchery fish.

Wild fish predominated the returns of winter steelhead, except in the Chetco River. Wild fish accounted for 94% of the unspawned fish caught in coastal streams (Table 7). This finding exceeded the population health goal of at least 90% wild fish. In contrast, hatchery fish composed a significant portion of winter steelhead caught in the Chetco River. In this stream, wild fish accounted for only 42% of the gillnet catches, a finding which was less than the population health goal of at least 50% wild fish (Table 7). However, there is a strong possibility that the sample was biased in favor of hatchery fish. This conclusion was based on the finding that hatchery fish composed a greater portion of the kelts as compared to unspawned fish.

Winter steelhead smolts of hatchery origin are released by ODFW at the mouth of the North Fork of the Chetco River. The North Fork enters the Chetco River at RK 9. In 2000-01, all of the sampling occurred downstream of this location. If mature hatchery fish tended to home to the site where they were released as smolts, then hatchery fish could have, per returning adult, been sampled at higher rates as compared to wild fish. To evaluate this possibility, sampling in 2001-02 will be conducted in areas upstream and downstream of the North Fork of the Chetco. Findings in each sampling area will be used to test the hypothesis that hatchery fish tend to hold in the Chetco River at sites immediately downstream of the North Fork.

Table 7. Composition of adult winter steelhead caught in the Chetco River and in other coastal rivers of the KMP, 2000-2001 return year.

	Unspawned			Spawned (kelts)		
Basin	Wild	Hatchery	% wild (95%CI)	Wild	Hatchery	% wild (95%CI)
Chetco	118	162	42% (36-48%)	20	69	22% (14-33%)
Other	341	22	94% (91-96%)	198	25	89% (84-93%)

Production Rates of Smolts (Goal 8)

Rotary traps were fished in the lower portions of Euchre Creek and Hunter Creek in 1999 and in 2000. The trap in Euchre Creek operated from 16 March through 28 May in 1999 and from 8 March through 26 May in 2000. The trap in Hunter Creek operated during the same period as the trap in Euchre Creek, except that trapping did not begin until 10 March in 2000. In both years, steelhead smolts were captured on the first night that each trap was fished. Thus, the following production estimates of smolts were 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 8). Annual estimates of production rates ranged between 107 and 191 smolts/km in Euchre Creek and ranged between 306 and 309 smolts/km in Hunter Creek. These findings suggest that rearing habitat may be more optimal for steelhead in Hunter Creek as compared to Euchre Creek.

Table 8. Estimated production rates of wild steelhead smolts in two coastal streams of the Klamath Mountains Province, 1999 and 2000. Estimates of steelhead habitat represent areas upstream of traps. No smolts of hatchery origin were captured.

		Steelhead	Smolts produced		Smolts produced/km	
Stream	Year	habitat(km)	Mean	95% CI	Mean	95% CI
Euchre	1999	27.5	2,951	2,610-3,292	107	95-120
Euchre	2000	27.5	5,260	4,342-6,178	191	158-225
Hunter	1999	20.2	6,233	4,700-7,766	309	233-384
Hunter	2000	20.2	6,180	4,696-7,664	306	232-379

ACKNOWLEDGMENTS

Celeste Cole, Forbes Jonasson, Steven Mazur, Amanda Robillard, Isaac Sanders, and Christopher Volpe assisted with the sampling of juvenile trout.

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APPENDIX

Data from sites sampled in 2000-01

Appendix Table 1. Sampling sites where densities of juvenile steelhead were not estimated in 2000.

Stream	EMAP #	UTM-E	UTM-N	Site description
				ROGUE RIVER BASIN
Larson Creek	38	516072	4683778	Artificial barrier present downstream of site
Willow Creek	78	504443	4695309	Unable to obtain access to site
Cheney Creek	98	458396	4686881	Natural barrier present downstream of site
				COASTAL BASINS
Deer Creek	7	405962	4653629	Natural barrier present downstream of site
Panther Creek	15	402155	4671671	Natural barrier present downstream of site
Brush Creek	23	388608	4723185	Natural barrier present downstream of site
Panther Creek	39	396581	4724505	Natural barrier present downstream of site
Meadow Creek	44	401392	4687896	Natural barrier present downstream of site
Brush Creek	63	386645	4723439	Natural barrier present downstream of site
Emily Creek tributary	67	409097	4665692	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, 2000. 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
Chetco River	1	426063	4667826	0.13	0.12	0.064	0.042	0.000	0.000	0.000	0.000
Cedar Creek	3	387739	4709982	0.31	0.26	0.073	0.040	0.100	0.040	0.000	0.000
Eagle Creek	4	403136	4676988	0.33	0.30	0.130	0.072	0.000	0.000	0.000	0.000
Elk River (North Fork)	9	401581	4730319	0.40	0.30	0.051	0.061	0.009	0.000	0.062	0.000
Pistol River (South Fork)	10	395344	4674656	1.50	1.02	0.173	0.036	0.011	0.005	0.000	0.000
Jack Creek	12	403594	4656104	0.78	0.21	0.108	0.000	0.121	0.000	0.000	0.000
Pistol River (North Fork)	14	395742	4684757	1.16	0.72	0.091	0.225	0.000	0.000	0.000	0.000
Henry Creek	17	427334	4670922	0.30	0.25	0.086	0.019	0.000	0.000	0.000	0.000
Myrtle Creek	19	385668	4718901	0.66	0.55	0.137	0.051	0.082	0.056	0.000	0.000
Quail Prairie Creek	20	412341	4673980	0.34	0.19	0.353	0.119	0.031	0.000	0.000	0.000
Mineral Hill Creek	24	405357	4676402	0.54	0.46	0.087	0.051	0.000	0.000	0.000	0.000
Little Chetco River	26	431611	4669102	0.15	0.13	0.066	0.012	0.000	0.000	0.000	0.000
Brush Creek	28	382445	4727174	0.27	0.08	0.167	0.044	0.058	0.010	0.000	0.000
Tincup Creek	29	417277	4686469	0.37	0.22	0.082	0.047	0.007	0.000	0.000	0.000
Wheeler Creek	32	410691	4661008	0.37	0.60	0.012	0.000	0.077	0.000	0.000	0.000
Bald Mountain Creek	33	385591	4729121	1.27	1.55	0.052	0.058	0.000	0.002	0.000	0.000
Crook Creek	34	386308	4682571	0.80	0.41	0.048	0.000	0.096	0.014	0.000	0.000
Winchuck River (East Fork)	37	410642	4657122	0.48	0.53	0.073	0.035	0.003	0.000	0.000	0.000
Thomas Creek	40	388567	4668985	1.25	0.99	0.580	0.116	0.000	0.000	0.000	0.000
Moser Creek	42	402782	4651229	2.43	1.14	0.092	0.000	0.126	0.061	0.000	0.000
Pistol River (South Fork)	45	398167	4675726	0.06	0.13	0.117	0.075	0.000	0.000	0.000	0.000
Crooked Bridge Creek	48	391357	4715478	0.28	0.26	0.000	0.008	0.045	0.000	0.000	0.000
Box Canyon Creek	49	422982	4680740	0.44	0.32	0.074	0.067	0.000	0.000	0.000	0.000
Sankey Creek	52	410654	4651458	0.67	0.38	0.086	0.010	0.081	0.004	0.000	0.000
Sunrise Creek	54	395782	4681869	0.83	0.60	0.038	0.027	0.000	0.000	0.000	0.000
Chetco River	56	425734	4667940	0.13	0.12	0.046	0.042	0.000	0.000	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
Boulder Creek	58	389667	4712394	0.52	0.35	0.111	0.004	0.113	0.025	0.000	0.000
Boulder Creek	59	416833	4676813	0.62	0.54	0.059	0.074	0.007	0.000	0.000	0.000
West Coon Creek	62	412636	4664426	0.82	0.30	0.036	0.000	0.005	0.000	0.000	0.000
Boulder Creek	64	417008	4677699	0.54	0.41	0.052	0.071	0.000	0.009	0.000	0.000
Hunter Creek	69	389750	4691623	2.84	2.82	0.101	0.187	0.000	0.000	0.000	0.000
Red Cedar Creek	74	391599	4730912	1.14	1.01	0.028	0.020	0.000	0.000	0.000	0.000
Bravo Creek	75	397520	4665296	1.47	1.89	0.159	0.169	0.008	0.000	0.000	0.000
Blackberry Creek	79	399518	4729238	0.53	0.85	0.099	0.060	0.007	0.010	0.000	0.000
Emily Creek	80	402284	4663118	1.67	0.91	0.054	0.017	0.003	0.000	0.000	0.000
West Coon Creek	82	413221	4664974	1.20	0.69	0.109	0.016	0.005	0.000	0.000	0.000
Hunter Creek (North Fork)	84	389934	4692842	2.17	1.31	0.254	0.135	0.000	0.000	0.000	0.000
Euchre Creek	88	392288	4718897	0.43	0.43	0.083	0.166	0.004	0.007	0.000	0.000
Quail Prairie Creek	89	408943	4672913	0.59	0.50	0.070	0.060	0.000	0.000	0.000	0.000
Fourth of July Creek	92	413094	4654648	0.71	0.27	0.079	0.005	0.036	0.000	0.000	0.000
Panther Creek	93	394810	4726642	0.60	0.55	0.005	0.134	0.000	0.000	0.000	0.000
Panther Creek	94	405043	4671520	0.44	0.39	0.008	0.000	0.000	0.009	0.000	0.000
Hubbard Creek tributary	99	381483	4733189	0.23	0.06	0.000	0.000	0.393	0.023	0.000	0.000
Wilson Creek	100	402658	4666222	1.26	1.06	0.091	0.053	0.008	0.030	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, 2000. Fish are yearlings of older, unless otherwise noted. Dashed lines indicate that age 0+ trout were not counted during snorkel surveys.

		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
Deer Creek	2	458682	4679440	0.41	0.75	0.008	0.000	0.000	0.000	0.020	0.002
Onion Creek	5	440583	4694561	0.46	0.28	0.030	0.037	0.000	0.000	0.000	0.000
Salt Creek	6	497132	4723401	0.36	0.24	0.000	0.000	0.091	0.023	0.000	0.000
Wards Creek	8	486098	4697431	0.09	0.09	0.010	0.000	0.026	0.000	0.000	0.000
Chicago Creek	11	507697	4729179	0.36	0.30	0.025	0.010	0.021	0.010	0.000	0.000
Louse Creek	13	467138	4706267	0.02	0.03	0.000	0.000	0.000	0.000	0.003	0.000
Berry Creek	16	520813	4724209	0.06	0.01	0.009	0.000	0.000	0.000	0.000	0.000
White Creek	18	460982	4677762	0.28	0.35	0.061	0.000	0.000	0.000	0.658	0.043
Illinois River (West Fork)	21	436401	4650625	0.02	0.01	0.028	0.020	0.000	0.000	0.124	0.029
Thompson Creek	22	483657	4673342	1.20	0.80	0.008	0.000	0.000	0.000	0.000	0.000
Russian Creek	25	444756	4722621	0.52	0.38	0.268	0.066	0.000	0.000	0.000	0.000
Board Shanty Creek	27	475041	4687802	0.30	0.09	0.035	0.000	0.000	0.000	0.000	0.000
Silver Creek (North Fork)	30	430724	4704646	--	0.16	0.051	0.002	0.000	0.000	0.000	0.000
Antelope Creek	31	527602	4685924	0.01	0.02	0.461	0.049	0.053	0.004	0.000	0.000
Taylor Creek	35	449310	4706374	0.27	0.36	0.018	0.031	0.000	0.006	0.365	0.045
Lick Creek	36	527454	4702690	0.44	1.35	0.001	0.000	0.000	0.000	0.000	0.000
Evans Creek	41	500984	4716849	0.17	0.21	0.023	0.028	0.007	0.000	0.000	0.000
Pleasant Creek	43	485716	4711645	0.30	0.24	0.015	0.000	0.000	0.001	0.007	0.000
Reeves Creek	46	446279	4675305	0.00	0.00	0.000	0.000	0.000	0.000	0.000	0.000
Williams Creek (East Fork)	47	478119	4670914	0.32	0.53	0.203	0.121	0.029	0.005	0.027	0.000
Silver Creek (South Fork)	50	427612	4697792	0.05	0.03	0.104	0.012	0.000	0.000	0.000	0.000
Long Branch Creek	51	512468	4717304	0.74	0.83	0.002	0.000	0.000	0.000	0.000	0.000
Evans Creek (West Fork)	53	490987	4724405	0.49	0.56	0.026	0.000	0.013	0.000	0.425	0.007
Twomile Creek	55	411825	4717964	0.55	0.27	0.174	0.056	0.000	0.000	0.000	0.000
Draper Creek	57	451115	4682487	0.04	0.34	0.006	0.000	0.000	0.000	0.169	0.000
Sixmile Creek	60	439835	4684129	0.14	0.18	0.070	0.041	0.000	0.000	0.000	0.000
Little Applegate River	61	515132	4661015	0.15	0.10	0.201	0.215	0.000	0.000	0.000	0.000

Apppendix 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
Jumpoff Joe Creek	65	466163	4708603	0.00	0.06	0.000	0.000	0.000	0.000	0.000	0.000
Antelope Creek	66	526938	4687143	0.06	0.01	0.193	0.179	0.009	0.014	0.000	0.000
Coyote Creek	68	469934	4725797	0.48	0.53	0.057	0.017	0.002	0.000	0.000	0.000
Lobster Creek (South Fork)	70	402957	4717416	0.52	0.49	0.082	0.007	0.004	0.000	0.052	0.003
McNeil Creek	71	528480	4713132	0.28	0.18	0.003	0.000	0.000	0.000	0.076	0.000
Sucker Creek	72	462937	4657321	0.33	0.20	0.070	0.072	0.000	0.005	0.000	0.000
Sam's Creek	73	500657	4703968	2.74	1.45	0.022	0.000	0.000	0.000	0.000	0.000
Eighty Acre Creek	76	540380	4713191	0.01	0.00	0.010	0.005	0.205	0.000	0.000	0.000
Althouse Creek	77	456586	4660577	0.28	0.32	0.011	0.016	0.000	0.000	0.009	0.017
Ashland Creek	81	523856	4672808	0.16	0.23	0.230	0.368	0.003	0.000	0.000	0.000
Grave Creek	83	480899	4721317	0.86	0.39	0.050	0.019	0.000	0.000	0.000	0.000
Galice Creek	85	448353	4710267	0.27	0.33	0.023	0.010	0.000	0.005	0.000	0.000
Josephine Creek	86	441122	4670571	0.60	0.17	0.021	0.000	0.000	0.000	0.000	0.000
Powell Creek	87	475835	4679138	0.68	0.62	0.074	0.022	0.022	0.015	0.000	0.000
East Creek	90	421884	4722508	0.79	0.43	0.222	0.044	0.000	0.000	0.000	0.000
Yale Creek	91	506948	4658892	0.18	0.28	0.240	0.176	0.000	0.019	0.000	0.000
Ramsey Gulch	95	464201	4726158	0.00	0.00	0.253	0.067	0.000	0.000	0.000	0.000
Hawk Creek	96	526739	4738665	0.50	0.29	0.004	0.000	0.008	0.000	1.392	0.448
Williams Creek (West Fork)	97	473249	4671486	0.41	0.33	0.108	0.050	0.102	0.003	0.021	0.000

Appendix Table 4. Daily catches of steelhead with gillnets fished in the lower portion (RK 3-9) of the Chetco River, 2000-01.

	UNSPAWNED						SPAWNED (KELTS)				
	WILD			HATCHERY			WILD		HATCHERY		
Date	Male	Female	Half-pounders	Male	Female	Half-pounders	Male	Female	Male	Female	Total
12/11	4	4	1	4	0	1	0	0	0	0	14
12/13	1	2	0	1	3	2	0	0	0	0	9
12/18	3	3	2	4	2	13	0	0	0	0	27
12/28	1	3	0	1	4	1	0	0	0	0	10
01/03	2	1	0	2	2	1	0	0	0	0	8
01/04	1	3	0	3	2	0	0	0	0	0	9
01/10	6	6	1	11	5	1	0	0	0	0	30
01/16	9	6	1	10	5	4	0	0	0	0	35
01/22	14	15	0	11	17	4	0	0	0	0	61
01/25	8	8	0	9	5	2	0	0	0	0	32
01/30	1	2	0	4	1	2	0	0	0	0	10
02/07	4	4	0	3	2	0	0	0	5	0	18
02/12	2	2	0	7	7	0	1	0	9	1	29
02/15	0	1	0	4	3	0	1	0	0	0	9
02/22	1	2	0	8	10	0	0	1	2	2	26
02/26	1	1	0	7	4	0	0	0	1	0	14
03/05	3	0	0	11	3	1	0	0	5	4	27
03/08	1	1	0	2	2	0	1	0	3	1	11
03/15	0	1	0	0	0	0	0	0	2	2	5
03/22	5	3	0	0	0	0	1	3	6	5	23
03/27	1	0	0	0	0	0	4	0	3	1	9
03/28	0	1	0	2	0	0	0	2	6	6	17
04/02	0	0	0	0	0	0	1	2	2	0	5
04/09	0	0	0	0	0	0	1	0	0	0	1
04/17	0	0	0	0	0	0	1	1	0	0	2
04/23	0	0	0	0	0	0	0	0	3	0	3

Appendix Table 5. Daily catches of steelhead with gillnets fished in the lower portions (RK 0-6) of coastal streams of the KMP, 2000-01.

		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	2	7	4	0	0	6	0	0	0	0	19
Elk River	12/19	2	1	0	0	0	1	0	0	0	0	4
Pistol River	12/20	1	0	5	0	0	3	0	0	0	0	9
Euchre Creek	12/26	0	0	0	0	0	0	0	0	0	0	0
Winchuck River	12/26	1	6	0	1	1	0	0	0	0	0	9
Pistol River	01/04	3	5	4	2	0	10	0	0	0	0	24
Hunter Creek	01/08	9	11	1	0	0	0	0	0	0	0	20
Elk River	01/09	7	6	1	0	0	1	0	0	0	0	15
Hunter Creek	01/17	8	15	3	1	1	1	0	0	0	0	29
Elk River	01/18	4	2	0	0	0	1	0	0	0	0	7
Winchuck River	01/23	21	18	0	2	3	0	0	0	0	0	44
Pistol River	01/29	5	4	0	0	0	2	0	0	0	0	11
Elk River	01/31	6	3	0	0	0	0	0	1	0	1	11
Pistol River	02/06	2	8	2	0	0	0	0	0	0	0	12
Elk River	02/06	3	4	0	0	0	0	2	2	0	0	11
Pistol River	02/14	14	7	1	0	2	0	0	0	1	0	25
Hunter Creek	02/20	14	28	1	0	1	0	0	1	0	1	46
Elk River	02/21	8	6	0	1	1	0	3	7	0	1	27
Hunter Creek	02/27	7	3	0	0	0	0	1	1	0	2	14
Pistol River	03/01	5	5	0	1	0	0	0	0	0	0	11
Winchuck River	03/06	1	3	0	1	0	0	0	1	2	0	8
Pistol River	03/13	6	4	0	0	1	0	0	0	0	0	11
Elk River	03/14	4	7	0	0	0	0	7	22	2	2	44
Pistol River	03/20	0	6	0	0	1	0	0	2	1	0	10
Winchuck River	03/21	5	1	0	1	0	0	3	5	1	2	18
Euchre Creek	03/29	4	3	0	0	0	0	2	1	0	0	10
Elk River	04/03	7	6	0	0	0	0	13	18	0	0	44
Pistol River	04/04	2	2	0	0	1	0	2	10	0	0	17
Winchuck River	04/09	2	8	0	0	0	0	15	17	6	2	50
Elk River	04/12	0	3	0	0	0	0	5	20	0	0	28
Winchuck River	04/17	0	0	0	0	0	0	10	0	0	0	10
Hunter Creek	04/24	2	1	0	0	0	0	7	10	0	0	20
Pistol River	04/24	1	2	0	0	0	0	0	10	1	0	14