

PERFORMANCE REPORT

STATE: Alaska

GRANT NO.: F-10-33

GRANT TITLE: Sport Fish Investigations in Alaska

PERIOD COVERED: July 1, 2017 - June 30, 2018

STUDY NO. AND TITLE: S-3-1a Copper River Juvenile Salmon Enumeration

STUDY OBJECTIVES:

The long term goal of this project will be to obtain annual estimates of abundance of out migrating Chinook salmon smolt in the Copper River. Because the design of this study relies on examining returning adults, estimates of smolt abundance cannot be obtained until 5-6 years after smolt are marked. This summary provides details of the smolt and parr marking portion of the study and details of sampling of returning adults will be provided in 2022 when the first returning cohort (ocean age-2 fish) will be returning.

The objectives for Copper River juvenile Chinook salmon study, **S-3-1(a)**, are to:

1. Capture and coded-wire tag (CWT) 20,000 Chinook Salmon smolt in the Copper River drainage during spring smolt migrations in 2018;
2. Capture and CWT 35,000 Chinook Salmon parr in the Tonsina, Klutina, Gulkana, and East Fork Chistochina rivers in fall 2017;
3. Sample Chinook Salmon returns in the Cordova commercial fishery in 2017– 2018 for missing adipose fins and send those fish to the ADF&G Mark, Tag and Age Lab for reading CWTs;
4. Sample Chinook Salmon returns in the Copper River from the Native Village of Eyak (NVE) mark-recapture fish wheels in 2017– 2018 for the missing adipose fins and send those fish to the ADF&G Mark, Tag and Age Lab for reading CWTs;

RESULTS/DISCUSSIONS:

Objective 1 (Spring 2018 smolt sampling): During spring 2018 tagging efforts, 10,132 emigrating Chinook salmon smolt were tagged with coded-wire tags between 11 May and 15 June. Of this total, most (9,201) were tagged in the tributaries, while 931 were tagged in the mainstem on the Copper River Delta, where out-migrating smolt are a mixture of spawning stocks. Tagging results were well below the tagging goal of 20,000 and past years' numbers due to a combination of factors. A very late spring coupled with an extremely high snow load produced only a narrow window in which to catch fish between ice-out and spring snow melt. Furthermore, outmigrating smolt caught in spring 2018 were the progeny of the smallest Chinook Salmon escapement on record in 2016 (~14,000 fish). Tagging efforts in fall 2017 (see below) were successful and thus we expect that adequate numbers of tagged smolt emigrated from the drainage in 2018 to estimate smolt abundance once the adult return is complete.

Objective 2 (Fall 2017 parr sampling): During fall 2017 sampling, a total of 35,923 Chinook salmon parr were captured and tagged in the East Fork Chistochina River (4,590), Gulkana River (8,251), Klutina River (11,562), and Tonsina River (11,480).

Objective 3 (Commercial Fishery Adult Sampling 2018): Although final numbers are not in yet, over 20 coded wire tagged Chinook Salmon were identified in the Chinook Salmon commercial fishery in summer 2018. Some (~10%) are likely from other stocks but numbers are encouraging considering the limited nature of the commercial fishery in 2018.

Objective 4 (Adult Sampling in NVE Fish Wheels 2018). As of June 24, 2018, a total of 34 adipose clipped Chinook Salmon had been detected in the fish wheels used to estimate adult escapement in the Copper River watershed. These numbers are extremely encouraging that the total number of smolt originally tagged will prove to be adequate for estimating outmigrating smolt abundance as well as ocean survival rates. This year only saw age 1.3 adults from brood year 2015 (11,039 spring smolt and 0 fall parr tagged) and age 1.2 adults from brood year 2016 (21,5176 spring smolt and 35,425 fall parr tagged) and we thus expect to see increasing numbers of tagged Chinook Salmon being recovered in the ensuing years.

FINAL REPORT STATUS:

This Performance Report serves as the final report for these objectives for the FY18 grant period.

PREPARED BY: Philip J. Joy, Fishery Biologist and James W. Savereide, Regional Research Supervisor;

DATE: September 1, 2018

PERFORMANCE REPORT

STATE: Alaska

GRANT NO.: F-10-33

GRANT TITLE: Sport Fish Investigations in Alaska

PERIOD COVERED: July 1, 2017 - June 30, 2018

STUDY NO. AND TITLE: S-3-1b Chena and Salcha River Chinook Salmon Escapement Enumeration

STUDY OBJECTIVES AND TASKS:

The long term goal of this project will be to obtain annual estimates of escapements of Chinook salmon returning to spawn in the Chena and Salcha rivers. The escapements of Chinook salmon in the Chena and Salcha rivers have been monitored since 1986 and they represent one of the longest continuous data sets of Chinook salmon escapement in the Yukon River drainage. These estimates have been used in production models to develop spawning escapement goals.

The objectives for the Chena and Salcha River Chinook Salmon Escapement Enumeration study, **S-3-1(b)**, are to:

- 1) estimate the total escapement of Chinook salmon in the Chena and Salcha rivers using tower-counting techniques;
- 2) estimate the age and sex compositions of the escapement of Chinook salmon in the Chena and Salcha rivers;
- 3) deploy and maintain 2 dual-frequency identification and adaptive resolution imaging sonars (DIDSON produced by Sound Metrics Corp., Lake Forest Park, WA) each in the Chena and Salcha rivers to enumerate and provide lengths of passing salmon during periods of high water when tower counts cannot be completed; and,
- 4) count chum salmon in the Chena and Salcha rivers throughout the duration of the Chinook salmon run.

RESULTS/DISCUSSIONS:

Objectives 1 and 3:

The counting tower/sonars operated on the Chena River from 26 June to 3 August 2017. During this period, inclement weather and subsequent high, muddy water obscured the flash panels and visual counts could not be conducted during 5-19 July. The Salcha River counting tower operated from 27 June to 4 August 2017. Visual counts could not be conducted during 4-5, 12-13, 17, and 26-27 July 2017 due to high water. However, enough visual count-days could be conducted that a running average was used to estimate salmon passage for missing count dates to acquire a preliminary estimate of Chinook salmon escapement and partial escapement for chum salmon for

2017. Counting operations cease prior to the conclusion of the chum salmon run. Sonar counts were used to estimate daily escapement during days when visual counts could not be conducted for these 2 rivers. Preliminary estimates for Chena and Salcha rivers Chinook salmon have been acquired using visual and sonar counts. The preliminary estimate for the Chena River Chinook Salmon is 4,201 (SE=265) and 4,195 (SE=205) for the Salcha River. Biological Escapement Goals for these rivers are 2,800-5,700 for the Chena River and 3,300-6,500 for the Salcha River. Therefore, during 2017, Chinook salmon escapement was achieved for these two rivers.

Objective 2:

For the Chena River, a total of 420 Chinook salmon were sampled during the carcass survey conducted during August 1-10, 2017 (Table 1). Of these 227 (54%) were males and 193 (46%) were females. The project biologist used internal organs of most fish to ensure correct gender identification. Ninety-two percent of scales collected were aged. Lengths by sex are as follows:

Males (mm): Minimum = 430, Maximum = 915, Average = 736. The majority of males were age 1.3 (83.4%), followed by 1.4 (10.9%), 1.2 (4.7%), and 2.3 (1.0%).

Females (mm): Minimum = 575, Maximum = 935, Average = 774. The majority of females were age 1.3 (62.9%), followed by 1.4 (36.6%), and 1.2 (0.6%).

Total Chinook salmon carcasses collected (mm): Minimum = 430, Maximum = 935, Average = 660. The overall majority of Chinook salmon were age 1.3 (74.1%) followed 1.4 (22.5%).

For the Salcha River, a total of 504 Chinook salmon were sampled during the carcass survey conducted during August 1-10, 2017 (Table 2). Of these 299 (59%) were males and 205 (41%) were females. The project biologist sliced stomachs of most fish to ensure correct gender identification. Ninety-three percent of scales collected were aged. Lengths with sex are as follows:

Males (mm): Minimum = 430, Maximum = 905, Average = 705. The majority of males were age 1.3 (83.0%), followed by 1.2 (9.4%), 1.4 (7.2%), and 2.2 (0.4%).

Females (mm): Minimum = 645, Maximum = 910, Average = 781. The majority of females were age 1.3 (56.2%), followed by 1.4 (43.3%), and 2.3 (0.5%).

Total Chinook salmon carcasses collected (mm): Minimum = 430, Maximum = 910, Average = 736. The overall majority of Chinook salmon were age 1.3 (72.0%) followed 1.4 (22.1%).

Objective 4:

Chena River Chum Salmon INCOMPLETE estimates to August 3rd (last Chinook salmon was seen on 31 July) based on visual and sonar counts were 21,156 (SE=988). A total of 173 chum salmon carcasses were collected on the Chena River for inclusion in the mixture model that will be used to apportion Chinook from chum salmon in the sonar files. Preliminary lengths with sex were as follows:

Males (mm): Minimum = 480, Maximum = 651, Average = 573

Females (mm): Minimum = 445, Maximum = 617, Average = 546

Total Chinook salmon carcasses collected (mm): Minimum = 445, Maximum = 651, Average=559

Salcha River Chum Salmon INCOMPLETE estimates to August 4th based on visual and sonar counts were 29,093 (SE=1,220).

A total of 173 chum salmon carcasses were collected on the Salcha River for inclusion in the mixture model that will be used to apportion Chinook from chum salmon in the sonar files. Preliminary lengths with sex were as follows:

Males (mm): Minimum = 495, Maximum = 630, Average = 574

Females (mm): Minimum = 480, Maximum = 670, Average = 553

Total Chinook salmon carcasses collected (mm): Minimum = 480, Maximum = 670, Average = 553

FINAL REPORT STATUS:

This Performance Report serves as the final report for these objectives for the FY18 grant period.

PREPARED BY: Lisa Stuby, Research Biologist and James W. Savereide, Research Supervisor.

DATE: September 1, 2018

Table 1.—Estimated proportions and mean length by age and sex of Chinook salmon sampled during the Salcha River carcass survey, 2017.

Age ^a	Sample Size	Sample Proportion	Length (mm)			
			Mean	SE	Min	Max
Males						
1.2	26	0.09	554	9	475	645
1.3	230	0.83	717	4	430	850
2.2	1	<0.01	585	-	-	-
1.4	20	0.07	772	18	615	905
Total Aged	277	0.59	705	5	430	905
Total Males ^b	299	0.59	705	5	430	905
Adjusted Total ^c		0.65				
Females						
1.3	109	0.56	758	4	645	855
1.4	84	0.43	810	5	690	910
2.3	1	0.01	775	-	-	-
Total Aged	194	0.41	781	4	645	910
Total Females ^b	205	0.41	782	4	645	910
Adjusted Total ^c		0.35				
Total						
Total Aged	471		736	4	430	910
Total Collected	504		736	4	430	910

^a Age is represented by the number of annuli formed during river residence and ocean residence (i.e., an age of 1.4 represents 1 annulus formed during river residence and 4 annuli formed during ocean residence plus 1 year for year of spawning for a total age of 6 years).

^b Totals include those Chinook salmon that could not be aged.

^c Estimated proportion of females after apply a correction factor of 0.867. Adjusted values presented in Table 9.

Table 2.—Estimated proportions and mean length by age and sex of Chinook salmon sampled during the Chena River carcass survey, 2017.

Age ^a	Sample Size	Sample Proportion	Length (mm)			
			Mean	SE	Min	Max
Males						
1.2	10	0.05	574	27	430	755
1.3	176	0.83	740	4	550	875
2.3	2	0.01	698	33	665	730
1.4	23	0.11	786	15	640	915
Total Aged	211	0.54	736	5	430	915
Total Males ^b	227	0.54	735	5	430	915
Adjusted Total ^c		0.67				
Females						
1.2	1	0.01	665	-	-	-
1.3	110	0.63	756	8	575	845
1.4	64	0.37	805	7	680	935
Total Aged	175	0.46	774	6	575	935
Total Females ^b	193	0.46	773	6	575	935
Adjusted Total ^c		0.33				
Total						
Total Aged	386		735	4	430	935
Total Collected	420		735	4	430	935

^a Age is represented by the number of annuli formed during river residence and ocean residence (i.e., an age of 1.4 represents 1 annulus formed during river residence and 4 annuli formed during ocean residence plus 1 year for year of spawning for a total age of 6 years).

^b Totals include those Chinook salmon that could not be aged.

^c Estimated proportion of females after apply a correction factor of 0.867.