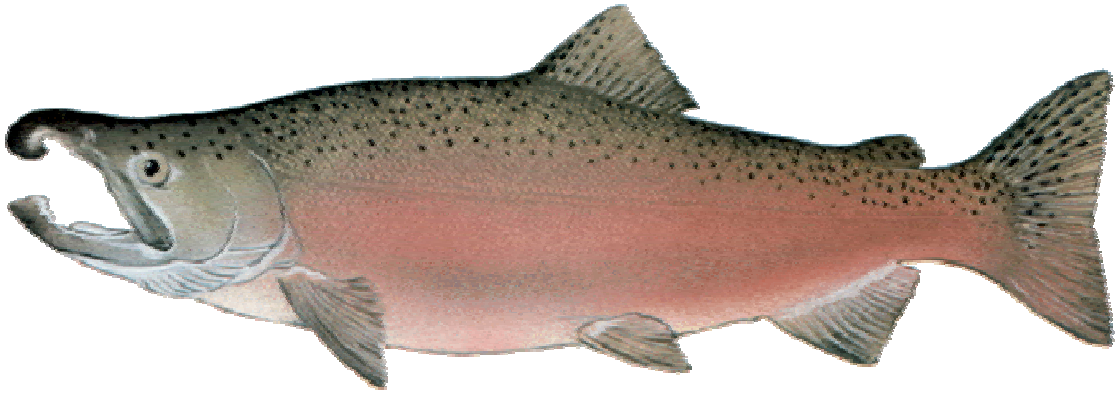
Juvenile Salmonid Outmigration in the Little North Fork Wilson and Little South Fork Kilchis Rivers - 2001



Prepared by Tim Dalton

Western Oregon Research & Monitoring Program

Oregon Department of Fish and Wildlife

For the Tillamook County Performance Partnership

and the Oregon Department of Forestry

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INTRODUCTION

Since 1998, as part of the Oregon Plan for Salmon and Watersheds, the Oregon Department of Fish and Wildlife (ODFW) has monitored downstream migration of juvenile salmonids (*Oncorhynchus spp.*) in various streams along the coast. The goals of this program were discussed by Dalton (1998). Briefly, we examine migration timing and abundance of the various species by size and/or age class. In the Tillamook Bay watershed, the Tillamook County Performance Partnership (TCCP) and the Oregon Department of Forestry (ODFW) have provided funding for monitoring in the Little North Fork (LNF) Wilson and Little South Fork (LSF) Kilchis rivers.

METHODS

During 2001, rotary screw juvenile traps were operated from March 1 to June 29, and from March 2 to June 15, in the LNF Wilson and LSF Kilchis rivers, respectively. The traps were normally checked and cleared of fish and debris once a day. However, to ensure fish safety, the traps were visited more frequently during storm events and high debris periods. Occasionally during such events, the traps were not operated, but fish numbers were estimated as the average of the catch during the four closest days, previous and afterwards.

Fish were anesthetized with MS-222 and enumerated by species and size or age class. Coho salmon *(O. kisutch)* were identified as fry (age 0+) or smolts (age 1+). All chum (*O. keta*) and chinook (*O. tshawytscha*) salmon captured were fry (age 0+). Trout species were segregated by size classes that roughly correspond to age classes, the largest class for each species containing smolts, the smaller classes parr. Trout fry (<60 mm) were not differentiated to the species level. Additional size classes were 60-89, 90-119 and $\geq$120 mm for steelhead (*O. mykiss*), and 60-89, 90-119, 120-159 and $\geq$160 mm for cutthroat trout (*O. clarki*). Sea-run trout migrate to sea at various ages according to individual smoltification maturity, steelhead usually at ages 1+ or 2+, cutthroat at 2+, 3+ and 4+; however, both can migrate at any age. Standard mark/recapture trap efficiency calibrations performed with each species and class, as described by Dalton (1998), were used to estimate total outmigrants from the catch data on a weekly basis.

RESULTS

Juvenile chinook salmon numbers had decreased greatly each year from 1998 to 2000 in both rivers, but in 2001 this trend was reversed (Tables 1 and 2). LNF Wilson and LSF Kilchis chinook salmon fry outmigrants were estimated at 431,523 and 29,424, respectively, in 2001, similar to the estimates for 1999. Migration timing in both rivers in 2001 was generally 1 to 2 weeks later than in the three previous monitoring years, except that in 2000 in the LNF Wilson most fry migrated several weeks later than in 2001 (Tables 3 and 4, Dalton 1998, 1999, 2000). Fry were first caught in mid March in 2001 in the LNF Wilson, and they began migrating in relatively large numbers in mid April. Peak weekly migration occurred at the beginning of May, but numbers migrating were rather consistent throughout that month. Relatively small numbers of fry continued to migrate through the end of June, when trapping was discontinued (Fig. 1). In the LSF Kilchis, no chinook salmon fry were caught before mid April. Migration peaked quickly later that month, and there was a secondary peak in the latter part of May, after which very few fish migrated (Fig. 2).

Table 1. Estimated juvenile salmonid migrants by age or size class in the Little North Fork Wilson River, 1998-2001 (no estimate was made when <5 marked fish were recaptured, but total number caught is given in parentheses).

	1998	1999	2000	2001
Chinook Salmon				
fry (age 0+)	1,223,944	451,236	226,121	431,523
Chum Salmon				
fry (age 0+)	145,002	59,346	27,813	7,052
Coho Salmon				
fry (age 0+)	9,437	418	21,676	6,923
smolts (age 1+)	3,345	246	259	14,442
Unidentified Trout				
fry (age 0+)	77,823	60,918	41,936	23,484
Steelhead				
parr 60-89 mm	1,893	1,087	2,280	2,512
parr 90-119 mm	3,247	1,539	4,993	10,719
smolts ≥120 mm	13,885	3,524	4,194	20,686
Cutthroat Trout				
parr 60-89 mm	(4)	(8)	139	(9)
parr 90-119 mm	(31)	225	674	398
parr 120-159 mm	1,945	603	1,557	1,850
smolts ≥160 mm	524	420	670	1,522

Table 2. Estimated juvenile salmonid migrants by age or size class in the Little South Fork Kilchis River, 1998-2001 (no estimate was made when <5 marked fish were recaptured but total number caught is given in parentheses).

	1998	1999	2000	2001
Chinook Salmon				
fry (age 0+)	109,649	30,948	4,622	29,408
Chum Salmon				
fry (age 0+)	(2)	(0)	(0)	(0)
Coho Salmon				
fry (age 0+)	4,747	211	8,297	41,567
smolts (age 1+)	571	385	38	2,289
Unidentified Trout				
fry (age 0+)	14,253	27,543	86,533	15,554
Steelhead				
parr 60-89 mm	2,812	763	2,110	3,008
parr 90-119 mm	2,277	1,306	3,541	5,244
smolts ≥120 mm	1,420	1,948	2,609	3,597
Cutthroat Trout				
parr 60-89 mm	127	66	(36)	40
parr 90-119 mm	489	505	604	652
parr 120-159 mm	601	1,190	1,812	1,645
smolts ≥160 mm	143	475	1,183	320

Chum salmon fry migration in the LNF Wilson began early in March in 2001, peaked in mid April, and ended in mid May (Fig. 1). Timing was similar to 1999 but about a week later than in 1998 and 2000 (Table 3, Dalton 1998, 1999, 2000). Fry numbers (7,052) decreased greatly for the third consecutive year (Table 1).

Coho salmon fry numbers in the LNF Wilson in 2001 (6,923) were only higher than in 1999, and were much lower than in 2000, but smolts (14,442) were much more numerous than in the previous years (Table 1). Peak migration of both was earlier than before, except that fry migrated earlier in 1998 (Table 3). Smolts were caught when trapping began but fry were not caught before the end of March. Both peaked in migration late in April. Smolts migrated in large numbers from mid April to late May but were few thereafter, but fair numbers of fry were still migrating at the end of June (Fig. 1). In the LSF Kilchis in 2001, both coho salmon fry (41,567) and smolts (2,289) were much more numerous than in the earlier years (Table 2). Here, fry migration peaked later, and smolts peaked earlier, than in the other years (Table 4). Fry were first caught in mid March, migrated in large numbers from mid to late April when the peak occurred, but thereafter were caught in only small numbers. Smolts were caught early in March with peak late in that month, and were also caught in fair numbers from mid April to early May but were not caught after May (Fig. 2).

Table 3. Week(s) of peak migration of juvenile salmonid migrants by age or size class in the Little North Fork Wilson River, 1998-2001.

	1998	1999	2000	2001
Chinook Salmon				
fry (age 0+)	4/20-26	4/19-25	5/22-28	4/30-5/6
Chum Salmon				
fry (age 0+)	4/6-12	4/12-18	4/3-9	4/9-15
Coho Salmon				
fry (age 0+)	3/23-29	5/10-16	5/1-7	4/23-29
smolts (age 1+)	5/4-10	5/24-30	5/1-7	4/23-29
Unidentified Trout				
fry (age 0+)	4/13-19	4/12-18	4/10-16	6/18-24
Steelhead				
parr 60-89 mm	4/20-26	5/24-30	4/3-9	3/19-25
parr 90-119 mm	4/27-5/3	5/24-30	5/8-14	4/23-29
smolts $\geq$120 mm	4/27-5/3	5/3-9	4/24-30	4/23-29
Cutthroat Trout				
parr 60-89 mm	--	--	5/1-7	--
parr 90-119 mm	--	6/7-13	4/17-23	5/21-27
parr 120-159 mm	5/25-31	6/7-13	5/22-28	5/28-6/10
smolts $\geq$160 mm	5/4-10	6/7-13	5/29-6/4	5/21-27

Our estimate of trout fry migrants in the LNF Wilson in 2001 (23,484) continued a declining trend since 1998 (Table 1). However, their migration timing was rather late compared to the previous years (Table 3, Dalton 1998, 1999, 2000). They were caught in only small numbers from the end of March until early to mid June. They peaked in mid to late June, but were migrating in somewhat reduced numbers when trapping ended (Fig. 4). Thus, we apparently sampled most of the migration, but our estimate is still likely somewhat low. There had been large annual increases in trout fry migrants in the LSF Kilchis since 1998. However, in 2001 their numbers (15,554) decreased to a level similar to 1998 (Table 2), and their migration timing in 2001, similar to previous years (Table 4), indicated that the migration was well sampled temporally. They began to be caught in mid to late March, peaked in migration in mid April, and were caught in only small numbers during most of May and until the end of sampling in mid June (Fig. 4).

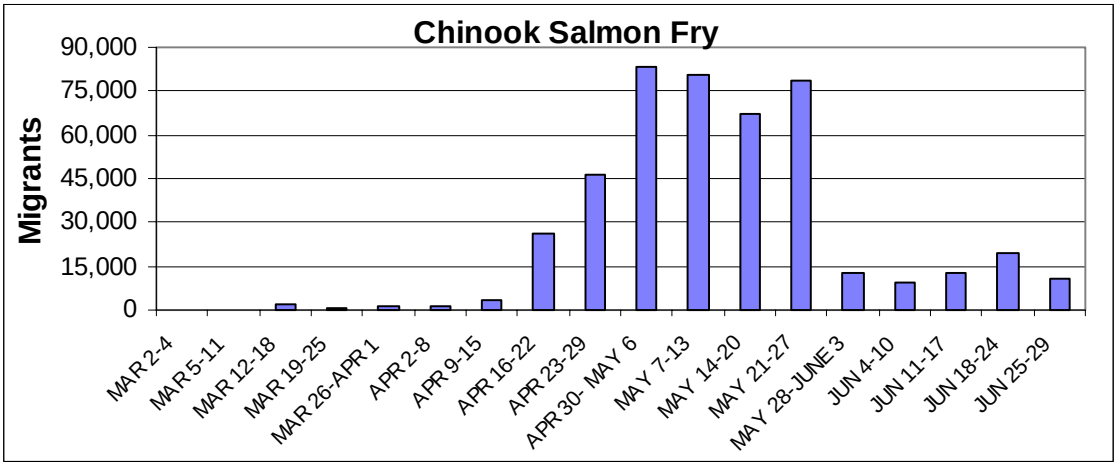
In both rivers, steelhead of all sizes were caught throughout the sampling season in 2001, and, particularly in the LNF Wilson, were more numerous than in the three previous monitoring years (Tables 1 and 2). In the LNF Wilson**,** small parr (2,512) exhibited a pronounced and relatively early migration peak in the latter half of March, with few fish migrating afterwards except during the latter half of April. Large parr (10,719) migrated in more steady numbers, but mostly in the latter half of April

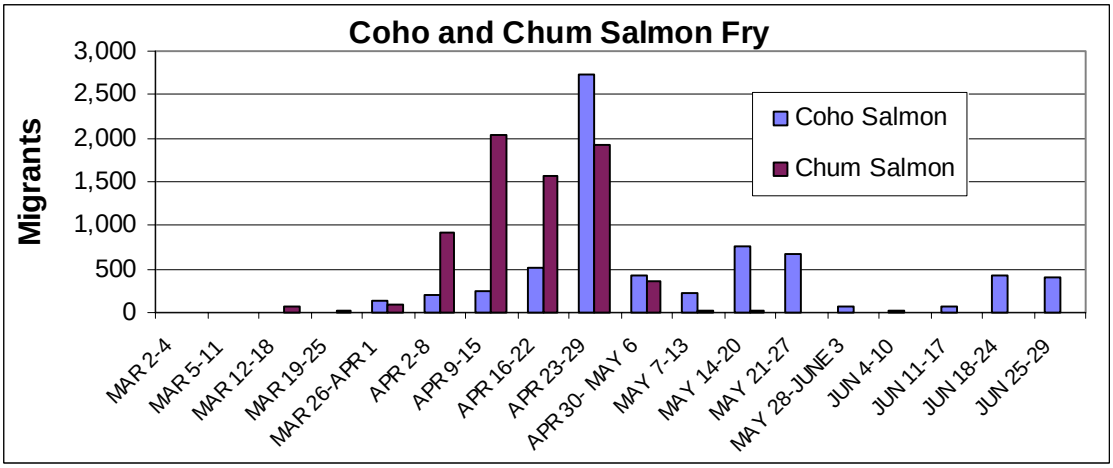
and in May. The peak was in late April, similar to 1998 but considerably earlier than in 1999 or 2000. Except for mid to late April when especially large numbers migrated, steelhead smolt (20,686) migration was fairly consistent from early March to mid May, with few fish migrating thereafter. Migration timing was similar to 1998 and 2000 but somewhat in advance of 1999 (Fig. 3, Table 3, Dalton 1998, 1999, 2000). All sizes of steelhead in the LSF Kilchis exhibited migration peaks in the latter half of March, which is early for parr but not unusual for smolts, and only large parr migrated in relatively large numbers after March (Fig. 4, Table 4). We estimated totals of 3,008 small parr, 5,244 large parr and 3,597 smolts (Table 2).

Table 4. Week(s) of peak migration of juvenile salmonid migrants by age or size class in the Little South Fork Kilchis River, 1998-2001.

	1998	1999	2000	2001
Chinook Salmon				
fry (age 0+)	4/13-19	4/12-18	4/17-23	4/23-29
Chum Salmon				
fry (age 0+)	--	--	--	--
Coho Salmon				
fry (age 0+)	3/30-4/5	3/1-7	4/10-16	4/23-29
smolts (age 1+)	4/27-5/3	5/3-9	5/1-7	3/19-25
Unidentified Trout				
fry (age 0+)	4/27-5/3	4/5-11	4/10-16	4/23-29
Steelhead				
parr 60-89 mm	3/23-29	5/24-30	4/10-16	3/19-25
parr 90-119 mm	4/27-5/3	5/24-30	4/10-16	3/19-25
smolts $\geq$120 mm	4/27-5/3	3/15-21	3/13-19	3/19-25
Cutthroat Trout				
parr 60-89 mm	5/18-24	3/15-21	--	3/5-11
parr 90-119 mm	5/18-24	5/24-30	5/15-21	5/28-6/3
parr 120-159 mm	5/11-17	5/24-30	5/15-21	5/7-13
smolts $\geq$160 mm	5/11-17	5/17-23	5/15-21	5/21-27

Cutthroat trout parr of 60-89 mm were caught very infrequently (9) in the LNF Wilson in 2001, thus we were unable to estimate their numbers. Smolts $\geq$160 mm were at their highest abundance (1,522) during the four years of monitoring, while parr of 120-159 mm (1,850) approached their highest abundance, and parr of 90-119 mm (398) were mid-range in abundance (Table 1). Smolts and parr of 120-159 mm were caught almost throughout the sampling season, but most fish migrated relatively late in the spring, timing that is fairly typical compared to previous years. The smolts showed a pronounced migration peak in late May and the 120-159 mm parr migrated in largest numbers from late May through the first half of June. Parr of 90-119 mm





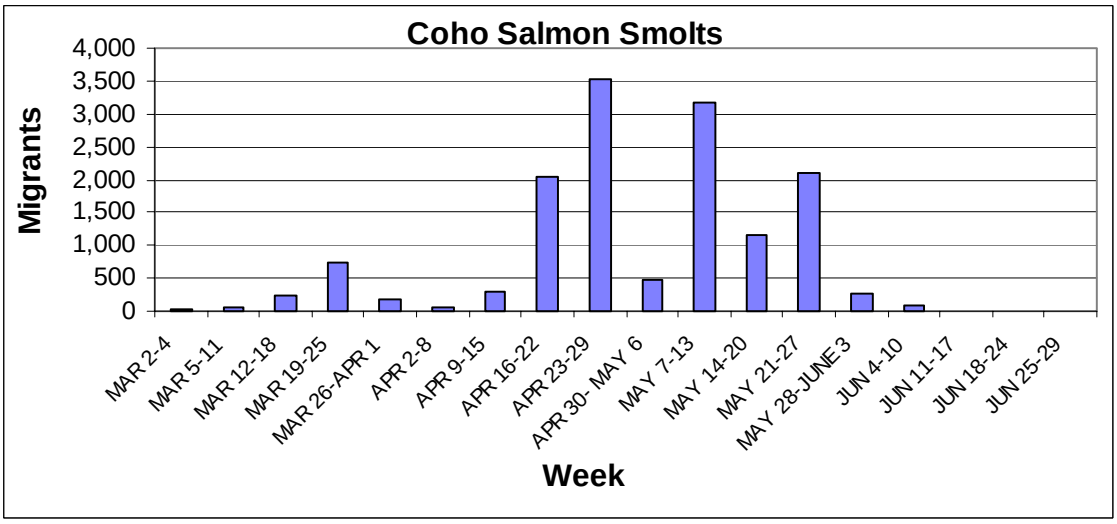


Figure 1. Outmigration of juvenile salmon in the Little North Fork Wilson River, 2001.

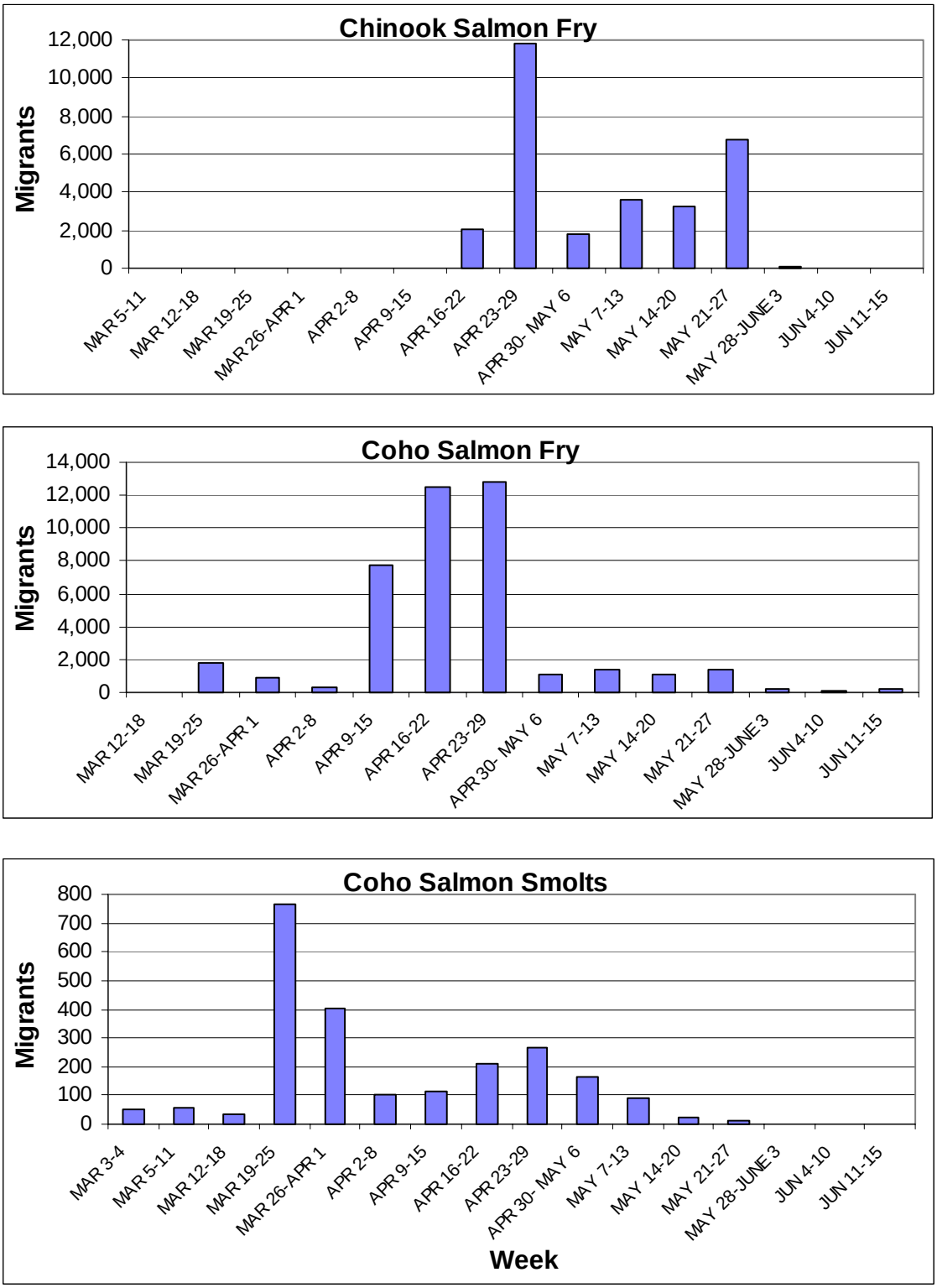


Figure 2. Outmigration of juvenile salmon in the Little South Fork Kilchis River, 2001.

migrated in fairly consistent numbers throughout the spring, however, with peak in late May, earlier than in 1999 but later than in 2000 (Fig. 3, Table 3). In the LSF Kilchis in 2001, cutthroat parr of 60-89 mm were few (40) relative to the three previous monitoring years (Table 2). They migrated in relatively even numbers in March and May, with very few fish moving in April and June (Fig. 4). Previously, peak migration had been in March or May (Table 4). Parr of 90-119 mm (652) and of 120-159 mm (1,645) were at the highest and near highest annual abundances, respectively, from 1998 to 2001, but smolts were near the lowest annual abundance (Table 2). As in past years, relatively few fish of these three size groups migrated until after mid April (Table 4, Dalton 1998, 1999, 2000). Parr of 90-119 mm and of 120-159 mm showed migration peaks in the second week of May, with relatively large numbers migrating through early June. Smolts migrated in largest numbers from early May through early June, with peak in late May (Fig 4.).

DISCUSSION

Among monitored coastal streams, there has been a general declining trend in numbers of chinook salmon fry migrants since 1998. Between 2000 and 2001, numbers of these fry increased only in the LNF Wilson and the LSF Kilchis (Appendix Table 1). Peak counts of adults in index spawning survey reaches on these two streams were comparable between the parent brood years (1999 and 2000), and these peak counts were quite low compared to most previous years dating to 1950 (K. Braun, personal communication). As in 1998-2000, the LNF Wilson had the highest density of chinook salmon fry (15.47 per meter of stream length). The LSF Kilchis had the second highest such density (2.51/m), but this more reflects low abundance of these fry in the other streams rather than particularly high abundance in the LSF Kilchis. It is possible that the generally low numbers of fry coastwide may be related to the low precipitation and consequent low river levels that predominated in the fall of 2000. These conditions may have resulted in many returning adults having spawned in lower river areas instead of swimming to areas upstream of juvenile monitoring trapping sites. This appeared to be the case for the North Fork Nehalem River, to the north of the Tillamook Bay watershed, and its trapping site, at which we also monitor adult returns in order to study survival. Even though chinook salmon fry numbers there in 2001 were by far the lowest yet estimated (Appendix Table 1), in the fall of 2000 the number of female spawners was even smaller relative to previous brood years, thus egg-to-fry survival above this trapping site was apparently very good (unpublished data). There can be a strong inverse relationship between peak flows and chinook salmon egg-to-fry fry survival (Seiler et al 1998, Beamer and Pess 1999). This has been attributed primarily to the scouring of redds and consequent dislodging of eggs (Montgomery et al. 1996, DeVries 1997). The number and intensity of storms was particularly low on the coast of Oregon in the fall and winter of 2000/2001. Thus, it is possible that overall chinook salmon fry production in 2001 may be substantially better than our monitoring sites might otherwise suggest.

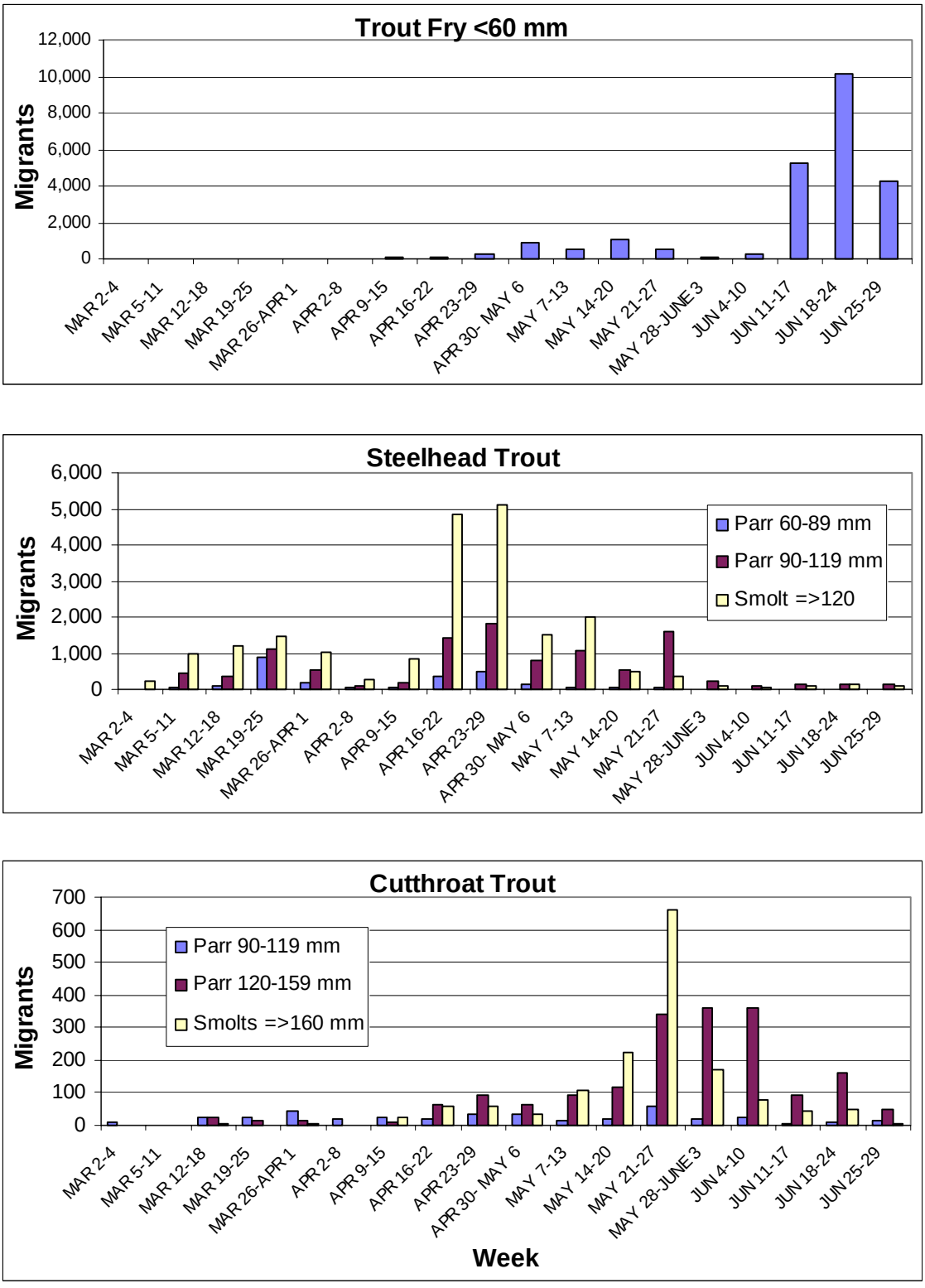


Figure 3. Outmigration of juvenile trout in the Little North Fork Wilson River, 2001.

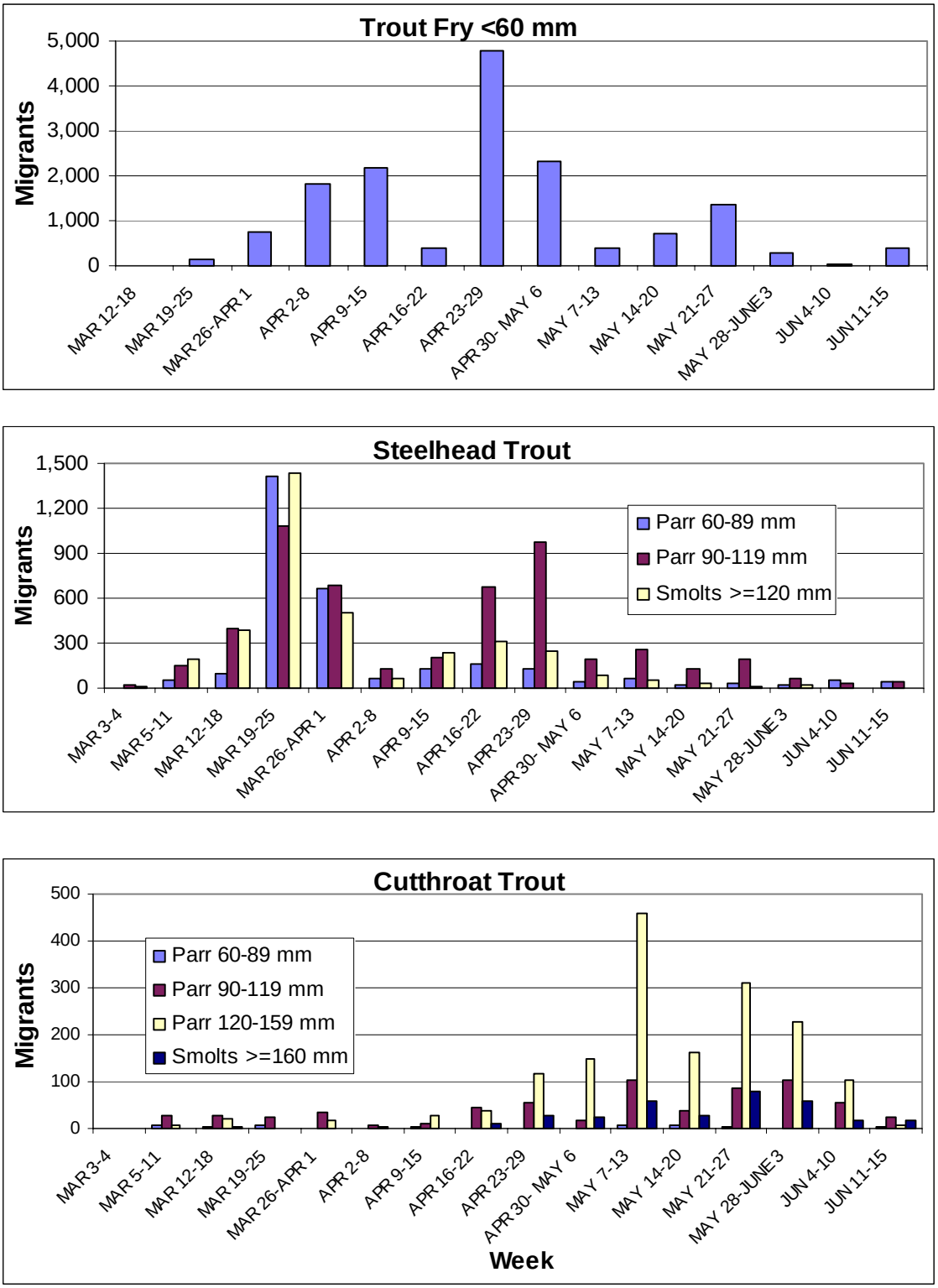


Figure 4. Outmigration of juvenile trout in the Little South Fork Kilchis River, 2001.

Once again, chum salmon fry were caught only in the LNF Wilson in 2001, at a density of 0.25/m, another substantial annual decrease (Appendix Table 1). It is also possible that the low river flows of the fall of 2000 inhibited adult chum salmon from progressing far upstream. The 2000 peak count of adults in the index reach of the LNF Wilson has never been lower (K. Braun, personal communication).

Contrarily, coho salmon fry and smolt densities in 2001 were in most streams at their highest levels during the four years of monitoring. This was particularly so for the LSF Kilchis, which had the second highest fry density (3.55/m) among the monitored streams (Appendix Table 1). In the index reach in 2000, the peak adult count, which occurred late in December when river levels had recently rose somewhat, was the highest since 1982. Smolt density (0.20/m) was, for the first year, not the lowest or next to lowest among the monitored streams. The high smolt numbers here and elsewhere may indicate good overwinter parr survival, which has also been related to low storm intensity (Bustard and Narver 1975, Reiser and Bjornn 1979, Tschaplinski and Hartman 1983). However, one must bear in mind that the fry numbers estimated in the spring of 2000 were the highest since monitoring began in the LSF Kilchis, and they were relatively high in most of the other streams as well. Thus, one might expect generally high numbers of smolts in 2001. The LNF Wilson was fairly low in coho salmon fry density (0.25/m) in 2001, compared both to its densities in previous years and to those of other streams in 2001. The index reach there is not commonly used by coho salmon to spawn, however, and so cannot be used to assess spawner density in the river. Smolt density (0.52/m) was relatively high in 2001, however fry density in 2000 was at its highest level of the monitoring years.

Steelhead smolt numbers and densities were at the highest level since 1998 in most of the monitored coastal streams. Overall, abundance of cutthroat trout smolts and large parr was also relatively high, and was the highest yet estimated in one-half of the streams for which estimates are available (Appendix Table 2). Both the LNF Wilson and LSF Kilchis have usually been among the most productive of the monitored streams for steelhead and cutthroat trout during 1998-2000, and this was again the case in 2001. The LNF Wilson had the highest density of steelhead smolts (0.74/m) among the streams, and this density in the LSF Kilchis (0.31/m) was the third highest. Density of cutthroat trout smolts and large parr was second highest in the LSF Kilchis (0.17/m) in 2001, and in the LNF Wilson this density (0.12/m) was fourth highest.

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Appendix Table 1. Estimated juvenile salmon migrants and migrants per meter of stream in coastal streams monitored by ODFW, 1998-2001 (no estimate was made when there were less than 5 recaptures of marked fish).

Stream (length in meters)	Species (age in years)	1998 Migrants (migrants/meter)	1999 Migrants (migrants/meter)	2000 Migrants (migrants/meter)	2001 Migrants (migrants/meter)
N. Fk. Nehalem R.	Chinook (0+)	984,449 (13.93)	496,371 (7.02)	414,739 (5.87)	81,751 (1.16)
(70,675)	Coho (0+)	18,256 (0.26)	2,728 (0.04)	109,394 (1.55)	120,386 (1.70)
	Coho (1+)	42,427 (0.60)	21,702 (0.31)	31,776 (0.45)	46,375 (0.66)
L. S. Fk. Kilchis R.	Chinook (0+)	109,097 (9.32)	30,948 (2.64)	4,556 (0.39)	29,424 (2.51)
(11,703)	Coho (0+)	4,747 (0.41)	211 (0.02)	8,297 (0.71)	41,567 (3.55)
	Coho (1+)	571 (0.05)	385 (0.03)	38 (<0.01)	2,289 (0.20)
L. N. Fk. Wilson R.	Chinook (0+)	1,223,944 (43.88)	451,236 (16.18)	226,121 (8.11)	431,523 (15.47)
(27,891)	Coho (0+)	9,437 (0.34)	418 (0.01)	21,676 (0.78)	6,923 ((0.25)
	Coho (1+)	3,345 (0.12)	246 (0.01)	259 (0.01)	14,442 (0.52)
	Chum (0+)	145,002 (5.20)	59,346 (2.13)	27,813 (1.00)	7,052 (0.25)
Siletz Mill Cr.	Chinook (0+)	no estimate	352 (0.01)	no estimate	no estimate
(30,907)	Coho (0+)	483 (0.02)	420 (0.01)	617 (0.02)	2,143 (0.07)
	Coho (1+)	9,534 (0.31)	3,974 (0.27)	4,311 (0.14)	15,475 (0.50)
Bales Cr.	Chinook (0+)	249,308 (31.58)	50,261 (6.37)	24,839 (3.15)	2,216 (0.29)
(7,895)	Coho (0+)	15,414 (1.95)	361 (0.21)	4,765 (0.60)	2,039 (0.26)
	Coho (1+)	1,624 (0.21)	508 (0.06)	414 (0.05)	1,227 (0.16)
Yaquina Mill Cr.	Chinook (0+)	7,063 (0.42)	34 (<0.01)	no estimate	no estimate
(16,862)	Coho (0+)	433 (0.03)	373 (0.15)	1,319 (0.08)	9,376 (0.56)
	Coho (1+)	6,698 (0.40)	2,225 (0.13)	5,601 (0.33)	7,026 (0.42)
Cascade Cr.	Chinook (0+)	no estimate	no estimate	649 (0.06)	no estimate
(11,465)	Coho (0+)	no estimate	no estimate	no estimate	2,578 (0.22)
	Coho (1+)	1,404 (0.12)	557 (0.05)	13 (<0.01)	1,485 (0.13)
E. Fk. Lobster Cr.	Coho (0+)	18,416 (3.09)	3,251 (0.54)	17,108 (2.87)	44,651 (7.48)
(5,969)	Coho (1+)	1,286 (0.22)	909 (0.15)	1,189 (0.20)	4,121 (0.70)
Upper Lobster Cr.	Coho (0+)	3,915 (0.62)	353 (0.06)	5,811 (0.92)	18,238 (2.88)
(6,334)	Coho (1+)	2,913 (0.46)	1,481 (0.23)	377 (0.06)	4,173 (0.66)
Cummins Cr.	Chinook (0+)	no estimate	no estimate	3,353 (0.26)	no estimate
(12,792)	Coho (0+)	no estimate	no estimate	no estimate	no estimate
	Coho (1+)	2,215 (0.17)	584 (0.05)	no estimate	306 (0.02)
Tenmile Cr.	Chinook (0+)	3,396 (0.11)	no estimate	21,777 (0.70)	20,997 (0.68)
(30,971)	Coho (0+)	2,402 (0.08)	no estimate	1,314 (0.42)	8,377 (0.27)
	Coho (1+)	5,580 (0.18)	1,739 (0.06)	2,006 (0.06)	5,032 (0.16)
W. Fk. Smith R.	Chinook (0+)	127,726 (2.14)	10,349 (0.17)	3,789 (0.06)	937 (0 .02)
(59,716)	Coho (0+)	2,527 (0.04)	3,076 (0.05)	3,605 (0.06)	13,843 (0.23)
	Coho (1+)	22,412 (0.38)	10,942 (0.18)	14,851 (0.25)	20,091 (0.34)

Appendix Table 2. Estimated juvenile trout migrants $\geq$120 mm and migrants per meter of stream length in coastal streams monitored by ODFW, 1998–2001 (no estimate was made when there were less than 5 recaptures of marked fish).

Stream (length in meters)	Species	1998 Migrants (migrants/meter)	1999 Migrants (migrants/meter)	2000 Migrants (migrants/meter)	2001 Migrants (migrants/meter)
N. Fk. Nehalem R.	Cutthroat	2,195 (0.03)	2,621 (0.04)	4,863 (0.07)	3,967 (0.06)
(70,675)	Steelhead	6,706 (0.09)	4,572 (0.06)	17,448 (0.25)	8,090 (0.11)
L. S. Fk. Kilchis R.	Cutthroat	736 (0.06)	1,658 (0.14)	2,995 (0.26)	1,965 (0.17)
(11,703)	Steelhead	1,418 (0.12)	1,948 (0.17)	2,609 (0.22)	3,597 (0.31)
L. N. Fk. Wilson R.	Cutthroat	2,469 (0.09)	1,025 (0.04)	2,227 (0.08)	3,372 (0.12)
(27,891)	Steelhead	13,885 (0.50)	3,524 (0.13)	4,194 (0.15)	20,686 (0.74)
Siletz Mill Cr.	Cutthroat	2,232 (0.07)	2,476 (0.08)	4,303 (0.14)	4,352 (0.14)
(30,907)	Steelhead	1,017 (0.03)	240 (0.01)	1,078 (0.03)	1,137 (0.04)
Bales Cr.	Cutthroat	552 (0.07)	174 (0.02)	458 (0.06)	no estimate
(7,895)	Steelhead	no estimate	no estimate	no estimate	no estimate
Yaquina Mill Cr.	Cutthroat	100 (0.01)	64 (0.00)	105 (0.01)	77 (<0.01)
(16,862)	Steelhead	240 (0.01)	374 (0.02)	280 (0.02)	874 (0.05)
Cascade Cr.	Cutthroat	830 (0.07)	745 (0.06)	991 (0.09)	1,934 (0.17)
(11,465)	Steelhead	110 (0.01)	no estimate	125 (0.01)	138 (0.01)
E. Fk. Lobster Cr.	Cutthroat	no estimate	no estimate	359 (0.06)	no estimate
(5,969)	Steelhead	no estimate	no estimate	no estimate	no estimate
Upper Lobster Cr.	Cutthroat	no estimate	no estimate	no estimate	no estimate
(6,334)	Steelhead	no estimate	no estimate	no estimate	no estimate
Cummins Cr.	Cutthroat	191 (0.01)	231 (0.02)	364 (0.03)	396 (0.03)
(12,792)	Steelhead	1,816 (0.14)	2,311 (0.18)	3,206 (0.25)	2,863 (0.22)
Tenmile Cr.	Cutthroat	1,272 (0.04)	1,656 (0.05)	1,818 (0.06)	2,421 (0.08)
(30,971)	Steelhead	11,896 (0.38)	7,315 (0.24)	13,627 (0.44)	18,128 (0.59)
W. Fk. Smith R.	Cutthroat	no estimate	3,868 (0.06)	2,095 (0.04)	2,534 (0.04)
(59,716)	Steelhead	6,388 (0.11)	2,895 (0.05)	2,836 (0.05)	7,678 (0.13)