

INVESTIGATIONS OF SALMON AND STEELHEAD TROUT
DOWNSTREAM MIGRATIONS
IN
CASPAR CREEK AND LITTLE RIVER,
MENDOCINO COUNTY

1993

DRAFT ONLY
DO NOT CITE

BY
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and

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The 1993 investigation was the seventh in a series of annual migration trend studies conducted on Caspar Creek and Little River by the California Department of Fish and Game, and the Federal Aid in Sport Fish Restoration Program.

**Downstream Migrant Trapping
Caspar Creek and Little River, Mendocino County
March-July 1993**

Abstract: This annual study has been conducted, since 1987, on two coastal streams, in order to observe the different trend patterns of juvenile out migrations for coho salmon and steelhead-trout, figure 1. Analysis of the 1993 trapping season indicates, at Little River, a decrease of steelhead-trout yearlings but an increase in coho "y+". Coho and trout yearlings, at Caspar Creek, simultaneously tapered in late May and were similar in magnitude, appendix 1 and graph 2. Coho "y+" smolts, at both estuaries, migrated from late April till late May. Steelhead-trout "y+" smolts were recorded migrating out, during the late May and early June period.

Objectives: To determine the size, timing, growth rate and age classifications of (wild) salmonids.

Procedures: Trapping and analysis was conducted by placing a fyke net and live car combination, low in each drainage, as early as water conditions allowed. Throughout the survey, traps were serviced a minimum of five times per week, and all fish caught were identified to species counted and then released downstream. For age analysis, once a week, fifty coho yearlings (y+), coho young of the year (yoy), steelhead-trout "y+" and steelhead-trout "yoy" (when available) were measured to fork length with scale samples taken from both yearlings only. Stream flows were measured at the beginning of each week.

Results - Caspar Creek: Operations began on the 2nd week of April and continued until July 19th, 1993. A total of 1,287 coho salmon yearlings and 8,387 of their young of the year were counted. A total of 1,232 steelhead-trout yearlings and 3,542 of their young of the year were also recorded trapped.

Analysis of coho "y+" indicates that 195 were trapped, during the first week of 4/5-11 and, due to high flows, a less than 100 percent trapping efficiency, for the next three weeks. As the stream receded, trapping then returned to a consistent rate of capture, for coho "y+", during week 5/3-9 through 5/17-23, then tapered dramatically thereafter, with zero captured in late June. Steelhead-trout "y+" peaked, at 239 counted, during the week of 4/12-18 and gradually fluctuated from 182 to 135 trapped between 4/19-25 through 5/17-23 then tapered dramatically, with a slight increase of 24 counted in mid-June, before ending with zero recorded trapped by the final day of the study, figure 2. There were 8,372 coho "yoy's" trapped in April, with a peak of 3,531 captured, during the week of 4/26-5/2, before tapering from 4 to zero trapped by late June. Steelhead-trout "yoy's" didn't make a strong appearance until early May and peaked during the week of May 10-16 at 1,275 trapped before fluctuating between 49 to 18 trapped weekly thereafter, figure 3.

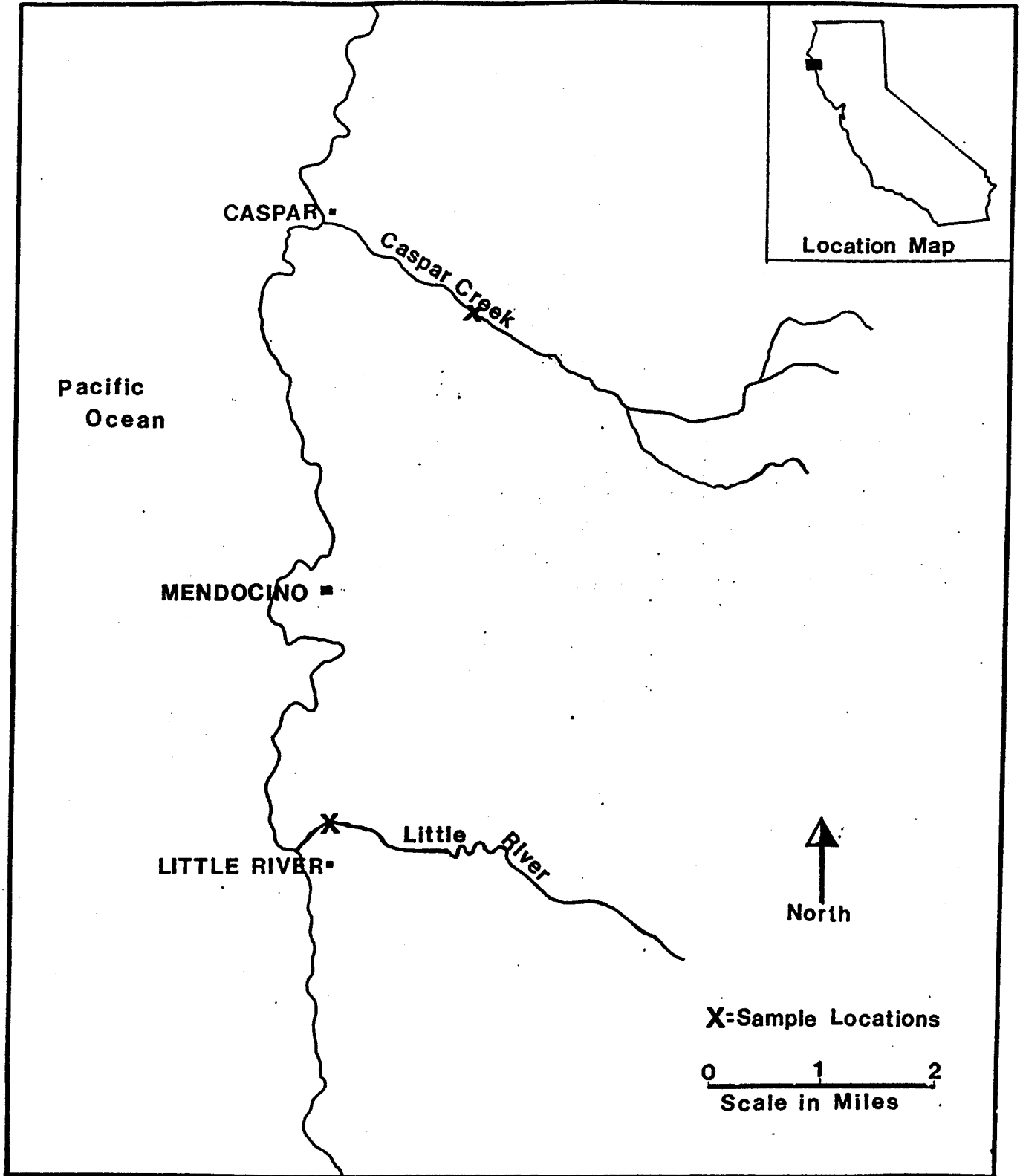
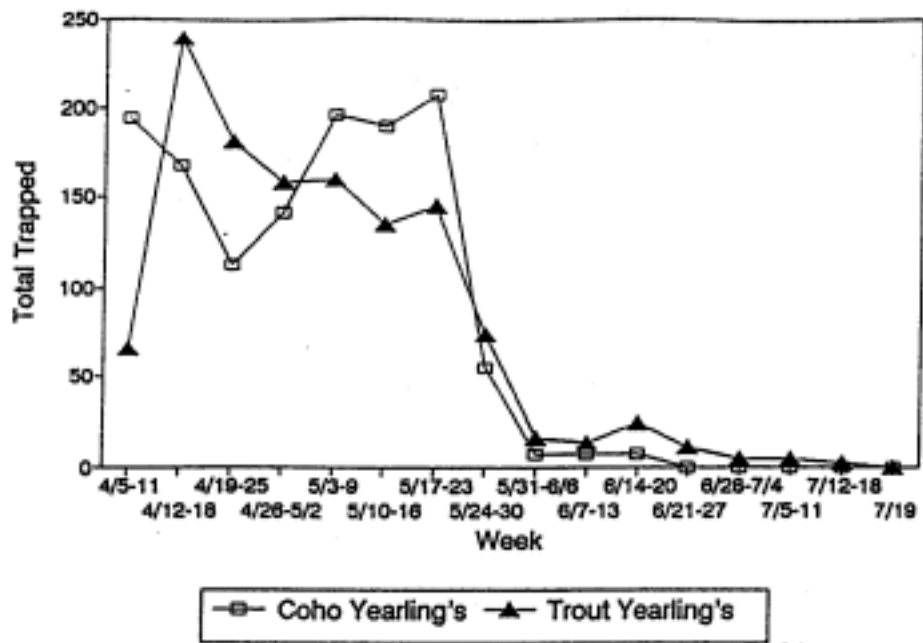


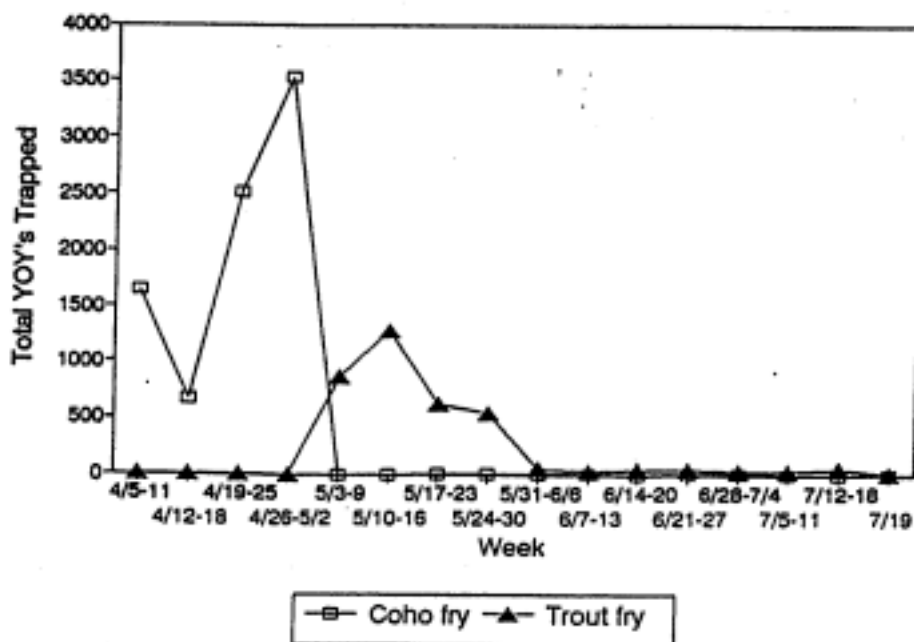
Figure 1. Location of sampling stations.

Figure 2, weekly totals of coho salmon and steelhead-trout yearlings, at Caspar Creek.



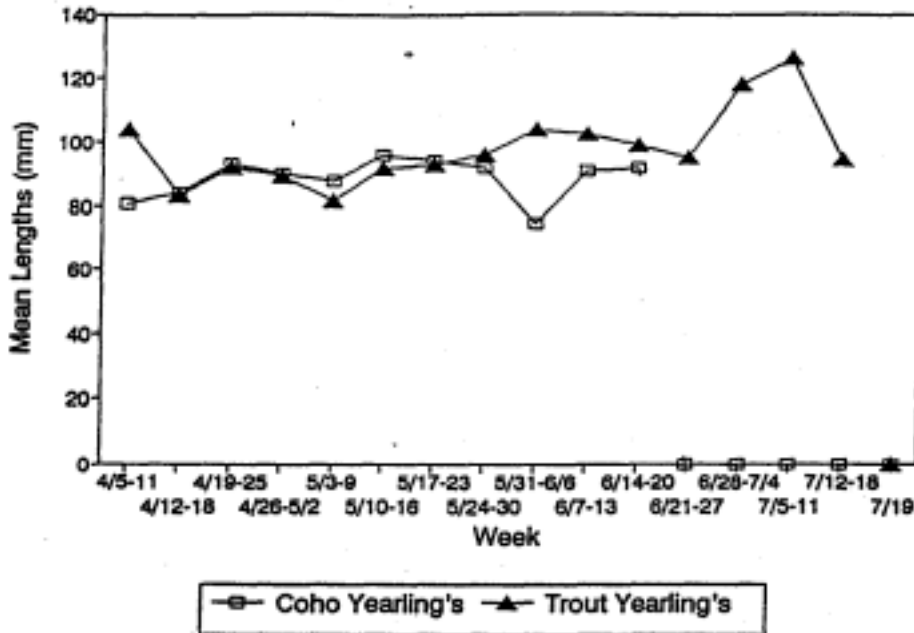
Coho "y+" eluded capture, during the 2nd through the 4th week of the study, as water was seen flowing over the sandbag retaining wall. Steelhead-trout "y+" migrate closer to the stream bottom and were channeled into the fyke net, during that heavy rainfall period between mid April and early May, figure 2. Coho "yoy's" hatched a month earlier then steelhead-trout fry, figure 3.

Figure 3. weekly totals of coho salmon and steelhead-trout young of the year, at Caspar Creek.



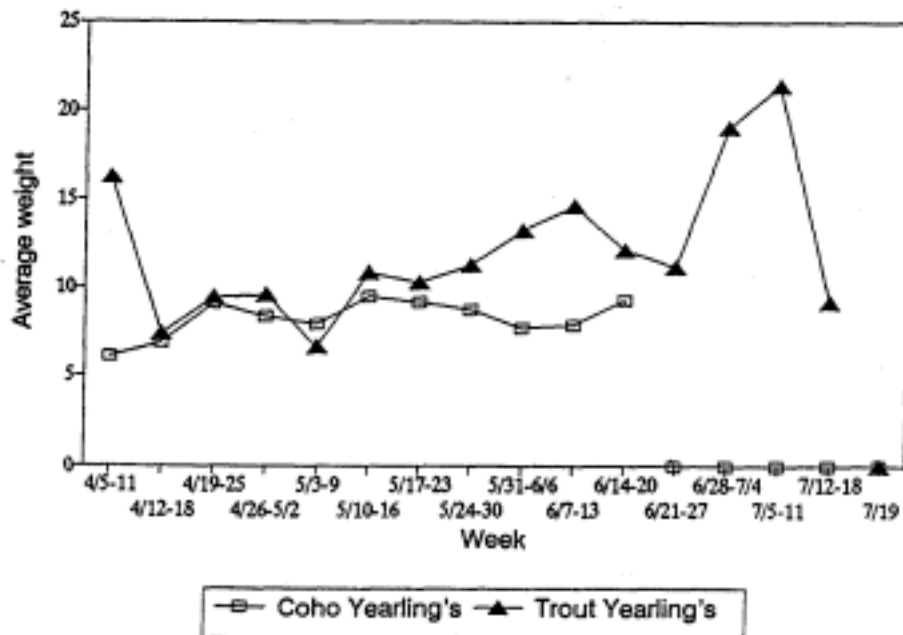
An analysis in lengths (mm), for coho "y+" revealed that they gradually increased from 81 to 92 mm, during the April through mid-June period. Steelhead-trout "y+" ranged from 1 to 3 years of age and fluctuated from 82 to 126 mm in length, with their largest size fish migrating, during the week of April 5-11 and then from late June through early July, figure 4.

Figure 4, weekly mean lengths of coho salmon steelhead-trout yearlings at Caspar Creek.



Coho salmon yearlings gradually increased in weight, during the course of the study from 6 to 9 grams. Steelhead-trout yearlings fluctuated in weight throughout the season with their heaviest size fish migrating, during the week of April 5-11 and then again on the 13th and 14th week, of the study, figure 5.

Figure 5, weekly weight (grams) of coho salmon and steelhead-trout yearlings at Caspar Creek.



Six steelhead-trout adults were trapped, during the high flow periods between April and May. The first adult was recorded on April 11th at 54 cm in length. Three more were trapped a week later on April 17th, with a range from 54 cm to 58 cm long. On April 18th another steelhead-trout adult was capture but got away somewhere up stream. On April 19th, a 47 cm in length adult was measured and for May 17th a steelhead-trout at 52 cm long was the last to be recorded and then released. Throughout most of the survey, sculpin (Cottus asper and Cottus aleuticus) and stickleback were also trapped. Occasionally trapped were Pacific Giant Salamanders and salamanders.

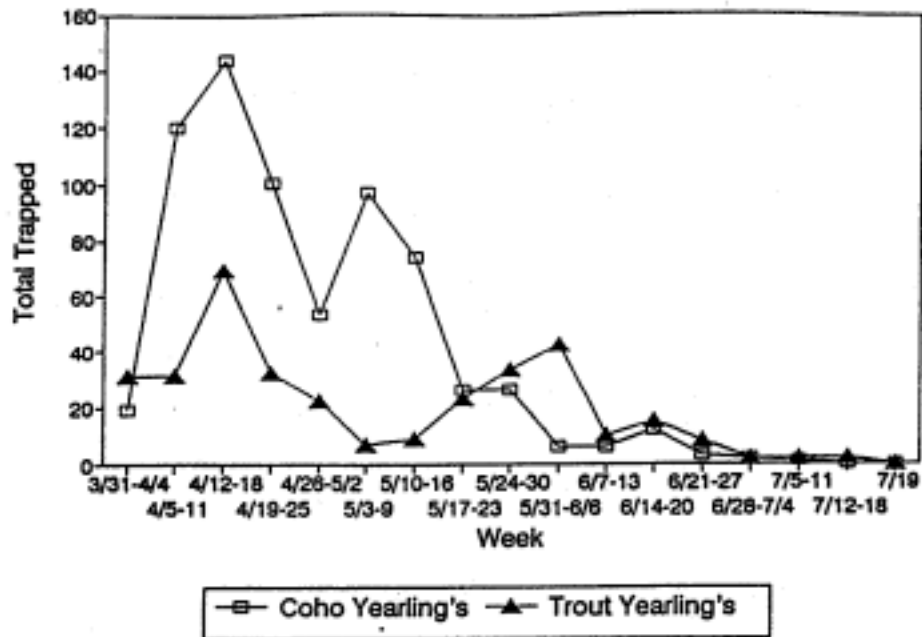
The stream flow at Caspar Creek peaked to 65 cfs in early June, with a prior flow pattern of gradual declines between periods of heavy rainfall, during the April 5-11 and April 19-25 weeks. Water levels were seen flowing over the sandbag retaining wall on April 17th, 18th and the 25th and then again from May 25th through June 1st, figure 10. The abundance of rain this year ended a seven year drought.

Caspar Creek's intertidal area was examined five times, during the course of the study. On May 4, 200 yards up the mouth 1 steelhead-trout was seen at an estimated length of 130 mm, with several "yoy's" (species unknown) also noticed. For May 11, no salmonids were observed at the old brick foundation of which was densely populated by a silver salt water fish (species unknown) at 3" in length, with a narrow but roundly shaped appearance. Also noticed were hundreds of "yoy's" along the bank. On June 1, no salmonids were visibly noticed and on July 15 one sculpin and hundreds of "yoy's" (species unknown) were present near the shallow edge of the stream, by the brick foundation (most likely they're the offspring of those salt water fish described earlier).

Results - Little River: Operations began on March 31 and continued until July 19th, 1993. A total of 689 coho yearlings, 845 coho young of the year, 338 steelhead-trout yearlings and 216 of their young of the year were record trapped.

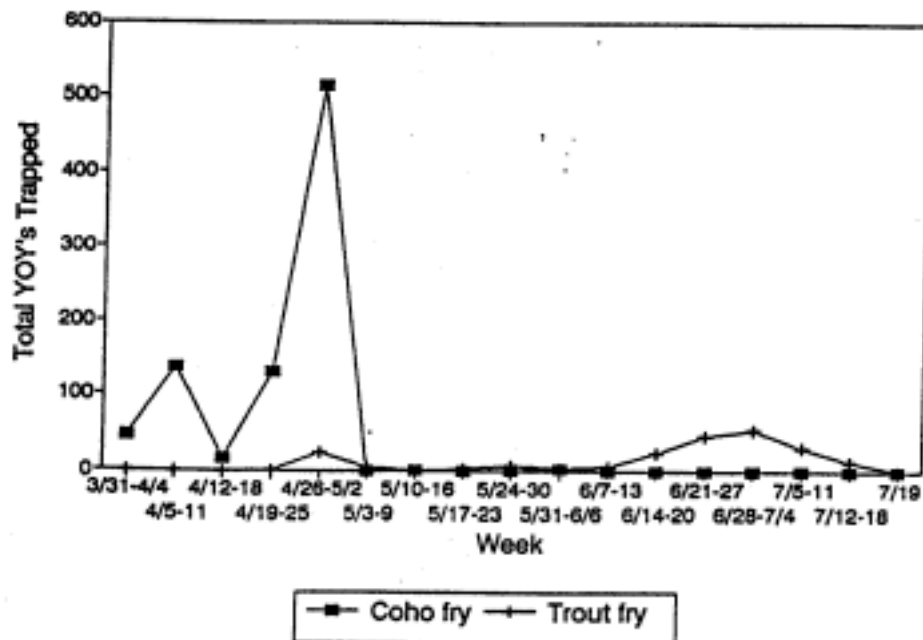
The peak trapping period occurred for both coho salmon and steelhead-trout "y+'s", during the week of April 12-18, at 144 and 69 trapped respectfully, with coho exhibiting a small peak in mid-May, at 74 trapped, before tapering to one captured by July 5-11. Steelhead-trout yearlings displayed a 2nd peck, during the week of May 31/June 6 at 42 captured before tapering to two trapped by July 12-18, figure 6. Coho "yoy's" displayed a total of 685 fish captured throughout the month of April, with a peak of 513 counted for the week of 4/26-5/2 then averaged zero to 2 trapped until the week of 5/31-6-6, when zero were then noticed thereafter. One steelhead-trout "yoy" appeared in late April, with a slight peak of 23 counted on the following week 4/26-5-2 as their highest peak of 54 trapped occurred, during the week of 6/28-7/4 before decreasing to one captured by the final day of the study, figure 7.

Figure 6, weekly totals of coho salmon and steelhead-trout yearlings at Little River.



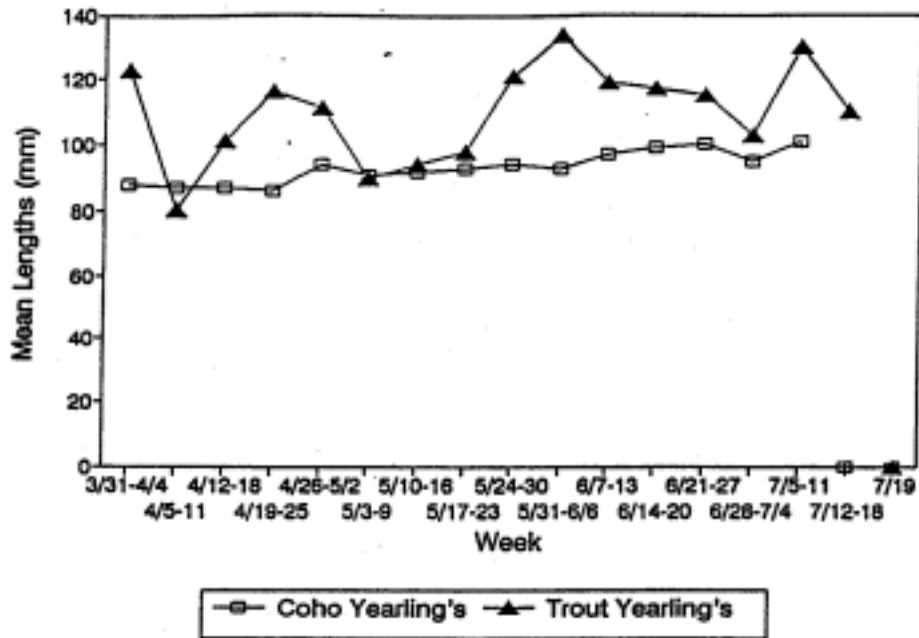
Both species reached their high point, during the same week, although the early period was dominated by coho yearlings and in the later weeks steelhead-trout yearlings were most frequently seen, figure 6. Coho fry were observed migrating, during the month of April. Steelhead-trout "yoy's" appeared in late April and peaked, during the week of 6/28-7/4, figure 7.

Figure 7, weekly totals of coho salmon and steelhead-trout young of the year at Little River.



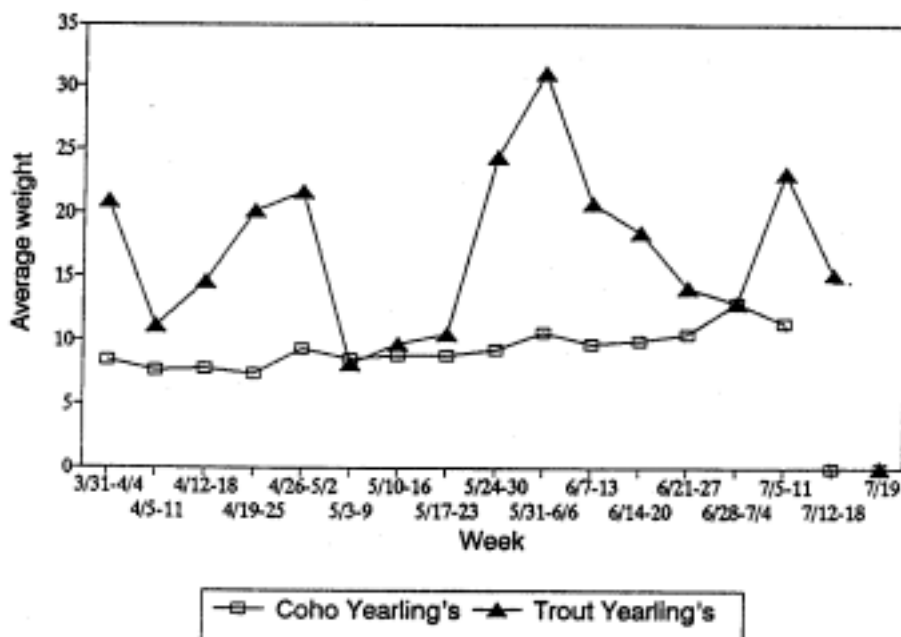
Analysis of mean lengths for steelhead-trout yearlings revealed that the larger size fish migrated on the 1st, 10th and the 15th week of the study. Conversely, coho yearlings displayed a consistent growth rate of 88 mm to 101 mm in length, figure 8.

Figure 8, weekly mean lengths of coho salmon and steelhead-trout yearlings at Little River.



Analysis in weight (grams) for coho yearlings revealed that they gradually increased from 8.42 to 11.36 grams, during March 31 through July 11th. Steelhead-trout yearlings fluctuated throughout the season, with their heaviest fish migrating, during the first week of April, early June and for the week of July 5-11, figure 9.

Figure 9, weekly weight (grams) of coho salmon and steelhead-trout yearlings at Little River.



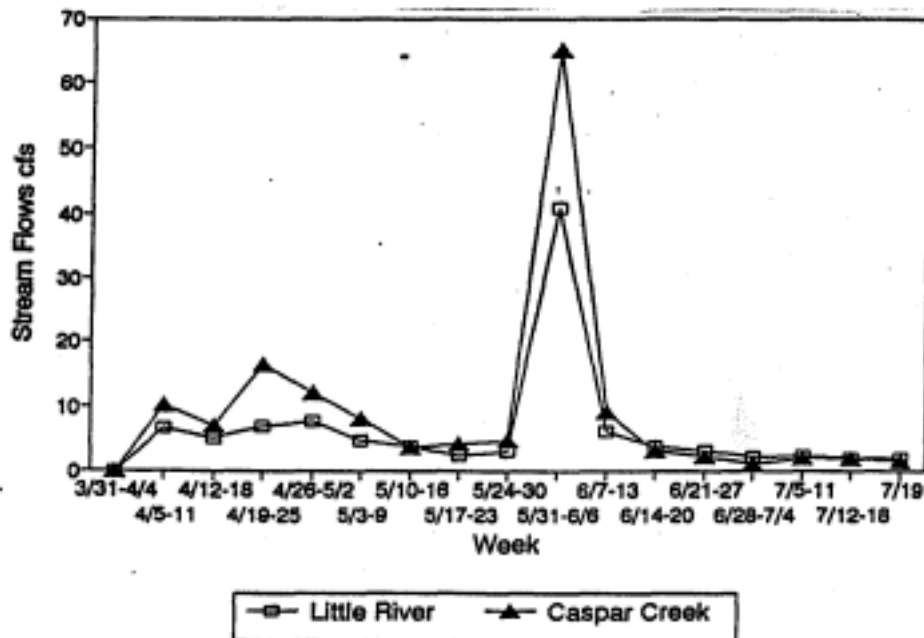
One adult steelhead-trout, at 40 cm in length, was trapped on April 19, during a high flow period. Sculpin, both (Cottus asper and Cottus alueuticus) as well as stickleback were trapped, throughout the survey. Occasionally, trapped were Gartner snakes, moles, frogs and salamanders.

There were eleven 24-hour periods of heavy rainfall, causing less than 100 percent trapping efficiency, for Little River, during March 31, April 17th, 18th, and the 25th then for the May 25th through June 1st period, as water was seen flowing over the sandbag walls, figure.10.

Little River was examined between the beach parking lot at Van Damme State Park down to the shore line, on four different occasions to confirm the presence and seaward egress of salmonids. During May 4th, the 11th, June 1st and July 15th fish were seen jumping and feeding in the pond portion of the estuary, however species was not known. Electro-shocking was not performed this year to truly identify fish seen in either intertidal area.

The flow pattern, at Little River, was high (6.5 cfs average) throughout April, before receding to a 4 cfs by the week of May 3-9 with a fluctuation of 2 to 3 cfs for the remainder of May. Little River then peaked to a 41 cfs measurement in early June but then @tapered thereafter, figure 10.

Figure 10, stream flow measurements for Caspar Creek and Little River.



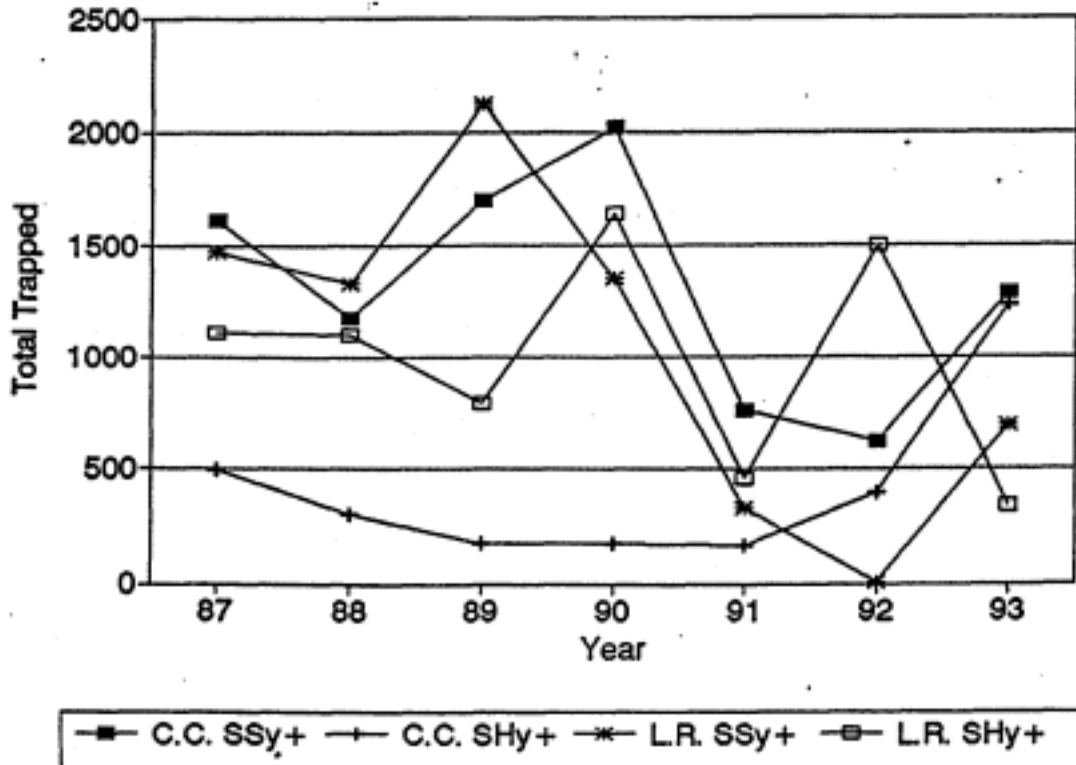
The main forks of Caspar Creek influenced the cfs stream flow measurements, during the heavy rainfall periods, figure 1. Little River's stream flow should increase, as the seven cement vehicle crossings, with a 1.5 diameter culvert per intersection, are now being removed and replaced with over head foot bridge.

Discussion: Coho "y+" swim near the surface and are influenced to migrate when stream flows are both high and sediment brown in color. Steelhead-trout yearlings swim closer to the bottom of the stream and are influenced to migrate, after the rainy period, when the water recedes to a transitional milky white color. Both species migrated at night and even during the early morning hours. High and low tides along with the position of the moon were also compared to their migration patterns but winter conditions seem to influence them more versus the earth's gravity pull; however, one adult steelhead-trout, at Little River was, trapped, during high tide, at 10 p.m.

Appendix 1, comparison of salmonids trapped from 1992 to 1993 at both estuaries. Figure 11, indicates that steelhead-trout yearlings may migrate intensely, during the month of March at Little River, as water conditions allowed the trapping operations for the 1990 and 1992 Downstream Migrant Fish Trapping study to began in early March.

	CASPAR CREEK		LITTLE RIVER	
	1992	1993	1992	1993
Coho yearlings	615	1287	1	689
Coho fry	4311	8387	489	845
SH/RT yearlings	396	1232	1500	338
SH/RT fry	1050	3542	18	216

Figure 11, total trapping analysis of coho salmon and steelhead-trout yearlings, from 1987 through the 1993 trapping season.



Caspar Creek

1993

Total Trapped

Week	Trapping: Units	Coho Salmon		Steelhead-trout	
		Y+	YOY	Y+	YOY
1	4/5-11	195	1654	66	1
2	4/12-18	168	676	239	1
3	4/19-25	113	2511	182	3
4	4/26-5/2	141	3531	158	0
5	5/3-9	196	0	159	860
6	5/10-16	190	0	135	1275
7	5/17-23	208	2	145	626
8	5/24-30	55	4	74	538
9	5/31-6/6	7	2	16	49
10	6/7-13	7	1	13	20
11	6/14-20	7	0	24	37
12	6/21-27	0	2	11	36
13	6/28-7/4	0	4	4	18
14	7/5-11	0	0	4	24
15	7/12-18	0	0	2	47
16	7/19-	0	0	0	7

Little River

1993

Total Trapped

Week	Trapping Units	Coho Salmon		Steelhead-trout	
		Y+	YOY	Y+	YOY
1	3/31-4/4	19	46	31	0
2	4/5-11	120	136	31	0
3	4/12-18	144	16	69	0
4	4/19-25	100	130	32	1
5	4/26-5/2	53	513	22	23
6	5/3-9	97	0	7	5
7	5/10-16	74	1	9	1
8	5/17-23	26	0	23	2
9	5/24-30	26	1	33	8
10	5/31-6/6	6	2	42	3
11	6/7-13	6	0	10	6
12	6/14-.20	12	0	15	23
13	6/21-27	3	0	8	46
14	6/28-7/4	2	0	2	54
15	7/5-11	1	0	2	30
16	7/12-18	0	0	2	13
17	7/19-	0	0	0	1

Caspar Creek

1993

Mean Lengths (mm)

Week	Trappings Units	Coho Salmon		Steelhead-trout	
		Y+	YOY	Y+	YOY
1	4/5-11	81	30	104	48
2	4/12-18	84	30	83	49
3	4/19-25	93	30	92	43
4	4/26-5/2	90	29	89	0
5	8/3-9	88	0	82	29
6	5/10-16	96	0	92	30
7	5/17-23	94	51	93	31
8	5/24-30	92	54	96	29
9	5/31-6/6	75	56	104	31
10	6/7-13	91	59	103	38
11	6/14-20	92	0	99	50
12	6/21-27	0	60	95	54
13	6/28-7/4	0	55	118	54
14	7/5-11	0	0	126	55
15	7/12-18	0	0	94	58
16	7/19-0	0	0	0	61

Little River

1993

Mean Lengths (mm)

Week	Trappings Units	Coho Salmon		Steelhead-trout	
		Y+	YOY	Y+	YOY
1	3/31-4/4	88	33	123	0
2	4/5-11	87	34	80	0
3	4/12-18	87	34	101	0
4	4/19-25	86	31	116	31
5	4/26-5/2	94	30	111	30
6	4/3-9	91	0	90	29
7	5/10-16	92	46	94	32
8	5/17-23	93	0	98	56
9	5/24-30	94	47	121	51
10	5/31-6/6	93	51	134	58
11	6/7-13	97	0	119	57
12	6/14-20	99	0	117	63
13	6/21-27	100	0	115	63
14	6/28-7/4	95	0	103	65
15	7/5-11	101	0	130	66
16	7/12-18	0	0	110	67
17	7/19-	0	0	0	71

Caspar Creek		1993			
Biomass (grams)					
Week	Trapping Units	Coho Y+	Salmon YOY	Steelhead-trout Y+	YOY
1	4/5-11	6.08	0.32	16.22	2
2	4/12-18	6.87	0.23	7.37	1.41
3	4/19-25	9.11	0.23	9.44	1.51
4	4/26-5/2	8.37	0.21	9.55	0
5	5/30-9	7.91	0	6.62	0.24
6	5/10-16	9.48	0	10.82	0.23
7	5/17-23	9.16	1.48	10.24	0.34
8	5/24-30	8.7	1.9	11.19	0.28
9	5/31-6/6	7.69	2.3	13.2	0.59
10	6/17-13	7.86	2.61	14.6	0.7
11	6/14-20	9.23	0	12.12	1.5
12	6/21-27	0	1.96	11.14	1.86
13	6/28-7/4	0	2.16	19.05	2.07
14	7/5-11	0	0	21.41	1.9
15	7/12-18	0	0	9.17	2.26
16.	7/19-	0	0	0	2.8

Little River		1993			
Biomass (grams)					
Week	Trappings Units	Coho Y+	Salmon YOY	Steelhead-trout Y+	YOY
1	3/31-4/4	8.42	0.3	20.98	0
2	4/5-11	7.62	0.2	11.13	0
3	4/12-18	7.8	0.83	14.59	0
4	4/19-25	7.37	0.23	20.27	0.3
5	4/26-5/2	9.37	0.24	21.76	0.23
6	5/3-9	8.61	0	8.19	0.25
7	5/10-16	8.82	0.71	9.74	0.37
8	5/17-23	8.78	0	10.57	2.12
9	5/24-30	9.29	1.73	24.5	1.88
10	5/31-6/6	10.6	1.25	31.12	2.22
11	6/7-13	9.73	0	20.76	2.14
12	6/14-20	10	0	18.5	2.92
13	6/21-27	10.5	0	14.13	2.87
14	6/28-7/4	12.98	0	12.98	2.92
15	7/5-11	11.36	0	23.19	3.43
16	7/12-18	0	0	15.22	3.47
17	7/19-	0	0	0	3.99

Stream Flows

1993

Week	Trapping Units	Caspar Creek	Little River
1	3/31-4/4	0	0
2	4/5-11	10.32	6.61
3	4/12-18	7.101	5.149
4	4/19-25	16.441	7.025
5	4/26-5/2	11.957	7.732
6	5/3-9	8.126	4.7222
7	5/10-16.	3.7005	3.8
8	5/17-23	4.109	2.492
9	5/24-30	4.8024	3.047
10	5/31-6/6	65	41
11	6/7-13	9.2195	6.234
12	6/14-20	3.16	3.7715
13	6/21-27	2.3364	3.22
14	6/28-7/4	1.05	2.22
15	7/5-11	1.9235	2.36
16	7/12-18	1.759	1.9
17	7/19-	1.453	1.97



Caught 4-17-93 58 cm
Female Steelhead-trout.
CC



Caught 4-17-93 54 cm
Female Steelhead-trout.
CC



Steelhead-trout
Caspac Creek
4-17-93 54 cm



Caught 4-17-93 58 cm
Female Steelhead-trout.
CC



Caught 4-17-93 54 cm
Possible Male
Steelhead-trout.
CC



4-17-93
Female Steelhead-trout
58 cm



or 10' long



June 28. C.C.
SS Y+, SH Y+
120 mm 160 mm



5/10/93 Little
SS Y+ 92mm
SH Y+ 94mm
River.



July 1 Caspar Cr.
SS Y+, SH Y+
115 mm 155 mm



C.C. Steelhead Y+
6-8-93 110mm



Scalors Samples
C.C. 5-2-93