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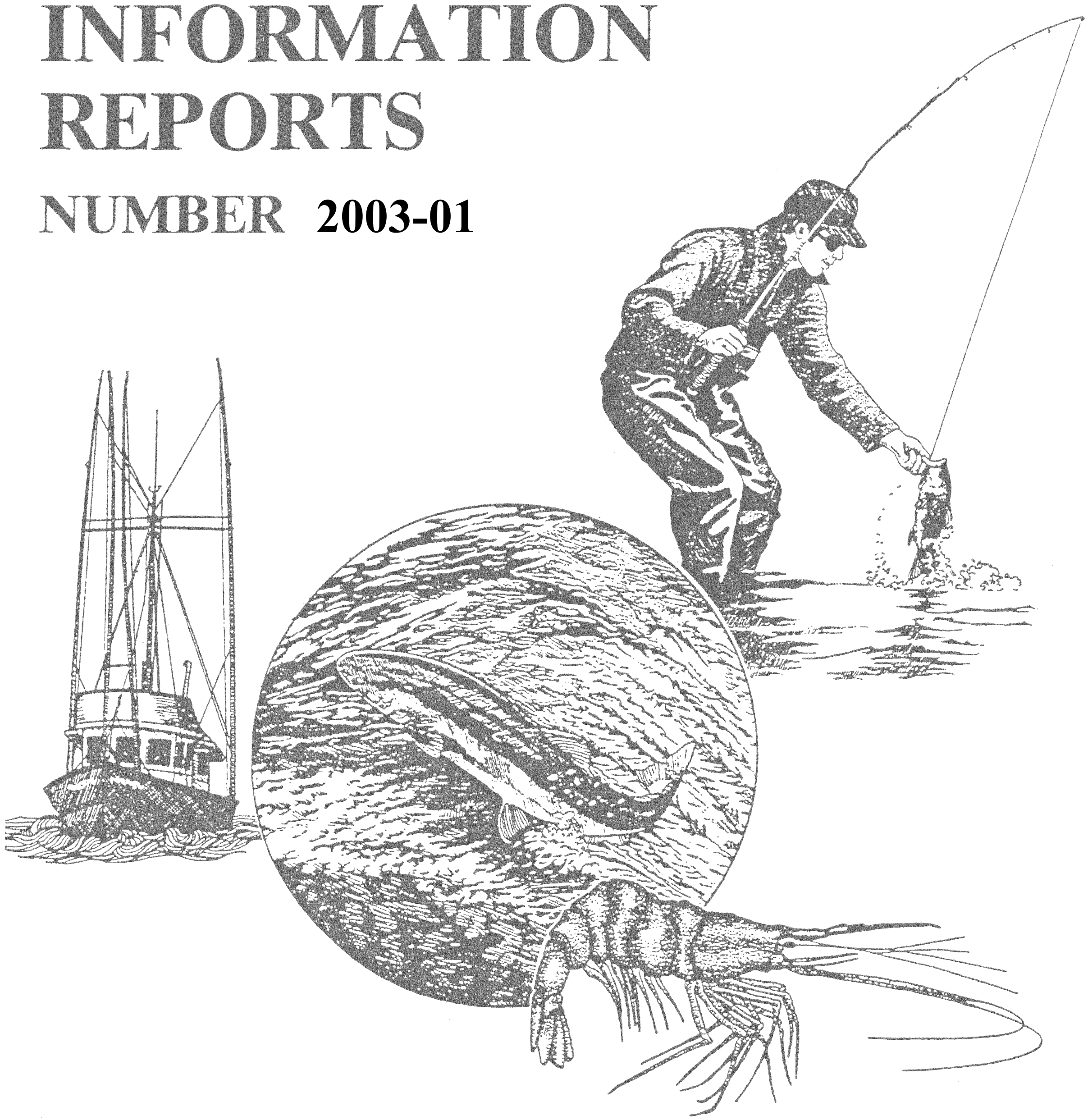

FISH DIVISION

Oregon Department of Fish and Wildlife

Assessment of the Status of Nestucca and Alsea Winter Steelhead, 2002

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ABSTRACT

We used a random probability design to estimate spawner abundance of winter steelhead (*Oncorhrynchus mykiss*) in the Nestucca and Alsea Basins during the 2002 return year. Redds were cumulatively counted in randomly selected stream reaches over the course of the spawning season as our metric of spawner abundance. We used a relationship between spawner abundance and redd counts obtained at calibration sites along the Oregon Coast to convert redd counts to estimates of spawner abundance. Using these procedures, we estimated that in 2002, 11,500 and 4,200 adult winter steelhead naturally spawned in the Nestucca Basin and Alsea Basins, respectively. Based on the timing of spawning of returning hatchery fish in each basin, as many as 10% of the natural spawners in the Nestucca Basin and as many as 50% of the Alsea Basin natural spawners could have originated from hatchery smolt releases. However, observations of the occurrence of fin-marks on natural spawners indicated that the actual proportions of natural spawners originating from hatcheries were probably lower. Our results suggest that the productivity of winter steelhead Nestucca Basin is higher than that in the Alsea Basin. Despite these differences in productivity, wild broodstock collection programs in either basin had insignificant impacts on natural seeding.

INTRODUCTION

This report presents results of a status assessment of winter steelhead (*Oncorhrynchus mykiss*) in the Alsea and Nestucca basins for 2002. This assessment is in response to concerns about the potential effects of wild broodstock development in these basins on the natural populations of winter steelhead. Starting in 2001, programs were initiated in each basin to develop hatchery smolt programs using wild parents. Studies were initiated in February 2001 in the Nestucca Basin (Susac and Jacobs 2002). In 2002, studies in the Nestucca Basin were continued and studies were initiated in the Alsea Basin. The goal of these studies was to characterize the condition of these runs. Methods employed followed those developed by the Coastal Salmonid Inventory Project of the Oregon Department of Fish and Wildlife. Information was obtained on the spawn timing, distribution and abundance of the adult spawning run, and the contribution of hatchery origin fish to the natural spawning population. This report documents findings during the 2001-2002 spawning year (2002 brood year).

STUDY AREA

The Nestucca and Alsea Basins drain the west slope of the coast range of Oregon (Figure 1). The Nestucca Basin is located on the North Oregon coast near the towns of Pacific City and Cloverdale. The Nestucca watershed has an area of 180 square miles and about 350 linear miles of streams. The substrate of the Nestucca Watershed originates form volcanic and sedimentary deposits. The Alsea Basin is located along the central Oregon coast near the town of Waldport. The Alsea River drains a watershed of an area of 344 square miles and about 515 linear miles of streams. The geologic composition of the Alsea Watershed is predominantly marine sediment. Both watersheds contain both public and privately owned land, with landscapes that transition from heavily forested hillsides to open pastures along the lowlands and banks of mainstems and larger order tributaries. Flow regimes in these basins have dramatic intra-annual variation, with peak winter flows generally exceeding summer low flows by two orders of magnitude.

The Nestucca and Alsea Basins are noted for their winter steelhead fisheries. Both basins support intense fisheries for returning adults during the period of November through March. Both fisheries are supported to a large degree from hatchery programs. To date, these programs rely on broodstocks that have been cultured at hatchery facilities in each basin for over 30 years.

METHODS

We used a stratified random sampling design to estimate the spatial distribution and abundance of winter steelhead redds in the Alsea and Nestucca Basins. Sampling strata consisted of mainstem stream reaches and tributary reaches. The tributary stratum consisted of the extent of coho spawning in the basin as developed through the methods described in Jacobs and Nickelson (1998). The mainstem stratum consisted of the remainder of each watershed downstream of coho spawning habitat but upstream from the head of tidal influence. The resulting stream network coverage that was used for selecting survey sites was based on 1:100,000 digital maps that were enhanced to include known spawning streams not included in the 1:100,000 stream layer. Survey site selection followed the procedure described in Stevens (2002), with the sampling rate set to achieve a target precision of the overall population estimate within approximately $\pm$ 30%.

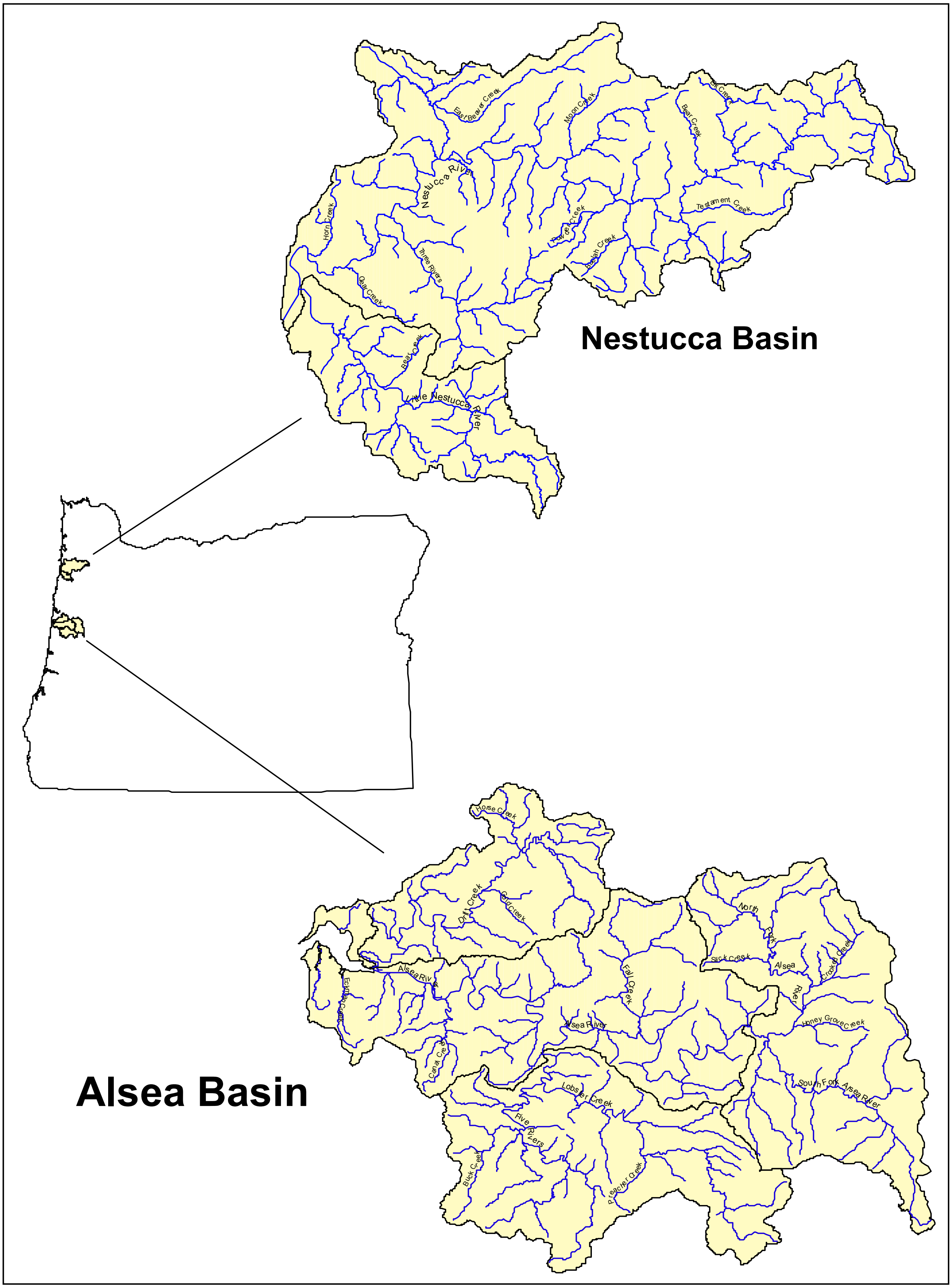

Figure 1. Map of the Nestucca and Alsea Basins.

We used cumulative redd counts as our metric of spawner abundance. Survey sites were repeatedly walked or floated throughout the spawning season to count redds. Individual redds were marked to avoid being recounted during subsequent surveys. Methods of redd identification are described in Susac and Jacobs (1998). In addition to counting redds, surveyors also counted live adults. When possible, counts of live adults were recorded as adipose fin-clipped or un-clipped. Fin-clip ratios were used to estimate the presence of hatchery fish among natural spawners. All winter steelhead released from coastal hatcheries receive an adipose fin-clip.

RESULTS

Spawning Timing

Surveys were initiated in the Nestucca Basin during the first week of January and continued through the end of May. Steelhead spawning activity was observed throughout this four-month period and peaked in mid April (Figure 2). Figure 2 also shows the cumulative percent of steelhead redds observed at weekly intervals. Half of the spawning activity occurred prior to the first week of April and 85% of spawning was complete by the end of April.

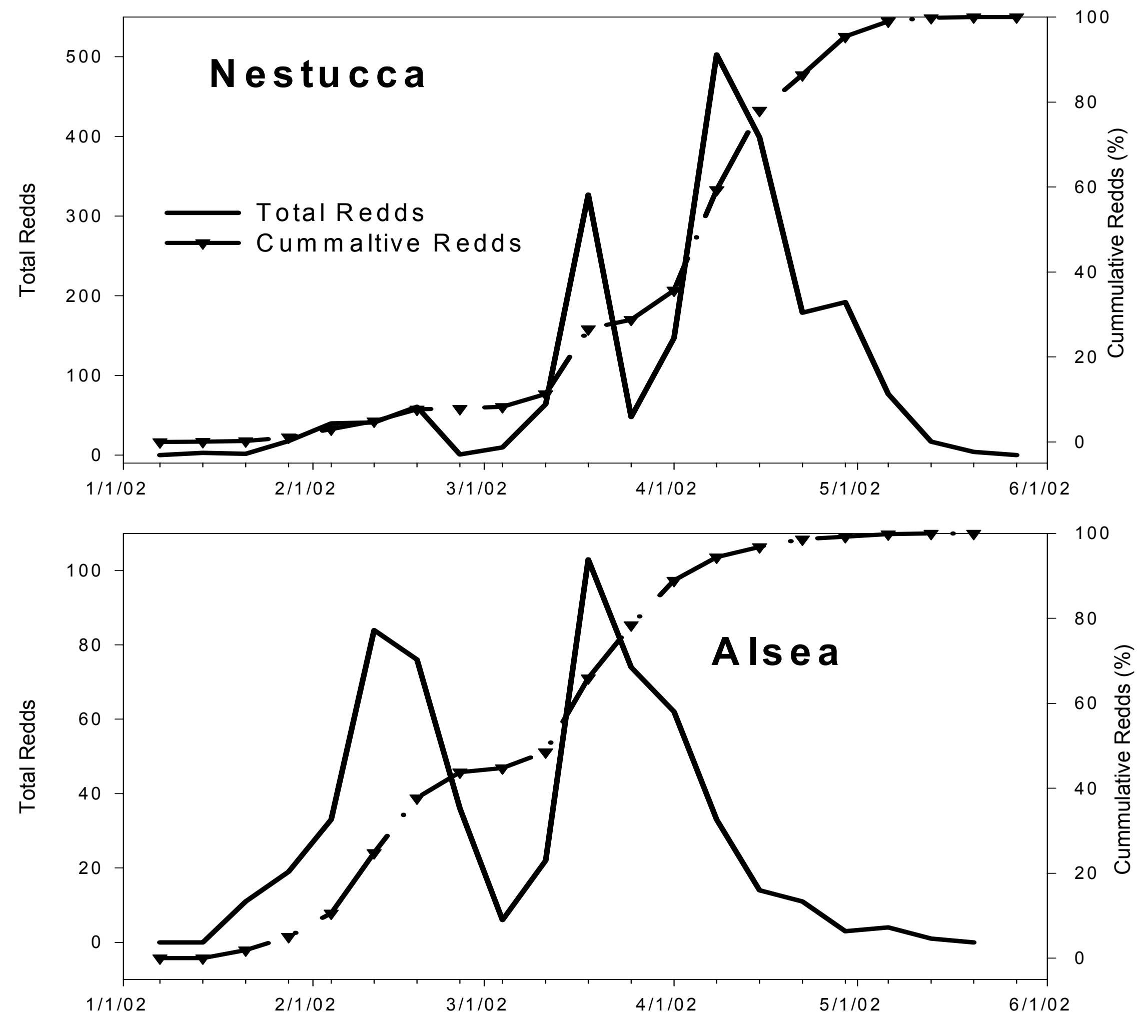

Figure 2. Number and cumulative frequency of new winter steelhead redds observed each week on random spawning surveys in the Nestucca and Alsea River Basins, 2002.

Surveys were initiated in the Alsea Basin during the first week of January and continued through the end of May. Steelhead spawning activity was observed from the week ending January 21 through the last week in April. Two distinct peaks in spawning activity were observed. The first peak occurred during mid-February and the second was in mid-March. Half of the spawning activity occurred prior to the second week of March and 85% of spawning was complete by the first week of April.

Detection of Hatchery Strays

Surveyors observed 597 live adult steelhead during spawning surveys in the Nestucca Basin in 2002. Of these fish, 151 were seen clearly enough to detect the presence or absence of adipose fin-clips. Eight fin-clipped fish (5.0%) were observed. A total of 20 dead steelhead were collected on the spawning grounds. Only one (5.0%) fin-marked adult was found. The rate was similar to the 4.0% observed in 2001 (Susac and Jacobs 2002). These results indicate that most of natural spawning of winter steelhead in the Nestucca Basin is from wild origin adults.

The conclusion that most natural spawners in the Nestucca Basin in 2002 are wild fish is further supported by comparing data obtained from hatchery returns and spawning timing to the timing of redd observations. In 2001-02, returning adult female winter steehead were captured at Cedar Creek Hatchery's collection facility from late November to the first week of March (Figure 3). Returns peaked in early January, with over 90% of the females returning by the first week of February. Although, at this facility, fish are not spawned throughout the run, the close correspondence between capture and spawn timing (*see* Figure 3) indicates that returning females are sexually mature and that capture timing generally reflects spawn timing. Given this, it appears that most spawning of hatchery origin winter steelhead is completed by early February. In contrast, in natural spawning areas only about 10% of the redds were observed by early February. Thus, it appears that there are few unspawned hatchery fish available during the time period when most natural spawning of Nestucca winter steelhead occurs.

Surveyors observed 238 live adult steelhead during spawning surveys in the Alsea Basin in 2002. Of these fish, 55 were seen clearly enough to detect the presence or absence of adipose fin-clips. Four fin-clipped fish (7.3%) were observed. A total of 17 dead steelhead were collected on the spawning grounds. Ten (58.8%) fin-marked adult were found. Nine of the fin-clipped adults were found in the lowest survey segment on Mill Creek that ends at the mouth of Beaty Creek. These carcasses probably originated from Alsea hatchery steelhead carcasses. The carcasses were placed in the lower section of Beaty Creek as part of an environmental enrichment program. Seventy-three hatchery fin-marked carcasses were placed on 12/23/01 and 64 were placed on 2/2/01 (Robert Buckman, Oregon Department of Fish and Wildlife Mid Coast District Biologist, personal communication on 4/11/03). This leaves a total of one non-placed fin-marked carcass and seven unmarked carcasses for a stray rate 12.5% compared with the aforementioned 7.3% for the live observations. These ratios are not significantly different than is expected from random chance (P=0.520).

Unlike in the Nestucca Basin, there was considerable overlap between the spawning timing of female steelhead returning to Alsea hatchery and the period when redds were observed in the Alsea Basin. Female steelhead returned to Alsea Hatchery during December through mid-March (Figure 3). Spawning took place throughout all but the tail ends of this period, indicating that females entered the hatchery when they were close to sexual maturity. Given this relationship, it is likely that the vast majority of hatchery-origin female steelhead would have spawned y the end of February in 2002. Examining the lower panel of Figure 2 shows that about half of the redds were observed prior to the end of February and therefore were constructed during the time when hatchery females were spawning. This overlap between hatchery spawn timing and redd observations indicates that about half of the natural spawning population of Alsea winter steelhead in 2002 had the potential of being influenced by stray hatchery fish, but that the latter half of the natural spawning population was composed primarily of wild fish.

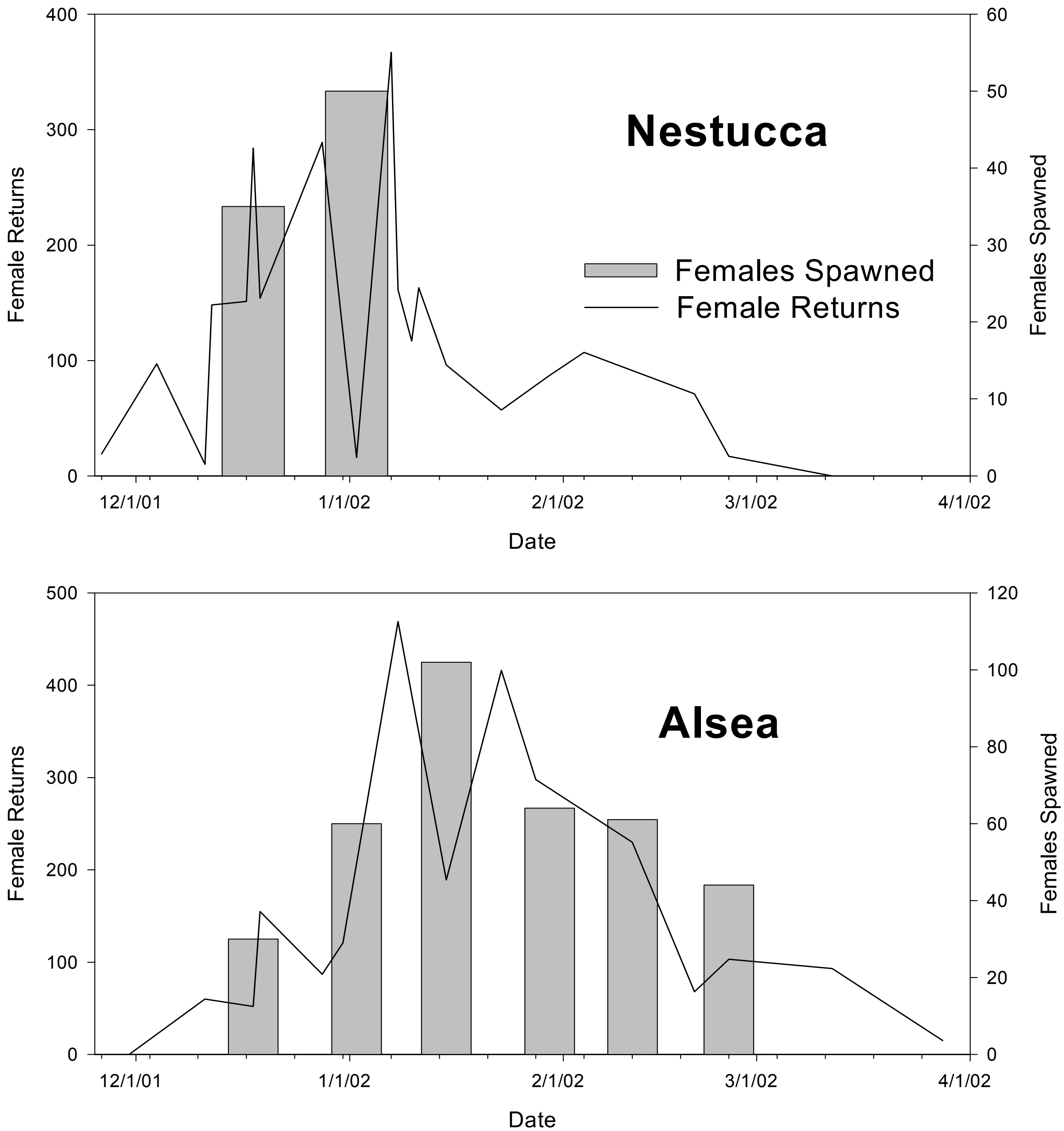

Figure 3. Timing of returns and spawning of female hatchery-origin winter steelhead at Alsea and Cedar Creek (Nestucca Basin) Hatcheries, 2001-02.

Spawning Distribution

Spawning was well distributed throughout the Nestucca Basin. Redds were observed at 38 of the 40 sites that were surveyed (Figure 4). Of the sites that contained redds, densities ranged from 3 to 342 redds per mile. Redd densities exceeded 20 redds per mile in 29 of the sites surveyed. Redds were observed in all of the mainstem sites that were surveyed. In the mainstem Nestucca River, redds were observed downstream to the mouth of Three Rivers. As with the 2001 surveys, the highest redd densities generally occurred in the upper mainstem areas. Among the tributaries, highest redd densities were observed in East Beaver and Elk Creeks.

Spawning was also distributed throughout the Alsea basin, however a higher portion of surveys contained few or no redds at all. Redds were observed in 17 of the 23 tributary sites and 11 of the 22 large water sites (Figure 5). Of the tributary sites that contained redds, density ranged from 2 to 38 redds per mile and averaged 13 redds per mile. For the large water surveys, densities raged from 0.7 to 64 redds per mile and averaged 8 redds per mile. Redd densities exceeded 10 redds per mile in 16 of the 45 sites surveyed. Highest redd densities occurred in Drift Creek Subbasin.

Redd Abundance

Overall, we conducted 40 surveys to estimate redd abundance in the Nestucca River Basin (Table 1). This sample size equated to an overall sampling rate of 20% of the sampling frame. Summary statistics for individual survey sites are listed in **Appendix Table A-1**. We estimated a total of 10,723 winter steelhead redds. The 95% confidence interval was within ± 20% and met our target level for the precision for the estimate. Redd abundance was higher in the tributary stratum than in the mainstem stratum.

In the Alsea Basin, we conducted 45 surveys to estimate redd abundance (Table 1). We sampled roughly 10% of the tributary spawning habitat and 25% of the mainstem or large water habitat. Summary statistics for individual survey sites are listed in **Appendix Table A-2**. We estimated a total of 3,058 winter steelhead redds for the Alsea River Basin in 2002. The 95% confidence interval of ± 28% met our target level for precision. The vast majority of redds occurred in the tributary stratum.

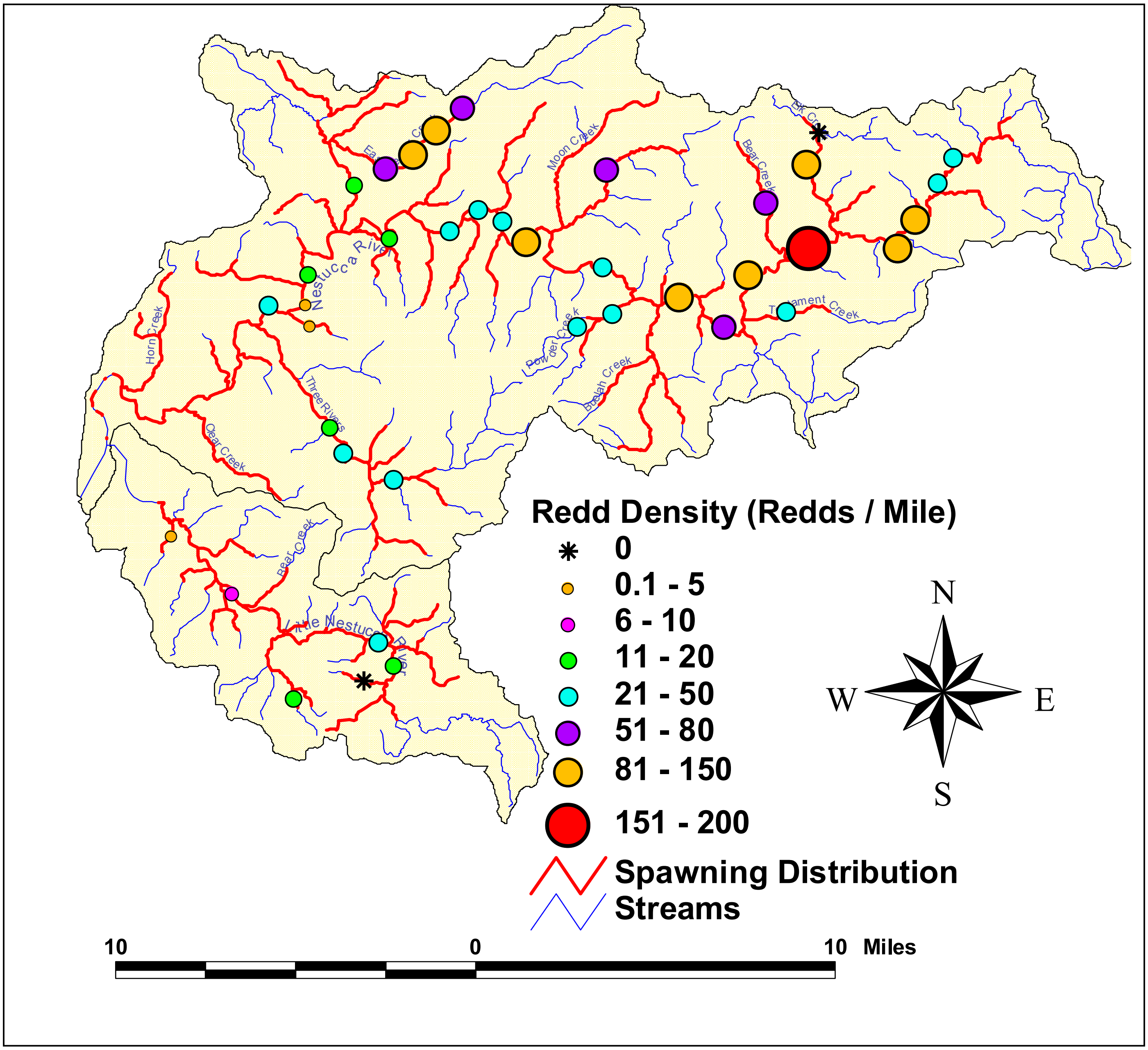

Figure 4. Density of winter steelhead redds observed at randomly selected survey sites in the Nestucca Basin, 2002.

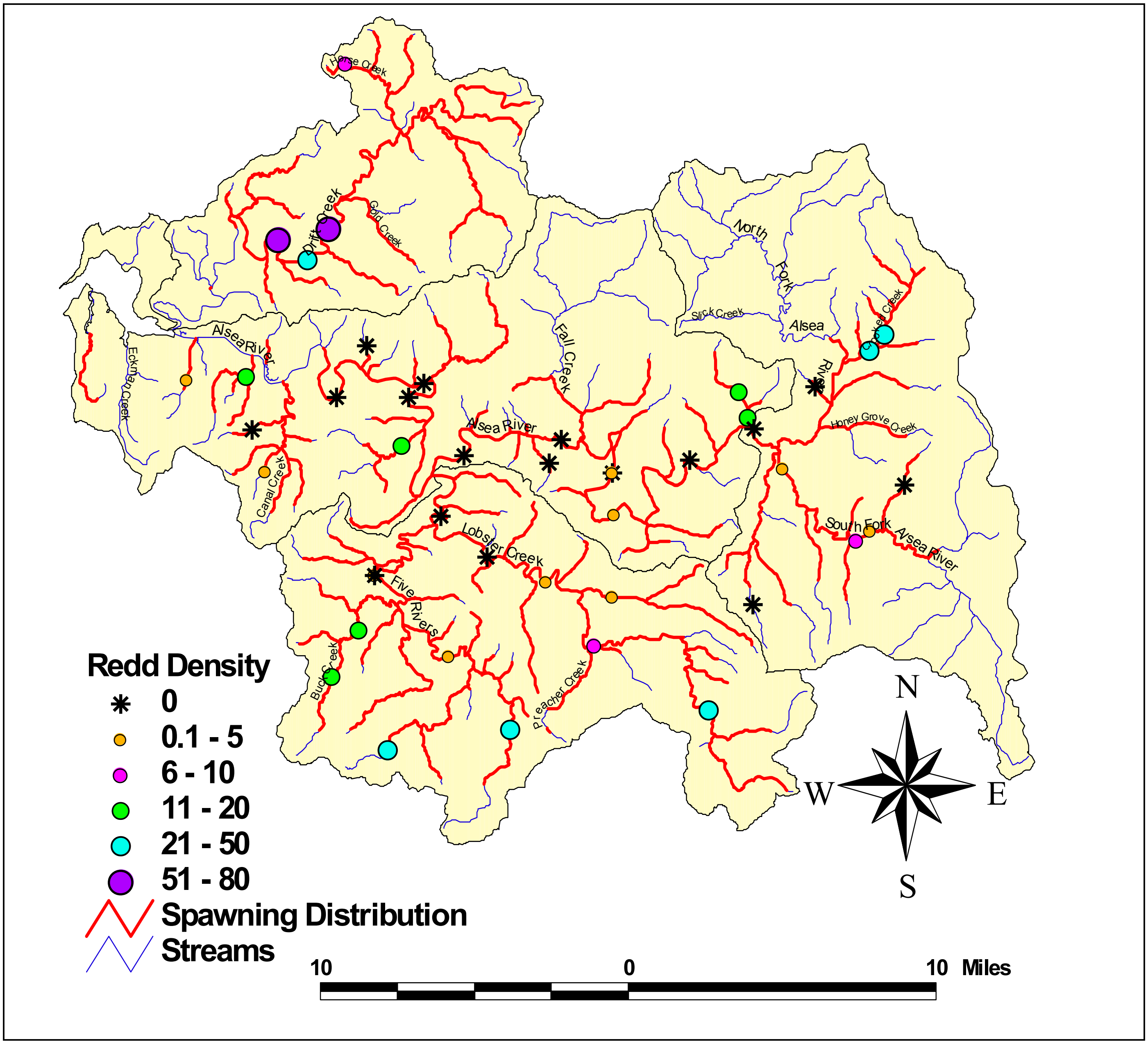

Figure 5. Density of winter steelhead redds observed at randomly selected survey sites in the Alsea Basin, 2002.

Table 1. Estimates of winter steelhead redd abundance in the Nestucca and Alsea River Basins, 2002. Estimates are derived from counts on randomly selected spawning surveys.

		Survey Effort		Redds	
Stratum	Spawning Miles	N	Miles	Estimate	95% Confidence Interval
Nestucca Basin					
Tributaries	163	19	19.8	7,994	1,860
Mainstem	47	21	22.2	2,729	959
Total	210	40	42.0	10,723	2,093
Alsea Basin					
Tributaries	239	23	21.9	3,250	1,141
Mainstem	85	22	23.3	666	321
Total	324	45	45.2	3,917	1,185

DISCUSSION

Redd counts can be used to approximate the size of the spawning run in the Nestucca and Alsea Basins. The accuracy of these estimates is dependent on the suitability of applying redd-to-adult relationships observed at calibration sites in other coastal basins to the redd counts in the Nestucca and Alsea Basins. The accuracy of these run-size estimates is also dependent on the reliability of using redd counts as a measure of spawning escapement. We have been evaluating the relationship between redd counts and winter steelhead spawner abundance over the last five years and have found a significant correlation (Jacobs et al. 2002). The relationship between adult abundance and redd counts (Figure 6) is strong (R^2=0.97, P< 0.001), suggesting that redd counts are a good indicator of run-size over a range of runs sizes from 35 to 2,131 fish.

Applying the relationship displayed in Figure 6 to our estimates of redd abundance yields resulting estimates of 11,500 and 4,200 naturally spawning steelhead in the Nestucca and Alsea Basins for 2002, respectively. Removing the portions of these runs that spawn during the same period when hatchery fish are being spawned can be used to make a conservative estimate of the portion of these populations that are derived from natural production. As stated on page 6, roughly 90% and 50% of the redds occurred after the completion of spawning by hatchery fish in the Nestucca and Alsea Basins, respectively. Applying these proportions yields 10,400 natural adult steelhead spawners in the Nestucca Basin and 2,100 in the Alsea Basin. These estimates of natural production assume that all redds observed during the period when hatchery fish spawn were constructed by hatchery-produced females. However, observations of fin-marks on live spawners near redds indicate that naturally produced fish also spawn during this time period. Thus, the true estimate of natural produced spawners for each basin probably lies somewhere between the estimates of total abundance and the adjusted values.

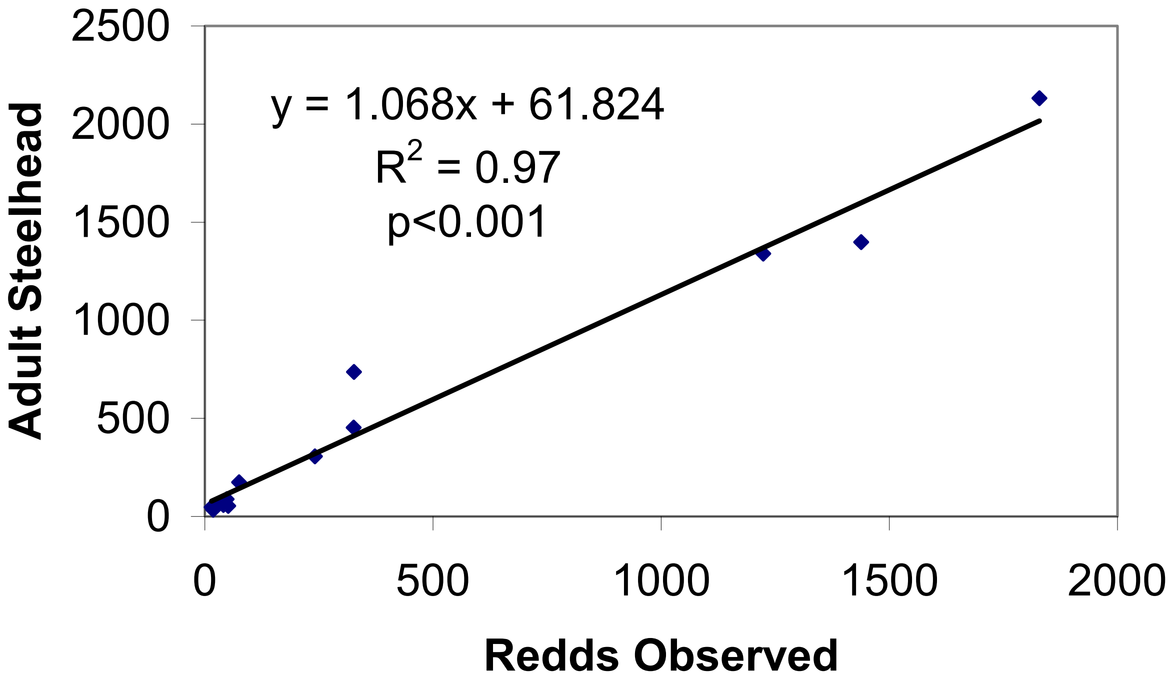

Figure 6. Relationships between adult winter steelhead abundance and redd counts above Oregon coastal calibration sites in 1998, 1999, 2000, 2001 and 2002.

Employing the same procedure described above to the number of redds estimated in the Nestucca Basin in 2001 (Susac and Jacobs 2002) yields a population estimate of 8,000 adult spawners. Like 2002, we felt that few hatchery fish contributed to the magnitude of this estimate because of the late timing that redds were observed and because few fin marked spawners were observed.

Results from our sampling in 2002 indicate that the Nestucca Basin was more productive than the Alsea Basin. Redd densities in the Nestucca Basin averaged over four times higher than those in the Alsea Basin. This comparison is based on the estimated number of total redds in each basin. This disparity in spawner density between the two river systems would even be greater if redd estimates were adjusted to remove hatchery-origin spawners. Possible reasons for the higher productivity of the Nestucca Basin may include better freshwater rearing habitat or better near-shore marine survival.

Wild broodstock collection records indicate that in 2002, 77 wild adult steelhead were captured to use as broodstock in the Nestucca Basin and that 42 wild adult steelhead were used for broodstock in the Alsea Basin. Relative to our conservative estimates of wild spawner abundance in each basin, broodstock collections comprised less than 3% of each population. At this rate, these programs had insignificant impacts on natural seeding.

Care must be used in interpreting population status from a limited time series of data. Little data exist on long-term variation in run-size for Oregon Coastal winter steelhead, however long-term data are available from counts at Willamette Falls and at Winchester Dam on the North Umpqua River. Figure 7 shows the counts at these sites expressed as proportions of the long-term (1950-2001) average. In both river basins, returns in 2002 were well above average. If the underlying natural factors influencing the overall abundance of Nestucca and Alsea River natural winter steelhead are similar to those in the Willamette and North Umpqua Rivers, then returns in 2002 should be viewed as above average relative to long-term abundances. Given the high degree of interannual variability that is present in these populations, status would be best determined over at least one brood cycle (4-5 years).

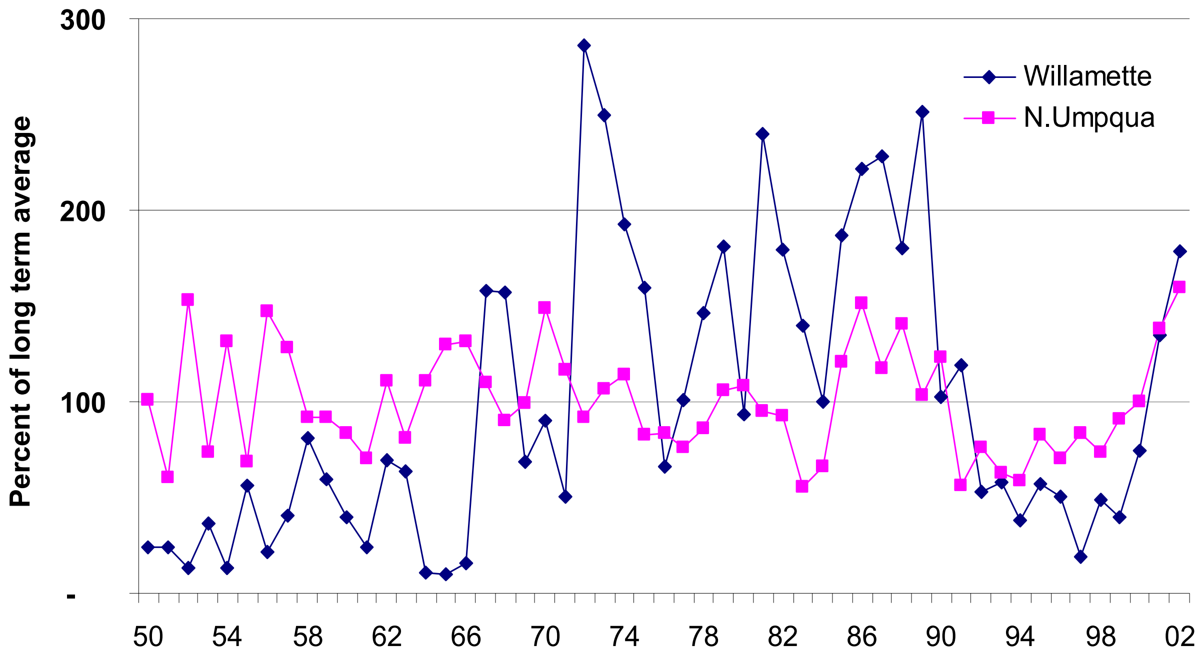

Figure 7. Annual passage counts of winter steelhead at Willamette Falls, Willamette River and Winchester Dam, North Umpqua River expressed as proportion of long-term average, 1950-2002.

ACKNOWLEDGEMENTS

We would like to thank field biologists Jeff Johnson and Dave Stewart who conducted the spawning surveys in the Nestucca Basin, and Eric Brown and Dave Herring for conducting the spawning surveys in the Alsea Basin. This report would not be possible without their diligence and hard work. Tom Nickelson provided expert administrative and editorial assistance.

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Appendix Table A-1. Survey statistics of 2002 winter steelhead spawning ground surveys conducted in the Nestucca Basin.

Basin, Subbasin, Survey	Seg-ment	Lower boundary	Upper boundary	No of Surveys	Times surveyed	Miles surveyed	Live Counts Total	Marked	Not marked	Unknown	Redds per mile
Nestucca River				**40**		**42.0**	**597**	**8**	**151**	**438**	**50.9**
Mainstem and Bay				**26**		**28.0**	**432**	**6**	**118**	**308**	**58.2**
Nestucca R	1	Three Rivers	George Cr		17	1.67	16	0	2	14	28.1
George Cr	1	Mouth	Headwaters		16	0.88	11	1	0	10	4.5
Nestucca R	1	George Cr	Farmer Cr		17	1.24	3	0	1	2	4.0
Nestucca R	1	Saling Cr	West Cr		17	1.89	9	0	4	5	11.1
Nestucca R	2	Saling Cr	West Cr		17	0.86	12	1	4	7	20.9
Nestucca R	3	Foland Cr	Wolfe Cr		13	1.03	9	0	0	9	16.5
Nestucca R	1	Tony Cr	Boulder Cr		14	1.30	4	0	1	3	26.9
Nestucca R	1	Boulder Cr	Bays Cr		14	1.35	14	0	0	14	34.0
Nestucca R	1	Bays Cr	Alder Cr		14	0.90	10	0	0	10	36.7
Nestucca R	1	Alder Cr	Moon Cr		14	1.00	24	0	2	22	139.0
East Cr	2	Mouth	Headwaters		17	1.00	42	0	10	32	75.0
Nestucca R	1	Limestone Cr	Morris Cr		14	1.00	14	0	3	11	47.0
Powder Cr	1	Mouth	Left Branch Powder Cr		18	1.10	16	0	1	15	47.3
Powder Cr	1	Left Branch Powder Cr	Dahl Fk Powder Cr		17	0.92	4	1	1	2	26.1
Nestucca R	1	Clarence Cr	Slick Rock Cr		13	1.20	17	0	0	17	85.8
Nestucca R	1	Mina Cr	Bible Cr		13	1.00	12	0	3	9	79.0
Testament Cr	1	Mouth	Headwaters		17	1.02	12	0	3	9	50.0
Nestucca R	3	Testament Cr	Bear Cr		14	1.24	12	0	3	9	101.3
Bear Cr	1	Mouth	Headwaters		18	1.42	28	0	13	15	62.9
Nestucca R	2	Bear Cr	Elk Cr		15	1.00	41	0	19	22	171.0
Elk Cr	2	Elk Cr, Trib B	Tucca Cr		17	1.30	35	1	14	20	87.7
Tucca Cr	1	Mouth	Headwaters		4	0.17	0	0	0	0	0.0
Nestucca R	2	Elk Cr	Fan Cr		16	1.00	22	1	10	11	148.0
Nestucca R	3	Elk Cr	Fan Cr		16	1.00	35	1	13	21	111.0
Nestucca R	3	Bald Mtn Cr	Ginger Cr		16	0.85	17	0	6	11	49.7
Nestucca R	4	Bald Mtn Cr	Ginger Cr		16	0.71	13	0	5	8	49.6
Three Rivers				**3**		**3.6**	**17**	**0**	**0**	**17**	**30.7**
Three Rivers	2	Cedar Cr	Pollard Cr		12	1.14	1	0	0	1	13.2
Three Rivers	3	Cedar Cr	Pollard Cr		13	1.14	7	0	0	7	32.6
Three Rivers	1	Alder Cr	Crazy Cr		17	1.34	9	0	0	9	46.3
Beaver Creek				**5**		**4.6**	**101**	**1**	**32**	**68**	**73.5**
Beaver Cr	1	Mouth	E Beaver Cr		17	0.86	3	0	1	2	17.4
E Beaver Cr	2	Wildcat Cr	Headwaters		18	1.06	32	0	9	23	61.3
E Beaver Cr	6	Wildcat Cr	Headwaters		19	0.81	22	0	9	13	108.2
E Beaver Cr	7	Wildcat Cr	Headwaters		19	0.87	31	1	8	22	116.4
E Beaver Cr	9	Wildcat Cr	Headwaters		17	0.95	13	0	5	8	64.0
Little Nestucca				**6**		**5.8**	**47**	**1**	**1**	**45**	**10.4**
Bowers Cr	1	Mouth	Headwaters		19	1.14	1	1	0	0	2.6
Little Nestucca	1	Austin Cr	Bear Cr		16	1.24	36	0	0	36	6.4
Little Nestucca R, S Fk	1	Kautz Cr	Headwaters		19	0.52	5	0	0	5	15.3
Little Nestucca	1	Cedar Cr	Louie Cr		18	0.76	4	0	1	3	23.7
Little Nestucca	1	Sourgrass Cr	Stillwell Cr		18	1.40	1	0	0	1	14.3
Stillwell Cr	2	Mouth	Headwaters		17	0.71	0	0	0	0	0.0

Appendix Table A-2. Survey statistics of 2002 winter steelhead spawning ground surveys conducted in the Alsea Basin.

Basin, Subbasin, Survey	Segment	Lower boundary	Upper boundary	No of Surveys	Times surveyed	Miles surveyed	Live Counts Total	Live Counts Marked	Live Counts Not marked	Live Counts Unknown	Redds per mile
Alsea River				**45**		**45.2**	**238**	**4**	**51**	**183**	**10.7**
Mainstem And Bay				**19**		**18.1**	**48**	**1**	**15**	**32**	**3.8**
Southworth Cr	1	Mouth	Headwaters		9	1.14	6	0	3	3	4.4
Sudan Cr	1	Mouth	Oxstable Cr		10	0.38	0	0	0	0	18.2
Bear Cr	2	Mouth	Headwaters		8	1.14	2	0	2	0	0.0
Skinner Cr	1	Mouth	Headwaters		9	0.81	2	0	1	1	4.9
Alsea R	2	Mill Cr	Hatchery Cr		1	1.20	0	0	0	0	0.0
Hatchery Cr	1	Mouth	Headwaters		9	0.49	1	0	0	1	0.0
Alsea R	1	Slide Cr	Scott Cr		11	0.70	2	0	0	2	0.0
Alsea R	3	Scott Cr	Brush Cr		11	0.85	5	0	0	5	0.0
Grass Cr	2	Mouth	Grass Cr, Meadow Fk		16	1.03	8	0	2	6	16.5
Alsea R	1	Five Rivers	Cedar Cr		10	1.40	2	0	0	2	0.0
Cow Cr	1	Mouth	Headwaters		14	0.81	0	0	0	0	0.0
Alsea R	1	Cow Cr	Fall Cr		11	0.81	1	0	0	1	0.0
Alsea R	1	Digger Cr	Benner Cr		11	1.00	2	0	1	1	0.0
Alsea R	2	Digger Cr	Benner Cr		11	1.40	0	0	0	0	0.7
Alsea R	3	Benner Cr	Sulmon Cr		11	1.30	0	0	0	0	1.5
Alsea R	1	Narrow Cr	Schoolhouse Cr		11	1.40	2	0	0	2	0.0
Mill Cr	1	Mouth	Beaty Cr		16	0.69	2	0	0	2	13.0
Mill Cr	1	Beaty Cr	Forks		16	1.40	13	1	6	6	12.9
Alsea R	2	Mill Cr	Roberts Cr		8	0.20	0	0	0	0	0.0
Drift Creek				**4**		**5.5**	**76**	**0**	**9**	**67**	**40.2**
Drift Cr	1	Ellen Cr	Cougar Cr		14	1.60	22	0	1	21	53.7
Drift Cr	1	Cougar Cr	Boulder Cr		14	1.80	28	0	5	23	36.1
Drift Cr	2	Boulder Cr	Slickrock Cr		14	1.00	24	0	1	23	64.0
Horse Cr	1	Deer Cr	Headwaters		13	1.15	2	0	2	0	7.0
Five Rivers				**14**		**14.6**	**73**	**2**	**20**	**51**	**11.9**
Five Rivers	1	Elk Cr	Lobster Cr		12	1.30	3	0	0	3	0.0
Lobster Cr	1	Taylor Cr	Crooked Cr		15	0.50	0	0	0	0	0.0
Lobster Cr	2	Camp Cr	Wilkinson Cr		15	1.10	6	0	0	6	4.5
Little Lobster Cr	2	Mouth	Briar Cr		16	1.59	1	0	0	1	1.9
Lobster Cr	1	Preacher Cr	Trib S, Lobster		14	1.11	0	0	0	0	6.3
Lobster Cr	2	Bear Cr	Lobster Cr, E Fk		18	1.30	23	0	5	18	36.9
Five Rivers	1	Cascade Cr	Cherry Cr		14	1.40	0	0	0	0	0.7
Five Rivers	2	Cascade Cr	Cherry Cr		14	1.40	5	0	0	5	0.0
Buck Cr	2	Wilson Cr	Bear Cr		9	0.60	3	1	1	1	18.4
Buck Cr	3	Bear Cr	Trib A		10	1.03	5	0	0	5	17.5
Buck Cr	1	Trib A	Headwaters		10	0.49	4	0	2	2	10.2
Five Rivers	1	Alder Cr	Crazy Cr		13	1.00	2	0	0	2	5.0
Green R	1	Green R, E Fk	Headwaters		16	1.02	8	0	6	2	26.5
Five Rivers	2	Summers Cr	Lord Cr		17	0.75	13	1	6	6	38.7
North Fork				**3**		**2.7**	**38**	**1**	**6**	**31**	**21.6**
Hayden Cr	1	Mouth	Headwaters		15	1.12	0	0	0	0	0.0
Crooked Cr	2	Baker Cr	Ernest Cr		16	0.44	9	1	2	6	29.5
Crooked Cr	1	Ernest Cr	Zahn Cr		16	1.14	29	0	4	25	35.2
South Fork				**5**		**4.2**	**3**	**0**	**1**	**2**	**3.3**
Swamp Cr	1	Swamp Cr, E Fk	Headwaters		16	0.92	0	0	0	0	0.0
Alsea R, S Fk	1	Bummer Cr	Headrick Cr		11	0.50	1	0	0	1	4.0
Alsea R, S Fk	1	Rock Cr	Blackberry Cr		10	0.30	0	0	0	0	10.0
Alsea R, S Fk	1	Blackberry Cr	Trout Cr		10	1.10	2	0	1	1	2.7
Trout Cr	2	Mouth	Headwaters		8	1.35	0	0	0	0	0.0