Nestucca River Native Broodstock Monitoring – Juveniles 2002.

Introduction

In the spring of 2001, the Oregon Department of Fish and Wildlife (ODFW) adopted a proposal to collect approximately 70 wild winter steelhead females from the Nestucca River Basin for hatchery broodstock. As part of an effort to monitor the impact of this broodstock collection on the wild winter steelhead population in the Nestucca, ODFW's Western Oregon Rearing Project was given the task of monitoring trends in the abundance and distribution of juvenile steelhead in the basin. This report presents the results of the sampling conducted during the summer of 2002.

Methods

Study Design

We had a target of surveying juvenile steelhead rearing at between 30-35, one-kilometer long stream reaches in the Nestucca River Basin. Sites were randomly selected using a stream reach database maintained by ODFW's Coastal Salmonid Inventory Project. On the Little Nestucca River, candidate stream reaches included all areas accessible to steelhead above tidewater. On the main Nestucca River, candidate stream reaches included all areas accessible to steelhead above the confluence of the Nestucca River and Beaver Creek. In total, 373 km of stream channel fell within our snorkeling sample universe.

Once completed, the site selection process provided the geographic coordinates (i.e. latitude and longitude) of each of the candidate sites. We then produced topographic maps showing the location of each sample point. Field crews used a handheld geographic positioning system (GPS) to find the start and end of each survey reach.

Survey Methodology

Surveys began on August 1, 2002 and concluded on September 30, 2002. To conduct the surveys, a two-to-four person snorkel crew counted the number of 1+ juvenile steelhead, 1+ cutthroat trout, and all coho salmon in each of the sample reaches. 0+ juvenile cutthroat and steelhead (< 90 mm fork length) were not counted. Age 1+ trout that could not be identified to species were counted as unknown trout. To reduce problems associated with snorkeling in shallow or fast water habitat, only pools $\geq$ 6 m^2 in surface area and $\geq$ 40 cm deep were snorkeled. In smaller streams, crewmembers either alternated the pools that they snorkeled or one crewmember snorkeled the entire reach. In larger streams where one snorkeler could not effectively enumerate fish, surveys were conducted with snorkelers swimming side-by-side.

In all but two sites, snorkel methodology involved a single upstream pass through each pool. At the two largest mainstem sites, counts were made while

swimming downstream. Counts of the number of juvenile coho, cutthroat, steelhead, unknown trout, chinook, blackside dace, and redside shiner were recorded for each pool. After snorkeling, we ranked the underwater visibility of each pool during the snorkel count on a scale of 0 to 3 where: 0 = not snorkelable due to extremely high amount of hiding cover or zero water visibility; 1 = high amount of hiding cover or poor water clarity; 2 = moderate amount of hiding cover or moderate water clarity neither of which were thought to impede accurate fish counts; and 3 = little hiding cover and good water clarity. We measured the maximum pool depth and estimated the length and average width of all snorkeled pools.

To provide some quality control of the snorkel data, and to provide information on temporal changes in abundance during the coarse of the sampling season, supervisory staff had a goal of resurveying a random sample of 10 to 20 percent of the sites surveyed.

Data Analysis

Only pools with a visibility rank of two or three were used in data analysis. The percentage of snorkel sites and the percentage of pools at each site with at least one fish was calculated for juvenile coho, $\geq$ 90 mm steelhead, and $\geq$ 90 mm cutthroat. For each snorkel site, the number of fish/m^2 of pool habitat was calculated for each of the three species/size classes by averaging the density estimates for each pool at that site. A basin-wide density for each of the three species/size classes was obtained by averaging the individual site densities. The 95% confidence interval around each species/size class frequency of occurrence and density estimate was determined using the statistical analysis outlined by Stevens (2002). This analysis also provided sample variances from which Z-values (Snedecor and Cochran 1980) were obtained to compare means. A Mann-Whitney rank sum test (Snedecor and Cochran 1980) was used to compare medians.

Results

We visited a total of 30 sites during the summer of 2002 (Figure 1). We were denied access at four sites and found that one site was above a barrier to anadromous fish passage. As a result, we snorkeled a total of 25 sites in the Nestucca River Basin during the summer of 2002.

Table 1 shows the summary statistics for the percentage of sites that contained at least one fish, the mean percentage of pools per site that contained at least one fish, and the density of fish observed in the Nestucca River Basin during the summer of 2002. Juvenile steelhead and cutthroat $\geq$ 90 mm were observed at all but one site, whereas juvenile coho were observed at all but four sites (Figures 2-4). The percentage of sites that contained at least one fish (Figure 5), and the mean and median percentage of pools per site that contained

at least one fish (Figure 6) where all similar to data collected in the summer of 2001 ($P \geq 0.54$).

Table 1. Summary statistics for juvenile salmonid snorkel surveys conducted in the Nestucca River Basin in the summer of 2002.

Species	Coho	≥ 90 mm Cutthroat	≥ 90 mm Steelhead
Sample size	25	25	25
Mean Fish/m^2 (95% confidence interval)	0.34(0.006)	0.03(<0.001)	0.05(<0.001)
Median density	0.14	0.02	0.05
Number of sites with at least one fish	21	24	24
Percentage of sites with at least one fish	84	96	96
Mean percentage of pools per site with at lease one fish (95% confidence interval)	66(76)	64(32)	69(36)
Median percentage of pools per site containing at least one fish	86	62	76

We observed average pool densities (fish/ $m^{2)}$ of 0.05 for steelhead, 0.03 for cutthroat, and 0.34 for coho. Compared to data collected in 2001, the mean density of juvenile coho was significantly higher ($P < 0.001$) while the density of both cutthroat and steelhead were significantly lower ($P < 0.001$) in the Nestucca River Basin in 2002 (Figure 7). Median densities, however, were not significantly different for any species in 2002 compared to 2001 ($P \geq 0.07$).

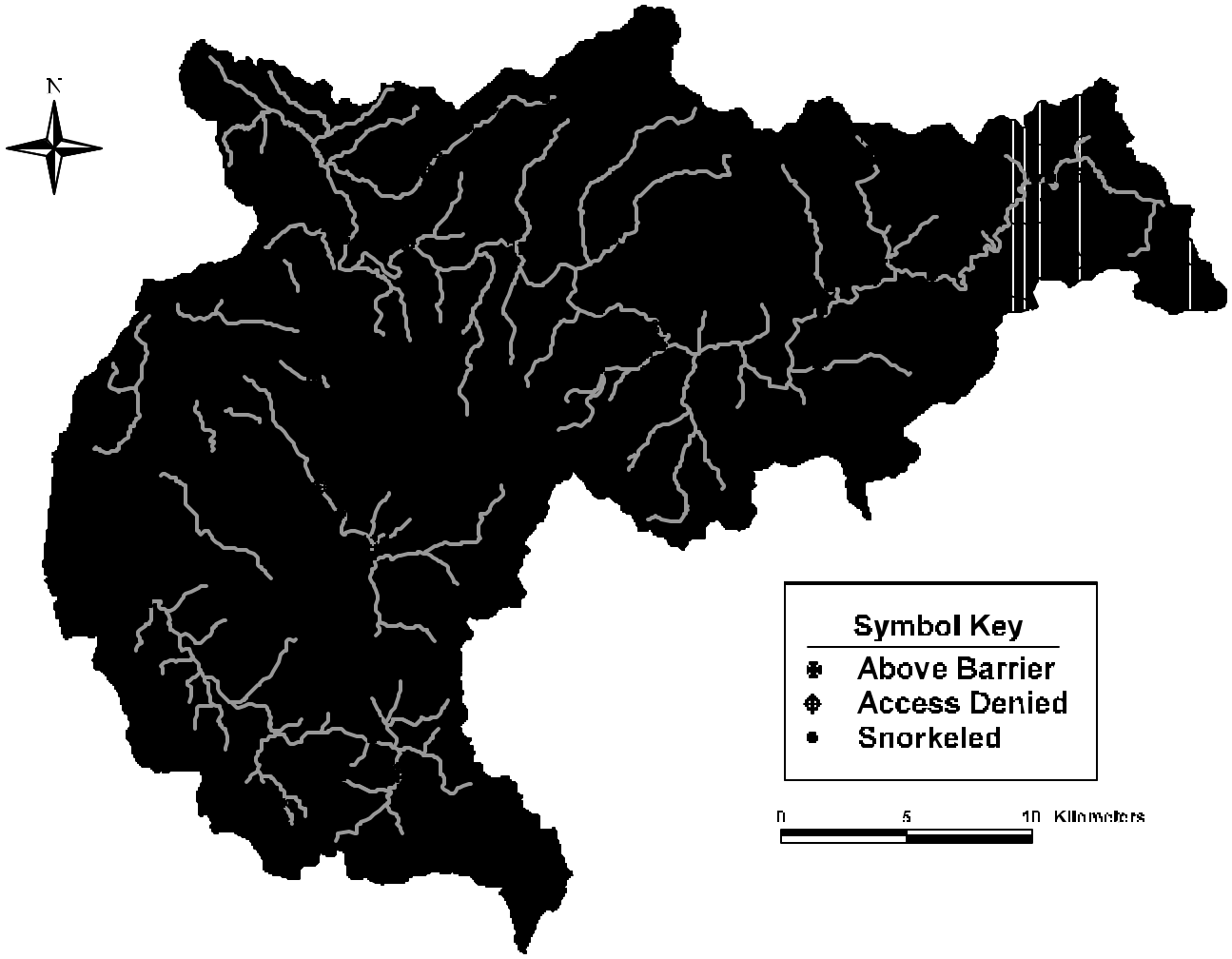

Figure 1. Location of sample stream reaches snorkeled for juvenile steelhead abundance in the Nestucca River Basin, 2002. Numbers next to are site numbers for reference to Appendix A. Gray highlighted stream areas depict candidate stream segments.

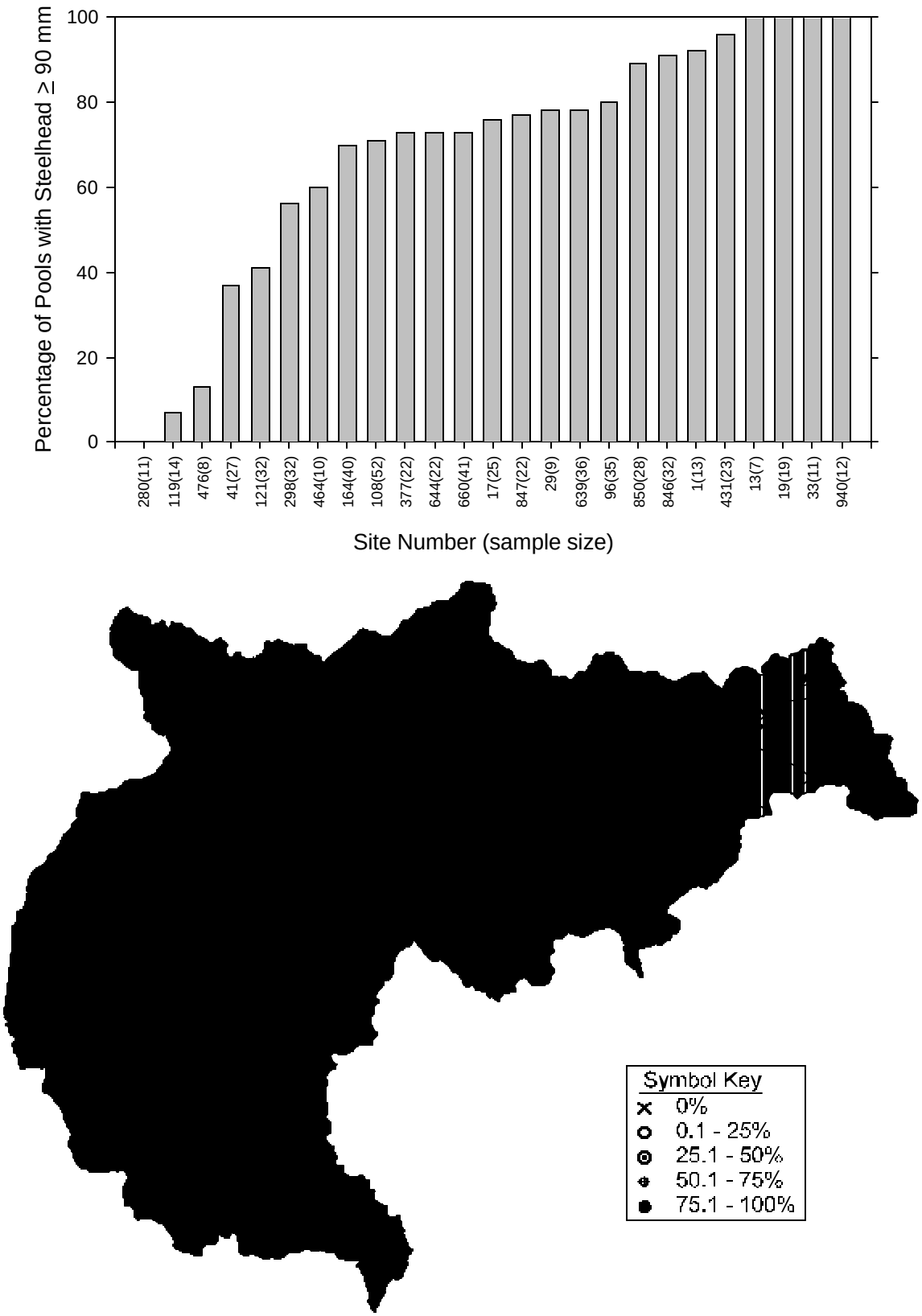

Figure 2. Percentage of pools at each site snorkeled in the Nestucca River that contained at least one > 90 mm juvenile steelhead in summer 2002.

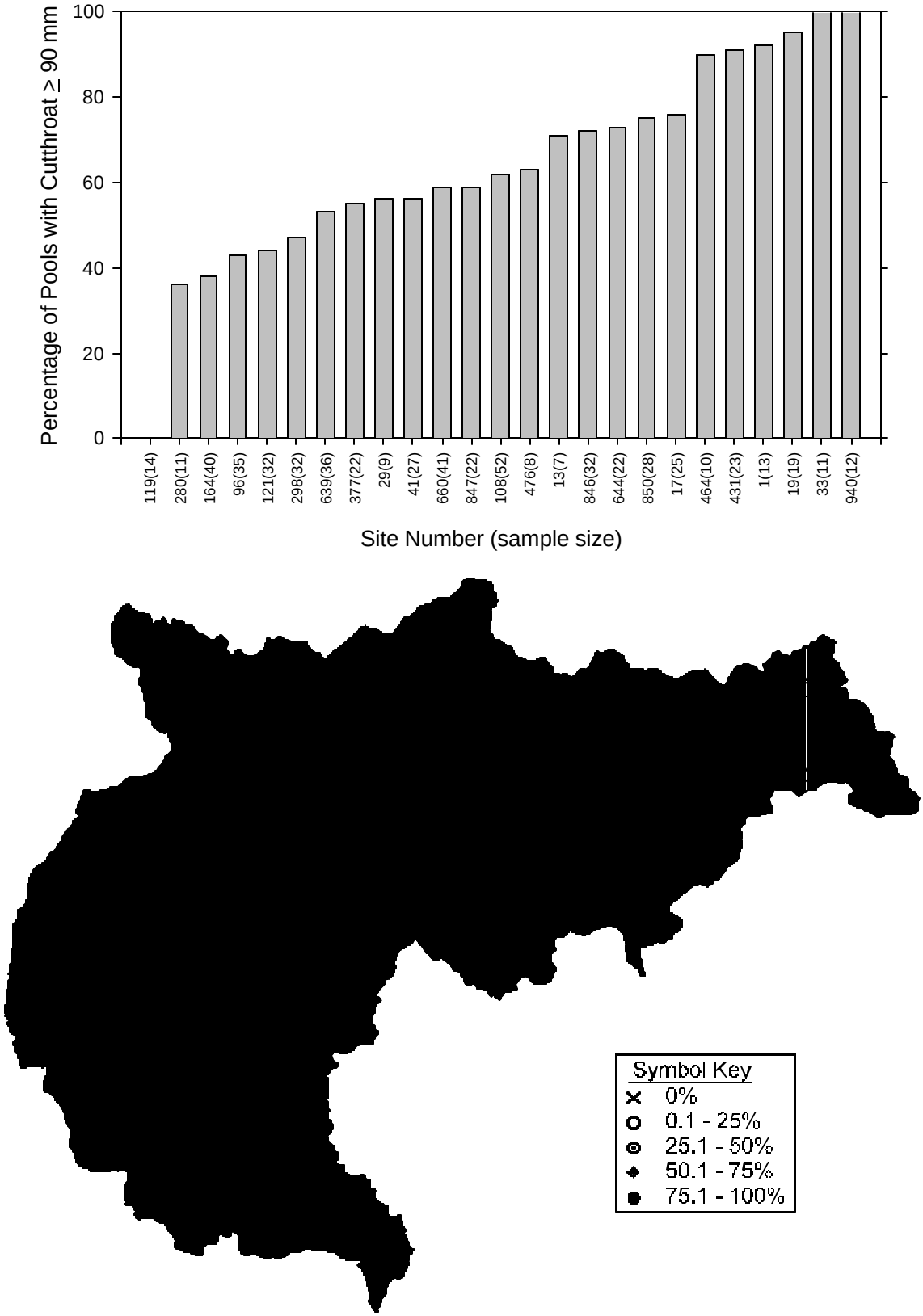

Figure 3. Percentage of pools at each site snorkeled in the Nestucca River that contained at least one > 90 mm juvenile cutthroat in summer 2002.

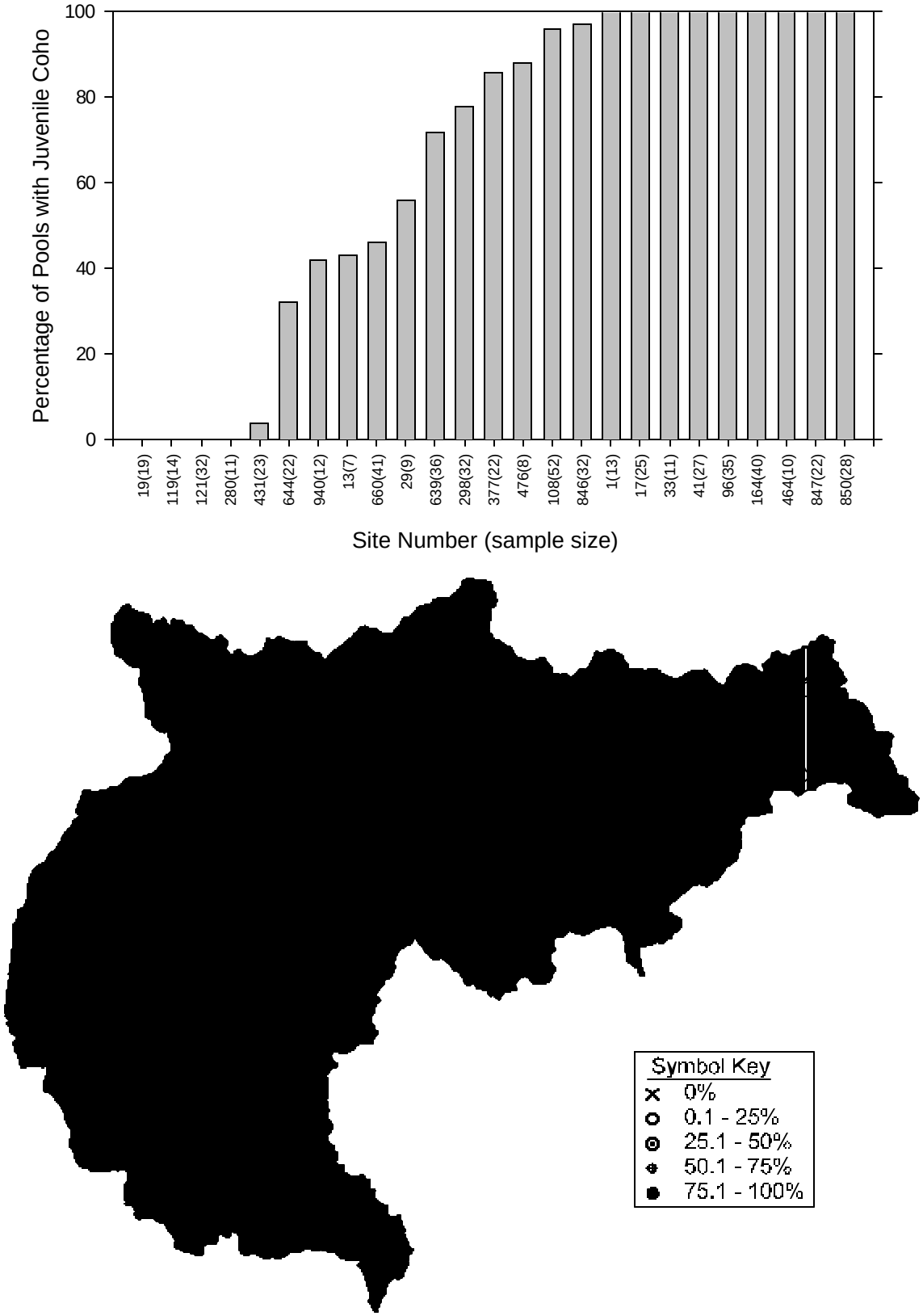

Figure 4. Percentage of pools at each site snorkeled in the Nestucca River that contained at least one juvenile coho in summer 2002.

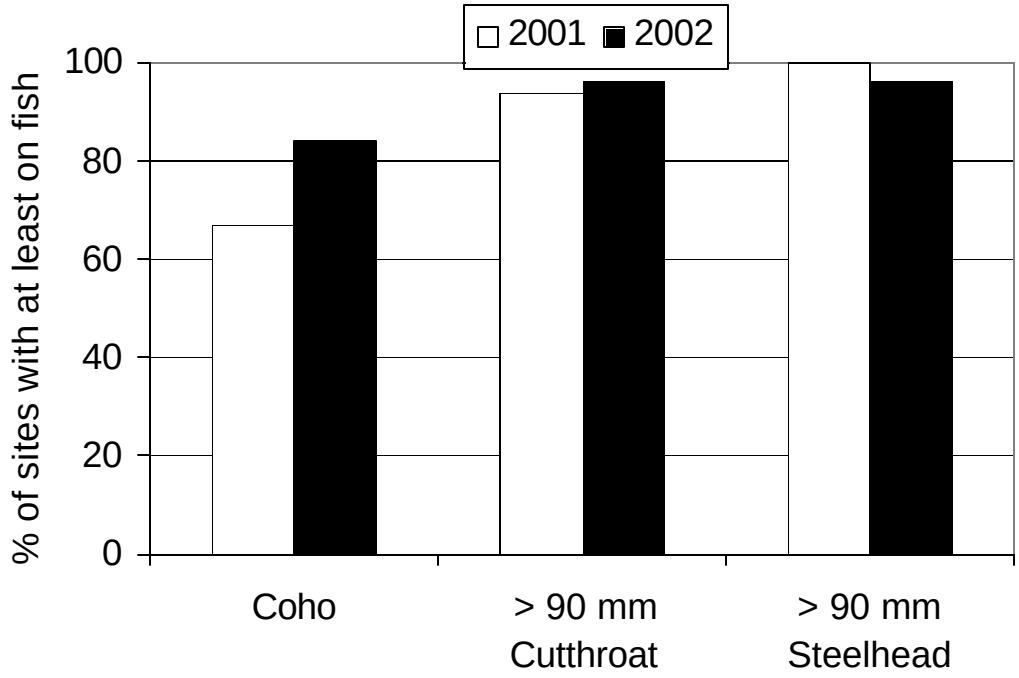

Figure 5. Percentage of Nestucca River Basin sites that contained at least one juvenile coho, cutthroat, or steelhead in the summers of 2001 and 2002.

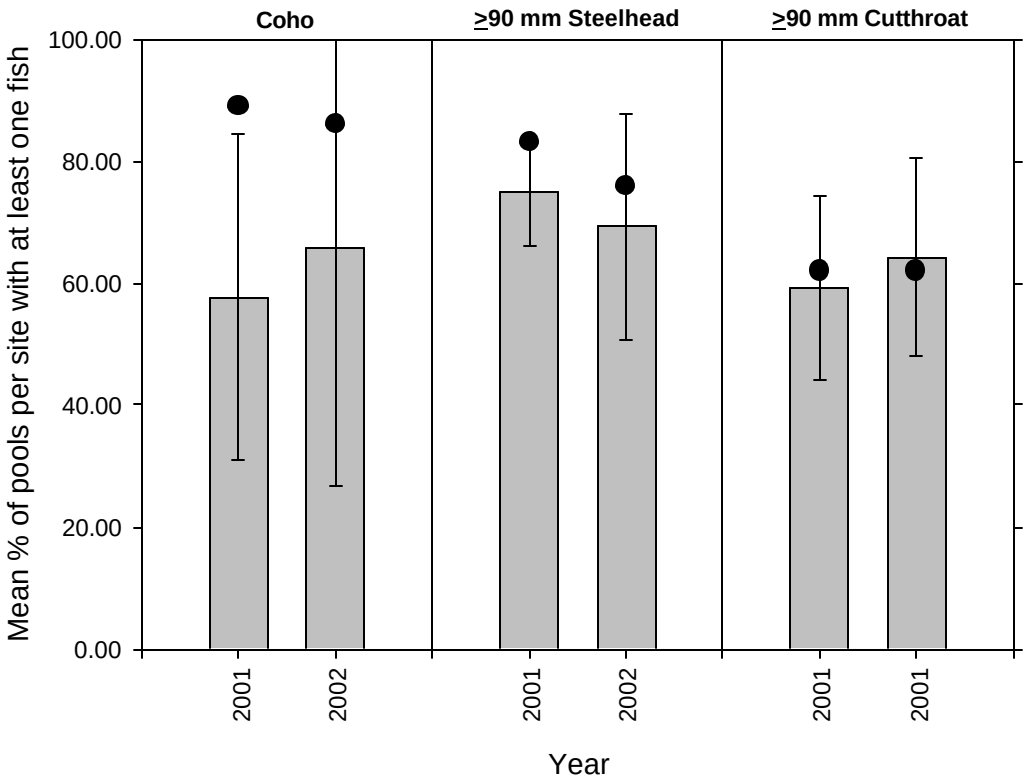

Figure 6. Mean (bars), median (solid circles), and standard error of the percentage of pools per site sampled in the Nestucca River Basin that contained juvenile coho, steelhead, or cutthroat in the summers of 2001 and 2002.

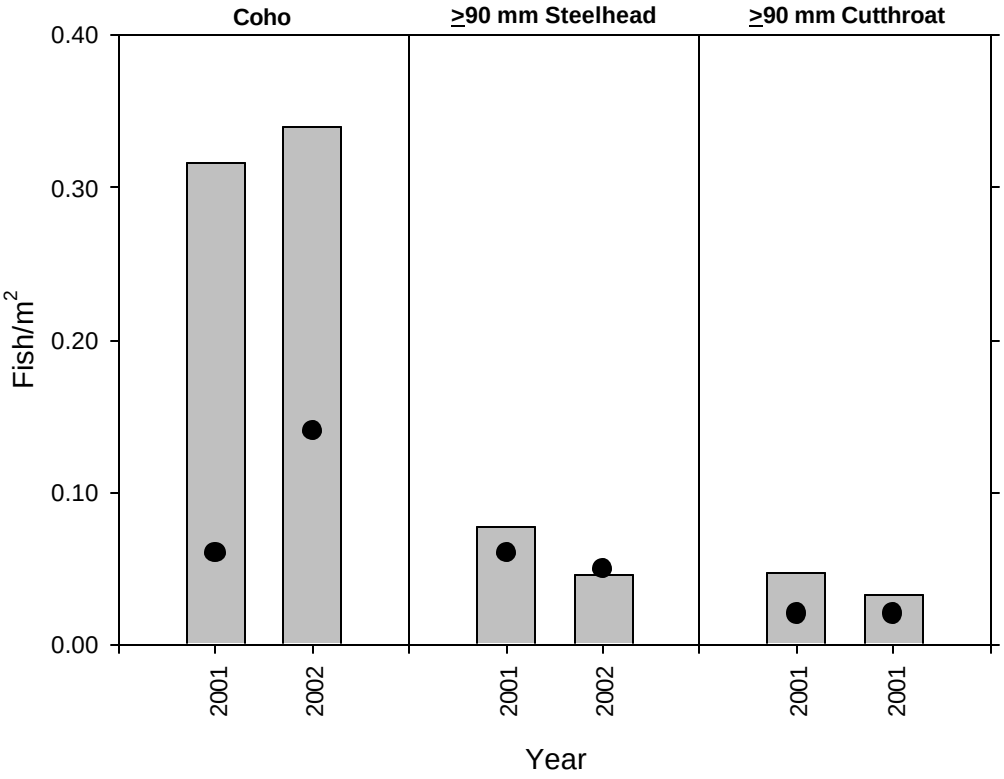

Figure 7. Mean (bars) and median (solid circles) of the density of juvenile coho, steelhead and cutthroat at sites sampled in the Nestucca River Basin in the summers of 2001 and 2002. Standard error bars are not shown because the sample variances are too small to be depicted on this graph.

Appendix A. Summary data for sites snorkeled in the Nestucca River Basin during August and September 2002.

Site Number	Survey Length (m)	Number of Pools	Pool Surface Area (m^2)	Number of Fish Observed in Pools		
				Coho	Cutthroat	Steelhead
1	1,000	13	10,242	3,829	105	138
13	1,000	7	8,705	17	14	60
17	1,000	25	5,852	3,512	127	238
19	1,000	19	4,617	0	307	500
29	1,000	9	15,035	79	49	27
33	1,005	11	6,244	3,063	124	227
41	1,000	27	4,744	1,688	23	15
96	1,000	35	2,663	3,151	35	121
108	1,000	52	1,585	463	53	87
119	275	14	483	0	0	1
121	1,000	32	1,998	0	28	23
164	1,000	40	4,628	3,815	21	62
280	1,000	11	232	0	13	0
298	1,000	32	1,664	683	58	39
377	792	22	1,769	217	53	35
431	1,000	23	2,870	15	212	269
464	1,050	10	9,066	683	17	20
476	1,000	8	225	81	13	1
639	1,000	36	2,168	223	86	115
644	1,000	22	893	37	50	59
660	1,000	41	3,034	172	58	125
846	1,007	32	3,116	1,352	105	166
847	1,000	22	2,151	1,196	27	44
850	1,000	28	3,306	1,302	52	164
940	1,020	12	2,984	60	118	76