

THE OREGON PLAN *for* *Salmon and* *Watersheds*



**Abundance Monitoring of Juvenile Salmonids
In Oregon Coastal Streams, 2004.**

Report Number: OPSW-ODFW-2006-1



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2004**

Oregon Plan for Salmon and Watersheds

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March, 2006

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Citation: Jepsen, D. B. 2006. Abundance Monitoring of Juvenile Salmonids in Oregon Coastal Streams, 2004. Monitoring Program Report Number OPSW-ODFW-2006-1, Oregon Department of Fish and Wildlife, Salem.

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Executive Summary

This report summarizes results of sampling the abundance and distribution of juvenile salmonids in coastal streams in western Oregon monitoring areas (MA's) in 2004, as part of the Western Oregon Rearing Project.

Coho

- The South Coast MA had significantly lower densities of coho in pools within 1st-3rd order streams than other MA's, with the exception of the Umpqua MA..
- In comparisons of brood cycle years (2001 vs. 2004) there were no differences in coho pool density for any MA.
- Average percent pool occupancy of coho (% of pools per site containing coho) was similar between the brood cycle years for most MA's, with the exception of North Coast sites in 2004 having greater occupancy than in 2001.
- Cumulative distribution functions (CDF's) for coho occurrence indicated that all MA's had more than 50% of sites with > 50% pool occupancy. Confidence bands around the estimates ranged between ~10-20%.
- The percentage of 1st-3rd order stream sites with juvenile coho densities ≥ 0.7 fish/m² (full seeding level) were greater in the Mid-South Coast (32%), North Coast (27%), and Mid Coast (26%), and lower in the South Coast (17%) and Umpqua (16%). Alternately, all monitoring areas had more than 10% of sites meeting this seeding level, with confidence bands around CDF estimates ranging between ~15-20%.
- Over the duration of the study, the linear relationship between adult spawners/mile and juvenile coho/m² the following year was strongest in the Mid-South Coast, South Coast and Umpqua MA's. Other MA's did not produce a statistically linear fit between adult and juvenile abundances. The slopes of the regression lines suggest that egg to parr survival is greater in the South Coast relative to other MA's. Juvenile coho in North and Mid Coast sites appear to be experiencing density dependant effects.

Steelhead

- Non-Rogue 1st-3rd order stream sites in the South Coast MA had significantly greater steelhead pool occupancy than comparable streams in other MA's and Rogue 1st-3rd order streams. There were no significant differences in mean densities of steelhead among areas in 2004. There were no differences between 4th-5th order sites, and with the exception of the North and Mid Coast MA's, larger order streams had greater pool occupancy by steelhead than 1st-3rd order streams.

- There were no statistical differences between MA level average pool densities, for either 1st-3rd order or 4th-5th order streams. Steelhead densities were low in 4th-5th order sites, ranging between 0.0 -0.02 fish/m²

Cutthroat

- The average percent pool occupancy ranged from 21% (Mid Coast) to 47% (Mid-South Coast) for 1st-3rd order stream sites. The Mid-South Coast 1st-3rd order stream sites had significantly greater pool occupancy than comparable streams in other MA's. There were no differences between 4th-5th order stream sites, and with one exception, there was no consistent trend of larger streams having greater pool occupancy than smaller streams.
- Average pool densities of cutthroat in 1st-3rd order streams were between 0.01 fish/m² (North and Mid Coast) and 0.05 fish/m² (Mid-South Coast). Mid-South Coast densities were significantly greater in 1st-3rd order sites than all other MA's except the Umpqua. Average cutthroat densities were low in larger order streams, and did not differ between MA's.

Introduction

As part of the Oregon Plan for Salmon and Watersheds, the Oregon Department of Fish and Wildlife (ODFW) initiated a project in 1998 to monitor juvenile coho salmon (*Oncorhynchus kisutch*) rearing in Oregon coastal streams. Monitoring was expanded in 2002 to include juvenile steelhead (*Oncorhynchus mykiss*) and cutthroat trout (*O. clarkii*). The project is designed to monitor the yearly status and long term trends in juvenile salmonid abundance within five coastal Monitoring Areas (hereafter referred to as MA's; Figure 1). This report summarizes abundance data collected in the summer of 2004 for all three species, and for coho includes an analysis with abundance data from prior years. Details of the study area and methods are described in previous annual reports (Jepsen and Rodgers 2004). Details of methods and analyses specific to the present year are included below.

Methods

A full description of study design, random site selection, and survey methods is found in Jepsen and Rodgers (2004). Snorkel surveys were conducted at randomly chosen candidate sites that were spatially balanced within two separate sampling frames (rearing distributions; but see South Coast steelhead, below). One frame included sites of all 1st-3rd order stream reaches within the known coastal coho rearing distribution. The other included sites from all 4th-5th order stream reaches within the known steelhead rearing distribution. For summary and comparative analyses, data for each species were split into subsets based on the MA and stream order frame (Table 1). This level of partitioning allowed separate fish abundance estimates for smaller streams (the presumed best rearing reaches for coho) and larger order streams (the presumed best rearing reaches for steelhead).

As noted in previous reports (Jepsen and Rodgers 2004), there is a more distinct rearing distribution for coho and trout in the South Coast MA relative to the other MA's, requiring an adjustment to the spatial design of site selection. The South Coast coho 1st-3rd order dataset was balanced in the same manner as the sites in other MA's, but the sites used for a larger stream order coho dataset were derived from a stream network based on a steelhead distribution sampling frame, and proportioned between Rogue and Non-Rogue basin sites. From the steelhead frame, steelhead and cutthroat trout subsets were created for 1st-3rd and 4th-5th order stream reaches, and then partitioned proportionately within Rogue and Non-Rogue basins. Although steelhead and cutthroat data were collected from South Coast coho 1st-3rd order sites, the sites are considered spatially unbalanced for steelhead distributions (and unknown for cutthroat). Similarly, coho data were collected from South Coast steelhead 1st-3rd order sites are considered spatially unbalanced for coho. These datasets are indicated by italics in summary tables but not used in comparative analyses.

The accuracy of pool counts was assessed by doing resurveys of 15-20% of sites, limited to those that contained juvenile coho. A resurvey generally occurred within 1-4 days of the original survey, and fish were counted from the same pools identified in the original survey.

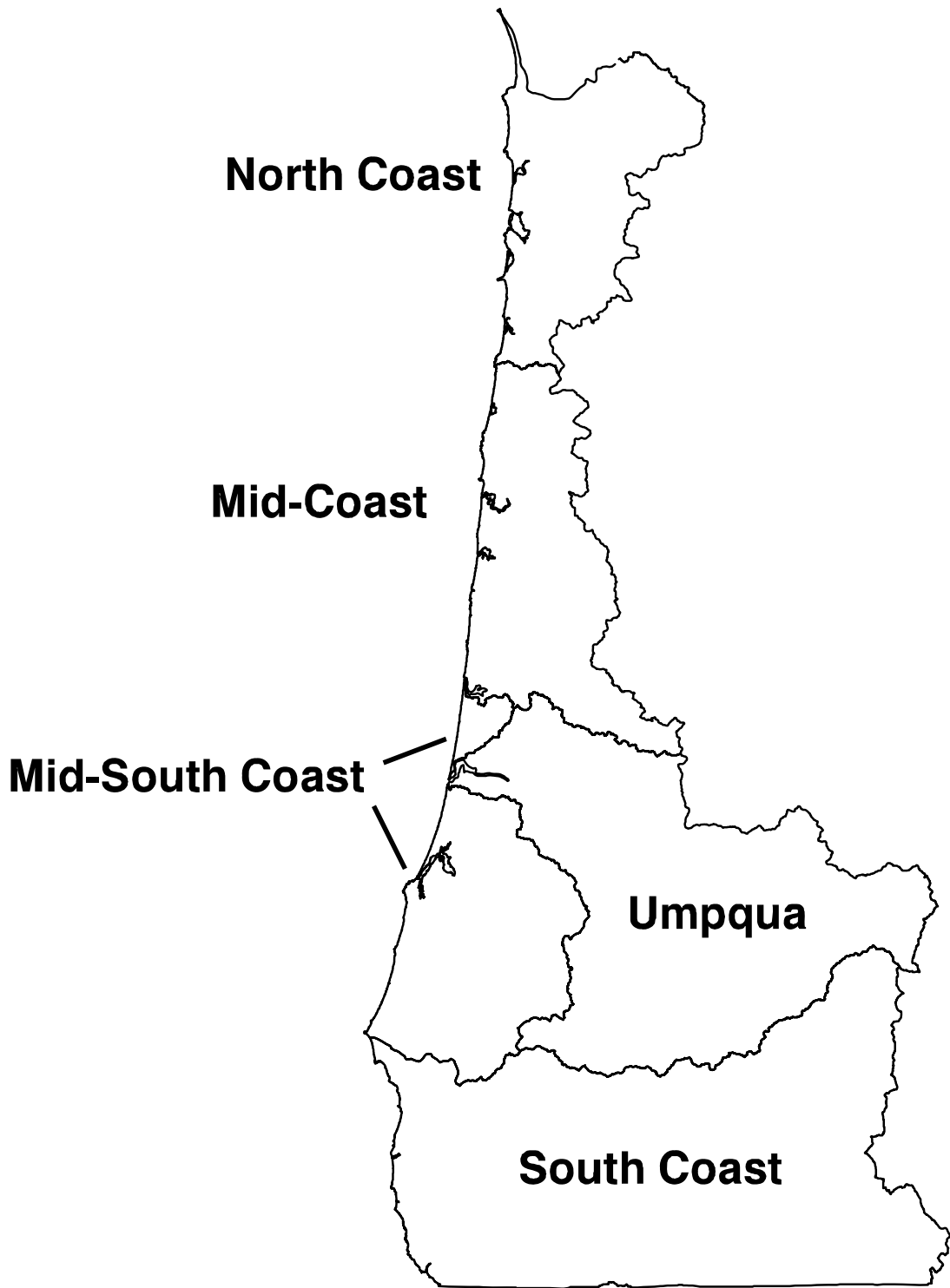


Figure 1. Location of five Monitoring Areas for coho salmon and steelhead along the Oregon Coast.

Table 1. Summary of juvenile salmonid datasets used in 2004 to test differences in average percent pool occupancy and average fish density. Datasets with common letters were compared. NC= North Coast, MC=Mid Coast, MS=Mid-South Coast, UMP=Umpqua, and SC-NR=South Coast Non-Rogue. Steelhead and cutthroat subsets in the South Coast were based on known steelhead distribution in those streams, and were divided into ¹non-Rogue Basin sites and ²Rogue Basin sites. ³See Methods for description of South Coast coho dataset for 4th-5th order streams.

Monitoring Area	1 st -3 rd order coho stream frame					4 th -5 th order steelhead stream frame				
	NC	MC	MS	UMP	SC-NR ¹	NC	MC	MS	UMP	SC-NR ¹
<i>Coho</i>										
Mid Coast	a					x				
Mid-South Coast	a	a				x	x			
Umpqua	a	a	a			x	x	x		
South Coast ³	a	a	a	a		x	x	x	x	
<i>Steelhead</i>										
Mid Coast	b					y				
Mid-South Coast	b	b				y	y			
Umpqua	b	b	b			y	y	y		
South Coast ¹	b	b	b	b		y	y	y	y	
South Coast ²	b	b	b	b	b	y	y	y	y	y
<i>Cutthroat</i>										
Mid Coast	c					z				
Mid-South Coast	c	c				z	z			
Umpqua	c	c	c			z	z	z		
South Coast ¹	c	c	c	c		z	z	z	z	
South Coast ²	c	c	c	c	c	z	z	z	z	z

Results and Discussion

In previous annual reports we included abundance data for individual sites, plotted for each species and stream order group (1st-3rd order and 4th-5th order). In this report we provide only MA-level summaries, but include Appendix 1 as a summary table for site data. Outputs from GIS referenced maps that spatially summarize fish abundance at individual sites are available by request from the Western Oregon Rearing Project.

Site Visitation

A summary table of sample sites, including UTM coordinates and fish count summaries is found in Appendix 1. The Mid Coast contained the most tributary sites that were sampled (snorkeled or electrofished), and the South Coast contained the fewest (Table 2). The Mid-South Coast had the highest number of sites that could not be sampled, primarily due to lack of water. Site access denial was highest in the Umpqua and lowest in the Mid Coast. A total of 34 sites were revisited for resurveys, proportioned across the monitoring areas. When resurveys of juvenile salmonid counts

were regressed on original surveys (Figure 2), the calculated slope of the relationships ranged from 0.9646x (steelhead) to 0.9921x (coho), indicating good agreement between the site visits.

Table 2. Summary status of randomly selected sites in 2004 for juvenile salmonid surveys in Oregon coastal Monitoring Areas. Refer to Table 1 and Methods section for explanation of superscripts at South Coast sites. Note that data for 4th-5th order sites for South Coast coho are not listed but are the total of the Non-Rogue and Rogue steelhead sites.

Monitoring Area	Sampled			Not Sampled							
	Snorkeled		Electro-fished	Could Not Be Sampled		Above Barrier		Access Denied		Not Visited	
	1 st - 3 rd order	4 th - 5 th order	1 st - 3 rd order	1 st - 3 rd order	4 th - 5 th order	1 st - 3 rd order	4 th - 5 th order	1 st - 3 rd order	4 th - 5 th order	1 st - 3 rd order	4 th - 5 th order
North Coast	33	12	8	4	1	1	0	5	0	1	1
Mid-Coast	38	11	0	0	1	4	0	4	0	1	3
Mid-South Coast	33	10	2	5	0	1	0	8	0	3	1
Umpqua	26	11	3	2	1	1	2	13	0	0	4
South Coast ³	23	-	0	3	-	0	-	4	-	2	-
South Coast ¹	38	5	0	0	0	0	0	0	0	0	1
South Coast ²	24	10	1	3	2	1	0	5	2	2	0

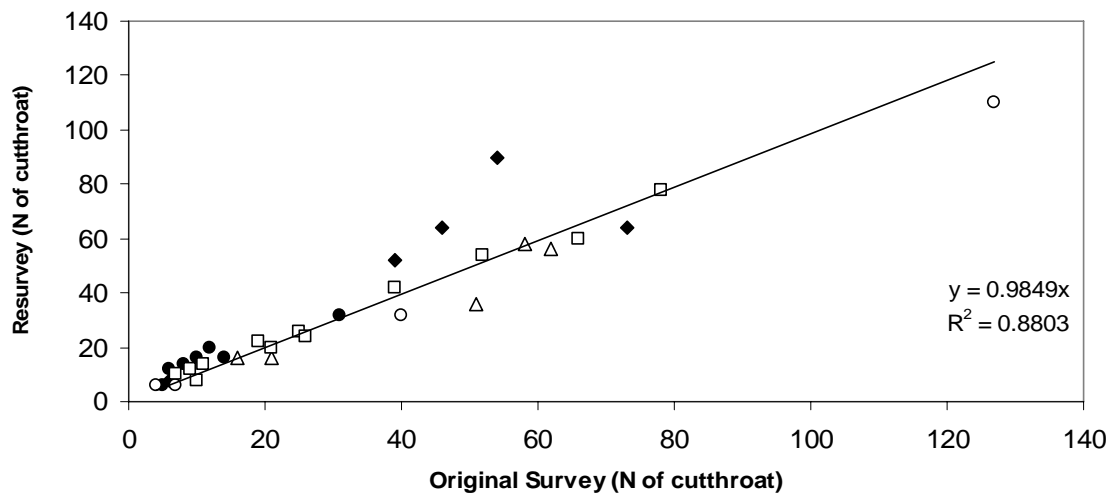
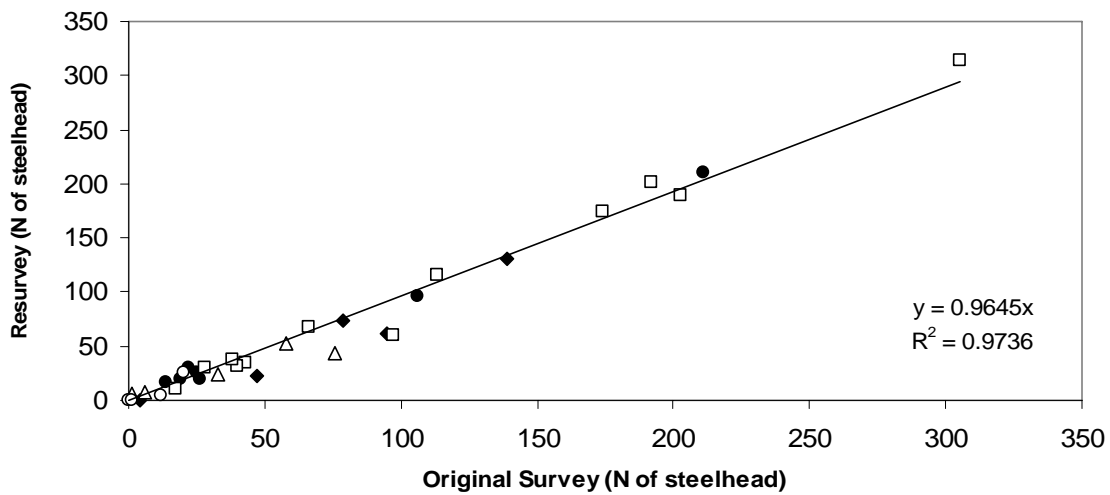
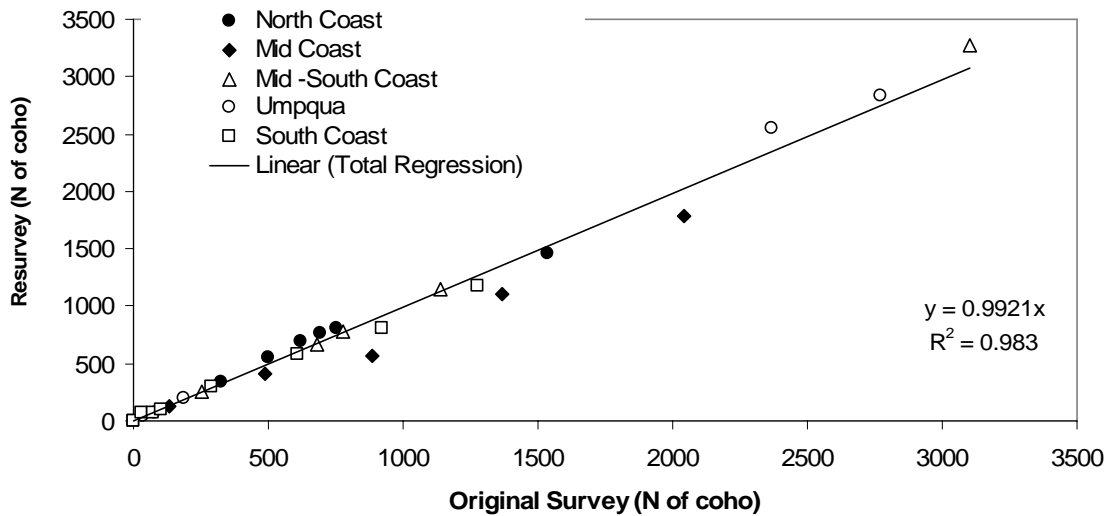


Figure 2. The relationship between original snorkel counts of the number of juvenile salmonids in pools and resurvey of the same pools, subdivided by monitoring area in 2004. Symbols are individual sites, and total linear regression line and model results are for all sites combined.

Juvenile Salmonid Frequency of Occurrence

Coho

Coho occurred in 59-83% of the 1st-3rd order stream sites, were more widespread among North and Mid-South Coast sites and least widespread among Umpqua sites (Table 3). Within the 1st-3rd order stream sites of an MA, the average percent pool occupancy ranged between 47% (Umpqua) to 67% (Mid-South Coast). The North and Mid-South Coast MA's had statistically greater pool occupancy than the Umpqua (Table 4). Among 4th-5th order stream sites, average percent pool occupancy was not different between MA's. Plots of percent pool occupancy in 1st-3rd order stream reaches for each site illustrate the extent to which juvenile coho are distributed among pools (Figures 3-4). Review of cumulative distribution function plots (CDF's) of pool occupancy data indicated that approximately 20-40% of 1st-3rd order sites per monitoring area did not achieve a level of 50% pool occupancy. Alternately, all monitoring areas had more than 50% of sites with > 50% pool occupancy. Confidence bands around the CDF estimates ranged between ~10-20%.

In comparisons between the 2001 and 2004 brood year cycle (for adult spawners in 2000 and 2003, respectively) only the North Coast had significantly different pool occupancy, with great occupancy in 2004 than 2001 (Table 5).

Steelhead

Steelhead occurred in 52-87% of the 1st-3rd order sites (excluding South Coast sites). For South Coast sites selected from steelhead distributions, steelhead were present at 97% and 96% of sites in the non-Rogue and Rogue basins, respectively (Table 3). The average percent pool occupancy ranged from 13% (Umpqua) to 44% (North Coast) for 1st-3rd order stream sites. Non-Rogue 1st-3rd order stream sites had significantly greater pool occupancy than comparable streams in other MA's and Rogue 1st-3rd order streams (Table 4). There were no differences between 4th-5th order sites (Table 4). With the exception of the North and Mid Coast MA's, larger order streams had greater pool occupancy by steelhead than 1st-3rd order streams.

Cutthroat

Cutthroat occurred in 76-94% of 1st-3rd order stream sites (excluding South Coast sites). For South Coast sites selected from steelhead distributions, cutthroat were present at 95% and 82% of sites in the non-Rogue and Rogue basins, respectively (Table 3). The average percent pool occupancy ranged from 21% (Mid Coast) to 47% (Mid-South Coast) for 1st-3rd order stream sites. The Mid-South Coast 1st-3rd order stream sites had significantly greater pool occupancy than comparable streams in other MA's (Table 4). As with steelhead, there were no differences between 4th-5th order sites (Table 4), and with the exception of Non-Rogue 4th-5th order stream sites (where 83% of pools contained cutthroat) there was no consistent trend of larger streams having great pool occupancy than smaller streams.

Table 3. The occurrence of juvenile salmonids observed by snorkeling or electrofishing in Oregon coastal streams in 2004. sthd=steelhead, cutt=cutthroat. Refer to Table 1 and Methods section for explanation of superscripts at South Coast sites. Cells with no data at South Coast sites are from spatially unbalanced site selection.

Monitoring Area	%of sites with at least one Juvenile Fish			Mean Percent Pool Occupancy (and 95% CI)			Median Percent Pool Occupancy		
	coho	sthd	cutt	coho	sthd	cutt	coho	sthd	cutt
<i>1st - 3rd order streams</i>									
North Coast	83	68	76	64(11)	44(7)	24(6)	83	46	17
Mid Coast	76	87	82	60(11)	38(8)	21(5)	79	41	15
Mid-South Coast	83	69	94	67(11)	25(7)	47(7)	95	17	46
Umpqua	59	52	83	47(10)	13(5)	29(6)	62	6	27
South Coast ³	70	-	-	55(15)	-	-	82	-	-
South Coast ¹	-	97	95	-	76(6)	34(6)	-	86	32
South Coast ²	-	96	82	-	61(12)	28(7)	-	51	30
<i>4th - 5th order streams</i>									
North Coast	67	33	42	42(16)	22(16)	20(14)	42	0	0
Mid Coast	100	91	91	79(17)	33(14)	40(16)	91	24	33
Mid-South Coast	70	70	80	69(26)	44(22)	42(20)	100	40	36
Umpqua	18	64	36	15(16)	27(12)	10(9)	0	20	0
South Coast ³	19	-	-	8(8)	-	-	0	-	-
South Coast ¹	-	100	100	-	87(11)	83(13)	-	89	80
South Coast ²	-	91	55	-	66(19)	32(17)	-	83	30

Table 4. *P*-values for tests of significance (Z statistic) for comparisons of the mean percent pool occupancy by juvenile salmonids for coastal Monitoring Areas sampled in 2004. Significant differences are bolded. Refer to Table 1 for key to header abbreviations and explanation of superscripts at South Coast sites.

Monitoring Area	1 st -3 rd order streams					4 th -5 th order streams				
	NC	MC	MS	UMP	SC-NR	NC	MC	MS	UMP	SC-NR
<i>Coho</i>										
Mid Coast	0.6445					0.4358				
Mid-South Coast	0.6209	0.3466				0.5136	0.4117			
Umpqua	0.0263	0.0883	0.0069			0.4413	0.3782	0.3872		
South Coast ³	0.3849	0.6378	0.2024	0.3406		0.3741	0.3462	0.3503	0.5027	
<i>Steelhead</i>										
Mid Coast	0.3005					0.5196				
Mid-South Coast	0.0004	0.0153				0.6637	0.5618			
Umpqua	0.0000	0.0000	0.0059			0.4917	0.4654	0.3955		
South Coast ¹	0.0000	0.0000	0.0000	0.0000		0.4711	0.4539	0.3867	0.3573	
South Coast ²	0.0144	0.0015	0.0000	0.0000	0.0300	0.6099	0.5312	0.4462	0.3899	0.4627
<i>Cutthroat</i>										
Mid Coast	0.3937					0.5757				
Mid-South Coast	0.0000	0.0000				0.6623	0.4744			
Umpqua	0.2493	0.0429	0.0002			0.4432	0.3765	0.3731		
South Coast ¹	0.0103	0.0003	0.0053	0.2147		0.5174	0.4093	0.4038	0.3920	
South Coast ²	0.3572	0.0817	0.0001	0.8552	0.1635	0.5906	0.4417	0.4342	0.4179	0.3717

Table 5. Differences in the mean percent pool occupancy for juvenile coho in 1st - 3rd order streams sampled in each coastal Monitoring Area for the brood cycle 2001-2004.

Monitoring Area	Difference in means	<i>P</i> for difference
North Coast	22.2	0.003
Mid Coast	2.6	0.743
Mid-South Coast	14.0	0.115
Umpqua	2.3	0.779
South Coast	14.0	0.118

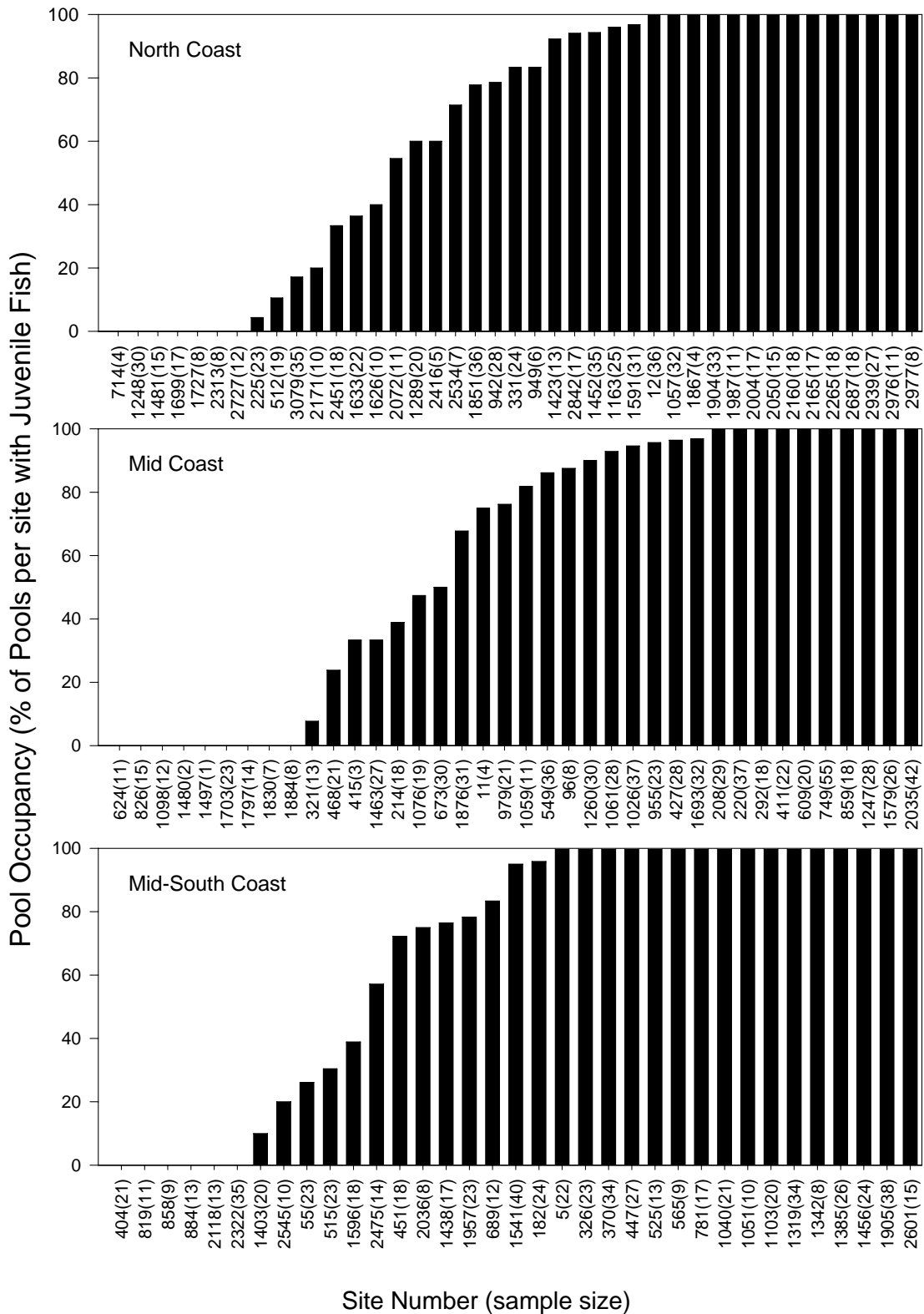


Figure 3. Percent occupancy in pools by juvenile coho in 1st-3rd order stream reaches of the North Coast, Mid Coast, and Mid-South Coast monitoring areas, summer 2004. See Appendix 1 for additional site data.

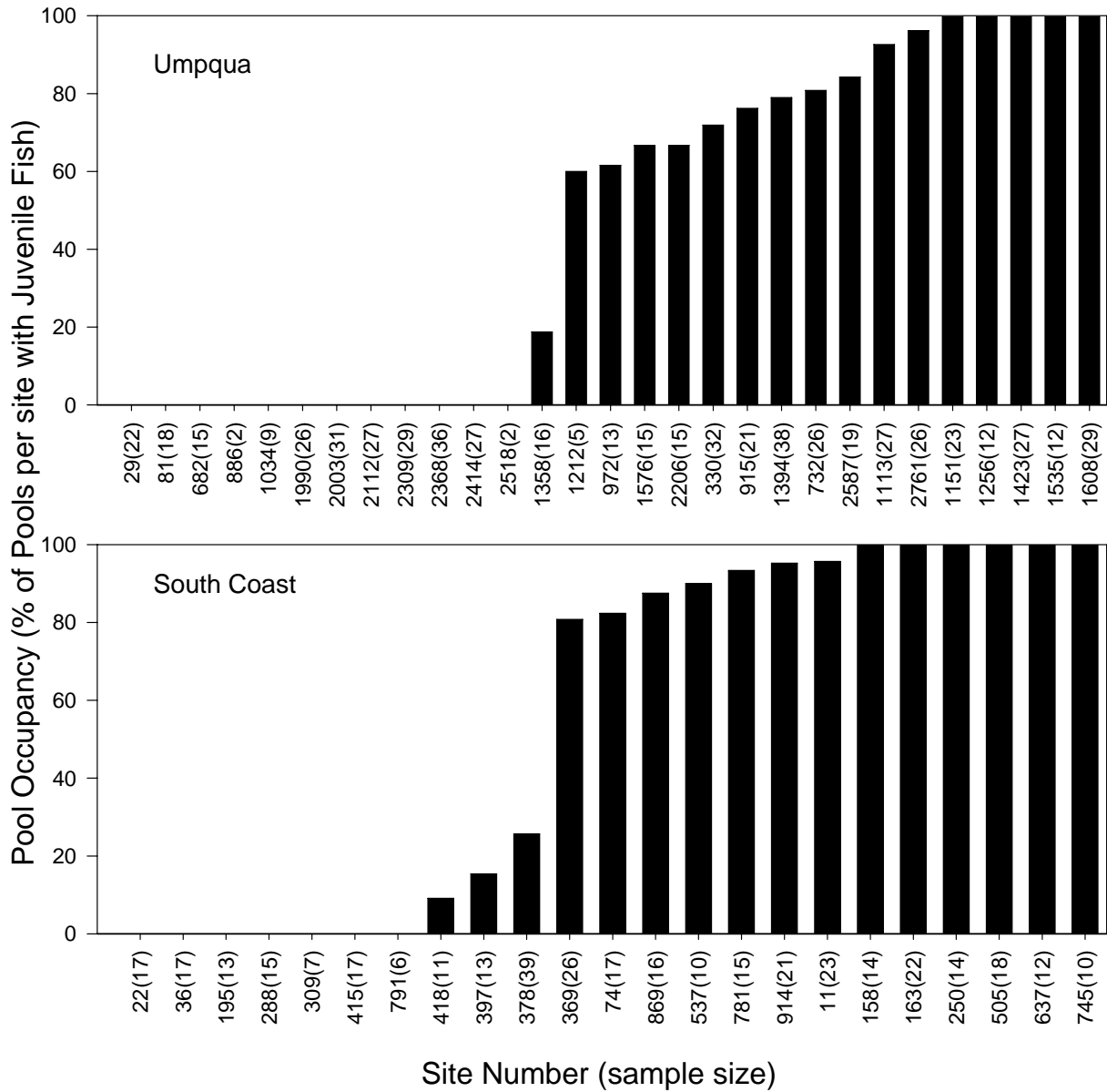


Figure 4. Percent occupancy in pools by juvenile coho in 1st-3rd order stream reaches of the Umpqua and South Coast monitoring areas, summer 2004. See Appendix 1 for additional site data.

Juvenile Salmonid Density

Coho

Average pool densities for coho in 1st-3rd order stream sites (Table 6) were between 0.25 fish/m² (South Coast) and 0.63 fish/m² (Mid-South Coast). The Mid-South Coast 1st-3rd order stream sites had significantly higher densities than all others MA's except the North Coast (Table 7), and the South Coast had significantly lower densities than all other MA's except the Umpqua. There were no differences in densities at 4th-5th order stream sites.

The percentage of 1st-3rd order stream sites with juvenile coho densities ≥ 0.7 fish/m² (Table 6; full seeding level) were greater in the Mid-South Coast (32%, North Coast (27%), and Mid Coast (26%), and lower in the South Coast (17%) and Umpqua (16%). Alternately, all monitoring areas had more than 10% of sites meeting this seeding level, with confidence bands around CDF estimates ranging between ~15-20%. Seeding levels ≥ 0.7 fish/m² were not achieved in any 4th-5th order stream reaches. Sites within a monitoring area had a range of juvenile coho densities, illustrating the relative degree to which sites were fully seeded (Figures 5-6).

The results of Z-tests for differences in the mean pool density of juvenile coho observed for the same brood cycles (sample years 2001 and 2004, for fish spawned in 2000 and 2003, respectively) are summarized in Table 8. There were no significant differences in juvenile coho densities between the years at any MA.

Steelhead

Average pool densities of steelhead in 1st-3rd order streams (Table 6) were between 0.01 fish/m² (Umpqua) and 0.09 fish/m² (South Coast Rogue basin). There were no statistical differences between MA level average pool densities, for either 1st-3rd order or 4th-5th order streams (Table 7). Steelhead densities were low in 4th-5th order sites, ranging between 0.0 -0.02 fish/m²

Cutthroat

Average pool densities of cutthroat in 1st-3rd order streams (Table 6) were between 0.01 fish/m² (North and Mid Coast) and 0.05 (Mid-South Coast). Mid-South Coast densities were greater in 1st-3rd order sites than all other MA's except the Umpqua (Table 7). Average cutthroat densities were low in larger order streams, and did not differ between MA's.

Table 6. Density (fish/m²) of juvenile fish in pools from snorkeler counts within coastal Monitoring Areas in 2004. sthd=steelhead, cutt=cutthroat. Refer to Table 1 and Methods section for explanation of superscripts at South Coast sites. Cells with no data at South Coast sites are from spatially unbalanced site selection.

Monitoring Area	Percent of sites with mean pool density ≥ 0.7 coho/m ²	Mean density (95% CI) of Juvenile Fish			Median density of Juvenile Fish		
		coho	sthd	cutt	coho	sthd	cutt
<i>1st - 3rd order streams</i>							
North Coast	27	0.42(0.13)	0.05(0.01)	0.01(0.00)	0.19	0.04	0.01
Mid Coast	26	0.39(0.10)	0.04(0.01)	0.01(0.00)	0.29	0.03	0.00
Mid-South Coast	32	0.63(0.20)	0.02(0.01)	0.05(0.02)	0.46	0.01	0.03
Umpqua	16	0.32(0.11)	0.01(0.01)	0.04(0.02)	0.26	0.00	0.02
South Coast ³	17	0.25(0.10)	-	-	0.07	-	-
South Coast ¹	0	-	0.07(0.03)	0.01(0.00)	-	0.04	0.00
South Coast ²	5	-	0.09(0.07)	0.02(0.01)	-	0.05	0.01
<i>4th - 5th order streams</i>							
North Coast	0	0.09(0.08)	0.00(0.00)	0.00(0.00)	0.00	0.00	0.00
Mid Coast	0	0.03(0.03)	0.00(0.00)	0.00(0.00)	0.01	0.00	0.00
Mid-South Coast	0	0.04(0.03)	0.00(0.01)	0.00(0.00)	0.03	0.00	0.00
Umpqua	0	0.00(0.01)	0.01(0.01)	0.00(0.00)	0.00	0.00	0.00
South Coast ³	0	0.00(0.00)	-	-	0.00	-	-
South Coast ¹	-	-	0.02(0.01)	0.01(0.00)	-	0.02	0.00
South Coast ²	-	-	0.01(0.01)	0.00(0.00)	-	0.01	0.00

Table 7. *P*-values for tests of significance (Z statistic) for comparisons of the mean density of juvenile salmonids in pools for coastal Monitoring Areas sampled in 2004. Significant differences are bolded. Refer to Table 1 for key to header abbreviations and explanation of superscripts at South Coast sites.

Monitoring Area	1 st -3 rd order streams					4 th -5th order streams				
	NC	MC	MS	UMP	SC-NR	NC	MC	MS	UMP	SC-NR
<i>Coho</i>										
Mid Coast	0.7039					0.3198				
Mid-South Coast	0.0910	0.0372				0.3826	0.3815			
Umpqua	0.2470	0.3646	0.0085			0.3197	0.5383	0.3234		
South Coast ³	0.0043	0.0617	0.0011	0.3984		0.7430	0.3216	0.4651	0.3200	
<i>Steelhead</i>										
Mid Coast	0.9379					0.5132				
Mid-South Coast	0.4352	0.3021				0.3521	0.4007			
Umpqua	0.3318	0.1835	0.3220			0.6037	0.9809	0.7352		
South Coast ¹	0.7245	0.6344	0.2541	0.1912		0.6285	0.9790	0.7036	0.8009	
South Coast ²	0.5177	0.4350	0.1760	0.1360	0.7518	0.9615	0.5924	0.4635	0.3232	0.3479
<i>Cutthroat</i>										
Mid Coast	0.4616					0.3966				
Mid-South Coast	0.0000	0.0001				0.6825	0.5615			
Umpqua	0.0016	0.0039	0.4845			0.3649	0.6117	0.3860		
South Coast ¹	0.5692	0.8572	0.0001	0.0031		0.8009	0.4975	0.9826	0.4443	
South Coast ²	0.0286	0.0878	0.0091	0.0786	0.0663	0.4627	0.8975	0.5330	0.7447	0.3829

Table 8. Differences in mean density in pools for juvenile coho in 1st - 3rd order streams sampled in each coastal Monitoring Area for the brood cycle 2001-2004.

Comparison	Difference in Means	<i>P</i> for difference
North Coast	0.02	0.882
Mid Coast	0.12	0.215
Mid-South Coast	0.16	0.265
Umpqua	0.15	0.614
South Coast	0.13	0.169

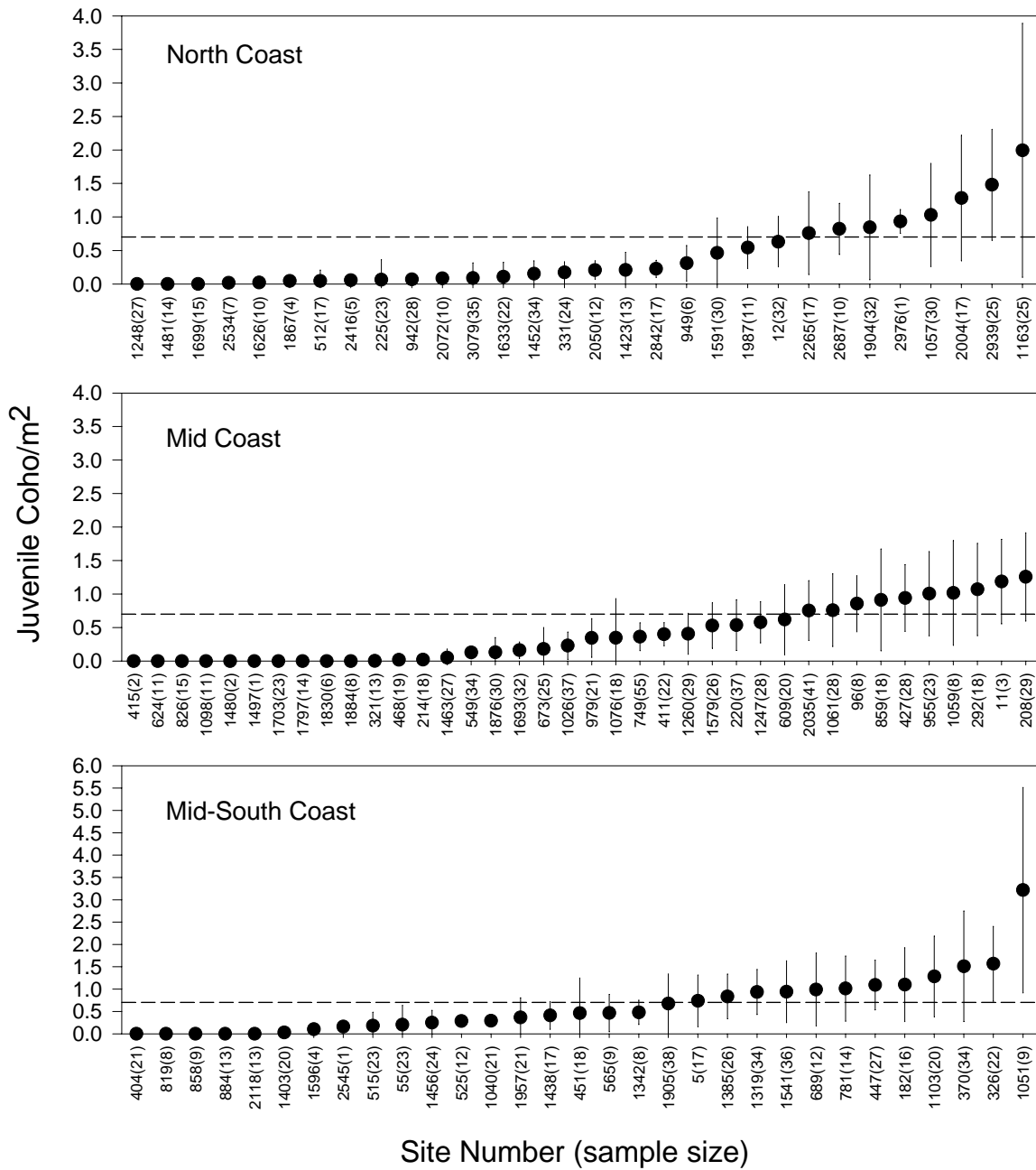


Figure 5. Mean density (and standard error) in pools of juvenile coho at 1st-3rd order stream reaches in North Coast, Mid Coast, and Mid-South Coast monitoring areas, summer of 2004. The reference line at 0.7 coho/m² represents a baseline for full seeding level of juvenile coho in Oregon coastal streams. See Appendix 1 for additional site data.

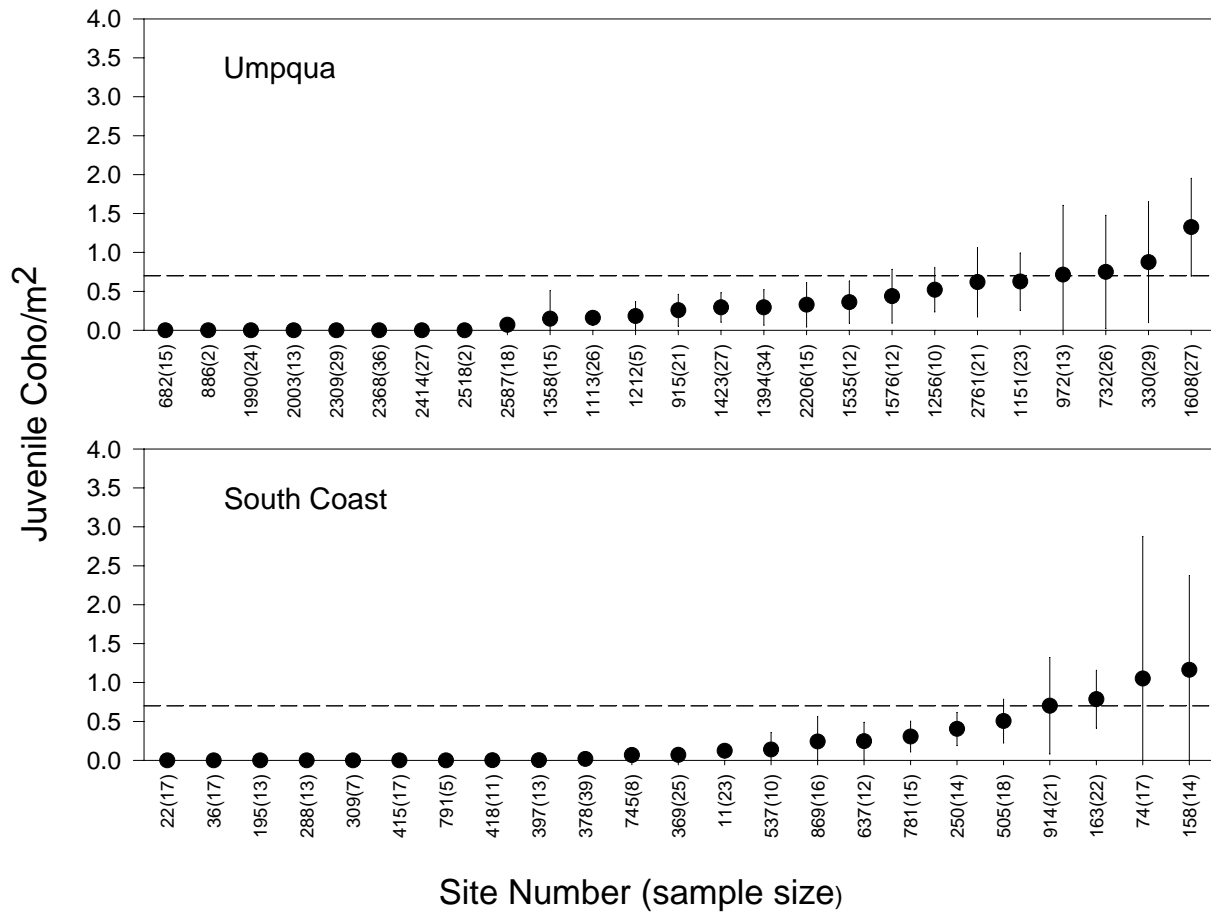


Figure 6. Mean density (and standard error) in pools of juvenile coho at 1st-3rd order stream reaches in the Umpqua and South Coast monitoring areas, summer of 2004. The reference line at 0.7 coho/m² represents a baseline for full seeding level of juvenile coho in Oregon coastal streams. See Appendix 1 for additional site data.

Juvenile Coho Population Trend and Comparison to Adult Abundance

The relationship between adult coho abundance estimates and corresponding juvenile coho densities can be evaluated at the monitoring area scale. For the brood years 1998-2003 the Mid-South Coast, Umpqua and South Coast MA's show a significant relationship, indicating a linear increase in juvenile coho densities with increasing adult spawners (linear regression: F-test p values in Figure 7). The slope of this relationship was not different than zero for the North Coast and Mid Coast ($\alpha=0.05$), indicating the simple linear regression model did not adequately explain the relationship between adult and juvenile coho abundance. In the Mid Coast, the simple linear model explained < 13% of the variation in juvenile coho densities. Examination of Mid Coast juvenile data suggested a log transformation that improved the linearity of the data ($p=0.016$) and increased to amount of variability explained by adult abundance data ($r^2=0.49$). However, the last few years have seen greater numbers of adult coho than in earlier years, without a corresponding increase in juvenile numbers in the North and Mid Coast Monitoring areas. This suggests a density dependent effect on juvenile coho (rearing capacity) in these areas that has not yet evident in the other monitoring areas. Preliminary analysis of a best fit model indicates that the North and Mid-Coast data are better explained with a logistic model that has a carrying capacity term in the equation (see results in Figure 7).

There is an indication that South Coast sites support a greater number of juvenile coho for a given number of adults, relative to North Coast and Mid-South sites, suggesting greater rearing capacity in South Coast streams (Figure 7).

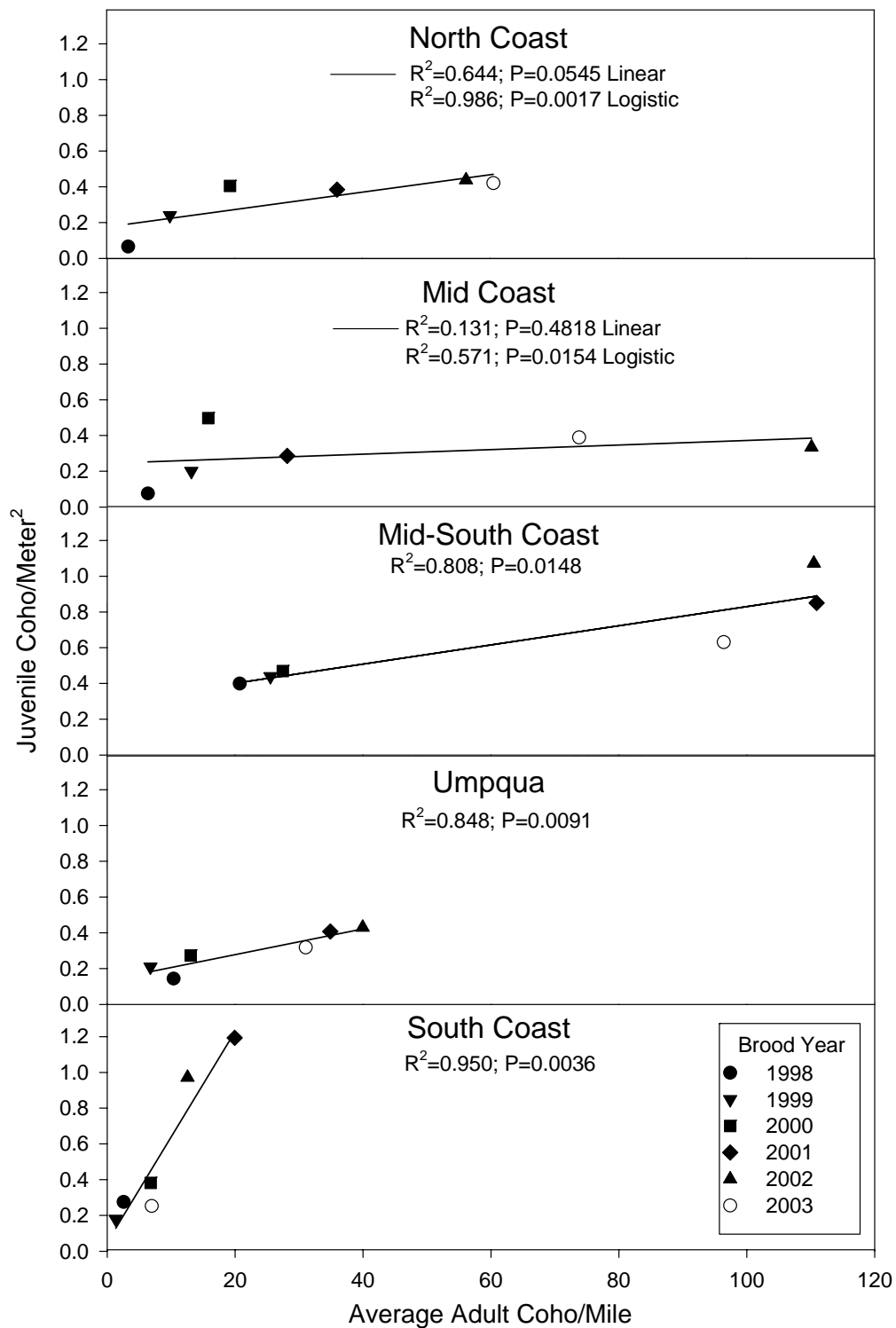


Figure 7. The relationship between the average number of juvenile coho/m² in 1st-3rd order stream reaches and the average adults/mile that produced them, for each of the five Monitoring Areas on the Oregon Coast, 1998-2004. Brood year refers to the year adult survey data were collected. Fitted lines are from the linear regression model with results displayed in each panel. A logistic model was also fit to the North and Mid Coast MA's, with results in the respective panels.

References

Jepsen, D. B. and Rodgers, J. D. 2004. Abundance monitoring of juvenile salmonids in Oregon coastal streams, 2002-2003. Monitoring Program Report Number OPSW-ODFW-2003-1, Oregon Department of Fish and Wildlife, Portland.

Appendix

Appendix 1. Location, sample sizes, average density, and percentage of pools containing juvenile salmonids at coastal Monitoring Area sites sampled in 2004. Bolded sites are 4th-5th order streams. Abbreviations for monitoring areas are: NC= North Coast, MC= Mid Coast, MS=Mid-South Coast, UMP=Umpqua, and SC=South Coast. South Coast sub-areas include 1st-3rd order streams within coho distribution (coho), and steelhead streams found in the Rogue basin (R sthd) and non-Rogue basins (NR sthd). Abbreviations for fish species are: Sthd= Steelhead, and Cutt=Cutthroat.

Monitoring Area	Site	Basin Name, Subbasin Name	Reach Name	UTM-east	UTM-north	Density (fish/m ²)		Occupancy (% of pools per site with fish)			
						N pools	Coho	N pools	Coho	Sthd	Cutt
NC	12	Trask River, South Fork	Boundary Creek	457349	5022158	32	0.63	36	100	94	58
NC	225	Nestucca River, Mainstem and Bay	Clear Creek	430461	5002694	23	0.06	23	4	78	52
NC	331	Nestucca River, Three Rivers	Crazy Creek	439703	5001997	24	0.17	24	83	83	4
NC	512	Trask River, Mainstem	Mill Creek	438039	5030231	17	0.04	19	11	0	0
NC	714	Tillamook River, Mainstem	Tillamook River	434913	5022172	0	-	4	0	0	0
NC	942	Nestucca River, Mainstem and Bay	West Creek	434891	5013980	28	0.07	28	79	46	29
NC	949	Neskowin Creek, Mainstem	Sloan Creek	428426	4990915	6	0.31	6	83	67	17
NC	1057	Nehalem River, Rock Creek	Rock Creek, N Fk	465728	5074399	30	1.03	32	100	56	31
NC	1163	Wilson River, North Fork	Wilson R, N Fk, W Fk	453888	5053220	25	1.99	25	96	88	24
NC	1248	Nehalem River, Rock Creek	Rock Creek, S Fk	466271	5068555	27	0.00	30	0	0	10
NC	1289	Nehalem River, Mainstem	Lousignont Cr., N Fk	474517	5065859	0	-	20	60	0	0
NC	1423	Necanicum River, Mainstem	Necanicum River	436600	5083938	13	0.21	13	92	46	38
NC	1452	Rover Creek, Mainstem	Bergsvik Creek	441334	5082463	34	0.15	35	94	17	11
NC	1481	Rover Creek, Mainstem	Little Muddy Creek	426890	5090648	14	0.00	15	0	40	13
NC	1591	Rover Creek, Mainstem	Little Joe Creek	441035	5081286	30	0.46	31	97	39	3
NC	1626	Nehalem River, North Fork	Nehalem River, N Fk	443457	5072776	10	0.02	10	40	0	10
NC	1633	Nehalem River, North Fork	Lost Creek	444351	5071983	22	0.11	22	36	36	23
NC	1699	Nehalem River, North Fork	Rackheap Creek	437514	5068323	15	0.00	17	0	53	0
NC	1727	Miami River, Mainstem	Miami River, Trib T	440611	5055535	0	-	8	0	0	0
NC	1851	Nehalem River, Mainstem	Foley Creek	431534	5054239	0	-	36	78	58	42
NC	1867	Kilchis River, Mainstem	Kilchis River	438765	5048466	4	0.04	4	100	100	50
NC	1904	Miami River, Mainstem	Miami River	434470	5051773	32	0.85	33	100	70	48
NC	1987	Kilchis River, Mainstem	Kilchis River, S Fk	443610	5049325	11	0.54	11	100	91	64
NC	2004	Kilchis River, Mainstem	Kilchis River, N Fk	444889	5051945	17	1.28	17	100	100	88

Monitoring Area	Site	Basin Name, Subbasin Name	Reach Name	UTM-east	UTM-north	Density (fish/m ²)		Occupancy (% of pools per site with fish)			
						N pools	Coho	N pools	Coho	Sthd	Cutt
NC	2050	Nehalem River, Mainstem	Foley Creek	434694	5057499	12	0.21	15	100	93	67
NC	2072	Necanicum River, Neawanna Creek	Neawanna Creek	430599	5091758	10	0.08	11	55	9	9
NC	2160	Nehalem River, Mainstem	Beneke Creek	461238	5089257	0	-	18	100	0	0
NC	2165	Nehalem River, Mainstem	Crawford Creek	464188	5088867	0	-	17	100	0	12
NC	2171	Nehalem River, Mainstem	Klines Creek	458116	5081389	0	-	10	20	0	0
NC	2265	Nehalem River, Mainstem	Hamilton Creek	456452	5090918	17	0.76	18	100	67	17
NC	2313	Nehalem River, Mainstem	McCoon Creek	475535	5100871	0	-	8	0	0	25
NC	2416	Nehalem River, Rock Creek	Rock Creek	471249	5077224	5	0.06	5	60	20	0
NC	2451	Nehalem River, Mainstem	Cedar Creek	478704	5077638	0	-	18	33	0	33
NC	2534	Nehalem River, Rock Creek	Rock Creek	484688	5080219	7	0.02	7	71	0	0
NC	2687	Nehalem River, Mainstem	Oak Ranch Creek	492203	5088102	10	0.82	18	100	33	6
NC	2727	Nehalem River, Mainstem	Oak Ranch Creek	493772	5083617	0	-	12	0	0	0
NC	2842	Trask River, North Fork	Trask River, N Fk	464896	5035454	17	0.23	17	94	94	53
NC	2939	Wilson River, Mainstem	Ben Smith Creek	459762	5047942	25	1.48	27	100	78	22
NC	2976	Wilson River, North Fork	Wilson River, N Fk	457739	5052089	1	0.93	11	100	82	73
NC	2977	Wilson River, North Fork	Wilson R, N Fk, W Fk	457732	5052293	0	-	8	100	88	38
NC	3079	Wilson River, Mainstem	Jordan Creek	461227	5043868	35	0.09	35	17	71	6
NC	11220	Wilson River, Mainstem	Wilson River	452184	5039126	3	0.01	3	100	100	67
NC	11230	Nehalem River, Mainstem	Nehalem River	467212	5090794	3	0.00	3	0	0	0
NC	11240	Nehalem River, Mainstem	Nehalem River	480117	5092485	3	0.00	3	0	0	67
NC	11250	Nestucca River, Mainstem	Nestucca River	445757	5012184	4	0.16	4	100	100	75
NC	11260	Wilson River, Mainstem	Wilson River	457897	5048381	7	0.59	7	71	29	14
NC	11270	Nehalem River, Mainstem	Nehalem River	455688	5076786	3	0.00	3	33	33	0
NC	11280	Nehalem River, Mainstem	Nehalem River	487404	5080482	5	0.00	5	0	0	0
NC	11310	Nehalem River, Mainstem	Nehalem River	449903	5070967	9	0.02	9	22	0	0
NC	11320	Nehalem River, Mainstem	Nehalem River	484370	5076379	4	0.01	4	75	0	0
NC	11330	Wilson River, Mainstem	Wilson River	443013	5035570	2	0.23	2	50	0	0
NC	11340	Nehalem River, Mainstem	Nehalem River	477657	5094141	2	0.00	2	50	0	0
NC	11350	Nehalem River, Mainstem	Nehalem River	440881	5060777	5	0.00	5	0	0	20
MC	11	Alsea River, Fiver Rivers	Martha Creek	446295	4902911	3	1.19	4	75	50	0
MC	96	Alsea River, Mainstem and Bay	Benner Creek	441390	4911275	8	0.86	8	88	75	50
MC	208	Siuslaw River, Lake Creek	Indian Creek, W Fk	428733	4893643	29	1.26	29	100	48	31
MC	214	Siuslaw River, Lake Creek	Indian Creek	432927	4890319	18	0.02	18	39	11	17
MC	220	Siuslaw River, Lake Creek	Rogers Creek	429202	4889735	37	0.54	37	100	59	49

Monitoring Area	Site	Basin Name, Subbasin Name	Reach Name	UTM-east	UTM-north	Density (fish/m ²)		Occupancy (% of pools per site with fish)			
						N pools	Coho	N pools	Coho	Sthd	Cutt
MC	292	Alsea River, Fiver Rivers	Lobster Creek, E Fk	451516	4899954	18	1.07	18	100	56	6
MC	321	Siuslaw River, Lake Creek	Lake Creek	460167	4895408	13	0.00	13	8	8	0
MC	411	Alsea River, North Fork	Crooked Creek	457246	4919071	22	0.40	22	100	82	64
MC	415	Alsea River, Mainstem and Bay	Roberts Creek	450731	4914338	2	0.00	3	33	0	0
MC	427	Alsea River, South Fork	Bummer Creek	451956	4907671	28	0.94	28	96	75	43
MC	468	Siuslaw River, Mainstem	Shaw Creek	473903	4857490	19	0.02	21	24	10	14
MC	549	Siuslaw River, Mainstem	Haight Creek	460374	4856570	34	0.13	36	86	3	28
MC	609	Siuslaw River, Mainstem	Clay Creek	454555	4861159	20	0.62	20	100	25	10
MC	624	Siuslaw River, Mainstem	Siuslaw River	449729	4864413	11	0.00	11	0	0	0
MC	673	Siuslaw River, Mainstem	Fawn Creek	475506	4856473	25	0.18	30	50	10	7
MC	749	Siuslaw River, North Fork	Porter Creek	423791	4887933	55	0.36	55	100	49	25
MC	826	Ten Mile Creek, Mainstem	Mill Creek	414583	4895297	15	0.00	15	0	53	7
MC	859	Siuslaw River, Mainstem	Barber Creek	441847	4876395	18	0.91	18	100	11	22
MC	955	Siuslaw River, Lake Creek	Hula Creek	442273	4882903	23	1.00	23	96	39	30
MC	979	Siuslaw River, Mainstem	Hanson Creek	422615	4875614	21	0.34	21	76	86	48
MC	1026	Yaquina River, Elk Creek	Spout Creek	445519	4933202	37	0.23	37	95	3	11
MC	1059	Yaquina River, Little Elk Creek	Little Elk Creek, Trib A	439453	4941107	8	1.02	11	82	27	27
MC	1061	Yaquina River, Mainstem and Bay	Bales Creek	440092	4947508	28	0.76	28	93	68	36
MC	1076	Yaquina River, Little Elk Creek	Oglesby Creek	442427	4942788	18	0.35	19	47	42	11
MC	1098	Siletz River, Mainstem	Sam Creek	442487	4950356	11	0.00	12	0	0	0
MC	1247	Siletz River, Mainstem	Mill Creek, N Fk	439998	4957057	28	0.58	28	100	64	54
MC	1260	Yaquina River, Mainstem and Bay	Little Beaver Creek	422852	4944236	29	0.41	30	90	60	10
MC	1463	Cummins Creek, Mainstem	Cummins Creek	415211	4901871	27	0.05	27	33	78	22
MC	1480	Yachats River, Mainstem	Carson Creek	420026	4907167	2	0.00	2	0	0	0
MC	1497	Alsea River, Mainstem and Bay	Constantine Creek	419654	4917137	1	0.00	1	0	100	0
MC	1579	Yaquina River, Elk Creek	Deer Creek	438239	4935277	26	0.53	26	100	12	8
MC	1693	Siuslaw River, Lake Creek	Congdon Creek	457930	4896601	32	0.16	32	97	69	19
MC	1703	Siuslaw River, Lake Creek	Greenleaf Creek	450664	4892806	23	0.00	23	0	13	30
MC	1797	Siuslaw River, Mainstem	Siuslaw River	459390	4858632	14	0.00	14	0	0	14
MC	1830	Siuslaw River, Mainstem	Siuslaw River	449521	4863416	6	0.00	7	0	14	14
MC	1876	Big Creek, Mainstem and S Fk	Big Creek	411595	4891212	30	0.13	31	68	35	10
MC	1884	Siuslaw River, Mainstem	Shoemaker Creek	428704	4879153	8	0.00	8	0	50	38
MC	2035	Alsea River, Drift Creek	Trout Creek	425684	4926322	41	0.75	42	100	74	33
MC	12360	Yaquina River, Mainstem	Elk Creek	432606	4938366	10	0.02	10	90	40	80

Monitoring Area	Site	Basin Name, Subbasin Name	Reach Name	UTM-east	UTM-north	Density (fish/m ²)		Occupancy (% of pools per site with fish)			
						N pools	Coho	N pools	Coho	Sthd	Cutt
MC	12370	Siuslaw River, Mainstem	Wolf Creek	455585	4867946	17	0.00	17	18	18	12
MC	12380	Yaquina River, Mainstem	Elk Creek	443204	4932279	17	0.20	17	100	24	53
MC	12400	Siletz River, Mainstem	Rock Creek #2	440495	4952519	11	0.04	11	91	27	27
MC	12420	Siletz River, Mainstem	Siletz River	430480	4952053	9	0.04	9	89	22	33
MC	12430	Alsea River, Mainstem	Alsea River	444074	4910670	4	0.00	4	100	75	25
MC	12440	Yaquina River, Mainstem	Elk Creek	433581	4934872	9	0.01	9	100	22	33
MC	12450	Siuslaw River, Mainstem	Wolf Creek	466916	4864035	18	0.04	18	61	6	11
MC	12460	Yaquina River, Mainstem	Yaquina River	431911	4944594	6	0.00	6	17	0	0
MC	12470	Alsea River, Mainstem	Alsea River	434184	4912618	5	0.00	5	100	60	60
MC	12480	Siletz River, Mainstem	Siletz River	438096	4961081	4	0.01	4	100	75	100
MS	5	Coos River, South Fork	Cedar Creek	444414	4797147	17	0.73	22	100	36	55
MS	55	Coos River, South Fork	Lost Creek	452565	4784777	23	0.20	23	26	4	57
MS	182	Coquille River, South Fork	Ward Creek	399330	4766084	16	1.10	24	96	4	29
MS	326	Fourmile Creek, Mainstem	Fourmile Creek	391437	4760010	22	1.57	23	100	26	35
MS	370	Coquille River, East Fork	Yankee Run Creek	416151	4776472	34	1.51	34	100	41	53
MS	404	Coquille River, Middle Fork	Big Creek	427798	4772620	21	0.00	21	0	0	52
MS	447	Coquille River, North Fork	Middle Creek	426881	4788713	27	1.09	27	100	63	59
MS	451	Coquille River, North Fork	Middle Creek	428629	4787378	18	0.46	18	72	0	33
MS	515	Coquille River, North Fork	Hudson Creek	419537	4789708	23	0.18	23	30	30	48
MS	525	Coquille River, North Fork	Middle Creek	421942	4787753	12	0.28	13	100	31	46
MS	565	Coquille River, North Fork	Middle Creek	418493	4786610	9	0.46	9	100	44	44
MS	689	Coquille River, North Fork	Johns Creek	413716	4769824	12	0.99	12	83	17	42
MS	781	Coquille River, South Fork	Salmon Creek	409609	4744205	14	1.01	17	100	88	82
MS	819	Sixes River, Mainstem	Sixes River	402449	4741305	8	0.00	11	0	0	9
MS	858	Sixes River, Mainstem	Sixes River	393274	4739671	9	0.00	9	0	67	67
MS	884	Floras Creek, Mainstem	Floras Creek	385485	4751819	13	0.00	13	0	77	46
MS	1040	Coos River, Millicoma River	Elk Creek	423830	4822612	21	0.29	21	100	48	71
MS	1051	Coos River, Millicoma River	Joes Creek	422055	4824892	9	3.22	10	100	10	40
MS	1103	Ten Mile Creek, S. Tenmile Lake	Benson Creek	417388	4824923	20	1.28	20	100	55	50
MS	1319	Coos River, South Fork	Wren Smith Creek	412671	4796837	34	0.93	34	100	68	38
MS	1342	Coos River, Millicoma River	Millicoma River, E Fk	428755	4807079	8	0.48	8	100	50	100
MS	1385	Coos River, Millicoma River	Millicoma River, E Fk	429198	4807560	26	0.84	26	100	42	73
MS	1403	Coos River, Millicoma River	Schumacher Creek	415968	4814747	20	0.03	20	10	10	70
MS	1438	Coos River, South Fork	McKnight Creek	419247	4802818	17	0.41	17	76	41	82

Monitoring Area	Site	Basin Name, Subbasin Name	Reach Name	UTM-east	UTM-north	Density (fish/m ²)		Occupancy (% of pools per site with fish)			
						N pools	Coho	N pools	Coho	Sthd	Cutt
MS	1456	Coos River, Millicoma River	Millicoma River, E Fk	425298	4807789	24	0.25	24	100	8	25
MS	1541	Coquille River, North Fork	Woodward Creek	413876	4791413	36	0.94	40	95	8	43
MS	1596	Coquille River, Mainstem and Bay	Fat Elk Creek	398581	4777573	4	0.10	18	39	0	50
MS	1905	Coos River, South Fork	Williams River	445542	4787215	38	0.67	38	100	21	21
MS	1957	Coquille River, Mainstem and Bay	Little Bear Creek	395118	4766593	21	0.37	23	78	0	78
MS	2036	Coquille River, North Fork	Coquille River, N Fk	412117	4779647	0	-	8	75	0	38
MS	2118	Sixes River, North Fork	Sixes River, N Fk	402683	4743395	13	0.00	13	0	0	23
MS	2322	Ten Mile Creek, Eel Lake	Eel Creek	404474	4826673	0	-	35	0	0	0
MS	2475	Coquille River, Mainstem and Bay	Cunningham Creek	405834	4783300	0	-	14	57	0	7
MS	2545	Coquille River, Mainstem and Bay	Cunningham Creek	405490	4782539	1	0.16	10	20	0	0
MS	2601	Big Creek, Mainstem	Big Creek	389889	4795834	0	-	15	100	0	80
MS	13280	Coquille River, Mainstem	Coquille River, S Fk	413984	4745330	3	0.01	3	100	100	33
MS	13290	Coquille River, Mainstem	Coquille River Mid. Fk	429690	4756866	16	0.12	16	94	19	19
MS	13300	Coquille River, Mainstem	Coquille River Mid. Fk	409446	4765103	2	0.00	2	0	0	0
MS	13310	Coquille River, Mainstem	Coquille River, N Fk	409488	4775898	4	0.08	5	100	40	20
MS	13320	Coos River, Mainstem	Coos River, S Fk	430992	4800566	5	0.10	5	100	40	40
MS	13330	Coquille River, Middle Fork	Twelvemile Creek	440412	4757183	25	0.00	26	0	73	38
MS	13340	Coquille River, Mainstem	Coquille River, N Fk	412390	4772813	1	0.03	1	100	100	100
MS	13360	Coos River, Mainstem	Coos River, S Fk	424577	4801289	2	0.02	2	100	0	100
MS	13370	Coquille River, Middle Fork	Myrtle Creek	419140	4761744	6	0.08	6	100	67	67
MS	13380	Coquille River, Mainstem	Coquille River, S Fk	405510	4762225	4	0.00	4	0	0	0
UMP	29	Umpqua River, Elk Creek	Elk Creek	485589	4821968	0	-	22	0	0	0
UMP	81	Umpqua River, South Fork	Roberts Creek	469231	4777141	0	-	18	0	0	11
UMP	330	Umpqua River, South Fork	Rice Creek	463848	4764881	29	0.87	32	72	6	3
UMP	682	Umpqua River, South Fork	Gravel Creek	462083	4744721	15	0.00	15	0	0	60
UMP	732	Umpqua River, South Fork	Rattlesnake Creek	460164	4729329	26	0.75	26	81	23	54
UMP	886	Umpqua River, South Fork	Van Dine Creek	472260	4764271	2	0.00	2	0	0	0
UMP	915	Umpqua River, South Fork	Wood Creek	467641	4736439	21	0.26	21	76	10	10
UMP	972	Umpqua River, South Fork	Bull Run Creek	479943	4733624	13	0.71	13	62	15	23
UMP	1034	Umpqua River, Mainstem and Bay	Dry Creek	414708	4832633	0	-	9	0	0	0
UMP	1113	Umpqua River, Mainstem and Bay	Wolf Creek	450689	4811470	26	0.16	27	93	44	15
UMP	1151	Umpqua River, Mainstem and Bay	Lutsinger Creek	442103	4831091	23	0.63	23	100	30	43
UMP	1212	Umpqua River, Smith River	Spencer Cr., W F, Tr. A	430078	4852204	5	0.18	5	60	0	20
UMP	1256	Umpqua River, Smith River	South Sister Creek	446740	4852964	10	0.52	12	100	0	33

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UMP	1358	Umpqua River, Smith River	Blackwell Creek	439594	4850651	15	0.15	16	19	31	38
UMP	1394	Umpqua River, Mainstem and Bay	Wells Creek	435689	4836052	34	0.29	38	79	11	42
UMP	1423	Umpqua River, Mainstem and Bay	Weatherly Creek	441352	4836500	27	0.29	27	100	19	48
UMP	1535	Umpqua River, Elk Creek	Big Tom Folley Creek	459558	4837313	12	0.36	12	100	25	67
UMP	1576	Umpqua River, Smith River	Peterson Creek	468703	4845326	12	0.44	15	67	0	7
UMP	1608	Umpqua River, Elk Creek	Squaw Creek	462883	4827905	27	1.33	29	100	0	55
UMP	1990	Umpqua River, Calapooya Creek	Brome Creek	496422	4806748	24	0.00	26	0	0	23
UMP	2003	Umpqua River, Calapooya Creek	Haney Creek	490966	4813228	13	0.00	31	0	0	10
UMP	2112	Umpqua River, Calapooya Creek	Cabin Creek	474688	4814421	0	-	27	0	0	0
UMP	2206	Umpqua River, Mainstem and Bay	Bear Creek	464274	4819268	15	0.33	15	67	7	27
UMP	2309	Umpqua River, South Fork	Falcon Creek	537075	4759974	29	0.00	29	0	34	52
UMP	2368	Umpqua River, South Fork	Boulder Creek	517781	4768580	36	0.00	36	0	31	64
UMP	2414	Umpqua River, South Fork	Black Canyon Creek	525234	4754576	27	0.00	27	0	33	37
UMP	2518	Umpqua River, South Fork	Shively Creek, E Fk	489580	4747924	2	0.00	2	0	0	0
UMP	2587	Umpqua River, South Fork	Myrtle Creek, N Fk	482725	4765982	18	0.07	19	84	58	32
UMP	2761	Umpqua River, Mainstem and Bay	Brads Creek	461126	4825455	21	0.62	26	96	0	62
UMP	14320	Umpqua River, North Fork	Little River	514999	4783373	21	0.00	21	0	86	5
UMP	14340	Umpqua River, Mainstem	Elk Creek	478963	4832153	14	0.00	14	0	0	0
UMP	14350	Umpqua River, Mainstem	Umpqua River, N Fk	491705	4793682	3	0.00	3	0	33	0
UMP	14360	Umpqua River, Mainstem	Umpqua River, S Fk	479711	4754553	5	0.00	5	0	20	0
UMP	14370	Umpqua River, Mainstem	Smith River	447605	4848659	11	0.01	11	73	9	0
UMP	14400	Umpqua River, Mainstem	Umpqua River, S Fk	471462	4767725	3	0.00	3	0	0	0
UMP	14420	Umpqua River, Mainstem	Umpqua River, S Fk	530022	4770100	8	0.00	8	0	50	25
UMP	14430	Umpqua River, Mainstem	Umpqua River, N Fk	482661	4794756	12	0.00	12	0	0	0
UMP	14440	Umpqua River, South Fork	Elk Creek	504429	4752212	10	0.04	10	90	70	50
UMP	14450	Umpqua River, Mainstem	Elk Creek	478567	4832139	14	0.00	14	0	0	0
UMP	14490	Umpqua River, Camp Creek	Mill Creek	432058	4828613	4	0.00	6	0	33	33
SC-coho	11	Rogue River, Mainstem	Grave Creek	476041	4719919	23	0.12	23	96	96	17
SC-coho	22	Rogue River, Mainstem	Grave Creek	482603	4720755	17	0.00	17	0	12	0
SC-coho	36	Rogue River, Mainstem	Grave Creek	486191	4727234	17	0.00	17	0	24	0
SC-coho	74	Rogue River, Mainstem	Flat Creek	523360	4734576	17	1.05	17	82	82	18
SC-coho	158	Rogue River, Mainstem	Trail Creek, W Fk	508622	4729177	14	1.16	14	100	93	29
SC-coho	163	Rogue River, Mainstem	Evans Creek	504327	4722949	22	0.79	22	100	86	18
SC-coho	195	Rogue River, Mainstem	Sams Creek	500312	4705142	13	0.00	13	0	54	8

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SC-coho	250	Rogue River, Mainstem	Little Butte Creek, S Fk	544597	4687818	14	0.40	14	100	93	14
SC-coho	288	Rogue River, Mainstem	Wolf Creek	461333	4723126	13	0.00	15	0	20	0
SC-coho	309	Rogue River, Mainstem	Jumpoff Joe Creek	460311	4707804	7	0.00	7	0	0	0
SC-coho	369	Rogue River, Lobster Creek	Lobster Creek, S Fk	402923	4717361	25	0.07	26	81	88	42
SC-coho	378	Elk River, Mainstem	Blackberry Creek	399392	4729013	39	0.02	39	26	74	18
SC-coho	397	Rogue River, Lobster Creek	Lobster Creek	393580	4707839	13	0.00	13	15	100	62
SC-coho	415	Rogue River, Lobster Creek	Lobster Creek, N Fk	398148	4720709	17	0.00	17	0	82	71
SC-coho	418	Elk River, Mainstem	Red Cedar Creek	392203	4729196	11	0.00	11	9	100	0
SC-coho	505	Rogue River, Illinois River	Althouse Creek	455381	4662245	18	0.50	18	100	50	6
SC-coho	537	Rogue River, Illinois River	Illinois River, E Fk	449037	4660761	10	0.14	10	90	50	10
SC-coho	637	Rogue River, Mainstem	Little Butte Creek, S Fk	532823	4695424	12	0.25	12	100	50	0
SC-coho	745	Rogue River, Applegate River	Williams Creek	479372	4678683	8	0.07	10	100	100	60
SC-coho	781	Rogue River, Applegate River	Williams Creek, E Fk	478478	4669411	15	0.31	15	93	80	47
SC-coho	791	Rogue River, Applegate River	Thompson Creek	483773	4673682	5	0.00	6	0	33	0
SC-coho	869	Rogue River, Applegate River	Waters Creek	454508	4690840	16	0.24	16	88	50	38
SC-coho	914	Rogue River, Illinois River	Crooks Creek	458824	4684002	21	0.70	21	95	57	24
SC-R sthd	1814	Rogue River, Mainstem	Soda Creek	541049	4687408	27	0.00	27	0	33	48
SC-R sthd	1817	Rogue River, Elk Creek	West Branch	518256	4732049	14	0.00	14	0	100	50
SC-R sthd	1818	Rogue River, Mainstem	Neil Creek	529605	4662825	5	0.00	6	0	0	33
SC-R sthd	1819	Rogue River, Big Butte Creek	Eighty Acre Creek	540196	4714288	5	0.00	5	0	100	60
SC-R sthd	1821	Rogue River, Trail Creek	Chicago Creek	507019	4729135	10	0.00	10	0	40	50
SC-R sthd	2031	Rogue River, Applegate River	Sterling Creek	500334	4668601	4	0.00	4	0	50	0
SC-R sthd	2032	Rogue River, Illinois River	Swede Creek	439397	4693580	36	0.00	36	0	44	44
SC-R sthd	2033	Rogue River, Applegate River	Grays Creek	474312	4684751	14	0.00	15	0	47	67
SC-R sthd	2034	Rogue River, Galice Creek	Galice Creek, N Fk	445073	4711755	33	0.00	33	0	94	39
SC-R sthd	2035	Rogue River, Mainstem	Coyote Creek	470113	4725664	7	0.00	7	0	86	14
SC-R sthd	2036	Rogue River, Illinois River	Collier Creek, N Fk	414230	4695865	36	0.00	36	0	92	0
SC-R sthd	2037	Rogue River, Evans Creek	Sykes Creek	489529	4715581	18	0.00	19	0	53	21
SC-R sthd	2039	Rogue River, Illinois River	Grayback Creek	466610	4666454	23	0.06	23	74	87	13
SC-R sthd	2040	Rogue River, Illinois River	Pine Creek	429584	4695109	9	0.00	9	0	89	11
SC-R sthd	2046	Rogue River, Rogue River	Howard Creek	443114	4718029	24	0.00	24	0	83	33
SC-R sthd	2047	Rogue River, Illinois River	Sucker Creek	461263	4663580	8	0.30	8	75	13	0
SC-R sthd	2048	Rogue River, Illinois River	Silver Creek	422202	4700725	17	0.00	17	0	100	0
SC-R sthd	2050	Rogue River, Grave Creek	Poorman Creek	457069	4723175	18	0.54	18	100	33	33

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SC-R sthd	2051	Rogue River, Applegate River	Little Applegate River	507286	4666807	16	0.00	16	0	100	44
SC-R sthd	2052	Rogue River, Illinois River	Secret Creek	443006	4696797	18	0.00	18	0	39	6
SC-R sthd	2053	Rogue River, Rogue River	Dutcher Creek	457790	4696995	9	0.38	10	70	30	20
SC-R sthd	2054	Rogue River, Mainstem	Taylor Creek	448592	4704604	23	0.98	23	100	30	26
SC-R sthd	2303	Rogue River, Mainstem	Little Butte Creek	529337	4697830	0	-	6	83	83	0
SC-R sthd	2306	Rogue River, Mainstem	Elk Creek	523730	4731235	10	0.00	10	0	20	30
SC-R sthd	2413	Rogue River, Applegate River	Applegate River	469427	4688349	2	0.00	2	0	50	100
SC-R sthd	2414	Rogue River, Illinois River	Illinois River	432713	4691860	4	0.00	5	0	100	0
SC-R sthd	2415	Rogue River, Applegate River	Applegate River	485047	4677821	4	0.00	4	0	100	75
SC-R sthd	2416	Rogue River, Illinois River	Illinois River	446087	4674983	5	0.00	5	0	20	0
SC-R sthd	2417	Rogue River, Applegate River	Applegate River	469945	4687724	6	0.00	6	0	83	50
SC-R sthd	2418	Rogue River, Illinois River	Illinois River	428792	4693482	2	0.00	2	0	100	0
SC-R sthd	2419	Rogue River, Rogue River	Evans Creek	484947	4702145	1	0.00	4	0	0	0
SC-R sthd	2422	Rogue River, Illinois River	Illinois River	414786	4707151	2	0.00	2	0	100	50
SC-R sthd	2423	Rogue River, Applegate River	Applegate River	494686	4665232	7	0.00	7	29	71	43
SC-NR sthd	1649	Pistol River, South Fork	Pistol River, S Fk	393985	4674828	29	0.00	29	0	93	34
SC-NR sthd	1650	Chetco River, South Fork	Quail Prairie Creek	410991	4674106	33	0.00	33	0	36	18
SC-NR sthd	1651	Elk River, Mainstem	Elk River	385353	4732142	7	0.00	7	29	71	43
SC-NR sthd	1652	Chetco River, Mainstem	Chetco River	425049	4668876	23	0.00	23	17	87	9
SC-NR sthd	1653	Pistol River, South Fork	Pistol River, S Fk	393140	4678774	17	0.00	17	6	88	53
SC-NR sthd	1654	Chetco River, Mainstem	Chetco River	420186	4683841	16	0.00	16	6	100	63
SC-NR sthd	1655	Euchre Creek, Cedar Creek	Miller Creek	388717	4708060	12	0.00	12	0	50	25
SC-NR sthd	1656	Chetco River, South Fork	Red Mountain Creek	414882	4666937	29	0.00	29	0	86	14
SC-NR sthd	1657	Chetco River, North Fork	Bravo Creek	396478	4664159	31	0.00	31	0	68	16
SC-NR sthd	1658	Chetco River, South Fork	Chetco River, S Fk	413084	4668122	16	0.00	16	0	94	50
SC-NR sthd	1659	Elk River, Mainstem	Panther Creek	394677	4726753	16	0.00	16	13	88	38
SC-NR sthd	1660	Chetco River, Mainstem	Hamilton Creek	401161	4657168	15	0.00	16	0	88	44
SC-NR sthd	1661	Pistol River, Mainstem	Pistol River	399867	4689155	39	0.00	39	0	72	3
SC-NR sthd	1662	Pistol River, Mainstem	Sunrise Creek	397994	4680433	34	0.00	34	0	0	6
SC-NR sthd	1663	Euchre Creek, Mainstem	Euchre Creek	391041	4716298	27	0.00	27	0	89	67
SC-NR sthd	1665	Chetco River, North Fork	Chetco River, N Fk	396353	4663274	21	0.00	21	0	67	10
SC-NR sthd	1666	Chetco River, Chetco River	Panther Creek	404331	4671419	20	0.00	20	0	55	15
SC-NR sthd	1667	Elk River, Mainstem	Elk River	379572	4737418	8	0.06	8	50	50	50
SC-NR sthd	1668	Chetco River, Mainstem	Little Chetco River	425746	4673564	25	0.00	25	0	100	32

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SC-NR sthd	1669	Hunter Creek, Mainstem	Hunter Creek	390935	4692243	28	0.00	28	0	93	0
SC-NR sthd	1670	Winchuck River, Mainstem	Winchuck River, S Fk	406024	4648020	19	0.00	19	5	84	95
SC-NR sthd	1671	Mussel Creek	Mussel Creek	387221	4718473	29	0.00	29	0	93	76
SC-NR sthd	1672	Winchuck River, Mainstem	Winchuck River, E Fk	408505	4654583	8	0.00	8	0	75	63
SC-NR sthd	1673	Chetco River, Chetco River	Emily Creek	403616	4663775	19	0.00	19	0	95	58
SC-NR sthd	1674	Chetco River, South Fork	Red Mountain Creek	415730	4668106	21	0.00	21	0	76	19
SC-NR sthd	1675	Elk River, Mainstem	Elk River	389020	4730062	10	0.00	10	0	100	40
SC-NR sthd	1676	Chetco River, Mainstem	Little Chetco River	427542	4670992	21	0.00	21	0	100	57
SC-NR sthd	1677	Pistol River, Mainstem	Sunrise Creek	395869	4681769	28	0.00	28	0	93	18
SC-NR sthd	1678	Chetco River, Eagle Creek	Mineral Hill Fork	406161	4681096	31	0.00	31	0	29	0
SC-NR sthd	1679	Euchre Creek, Mainstem	Crew Canyon Creek	390031	4714898	11	0.00	11	0	64	27
SC-NR sthd	1680	Chetco River, Emily Creek	unnamed trib	409473	4666599	12	0.00	12	0	42	8
SC-NR sthd	1681	Chetco River, North Fork	Chetco River, N Fk	395212	4667471	15	0.00	15	0	87	13
SC-NR sthd	1682	Chetco River, South Fork	Chetco River, S Fk	410573	4670508	16	0.00	16	0	94	63
SC-NR sthd	1683	Hubbard Creek	unnamed trib	381005	4732835	21	0.05	21	48	29	43
SC-NR sthd	1684	Chetco River, Mainstem	Chetco River	425645	4673672	15	0.00	15	0	100	13
SC-NR sthd	1685	Pistol River, Mainstem	Deep Creek	390732	4682070	20	0.00	20	0	95	25
SC-NR sthd	1686	Chetco River, Mainstem	Chetco River	414990	4682431	5	0.00	5	0	80	60
SC-NR sthd	1687	Euchre Creek, Euchre Creek	Boulder Creek #2	389370	4712948	19	0.00	19	0	68	32
SC-NR sthd	2208	Chetco River, Mainstem	Chetco River	411275	4680376	3	0.00	3	0	100	100
SC-NR sthd	2209	Chetco River, Mainstem	Chetco River	401803	4663717	3	0.00	3	0	67	67
SC-NR sthd	2210	Winchuck River, Mainstem	Winchuck River	404663	4653268	8	0.00	8	0	100	100
SC-NR sthd	2212	Chetco River, Mainstem	Chetco River	405823	4671522	5	0.00	5	0	80	80
SC-NR sthd	2214	Winchuck River, Mainstem	Winchuck River	402471	4652847	9	0.00	9	11	89	67

