

SNOQUALMIE RIVER JUVENILE SALMON OUT-MIGRATION STUDY PROGRESS REPORT February – June 2013

1. Summary of activities completed during the sampling season.

On January 30th installation of the rotary screwtrap began and full trapping operations commenced on February 5th. The season ended on June 14th completing 21 weeks of fishing in which 1,218 hours were fished over 94 days in 115 total shifts. The fishing effort consisted of 686.5 hours of night fishing representing 56.4% of the sampling hours. There were 14 scheduled fishing events that were unfishable during this five month period due to unfavorable sampling conditions (i.e. high debris and discharge levels). Two scheduled events were also rescheduled or canceled due to employee call-in. During the sampling season 6,134 salmon and trout were captured, counted and released. Of the total number of salmon and trout captured, 615 were unmarked Chinook sub-yearlings, 69 were unmarked Chinook yearlings and 1,718 were unmarked Coho yearling (Table 2). Both Coho and Chinook catch numbers are markedly higher than last season, but appear to be within the average range for this project over the long term.

During the trapping and handling process a total of 19 salmonid mortalities were reported of which 4 were Chinook sub-yearlings. Mortality rates were calculated for all salmonid species captured (Table 1). Mortality as a percentage of the total salmonid catch (0.003%) was significantly lower than the last years and substantially below the project average.

Table 1 shows a monthly breakdown of catch numbers for all species, and Table 3 shows statistical weeks (SW) and the corresponding dates for the 2013 sampling season. After a preliminary review of the data it appears that catch per unit effort (CPUE) for wild Chinook sub-yearlings was highest during SW 12 and 13 when 1.42 and .74 fish per hour were caught respectively. Also notable was a secondary peak for sub-yearling Chinook that was observed during SW 18 and 19 when .85 and 1.05 fish per hour were captured respectively. The timing of these peaks has varied from year to year, and does not exhibit the observed consistency documented with Coho outmigration in the Snoqualmie. The highest CPUE for Coho yearlings was recorded during SW 18 when 10.57 fish per hour were caught. The steep nature of the peak observed is likely due to increased effort during SW 19. During SW 19 the Skykomish River was unfishable due to high flows, and efforts were increased on the Snoqualmie during this time. This likely resulted in lower CPUE rates as a product of increased daytime effort, when catch rates are much lower. The timing of this peak is, however, consistent with the timing observed in all other years of the trapping project.

A total of 15 trap efficiency tests (6 Chinook sub-yearlings and 9 Coho yearlings) were conducted on 15 different days during the sampling season. During these tests, groups of salmon were marked (dyed) and released over a mile upstream of the trap site. The trap was then operated continuously (except during debris removal) for a minimum of 36 hours. Efficiency calculations were then determined as a percentage based on catch encounters with dyed fish. 2013 efficiency calculations suggest that the trap was operating at an efficiency rate of 0.58% for Chinook sub-yearlings and 0.66% for Coho yearlings during the sampling period. One sub yearling Chinook efficiency release was omitted from the results due to unfishable river conditions that occurred immediately following the release resulting in removal of the trap after only 5.5 hours of fishing time. The Chinook efficiency rates are much lower for 2013 than previous sampling years at this site. It is unclear why efficiency rates for this cohort were much lower than anticipated. Equipment was repeatedly inspected and appeared to be fully functioning, and all marked fish generally appeared to be active and healthy when released. The Coho yearling efficiency catch rates were .06% higher than last season, and within a reasonable average for this trapping location as compared to previous years.

2. Project status and difficulties

The 2013 season for the Snoqualmie River trapping project went well, not including the three instances when fishing conditions were not ideal due to high river levels and/or debris levels. On March 13th the lines were taken down in anticipation of flooding. The Snoqualmie River reached 14,000 cfs and the lines were not reinstalled until March 18th resulting in the cancellation of five scheduled sampling events. Removal of the guide lines occurred again on April 5th when a flood was forecasted and reinstalled on April 8th following a high water event. During this time period, the river level increased to 15,000 cfs and 3 scheduled fishing events had to be cancelled due to unfavorable conditions. On April 29th the river rose rapidly and peaked just over 9,000 cfs which caused quickly elevated debris flows during a specific fishing event resulting in the cancellation of just one shift. Fishing resumed normal operation as scheduled on April 30th. Aside from these occurrences, the trapping project on the Snoqualmie River was satisfactory. It is unclear why efficiency rates encountered for sub yearling Chinook were so far below anticipated rates in 2013, and further investigations into this matter will be conducted during the 2014 season in an attempt to isolate potential causative factors for these low catch percentages. It is unclear why efficiency rates for yearling Coho were higher than those for sub yearling Chinook, under normal operation this relationship is usually inverse of what was documented in 2013.

During the 2012 sampling season, another sampling effort was added to the project. In coordination with Washington State Department of Fish and Wildlife, all wild Chinook caught were sampled for DNA. These efforts continued in the 2013 season, and during the monitoring season approximately 615 upper-caudal DNA clips were taken from a mix of sub yearling and yearling

unmarked Chinook juveniles. Also, in ongoing cooperation with Seattle City Light, all unclipped juvenile steelhead were passed through a PIT tag reader. In total approximately 50 unmarked Steelhead smolts were scanned for PIT tags, and 0 tags were detected.

Finally, a noteworthy anomaly was the capturing of 2 adult Coho Salmon in February. This is very uncommon using this type of sampling equipment, but does occur infrequently. This is the first time adult Coho have been captured since the beginning of Snoqualmie trapping operations in 2000. This occurrence likely indicates both a strong adult Coho migration into the system in 2013 as well as an adult Coho migratory pattern that occurred later in the 2013 season than what is generally observed or anticipated.

Table 1: Snoqualmie River trap catch and mortalities 2013

(Data is preliminary)

February

	<i>Chinook</i>		<i>Coho</i>		<i>Chum</i>	<i>Pink</i>	<i>Steelhead</i>		<i>Resident Resident Resident</i>	<i>Cut./Rain. Trout Rainbow</i>	<i>Total Salmonid Fry/Parr</i>	<i>Catch</i>	<i>Lamp</i>	<i>Sculpin spp. Sunfish</i>	<i>Stickle-Stickle-spp.</i>	<i>back</i>
	<i>0+</i>	<i>1+</i>	<i>0+</i>	<i>1+</i>	<i>0+</i>	<i>0+</i>	<i>Unm Smolts</i>	<i>Mark Smolts</i>								
<i>Day</i>	(90.8 hours of effort)															
Catch	3	0	2	1	5	0	0	0	1	0	12	5	0	0	2	
Morts.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
<i>Night</i>	(120.4 hours of effort)															
Catch	21	1	7	11	54	0	0	0	5	0	100	13	0	1	3	
Morts.	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	
Monthly Totals	(211.2 hours of effort)															
Catch	24	1	9	12	59	0	0	0	6	0	112	18	0	1	5	
Morts.	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	

March

	<i>Chinook</i>		<i>Coho</i>		<i>Chum</i>	<i>Pink</i>	<i>Steelhead</i>		<i>Resident Resident Resident</i>	<i>Cut./Rain. Trout Rainbow</i>	<i>Total Salmonid Fry/Parr</i>	<i>Catch</i>	<i>Lamp</i>	<i>Sculpin spp. Sunfish</i>	<i>Stickle-Stickle-spp.</i>	<i>back</i>
	<i>0+</i>	<i>1+</i>	<i>0+</i>	<i>1+</i>	<i>0+</i>	<i>0+</i>	<i>Unm Smolts</i>	<i>Mark Smolts</i>								
<i>Day</i>	(104.6 hours of effort)															
Catch	22	0	33	1	40	0	0	0	0	0	97	1	0	0	0	
Morts.	0	0	0	0	1	0	0	0	0	0	2	0	0	0	0	
<i>Night</i>	(169.4 hours of effort)															
Catch	129	7	471	16	324	0	0	0	5	0	952	33	0	2	0	
Morts.	0	0	1	0	1	0	0	0	0	0	2	0	0	0	0	
Monthly Totals	(273.9 hours of effort)															
Catch	151	7	504	17	364	0	0	0	5	0	1049	34	0	2	0	
Morts.	0	0	1	0	2	0	0	0	0	0	4	0	0	0	0	

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Table 1: Snoqualmie River trap catch and mortalities 2013

(Data is preliminary)

April

	<i>Chinook</i>		<i>Coho</i>		<i>Chum</i>	<i>Pink</i>	<i>Steelhead</i>		<i>Resident Resident Resident</i>	<i>Cut./Rain. Trout Rainbow</i>	<i>Total Salmonid Fry/Parr</i>	<i>Catch</i>	<i>Lamp</i>	<i>Sculpin spp. Sunfish</i>	<i>Stickle-Stickle-spp.</i>	<i>back</i>
	<i>0+</i>	<i>1+</i>	<i>0+</i>	<i>1+</i>	<i>0+</i>	<i>0+</i>	<i>Unm Smolts</i>	<i>Mark Smolts</i>								
<i>Day</i>	(84.3 hours of effort)															
Catch	17	5	68	18	46	0	0	0	0	0	154	1	1	0	0	
Morts.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
<i>Night</i>	(139.5 hours of effort)															
Catch	117	34	679	285	114	0	8	0	0	0	1244	23	4	2	2	
Morts.	3	0	6	0	2	0	0	0	0	0	11	0	0	0	0	
Monthly Totals	(223.8 hours of effort)															
Catch	134	39	747	303	160	0	8	0	0	0	1398	24	5	2	2	
Morts.	3	0	6	0	2	0	0	0	0	0	11	0	0	0	0	

May

	<i>Chinook</i>		<i>Coho</i>		<i>Chum</i>	<i>Pink</i>	<i>Steelhead</i>		<i>Resident Resident Resident</i>	<i>Cut./Rain. Trout Rainbow</i>	<i>Total Salmonid Fry/Parr</i>	<i>Catch</i>	<i>Lamp</i>	<i>Sculpin spp. Sunfish</i>	<i>Stickle-Stickle-spp.</i>	<i>back</i>
	<i>0+</i>	<i>1+</i>	<i>0+</i>	<i>1+</i>	<i>0+</i>	<i>0+</i>	<i>Unm Smolts</i>	<i>Mark Smolts</i>								
<i>Day</i>	(191.8 hours of effort)															
Catch	108	8	133	223	1	0	1	2	0	0	476	5	0	1	0	
Morts.	1	0	0	1	0	0	0	0	0	0	2	0	0	0	0	
<i>Night</i>	(181.0 hours of effort)															
Catch	186	14	1308	1121	4	0	39	30	0	0	2709	37	1	3	20	
Morts.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Monthly Totals	(372.8 hours of effort)															
Catch	294	22	1441	1344	5	0	40	32	0	0	3185	42	1	4	20	
Morts.	1	0	0	1	0	0	0	0	0	0	2	0	0	0	0	

Table 1: Snoqualmie River trap catch and mortalities 2013

(Data is preliminary)

June

	<i>Chinook</i>		<i>Coho</i>		<i>Chum</i>	<i>Pink</i>	<i>Steelhead</i>		<i>Resident Resident Resident</i>	<i>Cut./Rain. Trout Rainbow</i>	<i>Total Salmonid Fry/Parr</i>	<i>Catch</i>	<i>Lamp</i>	<i>Sculpin spp. Sunfish</i>	<i>Stickle-Stickle-spp.</i>	<i>back</i>
	<i>0+</i>	<i>1+</i>	<i>0+</i>	<i>1+</i>	<i>0+</i>	<i>0+</i>	<i>Unm Smolts</i>	<i>Mark Smolts</i>								
<i>Day</i>	(60.1 hours of effort)															
Catch	4	0	16	2	0	0	0	0	0	0	22	2	0	0	2	
Morts.	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	
<i>Night</i>	(76.2 hours of effort)															
Catch	8	0	314	40	0	0	2	1	0	0	368	61	3	0	2	
Morts.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Monthly Totals	(136.3 hours of effort)															
Catch	12	0	330	42	0	0	2	1	0	0	390	63	3	0	4	
Morts.	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	

Totals

(1217.9 total hours of effort)

	<i>Chinook</i>		<i>Coho</i>		<i>Chum</i>	<i>Pink</i>	<i>Steelhead</i>		<i>Resident Resident Resident</i>	<i>Cut./Rain. Trout Rainbow</i>	<i>Total Salmonid Fry/Parr</i>	<i>Catch</i>	<i>Lamp</i>	<i>Sculpin spp. Sunfish</i>	<i>Stickle-Stickle-spp.</i>	<i>back</i>
	<i>0+</i>	<i>1+</i>	<i>0+</i>	<i>1+</i>	<i>0+</i>	<i>0+</i>	<i>Unm Smolts</i>	<i>Mark Smolts</i>								
Catch	615	69	3031	1718	588	0	50	33	11	0	6134	181	9	9	31	
Morts.	4	0	8	1	5	0	0	0	0	0	19	0	0	0	0	
Mortality Rate	0.65%	0.00%	0.26%	0.06%	0.85%		0.00%	0.00%	0.00%		0.31%					
% of Total Catch	9.7%	1.1%	48.0%	27.2%	9.3%	0.0%	0.8%	0.5%	0.2%	0.0%	97.2%	2.9%	0.1%	0.1%	0.5%	

Table 2. Annual sampling effort and catch totals for sub-yearling Chinook and yearling coho at the Snoqualmie River Rotary screwtrap 2001-2013 (preliminary data).

Year	Effort (hrs)	Chinook	Coho
2001	509	619	553
2002	780.3	653	1894
2003	945.5	882	1305
2004	1056	611	1127
2005	1017.8	677	1187
2006	992	761	2023
2007	509.5	120	615
2008	317.9	163	587
2009	632.1	259	754
2010	1157.8	357	1149
2011	500.8	284	1662
2012	847.2	377	1384
2013	1217.93	615	1718

Table 3. Statistical weeks and corresponding dates for 2013 sampling season.

Year	2013			
	StatWeek	BegWeek	MidWeek	EndWeek
2013	6	2/3	2/6	2/9
2013	7	2/10	2/13	2/16
2013	8	2/17	2/20	2/23
2013	9	2/24	2/27	3/2
2013	10	3/3	3/6	3/9
2013	11	3/10	3/13	3/16
2013	12	3/17	3/20	3/23
2013	13	3/24	3/27	3/30
2013	14	3/31	4/3	4/6
2013	15	4/7	4/10	4/13
2013	16	4/14	4/17	4/20
2013	17	4/21	4/24	4/27
2013	18	4/28	5/1	5/4
2013	19	5/5	5/8	5/11
2013	20	5/12	5/15	5/18
2013	21	5/19	5/22	5/25
2013	22	5/26	5/29	5/1
2013	23	6/2	6/5	6/8
2013	24	6/9	6/12	6/15
2013	25	6/16	6/19	6/22
2013	26	6/23	6/26	6/29

Figure 1. Chinook sub-yearling (age 0+) and coho yearling (age 1+) migration patterns observed during 2013 at the Snoqualmie River trap, river mile 12.2 (preliminary data).

