Tulalip Tribes Natural Resources Department Report

SKYKOMISH RIVER JUVENILE SALMON OUT-MIGRATION STUDY PROGRESS REPORT

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by
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i. Acknowledgements
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- NOAA Pacific Coastal Salmon Recovery Funds
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1. Introduction

In May of 1999, the National Marine Fisheries Service (NMFS) listed the Puget Sound Chinook salmon as threatened under the federal Endangered Species Act (ESA). This listing included Chinook salmon from the Snohomish River Basin (Skykomish and Snoqualmie populations). Similarly, decreases in many runs of Puget Sound Coho salmon have resulted in a designation as a species of concern under ESA. The recovery of these species depends upon improving the effectiveness of habitat, harvest, and hatchery management across the basin. In order to achieve such improved effectiveness, additional information is necessary to fill important data gaps within the Snohomish system, including information on Chinook and Coho salmon abundance, productivity, spatial structure, and diversity (Snohomish Basin Salmonid Recovery Technical Committee, 2005). Information about the trends and inter-annual variability in these population parameters is critical to inform salmon recovery efforts, provides basic information on the productivity and capacity of the system, and can lead to significant improvements in harvest management modeling and run forecasting. Additionally, the monitoring of production and survival along with other physical, chemical, and biological conditions provides a means to evaluate recovery actions, habitat conditions, and potential ecological trajectories in the basin.

A key project helping to provide information on Snohomish salmon populations has been the operation of two rotary screw traps in the Skykomish and Snoqualmie rivers. Over the last 12 years, these projects involved trapping and enumerating juvenile Chinook and Coho salmon (as well as several un-targeted species) as they emigrate from the Snohomish River Basin to the Puget Sound. The goals of these trapping efforts are to estimate Chinook and Coho salmon natural production, migration patterns, and freshwater survival. These goals are accomplished through the direct quantification of juvenile salmon emigrations, evaluation of trap efficiency, and assessment of influential environmental attributes (Kubo, Finley, Nelson, 2013).

The Tulalip Tribes (TTT) trapping project has been classified on a multi-agency basis as a project of high priority for monitoring juvenile salmonids in the Snohomish River basin. TTT has worked in close collaboration with the Bureau of Indian Affairs (BIA), Washington Department of Fish and Wildlife (WDFW), NOAA Fisheries, University of Washington (UW), Long Live the Kings (LLTK), Seattle City Light (SCL), U.S. Geological Survey (USGS), Northwest Indian Fisheries Commission (NWIFC), and other agencies to aid in better co-management of Snohomish basin salmon and steelhead stock assessment monitoring and run forecasting. Cooperative management agreements and in-kind contributions have been made to these agencies regularly from TTT in order to better assist in monitoring the status and trends of Snohomish Basin salmonid stocks.

2. Skykomish River Trapping Site Location and Characteristics

The Skykomish river trap site is located at river mile 26.5 of the Skykomish River (Figure 1). The wetted width of the Skykomish River at this point is ~325 ft. during the spring out-migration period and the channel's bank full width is ~490 ft. The channel's maximum depth at the site is ~5 ft. at summer low-flow level and approaches ~18.5 ft. at bank full depth. Summer low-flow at this location is ~3,030 cfs and mean annual discharge is ~4,070 cfs. The channel gradient is < 1% and substrate is principally gravel and cobble. When fishing; the trap is positioned in the thalweg of river, near the center of the channel. Land use adjacent to the project site is principally agriculture; however, riparian vegetation is relatively intact (with some supplemental plantings). Existing riparian vegetation is primarily cottonwood and alder and planted riparian vegetation includes cedar and spruce. At the immediate trapping site, the right-bank is composed of a gravel bar adjacent to a cottonwood stand. The left bank is just downstream of a hardened section (i.e. riprapped) with planted riparian vegetation integrated into a cottonwood stand. Adjacent to the stand is an active farm. (Kubo, Finley, Nelson, 2013).

Figure 1: Aerial photograph of the trap site at river mile 26.5 on the Skykomish River. The red dot indicates the approximate trap fishing position.

3. Summary of activities completed during the sampling season.

On February 1st, 2016 installation of the rotary screwtrap began and full trapping operations commenced on February 9th. The 2016 season ended on June 16th. The trap was operated for approximately 1032 hours over 128 days within an 18 week period. 730.7 of those hours were fished at night representing 70.8% of total trapping effort. Approximately 6 consecutive sampling events were cancelled during SW 8 between February 14-20 due to unfavorable sampling conditions (i.e. high debris and discharge levels) coupled with an unrelated equipment failure. Normal operation re-commenced during SW 9 on Monday, February 22nd. During the sampling season 61,140 salmon and trout were captured, counted and released. Of those fish, Pink salmon totaled 43,618 accounting for 65% of the total salmonid catch for 2016. Captured unmarked Chinook included 490 sub-yearlings and 276 yearlings. The number of Chinook sub-yearlings caught at the Skykomish River trap has varied widely from year to year, with this years' total falling 71% lower than the project average (2004-2016 average; 1,665). Captured unmarked Coho included 138 sub-yearlings and 1,087 yearlings. The number of unmarked Coho yearlings caught in 2016 was 54% lower than the project average (2004-2016 average: 4,652) (Table 1). During the trapping and handling process a total of 4 salmonid mortalities were reported, of which 0 were unmarked Chinook. Mortality as a percentage of the total salmonid catch was significantly below 1% (Table 7).

Year	Effort (Hours)	0+ Chinook	1+ Coho	Chinook CPUE	Coho CPUE
2000	308.5	1287	5972	4.17	19.36
2001	900.6	1786	5512	1.98	6.12
2002	671.7	1093	8851	1.63	13.18
2003	992.1	3394	8713	3.42	8.78
2004	1071	951	13949	0.89	13.02
2005	944.3	2411	3082	2.55	3.26
2006	1125.3	2928	6218	2.60	5.53
2007	446.8	1348	3882	3.02	8.69
2009	686.6	1650	1410	2.40	2.05
2010	1045.8	1989	1245	1.90	1.19
2011	666.8	765	1798	1.15	2.70
2012	1015.7	1323	3005	1.30	2.96
2013	1217.77	2446	4443	2.01	3.65
2014	888.2	1354	2625	1.52	2.96
2015	1078.7	1418	1596	1.31	1.48
2016	1031.5	490	2137	0.48	2.07
Project Average		*1665*	*4652*	2.02	6.06

Table 1. Annual sampling effort and catch totals for unmarked Sub-yearling Chinook and yearling Coho at the Skykomish River rotary screwtrap 2000-2016.

Efficiency testing and results.

A total of 14 trap efficiency tests (8 with Chinook sub-yearlings and 6 with Coho yearlings) were conducted on 14 different days throughout the 2016 sampling season. During these tests, groups of hatchery origin juvenile salmon were collected from Wallace River Hatchery, marked with biological dye, and released approximately one mile upstream of the trap site. These releases were conducted weekly throughout the duration of the sampling season unless the river was deemed unfishable. Following each release the trap was operated continuously (except during debris removal) for a minimum of 36 hours. Efficiency calculations are expressed as the percentage of captured dyed fish in relation to the total number of dyed fish released. The results of these tests are still being evaluated, but preliminary calculations suggest that the trap was operating at an efficiency rate of 1.02% for Chinook sub-yearlings and 1.01% for Coho yearlings during the 2016 sampling season (Table 2). Chinook sub-yearling efficiency rates in 2016 were slightly lower than documented seasonal averages (2001-2016 average: 1.37%), whereas Coho efficiency rates were consistent with observed averages at this site (2001-2016 average: 1.10%). During the 2016 season, trapping equipment was inspected and monitored frequently and the trap was found to be in fully operational condition with no escape paths detected and no major equipment malfunctions.

Year	River	Release Date	0+ CK Eff	1+ CO Eff
2016	Skykomish	2/25/2016	***1.36%***	
2016	Skykomish	3/1/2016	***1.40%***	
2016	Skykomish	3/9/2016	***0.65%***	
2016	Skykomish	3/15/16	***0.80%***	
2016	Skykomish	3/23/2016	***0.55%***	
2016	Skykomish	3/29/2016	***0.80%***	
2016	Skykomish	4/6/2016	***1.34%***	
2016	Skykomish	4/12/2016	***1.30%***	
2016	Skykomish	4/26/2016		***0.70%***
2016	Skykomish	5/4/2016		***0.98%***
2016	Skykomish	5/10/2016		***0.54%***
2016	Skykomish	5/18/2016		***0.84%***
2016	Skykomish	5/24/2016		***1.97%***
2016	Skykomish	6/1/2016		***omitted***
		2016 Avg. Total	1.02%	1.01%

Table 2. Efficiency Release dates, species, and capture percentages for the Skykomish River smolt trap, 2015.

In 2015 Snohomish County Public Utility District (PUD) began conducting similar efficiency releases at their smolt trap on the Sultan River. The Sultan trap site is approximately 7.8 river miles upstream from the Skykomish trap and is located on the Sultan River approximately 0.2 river miles upstream from the confluence of the Sultan and Skykomish. A total of 13 PUD efficiency tests were conducted in 2016 using a mix of natural origin Pink, Chum, sub-yearling Chinook salmon, and hatchery origin (adipose fin clipped) sub-yearling Chinook taken from the Wallace River Hatchery. The PUD release protocol at the Sultan trap is fairly consistent with the protocol utilized at Tulalip's Skykomish trap. The natural origin species are marked with biological dye, and released upstream, this dye is residually present long enough (approximately 36 hours) that encounters with dyed fish from the Sultan River occurred frequently at the Skykomish site. Because Tulalip is conducting releases using the same Wallace hatchery sub-yearling Chinook all ad-clipped sub-yearlings were released undyed by PUD. This allows the PUD trap operators to identify their released fish (there are no ad-clipped fish present in the Sultan system upstream of the trap site) without interfering with Tulalip's ongoing release and trapping efforts occurring downstream. Sub-yearling Chinook volitional releases do not occur from Wallace River Hatchery until June (annually) so it is assumed that any ad-clipped sub-yearling Chinook (dyed or otherwise) are from either PUD or Tulalip's release group(s). Also, because the fish are released undyed it is also possible to differentiate these fish from (a) Tulalip efficiency release sub-yearing chinook dyed with biological dye, and (b) other natural origin fish in the system. Preliminary analysis of the data indicates that fish from all 4 cohorts of PUD Sultan River releases are frequently encountered at the Skykomish trap site. This is particularly true for outmigrating dyed Pink salmon which were encountered most frequently. Table 3 indicates dates of PUD releases and the number of fish released for each species each day, Table 4 shows the corresponding catch percentages for each cohort.

Sultan River 2016 Releases					
Date	Release Time	0+ UM Chinook	Pink	Chum	0+ ADCL Chinook
2/29/2016	11:00		60		
3/8/2016	13:30	17	601	22	
3/15/2016	10:30	7	142	15	750
3/22/2016	16:00	8	408	21	
3/23/2016	12:00	8	702	27	
4/5/2016	15:00	17	402	15	
4/5/2016	17:00				750
4/12/2016	11:30	5	399	5	
4/12/2016	14:00				750
4/13/2016	12:30	12	144	3	
4/23/2016	15:00				750
5/11/2016	13:00				750
6/14/2016	12:00				750

Table3. Release dates, species, and number of fish released from the Sultan River, 2016.

Release Date (2016)	Species	Eff. %
2/29/2015	Pink	0.00%
3/8/16	Chinook UM	5.88%
	Pink	6.82%
	Chum	0.00%
3/15/16	Chinook UM	0.00%
	Pink	0.00%
	Chum	0.00%
	Chinook AD	0.13%
3/22/16	Chinook UM	12.50%
	Pink	2.45%
3/23/16	Chinook	0.00%
	Pink	0.00%
	Chum	6.25%
4/5/16	Pink	2.49%
	Chum	6.67%
	Chinook AD	0.27%
4/12/16	Chinook UM	20.00%
	Chum	0.00%
	Chinook AD	2.00%
4/13/16	Chinook UM	0.00%
	Pink	1.47%
	Chum	0.00%
4/23/16	Chinook AD	0.67%
5/11/16	Chinook AD	0.53%
6/14/16	Chinook AD	1.20%

Summed Chinook UM Avg.	4.05%
Summed Pink Avg.	2.41%
Summed Chum Avg.	3.70%
Summed Chinook AD Avg.	0.80%

Table 4. Release date, and corresponding average efficiency percentage of encounter at the Skykmoish trap for efficiency release fish from the Sultan River, 2016.

Release group size and flow conditions at the time of each release likely are the primary factors effecting catch percentages of Sultan release fish. Small release group sizes for natural origin Chinook and Chum likely play a role in low overall incidence of encounter for these release groups. Average efficiency recapture percentages appear to closely correlate to percentages calculated during Tulalip efficiency releases for sub-yearling outmigrant fish. Adipose fin-clipped sub-yearling Chinook encounters showed a summed total average of 0.80% compared to 1.02% calculated in Tulalips 0+ Chinook efficiency releases for 2016. The highest cohort specific recapture percentage was 20% occurring during the 04/12/16 PUD release of natural origin 0+ Chinook. The small release group size (5 individuals released) coupled with the unlikely encounter of 1 out of 5 total released fish resulted in the greatly inflated efficiency percentage. The relatively high cumulative averages for Pink and Chum fry efficiency tend to indicate fairly high incidence of recapture for ourmigrant ocean-type fry species. The cumulative averages for these cohorts were 2.41% for pink, and 3.70% for Chum. During the release conducted by PUD on 3/15/16 no fish from any cohort were recaptured at the Tulalip Skykomish Trap. This was the only instance in which no fish were captured from any of the 4 cohorts. For UM 0+ Chinook, Pink, and Chum the likely cause for this lack of encounter was the small overall release group sizes. It is however unclear why no fish were encountered from the ad-clipped 0+ Chinook release totaling 750 fish.

Catch Per Unit of Effort (CPUE) analysis.

A preliminary review of the data reveals that CPUE for unmarked Chinook sub-yearlings was the highest during Statistical Week (SW) 13 when the capture rate was approximately 2 fish per hour. CPUE for 0+ Chinook was fairly uniform and exhibited a slow ascending trend beginning in SW 8 and continuing until the eventual peak in SW 13. It appears that an undetermined proportion of the early 0+ Chinook outmigration may have occurred prior to the installation of the traps in 2016. Following the CPUE peak for 0+ Chinook in SW 13, catches dropped off before a secondary peak was seen in week 17 (Figure 3). The 2016 peak outmigration timing for sub-yearling Chinook was consistent with observed seasonal norms occurring between SW11 and SW17 for all recorded years. The sub-yearling Chinook outmigration occurred over a relatively extended period, while migration for unmarked Coho yearlings was more abbreviated, taking place over a 5 week period from SW16 to 22. The peak for Coho yearlings occurred during SW19 when approximately 10 fish per hour were captured. The timing of the yearling Coho outmigration is very consistent from year to year, and the 2016 data is consistent with monitoring trends observed since the beginning of trap operations in 2001. In all years the peak outmigration occurred between SW18 and SW22, as was observed in the 2016 sampling season. Table 7 shows a monthly breakdown of catch numbers for all species and Table 5 shows calendar weeks and the corresponding dates.

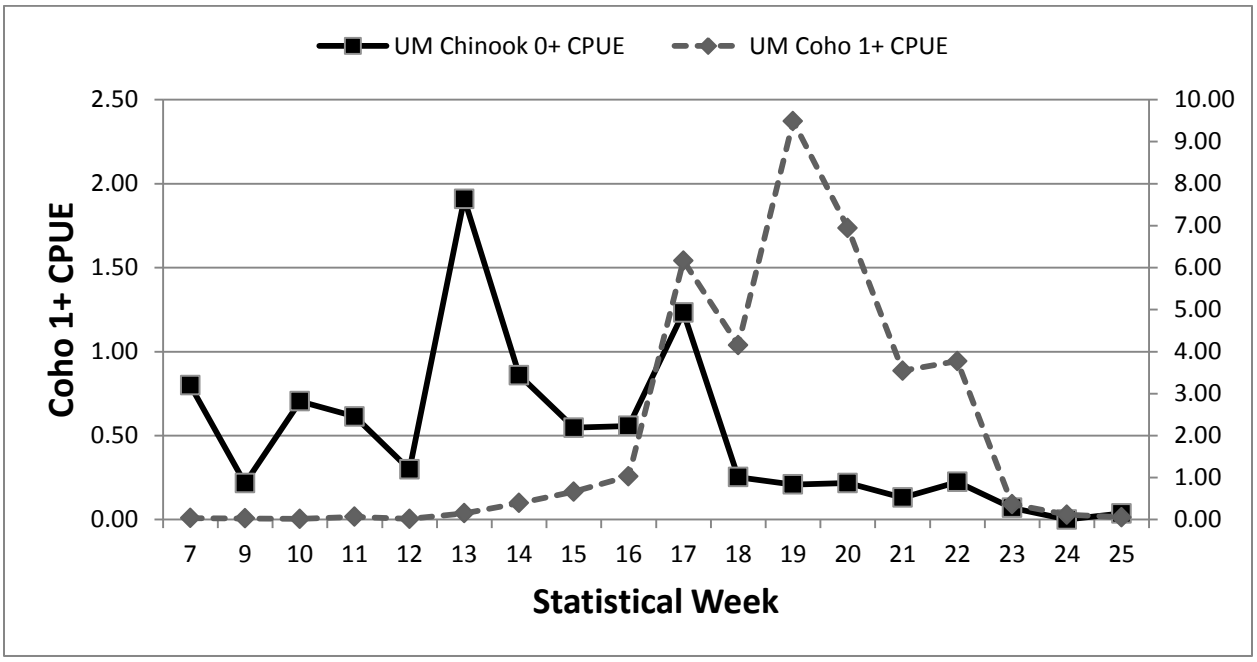

Figure 3. Chinook sub-yearling (age 0+) and coho (1+) migration patterns observed at the Skykomish River trap, February, 8th – June 5th, 2016.

2016 Trap Sampling Season				
Year	StatWeek	BegWeek	MidWeek	EndWeek
2016	6	1/31/2016	2/6/2016	2/3/2016
2016	7	2/7/2016	2/13/2016	2/10/2016
2016	8	2/14/2016	2/19/2016	2/17/2016
2016	9	2/21/2016	2/27/2016	2/24/2016
2016	10	2/28/2016	3/5/2016	3/2/2016
2016	11	3/6/2016	3/12/2016	3/9/2016
2016	12	3/13/2016	3/19/2016	3/16/2016
2016	13	3/20/2016	3/26/2016	3/23/2016
2016	14	3/27/2016	4/2/2016	3/30/2016
2016	15	4/3/2016	4/9/2016	4/6/2016
2016	16	4/10/2016	4/16/2016	4/13/2016
2016	17	4/17/2016	4/23/2016	4/20/2016
2016	18	4/24/2016	4/30/2016	4/27/2016
2016	19	5/1/2016	5/7/2016	5/4/2016
2016	20	5/8/2016	5/14/2016	5/11/2016
2016	21	5/15/2016	5/21/2016	5/18/2016
2016	22	5/22/2016	5/28/2016	5/25/2016
2016	23	5/29/2016	6/4/2016	6/1/2016
2016	24	6/5/2016	6/11/2016	6/8/2016
2016	25	6/12/2016	6/18/2016	6/15/2016
2016	26	6/19/2016	6/25/2016	6/22/2016

Table 5. Statistical weeks and corresponding dates for 2016 sampling season.

In general, average salmonid CPUE and total catch on the Skykomish trap have exhibited seasonal variability throughout the duration of the project due to fluctuating sampling conditions and the strength of a given years outmigrant cohort. Analysis of seasonal CPUE averages for sub-yearling Chinook and yearling Coho in 2016 indicate a lower than average capture rate for both of these species (Table 1).

The average CPUE for Chinook at the Skykomish site has displayed annual variance throughout the project duration (Figure 4). The overall CPUE for sub-yearling Chinook in the Skykomish River in 2016 was 76% lower than project average at approximately 0.48 fish per hour of effort (Project average CPUE; 2.02) . Taking into account seasonal variability and sampling conditions, the total annual catch and CPUE for sub-yearling Chinook seem to display annual variability, but no clear positive or negative trend. In 2007 the trap was moved upstream from RM 23 to its current location at RM 26.5. This relocation likely plays a direct role in lower overall encounters at the smolt trap from 2007 to present. This is likely due to the exclusion of the Woods Creek drainage from the sample, as well as decreasing the overall drainage area sampled.

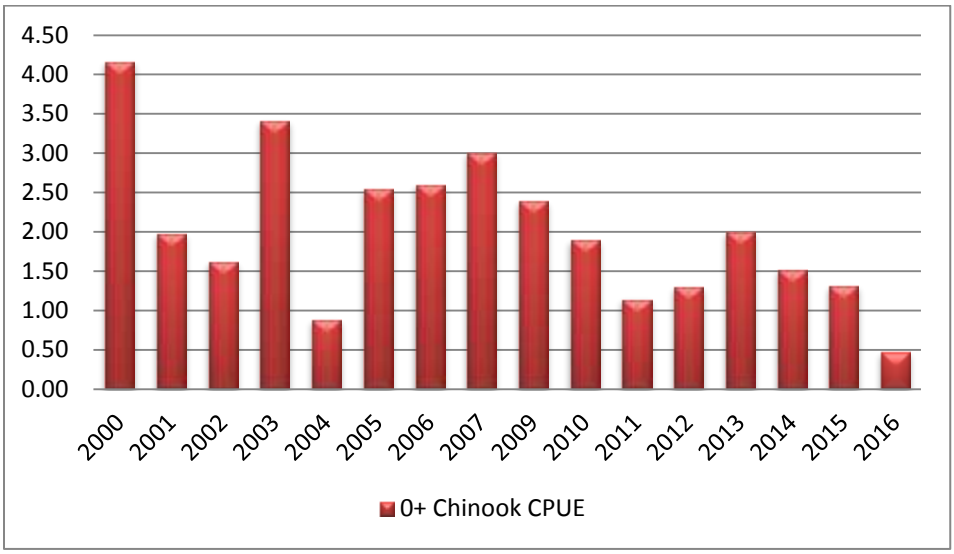

Figure 4. Sub-yearling Chinook average CPUE at the Skykomish trap; 2001-2016.

Yearling Coho catch rates dropped off significantly starting in 2009, and in 2010 the lowest documented average CPUE of 1.19 occurred (Figure 5). The overall decline in Coho catch rates is likely a direct product of the relocation of the trap to RM 26.5 in 2007. Woods Creek is a very effective Coho producing drainage, and has been excluded from the data following the traps relocation in 2007. 2008 data is not present due to unforeseen complications that halted the Skykomish trap operations in 2008. Since 2009, yearling Coho catch rates have remained fairly consistent both in total catch and CPUE. In 2016 the average yearling Coho CPUE was 66% lower than documented averages at 2.07 yearling Coho per hour sampled (Project average CPUE; 6.06 fish per hour). This number is likely due to a combination of a smaller outmigrant cohort size in 2016, and a much higher average CPUE's from 2000-2007 prior to the traps relocation. Aside from the apparent drop in catch rates from 2007 forward, yearling Coho annual catch and CPUE seem to display annual variability, but no clear positive or negative trend.

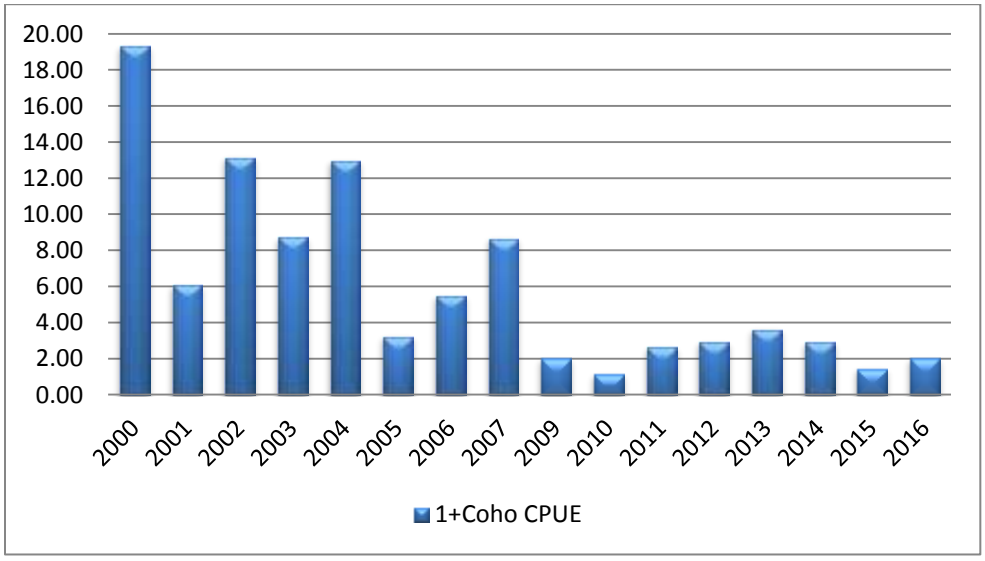

Figure 5. Yearling Coho average CPUE at the Skykomish trap by year; 2000-2016.

3.1 Additional Studies

Genetic Mark Recapture Parantage Assignment - WDFW

Beginning in 2012 under a funded cooperative management agreement with WDFW, TTT began assisting in a basinwide genetic mark and recapture (GMR) study being conducted by WDFW. DNA samples were collected at the Skykomish trap site for genetic parentage-assignment analyses of juvenile Chinook salmon in an attempt to further evaluate stock-specific production estimates and abundance. Under the WDFW GMR project protocol all unmarked (adipose intact) Chinook (both 0+ and 1+ size classes) caught in the trap were caudal clipped for DNA sampling.

In 2016, juvenile Chinook salmon were captured in eight-foot screw traps operated at RM 25 on the Skykomish River. Captured individuals were netted from the live box and held in five-gallon buckets. Fish were placed into a dishpan where they were identified to species, and examined for marks (adipose fin clips, CWT). Unmarked/untagged Chinook were measured and FL recorded in millimeters. For DNA parentage analysis, a small piece of caudal fin tissue was collected from all unmarked/untagged subyearling Chinook juveniles and immediately stored in 95% ethanol at ambient temperatures. Unmarked and untagged subyearling Chinook were presumed to be of natural-origin given that all regional hatchery Chinook production is marked through a combination of adipose fin clips and CWTs, less a very small proportion that end up not being marked due to clip and tag loss (Seamons, et. al, 2015). In 2016, approximately 566 upper-caudal DNA samples were taken from a mix of sub-yearling and yearling unmarked Chinook juveniles. This number is significantly lower than project averages dating back to beginning of the GMR study at the Skykomish in 2012 (Table 6).

Skykomish River	
Year	**Chinook Samples Taken**
2012	1,345
2013	2,324
2014	1,333
2015	1,444
2016	566
Total to Date	6,446

Table 6. GMR Sample Totals 2012-2016.

4. Project status and difficulties.

In terms of trap operation the 2016 trapping season went well. On 2/12/16 the main guy-line broke during trap deployment, resulting ultimately in complete trap failure. Trapping at the Skykomish site was ultimately suspended during the procurement and rigging of new lines. Coincidentally, during SW 8 (immediately following the trap failure) heavy rains caused river flooding that would have resulted in trapping cancellations regardless of functioning line-rigging. On February 15th the Skykomish peaked at approximately 57,000 cfs and it did not return to fishable levels until SW 9, normal trap operations re-commenced on February 22nd. High flows again resulted in shift cancellations during SW 17 from April 20-22nd. Extreme high temperatures caused mountain snow to melt very rapidly, on 4/21 the river peaked at approximately 12,000 cfs and maintained high flows for the remainder of the week.

Overall low sub-yearling Chinook and Coho catch rates were likely a direct product of unprecedented drought conditions in the summer of 2015 coupled immediately with record breaking high flows in the fall and winter of the same year. The 2015 adult salmon escapement throughout the Snohomish basin was met with unparalleled challenges in spawning success and the subsequent rearing success of the 2016 progeny resulting in a severely depleted outmigrating sub-yearling population in 2016.

Aside from the aforementioned broken guy-line, all trapping equipment including the trap itself, the boat, and all associated supplies were in full working order and operated as expected throughout the duration of the 2016 season.

5. References

Kubo, J., Finley, K., Nelson K. 2013. 2000-2012 Skykomish and Snoqualmie Rivers Chinook and Coho Salmon Out-Migration Study. Tulalip Tribes Natural Resource Division, Tulalip WA.

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Snohomish Basin Salmonid Recovery Technical Committee. 2005. Snohomish River Basin ecological analysis for salmonid conservation. Snohomish County Public Works, Surface Water Management, Everett, WA.

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Table 1: Skykomish River trap catch and mortalities 2016

(Data is preliminary)

February

	Chinook					Coho					Steelhead										
	Unm 1+	Mark 1+	Unm 0+	Mark 0+	0+	Unm 1+	Mark 1+	Chum	Pink	Sockeye	Unm Smolts	Mark Smolts	Cut. Trout	Rain. Trout	Trout Fry	Dolly/ Bull Trout	Total Salmonid Catch	Juv. Lamp.	Dace spp.	Sculpin spp.	Stickle-back
Day			(35.9 hours of effort)																		
Catch	0	0	2	0	1	0	0	11	960	0	0	0	0	0	0	0	974	0	0	0	0
Morts.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Night			(77.1 hours of effort)																		
Catch	0	0	40	27	7	3	0	305	3975	0	1	0	1	0	0	0	4359	6	1	15	0
Morts.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Monthly Totals	(113.0 hours of effort)																				
Catch	0	0	42	27	8	3	0	316	4935	0	1	0	1	0	0	0	5333	6	1	15	0
Morts.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

March

	Chinook					Coho					Steelhead										
	Unm 1+	Mark 1+	Unm 0+	Mark 0+	0+	Unm 1+	Mark 1+	Chum	Pink	Sockeye	Unm Smolts	Mark Smolts	Cut. Trout	Rain. Trout	Trout Fry	Dolly/ Bull Trout	Total Salmonid Catch	Juv. Lamp.	Dace spp.	Sculpin spp.	Stickle-back
Day			(74.6 hours of effort)																		
Catch	0	0	33	9	2	2	0	1267	7913	0	1	1	0	0	0	0	9228	0	3	0	0
Morts.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Night			(226.1 hours of effort)																		
Catch	1	1	241	78	54	37	21	10644	23020	0	2	1	3	0	0	0	34103	6	30	9	0
Morts.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Monthly Totals	(300.7 hours of effort)																				
Catch	1	1	274	87	56	39	21	11911	30933	0	3	2	3	0	0	0	43331	6	33	9	0
Morts.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 1: Skykomish River trap catch and mortalities 2016

(Data is preliminary)

April

	Chinook					Coho					Steelhead										
	Unm 1+	Mark 1+	Unm 0+	Mark 0+	0+	Unm 1+	Mark 1+	Chum	Pink	Sockeye	Unm Smolts	Mark Smolts	Cut. Trout	Rain. Trout	Trout Fry	Dolly/ Bull Trout	Total Salmonid Catch	Juv. Lamp.	Dace spp.	Sculpin spp.	Stickle-back
Day			(76.8 hours of effort)																		
Catch	1	19	25	22	5	26	29	385	2792	0	0	7	0	0	0	0	3311	0	8	0	0
Morts.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Night			(133.5 hours of effort)																		
Catch	4	250	95	55	20	493	71	2410	4939	0	2	419	2	0	0	0	8760	3	50	5	0
Morts.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Monthly Totals	(210.3 hours of effort)																				
Catch	5	269	120	77	25	519	100	2795	7731	0	2	426	2	0	0	0	12071	3	58	5	0
Morts.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

May

	Chinook					Coho					Steelhead										
	Unm 1+	Mark 1+	Unm 0+	Mark 0+	0+	Unm 1+	Mark 1+	Chum	Pink	Sockeye	Unm Smolts	Mark Smolts	Cut. Trout	Rain. Trout	Trout Fry	Dolly/ Bull Trout	Total Salmonid Catch	Juv. Lamp.	Dace spp.	Sculpin spp.	Stickle-back
Day			(116.1 hours of effort)																		
Catch	2	0	4	2	2	48	23	35	11	0	0	1	0	0	1	0	129	4	4	0	0
Morts.	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0
Night			(159.0 hours of effort)																		
Catch	61	6	44	1118	13	1501	891	40	7	0	20	102	20	0	1	0	3824	16	31	13	0
Morts.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Monthly Totals	(275.1 hours of effort)																				
Catch	63	6	48	1120	15	1549	914	75	18	0	20	103	20	0	2	0	3953	20	35	13	0
Morts.	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0

Table 1: Skykomish River trap catch and mortalities 2016

(Data is preliminary)

June

	Chinook					*Coho*					*Steelhead*										
	Unm 1+	*Mark 1+*	*Unm 0+*	*Mark 0+*	*0+*	*Unm 1+*	*Mark 1+*	*Chum*	*Pink*	*Sockeye*	*Unm Smolts*	*Mark Smolts*	*Cut. Trout*	*Rain. Trout*	*Trout Fry*	*Dolly/ Bull Trout*	*Total Salmonid Catch*	*Juv. Lamp.*	*Dace spp.*	*Sculpin spp.*	*Stickle-back*
Day			(68.5 hours of effort)																		
Catch	3	0	0	137	8	6	41	1	0	0	0	0	0	0	0	0	196	1	0	0	1
Morts.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Night			(64.0 hours of effort)																		
Catch	4	0	6	2172	26	21	11	3	1	0	7	1	3	0	1	0	2256	0	4	3	0
Morts.	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
Monthly Totals	(132.5 hours of effort)																				
Catch	7	0	6	2309	34	27	52	4	1	0	7	1	3	0	1	0	2452	1	4	3	1
Morts.	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0

Totals (1031.5 total hours of effort)

	Chinook					*Coho*					*Steelhead*										
	Unm 1+	*Mark 1+*	*Unm 0+*	*Mark 0+*	*0+*	*Unm 1+*	*Mark 1+*	*Chum*	*Pink*	*Sockeye*	*Unm Smolts*	*Mark Smolts*	*Cut. Trout*	*Rain. Trout*	*Trout Fry*	*Dolly/ Bull Trout*	*Total Salmonid Catch*	*Juv. Lamp.*	*Dace spp.*	*Sculpin spp.*	*Stickle-back*
Catch	76	276	490	3620	138	2137	1087	15101	43618	0	33	532	29	0	3	0	67140	36	131	45	1
Morts.	0	0	0	1	0	3	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0
% Mort	0.00%	0.00%	0.00%	0.03%	0.00%	0.14%	0.00%	0.00%	0.00%		0.00%	0.00%	0.00%		0.00%		0.01%				
% of Total Catch	0.1%	0.4%	0.7%	5.4%	0.2%	3.2%	1.6%	22.4%	64.8%	0.0%	0.0%	0.8%	0.0%	0.0%	0.0%	0.0%	99.7%	0.1%	0.2%	0.1%	0.0%