Executive Secretary's Summary of Decisions
2020 Fall Meeting
October 19-22, 2020 via webinar

The Pacific Salmon Commission held its 2020 Fall Meeting from October 19-22 via webinar and discussed a number of topics (see attached agenda).

The Commission AGREED:

1. The minutes from July 2020 are approved as submitted.
2. The final 2019 post-season reports are adopted as submitted by the Parties.
3. The report from the Chinook Interface Group report is adopted as submitted, noting:
    a. The Terms of Reference for the CWT&R/CEII and MSF Fund programs are adopted as shown in the CIG report. The Finance and Administration Committee will address the 10% Secretariat administration fees listed in the MSF Fund Terms of Reference.
    b. The CTC will provide a full report on incidental mortality in October 2021, preceded by a literature review on the issue in late October 2020.
    c. The CTC work plan is approved, as shown in the CIG report, with follow up by the CIG as needed in January and February 2021 and subsequent check-ins as needed to monitor progress and answer questions on the tasks at hand.
    d. The Okanagan Chinook Workgroup Work Plan is adopted as shown in the CIG report, understanding the workgroup will strive to streamline the number of webinars to make them as efficient as possible.
    e. The CYER workgroup work plan is adopted as shown in the CIG report.
    f. The CIG will follow up on the impacts of COVID-19 on assessment programs, with further discussion at CIG meetings in January 2021.
4. The Test Fishing Workgroup update is accepted, noting that further discussions are planned in winter 2020/21.
5. Panel and Technical Committee work plans are accepted as submitted, noting the following:
    a. Canada will provide a summary of progress on the review of Nass and Skeena sockeye escapement estimates, which will be attached to the present minutes.
    b. SFEC will provide a draft communication regarding agency calculation of mortalities in MSF's, and any necessary amendments to the 2004 MOU, for discussion in January 2021.
    c. The Secretariat will work with Panel and Committee co-chairs to ensure they have the technical and administration support needed for the 2021 virtual meeting cycle, including managing public participation and recordings when needed.
6. The slate of officers for 2020/21 is accepted as tabled by the Parties.

ATTENDANCE

PACIFIC SALMON COMMISSION
FALL MEETING
OCTOBER 19-23, 2020
Held Virtually

COMMISSIONERS

UNITED STATES

P. Anderson (Chair)
W.R. Allen
W. Auger
R. Klumph
S. MacCorkle
S. Rumsey
D. Vincent-Lang

CANADA

R. Reid (Vice Chair)
R. Jones
M. Ned
B. Riddell
A. Thomson

Draft Agenda - Fall Meeting
October 19-23, 2020
via webinar

1. Adoption of Agenda
2. Approval of minutes: July 10, 2020 webinar
3. Executive Secretary's Report

Action Items Pending

4. Adoption of final 2019 post-season reports
5. Chinook issues and CIG report
    a. Terms of reference for CWT&R, CEII, and MSF programs
    b. Literature review for incidental mortality
    c. CTC work plan 2020/2021
    d. Okanagan Chinook Work Group work plan 2020/2021
6. Report from test fishing working group

Panels and Committees

7. Presentation of annual work plans and COVID-19 impact reports
8. Instructions to Panels and Committees

Other Business

9. Presentation on Big Bar landslide
10. Approval of officers for 2020/21
11. Recognition of Bob Turner's service
12. Public comments as needed

Annotated agenda

October 2020 Fall Meeting

1. Adoption of Agenda

    - *Consistent with PSC bylaws, an agenda shall be adopted by the Commission at the start of each meeting. The Commission shall not ordinarily take a decision on any item that has not been included in the draft agenda for the meeting. Where circumstances warrant, supplementary decision items may be added to the agenda with the concurrence of each National Section.*

2. Approval of minutes: July 10, 2020 webinar

    - *The Parties received draft minutes for the July 10 webinar via email on August 5, 2020.*

3. Executive Secretary's Report

    - *The Executive Secretary will provide a short report on significant events since the last Commission meeting, "housekeeping" items for the current meeting, and other issues needing attention.*

    - *For the present meeting, the report will include: a) welcoming newly appointed Commissioner Rumsey (USA); and b) staffing issues at the Secretariat.*

Action Items Pending

4. Adoption of final 2019 post-season reports

    - *Preliminary 2019 post-season reports were adopted at the January 2020 Post-Season meeting.*

    - *Consistent with a January 2018 Commission decision, final post-season reports are due Oct. 1 each year (covering the previous calendar year) and thus ready for adoption at each Fall Meeting.*

5. Chinook issues
    a. Terms of reference for CWT&R, CEII, and MSF programs

        - *At the February 2020 annual meeting, the Commission agreed on a process for the CIG to review TOR for the subject programs. The CIG met via webinar on September 28, 2020 to discuss the drafts and prepare for Commission discussion.*

    b. Literature review on incidental mortality

        - *At the February 2020 annual meeting, the Commission agreed that the CTC should conduct a literature review and confirm or update existing assumed mortality rates for use in assessments and modeling.*

    c. CTC work plan for 2020/2021

        - *The CIG has begun regular review and discussion of the CTC work plan at each October meeting, effective October 2019. The goal is to provide a*

recommended CTC work plan at each January Post-Season Meeting, with interim meetings (Oct.-Jan.) approved as appropriate.

d. Okanagan Work Group work plan

- *Since October 2019, the Okanagan Chinook Work Group has provided annual work plans for Commission consideration. The CIG may offer its views on the Okanagan work plan at this meeting.*

6. Test fishing working group

- *At the July 10, 2020 webinar, the Commission agreed a small working group of two or three Commissioners from each section will convene with the Executive Secretary to examine the test fishing documents submitted for that meeting and recommend a course of action at the October 2020 Fall Meeting. That working group met via webinar on October 5.*

Panels and Committees

7. Presentation of annual work plans and COVID-19 impact reports

- *For this meeting, Panels and Committees were instructed to respond to a number of questions about the impacts of the pandemic on short- and long-term implementation of Annex IV. Commissioners are invited to discuss the responses.*
- *As per normal practice, Panels and Committees will submit work plans for October 2020-September 2021. These work plans follow a standard format and specify tasks, timelines, and meeting schedules for the next work period.*
- *Work plans must specify the number of days, dates and location of proposed meetings. The Secretariat requires these details for venue booking, and national sections require them for budgeting. Work plans that do not include these details should be referred back for completion.*
- *Where proposed meetings would not include the full attendance of a Panel or Committee, the work plan should specify the number of attendees anticipated.*

8. Instructions to Panels and Committees

- *The Commission is invited to specify which work plans are adopted, which require revision, and any other instructions to the Panels and Committees.*
- *To facilitate venue booking, Panels and Committees should be instructed to submit any plans for November 2021 meetings by the end of the February 2021 PSC meetings.*

Other Business

9. Presentation on Big Bar landslide

- *During the July 10 webinar, it was agreed that Canada would provide an update on the Big Bar landslide during Fall Meeting.*

10. Approval of officers for 2020/21
    - *The National Sections have pre-populated a slate of officers to serve from the close of the current meeting until the close of the October 2021 Fall Meeting. The Commission is invited to consider this slate for adoption.*
11. Recognition of Bob Turner's service
    - *Mr. Turner is vacating his seat in the U.S. Section, and Commissioners are invited to offer their remarks.*
12. Public comments as needed
    - *When appropriate, and with the concurrence of the Vice-Chair, the chair may provide time for public visitors to speak during the meeting.*

2019 POST SEASON REPORT UNITED STATES SALMON FISHERIES OF RELEVANCE TO THE PACIFIC SALMON TREATY

Report Submitted to the Pacific Salmon Commission
By the United States Section

January 2, 2020

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POST SEASON REPORT

I. PRELIMINARY 2019 SOUTHEAST ALASKA FISHERIES

NORTHERN BOUNDARY AREA FISHERIES

District 104 Purse Seine Fishery

The 2019 revision of the Pacific Salmon Treaty (PST) Agreement calls for abundance-based management of the District 104 purse seine fishery. The agreement allows the District 104 purse seine fishery to harvest 2.45 percent of the Annual Allowable Harvest (AAH) of Nass and Skeena sockeye salmon prior to Alaska Department of Fish and Game (ADFG) statistical week 31 (referred to as the treaty period). The AAH is calculated as the total run of Nass and Skeena sockeye salmon minus either the escapement requirement of 1.1 million (200,000 Nass and 900,000 Skeena) or the actual in-river escapement, whichever is less.

The District 104 purse seine fishery opens by regulation on the first Sunday in July. In 2019, the first potential opening was July 7 (week 28). The pre-week 31 fishing plan for District 104 was based on the preseason Canadian Department of Fisheries and Oceans (DFO) forecast runs of approximately 2.33 million Nass and Skeena sockeye salmon. In the 2019 Treaty period (Alaska statistical weeks 28-30), 9,399 sockeye salmon were harvested during a 12-hour opening in Week 28 and a 12-hour and a 10-hour opening in week 29 (Table 1). The fishery closed in week 30 due to low Skeena River sockeye salmon abundance. A total of 36 purse seine vessels fished at some time in the district during the Treaty period. In past years 60% to 80% of Treaty-period sockeye salmon have been of Nass and Skeena origin, therefore we would anticipate between 5,600 and 7,500 Nass and Skeena sockeye salmon may have been harvested in the District 104 purse seine fishery during the 2019 Treaty period. The final number of Nass and Skeena sockeye salmon harvested, and the actual harvest by stock, will not be available until harvest, escapement, and stock composition estimates are finalized for the year.

In 2019, a total of 3,528,011 pink salmon, 270,993 sockeye salmon, 175,212 chum salmon, 77,593 coho salmon, and 7,174 Chinook salmon were harvested in the District 104 purse seine fishery (Table 1). The number of days that the fishery was open, and the number of boats fishing were both below the 1985–2018 average (Figure 1 and 2). Purse seine fisheries were on non-retention for Chinook salmon throughout most the season, except for weeks 30 and 31. Sockeye salmon harvests were below average in all weeks except 33 (Figure 4) and the treaty period (week 28–30) harvest of 9,399 was only 10% of the 1985–2018 average. The total sockeye salmon harvest of 270,993 was 59% of the 1985–2018 average of 458,000 fish. Harvests of coho salmon were also below average in all weeks except 33 (Figures 5) and the overall harvest of 77,593 was 70% of the long-term average. The overall pink salmon harvest of 3,528,011 was only 44% of the long-term average (Figure 6) and the chum salmon harvest of 175,212 was 60% of the long-term average (Figure 7).

Since the PST was signed in 1985, the number of hours open, boats fished, and boat-days fished in the pre-Week 31 annex period in District 104 are down 56%, 62% and 85% respectively compared to the averages in the pre-treaty 1980-1984 period (Table 2). The total pre-week 31

Treaty-period sockeye salmon harvest is also down 49%. The seine fleet moves freely between districts as various species are harvested, so seining opportunities elsewhere affect the effort and catch in District 104.

Table 1. Catch and effort in the Alaska District 104 purse seine fishery, 2019.

Week/ Opening	Start Date	Chinook	Sockeye	Coho	Pink	Chum	Boats	Hours
28	7/7	0	959	2,229	6,420	1,995	26	12
29	7/14	0	2,679	2,935	19,209	5,962	11	12
29B	7/18	0	5,761	3,201	71,108	6,975	17	10
31	7/28	1,429	22,124	5,224	598,209	14,619	48	15
31B	7/31	5,745	52,441	13,036	983,188	29,762	88	39
32	8/4	0	30,516	4,340	500,532	26,588	56	39
32B	8/8	0	29,974	8,231	447,968	23,701	39	39
33	8/12	0	69,430	19,347	515,787	31,174	56	39
33B	8/16	0	30,100	8,584	245,664	17,699	41	39
34	8/20	0	23,355	8,346	104,688	12,138	22	39
34B	8/24	0	3,654	2,120	35,238	4,599	13	39
							Permits Fished	
Weeks 28-30		0	9,399	8,365	96,737	14,932	55	34
Weeks 31-34		7,174	261,594	69,228	3,431,274	160,280	109	288
Total		7,174	270,993	77,593	3,528,011	175,212	112	322

Table 2. Fishing opportunity, effort, and sockeye salmon harvest prior to week 31 in the District 104 purse seine fishery, 1980–2019.

Year	Hours Fished	Individual Permits Fished	Days Fished (1d=15hrs)	Approximate Boat-Days	Sockeye Harvest	Sockeye Catch per Boat-Day
1980	207	244	13.8	2,877	266,273	93
1981	132	212	8.8	1,108	185,188	167
1982	117	255	7.8	1,435	213,150	149
1983	108	241	7.2	1,211	170,306	141
1984	132	174	8.8	805	103,319	128
1985	84	141	5.6	502	100,590	200
1986	108	194	7.2	968	91,320	94
1987	90	134	6	457	72,385	158
1988	108	210	7.2	994	248,789	250
1989	84	135	5.6	438	157,566	360
1990	42	171	2.8	276	169,943	615
1991	41	134	2.7	243	98,583	406
1992	29	108	1.9	142	79,643	561
1993	45	171	3	343	163,189	476
1994	55	84	3.7	202	158,524	783
1995	58	109	3.9	218	71,376	328
1996	31	113	2.1	128	215,144	1,684
1997	56	159	3.7	409	572,942	1,402
1998	32	78	2.1	89	17,394	196
1999	30	38	2	44	7,664	174
2000	81	66	5.4	192	48,969	255
2001	50	95	3.3	182	203,090	1,115
2002	72	44	4.8	124	26,554	215
2003	52	40	3.5	97	84,742	875
2004	107	24	7.1	102	30,758	302
2005	68	38	4.5	93	35,690	382
2006	95	39	6.3	117	89,615	766
2007	50	68	3.3	136	112,135	824
2008	33	17	2.2	22	6,262	281
2009	72	38	4.8	95	15,971	168
2010	55	21	3.7	39	4,617	118
2011	84	29	5.6	77	25,280	329
2012	87	30	5.0	93	18,300	196
2013	46	36	3.1	59	13,102	222
2014	60	101	4	260	115,015	442
2015	70	39	4.7	100	43,873	439
2016	60	106	3.8	332	110,346	332
2017	20	24	1.3	20	12,036	602
2018	48	55	3.2	122	19,743	128
2019	34	36	2.3	50	9,399	188
Avg. 80-84	139	225	9	1,487	187,647	136
Avg. 85-18	62	85	4	227	95,328	462
% Change	-56%	-62%	-56%	-85%	-49%	241%

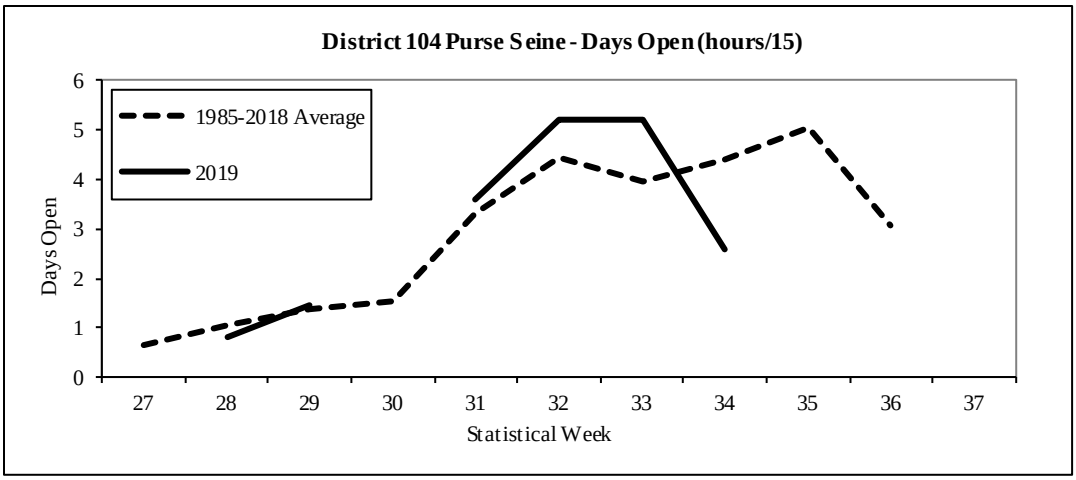

Figure 1. Days open by week in the District 104 purse seine fishery, 2019.

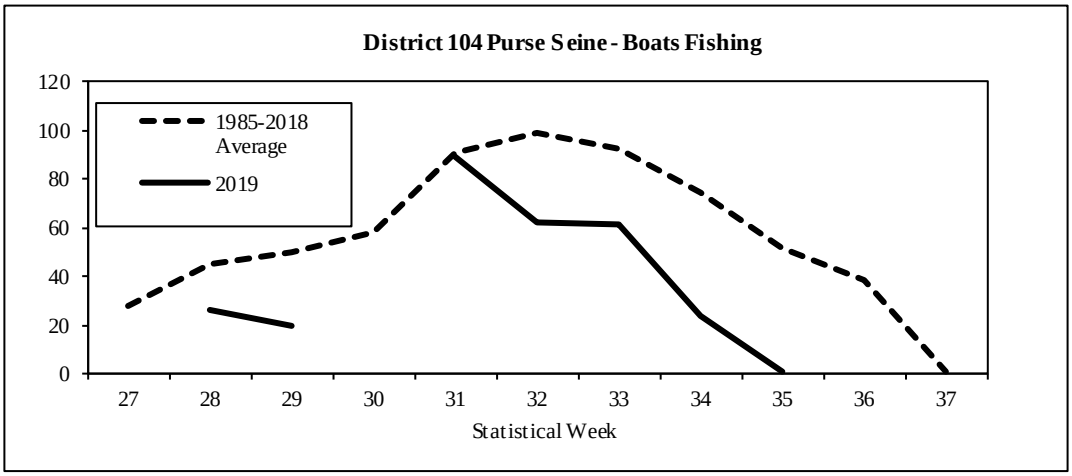

Figure 2. Number of boats fishing by week in the District 104 purse seine fishery, 2019.

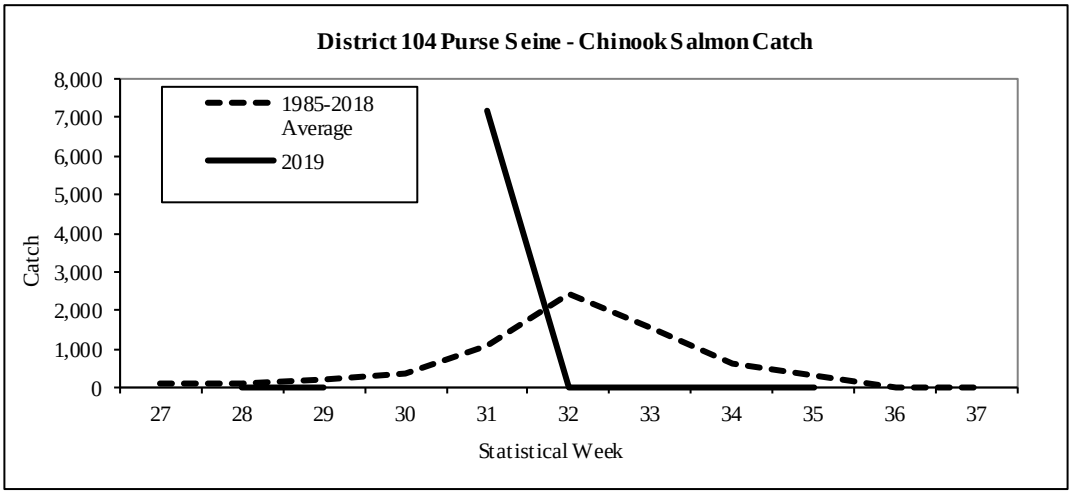

Figure 3. Chinook salmon harvest by week in the District 104 purse seine fishery, 2019.

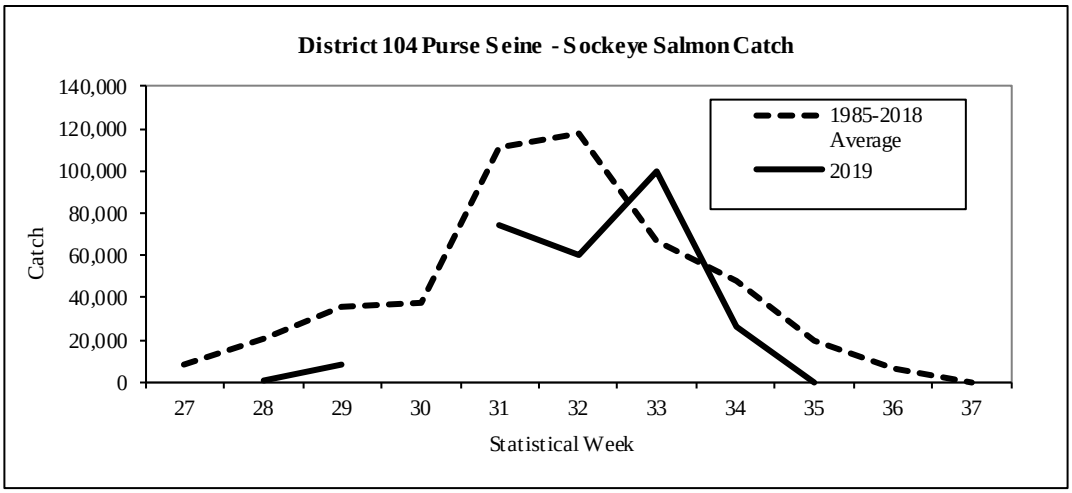

Figure 4. Sockeye salmon harvest by week in the District 104 purse seine fishery, 2019.

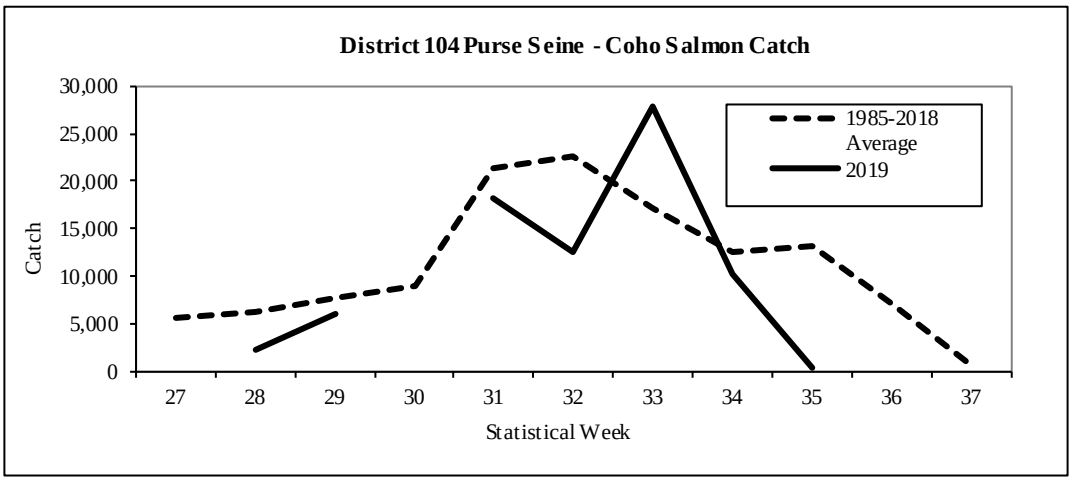

Figure 5. Coho salmon harvest by week in the District 104 purse seine fishery, 2019.

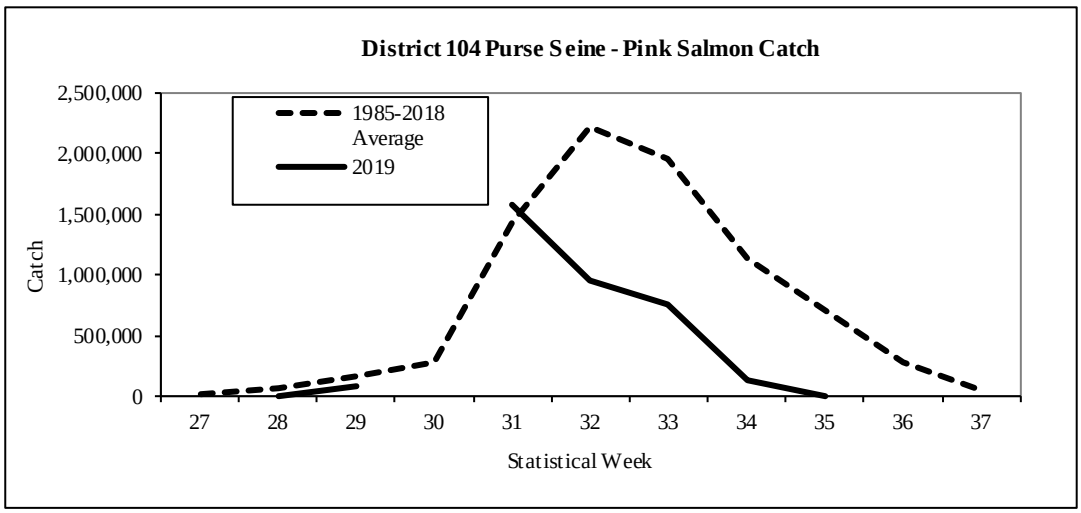

Figure 6. Pink salmon harvest by week in the District 104 purse seine fishery, 2019.

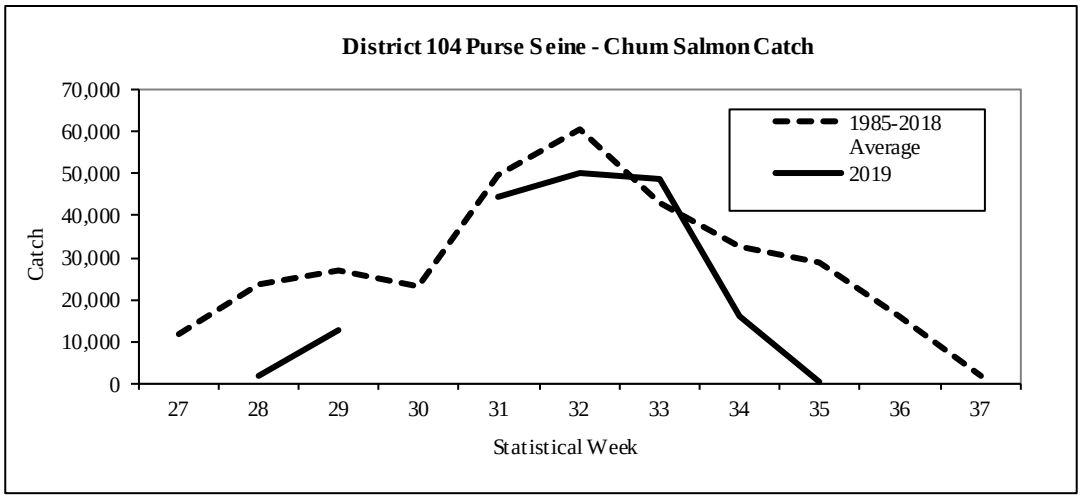

Figure 7. Chum salmon harvest by week in the District 104 purse seine fishery, 2019.

District 101 Drift Gillnet Fishery

The 2019 PST agreement calls for abundance-based management of the District 101 (Tree Point) drift gillnet fishery. The agreement specifies a harvest of 13.8 percent of the AAH of the Nass River sockeye salmon run. The AAH is calculated as the total run of Nass sockeye salmon minus either the escapement requirement of 200,000 or the actual in-river escapement, whichever is less. The run of Nass sockeye salmon was forecasted at 620,000 in 2019 which, minus an escapement goal of 200,000, would result in an AAH of about 420,000. Using this forecast, the 2019 allowable harvest in the District 101 drift gillnet fishery was approximately 58,000 Nass River sockeye salmon.

The District 101 drift gillnet fishery opens by regulation on the third Sunday in June, which was June 16 (week 25) in 2019. During the early weeks of the fishery, management is based on the run strength of Alaska wild stock chum and sockeye salmon and on the run strength of Nass River sockeye salmon. Beginning in the third week of July, when pink salmon stocks begin to enter the fishery in large numbers, management emphasis shifts by regulation to that species. By regulation, the District 101 Pink Salmon Management Plan (PSMP) begins the third Sunday in July and sets gillnet fishing time in this district in relation to the District 101 purse seine fishing time. Beginning in Week 36 (September 1) management was based on the strength of wild stock fall chum and coho salmon.

The District 101 drift gillnet fishery opened Sunday June 16 (week 25) in 2019. The number of days the fishery was open was near average all season (Figure 8), but the number of boats fishing during weekly openings was below average throughout the season (Figure 9). The total number of individual boats fishing during the season was 57, which was approximately 54% of the 1985-2018 average of 105 boats. A total of 15,986 sockeye salmon were harvested, which was only 14% of the 1985–2018 average of 111,870 fish and the lowest harvest since the inception of the PST (Tables 3 and 4). Harvests of sockeye salmon were well below treaty period averages throughout the season (Figure 10). The cumulative sockeye salmon harvest prior to the initiation of the PSMP in Week 30 was 5,962 fish, or about 37% of the season's total sockeye salmon harvest. The final number of Nass River sockeye salmon harvested at Tree Point will not be available until catch, escapement, and stock composition estimates are finalized for the 2019 season. In past years approximately 65% of the District 101 gillnet sockeye salmon harvest has

been of Nass River origin, therefore we would anticipate that approximately 10,400 Nass River sockeye salmon may have been harvested in the District 101 gillnet fishery in 2019.

Coho salmon harvests were below average throughout the season and the total harvest of 28,800 fish was 59% of the treaty period average (Figure 11). Pink salmon harvests were below average most of the season and the total harvest of 204,971 fish was 42% of average (Figure 12). Chum salmon harvests were near or below average in most weeks of the fishery and the total harvest of 182,457 fish was 61% of average (Figure 13). Chinook salmon harvests were near average throughout the season (Figure 14).

Table 3. Weekly harvest and effort in the Alaska District 101 commercial drift gillnet fishery, 2019.

Week	Start Date	Chinook	Sockeye	Coho	Pink	Chum	Boats	Hours
25	6/16	262	512	361	582	771	30	95.98
26	6/23	428	1,466	269	3,481	2,899	33	96
27	6/30	327	1,508	175	10,463	5,911	38	96
28	7/7	98	1,486	363	25,954	19,666	41	96
29	7/14	41	990	232	22,670	17,140	44	96
30	7/21	57	2,347	438	30,715	20,593	38	96
31	7/28	61	3,779	1,595	35,060	28,600	39	120
32	8/4	22	2,098	1,243	34,883	23,559	35	120
33	8/11	6	964	1,295	30,866	12,069	32	120
34	8/18	1	193	1,592	8,045	22,854	20	120
35	8/25	3	504	4,134	2,132	20,318	35	120
36	9/1	2	102	2,665	90	4,462	33	96
37	9/8	4	32	5,049	26	2,634	29	96
38	9/15	1	4	5,640	4	830	24	96
39	9/22	0	0	2,758	0	142	13	96
40	9/29	0	1	991	0	9	7	96
Total		1,313	15,986	28,800	204,971	182,457	57	1,656
1985-2018 Avg.		1,484	111,870	48,608	490,021	298,202	106	1,371

Table 4. Sockeye salmon harvest in the Alaska District 101 gillnet fishery, 1985 to 2019, and comparison of harvest and effort (boats, hours, and boat-hours) between weeks 26 and 35 when sockeye salmon are most abundant in this district.

	Total	Catch and Effort between Weeks 26-35			
Year	Sockeye Harvest	Sockeye Harvest	Individual Permits Fished	Total Hours Open	Boat-Hours[1]
1985	173,100	159,021	155	1,032	106,209
1986	145,699	143,286	201	960	109,490
1987	107,503	106,638	178	615	64,104
1988	116,115	115,888	192	756	93,072
1989	144,936	130,024	178	1,023	117,465
1990	85,691	78,131	159	840	70,421
1991	131,492	123,508	136	984	80,064
1992	244,649	243,878	118	1,080	94,159
1993	394,098	390,299	149	1,032	102,814
1994	100,377	98,725	144	984	74,408
1995	164,294	151,131	140	1,008	82,512
1996	212,403	175,569	130	1,104	86,108
1997	169,474	152,662	138	1,008	81,672
1998	160,506	159,307	124	1,044	87,358
1999	160,028	158,268	118	1,032	80,424
2000	94,651	94,399	95	912	49,488
2001	80,041	62,129	76	1,020	46,874
2002	120,353	106,360	76	1,008	42,528
2003	105,263	96,921	71	1,104	44,008
2004	142,357	141,395	61	1,104	42,400
2005	79,725	75,875	70	1,104	40,864
2006	62,770	53,048	48	840	28,265
2007	66,822	50,642	56	1,032	33,713
2008	34,113	30,672	54	936	31,961
2009	69,859	69,325	65	1,080	43,432
2010	62,680	61,987	68	1,008	45,135
2011	88,618	87,744	87	840	47,627
2012	62,506	40,518	85	1,008	43,695
2013	54,575	45,413	92	1,104	59,437
2014	55,828	49,722	73	1,095	44,551
2015	28,155	27,365	71	912	35,946
2016	39,912	38,078	71	1,008	44,640
2017	25,073	19,702	68	984	39,672
2018	19,920	18,540	54	1,296	30,960
2019	15,986	15,335	51	1,080	37,944
Average 1985-2018	109,131	102,043	106	999	61,812

[1]Boat-hours equals the sum of all weekly estimates of boat-hours: boats fished multiplied by open hours. Boat-hours does not equal individual permits fished multiplied by total open hours.

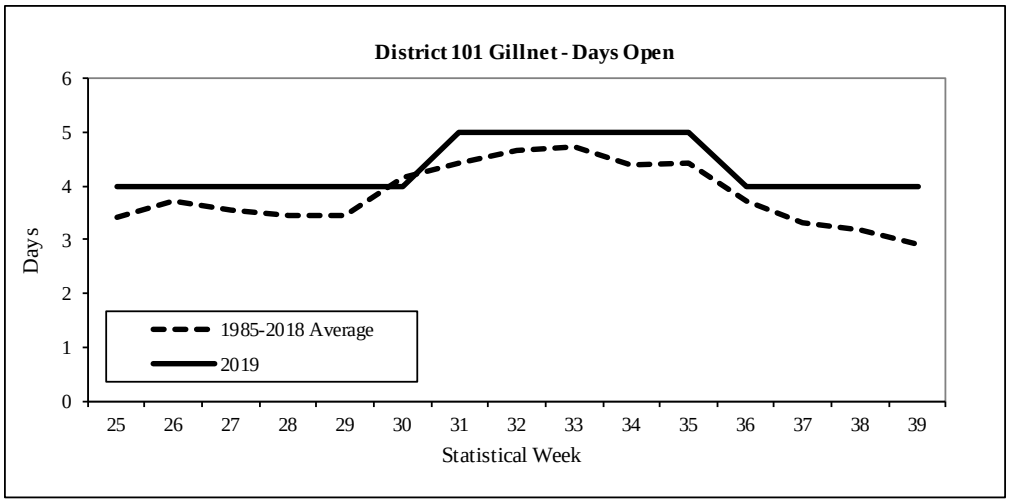

Figure 8. Days open by week in the District 101 drift gillnet fishery, 2019.

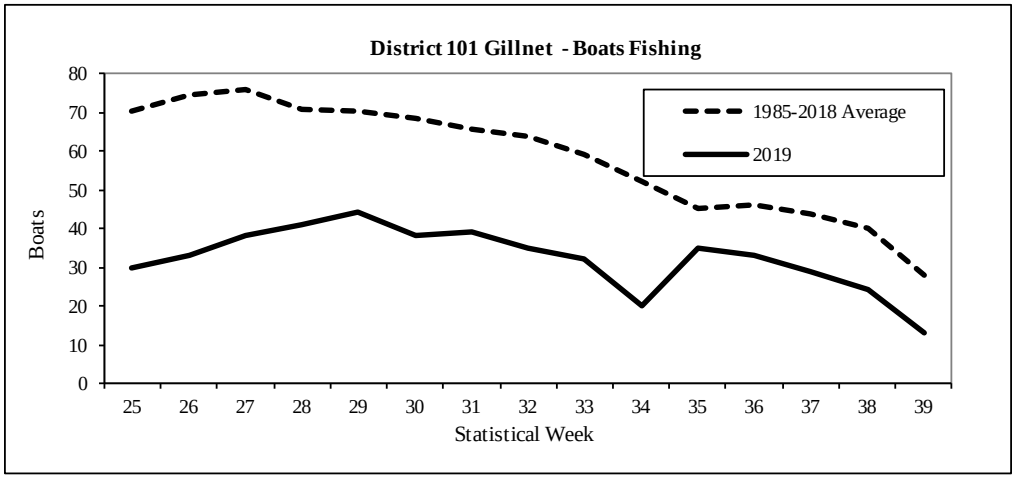

Figure 9. Number of boats fishing by week in the District 101 drift gillnet fishery, 2019.

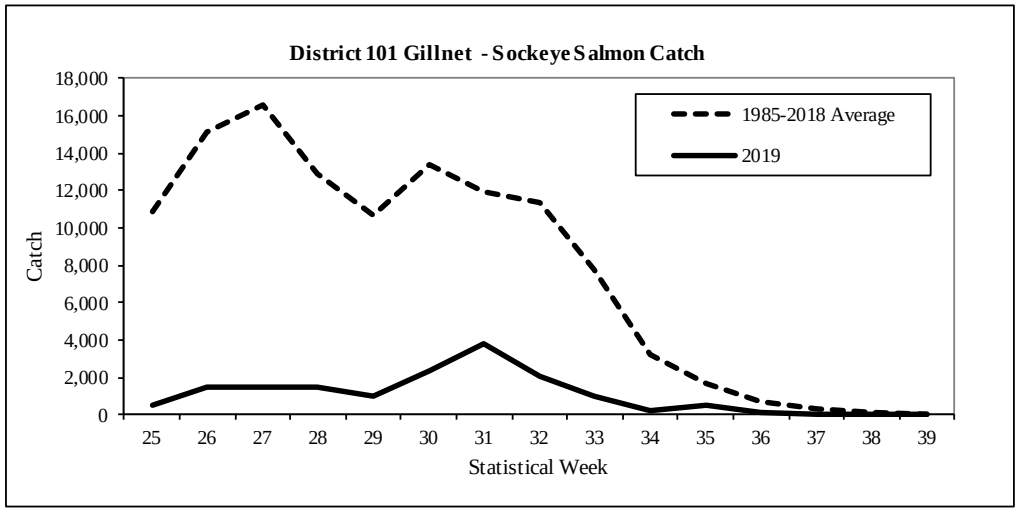

Figure 10. Sockeye salmon harvest by week in the District 101 drift gillnet fishery, 2019.

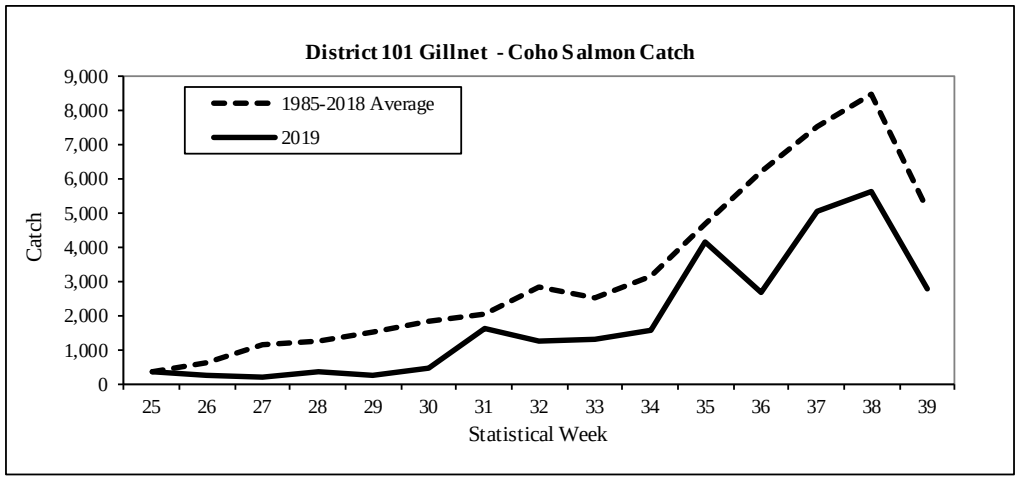

Figure 11. Coho salmon harvest by week in the District 101 drift gillnet fishery, 2019.

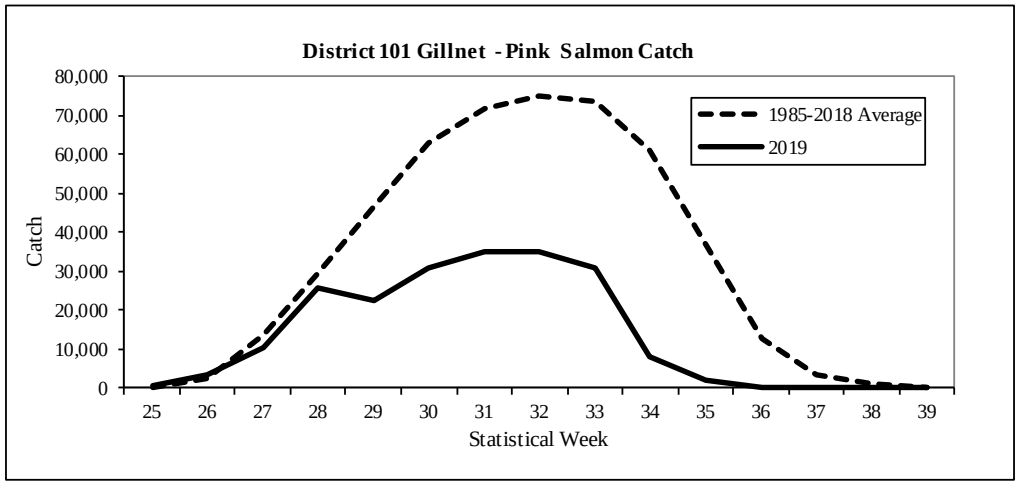

Figure 12. Pink salmon harvest by week in the District 101 drift gillnet fishery, 2019.

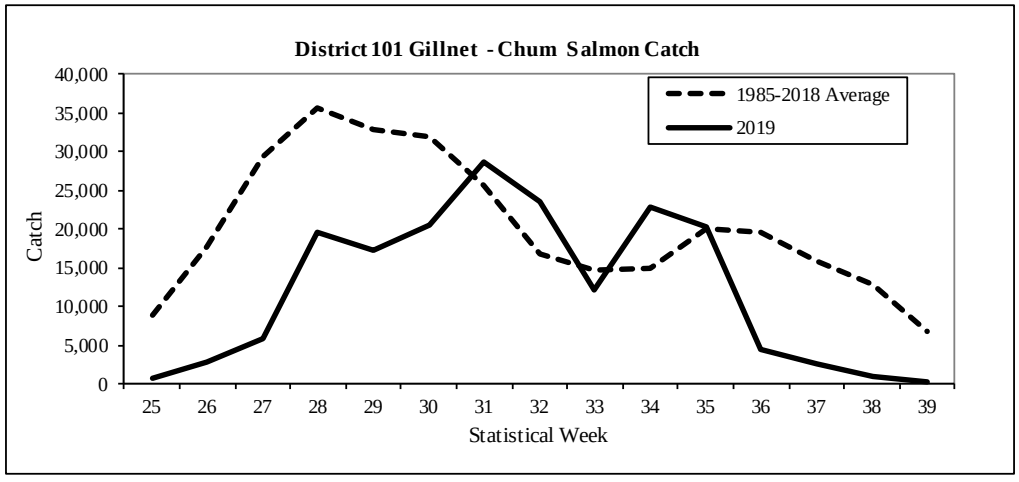

Figure 13. Chum salmon harvest by week in the District 101 drift gillnet fishery, 2019.

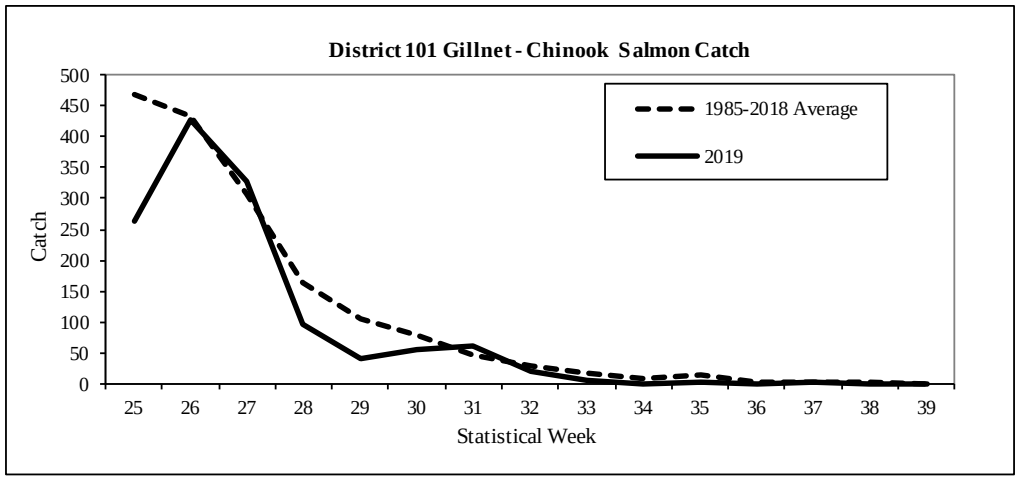

Figure 14. Chinook salmon harvest by week in the District 101 drift gillnet fishery, 2019.

Pink, Sockeye, and Chum Salmon Escapements

Escapements of pink salmon were generally strong in southern Southeast Alaska and poor to average throughout the northern half of the region. The total 2019 Southeast Alaska pink salmon escapement index of 8.81 million index fish ranked 33rd since 1960. Biological escapement goals were met in the Southern Southeast and Northern Southeast Outside subregions, but escapement to the Northern Southeast Inside Subregion was below goal in 2019 (Table 5). On a finer scale, escapements were within or above management targets for 9 of 15 districts in the region and for 27 of the 46 pink salmon stock groups in Southeast Alaska. The Southern Southeast Subregion includes all of the area from Sumner Strait south to Dixon Entrance (Districts 101–108). The escapement index value of 5.63 million was within the escapement goal range of 3.0 to 8.0 million index fish. The pink salmon harvest of 18.0 million in the Southern Southeast Subregion was below the recent 10-year average of 20 million fish. The overall Southeast Alaska pink salmon harvest of 21.1 million fish was approximately 58% of the 2009–2018 average of 36.1 million.

Table 5. Southeast Alaska 2019 pink salmon escapement indices and biological escapement goals by subregion (in millions).

Subregion	2019 Pink Salmon Index	Biological Escapement Goal	
		Lower Bound	Upper Bound
Southern Southeast	5.63	3.0	8.0
Northern Southeast Inside	1.65	2.5	6.0
Northern Southeast Outside	1.53	0.75	2.50
Total	8.81		

Sockeye salmon runs throughout Southeast Alaska were mixed in 2019, and escapement targets were met for 10 of the 12 sockeye salmon systems with formal escapement goals. Sockeye runs were very good for many northern stocks but were generally poor in southern Southeast Alaska. The Hugh Smith Lake adult sockeye salmon escapement was 2,040, which was well below the optimal escapement goal range of 8,000 to 18,000 adult sockeye salmon. Based on the expanded peak foot survey count, the escapement of sockeye salmon into McDonald Lake was only 24,200 fish, which was below the sustainable escapement goal range of 55,000 to 120,000.

For summer-run chum salmon, lower bound sustainable escapement goals were met for all three subregions in Southeast Alaska. Runs are divided into summer and fall stocks. The Southern Southeast summer-run chum salmon stock group is composed of an aggregate of 15 summer-run chum salmon streams on the inner islands and mainland of southern Southeast Alaska, from Sumner Strait south to Dixon entrance, with a sustainable escapement goal of 62,000 index spawners (based on the aggregate peak survey to all 15 streams). Summer chum salmon escapements were near or above average at most index streams in southern Southeast Alaska, and the index of 105,000 in 2019 was well above the escapement goal (Figure 15).

Cholmondeley Sound is the only area in southern Southeast Alaska with a formal escapement goal for fall chum salmon. Fall chum salmon runs are monitored in Cholmondeley Sound through aerial surveys at Disappearance and Lagoon creeks. The escapement index of 20,000 was below the lower bound of the sustainable escapement goal range of 30,000 to 48,000 index spawners (based on the aggregate peak survey to both streams; Figure 16).

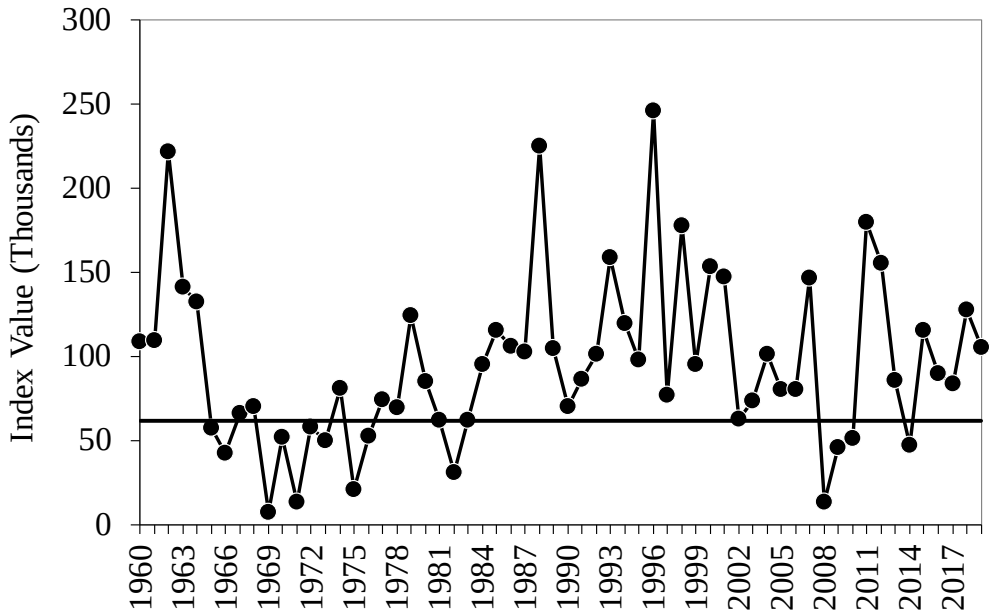

Figure 15. Observed escapement index value by year (solid circles) and the sustainable escapement goal threshold of 62,000 index spawners (horizontal line) for wild summer-run chum salmon in the Southern Southeast Subregion, 1960–2019.

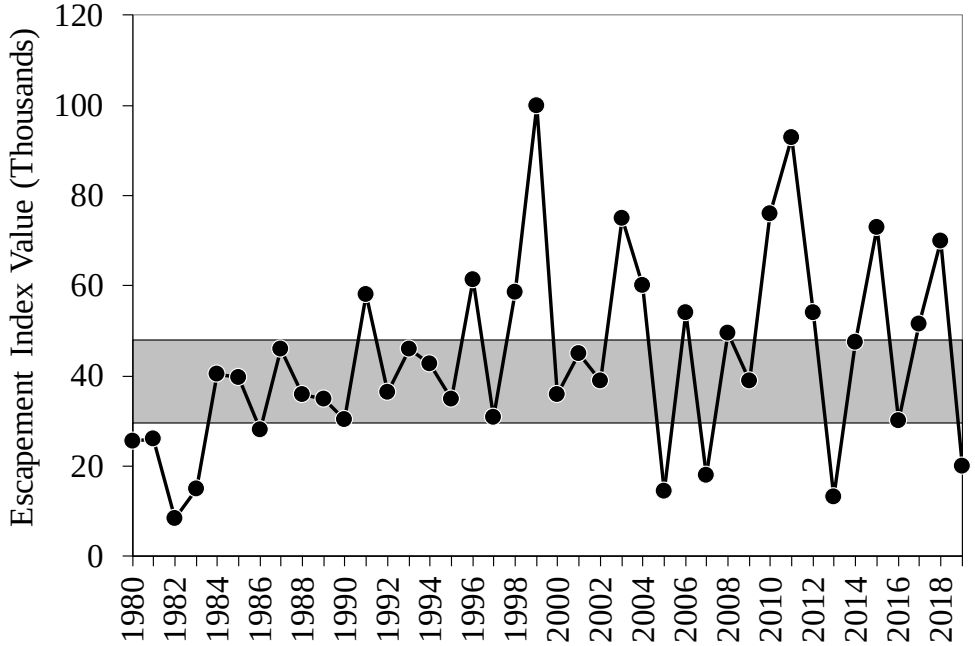

Figure 16. Observed escapement index value by year (solid circles) and the sustainable escapement goal range of 30,000 to 48,000 index spawners (shaded area) for Cholmondeley Sound fall-run chum salmon, 1980–2019.

TRANSBOUNDARY AREA FISHERIES

Stikine River Area Fisheries

The 2019 preseason forecast for large Chinook salmon returning to the Stikine River was approximately 8,250 fish, which did not allow for directed Chinook salmon fisheries in District 108. The standard mark-recapture program was not operated this year due to the low forecasted run and the desire by both countries to reduce mortality associated with the program. Inseason estimates produced by the Stikine Chinook Management Model (SCMM) indicated an escapement of 13,600 fish, which is near the lower end of the goal range of 14,000 fish. The final run size was estimated to be 14,400 fish.

The 2019 preseason forecast for sockeye salmon returning to the Stikine River was 90,000 fish, which was well below the recent 10-year average of 153,000 fish. The 2019 forecast included approximately 29,000 wild Tahltan (32%), 36,000 enhanced Tahltan (40%), and 24,000 mainstem (27%) sockeye salmon. During the first half of the sockeye salmon management period, fishing periods in District 108, and to a lesser extent in District 106, were determined by the inseason abundance estimate of the Tahltan Lake run. Management actions during the second half of the sockeye fishery became focused on the mainstem component of the Stikine River sockeye salmon run in District 8, while returns to local area systems were the focus in District 6. Typically, Tahltan Lake sockeye salmon stocks exhibit peak run timing in District 106 and 108 fisheries during statistical week 26 (June 24–June 30). During an average Tahltan Lake run, significant numbers of sockeye salmon could be present as early as statistical week 24 (June 10–16) and as late as statistical week 31 (July 29–August 4). The actual 2019 runs of local area sockeye salmon stocks were average to below average.

Due to the poor performance of Chinook salmon stocks in SE Alaska, restrictions were implemented in the Districts 106 and 108 gillnet fisheries to conserve Chinook salmon. In District 106, the initial opening was delayed by one week and a six-inch maximum mesh restriction was in place for the first three openings. In District 108, the initial opening was delayed until week 26. Additionally, time, area, and mesh restrictions were implemented through statistical week 29 (July 14–July 20). Estimated harvest of large Stikine River Chinook salmon by the District 108 drift gillnet fishery during the sockeye salmon directed fishery period (weeks 27–29) was 113 fish based on GSI. The District 108 Spring Troll hatchery access fishery was closed for 2019. Commercial trolling remained closed to Chinook salmon retention in District 108 until the second opening of the Summer Troll fishery. U.S. harvest of large Stikine River Chinook salmon in all District 108 fisheries was estimated to be 134 fish; well below the U.S. base level catch (BLC) of 3,400 fish.

The District 106 drift gillnet sockeye salmon fishery opened Sunday, June 16 (week 25) and the District 108 drift gillnet fishery opened Sunday, June 23 (week 26). The initial openings in District 106 were limited to two days in week 25 and 26. The following week, both districts were opened for three days with mesh and area restrictions in place. The mesh restriction was lifted from District 6 in week 28, but mesh and area restrictions continued to be in place for District 108. Given the below average forecast of sockeye salmon runs returning to the Stikine River and local area stocks, fishing time was limited to two days for most weeks. Fishing time peaked with three days in week 27 to harvest the surplus Tahltan Lake component of the Stikine River sockeye salmon run. By week 29, it became apparent that the mainstem portion of the Stikine River sockeye run was coming in below average and open time in District 108 was limited to

two days before closing for two weeks during weeks 30 and 31. Open time in District 106 also experienced weekly reductions and was limited to two days per week in weeks 29 through 31 for McDonald Lake sockeye conservation (Tables 6 and 7). The preliminary postseason assessment for Stikine River sockeye salmon was 85,500 fish and included 26,900 wild Tahltan (23%), 29,800 enhanced Tahltan (24%), and 28,800 Mainstem (41%) fish.

Districts 106 and 108 were managed based on pink salmon abundance during the month of August and three or four-day openings occurred in weeks 32 through 34 (Figures 17 and 24). In late August, management focus switched to coho salmon and the fisheries continued to be open for two to four days weekly through the remainder of the season. The number of boats participating in the District 106 fishery was below average early and late in the season, and slightly above average from weeks 33 to 36 (Figure 18). The seasonal number of permits fished was 87% of average (Table 6). The number of boats participating in the District 108 fishery was below average in nearly all weeks of the fishery and the 78 permits fished was 60% of the average of 130 permits (Figure 25; Table 7).

During the 2019 season, 424,495 pink salmon, 23,844 sockeye salmon, 113,152 chum salmon, 59,208 coho salmon, and 1,073 Chinook salmon were harvested in the District 106 drift gillnet fishery (Table 6). Chinook salmon harvests were below average from mid-June through late August, but were well above average in week 36 (Figure 19); the harvest was comprised of 43% Alaska hatchery origin fish. Sockeye salmon harvests were below average all season (Figure 20), and the total sockeye salmon harvest of 23,844 fish was 29% of the recent 10-year average; 4,300 were estimated to be of Stikine River origin. Harvests of coho salmon were also below average in most weeks of the season and the overall harvest of 59,208 coho salmon was 41% of the recent 10-year average of 145,300 fish (Figure 21). Pink salmon harvests were above average most of the season (Figure 22), and the overall harvest of 424,495 fish was 139% of the recent 10-year average. Chum salmon harvests were well below average through mid-July, above average from mid-to-late August, and then dropped back below average throughout the remainder of the season. The overall harvest of 113,152 chum salmon was 70% of average (Figure 23).

During the 2019 season, 10,884 pink salmon, 6,591 sockeye salmon, 50,653 chum salmon, 9,478 coho salmon, and 4,253 Chinook salmon were harvested in the District 108 drift gillnet fishery (Table 7). The harvest of Chinook salmon was well below average in the first week of the fishery in week 26, well above average in week 27, and was near or below average until late July (Figure 26). An estimated 134 Stikine River large Chinook salmon were harvested in District 108 from weeks 25 through 29 by subsistence, sport, troll, and drift gillnet fisheries. District 108 gill net sockeye salmon harvests were below average throughout the season (Figure 27) and the harvest of 6,591 fish was only 22% of the recent 10-year average. An estimated 3,700 fish, or 57% of the harvest, were estimated to be Stikine River sockeye salmon. The overall coho salmon harvest of 9,478 fish was also well below the recent 10-year average of 26,300 fish (Table 7, Figure 28). Pink salmon harvests were below average throughout the season and the overall harvest was 24% of the recent 10-year average (Figure 29). The overall harvest of 50,653 chum salmon was 34% of the recent 10-year average (Figure 30).

Table 6. Weekly salmon harvest in the Alaskan District 106 commercial drift gillnet fisheries, 2019.

Week	Start Date	Chinook	Sockeye	Coho	Pink	Chum	Boats	Days	Boat Days
25	16-Jun	66	309	191	542	147	32	2	64
26	23-Jun	109	1,028	376	4,546	1,349	40	2	80
27	30-Jun	191	3,157	1,054	14,202	8,232	42	3	126
28	7-Jul	75	2,933	1,437	17,856	6,350	42	2	84
29	14-Jul	125	3,399	1,726	42,209	8,927	47	2	94
30	21-Jul	60	3,045	1,056	48,534	9,187	47	2	94
31	28-Jul	54	3,284	2,036	45,276	14,046	48	2	96
32	4-Aug	72	2,522	1,912	65,957	10,640	63	3	189
33	11-Aug	62	2,417	7,429	111,893	11,583	74	4	296
34	18-Aug	15	1,380	7,027	50,430	18,130	65	4	260
35	25-Aug	29	266	8,866	17,647	13,255	75	3	225
36	1-Sep	151	86	7,704	4,631	6,567	80	3	240
37	8-Sep	28	18	8,485	736	3,340	70	2	140
38	15-Sep	16	0	5,766	34	1,048	46	3	138
39	22-Sep	10	0	2,743	2	255	13	3	39
40-41	29-Sep	10	0	1,400	0	96	18	5	90
Total		1,073	23,844	59,208	424,495	113,152	131	45	2,254
2009-2018 Average		2,335	82,240	145,292	304,358	162,255	150	47	2,751
2019 as % of Average		46%	29%	41%	139%	70%	87%	100%	82%

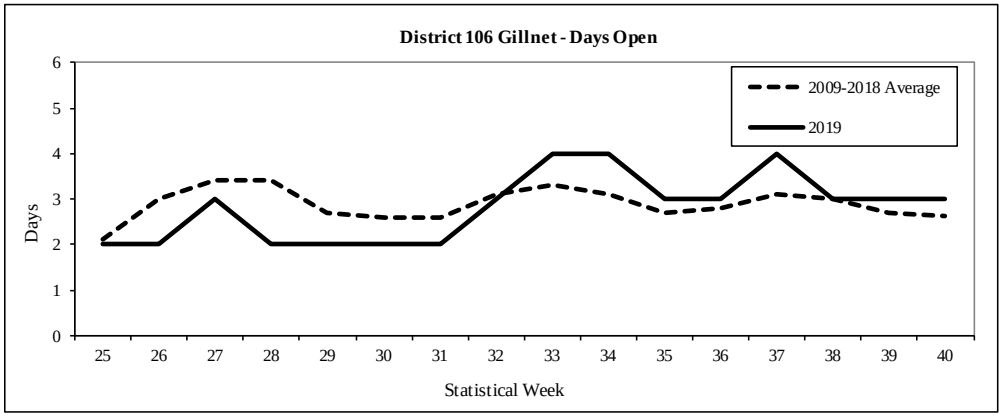

Figure 17. Days open by week in the District 106 drift gillnet fishery, 2019.

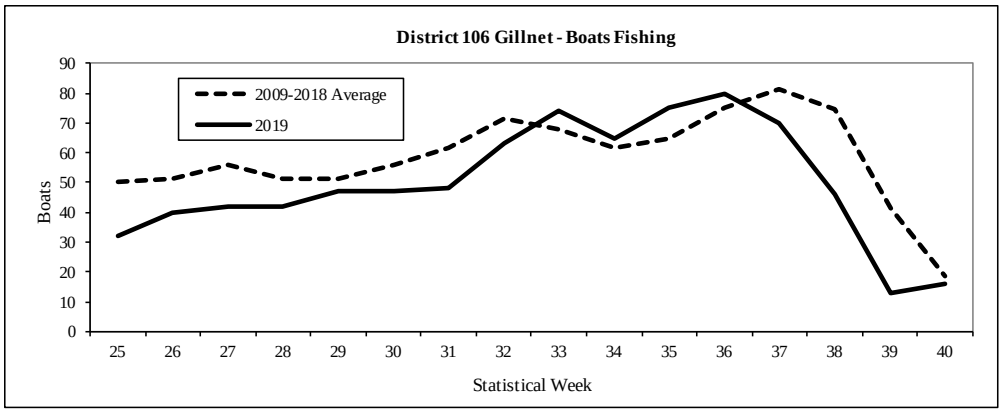

Figure 18. Number of boats fishing by week in the District 106 drift gillnet fishery, 2019.

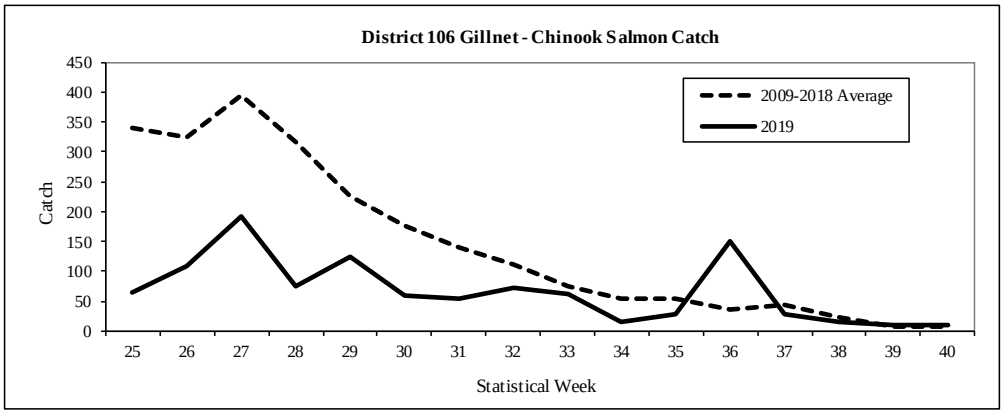

Figure 19. Chinook salmon harvest by week in the District 106 drift gillnet fishery, 2019.

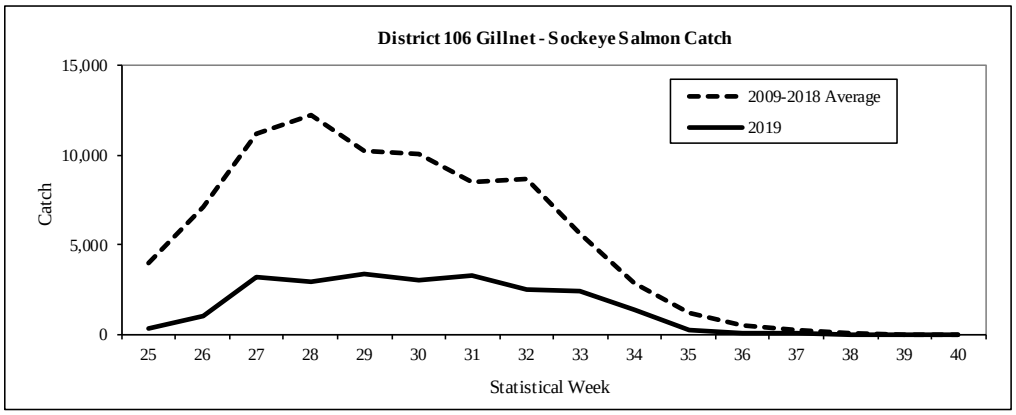

Figure 20. Sockeye salmon harvest by week in the District 106 drift gillnet fishery, 2019.

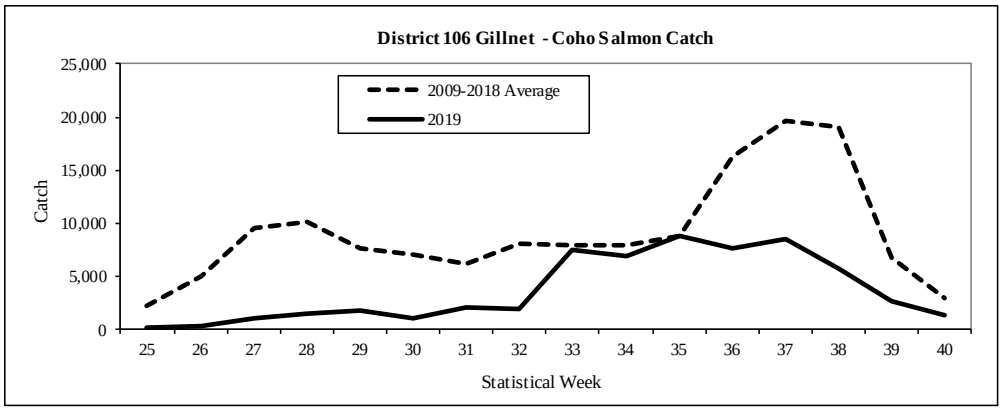

Figure 21. Coho salmon harvest by week in the District 106 drift gillnet fishery, 2019.

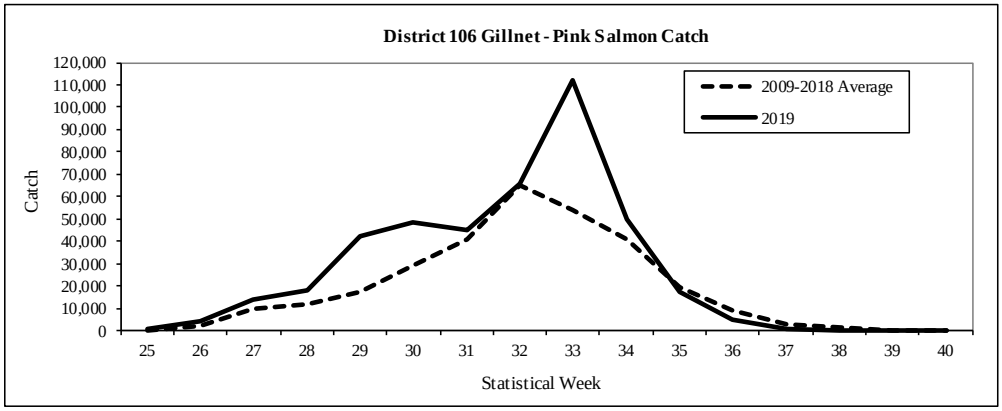

Figure 22. Pink salmon harvest by week in the District 106 drift gillnet fishery, 2019.

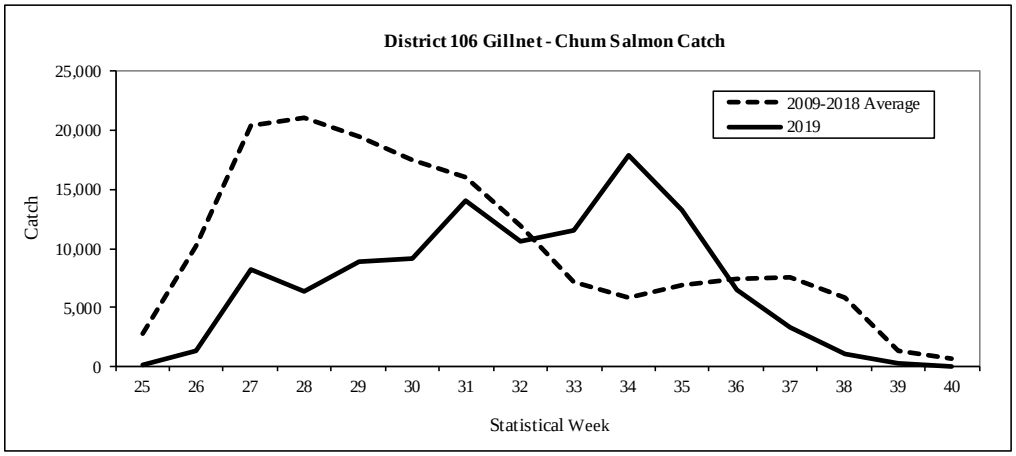

Figure 23. Chum salmon harvest by week in the District 106 drift gillnet fishery, 2019.

Table 7. Weekly salmon harvest and effort in the Alaskan District 108 traditional commercial drift gillnet fishery, 2019.

Week	Start Date	Chinook	Sockeye	Coho	Pink	Chum	Boats	Days	Boat Days
26	23-Jun	139	1,329	9	26	68	12	2	24
27	30-Jun	2,609	2,001	41	258	985	35	3	105
28	7-Jul	792	1,219	37	602	3,150	28	2	56
29	14-Jul	536	1,232	76	1,843	3,851	20	2	40
32	4-Aug	110	566	597	4,864	26,639	51	3	153
33	11-Aug	44	156	1,073	1,679	9,690	31	4	120
34	18-Aug	10	69	1,863	1,126	5,382	30	4	120
35	25-Aug	2	15	1,297	444	745	13	3	39
36	1-Sep	1	1	549	35	28	9	3	27
37	8-Sep	9	3	1,792	6	33	14	2	28
38	15-Sep	1	0	1,563	1	74	13	3	39
39-41	22-Sep	0	0	581	0	8	8	8	24
Total		4,253	6,591	9,478	10,884	50,653	78	39	775
2009-2018 Average		6,771	29,636	26,292	45,272	149,031	130	49	1,735
2019 as % of Average		63%	22%	36%	24%	34%	60%	80%	45%

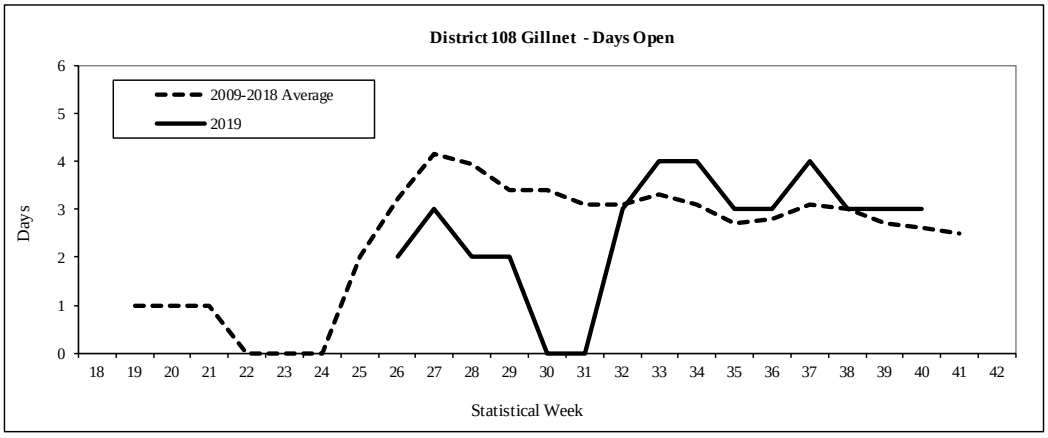

Figure 24. Days open by week in the District 108 drift gillnet fishery, 2019.

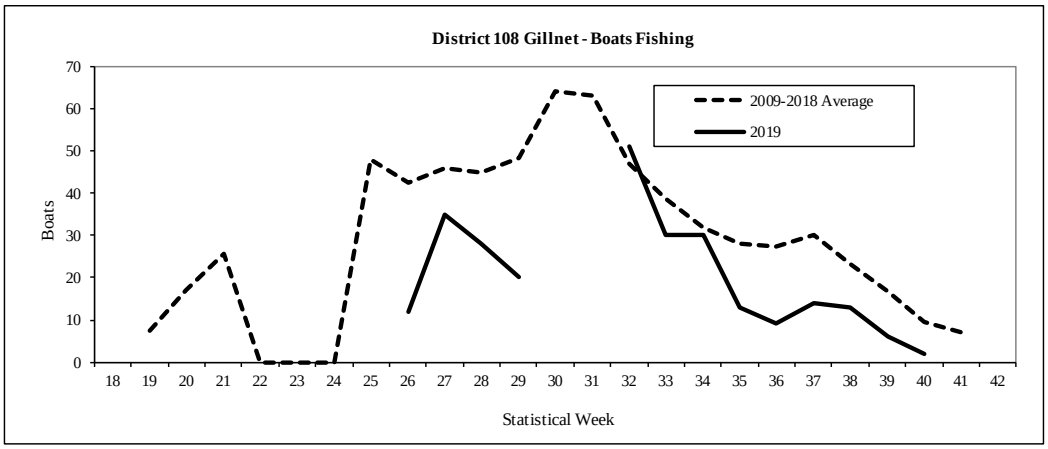

Figure 25. Number of boats fishing by week in the District 108 drift gillnet fishery, 2019.

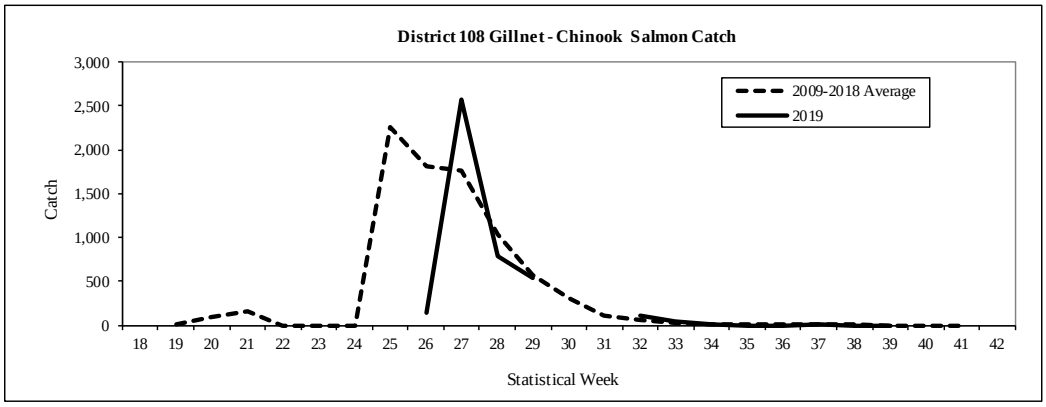

Figure 26. Chinook salmon harvest by week in the District 108 drift gillnet fishery, 2019.

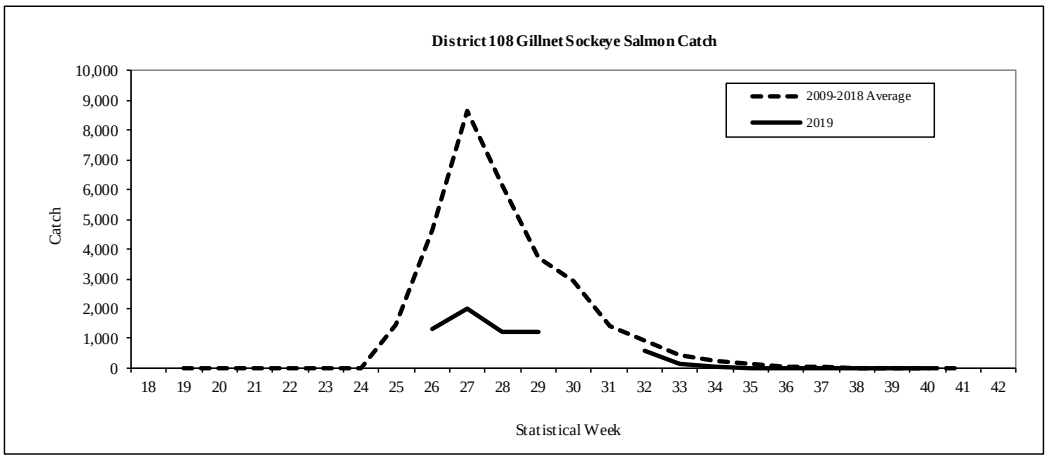

Figure 27. Sockeye salmon harvest by week in the District 108 drift gillnet fishery, 2019.

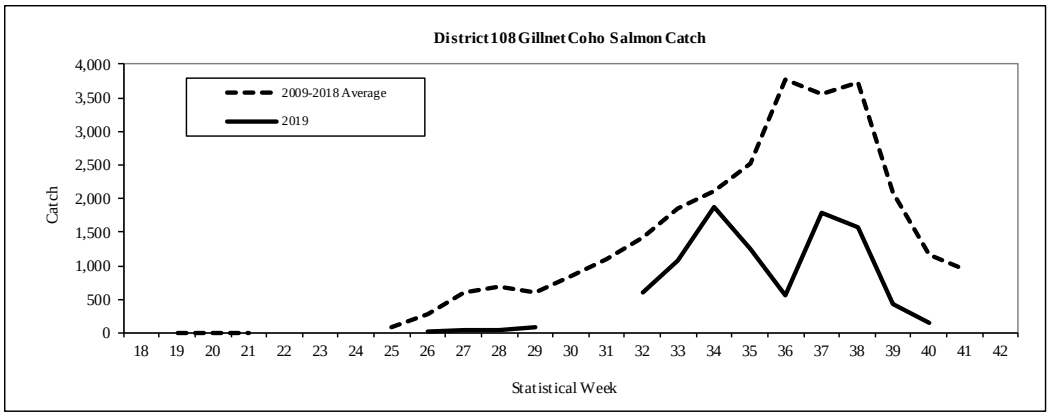

Figure 28. Coho salmon harvest by week in the District 108 drift gillnet fishery, 2019.

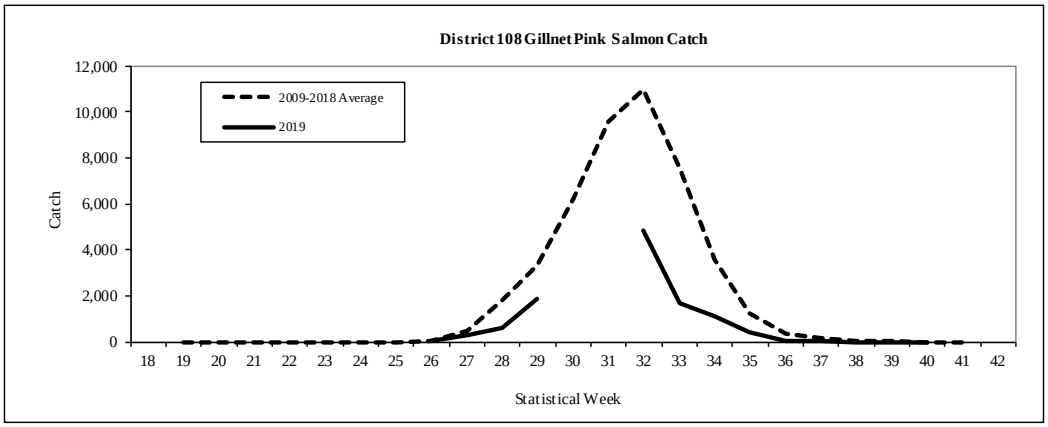

Figure 29. Pink salmon harvest by week in the District 108 drift gillnet fishery, 2019.

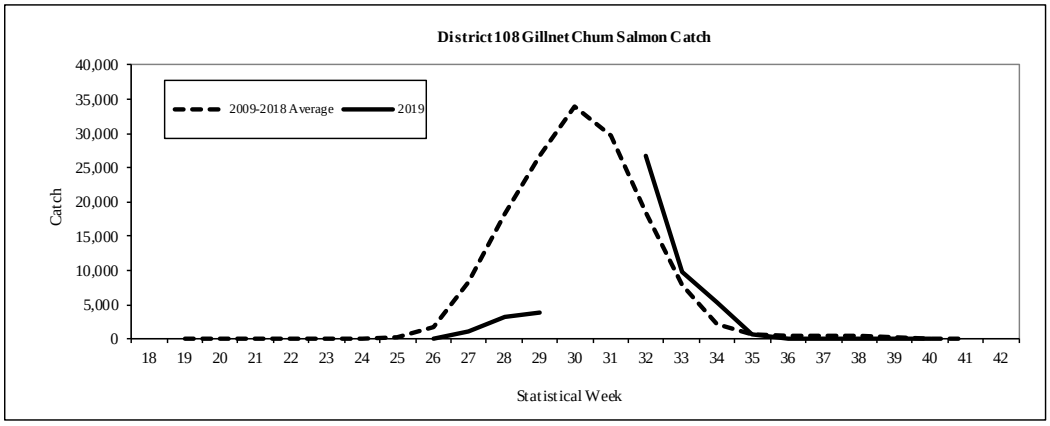

Figure 30. Chum salmon harvest by week in the District 108 drift gillnet fishery, 2019.

Taku River Area Fisheries

The traditional drift gillnet fishery in District 111 targets salmon stocks bound for the trans-boundary Taku River. This fishery is managed for Chinook salmon from week 18 to week 24 when there are sufficient fish surplus to escapement needs to provide for a fishery. From week

25 to week 33 the fishery is managed for Taku River sockeye salmon, and from week 34 to week 42 for Taku River coho salmon. Also harvested in this fishery are salmon bound for Stephens Passage and Port Snettisham streams as well as enhanced Chinook, sockeye, coho and chum salmon from Douglas Island Pink and Chum, Inc. (DIPAC) hatchery releases. The traditional fishery does not include harvests from the Speel Arm Special Harvest Area (SHA) inside Port Snettisham.

The escapement goal range for Taku River large Chinook salmon is 19,000 to 36,000 fish with a point goal of 25,500 fish. In years of high abundance, directed Chinook salmon fisheries can be implemented to harvest fish in excess of escapement needs. The 2019 preseason terminal run forecast for the Taku River of 9,050 large Chinook salmon did not allow for any directed Chinook salmon fisheries in District 111 and significant restrictions in time, area, and gear were implemented in the first three directed sockeye salmon openings (weeks 25–27) to minimize Chinook salmon harvest.

The traditional spawning objective for Taku River sockeye salmon was a range of 71,000 to 80,000 fish, with a point goal of 75,000 fish. This was established in 1985 based on the professional judgement of U.S. and Canadian biologists during initial PST negotiations to be used until a scientifically based goal was developed. Historically, the total allowable catch associated with this goal has been based on an inriver run size estimate inflated by not accounting for tag dropout rates that more recent radio telemetry studies have documented in the mark/recapture experiment. Concurrent with the adoption of an adjusted inriver run estimate to account for these dropouts, an interim spawning objective for the 2019 season was agreed to by the TBR Panel in February of 2019. This arrangement incorporated a 22% adjustment to the inseason inriver run estimates, and a corresponding interim spawning objective range of 55,000 to 62,000 fish with a management target of 59,000 fish. A bilaterally approved MSY goal for Taku River sockeye salmon will be in place prior to the 2020 fishing season. The original 2019 Taku River wild sockeye salmon terminal run forecast of 154,000 fish was based on Canadian stock-recruit and sibling forecasts was below the average of 180,000 fish. For early season management purposes before an inseason estimate was available, this forecast was adjusted by the observed dropout rate to 120,000 fish. DIPAC forecasted 230,000 enhanced sockeye salmon returning through District 111 waters to Snettisham Hatchery.

An escapement goal range of 50,000 to 90,000 Taku River coho salmon with a point goal of 70,000 fish was adopted in early 2015. New harvest sharing provisions between the U.S. District 111 drift gillnet fishery and the Canada inriver fisheries are in place, specified in the PST, and the U.S. management intent in 2019 was to achieve the AC and spawning objective. The 2019 preseason Taku River forecast was for a below average terminal run of 73,000 coho salmon, and DIPAC forecast a run of 62,000 enhanced coho salmon from releases in Gastineau Channel. DIPAC forecasted runs totaling 1,400,000 enhanced chum salmon to Gastineau Channel and Limestone Inlet, which was near the recent average.

The traditional drift gillnet fishery in District 111 began on Sunday, June 16, 2019 (week 25). The initial drift gillnet opening of the season in District 111 was for two days, with a significant area restriction, six inch maximum mesh size restriction, and night closures in place, intended to minimize harvest of Taku River Chinook salmon. Effort for the opening was 35 boats, which was above the ten-year average of 28 boats. Only 191 sockeye salmon were harvested during the opening, and the chum salmon harvest of 628 fish was only 9% of the average week 25 harvest

for the district (Figures 34 and 37). A total of 83 Chinook salmon were harvested, which was well below average for week 25 (Figure 33).

From late June through late July (weeks 26–31) effort in the District 111 drift gillnet fishery was generally below average, with a peak of 108 boats fishing in week 31 (Figure 32). From early August through early October (weeks 32–41), overall effort in the fishery was well below average in most weeks (Figure 32). Harvests of sockeye salmon were near or above average through early August, but then dropped to below average for the rest of the season (Figure 34). Weekly chum salmon catches were well below average and approximately 245,000 fish were harvested from mid-June to mid-August (Figure 37). The vast majority of the summer-run chum salmon harvest in District 111 consists of DIPAC hatchery fish returning to release sites in Gastineau Channel and Limestone Inlet. The Chinook salmon harvest of 1,201 fish was near average for years with no directed Chinook salmon fishery (Figure 33). Pink salmon harvests built to above average in the weeks prior to mid-July, then dropped below average for the remainder of the season. The pink salmon harvest of 69,137 fish was only 47% of average (Figure 36). The overall coho salmon harvest of 23,235 fish was below average and the peak weekly harvest of 7,048 fish occurred in week 37 (Figure 35). Fall chum salmon harvests were well below average from week 34 through 40 (Figure 37).

A number of Chinook salmon stocks are known to contribute to the Juneau area sport fishery, including those from the Taku, Chilkat, and King Salmon rivers, and local hatchery stocks, but the major contributor of mature wild fish is believed to be the Taku River. Non-retention of Chinook salmon in District 111, 112, 115, and parts of District 113 and 114, from April 1 through June 14, resulted in minimal harvest of wild fish in the sport fishery. The GSI-based District 111 harvest estimates of Taku River large Chinook salmon during the accounting period is 124 fish in the drift gillnet fishery, 94 fish in the sport fishery, and an estimated 10 fish in the personal use fishery, for a total of 228 fish. Harvests of Taku River large Chinook salmon in these fisheries from week 30 onwards were minimal and resulted in a total harvest well below the U.S. base level catch of 3,500 fish. The preliminary escapement estimate of Taku River large Chinook salmon is approximately 10,000 to 12,000 fish, which is well below the escapement goal range of 19,000 to 36,000 fish.

The 2019 traditional District 111 sockeye salmon harvest of 95,421 fish was 97% of average. Peak catches of sockeye salmon occurred in weeks 29 through 31 (mid-July to early August; Figure 34). The Speel Arm SHA was opened from week 32 to 37 and 9,605 sockeye salmon were harvested in the common property fishery. The lower bound of the Speel Lake sustainable escapement goal range of 4,000 to 9,000 fish was reached with 6,440 fish counted through the weir through September 20. DIPAC sockeye salmon returning to the Snettisham Hatchery contributed a minimum of 21,000 fish to the traditional District 111 harvest. The preliminary escapement estimate of Taku River sockeye salmon is 77,000 fish, which was above the interim escapement goal range of 55,000 to 62,000 fish.

The 2019 traditional District 111 coho salmon harvest of 23,235 fish was 64% of the recent ten-year average (Figure 35). Approximately 88% of the coho salmon were harvested in Taku Inlet, which was above the ten-year average of 82%, and 12% were harvested from Stephens Passage and Port Snettisham. Coho salmon stocks harvested in District 111 include runs to the Taku River, Port Snettisham, Stephens Passage, and local Juneau area streams as well as Alaskan hatcheries. This was the fifth year of full production for DIPAC's revitalized enhanced coho

salmon program. Alaska hatchery (nearly entirely DIPAC) coho salmon first appeared in the District 111 harvest in week 32, and comprised substantial proportions of the harvest each remaining week of the fishery. Alaska hatchery coho salmon contributed 35% of the 2019 District 111 traditional drift gillnet harvest. The preliminary escapement estimate of Taku River coho salmon is 82,700 fish, which was towards the upper end of the escapement goal range of 50,000 to 90,000 fish.

The 2019 District 111 traditional pink salmon harvest of 69,137 fish was 47% of average (Figure 36). Pink salmon escapements were very poor in the Northern Southeast Inside subregion of Southeast Alaska and the District 111 escapement index was approximately 37% of the lower end of the management target range. The 2019 District 111 traditional fishery chum salmon harvest of 245,962 fish was 41% of average and was comprised almost entirely of summer run fish (Figure 37). The summer chum salmon run continues through mid-August (week 33) and is mostly comprised of domestic hatchery fish and small numbers of wild stocks. Chum salmon returning to DIPAC release sites in Gastineau Channel and Limestone Inlet contributed a major portion of the harvest, but quantitative contribution estimates are not available. Approximately 54% of the District 111 chum harvest was taken in Taku Inlet, and 47% in Stephens Passage. The harvest of 1,181 fall-run chum salmon (i.e. chum salmon caught after week 33) was 42% of average. Most of these fall-run chum salmon are probably wild fish of Taku and Whiting River origin.

Table 8. Weekly salmon harvest in the Alaskan District 111 traditional commercial drift gillnet fishery, 2019[a].

Week	Start Date	Chinook	Sockeye	Coho	Pink	Chum	Boats	Days	Boat Days
25	16-Jun	83	191	1	2	628	35	2	70
26	23-Jun	133	988	6	102	2,530	41	2	82
27	30-Jun	304	2,363	39	2,328	17,677	59	2	118
28	7-Jul	272	7,914	75	20,125	46,322	99	3	297
29	14-Jul	144	17,694	155	17,752	84,049	87	4	348
30	21-Jul	117	27,574	637	10,133	66,058	96	4	384
31	28-Jul	92	21,400	1,900	7,407	22,397	108	4	432
32	4-Aug	31	9,888	1,105	6,505	3,911	56	5	280
33	12-Aug	14	5,530	1,206	3,775	1,209	23	4	92
34	18-Aug	2	1,705	1,941	948	542	19	3	57
35	26-Aug	1	113	2,563	59	292	22	2	44
36	1-Sep	5	54	2,120	1	129	20	3	60
37	8-Sep	2	7	7,048	0	147	25	4	100
38	15-Sep	1	0	4,041	0	67	26	5	130
39	22-Sep	0	0	264	0	4	8	5	40
40	27-Sep	0	0	134	0	0	2	5	10
41	10/6	0	0	0	0	0	0	5	0
Total		1,201	95,421	23,235	69,137	245,962	183	62	2,544
2009–2018 Average		1,836	98,333	36,418	145,906	598,379	195	51	2,947
2019 as % of Average		65%	97%	64%	47%	41%	94%	122%	86%

[a] There was no directed fishery for Chinook salmon in District 111 in 2019 due to a low Taku River preseason abundance forecast.

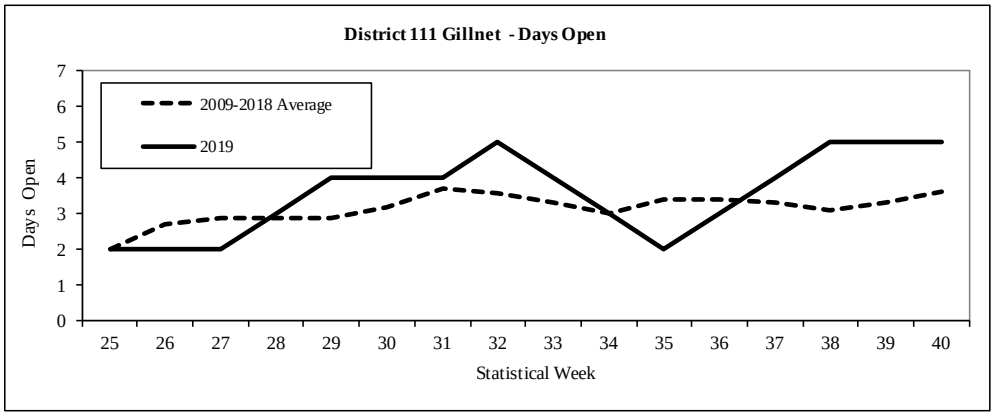

Figure 31. Days open by week in the District 111 drift gillnet fishery, 2019.

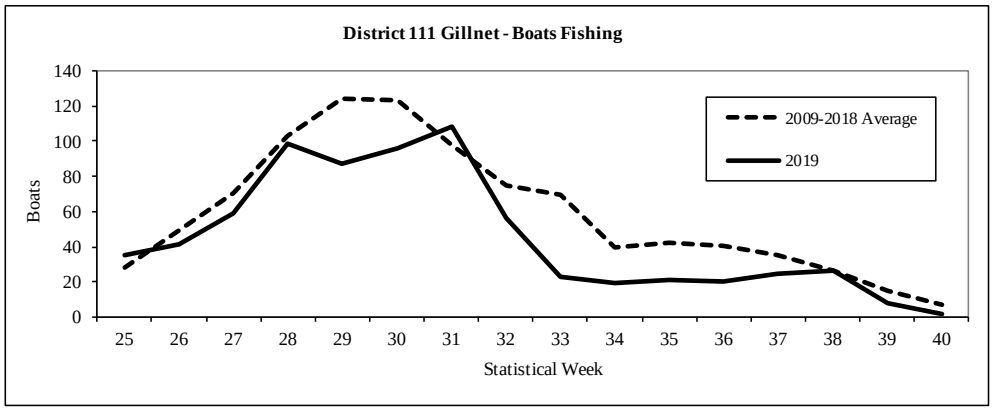

Figure 32. Number of boats fishing by week in the District 111 drift gillnet fishery, 2019.

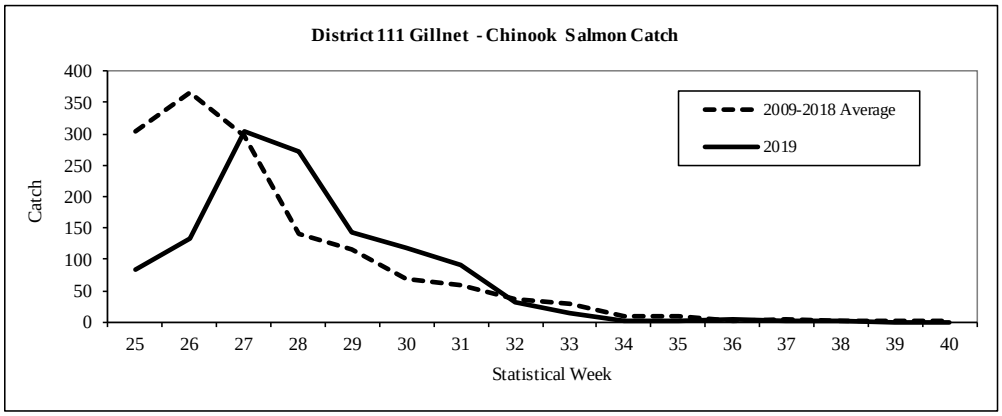

Figure 33. Chinook salmon harvest by week in the District 111 drift gillnet fishery, 2019.

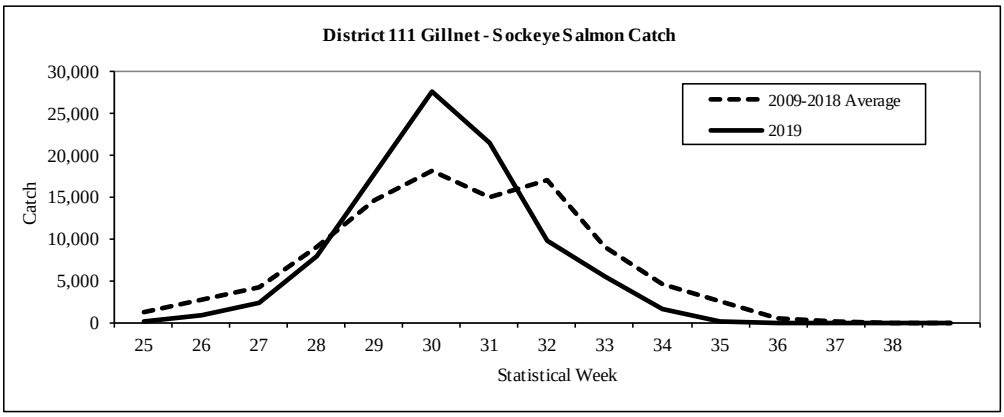

Figure 34. Sockeye salmon harvest by week in the District 111 drift gillnet fishery, 2019.

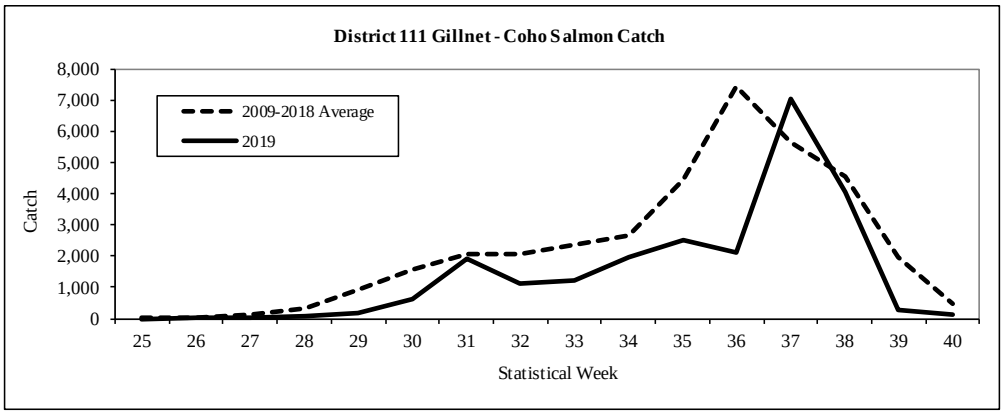

Figure 35. Coho salmon harvest by week in the District 111 drift gillnet fishery, 2019.

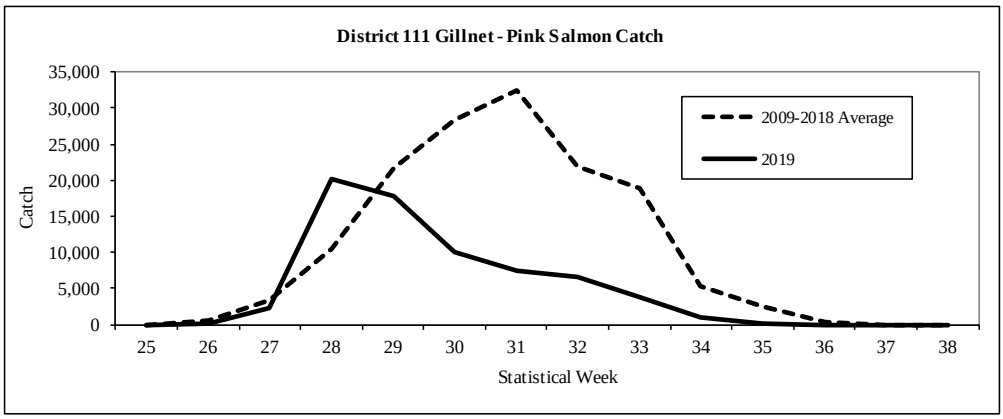

Figure 36. Pink salmon harvest by week in the District 111 drift gillnet fishery, 2019.

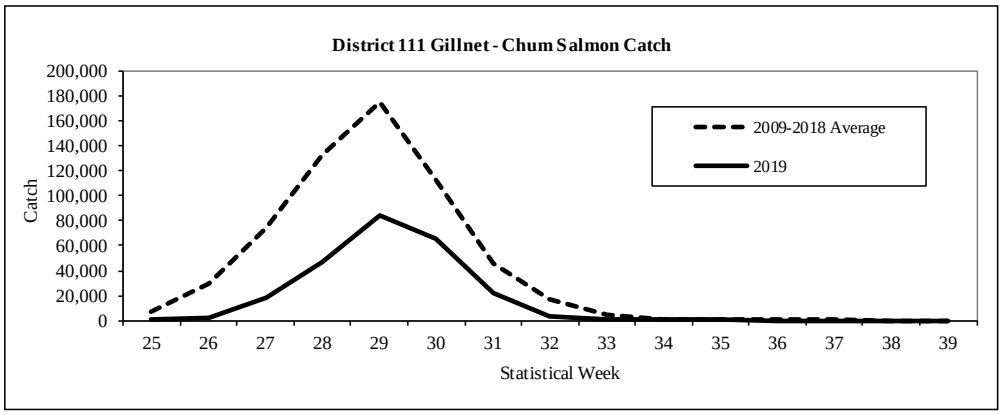

Figure 37. Chum salmon harvest by week in the District 111 drift gillnet fishery, 2019.

Transboundary River Joint Enhancement

The transport of sockeye salmon fry from the Snettisham Hatchery facility back to the Canadian lakes was complete on June 14, 2019. Approximately 6.32 million fry were released in Tahltan and Tatsamenie lakes in Canada. The overall green egg to fry survival for brood year (BY) 2018 releases was 79% (Table 9). After transporting BY18 fry back to their respective lakes, all TBR modules, incubators, and short-term fry rearing containers were broken down, cleaned, and disinfected prior to setting up to receive green eggs from BY19 egg-takes.

Brood year 2019 egg-takes began on August 31st at Tahltan Lake, September 4th at Trapper Lake, and September 17th at Tatsamenie Lake. An estimated total of 7.5 million green eggs were collected from the three donor lakes. Tahltan Lake egg-takes were completed on September 25th after collecting an estimated 4.5 million eggs in 10 egg lots. Tatsamenie Lake egg-takes were completed on October 12th after collecting 2.6 million eggs in 6 lots. Trapper Lake egg-takes were completed on September 6th after collecting 429,000 eggs in 2 lots. DFO contractors collected adult sockeye salmon tissues on the spawning grounds and shipped them to the ADF&G Juneau Fish Pathology laboratory via Snettisham Hatchery per the treaty agreement.

Table 9. Summary of numbers and survival rates of brood year 2018 sockeye salmon fry released May and June 2019. Fish were raised at Snettisham Hatchery as part of the Transboundary River Salmon Enhancement Project.

Brood stock	Release site	Number of trips	Survival rate to eyed stage	Survival rate to release	Number released
Tahltan	Tahltan Lk	4	93.8%	82.5%	1,858,000
Tatsamenie	Upper Tatsamenie Lk	3	81.3%	75.5%	1,389,600
Tatsamenie	Upper Tatsamenie Lk Lk, Extended Rearing	4	81.6%	79.9%	378,700
	Average/Totals	11	87.5%	79.4%	3,618,500

During the 2019 season, the ADF&G Thermal Mark Lab processed 10,652 sockeye salmon otoliths collected by ADF&G and DFO staff as part of the U.S./Canada fry-planting evaluation program. These collections came from commercial and test fisheries in both U.S. and Canadian waters on the Taku and Stikine Rivers over a 13-week period. The laboratory provided estimates on hatchery contributions for 58 distinct sample collections. Estimates of the percentage of hatchery fish contributed to commercial fishery catches were provided to ADF&G and DFO fishery managers 24 to 48 hours after samples arrived at the lab.

Alsek River Area Fisheries

Although harvest sharing arrangements of Alsek salmon stocks between Canada and the U.S. have not been specified, Annex IV of the Pacific Salmon Treaty calls for the development and implementation of cooperative abundance-based management plans and programs for Alsek River Chinook and sockeye salmon. Escapement goals are in place for Chinook and sockeye salmon stocks spawning at the Klukshu River, a tributary that flows into the Tatshenshini River, approximately 80 km northeast of its junction with the Alsek River. The principal escapement-monitoring tool for Chinook, sockeye, and coho salmon stocks on the Alsek River is the Klukshu River weir, operated by Fisheries and Oceans Canada in cooperation with the Champagne-Aishihik First Nation since 1976. In 2013, Canadian and U.S. biologists adopted a new biological escapement goal range of 7,500 to 11,000 sockeye salmon through the Klukshu River weir. The current biological escapement goal range for Klukshu River Chinook salmon, adopted in February 2013, is a range of 800 to 1,200 fish.

ADF&G manages the Alsek River commercial set gillnet fishery to achieve the agreed upon escapement goal ranges. Time and area openings are adjusted by monitoring fishery performance data and comparing it to historical CPUE. The duration of weekly fishing periods is based on fishery performance data (CPUE) and Klukshu River weir data. Historically, gillnets have often been restricted to a maximum mesh size of 6 inches through July 1 to minimize Chinook salmon

harvest. The U.S. commercial set gillnet sockeye salmon fishery was delayed two weeks in 2019 and a 6-inch maximum mesh restriction was in effect through July 18 as a Chinook salmon conservation measure.

Preseason expectations were for below average Chinook and sockeye salmon runs in 2019. The overall Alsek drainage sockeye salmon run was expected to be approximately 45,000 fish; which was near the recent 10-year average run size of approximately 46,700 sockeye salmon. The preseason outlook for 2019 was based on a predicted run of 10,400 Klukshu River sockeye salmon derived from a Klukshu River stock-recruitment model and an assumed Klukshu River contribution rate of 23% to the total run (based on mark-recapture results from 2000–2004 and run size estimates using GSI from 2005–2006 and 2011–2014). Principal contributing brood years for the 2019 run were 2014 and 2015. The Klukshu River escapements in 2014 and 2015 were 12,100 and 11,400 sockeye salmon respectively; both below the 10-year average of 14,700 fish.

The 2019 Alsek River set gillnet fishery opened Sunday June 16 (week 25). The total number of individual permits fished during the season was 12, which was below the 2009–2018 average of 16 permits. The commercial fishery was opened for a total of 40 days which was near the ten-year average of 46 days. The overall effort in boat-days was 58% of the average due to low or no effort in many weeks late in the season (Table 10). Harvests of Chinook salmon through late June were below the recent ten-year average (Table 10). Harvests of sockeye salmon were near average from weeks 26 to 29 and then dropped to well below average from week 30 on. The total harvest of 9,787 fish was 71% of the 2009–2018 average of 13,820 fish (Table 10). There was little effort after late July. In the past several years there has been reduced fishing effort during the coho salmon season due to economic struggles and lack of pilots to transport fish to town. In 2019, only 1 coho salmon was harvested (Table 10).

The Klukshu River weir count of 19,073 sockeye salmon was above the upper bound of the 7,500 to 11,000 fish escapement goal range. The count of 4,274 early run sockeye salmon (count through August 15) and the late run count of 14,799 were both above average. The Alsek River drainage estimate of 114,000 fish is above the escapement goal of 24,000 to 33,500 sockeye salmon. The Klukshu River weir count of 1,589 Chinook salmon was above the upper bound of the 800 to 1,200 fish escapement goal range. Alsek River drainage escapement estimate of 3,400 to 6,400 Chinook salmon encompasses the escapement goal range of 3,500 to 5,300 fish.

Table 10. Weekly fishing effort and salmon harvest for Alsek River, 2019.

Statistical Week	Start Date	Catch					Effort		
		Chinook	Sockeye	Coho	Pink	Chum	Boats	Days	Boat Days
25	16-Jun	26	509	0	0	0	11	1	11
26	23-Jun	36	2,108	0	0	0	11	1	16
27	30-Jun	10	1,613	0	0	0	9	2	18
28	7-Jul	5	2,739	1	0	0	10	2	20
29	14-Jul	2	2,422	0	0	0	8	2	16
30-32[a]	21-Jul	0	396	0	0	0	10	5	14
33-40[b]	11-Aug	0	0	0	0	0	0	27	0
Total		79	9,787	1	0	0	12	40	95
2009-2018 Avg.		406	13,820	829	0	6	16	46	165
2019 as % of Avg.		19%	71%	0%		0%	75%	87%	58%

[a] Includes weeks with fewer than three permits, confidential information so data combined in catch table.
[b] Weeks 33-40 opened to fishing but not fished.

SOUTHEAST ALASKA CHINOOK SALMON FISHERY

All Gear Harvest

The Southeast Alaska/Yakutat (SEAK) Chinook salmon fishery is managed to stay within the annual all-gear PST total allowable catch limit determined by the SEAK early winter District 113 Troll fishery catch-per-unit-effort (CPUE) metric estimated from data collected in statistical weeks 41–48. Management of the 2019 SEAK Chinook salmon fishery was configured based on a preseason winter power troll CPUE metric of 3.38 for the 2019 fishing season. This CPUE translated into an all-gear PST allowable catch limit of 140,323 Treaty Chinook salmon. Management plans established by the Alaska Board of Fisheries allocate the CPUE-based Treaty catch limit among gear types and prescribe management measures for both commercial and sport fisheries [5AAC 29.060(b) and 47.055].

During the 2018 Alaska Board of Fisheries meeting held in Sitka, action plans for Chilkat, King Salmon, and Unuk river stocks of Chinook salmon were adopted, giving the ADF&G direction, through emergency order authority, to conserve these stocks along with other wild SEAK and TBR stocks. Therefore, management actions were taken by all gear types in 2019 to lower calendar year exploitation rates and pass as many SEAK and TBR Chinook stocks to escapement as possible. The winter troll fishery closed early on March 15, spring troll fisheries were restricted to near terminal areas or areas on the outside coast, and in the summer troll fishery the primary corridors and waters directly adjacent to the terminus of the Unuk, Chilkat and Stikine rivers were closed to the retention of Chinook salmon in the troll fishery. Retention of Chinook salmon in the purse seine fishery was delayed until July 20. The purse seine fishery had three 15-hour and one 39-hour period of Chinook retention then went back to Chinook non-retention for the remainder of the season after August 1. Gillnet fisheries in districts 6 and 8 (near the mouth of the Stikine river) were delayed to the latter part of June. Gillnet fisheries in districts 11 and 15 (near the mouths of the Taku and Chilkat rivers) were subject to time and area restrictions through mid-July, with gear restrictions in place through early July. Openings in terminal harvest areas were delayed into June. Similarly, sport fisheries outside of terminal areas were delayed until mid-June or early July and were closed to non-residents during the first half of August.

The total Chinook salmon harvest by all SEAK commercial fisheries was 145,396 fish and the sport fish harvest was 29,700, for a total all-gear harvest of 175,096 (Table 11). This includes an all-gear harvest of 1,309 in the Annette Island Metlakatla Indian Community tribal fishery that is not directly managed by the State of Alaska. The all-gear harvest of Treaty Chinook salmon was 140,307 fish including 1,053 fish from the Metlakatla Indian Community tribal fishery (Table 12). The 2019 all-gear Treaty harvest of 140,307 was below the CPUE-based harvest limit of 140,323.

Table 11. Estimated all-gear Chinook salmon harvests in 2019**.**

Gear	Total Harvest	AK Hatchery Harvest	Wild Terminal Exclusion	Alaska Hatchery Addon	Treaty Harvest
Troll	109,364	8,841	211	6,087	103,067
Sport	29,700	6,600	0	5,104	24,596
Drift Gillnet	14,419	12,773	0	11,377	3,042
Purse Seine	21,367	12,506	0	12,011	9,356
Set Gillnet	246	0	0	0	246
Total Net	36,032	25,280	0	23,387	12,644
Total All Gear	***175,096***	***40,721***	***211***	***34,578***	***140,307***

Note: Annette Island Metlakatla Indian Community tribal harvest of 1,309 Chinook salmon are included of which 1,053 were Treaty fish. This includes a total tribal harvest of 736 troll, 385 drift gillnet, 188 purse seine fish of which 559 troll, 306 drift gillnet, and 188 purse seine Treaty fish.

Note: Terminal area harvests are included.

Table 12. Southeast Alaska Chinook salmon all-gear harvests (1987–2019) and deviation from the harvest ceiling limit (1987-1998), postseason allowable catch (1999-2008), and preseason catch limit (2009-2019). Harvests are in thousands.

Year	Total Harvest	Add-on and Exclusion Harvest	Treaty Harvest Limit[1]	Treaty Harvest	Deviation Number	Deviation Percent
1987	282.4	17.1	263.0	265.3	2.3	0.9%
1988	279.3	22.5	263.0	256.8	-6.2	-2.4%
1989	291.0	21.5	263.0	269.5	6.5	2.5%
1990	366.9	45.9	302.0	321.0	19.0	6.3%
1991	359.5	61.5	273.0	298.0	25.0	9.2%
1992	258.8	36.8	243.0	222.0	-21.0	-8.7%
1993	304.1	32.9	263.0	271.2	8.2	3.1%
1994	264.4	29.2	240.0	235.2	-4.8	-2.0%
1995	235.7	58.8		176.9		
1996	236.3	81.3		155.0		
1997	343.0	56.3		286.7		
1998	270.6	27.4	260.0	243.2	-16.8	-6.5%
1999	251.0	52.2	184.2	198.8	14.6	7.9%
2000	263.3	76.8	178.5	186.5	8.0	4.5%
2001	265.7	78.8	250.3	186.9	-63.4	-25.3%
2002	426.5	69.4	371.9	357.1	-14.8	-4.0%
2003	439.4	59.3	439.6	380.2	-59.4	-13.5%
2004	499.3	82.2	418.3	417.0	-1.3	-0.3%
2005	493.2	104.6	387.4	388.6	1.2	0.3%
2006	435.5	75.5	354.5	360.1	5.6	1.6%
2007	404.7	76.4	259.2	328.3	69.1	26.6%
2008	244.3	71.4	152.9	172.9	20.0	13.1%
2009	293.6	65.7	218.8	228.0	9.2	4.2%
2010	284.8	54.1	221.8	230.6	8.8	4.0%
2011	357.4	66.2	294.8	291.2	-3.6	-1.2%
2012	295.3	52.5	266.8	242.8	-24	-9.0%
2013	257.3	65.9	176.0	191.4	15.4	8.8%
2014	492.5	57.3	439.4	435.2	-4.2	-1.0%
2015	403.3	68.3	237.0	335.0	98	41.4%
2016	387.0	36.3	355.6	350.7	-4.9	-1.4%
2017	207.1	31.6	209.7	175.4	-34.3	-16.4%
2018	164.7	37.0	144.5	127.8	-16.7	-11.6%
2019[2]	175.1	34.8	140.3	140.3	0	0%

[1] 1999-2008 Treaty Harvest Limit determined by post-season PSC Chinook Model AI
2009-2018 Treaty Harvest Limit determined by pre-season PSC Chinook Model AI
2019-Present Treaty Harvest Limit determined by D113 Early Winter CPUE Model

[2] 2019 deviations are slightly less than 0.

Troll Fishery

The accounting of Treaty Chinook salmon harvested by trollers begins with the winter fishery and ends with the summer fishery. The winter troll fishery is managed for a guideline harvest level (GHL) of 45,000 non-Alaska hatchery-produced Chinook salmon, with a guideline harvest range of 43,000−47,000 non-Alaska hatchery-produced fish, plus the number of Alaska

hatchery-produced Chinook salmon harvested during the winter fishery. The 2018–2019 winter troll fishery was open from October 11, 2018 through March 15, 2019. To help reduce encounters of wild SEAK and TBR Chinook salmon, the winter season the fishery was closed from March 16 through April 30, prior to reaching the GHL. A total of 12,366 Chinook salmon were harvested. Of these, 1,647 (13%) were of Alaska hatchery origin, of which 1,087 counted toward the Alaska hatchery add-on, resulting in a Treaty harvest of 11,279 (Table 13).

The spring troll fisheries target Alaskan hatchery-produced Chinook salmon and are conducted along migration routes or close to hatchery release sites. Terminal area fisheries, which begin during the spring, occur directly in front of hatcheries or at remote release sites. While there is no ceiling on the number of Chinook salmon harvested in the spring fisheries, the take of Treaty Chinook salmon is limited according to the percentage of the Alaskan hatchery fish taken in the fishery. Non-Alaska hatchery fish are counted towards the annual Treaty catch limit of Chinook salmon, while most of the Alaska hatchery (add-on) fish are not.

In 2019, spring troll fisheries were conducted between May 1 and June 30. To help reduce encounters of wild SEAK and TBR Chinook salmon during May and June, spring troll fisheries located in known wild Chinook salmon migration corridors did not open. A total of 17 fisheries opened during spring in 2019, which is a 66% reduction from the recent 10-year average. The combined harvest for spring troll fisheries was 12,325 Chinook salmon, of which 5,398 (44%) were of Alaska hatchery origin and 3,814 counted toward the Alaska hatchery add-on, resulting in a Treaty harvest of 8,511.

The 2019 summer troll fishery included two Chinook salmon retention periods, from July 1–5 and August 13–14. Following the two traditional summer retention periods, an allocated non-competitive limited harvest fishery was conducted from September 1–10 during the second summer coho-directed fishery to harvest the remaining portion of the annual troll Treaty Chinook salmon allocation. Alaska regulations state that if the number of Chinook salmon remaining on the annual troll allocation, following the second traditional summer retention period, is insufficient to prosecute a competitive fishery, the troll fishery may reopen to the harvest of Chinook salmon in a limited harvest fishery. In 2019, a maximum of two Chinook salmon per permit could be retained over the 10-day limited harvest fishery period. A total of 83,721 Chinook salmon were harvested during summer, of which 1,528 (2%) were of Alaskan hatchery origin and 1,008 counted toward the Alaska hatchery add-on. The resulting Treaty Chinook salmon harvest was 82,713 fish.

The total harvest for all troll fisheries in the 2019 accounting year was 109,364 Chinook salmon, of which 103,067 were Treaty Chinook salmon. This includes a total harvest of 736 in the Annette Island Metlakatla Indian Community tribal troll fishery of which 559 were Treaty Chinook salmon.

Table 13. Troll fishery Chinook salmon harvest by season, 2019.

Gear/Fishery	Total Harvest	Alaska Hatchery Harvest	Alaska Hatchery Add-on	Terminal Exclusion Harvest	Total Term. Exclusion/ Alaska Hatchery Add-on	Treaty Harvest
Winter Troll	12,366	1,647	1,087	0	1,087	11,279
Spring Troll[a]	12,536	5,398	3,814	211	4,025	8,511
Summer Troll						
First Period[b]	58,347	1,050	693	0	693	57,654
Second Period	24,699	478	315	0	315	24,384
LHF[c]	675	0	0	0	0	675
Total Summer	83,726	1,528	1,008	0	1,008	82,718
Total Traditional Troll	108,628	8,573	5,909	211	6,120	102,508
Annette Is. Troll	736	268	177	0	177	559
Total Troll Harvest	**109,364**	**8,841**	**6,087**	**211**	**6,297**	**103,067**

[a] Spring troll harvest includes all terminal and Wild Terminal Exclusion harvests for year.
[b] Total summer harvest includes confiscated harvest for year.
[c] The limited harvest fishery (LHF) occurred during the second Chinook Non-Retention coho-directed fishery.

Net Fisheries

A total of 14,419 Chinook salmon were harvested in the drift gillnet fisheries in 2019, of which 12,773 (89%) were of Alaska hatchery origin and 11,377 counted toward the Alaska hatchery add-on, resulting in a Treaty harvest of 3,042 fish (Table 11). This includes a harvest of 385 in the Metlakatla Indian Community tribal drift gillnet fishery of which 306 were Treaty Chinook salmon. A total of 21,367 Chinook salmon were harvested in the purse seine fisheries, of which 12,506 (59%) were of Alaska hatchery origin and 12,011 counted toward the Alaska hatchery add-on, resulting in a Treaty harvest of 9,356 fish. This includes a harvest of 188 in the Metlakatla Indian Community tribal purse seine fishery; all 188 were Treaty Chinook salmon. A total of 246 Chinook salmon were harvested in the set gillnet fisheries, none of which were of Alaska hatchery origin, resulting in a Treaty harvest of 246 fish (Table 11).

With the exception of directed gillnet harvests of Chinook salmon in SEAK terminal area regulatory Districts 108 and 111, as provided in the Transboundary River chapter of the PST (Chapter 1), harvests of Chinook salmon in net fisheries are primarily incidental to the harvest of other species, and in 2019 only constituted a small fraction (<1.0%) of the total net harvest of all species.

Recreational Fisheries

The Southeast Alaska Chinook salmon sport fishery is managed under the directives of the *Southeast Alaska King Salmon Management Plan* (5 AAC 47.055). This plan prescribes management measures based upon the SEAK early winter troll CPUE metric and the harvest management plan adopted by the Alaska Board of Fisheries. In 2019, 25,844 Treaty Chinook salmon were allocated to the sport fishery. To avoid implementation of the payback provisions in

the new PST agreement which requires the payback of any overages to the Alaska all-gear catch limit the following year, the sport fishery was managed conservatively with a harvest target of 25,300 treaty Chinook salmon in 2019. As directed by the Southeast Alaska King Salmon Management Plan, if restrictions are necessary to keep the sport fishery within its harvest allocation, nonresident anglers will be restricted first, and the department shall only restrict resident anglers if nonresident angler restrictions are insufficient to keep the sport harvest within the sport harvest allocation.

The following regulations applied during the 2019 sport fishery as dictated by the *Southeast Alaska King Salmon Management Plan:*

Alaskan Resident

- The resident bag and possession limit was one Chinook salmon, 28 inches or greater in length.
- In those inside waters where the sport fishery for Chinook salmon was closed to retention during the spring and early summer (Juneau area, Petersburg/Wrangell area, Ketchikan area), when those waters reopen the resident bag and possession limit was two Chinook salmon 28 inches or greater in length through December 31, 2019.

Nonresident

- The nonresident bag and possession limit was one Chinook salmon, 28 inches or greater in length;
- From January 1 through June 30, a nonresident's annual catch limit was three Chinook salmon, 28 inches or greater in length;
- From July 1 through December 31, a nonresident's annual catch limit was one Chinook salmon, 28 inches or greater in length, and any Chinook salmon 28 inches or greater in length harvested by a nonresident from January 1 through June 30 applied toward the one fish annual catch limit;

The sport fishery was monitored closely throughout the season to ensure it stayed below the PST catch limit and the conservative harvest target. In mid-July, the sport fishery was projected to exceed the harvest target and PST allocation unless restrictive action was taken. Following directives of the Southeast Alaska King Salmon Management Plan, restrictions specific to nonresident anglers were announced in late July, which included a period of non-retention of Chinook salmon, August 1 – September 15th. As monitoring of the sport fishery continued, and harvest levels dropped due to Chinook salmon non-retention by nonresidents, updated PST harvest projections confirmed that a non-retention period could be rescinded August 16th for nonresident anglers while still ensuring the sport fishery stayed within its allocation. The 2019 sport fishery had an estimated total harvest of 29,700 Chinook salmon, of which 24,596 counted as PST or treaty harvest (Table 11).

SOUTHEAST ALASKA COHO SALMON FISHERIES

Attachment B of the June 30, 1999 U.S.-Canada Agreement relating to the Pacific Salmon Treaty specifies provisions for inseason conservation and information sharing for northern boundary coho salmon. In 2019, troll CPUE in Area 6 in the early weeks of the fishery averaged 16 coho/day, which was within the boundary area conservation trigger range of 15–22 coho/day. Accordingly, as provided for in paragraph 3 (section c), both parties agreed to a 10-day conservation closure, from July 28 through August 6. The mid-July projection of region-wide

total commercial harvest of 1.70 million was greater than the 1.1 million trigger for an early region-wide troll closure, specified in Alaska Board of Fisheries regulation and the PST conservation agreement.

The 2019 region-wide summer troll coho salmon fishery began by regulation on June 1, and with a 10-day seasonal fishery extension, continued in all waters of SEAK through September 30. All waters of SEAK were open to troll gear during the September 21–30 extension. The 2019 all-gear catch of coho salmon totaled 1.72 million fish, of which 1.54 million (89%) were taken in commercial fisheries (Table 14). The troll harvest of 975,000 coho salmon was 40% below the 10-year average of 1.58 million fish and accounted for 63% of the commercial catch. Power troll wild coho salmon CPUEs were below the 20-year average for the majority of the summer season. The overall wild stock abundance (wild troll catch divided by an index of the troll exploitation rate) was estimated at 4.12 million fish and was 3% above the 20-year average. With pink salmon abundance down throughout much of SEAK in 2019, purse seine opportunities were reduced. Consequently, the purse seine coho salmon harvest of 249,800 fish was 19% below the 10-year average, while the drift gillnet harvest of 210,500 fish was 42% below the 10-year average. The set gillnet harvest of 100,500 fish in the Yakutat area was 26% below the 10-year average, with 71% of the catch taken in the Situk-Ahrnklin Lagoon. A very preliminary estimate of the Southeast Alaska sport catch (185,400) is 29% below the 10-year average (261,400 fish).

Wild production accounted for 1.12 million fish (73%) in the commercial catch compared with a recent 10-year average of 1.83 million fish (77% wild). The hatchery percentage of the commercial catch was 27%. Of the estimated hatchery contribution of 410,800 fish, over 99% originated from facilities in Southeast Alaska, with facilities on or near the outer coast accounting for an estimated 65% of the return while inside hatchery returns contributed to the remaining 35%.

Preliminary all-fishery coho salmon exploitation rate estimates were low for all three wild indicator stocks, at 29% for Auke Creek, 22% for Berners River, and 54% for Hugh Smith Lake. The all-fishery exploitation rate for the Hugh Smith Lake stock was below the long-term average of 61%. Most of the reduction in the all-fishery exploitation rate was driven by decreases in the Alaska troll fleet. The Alaska troll fishery exploitation rate on the Hugh Smith Lake stock (23.4%) was below the 25-year (1994–2018) average of 30%. Alaska troll fishery exploitation rates on northern inside stocks were record lows, estimated at only 5.7% for Auke Creek and 6.7% for the Berners River compared with 25-year averages of 25% and 26%, respectively. While Alaska troll exploitation rates were below average, drift gillnet exploitation rates were within ranges of previously observed values. Compared with 25-year averages, Alaska drift gillnet fisheries accounted for an estimated 22% of the Auke Creek return (average 7%), 14% of the Berners River return (average 23%), and 11% of the Hugh Smith Lake return (average 13%).

Escapement counts and estimates were within or above goals for most coho salmon stocks. The total escapement of 1,239 adult coho salmon to Hugh Smith Lake was within the biological escapement goal of 500–1,600 spawners. Despite a 2018 smolt migration that was 59% above the long-term average, the estimated total run size of 2,678 adults was 32% below the 1983–2018 average. This disparity was likely caused by a marine survival rate (9.0%) that was slightly below the long-term average (12.2%). The Hugh Smith Lake marine survival of coho salmon is slightly higher than the recent five-year average (7.6%) and much higher than the record low of 2018 (2.7%).

Coho salmon escapements were within the respective goal ranges for three northern Southeast inside stocks (Chilkat River, Taku River, Auke Creek), above the goal for Berners River, and below the goal for Montana Creek. Survey estimates were not able to be collected on Peterson Creek due to high water condition and turbidity during peak abundance timing. The combined peak count of 7,916 coho salmon in the 14 surveyed streams in the Ketchikan area was slightly below the 1987–2017 average yet within the goal of 4,250–8,500 spawners. The combined peak count of spawners in five streams in the Sitka area (1,480 spawners) was approximately equal to the long-term average and exceed the escapement goal of 400–800 spawners.

Similar to Hugh Smith Lake, coho salmon marine survival for the northern inside stocks was above the five-year average yet still below the long-term average. Smolt-to-adult survival rates of 11.4% for the Berners River and 10.0% for Auke Creek represented a slight improvement over the five-year mean survival rates of 8.3% (Berners River) and 9.6% (Auke Creek). However, the marine survival estimates were far below historical averages of 15.0% for the Berners River (1990–2018) and 18.1% for Auke Creek (1980–2018). In 2019, the proportion of jack to adult coho salmon at Auke Creek (20%) was approximately the same as the long-term median (21%), indicating that marine survival will likely continue to improve compared to the recent poor conditions of 2016–2018.

Table 14. Coho salmon harvest in Southeast Alaska in 2019 by gear type (preliminary).

Gear Type	Harvest
Troll	975,000
Purse Seine	249,800
Drift Gillnet	211,000
Set Gillnet	100,500
Sport (marine and freshwater)	185,400
Total	1,721,700

II. PRELIMINARY 2019 CHINOOK AND COHO SALMON FISHERIES IN WASHINGTON AND OREGON

INTRODUCTION

This report describes the conduct of United States (U.S.) fisheries of interest to the Pacific Salmon Commission (PSC) that occurred during 2019 in the area north of Cape Falcon, Oregon and south of the U.S./Canada border. These fisheries were conducted under pre-season management plans that were consistent with Annex IV of the Pacific Salmon Treaty (PST 2019) including obligations defined within Chapter 3 for Chinook individual stock based management regimes (ISBM) and Chapter 5 for Southern Coho Management.

An overview of the Chinook (*Oncorhynchus tshawytscha*) and Coho (*Oncorhynchus kisutch*) salmon conservation challenges facing managers during the 2019 pre-season planning process in this region is provided in the following section. The conduct of major fisheries described, and estimates of landed catch, where available, are compared to pre-season catch limits or expectations for Chinook (Table 15) and Coho (Table 16). For perspective, landed catches for those fisheries since 2014 are also presented. Where available, preliminary estimates of the number of Chinook or Coho salmon released by anglers in 2019 mark-selective fisheries are also presented (Table 17). All estimates for the 2019 fisheries are preliminary and subject to change. Estimates of spawning escapements and abundance of Coho and Chinook stocks are not available at this time.

PRE-SEASON PLANNING

Pre-season planning for southern U.S. fisheries of interest to the PSC is a coordinated activity involving Tribal, State and Federal management entities, with the involvement of conservation and fishing interests. The Pacific Fishery Management Council (PFMC) conducted a series of public meetings to consider options for ocean fishery season structures while the Tribes and States conducted government-to-government and public, open meetings throughout the region to develop and analyze alternative season structures for fisheries in the inside waters of the Columbia River, coastal Washington and Puget Sound. Participants in these various planning sessions evaluated the biological and socio-economic consequences of the alternative season structures for the outside (ocean) and inside (marine and freshwater) fisheries (Figure 38) including the anticipated impacts on U.S. southern origin stocks in fisheries conducted under the PST in Canada and Southeast Alaska. Agreement was reached on season structures expected to achieve conservation goals, domestic fishery objectives and legal obligations, including the PST, assuming fisheries are conducted as planned and pre-season abundance estimates are accurate.

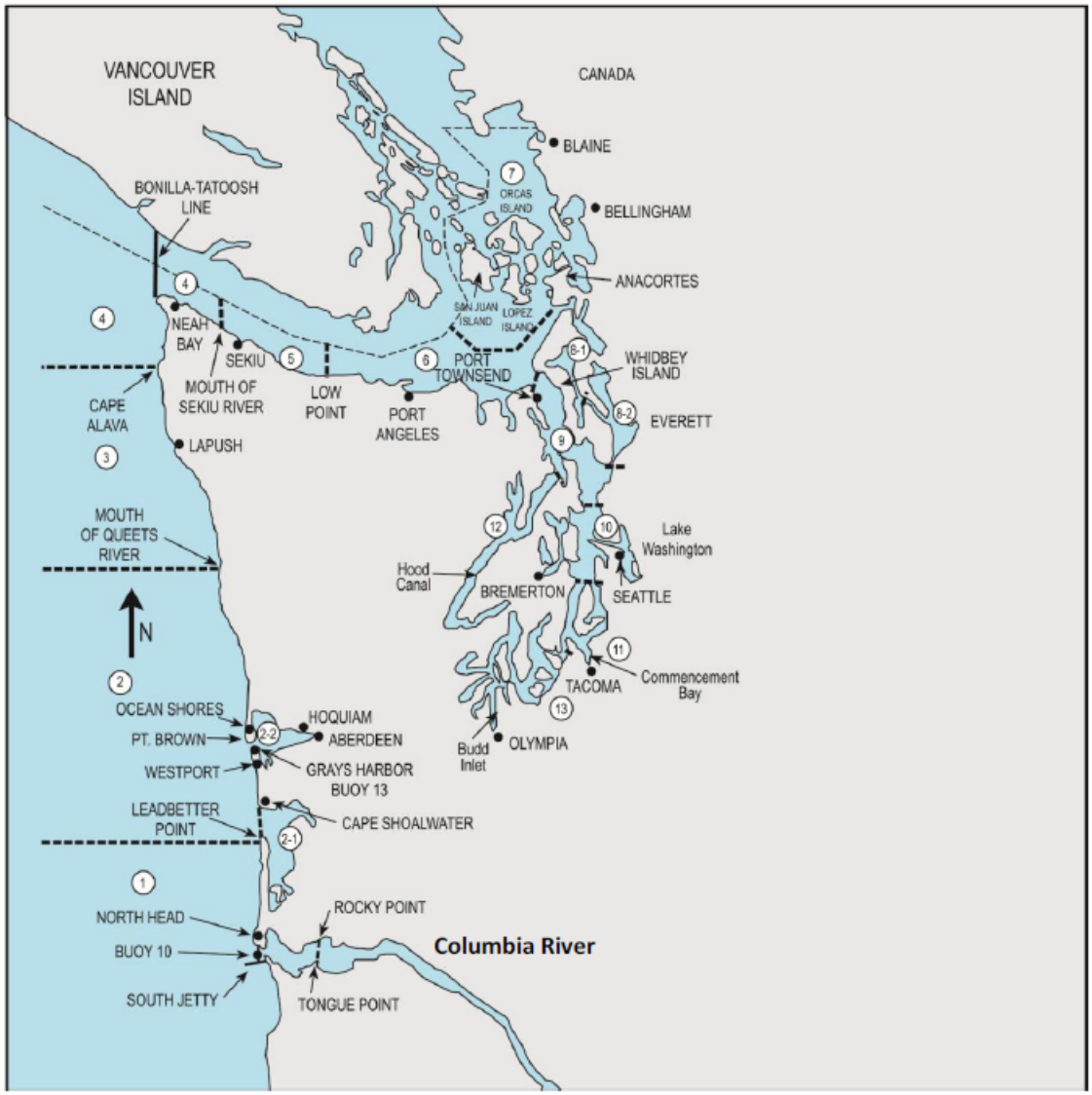

Figure 38. Map of Western Washington marine catch areas of the Washington coast (Areas 1 through 4) and Puget Sound (Areas 5 through 13) (WAC 220-22-030). Inside (Columbia River) fisheries reported in this document extend beyond the scope of this map.

Chinook Salmon Management

Under the 2019 Pacific Salmon Treaty Agreement, southern U.S. fisheries are subject to the Individual Stock Based Management provisions of Annex IV, Chapter 3. These provisions require that Southern U.S. fisheries on Chinook stocks shall be managed to limit the total adult equivalent mortality to the limits listed in Attachement I of Chapter 3.

Conservation obligations associated with the U.S. Endangered Species Act (ESA) for threatened and endangered Chinook salmon stocks originating from Puget Sound and the Columbia River have been more constraining to southern U.S. fisheries than PST obligations. Catch quotas for the 2019 U.S. ocean fisheries in the area north of Cape Falcon, Oregon, were defined by the impact limits on ESA-listed lower Columbia River natural tule fall Chinook stocks, ESA-listed Puget Sound Chinook stocks, and the abundance of other healthy, harvestable Chinook salmon stocks contributing to fisheries in this area. Puget Sound fishing seasons were structured to

provide fishing opportunity on healthy salmon species or stocks within the impact limits defined for ESA-listed Puget Sound Chinook.

Coho Salmon Management

During the pre-season fishery planning process of 2019, Canadian fishery managers informed the U.S. that the Interior Fraser management unit was again expected to be in the *low* categorical abundance status, and U.S. fisheries were constrained to ensure that the exploitation rate on this management unit did not exceed 10.0% as defined by the PST Southern Coho Management Plan. Of the U.S. natural spawning Coho management units (MUs) managed under the PST, the Strait of Juan de Fuca MU was forecasted to be in *low* abundance status. The Skagit, Snohomish, and Hood Canal Coho MUs were predicted to be in *moderate* status, while the Grays Harbor, Queets, Quillayute, Hoh, and Stillaguamish MUs were forecasted to be in *abundant* status.

The impacts of planned Southern U.S. fisheries on natural Coho stocks, seasons, and catch limits were predicted using the Fisheries Regulation Assessment Model (FRAM). The total exploitation rate on the Interior Fraser Coho management unit was predicted to be 9.1% in Southern U.S. fisheries. Seasons and Coho quota levels for U.S. ocean fisheries were closed or severely constrained by the management objectives of Washington coastal and Puget Sound natural Coho and ESA-listed lower Columbia River natural Coho. Limits to fisheries in marine areas within northern Puget Sound and the Strait of Juan de Fuca were likewise constrained by management objectives reflecting very low forecasted returns for some Puget Sound natural Coho stocks.

NORTH OF CAPE FALCON OCEAN FISHERIES

Details regarding North of Cape Falcon ocean salmon fishing plans were reported in Preseason Report III, published by the Pacific Fishery Management Council in April 2019. https://www.pcouncil.org/salmon/stock-assessment-and-fishery-evaluation-safe-documents/preseason-reports/

Fisheries in this area are managed to meet conservation objectives for ESA-listed stocks, natural stocks and brood stock goals for hatchery stocks. Within these stock management objectives, ocean fishing seasons are defined that meet legal requirements of Tribal treaties and allocations between Non-Tribal troll and sport fisheries. Ocean fishery seasons are also constructed to ensure a balance of opportunity for harvest with the inside fisheries. Lower Columbia River hatchery Coho and Columbia River fall Chinook have historically been the major stocks contributing to catches of ocean fisheries in the North of Cape Falcon area.

Chinook and Coho salmon catch quotas were established for the 2019 ocean Tribal, Non-Tribal troll and sport fisheries. Ocean fishery quotas for Chinook salmon were defined by exploitation rate limits on several ESA-listed Puget Sound Chinook stocks as well as the total exploitation rate limit of 38% on ESA-listed lower Columbia River natural tule fall Chinook stocks in all fisheries.

Non-Tribal Troll Fishery

Pre-season quota levels for the non-Tribal troll fisheries were 26,250 Chinook and 30,400 Coho with a clipped adipose fin, hereinafter referred to as marked. The preliminary estimate of non-Tribal harvest in the 2019 North of Falcon troll fishery is 24,200 Chinook (92% of the coast-

wide quota) and 5,500 Coho (18% of the coast-wide non-Tribal troll quota). Trollers harvested 7,000 Chinook in the May 1 – June 30 fishery, and the remaining 17,200 Chinook were harvested in the summer all-species fishery between July 1 and September 30. All Coho were harvested during the summer all-species fishery.

Tribal Troll Fishery

The Tribal troll ocean fishery (also known as the Treaty troll fishery) quotas were defined by conservation concerns for ESA-listed Lower Columbia River natural tule fall Chinook and ESA-listed Puget Sound Chinook. The coho quota was based on concerns for Puget Sound coho, Thompson River coho, and ESA-listed lower Columbia River natural coho.

The Treaty troll fishery was implemented in Ocean Areas 2, 3, 4 and 4B. The 2019 quotas were set at 35,000 Chinook and 55,000 coho. The Chinook quota was split into two sub-quotas—a 17,500 sub-quota during May-June and a 17,500 sub-quota during July-September. The 55,000 coho quota could be harvested during the July-September all-species fishery.

The May-June Chinook Tribal troll ocean catch (2,919 fish) was the lowest recorded in the past 10 years. The May-June fishery harvested 16.7% of the 17,500 Chinook sub-quota. Chinook landings were highest in June, which accounted for 71% of the Chinook landings during this time period. However the number of trips were fairly equal between May and June at 65 and 72 trips, respectively.

The all-species portion of the Tribal troll fishery ran from July 1 until September 15. The fishery harvested 88.1% of the 17,500 Chinook sub-quota and 100.9% of the 55,000 coho quota. Coho landings were highest in August accounting for 61% of the overall catch, followed by July and September at 26% and 13%, respectively. Similar to last year Chinook effort was highest in July, which accounted for approximately 80% of the Chinook landings during this time period. Chinook landings slowed in August (2,800 fish) and were minimal in September (299 fish). There were 761 landings during the all-species portion of the fishery.

Overall the Tribal troll fishery harvested 52.4% of the 35,000 Chinook quota and 100.9% of the 55,000 coho quota. The total ocean salmon harvest for the 2019 Tribal troll fishery was 18,332 Chinook and 55,476 coho.

Ocean Sport Fisheries

Pre-season quotas for the Washington coastal sport fishery (Ocean Areas 1 through 4) were 26,250 Chinook and 159,600 marked Coho. Preliminary total catch estimates for the ocean sport fisheries north of Cape Falcon were 10,800 Chinook (42% of the pre-season coast-wide quota) and 81,700 Coho (51% of the pre-season coast-wide sport quota). A description of the season structure and catches by management area follows.

Columbia Ocean Area (including Oregon)

All-species salmon sport fishing opened in Ocean Area 1 (Columbia Ocean Area) on June 22 with a pre-season quota of 79,800 marked Coho and a guideline of 7,150 Chinook. The fishery closed on its automatic closure date, September 30. The catch estimates for Area 1 were 4,000 Chinook (56% of the guideline) and 53,500 Coho (67% of the quota). The Chinook minimum size limit was 24 inches and the Coho minimum size limit was 16 inches with a sub-area closure in the Columbia Control Zone. A preliminary overall legal-sized Coho mark rate of 59% was

calculated from on-water data collection in this area.

Preliminary estimates of Coho encounters (retained and released) and mark rate in the Area 1 Coho mark-selective sport fishery, June 22 – September 30, 2019.			
Coho retained	Coho released	Total encounters	Mark %
53,500	28,700	81,200	59%

Westport, Washington

Ocean Area 2 (Westport, WA) opened for all-species salmon sport fishing on June 22 with a pre-season quota of 59,050 marked Coho and a guideline of 12,700 Chinook. The fishery closed on its automatic closure date, September 3. The catch estimates for Area 2 were 2,300 Chinook (18% of the guideline) and 20,200 Coho (34% of the quota). The Chinook minimum size limit was 24 inches and the Coho minimum size limit was 16 inches with a sub-area closure in the Grays Harbor Control Zone beginning August 12. A preliminary overall legal-sized Coho mark rate of 47% was calculated from on-water data collection in this area.

Preliminary estimates of Coho encounters (retained and released) and mark rate in the Area 2 Coho non-retention sport fishery, June 22 – September 30, 2019.			
Coho retained	Coho released	Total encounters	Mark %
20,200	24,300	44,500	47%

La Push, Washington

Ocean Area 3 (La Push, WA) opened for all-species salmon sport fishing on June 22 with a pre-season quota of 4,050 marked Coho and a guideline of 1,100 Chinook. The fishery closed on its automatic closure date, September 30, and a portion of the area reopened October 1 – 13 with additional quotas of 100 marked Coho and 100 Chinook. The catch estimates for Area 3 were 600 Chinook (50% of the overall guideline of 1,200) and 1,800 Coho (43% of the overall quota of 4,150). Of the total catch, 164 Chinook and 16 Coho were landed during the October limited-area fishery. The Chinook minimum size limit was 24 inches and the Coho minimum size limit was 16 inches. A preliminary overall legal-sized Coho mark rate of 41% was calculated from on-water data collection in this area.

Preliminary estimates of Coho encounters (retained and released) and mark rate in the Area 3 Coho non-retention sport fishery, June 22 – October 13, 2019.			
Coho retained	Coho released	Total encounters	Mark %
1,800	4,000	5,800	41%

Neah Bay, Washington

Ocean Area 4 (Neah Bay, WA) opened for all-species salmon sport fishing on June 22 with a pre-season quota of 16,600 marked Coho and a guideline of 5,200 Chinook. Effective July 14, Chinook retention was prohibited in the area after 75% of the area Chinook guideline had been landed; the Chinook remaining on the guideline were reserved for hooking mortality impacts associated with Coho-directed fishing through September. The fishery closed on its automatic closure date, September 30. The catch estimates for Area 4 were 3,900 Chinook (75% of the guideline) and 6,200 Coho (37% of the quota). The Chinook minimum size limit was 24 inches and the Coho minimum size limit was 16 inches. A preliminary overall legal-sized Coho mark rate of 37% was calculated from on-water data collection in this area.

Preliminary estimates of Coho encounters (retained and released), in the Area 4 Coho non-retention sport fishery, June 22 – September 30, 2019.			
Coho retained	Coho released	Total encounters	Mark %
6,200	16,900	23,100	37%

NORTH OF CAPE FALCON INSIDE FISHERIES

WASHINGTON COASTAL RIVER FISHERIES

North Washington Coastal Rivers

Net and sport fisheries directed at salmon in this region were implemented based upon pre-season, Tribal-State agreements and subject to in-season adjustments. Tribal net harvest includes non-selective catch from the Sooes, Quillayute, Hoh, Queets, and Quinault Rivers. The 2019 Tribal net fisheries in north coastal rivers harvested an estimated 11,100 Chinook salmon and 12,000 coho salmon through November 15, 2019.

Recreational fisheries conducted during 2019 in the Quillayute, Hoh and Queets River systems included mark-selective fisheries targeting hatchery Chinook and Coho in the Quillayute and Queets systems. The Hoh system had a hatchery chinook sport fishery in June but was non-selective when the fishery reopened from September 16 through November. Harvest or impact estimates for these fisheries are unavailable at this time.

Grays Harbor, Washington

Harvest numbers reported for Grays Harbor, Washington include catch from both the Humptulips and Chehalis Rivers through November 15, 2019. The non-selective Tribal net fisheries in Grays Harbor, and including fisheries in the Humptulips and Chehalis Rivers, harvested an estimated 2,400 Chinook salmon and 7,700 Coho salmon. The non-Tribal commercial fishery in the northern portion of Grays Harbor near the Humptulips River (Area 2C) was non-selective and harvested 43 Chinook and 19 Coho. There were 2 Chinook salmon (mark-selective) and 799 Coho harvested in the Non-Tribal commercial gillnet fishery in Areas 2A and 2D. Sport fisheries conducted in the Chehalis and Humptulips Rivers included mark-selective components for Chinook and Coho salmon. Harvest data for these fisheries are not available at this time.

COLUMBIA RIVER FISHERIES

Tribal and non-Tribal net and sport salmon fisheries were implemented in 2019 during the winter/spring (January – June 15), summer (June 16 – July) and fall (August – October) periods. All fisheries were constrained by impacts on ESA-listed stocks. Winter/spring fisheries were primarily constrained by impacts on ESA-listed upper Columbia River spring Chinook, Snake River spring/summer Chinook, and Cowlitz spring Chinook. Summer season fisheries were constrained by impacts to upper Columbia summer Chinook and ESA-listed sockeye. Fall fisheries were mainly constrained by impacts to ESA-listed Snake River fall Chinook and upriver summer steelhead. Additionally, careful in-season management to limit the fishery impacts on ESA-listed wild lower Columbia tule fall Chinook, and lower Columbia River Coho further constrained Columbia River fall fisheries during 2019.

Columbia River salmon fisheries are developed and regulated to meet conservation standards. Fisheries are managed to operate within the impact limits set for ESA-listed stocks, meet the objectives for healthy Columbia River natural stocks, and ensure broodstock needs are met for hatchery salmon. Mainstem Columbia River fisheries are also developed and managed to remain within the requirements of the 2018 – 2027 *US v. Oregon* Management Agreement (MA), which includes Tribal/Non-Tribal sharing agreements. All 2019 data are preliminary and subject to change; some fisheries are still ongoing at the time of this report. The following section includes harvest numbers from Columbia River fisheries that are considered to be of the interest to PSC; therefore, the data may not match other reports that include total harvest.

Winter-Spring Fisheries

Non-Tribal Net

The mainstem winter/spring commercial fishery operated under mark-selective fishery (MSF) regulations during 2002 - 2016. As a result of guidance from the Oregon and Washington Fish and Wildlife commissions, there were no winter/spring non-Tribal commercial salmon seasons in the mainstem Columbia River since 2016. Commercial fisheries during the winter/spring timeframe did occur in off-channel areas (Select Areas) in the Columbia River estuary but are not reported in this document.

Sport

Mainstem Columbia River mark-selective sport fisheries began in 2001. For 2019, the area below Bonneville Dam was open from January 1 – April 10, April 13-14, and April 20-21, and April 27-28for hatchery Chinook retention, and was closed downstream of the Lewis River beginning March 1. Catch estimates for this area totaled 1,677 hatchery adult spring Chinook kept and 480 non-adipose fin clipped Chinook released. From Bonneville Dam to the Washington-Oregon state line it was open March 1 – May 5 and May 11-12, there were 274 hatchery adult spring Chinook kept and 80 non-adipose fin clipped Chinook released. The Snake River fishery structure included two specific catch areas open on a days-per-week rotation as was open May 11-27. Catch in the Snake River fishery totaled 326 hatchery adult spring Chinook and 50 non-adipose fin clipped released. Fisheries also occurred in tributaries but are not reported in this document.

Preliminary estimated encounters of adult Spring Chinook in the 2019 Winter/Spring Columbia River mark-selective sport fishery.

System	Area	Chinook Kept	Chinook Released	Total Encounters	% Kept
Columbia River	Below BON (LCR)	1,677	480	2,157	78%
Columbia River	BON to WA-OR S/L	274	80	354	77%
Snake River	Washington Waters	326	50	376	87%

Tribal

Tribal mainstem winter/spring fisheries typically occur from January 1 through June 15. Tribal mainstem fisheries are not mark-selective. Tribal fisheries are primarily conducted in the mainstem Columbia River from Bonneville Dam upstream to McNary Dam (Zone 6). Some additional harvest occurs just downstream of Bonneville Dam in platform and hook-and-line fisheries. Spring season fisheries may include three fishery sectors, a ceremonial permit gillnet

fishery, a platform and hook and line fishery and a commercial gillnet fishery (during winter and periodically in the spring, after ceremonial needs have been met).

During 2019, the platform and hook-and-line fishery was open for subsistence fishing throughout most of the winter/spring period. Fisheries were temporarily closed for just 18 days to assess catches. Commercial sales did not occur in 2019 Tribal fisheries during the spring management period. Harvest estimates from the combined ceremonial and subsistence fisheries totaled approximately 4,688 upriver spring Chinook (includes harvest from below Bonneville Dam). Tribal harvest in tributaries is not included in this report.

Summer Fisheries

Non-Tribal Net

As a result of guidance from the Oregon and Washington Fish and Wildlife commissions in conjunction with a low run, non-Tribal commercial fisheries did not occur in the 2019 summer management timeframe. Commercial fisheries during the summer timeframe did occur in off-channel areas (Select Areas) in the Columbia River estuary but are not reported in this document.

Sport

Summer season recreational fisheries did not allow retention of any salmon from the Astoria-Megler Bridge near the mouth of the Columbia River upstream to Priest Rapids Dam with an estimated 530 summer Chinook released. The fishery above Priest Rapids Dam had a delayed opening of July 15 and was mark-selective, which are not reported in this document. In-river allocation agreements dictate that a substantial share of the non-treaty catch be provided for fisheries upstream of Priest Rapids Dam.

Tribal

Summer season Tribal fisheries occurred from June 16 through July 28. Tribal mainstem fisheries are not mark-selective. Tribal fisheries are primarily conducted in the mainstem Columbia River from Bonneville Dam upstream to McNary Dam (Zone 6). Some additional harvest occurs just downstream of Bonneville Dam in platform and hook-and-line fisheries. There was a brief period of permit gillnet fisheries followed by two weekly commercial gillnet fishing periods were conducted from June 24 – July 3. Platform and hook-and-line fisheries also occurred throughout the season, and fish were sold commercially or retained for subsistence use. Tribal fisheries within the mainstem harvested a total of 5,637 Upper Columbia summer Chinook.

Fall Fisheries

Non-Tribal Net

Fall season mainstem fisheries are typically categorized into early and late fall seasons. The early fall season generally encompasses the month of August and in some years, early September, whereas the late fall season generally begins in mid-September and may continue through October. Time, area, and gear restrictions were in place for fall season commercial gillnet fisheries. Fall gillnet fisheries are non-MSF. No seine fisheries occurred in 2019 due to ESA constraints. In 2019, the early fall season consisted of four fishing periods during

August 14-27 in commercial Zones 4-5 (Warrior Rock to Beacon Rock). The late fall season consisted of 1 fishing period during October 8-9 in the same area. Harvest estimates are estimated to include 8,148 Chinook and 220 Coho Salmon. Tangle net fisheries occurred with eleven fishing periods during September 30 – October 25 in commercial Zones 1-3 (mouth to Warrior Rock) and are MSF for Coho and non-MSF for Chinook. Harvest estimates are estimated to include 677 Chinook and 2,495 marked Coho Salmon (704 unmarked Coho Salmon were released). Commercial fisheries during the fall timeframe did occur in off-channel areas (Select Areas) in the Columbia River estuary but are not reported in this document.

Sport

Fall season recreational fisheries are mark-selective for Coho, and in recent years have included some mark-selective periods for Chinook in the Buoy 10 area and in the 69-mile stretch of the lower Columbia River from the Tongue Point line upstream to Warrior Rock, which is near the mouth of the Willamette River. There were no mark-selective periods for Chinook in the mainstem Columbia River during 2019.The Buoy 10 fishery opened August 1 and continued through December 31; Chinook retention was allowed August 1 through August 20. Additional regulations for the Buoy 10 fishery included minimum size limits for Chinook (24-inches) and Coho (16-inches), and in 2019, steelhead retention was prohibited August through September. Released Chinook typically consisted of fish that did not meet the minimum size requirement, fish released during non-retention periods, and any voluntary releases of legal-sized Chinook throughout the season.

Buoy 10 catches included 11,240 Chinook and 23,470 hatchery Coho Salmon kept. Released fish included 16,780 Chinook and 25,800 Coho Salmon.

The lower Columbia River (LCR) mainstem sport fishery from the Rocky Point – Tongue Point line upstream to Bonneville Dam opened August 1 through September 25 and October 18 – December 31. In the area from the Rocky Point – Tongue Point line upstream to the Lewis River, Chinook retention was open August 1-27, with Chinook retention closed beginning August 21 downstream of West Puget Island. Chinook retention was allowed August 1-September 5 from the Lewis River upstream to Bonneville Dam. The kept catch estimate for the LCR sport fishery was 7,165 adult Chinook; an additional 6,737 adult Chinook were released, and 1,046 hatchery Coho were kept (1,075 Coho were released). Steelhead retention was closed August through October.

The mainstem sport fishery from Bonneville Dam to the Highway 395 Bridge (near Pasco, Washington) was open August 1 – September 25 and October 18-31. Adult catch estimates for the Bonneville to McNary area totaled 3,351 fall Chinook and 729 Coho Salmon. Steelhead retention was closed August through December below the Dalles Dam, and September through December upstream. Additional fisheries occurred on the Columbia River in the Hanford Reach area (downstream of Priest Rapids Dam), in tributaries and in the Snake River, but are not reported in this document.

Adult Fall Chinook and Coho Salmon Handle in the 2019 Columbia River Fall Sport Fisheries					
System	Area	Chinook Kept	Chinook Released	Total Handle	% Kept
Columbia River	Buoy 10	11,240	16,780	28,020	40%
Columbia River	LCR Sport	7,165	6,737	13,902	52%
Columbia River	Bonneville-McNary	3,351	390	3,741	90%
System	Area	Coho Kept	Coho Released	Total Handle	% Kept
Columbia River	Buoy 10	23,470	25,800	49,270	48%
Columbia River	LCR Sport [1]	1,046	1,075	2,121	49%
Columbia River	Bonneville-McNary [2]	729	182	911	80%

Tribal

Fall season Tribal fisheries occur from August 1 through December 31. Tribal fisheries are not mark-selective. Tribal fisheries are primarily conducted in the mainstem Columbia River from Bonneville Dam upstream to McNary Dam (Zone 6). Some additional harvest occurs just downstream of Bonneville Dam in platform and hook-and-line fisheries. Platform and hook and line fisheries will remain open through December 31.

The Tribal commercial gillnet fishery consisted of a brief period of permit gillnet fishing followed by seven weekly fishing periods from August 21 through October 5. Preliminary harvest estimates for all fall season fisheries total 58,447 adult fall Chinook and 4,675 adult Coho; however, some additional fish may be landed in the ongoing platform fisheries. Harvest estimates reported herein include catch from Zone 6 tributary fisheries.

PUGET SOUND FISHERIES

Puget Sound marine fisheries of interest to the Pacific Salmon Commission were regulated to meet conservation and allocation objectives for Chinook, Coho, Chum, Pink, and Sockeye salmon stocks, per Tribal-State agreement. For Puget Sound Chinook listed under the ESA, fisheries were managed according to the Puget Sound Chinook Harvest Management Plan (PSIT and WDFW 2010). This management plan defines limits to total exploitation rates for natural stocks and was determined by the National Marine Fisheries Service (NMFS) to be consistent with requirements specified under the ESA 4(d) Rule.

Release requirements were applied to many sport and net fisheries for Chinook, Coho, and Chum salmon -- the latter to protect ESA-listed Hood Canal and Strait of Juan de Fuca summer Chum.

Puget Sound marine fisheries were constrained by the need to meet management objectives for ESA-listed Puget Sound Chinook and due to conservation concerns for some Puget Sound Coho stocks. The primary constraining Puget Sound Chinook stocks during 2019 pre-season planning included Mid-Hood Canal, Stillaguamish, and Nooksack Chinook. Strait of Juan de Fuca and Snohomish Coho were the primary Coho management units of concern for developing fisheries in the Strait of Juan de Fuca, San Juan Islands, and Puget Sound.

Strait of Juan de Fuca Sport

Marked Chinook retention was allowed for sport fishing in salmon management Area 5 from February 16, 2019 through April 30, 2019 and in Area 6 from February 1, 2019 through April 30, 2019. Sport fishing regulations allowed retention of marked Chinook and marked Coho from July 1 through August 15 in Areas 5 and 6, with marked Coho retention also permitted through September 30 in Area 5. Dungeness Bay was open for marked Coho retention during the month of October. Preliminary estimates of Chinook encounters and the legal-size mark rate in the Area 5 sport mark-selective fishery are presented in the following table.

Preliminary estimates of Chinook retained, released (legal and sub-legal size), and the legal-size mark rate in the Area 5 sport mark-selective fishery, July 1 – August 15, 2019.

Chinook retained	Chinook released	Total encounters	Mark % (legal size)
4,566	10,970	15,897	62.0%

A detailed report of this summer period sport fishery, including estimated catch, effort and other results of sampling and monitoring programs, will be available from the Washington Department of Fish and Wildlife in early 2019.

Strait of Juan de Fuca Tribal Troll (Area 4B, 5, and 6C)

During the winter Tribal troll fishery in Areas 4B, 5, and 6C (November 1, 2018 – April 15, 2019), 1,100 Chinook and zero Coho were caught. In the summer Tribal troll fishery in Areas 5 and 6C only (June 1 – September 30, 2019), 400 Chinook and 200 Coho were caught. The Tribal catch estimates from this area do not include catch from Area 4B during the May-September PFMC management period, which have been included in the North of Cape Falcon Tribal ocean troll summary.

Strait of Juan de Fuca Tribal Net

Preliminary estimates of the 2019 catch in the Strait of Juan de Fuca Tribal net fisheries (no non-Tribal net fisheries in the Strait of Juan de Fuca) are 0 Chinook and 200 Coho salmon.

San Juan Islands Net (Areas 6, 7, and 7A)

Preliminary estimates of the 2019 catch in the San Juan Island net fishery directed at Sockeye, Pink, or Chum salmon totaled 9 Chinook and 869 Coho salmon in the non-Tribal fishery. Tribal fishery landings from this area for all gear types totaled 3,600 Chinook and 1,500 Coho.

San Juan Islands (Area 7) Sport

Marked Chinook retention was allowed in the entire Area 7 during the winter/spring season from January 1, 2019 through April 15, 2019. Preliminary estimates of Chinook retained and released by anglers during this fishery were produced via an intensive sampling program and are presented in the table below. A detailed report of this fishery, including estimates of catch, effort and other results of sampling and monitoring programs, is available from the Washington Department of Fish and Wildlife.

Estimated Chinook retained, released (legal and sub-legal size) and the legal size mark rate in the Area 7 sport mark-selective fishery, January 1 through April 15, 2019.			
Chinook retained	Chinook released	Total encounters	Mark % (legal size)
3,776	5,120	8,894	73.6%

During the summer season in Area 7, recreational anglers were allowed to retain Chinook from July 1 through July 31. The southern Rosario Strait and eastern portions of Area 7 were closed from July 1 – September 30 to protect Puget Sound Chinook salmon. Additional sub-area closures are described in the 2019-20 Washington State Sport Fishing Rules Pamphlet. The table below presents estimated Chinook encounters (retained and released) and the legal-size mark rate in the Area 7 sport mark-selective fishery, from July 1-31, 2019.

Estimated Chinook retained, released (legal and sub-legal size) and the legal size mark rate in the Area 7 sport mark-selective fishery, July 1-31, 2019.			
Chinook retained	Chinook released	Total encounters	Mark % (legal size)
3,025	2,746	5,771	82%

Inside Puget Sound (Areas 8-13) Sport

Mark-selective sport fisheries (MSFs) targeting adipose fin-clipped (marked) hatchery Chinook were conducted in Area 8.1 (Deception Pass, Hope Island, and Skagit Bay), Area 8.2 (Port Susan & Port Gardner), Area 9 (Admiralty Inlet), Area 10 (Seattle-Bremerton), Area 11 (Tacoma-Vashon Island), Area 12 (Hood Canal), and Area 13 (South Puget Sound) during the winter (October 2018 – April 2019) period, and in Areas 9, 10, 11, 12, and 13 during the summer (May – September 2019) period. Additionally, marked and unmarked Chinook retention was permitted in the Tulalip Bay (Area 8-2) from June 1 through September 2 (Fridays through noon Mondays), and from September 7 through September 29 (Saturdays and Sundays), and in Elliot Bay (Area 10) from August 2 through noon August 5.

Puget Sound Chinook mark-selective sport fisheries conducted in marine areas during 2017-2019.	
Areas	Season
8.1 & 8.2	Winter: December 1, 2018 – April 11, 2019.
9	Winter: January 1, 2019 – April 15, 2019. Summer: July 25 – July 28, 2019; July 31 – August 4, 2019; August 6 – August 9, 2019.
10	Winter: January 1, 2019 – January 19, 2019. Summer: July 25 – August 17, 2019; Elliot Bay: August 2 – August 5 (noon); Sinclair Inlet: July 1 – September 30, 2019.
11	Winter: October 1, 2018 – April 30, 2019. Summer: July 1 – August 25, 2019.
12	Winter: October 1, 2018 – April 30, 2019. Summer: July 1 – September 30, 2019 (South of Ayock Point).
13	Year round: January 1 – December 31

Post-season reports detailing results of these Chinook MSFs, including estimates of retained and released encounters, effort and mark rates from sampling and monitoring programs, will be available from the Washington Department of Fish and Wildlife in the spring of 2019.

Mark-selective sport fisheries during 2019 directed at marked Coho were conducted in the following marine catch areas: Areas 5 and 6 from July 1 – September 30, Area 9 from July 16 – September 30 and in Area 13 from January 1 – December 31. Marked and unmarked Coho retention was permitted in Area 7 during the months of July and September, Area 8.1 from August 1 – October 31, 2019,Tulalip Bay from June 1 – September 2 (on Fridays through noon,

Mondays only) as well as from September 7 – September 29 (Saturdays, Sundays), in Area 11 from July 1 – September 30; and in Area 12 from January 1 – April 30, 2019 in the whole area, as well as from August 1 – December 31, 2019 in the areas North of Ayock Point and from July 1 – December 31, 2019in the area South of Ayock Point.

Puget Sound Marine Net (Areas 8-13 & 7B-D)

To achieve conservation objectives for natural Puget Sound Chinook, limited marine net fishing opportunities directed at returns of hatchery Chinook and both hatchery and natural Coho were planned for 2019. Chinook and Coho were also intercepted in fisheries directed at Pink and Chum salmon. A total of 62,300 Chinook and 45,400 Coho were landed in the Tribal marine net fisheries in Puget Sound (Areas 8-13 & 7B-D) during 2019. Non-Tribal net fishery landings from these areas totaled 12,100 Chinook and 10,900 Coho. Nearly all Chinook landed in the non-Tribal net fishery occurred during Chinook-directed fisheries in Areas 7B, 7C, and 12C.

Puget Sound Rivers Fisheries

Tribal net and non-Tribal sport fisheries were implemented in freshwater systems based upon pre-season, Tribal-State agreements and subject in part to in-season adjustment. Harvest of Chinook and Coho in the Tribal in-river net fisheries (includes catch from river systems in the Strait of Juan de Fuca, Hood Canal, and Puget Sound) totaled 37,500 Chinook and 41,500 Coho during 2019.

Also, recreational fisheries targeting Chinook salmon were conducted in nine Puget Sound Rivers that have PSC Chinook coded wire tag (CWT) exploitation rate indicator stocks or double index tag (DIT) groups, as listed in the table below. Of these, seven rivers had mark-selective fisheries and two rivers had non-selective fisheries, as follows:

Chinook mark-selective sport fisheries conducted in Puget Sound rivers during 2019.	
River	Season
Nooksack River	September 1 - 30
Cascade River	June 1 – July 15
Skagit River	May 1 – May 31 from the highway 536 bridge; June 1 – July 15
Skykomish River	June 1 – July 31
Carbon River	September 1 – November 30
Puyallup River	August 15 – December 31
Nisqually River	July 1 – November 15
Chinook non-selective sport fisheries conducted in Puget Sound rivers during 2019.	
River	Season
Samish River	August 1 – September 22
Green River	August 20 – November 12

During the 2019 season there were mark-selective sport fisheries targeting hatchery Coho in the rivers of Puget Sound that have PSC Coho CWT exploitation rate indicator stocks or DIT groups on the Wallace River (Skykomish tributary) October 17 through December. A mark selective fishery was open on the Dungeness October 16 through November 30. Recreational non-selective Coho fisheries were conducted on the Nooksack River, Skagit River, Skykomish River (September only), Snohomish River, Snoqualmie River, Cascade River, Green River, Carbon River, Puyallup River, Nisqually River, and Quilcene River.

REFERENCES

Pacific Salmon Treaty (PST) Act of 1985. 2008 Agreement. U.S.-Canada. Public Law 99-5, 16 U.S.C. 3631.

Puget Sound Indian Tribes and Washington Department of Fish & Wildlife (PSIT and WDFW). 2010. Comprehensive Management Plan for Puget Sound Chinook: Harvest Management Component. Northwest Indian Fisheries Commission, Olympia, Washington. 237 p.

Pacific Fishery Management Council (PFMC). 2008. Fishery Regulation Assessment Model (FRAM): An Overview for Coho and Chinook v3.0. Pacific Fishery Management Council, Portland, Oregon. 43 p.

Table 15. Preliminary 2019 Landed Chinook Catch for Washington and Oregon Fisheries of Interest to the Pacific Salmon Commission. Values are presented in number of fish rounded to the nearest 100. [9/]

	2019			Landed						
	Preseason [5/]									
Fisheries	Total Mortality [1/]	Landed [2/]	Preliminary Landed	2018	2017	2016	2015	2014	2013	2012
OCEAN FISHERIES										
Commercial Troll										
Neah Bay and La Push (areas 3,4,4B) [3/]	51,300	45,000	39,100	34,000	35,200	28,100	73,600	77,100	63,700	79,400
Columbia Ocean Area and Westport (area 1,2) [4/]	24,400	16,200	3,400	13,800	24,700	14,200	50,900	39,100	28,300	20,600
Sport (see text for quota information)										
Neah Bay (area 4)	6,200	5,500	3,900	3,000	7,300	3,300	8,500	5,900	6,200	5,600
La Push (area 3)	1,000	900	600	400	500	300	2,400	1,600	2,400	1,300
Westport (area 2)	14,200	12,700	2,300	4,900	6,600	8,400	19,100	23,500	13,700	19,500
Columbia Ocean Area (area 1)[13/]	9,200	7,100	4,000	2,200	7,600	6,000	12,200	11,300	8,500	9,100
INSIDE FISHERIES										
Sport [10/]										
Strait of Juan de Fuca (area 5,6)	20,300	11,100	-	16,700	9,810	15,000	11,800	11,100	14,900	13,900
San Juan Islands (area 7)	7,500	4,700	-	7,500	7,000	5,900	8,600	9,200	9,500	5,800
Puget Sound Marine (area 8-13)	29,100	17,200	-	34,400	21,600	16,700	9,000	12,100	16,600	22,000
Puget Sound Rivers [12/]	19,400	18,600	-	8,000	23,700	9,600	11,100	11,800	19,600	23,200
North WA Coastal Rivers	-	-	-	1,600	1,600	600	2,200	1,200	2,700	1,600
Grays Harbor [7/]	3,400	2,700	-	3,700	2,700	2,800	3,400	1,200	3,800	4,600
Columbia River (Spring) [6/]	-	-	2,000	9,100	9,100	14,100	23,100	21,400	8,400	17,000
Columbia River (Summer) [6/]	-	-	-	1,300	3,800	6,800	6,700	2,300	2,100	3,200
Columbia River (Fall) (incl. Buoy 10) [6/]	-	-	21,800	22,400	60,400	65,600	91,300	63,000	74,500	47,000
Commercial[11/]										

Strait of Juan de Fuca net and troll (area 4B,5,6C)	7,700	4,700	1,500	3,100	1,900	700	5,900	6,100	4,000	3,900
San Juan Islands (area 6,7, 7A)	8,500	8,400	3,600	3,900	2,600	100	4,800	6,900	3,800	400
Puget Sound Marine (8-13,7B-D)	45,800	45,000	62,300	70,600	90,600	55,800	33,100	28,400	70,100	75,700
Puget Sound Rivers[12/]	34,600	34,600	37,500	41,600	53,900	23,300	21,200	19,900	26,800	39,500
North WA Coastal Rivers	-	-	11,100	11,000	14,200	9,400	17,200	20,100	14,300	12,800
Grays Harbor (area 2A-2D) [7/]	1,800	1,600	2,400	2,700	3,700	2,100	10,500	5,100	2,900	4,000
Columbia River Net (Winter/Spring) [8/]	-	-	4,700	10,900	8,100	20,400	37,600	28,200	11,200	23,800
Columbia River Net (Summer) [8/]	-	-	5,600	9,500	16,300	23,400	41,700	22,200	15,300	9,500
Columbia River Net (Fall) [8/]	-	-	67,300	63,000	140,600	188,900	343,900	365,900	312,500	119,800

[1/] Estimates of total mortality (not adjusted for adult equivalents) include non-retention mortality. Total Mortality is estimated by Fishery Regulation Assessment Model (FRAM) as catch + incidental mortality, where incidental mortality = drop off + non-retention mortality (PFMC 2008).

[2/] For the ocean fisheries, this column shows the Chinook troll and recreational quotas used for 2018 pre-season fishery planning as distributed by ocean area (Landing Quotas = Landed). See text for any in-season adjustments.

[3/] Includes Area 4B catch during the PFMC management period (May 1 – September 15); Area 4B Treaty troll catch outside PFMC period included under Strait of Juan de Fuca net and troll (October-April).

[4/] Includes Oregon troll catch in Area 1.

[5/] FRAM modeled pre-season fishery impacts cover the current fishery planning year, for Chinook defined as May 1 through April 30.

[6/] Mainstem retained adult sport catch only (upstream to McNary Dam for spring, Priest Rapids Dam for summer and to Hwy 395 for fall). See tables 10, 22-23 in the current Joint Staff Report regarding spring and summer Chinook and tables 25-27 in the annual fall report.

[7/] Includes Grays Harbor catch, as well as catch from the Chehalis and Humptulips Rivers and their tributaries for sport and Chehalis and Humptulips Rivers for net estimates.

[8/] Mainstem retained catch only, includes tribal C&S and Commercial from all gear types and non-tribal (Columbia River mouth upstream to McNary Dam). Catch data from annual Joint Staff Reports. Winter and spring catch Tables 7 (Tribal) and T18 (non-Tribal). Summer catch is in Table10. Fall catch from annual fall report T21, 23 and 29. http://wdfw.wa.gov/fishing/crc/staff_reports.html.

[9/] Includes catch from mark-selective fisheries as shown in table 3.

[10/] Sport data for the most recent two years are preliminary. All data subject to change.

[11/] Includes non-tribal & tribal commercial, as well as tribal C&S for all gear types.

[12/] Chinook fisheries in Puget Sound Rivers are modeled using the Terminal Area Management Module (TAMM), based upon FRAM output of terminal run sizes. Total Mortality is estimated in TAMM as catch + non-retention mortality (PFMC 2008).

[13/] Includes Oregon sport catch in Area 1.

Table 16. Preliminary 2019 Landed Coho Catch for Washington and Oregon Fisheries of Interest to the Pacific Salmon Commission. Values are presented in number of fish rounded to the nearest 100. [6/]

	2019			Landed						
	Preseason [9/]									
Fisheries	Total Mortality [1/]	Landed [2/]	Preliminary Landed	2018	2017	2016	2015	2014	2013	2012
OCEAN FISHERIES										
Commercial Troll										
Neah Bay and La Push (area 3,4,4B) [3/]	67,800	61,700	55,100	11,900	13,300	-	4,100	60,100	48,500	38,600
Columbia Ocean Area and Westport (area 1,2) [10/]	31,500	23,700	5,900	1,300	1,800	-	4,800	19,000	5,400	2,800
Sport (see text for quota information)										
Neah Bay (area 4)	20,100	16,600	6,200	4,900	3,500	100	7,800	5,600	6,500	7,500
La Push (area 3)	4,900	4,200	1,800	1,000	1,750	-	600	4,600	2,800	2,200
Westport (area 2)	68,800	59,100	20,200	15,400	15,750	-	30,700	54,500	20,400	11,900
Columbia Ocean Area (area 1)[12/]	90,700	79,800	53,500	20,500	21,600	18,600	44,600	75,100	20,500	11,400
INSIDE FISHERIES										
Sport [7/]										
Strait of Juan de Fuca (area 5,6)	25,400	21,800	-	28,500	5,450	200	62,900	63,000	41,300	76,200
San Juan Islands (area 7)	1,100	1,100	-	4,800	100	100	3,700	2,000	2,600	2,200
Puget Sound Marine (area 8-13)	49,800	44,500	-	51,000	35,200	5,200	77,200	59,200	72,100	91,300
Puget Sound Rivers	25,900	24,600	-	18,300	9,000	11,300	18,600	17,900	70,000	43,500
North WA Coastal Rivers	6,000	5,800	-	2,000	4,900	1,600	3,600	8,800	7,200	2,700
Grays Harbor [5/]	14,900	14,200	-	4,000	9,200	3,700	8,200	27,300	21,200	18,300
Columbia River Buoy 10[4/,11/]	58,700	50,000	23,500	6,800	18,800	9,200	36,900	57,700	7,600	7,400
Commercial [8/]										
Strait of Juan de Fuca net and troll (area 4B,5,6C)	2,700	2,700	400	5,000	1,200	700	1,700	2,300	2,700	3,500
San Juan Islands (area 6,7,7A)	10,900	7,500	1,900	4,000	3,400	4,100	3,900	19,800	19,400	10,500

Puget Sound Marine (area 8-13,7B-D)	133,300	130,400	47,000	124,600	134,400	210,900	28,800	108,400	168,500	236,300
Puget Sound Rivers	74,700	73,200	41,500	114,600	63,200	65,400	17,800	73,400	136,000	132,400
North WA Coastal Rivers	47,300	46,300	12,000	22,000	63,500	57,800	18,400	101,400	44,800	39,700
Grays Harbor (area 2A-2D) [5/]	33,100	32,500	7,700	9,800	12,700	3,200	14,700	80,100	30,400	43,400

[1/] Estimates of total mortality include non-retention mortality. Total Mortality is estimated by Fishery Regulation Assessment Model (FRAM) as catch + incidental mortality, where incidental mortality = drop off + non-retention mortality (PFMC 2008).

[2/] For ocean fisheries this column shows the Coho troll and recreational quotas used for 2019 pre-season fishery planning as distributed by ocean area (Landing Quotas = Landed). See text for any in-season adjustments.

[3/] Includes area 4B catch during the PFMC management period (May 1 – September 15); area 4B Treaty troll catch outside the PFMC period included under Strait Juan de Fuca net and troll (October-April).

[4/] Retained catch only. See table 26 in the current Fall Joint Staff report available on line at http://wdfw.wa.gov/fishing/crc/staff_reports.html.

[5/] Includes Grays Harbor catch, as well as catch from the Chehalis and Humptulips Rivers; their tributaries are included in sport estimates only.

[6/] Includes catch from mark-selective fisheries where estimates are available.

[7/] Sport data for the most recent two years are preliminary. All data subject to change.

[8/] Includes Non-Tribal and Tribal commercial and take home, as well as Tribal ceremonial and subsistence (C&S) for all gear types. Starting in 2012, the Copalis, Moclips, and Ozette Rivers have been removed from landed catch.

[9/] FRAM modeled pre-season fishery impacts cover the current fishery planning year, for Coho defined as January 1 through December 31.

[10/] Includes Oregon troll catch in Area 1.

[11/] Sport data are preliminary. For Buoy 10, see tables 25 in the annual fall report.

[12/] Includes Oregon sport catch in Area 1.

Table 17. Mark-Selective Chinook and Coho Fisheries by Area and Year. "Yes" denotes that a mark selective fishery occurred, even if it only occurred in a subset of the fishing area, season, gear type, or user group.

Selective Coho	**2019**	**2018**	**2017**	**2016**	**2015**	**2014**	**2013**	**2012**	**2011**	**2010**	**2009**
Ocean Troll											
Cape Flattery & Quillayute (Areas 3/4)	yes	yes	yes	no	yes	yes	yes	yes	yes	yes	yes
Columbia R & Grays Harbor (Areas 1 & 2)	yes	yes	yes	no	yes	yes	yes	yes	yes	yes	yes
Ocean Sport											
Neah Bay (Area 4)	yes	yes	yes	no	yes	yes	yes	yes	yes	yes	yes
LaPush (Area 3)	yes	yes	yes	no	yes	yes	yes	yes	yes	yes	yes
Grays Harbor (Area 2)	yes	yes	yes	no	yes	yes	yes	yes	yes	yes	yes
Col. R. (Leadbetter Pt. to Cape Falcon)	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Inside Fisheries											
Sport											
Juan de Fuca (Areas 5 & 6)	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
San Juan Islands (7)	no	no	no	no	yes	yes	yes	yes	yes	yes	yes
Puget Sound Sport (Areas 8-13 all year)	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Puget Sound Rivers	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
North WA Coastal Rivers	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Grays Harbor (Areas 2-2)	yes	yes	yes	yes	yes	yes	yes	yes	no	yes	yes
Willapa Bay (Area 2-1)	no	no	yes	no	yes	no	no	no	no	yes	no
Columbia River Buoy 10	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Commercial											
North WA Coastal Rivers	no	no	no	no	no	no	no	no	no	no	no
Grays Harbor (Areas 2A-2D)	no	no	no	no	no	no	no	no	yes	yes	yes
Willapa Bay (Area 2-1)	no	no	no	no	no	no	no	no	no	yes	no
Columbia River Net/ - Fall	yes	no	no	no	yes	yes	yes	no	no	no	no
Strait of Juan de Fuca (Areas 4B/5/6C) Net & Troll	no	no	no	no	no	no	no	no	no	no	no
San Juan Islands (Areas 6, 7 & 7A)	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Puget Sound Marine (Areas 8 - 13)	no	no	no	yes	no	no	no	no	no	no	no
Puget Sound Rivers	no	no	no	no	no	no	no	no	no	no	no
Selective Chinook	**2019**	**2018**	**2017**	**2016**	**2015**	**2014**	**2013**	**2012**	**2011**	**2010**	**2009**
Ocean Troll											
Cape Flattery & Quillayute (Areas 3/4/4B)	no	no	no	no	no	no	no	no	no	no	no
Columbia. R & Grays Harbor (Areas 1&2)	no	no	no	no	no	no	no	no	no	no	no
Ocean Sport											
Neah Bay (Area 4)	no	no	no	no	yes	yes	yes	yes	yes	yes	no
La Push (Area 3)	no	no	no	no	yes	yes	yes	yes	yes	yes	no
Grays Harbor/Westport (Area 2)	no	no	no	yes	yes	yes	yes	yes	yes	yes	no

Col. R./Ilwaco (Leadbetter Pt. to Cape Falcon)	no	no	no	no	yes	yes	yes	yes	yes	yes	no
Inside Fisheries											
Sport											
Juan de Fuca (Area 5&6)	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
San Juan Islands (Area 7)	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Puget Sound Sport (Areas 8-13)	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Puget Sound Rivers	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
North WA Coastal Rivers	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Grays Harbor (Areas 2-2)	yes	yes	yes	yes	yes	yes	yes	yes	no	no	no
Columbia River Sport - Winter/Spring	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Columbia River Sport - Summer	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	no
Columbia River Sport - Fall	yes	no	yes	yes	yes	yes	yes	yes	no	no	no
Willapa Bay (Area 2-1)	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Commercial											
North WA Coastal Rivers	no	no	no	no	no	no	no	no	no	no	no
Grays Harbor (Areas 2A-2D)	yes	yes	yes	yes	yes	yes	yes	yes	no	no	no
Willapa Bay (Area 2-1)	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Columbia River Net-Winter/Spring	no	no	na	yes	yes	yes	yes	yes	yes	yes	yes
Columbia River Net - Summer	no	no	na	no	no	no	no	no	no	no	no
Columbia River Net - Fall	no	no	no	yes	yes	yes	yes	no	no	no	no
Strait of Juan de Fuca(4B/5/6C) Net & Troll	no	no	no	no	no	no	no	no	no	no	no
San Juan Islands (Areas 6, 7 & 7A)	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Puget Sound Marine (Areas 8 - 13)	no	no	no	no	yes	no	no	no	yes	yes	no
Puget Sound Rivers	yes	yes	yes	no	yes	yes	yes	yes	yes	no	no

III. PRELIMINARY REVIEW OF THE 2019 WASHINGTON CHUM SALMON FISHERIES OF INTEREST TO THE PACIFIC SALMON COMMISSION

This summary report provides a preliminary review of the 2019 U.S. Chum salmon (*Oncorhynchus keta*) fisheries conducted by Puget Sound salmon co-managers (Puget Sound Treaty fishing tribes and the State of Washington) in the Strait of Juan de Fuca (Salmon Management and Catch Reporting Areas 4B, 5 and 6C), the San Juan Islands and the Point Roberts area (Areas 7 and 7A) (Figure 39), conducted in compliance with provisions of Chapter 6 of Annex IV of the Pacific Salmon Treaty (PST 2019). The harvest and abundance information provided are based on preliminary data reported through November 18, 2019. These preliminary data are subject to correction and revision as additional information becomes available.

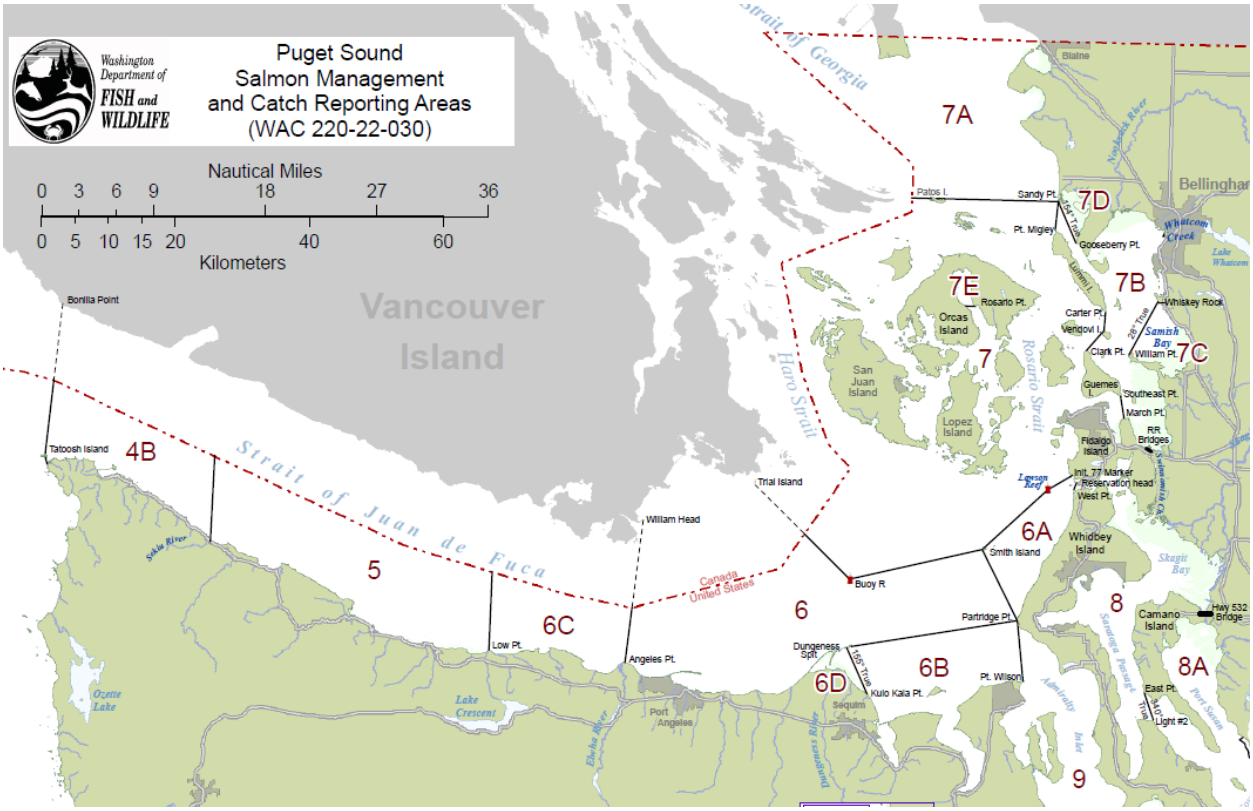

Figure 39. Puget Sound Salmon Management and Catch Reporting Areas with Chum salmon fisheries of interest to the Pacific Salmon Commission.

MIXED STOCK FISHERIES

Areas 4B, 5 and 6C

As in previous years, the 2019 Chum salmon fishery in Areas 4B, 5 and 6C was restricted to limited effort of Tribal fishers using gillnets. The fall Chum-directed salmon fishery opened the week of October 13, with a schedule of six days per week and continued through November 9. A total of 310 Chum salmon were harvested during this period (Table 18). During the fall Chum fisheries in Areas 4B, 5, and 6C, there was a reported by-catch of 6 Coho, 31 Chinook, and zero Steelhead.

Table 18. Preliminary 2019 Chum salmon harvest report for Washington Salmon Catch Reporting Areas 4B, 5, and 6C.

Areas 4B, 5, 6C	
Tribal Gill Net Only	
Time Periods	GN
Through 9/21	0
9/22-9/28	1
9/29-10/5	2
10/6-10/12	193
10/13-10/19	12
10/20-10/26	102
10/27-11/2	0
11/3-11/9	0
11/10-11/16	0
Total	310

Areas 7 and 7A

Chum salmon fisheries in Areas 7 and 7A are regulated to comply with a base harvest ceiling of 125,000 Chum salmon, unless Canada estimates chum stocks migrating through Johnstone Strait ("Inside Southern Chum salmon") are below the critical threshold of 1.0 million (PST 2019). Chapter 6 of Annex IV specifies that U.S. commercial fisheries for Chum salmon in Areas 7 and 7A will not occur prior to October 10. Paragraph 9 (a) specifies run sizes below 1.0 million as critical (estimated by Canada). For Inside Southern Chum run sizes below the critical threshold, Paragraph 10 (b) states the U.S. catch of Chum salmon in Areas 7 and 7A will be limited to those taken incidentally to other species and in other minor fisheries, and shall not exceed 20,000.

On October 7, 2019 Canada notified the U.S. that the Inside Southern Chum aggregate was estimated to be below the critical threshold of 1.0 million and the U.S. was expected to limit chum harvest to incidental and minor fisheries not exceeding 20,000. Following this notification, the U.S. cancelled Area 7 and 7A commercial chum fisheries that were scheduled to open on October 10. Additionally, beginning October 10, the U.S. required chum release from reef net fisheries targeting coho and scheduled the reef net fishery to close on October 16.

Paragraph 9 (d) states that Canada will provide an in-season estimate of Fraser River Chum salmon run size no later than October 22. If that estimate is below 1,050,000, then the U.S. will limit its fishery in Areas 7 and 7A to not exceed a catch of 20,000 additional Chum salmon from the day following notification. On October 16, 2019, Canada notified the U.S. that the Fraser River chum run size was estimated to be below the 1,050,000 fish threshold. Therefore, the U.S. was expected to limit chum harvest to not exceed 20,000 from the day following this notification. Areas 7 and 7A therefore remained closed to commercial chum fisheries through the remainder of the Chum management period.

Non-Tribal reef net fisheries targeting Coho salmon were conducted following the end of Fraser Panel control on September 17 with chum and unmarked coho retention prohibited prior to

October 1. Chum salmon by-catch in this fishery was 574. Following notification from Canada on the prohibition of chum salmon retention, reefnets were required to release chum from October 10 through the end of the fishery on October 16.

The total 2019 Chum salmon catch by all gears in Areas 6, 7, and 7A (reported through November 18) was just 612 fish (Table 19). Because no fall Chum salmon-directed fisheries occurred in Areas 6, 7, and 7A, there was no reported by-catch of Coho, Chinook, or zero Steelhead (Table 19).

Table 19. Preliminary 2019 Chum salmon harvest report for Washington Salmon Catch Reporting Areas 6, 7 and 7A.

	Area 6	Area 7				Area 7A			Area 6,7,7A
Time Periods	GN	PS	GN	RN	Area Total	PS	GN	Area Total	Total
Through 9/21		24			24	14		14	38
9/22-9/28					0			0	0
9/29-10/5				6	6			0	6
10/6-10/12				568	568			0	568
10/13-10/19					0			0	0
10/20-10/26					0			0	0
10/27-11/2					0			0	0
11/3-11/9					0			0	0
11/10-11/16					0			0	0
Total	0	24	0	574	598	14	0	14	612
Gear Type Abbreviations: GN=Gill Net; PS=Purse Seine; RN=Reef Net									
10/10- 11/18 By-catch	Coho: 0		Chinook: 0		Steelhead: 0				

PUGET SOUND TERMINAL AREA FISHERIES AND RUN STRENGTH

Pre-season forecasts for Chum salmon returns to Puget Sound in 2019 predicted a fall Chum run size totaling approximately 1,092,085 fish, with 518,645 Chum predicted to return to Hood Canal and 449,345 predicted to return to South Puget Sound. As of the date of this report, in-season estimates indicate that Chum returns to Puget Sound are generally well below forecast. In-season run size estimates from the 2019 fall Chum fisheries in Hood Canal and South Puget Sound indicate that South Sound fall Chum is roughly half of the pre-season forecast and Hood Canal is about two-thirds of that forecast. As of the date of this report, spawning escapement surveys are in progress for most Puget Sound stocks and therefore escapement estimates are not yet available. Early indications from these surveys suggest that a number of natural chum stocks may fail to meet their escapement goals again this year. It is also now evident that a number of fall Chum hatchery programs throughout Puget Sound will likely not achieve their egg-take objectives for 2019.

REFERENCES

Pacific Salmon Treaty (PST) Act of 1985. 2019 Agreement. U.S.-Canada. Public Law 99-5, 16 U.S.C. 3631.

IV. PRELIMINARY REVIEW OF 2019 UNITED STATES FRASER RIVER SOCKEYE FISHERIES

INTRODUCTION

The 2019 Fraser River Panel fishing season was implemented under Annex IV of the Pacific Salmon Treaty (PST 2014), and guidelines provided by the Pacific Salmon Commission to the Fraser River Panel. The treaty establishes a bilateral (U.S. and Canada) Fraser River Panel (Panel) that develops a pre-season management plan and approves in-season fisheries within Panel Area waters directed at sockeye and pink salmon bound for the Fraser River (Figure 40). In partial fulfillment of Article IV, paragraph 1 of the PST, this document provides a season review of the 2019 U.S. Fraser River salmon fisheries as authorized by the Panel. Catch and abundance information presented is considered preliminary.

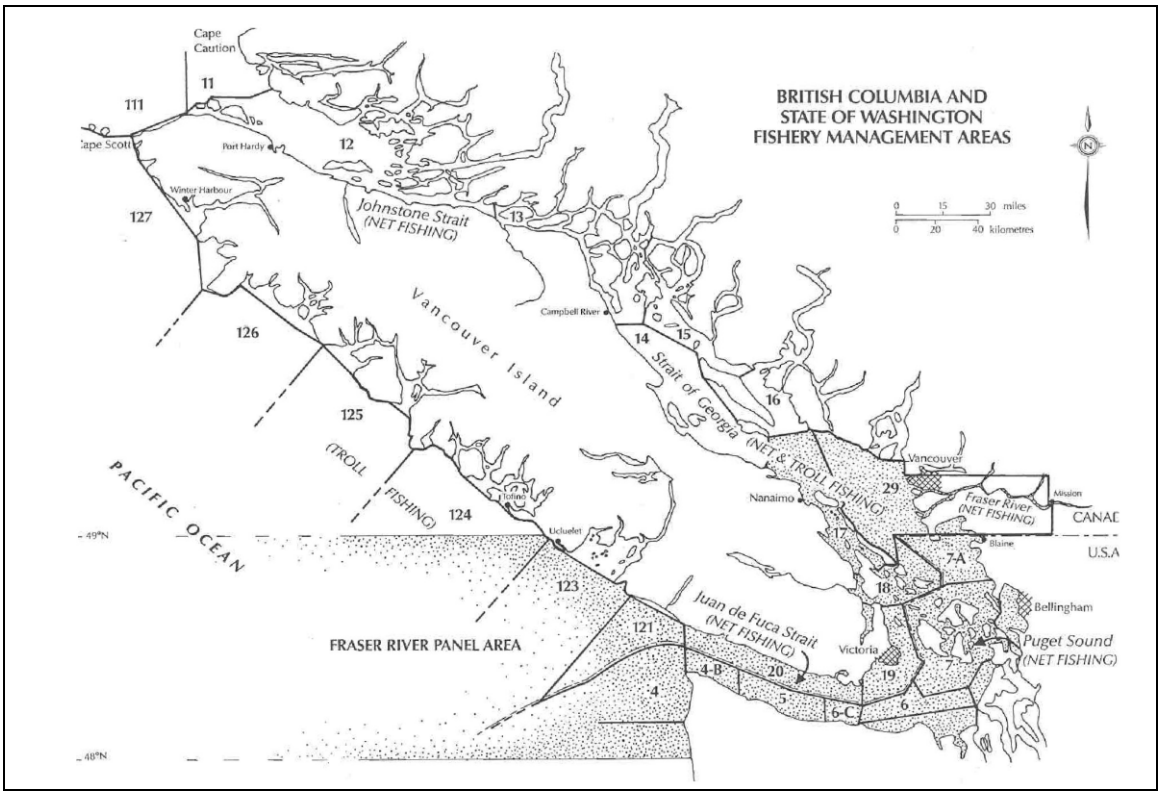

Figure 40. British Columbia and State of Washington Fishery Management Areas, 2019. The shaded area in the figure represents the marine waters managed by the Fraser River Panel.

PRE-SEASON EXPECTATIONS AND PLANS

Forecasts and Escapement Goals

Pre-season run size forecasts and escapement goals by run-timing group (run) at various probability levels were provided to the Panel by the Department of Fisheries and Oceans, Canada (DFO). Table 20 shows the 2019 pre-season sockeye forecasts based on the 50 percent probability level, which represent the mid-point of the range of forecast run sizes. Table 20 also provides the escapement goals for the sockeye run-timing groups based on the pre-season forecast of abundance. The escapement goals for all runs can change in-season as the run size estimates are updated.

Fraser River pink salmon returns were projected pre-season at 5,018,600 fish, with an escapement goal of 4,483,400.

Table 20. 2019 pre-season Fraser River sockeye forecasts and escapement goals by run-timing group.

	Early Stuart	**Early Summer**	**Summer**	**Late**	**Total**
Forecast of Abundance	41,000	465,000	3,930,000	359,000	4,795,000
Escapement Goal	41,000	186,000	1,572,000	336,600	2,135,600

Northern Diversion Rate

Northern diversion rate is defined as the percentage of Fraser sockeye migrating through Johnstone Strait (rather than the Strait of Juan de Fuca) in their approach to the Fraser River. The pre-season forecast for diversion was 69%, which is greater than the 1990-2017 median diversion of 63%. For pink salmon, a pre-season northern diversion rate of 50% was adopted.

Management Adjustment (MA) and Environmental Conditions

Management adjustments (MA) for sockeye salmon reflect the anticipated difference between escapement estimates at Mission (minus catch above Mission) and actual spawning escapements. Adjustments adopted by the Panel are added to the gross escapement goal, effectively increasing the spawner escapement goal for that run-timing group. MAs are modeled using forecasts of environmental conditions and return timing or median historical differences between estimates. Table 21 provides the pre-season projected MAs used for planning fisheries in 2019. In-season management adjustments use MA models that are based on both measured and forecasted temperatures and discharges or, for Late-run sockeye, upstream migration timing.

Table 21. 2019 pre-season proportional management adjustment (pMA) and corresponding proportional difference between estimates (pDBE[1]) for each run-timing group.

Early Stuart		Early Summer		Summer		Late	
pMA	pDBE	pMA	pDBE	pMA	pDBE	pMA	pDBE
0.69	-41%	0.45	-31%	0.09	-8%	0.56	-36%

[1] Early Stuart pDBE = "all years" historical median; Early Summer pDBE = "dominant/subdominant cycle" historical median; Summer pDBE = "all years" historical median; Late pDBE = weighted odd-year median for Lates excluding Birkenhead (-0.58) and all years Birkenhead (-0.27) using p50 forecast abundance.

Run Timing

Run timing is temporal information about the presence of a salmon stock in a specific time and area. Run timing is an important variable when planning fisheries and updating run sizes in-season. The following Area 20 50% dates (the dates when 50% of the run is forecast to have passed through Area 20) were predicted pre-season for the major Fraser River sockeye run groups.

Table 22. 2019 Area 20 median 50% run timing dates and updated pre-season timing forecasts in June.

Run-Timing Group	Area 20 50% Run-Timing Median Date	Area 20 50% Run Timing (June)[1]
Early Stuart	July 4	July 5
Early Summer	July 30	July 30
Summer	August 10	August 10
Late	August 18	August 18
Pink Salmon	August 28	August 28/25[2]

[1] DFO sockeye run-timing forecast used for Early Stuart and Chilko. All remaining components used the historical median run timing.

[2] The pink run-timing forecast from DFO was not available for the June meeting and pre-season modeling for pink salmon was based on the August 28 median.

U.S. Total Allowable Catch (TAC)

Following Annex IV of the PST, U.S. TAC is calculated as 16.5% of the TAC for international sharing for sockeye salmon and 25.7% for pink salmon. Pre-season, the U.S. TAC was established at 331,800 sockeye and 135,800 for pink salmon. The TAC available by sockeye run-timing group is shown in Table 23.

Table 23. 2019 U.S. total allowable catch (TAC) by run-timing group[1].

Run Timing Group	Pre-season U.S. TAC
Early Stuart	0
Early Summer	22,700
Summer	309,100
Late	0
Total	331,800
Pink Salmon	135,800

[1] Based on Panel-approved final pre-season model run.

Pre-season Management Plans

During the pre-season planning process the Panel evaluates and adopts management approaches for Fraser sockeye that address conservation and harvest objectives for each major run-timing group. The Panel develops fishing plans and in-season decision rules with the objective of meeting management goals. Managing Fraser River sockeye salmon involves a trade-off between catching abundant runs while meeting escapement objectives for less abundant run-timing groups.

In 2019, based on the pre-season forecast, only the Early Summer and Summer run-timing groups had U.S. TAC (Table 23) with the majority of TAC (~95%) in the Summer-run group which was expected to be dominated by the Chilko stock. The U.S. planned to begin fishing relatively early to avoid Late run sockeye which had no U.S. TAC. U.S. fisheries were planned to commence in late July in areas 4B/5/6C and in early August in areas 6/7/7A to target the Summer-run group while also harvesting co-migrating Early-Summer run sockeye and pink salmon.

IN-SEASON MANAGEMENT

In-season, the Pacific Salmon Commission staff analyzes a variety of information to produce best estimates of northern diversion, management adjustments, timing, abundance, and harvest by run-timing group. Stock identification information (both genetic data and scales), age data, test fishing data, escapement counts past Mission, harvest data, and environmental information are all used to provide in-season estimates that are critical to the Fraser Panel for making management decisions.

Run Assessment

The final in-season total sockeye abundance estimate adopted by the Fraser River Panel in 2019 was 500,000 (Table 24), which was about 10% of the pre-season forecast. This is the lowest sockeye return to the Fraser River since record keeping began. All run-timing groups returned below their pre-season forecast. The return of Summer-run sockeye, the group with the largest pre-season forecast, was only 9% of the pre-season forecast.

The 2019 Fraser sockeye run timing varied across run-timing groups. The Early Stuart run was three days later than the pre-season forecast, while the Early Summer run was one day early. Summer-run sockeye had the greatest discrepancy from expected pre-season forecast timing, arriving nine days later than expected, while Late-run sockeye returned one day late (Table 25). Fraser pink salmon were eleven days early relative to the pre-season median timing and eight days earlier than the in-season forecast provided by DFO.

Table 24. Comparison of 2019 pre-season to final adopted in-season abundance estimates for Fraser River sockeye salmon, by run-timing group.

Run Timing Group	Pre-Season 50% Probability Forecast	In-Season Run SizeEstimate[1]	Comparison: In-Season /Pre-Season
Early Stuart	41,000	26,000	63%
Early Summer	465,000	94,000	20%
Summer	3,930,000	360,000	9%
Late	359,000	20,000	6%
Total Sockeye	4,795,000	500,000	10%
Pink Salmon	5,018,600	8,900,000	173%

[1] As of September 24, 2019.

Table 25. Comparison of 2019 preliminary 50% run-timing dates through Area 20 to in-season estimates.

Run-Timing Group	Pre-season 50% Run- Timing Date	In-season 50% Run- Timing Date
Early Stuart	July 5	July 8
Early Summer	July 30	July 29
Summer	August 10	August 19
Late	August 18	August 19
Pink Salmon	August 28/August 25	August 17

Season Description

The Fraser Panel held 22 regular meetings either in-person or by conference call from July 9 through September 17 (usually on Tuesdays and Fridays) to receive updates from PSC staff on the abundance and timing of the sockeye and pink salmon returns and to review migration conditions in the Fraser River watershed. In 2019, a major landslide on the Fraser River at Big Bar (83 km north of Lillooet, B.C. by river) drastically altered flow conditions in-river limiting fish passage through the area. Water temperature and flow conditions however were not a major factor affecting management decisions in 2019 because of the extremely low number of sockeye returning. The last Fraser Panel in-season meeting was on September 17. Table 26 summarizes changes to run sizes made by the Fraser Panel during the 2019 season and the effect on U.S. TAC.

The following summarizes the major decisions related to U.S. fishing during the 2019 season. Prior to the first U.S. commercial fishery opening, the Panel reduced the adopted run sizes for all sockeye run-timing groups significantly and there was no U.S. TAC for sockeye after the August 13 Panel meeting. Therefore, all U.S. commercial fisheries in 2019 were pink-directed fisheries.

Week ending August 23, 2019

The first panel-approved U.S. commercial fishery opening was from August 21 to August 23 in areas 4B/5/6C and 7/7A for Treaty Indian fishers. The pink run size increased to 7,400,000 on August 23. The pink salmon northern diversion rate remained low at 4%.

Week ending August 30, 2019

The first All Citizens purse seine and gillnet fisheries were opened in areas 7/7A (excluding the apex) on August 24 and 25. The Treaty Indian fishery in areas 4B/5/6C was open from August 24-28. Treaty Indian and All Citizens reefnet fisheries were open in Area 7 on August 25 and 26. The Panel agreed to a provisional pink salmon run size of 5.0 million on August 27, reducing the U.S. TAC below the already landed catch. No further U.S. fisheries were planned. The pink salmon diversion rate increased to 59%. Purse seine test fisheries in areas 12 and 20 finished on August 30, therefore no additional marine CPUE or diversion rate estimates were available for the remainder of the 2019 season.

Week ending September 6

No changes were made to the sockeye or pink salmon run sizes and U.S. fisheries remained closed.

Week ending September 13

On September 12, the Panel approved run size updates for all sockeye run timing groups and the pink salmon run size increased to 8,900,000, which increased U.S. pink salmon TAC and allowed for additional fisheries. All Citizens gillnet and purse seine fisheries were open in Area 7 on September 13 and in Area 7A (excluding the apex) on September 13 and 14 with the September 14 fishery opening having reduced hours. All Citizens and Treaty Indian reefnet fisheries were open in Area 7 on September 13 and 14. Treaty Indian fisheries in areas 4B/5/6C were open from September 15-16. No additional U.S. fisheries were planned thereafter.

The Fraser Panel relinquished control of U.S. fishery areas as follows:

- Areas 4B/5/6/6C/7 on 11:59 p.m. September 17, 2019,
- Area 7A (excluding the apex) on 11:59 p.m. September 21, 2019, and
- Area 7A (apex area) on 11:59 p.m. October 5, 2019.

Table 26. Summary of changes to Fraser River sockeye and pink salmon run sizes adopted by the Fraser Panel during the 2019 season and U.S. TAC.

Meeting Date	Run-Timing Group	Change Made	U.S. TAC	
			Sockeye	Pink
Pre-season			331,800	135,800
July 19, 2019	Early Stuart	decreased to 27,000	331,800	135,800
August 2, 2019	Early Summer	decreased to 221,000	308,900	135,800
August 9, 2019	Early Summer	decreased to 112,000	312,800[1]	135,800
August 13, 2019	Summer	Decreased to 1,065,000	0	136,200
August 16, 2019	Early Summer Summer Late	Decreased to 85,000 Decreased to 224,000 Decreased to 111,000	0	136,200
August 20, 2019	Early Summer Summer	Increased to 90,000 Increased to 400,000	0	131,600
August 23, 2019	Late Pink	Decreased to 40,000 Increased to 7,400,000	0	353,800
August 30, 2019	Pink	Decreased to 5,000,000	0	130,500
September 12, 2019	Early Stuart Early Summer Summer Late Pink	Decreased to 26,000 Increased to 94,000 Decreased to 360,000 Decreased to 20,000 Increased to 8,900,000	0	739,300

[1] Despite the Early-summer run size decreasing, the TAC increased due to revised test fishing deductions.

Harvest

Based on the pre-season forecasts, U.S. harvest opportunities in 2019 was anticipated to be good for sockeye given the "sub-dominant" cycle return with ~ 332,000 sockeye available for U.S. harvest. However, pink salmon harvest was expected to be modest with only ~136,000 U.S. TAC. From the beginning of in-season assessments, sockeye failed to meet pre-season expectations. On August 13th, the Summer run size was downgraded from 3,930,000 to 1,065,000 which eliminated all U.S. sockeye TAC. Pink-directed Treaty Indian fisheries which started on August 21, requested fishers to make all efforts to release sockeye alive, and All Citizens fisheries required sockeye release. In those fisheries 470 sockeye were harvested by Treaty Indian fishers and landed for C&S purposes (Table 27). Thereafter, sockeye were required to be released from pink-directed Treaty Indian fisheries due to the extremely low in-season abundance of sockeye. The pink salmon run size varied throughout the season and eventually increased to 8,900,000 on September 12, 2019. However, despite additional All Citizens and Treaty Indian fisheries following this run size increase, most of the returning pink salmon had passed through U.S. waters. A total of 232,904 Fraser pink salmon were harvested in U.S. fisheries in 2019 (Table 28). Of this, 159,380 pink salmon were harvested in the Treaty Indian fishery (68%) and 73,524 in the All Citizens fishery (32%). Treaty Indian commercial fisheries were open for 10 days in areas 4B/5/6C and 4 days in 7/7A. All Citizens fisheries were open for 4 days for each gear type.

Table 27. Preliminary summary of 2019 U.S. catches of Fraser River sockeye salmon in Panel area waters.

	Treaty Indian	All Citizens
Ceremonial and Subsistence (all areas)	470	0
Commercial Catch in Areas 4B/5/6C	0	0
Commercial Catch in Areas 6/7/7A	0	0
Total Catch	470	0
% of U.S. Catch	100%	0%

Table 28. Preliminary summary of 2019 U.S. catches of Fraser River pink salmon in Panel area waters.

	Treaty Indian	All Citizens
Ceremonial and Subsistence (all areas)	0	0
Commercial Catch in Areas 4B/5/6C	0	0
Commercial Catch in Areas 6/7/7A	159,380	73,524
Total Catch	159,380	73,524
% of U.S. Catch	68%	32%

The 2019 Fraser sockeye and pink salmon season presented many management challenges:

- The sockeye salmon return was only 10% of the pre-season forecast and the lowest on record (<500,000 fish).
- The run timing for the Summer run (August 19) was the second latest recorded and affected the scheduling of pink-directed fisheries in order to reduce sockeye impacts.
- The run timing for the pink salmon run (August 19) was the earliest recorded which also affected the scheduling of pink-directed fisheries in order to reduce sockeye impacts.
- The migration time of pink salmon from Area 20 to the Fraser River appears to have been the longest ever observed at > 20 days.

POST-SEASON REPORT FOR THE 2019 CANADIAN TREATY LIMIT FISHERIES

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I INTRODUCTION

The chapters in Annex IV of the Pacific Salmon Treaty outline the joint conservation and harvest sharing arrangements between Canada and the United States of America (U.S.) for key stocks and fisheries subject to the Treaty. In August 2018, the PSC recommended new provisions, under Annex IV of the PST, to the Governments of Canada and the U.S. for review and ratification. Both governments agreed to the provisional application of the new agreements as of January 1, 2019 while the ratification process was completed. Effective May 3, 2019, the Annex IV amendments came fully into force through the exchange of diplomatic notes between Canada and the U.S., and will remain in place for 10 years. Chapter 4 (Fraser River Sockeye and Pink) expired on December 31, 2019. In February 2019, agreement-in-principle was reached and the proposed amendments were referred to the Governments of Canada and the U.S. for review and ratification. Both governments agreed to the provisional application of the amendments as of January 1, 2020 while the ratification process is completed. The new amendments are expected to come into force in Spring 2020 and will remain in place for 9 years, bringing Chapter 4 into alignment with the five other fishing Chapters under the PST.

Annex fisheries are reported in the order of the Chapters of Annex IV. Comments begin with expectations and management objectives, escapements (where available and appropriate) and catch results by species. The expectations, management objectives, catches and escapements focus on those stocks and fisheries covered by the Pacific Salmon Treaty.

Annually, DFO releases a Salmon Outlook document which is referenced in various sections of this report; this document provides a categorical indication of salmon production (using a 4 point rating scale), and associated fishing opportunities by geographic area and species stock groups called an Outlook Unit for the coming season. Pre-season quantitative forecasts are documented where they are produced.

The catch information reported in this document provides the best information available to September 30, 2019. The catches are based on in-season estimates (hailed statistics); on-grounds counts by DFO, logbooks, dockside tallies, landing slips (First Nation fisheries), fish slip data (commercial troll and net), creel surveys and observers (recreational and commercial). Appendix 1 summarizes 2003-2019 catches in Canadian fisheries that have at some time been under limits imposed by the Pacific Salmon Treaty. All Southern commercial, recreational, First Nations, Excess Salmon to Spawning Requirements (ESSR) and test fisheries are reported in appendices at the end of this report.

2 TRANSBOUNDARY RIVERS

2.1 STIKINE RIVER

Following the 2019 pre-season meeting of the Transboundary Panel, Canada developed its fishing strategy for Stikine River salmon fisheries based on the catch sharing and management arrangements outlined in Annex IV, Chapter 1 of the Pacific salmon Treaty (PST). The 2019 Canadian Stikine River salmon fishery management approach was designed to achieve the spawning escapement targets and the following harvest objectives: 1) to harvest 47% of the total allowable catch (TAC) of Stikine River Sockeye Salmon in existing fisheries; 2) to allow additional harvesting opportunities for Sockeye that were surplus to spawning requirements; and 3) to harvest up to 5,000 Coho Salmon through a directed fishery. A pre-season forecast of 8,300 Chinook was below the PST threshold run size of 24,500 which did not allow for a directed Chinook fishery in 2019. The low forecast abundance of Chinook salmon also resulted in the cancellation of the 2019 Chinook assessment fishery.

The 2019 Canadian Stikine River commercial fishing season opened on June 25 (statistical week 26) and ended September 7 (statistical week 36). From statistical weeks 26 through 29 a directed Sockeye fishery was followed by a directed Coho fishery which began in statistical week 35 and ended in statistical week 36. No commercial harvest opportunity was provided during statistical weeks 30 through 34 due to low abundance of non-Tahltan Lake origin Sockeye Salmon.

Commercial fishing gear permitted for the 2019 season was limited to one 135-metre (443 ft.) gill net per licence holder. The maximum mesh size permitted was 140 mm (5.5”) through July 20, followed by a maximum mesh size of 204 mm (8”). The lower Stikine commercial fishing zone covered the area from the international (U.S./Canada) border upstream to near the confluence of the Porcupine and Stikine Rivers, and also included the lower 10 km (6 mi.) reach of the Iskut River.

In the upper Stikine River commercial fishery, located upstream from the Chutine River, fishing periods generally mirrored those in the lower Stikine River commercial fishery, but lagged by one week. Each commercial fishery licence holder was permitted the use of one net. As in past years, the commercial fishing area was located upstream of the Chutine River to the mouth of the Tuya River. The Canadian First Nation Food, Social, and Ceremonial (FSC) fishery located near the community of Telegraph Creek, British Columbia (BC) was active from June to the first week of August, with no time or gear restrictions imposed in 2019. To facilitate Chinook salmon conservation, efforts were implemented within the First Nation FSC to minimize Chinook salmon catch.

Canadian recreational fishery effort was effectively absent in 2019 due to area, retention, and size restrictions for the duration of the Chinook salmon season. Opportunities were provided for Coho salmon but effort is generally low during the late summer and fall in the recreational fishery.

2.1.1 CHINOOK SALMON

The pre-season forecast of 8,300 large (i.e. fish with a mid-eye to fork length of > 660mm (~26”) or a fork length of > 735mm (~29”)) Chinook Salmon, as developed by the Canada/U.S. Transboundary Technical Committee (TTC), (TTC)did not result in a total allowable catch allocation that could accommodate directed fisheries. The current, bilaterally recognized fishery management strategy, specifies that a pre-season forecast

run size of < 24,500 precludes either Canada or the U.S. from prosecuting a directed fishery. Specific management provisions were implemented within all Canadian fisheries to minimize the likelihood of interception of Chinook salmon in 2019.

The 2019 total Canadian fishery catch of Chinook salmon was 333 large Chinook salmon and 237 jacks (which occurred exclusively within the First Nation FSC fishery). This was well below the 10-year average of 2,300 large Chinook salmon and 1,000 jacks. No Chinook Salmon were harvested within the 2019 recreational or commercial fisheries as retention was prohibited.

The post-season estimate of the 2019 Stikine River Chinook Salmon terminal run was approximately 14,300 large Chinook salmon. Accounting for the total Canadian catch of Chinook Salmon, the total system-wide spawning escapement was estimated at approximately 13,800 large Chinook Salmon. The Chinook salmon escapement estimate of 13,800 is 21% below the target S_{MSY} escapement goal of 17,400 large Chinook salmon and did not achieve the lower end of the escapement goal range.

2.1.2 SOCKEYE SALMON

The forecast for Stikine River Sockeye Salmon, as developed by the TTC, was for a terminal run size[1] of 90,000 fish including: 66,000 Tahltan Lake origin Sockeye salmon (30,000 wild and 36,000 enhanced) and 24,000 non-Tahltan wild Sockeye Salmon. The 2019 Stikine River Sockeye Salmon terminal run size forecast was below the 10-year average terminal run size of approximately 120,000 fish.

The combined harvest of 2019 Stikine River Sockeye Salmon in Canadian fisheries was 16,213, which is below the 10-year average of 47,000 fish. The lower Stikine River commercial fishery harvested 10,772 Sockeye, while the upper Stikine River commercial and First Nation FSC fisheries harvested a total of 40 and 5,401 Sockeye Salmon respectively. The estimate of the total contribution of Sockeye Salmon from the Canada/U.S. Stikine Sockeye enhancement program to the combined Canadian harvest was approximately 7,600 fish (or 47% of the total harvest). The Sockeye Salmon stock assessment test fishery was not conducted in 2019.

A total of 36,999 Sockeye Salmon returned to Tahltan Lake in 2019. The 10-year average is 26,800, while the escapement goal range is 18,000 to 30,000 fish. An estimated 20,300 of the fish counted (55%) originated from the bilateral Stikine Sockeye Salmon enhancement program. A total of 3,579 Sockeye Salmon were collected for broodstock to support the Stikine Sockeye Salmon enhancement program while 212 fish were removed for stock identification purposes. It is estimated that approximately 33,000 fish successfully spawned in Tahltan Lake during 2019. The total estimated run size of 59,000 Tahltan Lake Sockeye Salmon was approximately 11% below the pre-season expectation of 66,000 fish.

The spawning escapement for the non-Tahltan Sockeye Salmon stock group is calculated using stock identification, test fishery and in-river commercial catch and effort data. Historical non-Tahltan contributions to the overall run was used as the principal tool in estimating the spawning ground escapement of the non-Tahltan Lake stock grouping in 2019. The escapement estimate for 2019 was 23,200 non-Tahltan Sockeye Salmon. The non-Tahltan spawning escapement estimate was within the escapement goal range of 20,000 to 40,000 and was slightly above the 10 year average of 22,500 fish.

[1] Terminal run excludes U.S. interceptions that occur outside Districts 108 and 106.

Based on the in-river run reconstruction of the Tahltan Lake Sockeye Salmon run expanded by run timing, along with stock identification data from lower river assessment projects and estimated harvests of Stikine River Sockeye salmon in U.S. terminal gill net fisheries, the post-season estimate of the terminal Sockeye salmon run size is approximately 89,400 fish. This estimate includes 58,700 Tahltan Lake origin fish and 30,700 Sockeye Salmon of the non-Tahltan stock group. The 2019 Stikine River Sockeye Salmon run was below the 10-year average terminal run size of ~152,000 Sockeye Salmon and is near the preseason forecast of 90,000 fish.

Based on the post-season run size estimate, Canada was allocated an allowable catch of approximately 16,600 Stikine River Sockeye Salmon. The total Canadian fishery harvest of Stikine River Sockeye Salmon in 2019 was 16,213.

2.1.3 COHO SALMON

The total Canadian fishery harvest of Coho Salmon in 2019 was 5,228. All Coho Salmon were harvested during the directed Coho Salmon fishery in statistical weeks 35 to 36. The total Canadian fishery harvest was below the recent 10-year average of 5,548 fish.

A Coho Salmon test fishery was not conducted in 2019. The CPUE observed in the targeted Coho Salmon fishery was near average for statistical weeks 35 to 36. Aerial surveys of six index spawning sites yielded below average counts observed under excellent viewing conditions but it was felt that the surveys were conducted after the peak spawning period.

2.1.4 JOINT SOCKEYE SALMON ENHANCEMENT PROGRAM

Joint Canada/U.S. enhancement activities continued from 2018 through 2019 with the collection of Sockeye Salmon eggs from Tahltan Lake in British Columbia, transportation of eggs to the Snettisham Hatchery in Alaska where they were raised to fry, and subsequent transportation and release at out-plant sites in British Columbia.

From May 16 to May 18, 2019 approximately 1.9 million fry were out-planted into Tahltan Lake. All fry originated from the 2018 egg-take and were mass-marked at the Snettisham hatchery with thermally induced otolith marks. Green egg to released fry survival was approximately 83%. No fry reared at the Snettisham hatchery was lost due to Infectious Hematopoietic Necrosis virus (IHNv). Sockeye Salmon enhancement programs have been subject to IHNv outbreaks before as the disease is naturally occurring in Stikine Sockeye Salmon stocks.

For 2019, the agreed bilateral Stikine River Enhancement Production Plan (TEPP) identified collection of 5.0 million Sockeye Salmon eggs from Tahltan Lake for transport to Snettisham Hatchery in Alaska for incubation and thermal marking. In the fall of 2019, the Sockeye Salmon egg collection target was revised to 4.5 million eggs to respect the projected 50/50 wild/enhanced fry population in Tahltan Lake as a result of adult escapement above the upper end of the spawning escapement goal. A total of 4.4 million sockeye salmon eggs were successfully collected and transported to Snettisham Hatchery. As in previous years additional efforts beyond beach seining were employed to acquire brood stock including angling and temporarily holding female Sockeye Salmon brood stock to mature in floating net pens in Tahltan Lake.

2.2 TAKU RIVER

Following the 2019 pre-season meeting of the Transboundary Panel, Canada developed its fishing strategy for Taku River salmon fisheries based on the catch sharing and management arrangements outlined in Annex IV, Chapter 1 of the Pacific salmon Treaty (PST). Accordingly, the Canadian fishery strategy incorporated specific conservation considerations and contained the following harvest objectives: 1) to harvest 20% of the TAC of Taku River Sockeye Salmon (adjusted as necessary according to projections of the number of enhanced Sockeye), plus harvest any salmon in excess of spawning and brood stock needs; 2) to harvest enhanced Taku River Sockeye Salmon incidentally to wild Sockeye Salmon; and, 3) to harvest 5,000 Coho Salmon plus Canada's share of the TAC and any salmon surplus to spawning needs in a directed Coho Salmon fishery.

The 2019 commercial fishing season on the Taku River opened on July 2 (statistical week 27), and closed on October 15 (statistical week 42). Fishing area and gear restrictions were as per recent years, and incorporated the maximum gill net length of 36.6 metres, established in 2008 for drift gill nets and in 2009 for set gill nets.

The Taku River commercial fishing area in Canada consists of the mainstem of the river from the international border upstream approximately 18 km (11 mi.), to a geological feature known locally as Yellow Bluff. Nearly all commercial fishing activity takes place in the lower half of this area, downstream of the Tulsequah River / Taku River confluence.

The First Nation Taku River FSC fishery is primarily located in the lower Taku River in the same area as the Canadian commercial. Small numbers of fish are also harvested on the lower Nakina River and at the outlet of Kuthai and King Salmon lakes.

Canadian recreational fishery effort was largely absent in 2019 due to area, retention, and size restrictions for the duration of the Chinook salmon season. Restrictions were implemented within the recreational fishery to prohibit the harvest of Taku River Chinook Salmon as abundance was well below the minimum spawning escapement requirement. Recreational fishing for Coho salmon did not require additional restrictions in 2019 to address conservation concerns.

2.2.1 CHINOOK SALMON

The bilateral pre-season forecast was for a terminal run of 9,100 large Chinook Salmon, approximately 58% below the previous 10-year average of 21,700 fish. A run size of 9,100 fish was well below the S_{MSY} escapement goal of 25,500 fish (below the lower end of the escapement goal range of 19,000 to 36,000), and as a result, there was no allowable catch (AC) for either the U.S. or Canada. In response, Canada did not prosecute a directed commercial Chinook salmon fishery. Additionally, significant efforts were made in all other fisheries to avoid the incidental harvest of Chinook salmon. For 2019, the in-river Chinook assessment fishery was not conducted to allow for the maximum number of Chinook salmon to pass to the spawning grounds.

The catches of large Chinook salmon in the Canadian fisheries were: 0 large Chinook salmon harvested in the directed commercial Sockeye and Coho Salmon fisheries; 10 large Chinook salmon in the First Nation FSC fishery; and 0 large Chinook salmon in the recreational fishery. The total base level and test/assessment fishery harvest of 10 large Chinook salmon was well below the allowance of 2,900 fish.

The Taku River large Chinook salmon spawning escapement estimate for 2019 was approximately 11,600 fish, which was well below the S_{MSY} target of 25,500 and the goal range of 19,000 to 36,000. The previous 10-year average spawning escapement was 17,800 large Chinook.

The total Canadian catch of large Chinook salmon was 10, which was well below the 10-year average of approximately 2,000 fish (excluding test/assessment fisheries).

2.2.2 SOCKEYE SALMON

The Canadian pre-season run outlook for wild Sockeye salmon was 154,000 fish, approximately 15% below the previous 10-year average total run size of 181,000 fish. In addition, approximately 2,500 adult Sockeye Salmon of Tatsamenie Lake origin were expected to return from fry out plants associated with the Canada/U.S. joint Taku Sockeye salmon enhancement program. The forecasted return of enhanced Tatsamenie Lake origin Sockeye Salmon was considered to be a below average return.

The Canadian Sockeye Salmon catch was 21,500 fish, of which 21,395 were taken in the commercial fishery, 105 in the First Nation FSC fishery, and 0 in assessment/test fisheries. This harvest was 8% below the 10-year average total of 23,400 fish, with the contribution of Sockeye salmon from the bilateral enhancement program estimated at 425 fish (2% of the total Canadian catch).

To reduce incidental harvest of Chinook salmon, the directed Sockeye Salmon fishery commenced 16 days late on July 2 (statistical week 27). Additionally, the use of set nets was not permitted for the first opening and fishers were not permitted to retain incidentally-caught Chinook salmon in the directed Sockeye Salmon fishery. The maximum permissible mesh size in the first three weeks of the directed Sockeye Salmon fishery was 140 mm (5.5”) which was intended to reduce the gilling of large Chinook salmon and permit release. Projections of the total wild Sockeye salmon run size, TAC, and total escapement were made weekly throughout the fishing season. As in past years, projections were based on the joint mark-recapture program, the estimated catch of Taku River Sockeye Salmon in U.S. fisheries, the catch in the Canadian fishery, and historical run timing information. The post-season run size estimate is 166,000 fish (comprising 162,000 wild and 4,000 enhanced Sockeye Salmon). Subtracting the interim (2019) escapement target of 59,000 from the wild run of 162,000 fish resulted in a TAC of approximately 103,000 wild fish. The Canadian allowable catch, based on a 20% harvest share (which in turn is associated with an enhanced return of 1 to 5,000 fish), was 20,600 wild fish; the actual catch was 21,055, representing 20% of the TAC. Under new Chapter 1 provisions for 2019, Canada was able to harvest any surplus fish above spawning and brood stock needs.

The estimated spawning escapement of wild Sockeye salmon in the Canadian section of the Taku River was 75,000 fish which was above the interim escapement goal range of 55,000 to 62,000 fish.

2.2.3 COHO SALMON

The catch of 12,252 Coho salmon (12,145 commercial and 107 First Nation FSC) was 29% above the 10-year average of 9,500 fish. The catch during the directed commercial/assessment Coho salmon fishery, i.e. after statistical week 33, was 9,746 fish. Based on the mark-recapture program, the bilateral estimate of the run into Canada is approximately 95,000 fish. In accordance with the new PST provisions beginning in 2019, a run size of this magnitude afforded Canada an allocation of approximately 25,000 Coho Salmon. The post-season

spawning escapement estimate is 83,000 fish, which is near the 10-year average of 82,000 fish. The 2019 escapement was above the target of 70,000 fish and within the escapement goal range of 50,000 to 90,000 fish.

2.2.4 JOINT SOCKEYE SALMON ENHANCEMENT PROGRAM

Joint Canada/U.S. enhancement activities continued from 2018 through 2019 with Sockeye salmon fry hatched at Snettisham Hatchery in Alaska transported back to Tatsamenie Lake, British Columbia (where these fish were collected as eggs in 2018). On May 19, 2019, approximately 1.4 million emergent Sockeye salmon fry were out-planted into Tatsamenie Lake from the 2.3 million eggs collected in 2018. No losses were experienced from Infectious Hematopoietic Necrosis virus (IHNv) for the eggs collected in 2018. In addition, as part of an extended rearing project, approximately 370,000 fry were released into net pens for rearing between May 25 and June 14. Net pen reared fry were released at approximately 2.1 grams on June 22 and July 5. Smolt production for 2019 was above average with an estimate of 1.7 million coming off a strong brood year in 2018. Analysis to determine the origin of smolts is underway in order to inform annual release strategies.

As a result of the large return of sockeye salmon to King Salmon Lake in 2019, the planned enhancement (egg take) program did not proceed. The success of natural production in a "high escapement" year will be evaluated to inform future enhancement program considerations.

For 2019, the agreed bilateral Taku River Enhancement Production Plan (TEPP) identified collection of up to 3.0 million Sockeye Salmon eggs from Tatsamenie Lake and 500,000 eggs from Little Trapper Lake for transport to Snettisham Hatchery in Alaska for incubation and thermal marking. Approximately 2.3 million Sockeye Salmon eggs were collected from Tatsamenie Lake and approximately 400,000 Sockeye Salmon eggs were collected from Little Trapper which was hampered by high brood stock holding mortality. The resulting fry will be released to Trapper Lake, upstream of a barrier, to establish a small escapement of salmon for barrier passage evaluation. Barrier removal project plans were established in 2016 and are ongoing in support of a potential Sockeye Salmon enhancement program for Trapper Lake.

2.3 ALSEK RIVER

Although catch sharing provisions for Alsek River salmon stocks between Canada and the U.S. have not yet been established, Annex IV, Chapter 1 of the Pacific Salmon Treaty calls for the development and implementation of cooperative abundance-based management plans and programs for Alsek River Chinook and Sockeye Salmon. In 2013, escapement goal ranges for Alsek River Chinook and Sockeye Salmon were recommended by the Transboundary Panel, these are: 3,500 to 5,300 Chinook salmon and 24,000 to 33,500 Sockeye Salmon. Additionally, the escapement targets were revised for Klukshu River Chinook and Sockeye Salmon; these are: 800 to 1,200 Chinook and 7,500 to 11,000 Sockeye. The principal escapement-monitoring tool for Chinook, Sockeye, and Coho Salmon stocks on the Alsek River is the Klukshu weir, in operation since 1976 by DFO in collaboration with the Champagne and Aishihik First Nations (CAFN).

The development of basin-wide stock assessment programs are being investigated as part of the development of abundance-based management regimes and to accurately assess whether the escapement goals for Alsek River Chinook and Sockeye Salmon stocks achieve sustainable stock conservation objectives. At this time, there are no programs in place to estimate the Coho Salmon returns or spawning escapement to the Alsek River

watershed. A proportion of Chinook and Sockeye Salmon spawning escapement to the Alsek River watershed is enumerated at the Klukshu River using video enumeration techniques. Current escapement monitoring programs include the Klukshu River, Village Creek Sockeye Salmon enumeration, and post-season run reconstructions using genetic stock identification analyses which allow for annual comparisons of escapement indices. The most reliable long-term comparative escapement index for Alsek River drainage salmon stocks is the Klukshu River count. Chinook salmon stock assessment feasibility projects are being conducted on the Blanchard and Takhanne Rivers to develop an improved understanding of Alsek River Chinook Salmon production.

The harvest estimate for the 2019 Canadian Alsek River First Nation FSC fishery was 32 Chinook, 648 Sockeye and 0 Coho Salmon. The Champagne and Aishihik First Nations encouraged their members to reduce salmon fishing effort in their traditional territory in response to the poor pre-season forecasts for Chinook and Sockeye Salmon. The 10-year average harvest in the Canadian First Nation FSC fishery on the Alsek River is 61 Chinook, 1,034 Sockeye, and 16 Coho Salmon, although noting that this most recent period has experienced significant reductions in Chinook and Sockeye Salmon returns (and associated fishery harvests). 2019 catch estimates for the Alsek River recreational fishery were 5 Chinook salmon retained, and 5 Sockeye Salmon retained. Notably, the retention of Chinook and Sockeye Salmon in the recreational fishery was not permitted for the majority of the 2019 the season in response to the poor pre-season forecasts and early in-season run abundance information. Approximately 10 Coho Salmon were harvested in the recreational fishery.

The 2019 count and escapement estimate for Klukshu River Sockeye Salmon was 19,073 and 18,749 fish. The count and escapement estimate were both below the 10-year average of 11,000 and 10,800, respectively. Sockeye Salmon spawning escapement was above the upper end of the escapement goal range. The Sockeye Salmon count at Village Creek was 1,497 fish; compared to the recent 10 year average of 700 fish.

The most reliable comparative Chinook salmon escapement index for the Alsek River drainage is considered to be the Klukshu River count. The Chinook salmon count and escapement estimate in 2019 was 1,589 and 1,573 fish, above the average of 1,200 and 1,170 fish respectively. Chinook salmon spawning escapement was above the upper end of the escapement goal range in 2019.

The Klukshu River Coho Salmon count was 2,180. The 2019 count, as in past years, is not considered a complete indicator of run strength as the assessment program is not operated for the entire duration of the Coho Salmon return to the Klukshu River.

3 NORTHERN BC

3.1 NORTHERN BC CHINOOK AGGREGATE ABUNDANCE-BASED MANAGEMENT (AABM) FISHERIES

3.1.1 OBJECTIVES AND OVERVIEW

Escapements of Northern Chinook salmon have declined in recent years. Reduced survival rates and reduced productivity have been observed across British Columbia and South East Alaska. Conservation measures were implemented in 2019 salmon fisheries in response to declines in Chinook salmon abundance. Chinook salmon fisheries implemented in Northern BC under the PST AABM management regime include the Northern British Columbia troll and Haida Gwaii recreational fisheries.

These fisheries are managed to an annual total allowable catch (TAC) based on the forecast abundance of the aggregate of stocks that contribute to each fishery. In Canada, conservation is the first priority in fisheries management. Once conservation obligations are met, priority access is given to First Nations for food, social, ceremonial, and treaty requirements. Once those obligations are met, priority access to Chinook salmon is provided to the recreational fishery, with commercial fisheries next in priority. Management constraints to the fishery include management for stocks of conservation concern, minimizing encounters of undersized Chinook Salmon and non-target species and minimizing fisheries where legal and sublegal-sized Chinook Salmon have to be released.

3.1.2 STOCK STATUS

The pre-season distribution of the NBC AABM TAC by fishery is shown in Table 3-1 below. The total Chinook catch in the Area F Troll fishery and recreational fishery can be found in Appendix 3.

Table 3-1: Pre-Season Total Allowable Catch Estimate for NC AABM Chinook

	Pre-Season	In-Season
NC BC Troll AABM and Haida Gwaii Sport Abundance Index	0.96	-
NC BC Troll AABM and Haida Gwaii Sport Chinook TAC	124,800	-
NC BC Troll AABM Chinook TAC	88,400	Actual catch: 42,801
Haida Gwaii Sport Chinook TAC	36,400	Actual catch: 45,200
Total NBC AABM	124,800	Actual catch: 88,001

3.1.3 RECREATIONAL FISHERIES

Estimates of AABM tidal sport catches near the mainland coast of Northern BC were obtained from creel surveys and lodge catch reports from lodges operating on Haida Gwaii. The recreational fishery maintained full daily limits of two daily and four possession. A minimum size limit of 45 cm was in effect and barbless hooks were mandatory in the sport fishery. Virtually all sport releases in AABM areas are legal sized.

In Area 1, the recreational salmon fishery primarily occurs between Masset and Lanagara Island along the north shore of Graham Island. In Area 2W, the recreational salmon fishery primarily occurs between Englefield Sound and Port Louis. The Chinook salmon fishery in east Skidegate during late winter and early spring was reported to be average. While the harvest of Chinook in Area 2E is unknown, it is assumed to be less than 500 pieces and a small proportion of the recreational catch in Areas 1 and 2W. Recreational effort (>99%) primarily occurs in Area 1 and 2W. The majority of the fishery occurs between mid-May and mid-September with little effort in the winter.

3.1.4 COMMERCIAL FISHERIES

The North Coast BC troll fishery opening for Chinook fishing was delayed and opened from August 20 to September 30 as part of fishery restrictions designed to pass through Fraser Summer 4_1 (South Thompson) Chinook to Fraser River fisheries. The entire 2019 Northern BC troll fishery was conducted under a system of individual transferable quotas. The size limit was 67 cm and barbless hooks and revival boxes were mandatory. No troll test fisheries were conducted in the North Coast of BC in 2019.

3.2 NORTHERN BC CHINOOK INDIVIDUAL STOCK-BASED MANAGEMENT (ISBM) FISHERIES

3.2.1 OBJECTIVES AND OVERVIEW

Northern BC Chinook Individual Stock-Based Management (ISBM) Fisheries include commercial net fisheries throughout north and central BC, marine sport fisheries along the mainland coast and in freshwater, and First Nations fisheries in marine and freshwater areas. The PST obligations in these fisheries are for a general harvest rate reduction (estimated in aggregate across fisheries) for ocean mixed stock fisheries and for stock-specific objectives (i.e., achieving the escapement goal) in terminal areas.

3.2.2 STOCK STATUS

Since assessments of the ISBM fisheries are relative to the escapements achieved in the Chinook indicator stocks, a brief overview of the 2019 returns is provided. Chinook escapements to the upper Nass River were 10,493 (based on mark-recapture data). The estimated 2019 escapement for the Skeena River aggregate was 24,536 using the historic index and 23,248 using the genetic-based estimate. The estimated total escapement in the Bella Coola/Atnarko River in 2019 (excluding jacks) was 11,675 fish with a wild escapement of 4,587 fish (below the agency escapement goal of 5,009 fish.)

The total Chinook catch in the Test fishery on the Skeena River was 550. ISBM catch data can be found in Appendix 3.

3.2.3 FIRST NATIONS FSC FISHERIES

A total of 11,214 Chinook were reported caught by First Nations in Areas 3 and 4. Nisga'a Treaty catch was reported at 6,336 Chinook (all in Area 3/Nass River). First Nations' catches in marine areas were not reported in Areas 1 through 6. A total of 2,520 Chinook were reported caught in Areas 6, 7 and 8. No Chinook catches were reported by First Nations in Rivers Inlet (Area 9) or Smith Inlet (Area 10).

3.2.4 RECREATIONAL FISHERIES

3.2.4.1 TIDAL WATERS

Estimates for tidal sport catches near the mainland coast of Northern BC were obtained from a creel survey conducted in Areas 3 and 4 in 2019. Chinook daily limits started at 2 per day, but was reduced in Area 3, 4, and 5 to 1 (one) Chinook per day from July 27, 2019 to August 5, 2019. This change was implemented as part of measures to address poor Sockeye returns to the Skeena River and provide First Nations priority access for FSC fisheries.

Area 6 had a daily limit of 2 per day for the 2019 season.

Tidal sport catch from lodges operating in the Smiths Inlet, Rivers Inlet, Hakai Pass and Bella Bella areas were estimated using log books.

3.2.4.2 NON-TIDAL WATERS

The Skeena River watershed started with normal daily limits and opening times for Chinook, Coho and Pink Salmon in 2019. Sockeye started with a daily limit of 2 per day on the Skeena River.

On July 27, 2019 the Department closed the entire Skeena River watershed to fishing for all salmon. This closure was an identified conservation measure to address Sockeye conservation. On Aug 15, 2019 sections of the Skeena River and specific tributaries re-opened to Coho and/or Pink Salmon. Chinook remained closed for the remainder of the season.

The Nass River watershed started with normal daily limits and opening times for Chinook.

On June 25, 2019 the Department reduced the daily limit to two (2) Chinook salmon, only one of which could be over 65 cm in the Nass River watershed. Additionally the Nass River main stem waters near the Meziadin River confluence were closed for the remainder of the 2019 season.

3.2.5 COMMERCIAL FISHERIES

Chinook commercial fisheries were closed in the North Coast (Areas 3-10), except for Area 8. In Area 8, the gillnet fishery opened on June 3, 2019. Opportunities were generally limited to one fishing day a week and the last opening was on June 24. Total effort was 171 boat days. There was a small scale economic opportunity fishery in the Bella Coola Gill Net area, conducted by the Nuxalk First Nation for chinook and chum. Three fisheries were held; June 25, July 25 and August 1 for the Nuxalk First Nation Commercial Salmon Allocation Framework (CSAF) fishery. Total effort was 46 boat days.

Refer to Appendix 3 for Chinook catch totals.

3.3 NORTHERN BC PINK SALMON FISHERIES

3.3.1 OBJECTIVES AND OVERVIEW

In 2019, Canada was to manage the Area 3-1 to 3-4 net fisheries to achieve an annual catch share of 2.49% of the annual allowable harvest (AAH) of Alaskan Districts 101, 102 and 103 Pink Salmon. The total return of Pink Salmon to Alaskan Districts 101, 102 and 103 was not available at the time of publication.

Canada was also to manage the Area 1 troll fishery to achieve an annual catch share of 2.57% of the annual allowable harvest (AAH) of Alaskan Districts 101, 102 and 103 Pink Salmon.

3.3.2 COMMERCIAL FISHERIES

Areas 3-1 to 3-4 Pink Net Catch

In the Canadian Northern Boundary Area, Pink Salmon returns were anticipated to be average to below average for Areas 3 and 4, based on brood year return strength. Actual returns to Area 3 were higher than anticipated, while the Area 4 returns were below average.

Area 1 Pink Troll Catch

The Canadian commercial troll fishery targeting Coho Salmon with retention of Pink Salmon was open in the northern portion of Area 1 (Dixon Entrance AB Line) from July 1 to July 17, and then expanded to the rest of Area 1 until it was closed on September 30. Pink retention was also permitted during the Chinook directed fishery in parts of Area 1 which opened from August 20 to September 30. Area 1 Pink Salmon directed effort was very minimal and the total Pink catch in the Area F Troll fishery and recreational fishery can be found in Appendix 3.

4 SOUTHERN BC CHINOOK SALMON

4.1 SOUTHERN BC AGGREGATE ABUNDANCE-BASED MANAGEMENT (AABM) CHINOOK

4.1.1 OBJECTIVES AND OVERVIEW

Chinook fisheries are managed by either an aggregate abundance-based management (AABM) or individual stock-based management (ISBM) regime. Allowable harvest impacts in AABM areas are determined by provisions in the Pacific Salmon Treaty and subject to domestic considerations, such as conservation and allocation. In Southern BC, all AABM Chinook fisheries are located off the West Coast Vancouver Island (WCVI), including components of the recreational fishery, First Nations fisheries, and the Area G troll fishery.

For the period October 2018 through September 2019, the forecast Chinook abundance index was 0.61 of the PST base period; therefore, under Treaty provisions, the maximum allowable catch was 79,900 Chinook for WCVI AABM fisheries, which includes a 12.5% reduction consistent with the treaty provisions that came into effect in January 2019.

Domestic considerations for managing Chinook catch in WCVI AABM fisheries are driven by concerns regarding the low status of natural WCVI, Lower Strait of Georgia (LGS), and Fraser River Chinook, as well as Interior Fraser Coho and Interior Fraser River Steelhead populations. Management measures in AABM Chinook fisheries to limit impacts to these domestic stocks of concern are summarized in the fishery subsections.

To protect returning Fraser Chinook stocks of concern, the Area G troll fishery was closed until August 1, 2019. Additionally, a 27-day rolling window closure was applied in portions of September/October to protect Interior Fraser River Steelhead.

The pre-season planning distribution of the total WCVI AABM TAC by fishery is shown in Table 4-1 below.

AABM Chinook catch and release information from all fisheries can be found in Appendix 4.

Table 4-1 Pre-Season Total Allowable Catch Estimate for October 2018 to September 2019 WCVI AABM Chinook

	Pre-Season	In-Season
WCVI AABM Abundance Index	0.61	
WCVI AABM Chinook TAC	79,900	
AABM Recreational Harvest Projection	50,000	Actual catch: 35,418
First Nations Harvest Projection (FSC)	5,000	Actual catch: 71
Maa-nulth First Nations Domestic Allocation (FSC)	3,297	Actual catch: 1,184
Five Nations Allocation	7,039	Actual catch: 7,123
Area G Troll Allocation	14,564	Actual catch: 23,195
Total AABM	79,900	66,991

4.1.2 FIRST NATIONS DOMESTIC AND FSC FISHERIES

The 2019 WCVI AABM FSC Chinook reported catch (to date) can be found in Appendix 4. Catch from Maa-nulth Nations Domestic fisheries can also be found in Appendix 4.

4.1.3 FIRST NATIONS COMMERCIAL HARVEST

Five Nations Communal Sales Fishery

In 2019, the Department provided communal sale fishery opportunities for the Five Nations (five Nuu-chah-nulth First Nations located on the West Coast of Vancouver Island - Ahousaht, Ehattesaht, Hesquiaht, Mowachaht/Muchalaht, and Tla-o-qui-aht) that included AABM Chinook. These opportunities were categorized as Offshore Integrated Hook and Line communal sale fisheries.

The TAC was 7,039 pieces. The fishery was carried out in portions of Areas 24, 25, 26, 124, 125 and 126 on the west coast of Vancouver Island over several openings from May to November. A 100% independent dockside monitoring program was in place for the entire season. Retention of Chum, Pink and hatchery-marked Coho was also permitted, as well as several groundfish species. Total salmon catches from this fishery can be found in Appendix 4.

4.1.4 COMMERCIAL FISHERIES

For the 2018/2019 Chinook year (October 1, 2018 to September 30, 2019), fisheries were shaped by conservation concerns for the following domestic stocks: Fraser River Spring 4_2 Chinook, Fraser River Spring 5_2 and Summer 5_2 Chinook, WCVI wild Chinook, LGS Chinook, Interior Fraser River Coho, and Interior Fraser River Steelhead.

The distribution of the WCVI AABM TAC between fisheries is shown above in Table 4-1.

Area G Troll

The Area G troll annual management plan is designed to maintain exploitation rates on domestic stocks of concern within established limits through the use of fishing time and area closures in conjunction with fishing effort limits. The management plan is subject to change when required to address specific conservation concerns. For the 2019 fishing season, the following changes to the annual fishing plan were implemented:

- Additional conservation measures to further protect low returns of Fraser River Chinook were implemented. For Area G troll this addressed by implementing a fishery closure that remained in place until August 1.
- A 27-day rolling window closure starting in September was applied to protect Interior Fraser River Steelhead.

The Area G catch in 2019 occurred over two openings from August 1 to 8 and from August 29 to September 15. Catch is summarized in Appendix 4.

4.1.5 RECREATIONAL FISHERIES

The WCVI AABM recreational Chinook fishery primarily takes place in offshore Areas 121 to 127 from June to September. Chinook catch from inshore Areas 21 to 27 in June and Areas 21 to 24 in July are also included in the AABM estimate. Catch and effort are largely driven by abundance and weather, and together both have impacts on annual harvest. Previous sampling has indicated that there is minimal AABM catch and effort outside of this period.

Domestic Chinook management measures are in place in the near-shore AABM areas to protect migrating WCVI-origin Chinook. In 2019, management measures continued to include finfish closures in several areas, increasing terminal Chinook non-retention areas, and focussing recreational opportunities in areas where DNA samples indicated that WCVI Chinook presence is lower.

New domestic management actions were implemented to further protect Fraser River Chinook populations, which included a Chinook non-retention area from April 19 to July 14 (inclusive) in Areas 121 to 127 seaward of a 1 nm surfline boundary. As a result of the Big Bar landslide, and concerns around the successful migration of Fraser Chinook, further measures were put in place from July 15 to July 31 (inclusive) which restricted the maximum size to 80 cm for Chinook retention in these offshore areas.

Chinook catch in the AABM recreational fishery is estimated through several catch monitoring programs, including a creel survey, a logbook program and DFO's electronic survey information (iREC). The creel survey continues to be the most utilized catch monitoring program in this area particularly because it collects effort (number of boat trips), and catch per unit effort data. Catch for any given species within a defined time-area stratum is estimated by multiplying effort estimates by CPUE. Total effort is estimated through vessel counts, gathered through either aerial or on-water boat surveys of the fishing area. CPUE is estimated from interviews with anglers at specific landing sites and from trip logbooks and manifests submitted by lodges and guides through a voluntary monitoring program. Logbook effort is removed from effort estimates where there is overlap. Data regarding the daily activity profile of the fishery, fishing locations, and the proportion of guided versus un-guided effort are also gathered from angler interviews.

The Chinook recreational catch estimate from the creel survey for the 2019 WCVI AABM fishery is provided in Appendix 4.

See Figure 4-1 below which illustrates catch and effort from 1995 through 2019.

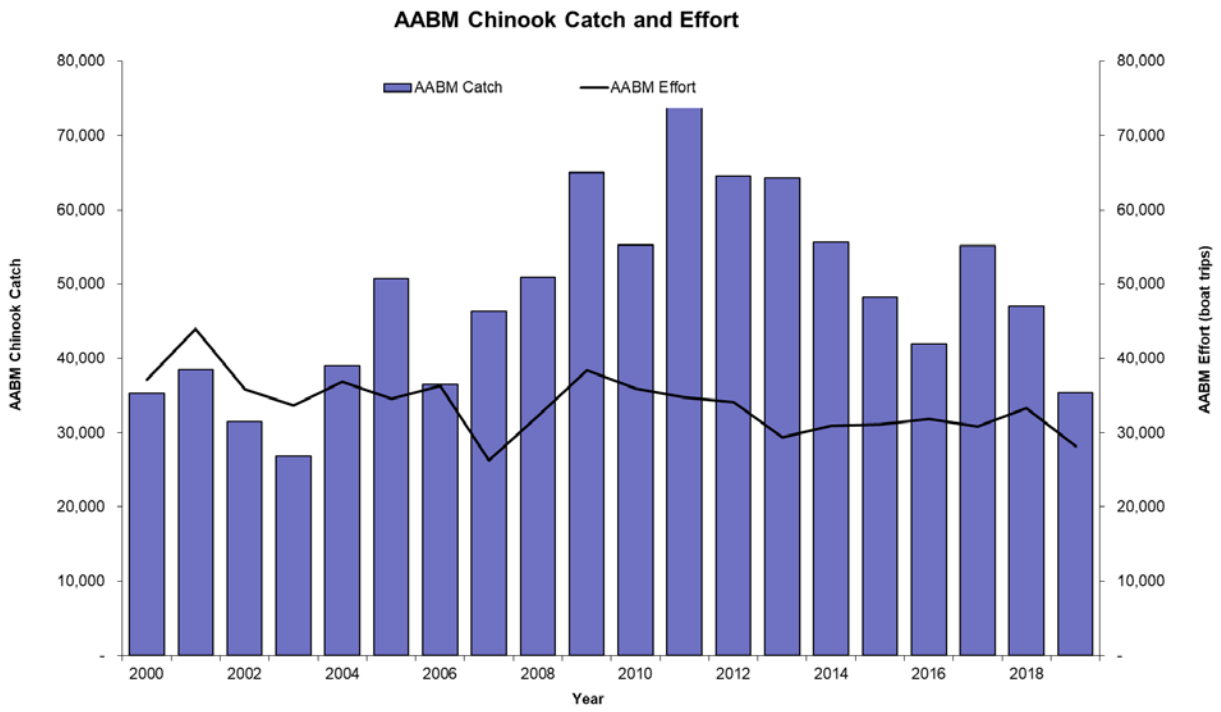


Figure 4-1 WCVI Recreational AABM Catch and Effort- Chinook, 2000-2019

4.2 SOUTHERN BC CHINOOK INDIVIDUAL STOCK BASED MANAGEMENT (ISBM) FISHERIES

4.2.1 OBJECTIVES AND OVERVIEW

In addition to the PST regime, Canada implemented management actions as required to ensure conservation of Canadian-origin Chinook and to meet domestic allocation requirements. These Chinook fisheries were managed to harvest rates on an individual stock basis (ISBM).

Measures were taken in 2019 in First Nations FSC, recreational and commercial Chinook fisheries to protect West Coast Vancouver Island (WCVI), Lower Strait of Georgia (LGS), and Fraser River Chinook stocks.

Specific management actions were taken to protect WCVI-origin Chinook in Canadian ocean fisheries (not including enhanced terminal areas), the harvest of which is managed to an exploitation rate of 10%. Fisheries to which this limit applies are the northern troll, Haida Gwaii recreational, WCVI troll and WCVI recreational. Most Southern BC fisheries were managed such that impacts on WCVI wild Chinook stocks were minimized, with the exception of terminal fisheries focussed on enhanced stocks.

LGS Chinook stocks are improving from historic lows seen in 2009 and are stable or rebuilding. Significant management measures in recreational and commercial fisheries continued to be in place to protect these stocks. Some LGS Chinook stocks are seeing a gradual increase in terminal returns, particularly in the Cowichan River.

For 2019, the management target for Spring 4_2, Spring 5_2, and Summer 5_2 Chinook was to reduce overall Canadian fishery mortalities on these populations to near 5% to support conservation and promote rebuilding.

Expected fishery mortalities were not intended to be a management target and the objective was to allow as many fish to pass through to the spawning grounds as possible. In addition, the precautionary fishery measures were expected to reduce Canadian fishery mortalities on Summer 4_1 and Fall 4_1 Chinook management units by at least 25%.

First Nations FSC management actions in the Fraser River included time and area closures, and reduced fishing times.

Recreational fisheries in Juan de Fuca Strait, the lower Strait of Georgia and the approach waters of the Fraser River had specific time, area, size and mark-selective restrictions designed to minimize the amount of exploitation on these Chinook stocks.

In 2019, commercial fisheries in Barkley Sound and Nootka Sound targeted ISBM Chinook. Chinook non-retention was in place for other southern BC commercial fisheries (excluding AABM Chinook).

ISBM Chinook catch and release information from all fisheries can be found in Appendix 4.

4.2.2 STOCK STATUS

4.2.2.1 WEST COAST VANCOUVER ISLAND CHINOOK

Wild West Coast Vancouver Island (WCVI) Chinook are a stock of concern. While stocks are low and stable, they are below target and have not rebuilt from low abundances that resulted from a decline in productivity observed during the early to mid-1990s. Of particular concern are those stocks that originate from the SWVI area conservation unit (i.e. Clayoquot Sound).

Hatchery production supports terminal fisheries directed at surplus production with extensive management measures in place to reduce impacts on wild origin stocks. For WCVI hatchery stocks, the terminal return is defined as total catch (First Nations FSC, sport and commercial) in the near approach areas of the hatchery plus escapement (brood collection plus natural spawners, and ESSR if applicable). In these approach areas, catch is dominated by the hatchery stock (e.g. > 95%); therefore, higher exploitation rates are permitted than in times and areas dominated by naturally produced WCVI Chinook stocks.

A small assessment fishery near the Mquq^{W}in / Brooks Peninsula occurred in 2019 in order to assess the ability to improve the precision and accuracy of annual WCVI Chinook return estimates. The total catch was 344 Chinook.

4.2.2.2 STRAIT OF GEORGIA CHINOOK

Fall Season

Adult returns of fall Chinook to SEP facilities south of Campbell River were average to above average in 2019. Puntledge River escapements continued to increase with 13,679 adults returning compared to the 10 year average of 6,834. Further south, the Big Qualicum River escapement was closer to the 4 year average of 6,830 and similar to 2018 at 7,482. Counts in the Little Qualicum River were well above average at 9,132 based on an AUC expansion of swim results.

Chinook escapement to mid-island streams was variable. The AUC expanded count in the Englishman River (1,580) was nearly double the 12 year average of 870. Nanaimo River counts were near the four year average with a total return of 2,844 adults and 2,298 jacks.

Cowichan River Chinook (a wild Chinook indicator stock) declined from a high of 16,982 adults in 1995 to 1,260 in 2009. Exploitation rates on CWT hatchery fish were estimated at 80 to 90% in the early 1990s but declined to an average of 56% for the period 2006 to 2012 as a result of various harvest restrictions implemented over the last 20 years. Additional conservation measures were introduced in 2005 to reduce the harvest of Cowichan Chinook by the Strait of Georgia sport and WCVI troll fisheries. First Nations have substantially reduced harvests of Chinook in the Cowichan River in recent years. The declining trends after 1990 in various southern Strait of Georgia Rivers are attributed to high exploitation rates, a decline in marine survival, and habitat issues.

The Cowichan River counting fence was operational from September 9th to October 17th following significant repairs in 2017 and further modifications in 2018. In 2019, the fish passageways were significantly widened and new camera systems installed to reduce migration delays. A total of 10,527 adult Chinook were enumerated before the fence was removed due to increasing water levels. The final escapement estimate using a PIT tag based expansion (as in 2017 and 2018) was 17,946 adults, including brood captures, FSC fishery harvest and lower river spawners (below the fence). Hatchery contributions based on adipose clips were estimated at 11.4% for adults. Jack returns were down from the three year average of 6,800 to 3,303 while the proportion of adipose clips in the population was 12.5%.

The escapement target of 6,500 naturally spawning adults was met for a fourth consecutive year. As a result of increasing escapements in recent years as well as more restrictive fishing regulations throughout southern B.C. the Cowichan specific spot closures implemented in 2005 were lifted in the central and northern Strait of Georgia. Terminal closures in Area 18 remain in effect.

On the mainland side of the northern Strait of Georgia, Sliammon and Lang hatcheries continue to have variable returns; however, in the last five years the returns to Lang Creek have been stronger than in previous years with 1,739 adults in 2019 (4 year average 1,130). 300 adult Chinook returned to Sliammon Creek in 2019 which is above the 12 year average of 110. There are a few very small, wild populations remaining in the Theodosia and Skwakwa rivers, and those rivers entering Jervis Inlet, where assessment data are poor or not available. Historically, a large proportion of the Chinook stock aggregate originating from rivers north of Nanaimo migrate into central and northern BC and Alaska. Exploitation rates on this stock aggregate have gradually been reduced over the last 15 years, thus the stable trend in annual returns to rivers over this period suggests a reduction in marine survival.

Spring/Summer Season

The Puntledge, Nanaimo and more recently the Cowichan systems have identified early runs of Chinook in the Strait of Georgia. Efforts to recover Puntledge summers to viable levels have resulted in improved returns to the river since 1999. The 2019 escapement estimate for Puntledge was 645 adults, which is close to the four year average of 750. Monitoring of Nanaimo spring/summer Chinook escapement was improved in 2019 with a series of swims from June through September. Several surveys of the reach upstream of second lake where spring run fish are believed to reside produced a peak count of three jacks. A total of 206 summer run adults for 2019 was well below the 4 year average of 670. Two swim surveys of the Chemainus River revealed a peak

count of just nine summer Chinook adults. Recent counts in this system have been very low but the rock slide in the lower canyon was cleared naturally in winter 2018/2019, restoring access to a significant portion of the system.

4.2.2.3 JOHNSTONE STRAIT MAINLAND INLET CHINOOK

Currently only three systems are monitored consistently. In Area 12, the Nimpkish River is assessed using standardized swim surveys and stream walks by hatchery staff. In Area 13, the Campbell/Quinsam and Phillips rivers are assessed by intensive mark-recapture programs. The Campbell/Quinsam is a long-term Chinook indicator, assessed yearly since 1984 (program carried out by Quinsam Hatchery). Other systems are covered using intermittent visual surveys. In 2019, surveys in Area 12 Mainland Inlet systems, such as Ahnuhati and Wakeman Rivers, indicated an increase in Chinook observations.

Nimpkish River

In 2019, observations of Chinook abundance were up relative to both the 2018 and 2015 returns. The estimate of 2,500 Chinook (peak count 1,543) is 69% higher than the 5-year average (1,476) and approximately 89% larger than the 2015 parental brood year (1,318). Hatchery broodstock targets were met.

Campbell/Quinsam System

The 2019 program has the combined system final Chinook estimate at 7,388 adults; an increase over the estimated 7,072 that returned in 2018, above both the 5-year average (6,130), and historic 1984-2018 average (6,979). The parental brood year for the returning age-4s was approximately 3,900. The 2019 Chinook broodstock target was attained by the hatchery.

Phillips River

The final results for the Phillips River program was a 2019 Chinook escapement of 2,531 adults; however, the estimate may be highly uncertain. Deadpitch effort remained similar to past years, however increased bear activity on the river impacted carcass availability. The 5-year historic average for this system is approximately 2,100.

4.2.2.4 FRASER RIVER CHINOOK

Fraser River Chinook are assessed as five naturally spawning stock groups for PSC management under the 2019 agreement including Fraser Spring-Run 42, Fraser Spring-Run 52, Fraser Summer-Run 52, Fraser Summer-Run 41, and the Harrison River (Fall-Run 41).

Within the Fraser, prior to 2019 there were five CWT-indicator stocks; Nicola River (Fraser Spring-Run 42), Lower Shuswap (Fraser Summer-Run 41), Harrison River and Chilliwack River (Fraser Fall 41), and Dome Creek (Fraser Spring-Run 52) that was discontinued in 2005. Two new CWT-indicator stocks are under development: Lower Chilcotin River (Fraser Spring 52) to replace Dome Creek, and Chilko River (Fraser Summer 52).

Escapements to the Fraser Summer-Run 41 increased during the 1990s and remained abundant until 2012; and were low from 2016-2018. The spawning escapement in 2019 based on the CTC index for the aggregate in

2019 was 169,234 Chinook, which is higher than the long-term average (1999-2018) of 95,820 and 94% of the parental brood. The 2019 Lower Shuswap River escapement estimate was 29,649, which exceeded the escapement goal of 12,300.

In 2019, the Big Bar Landslide on the Fraser Mainstem obstructed migration of some populations in the Fraser Spring-Run 52 and Fraser Summer-Run 52 stock groups. For Chinook returning to rivers upstream of the landslide, 13% of the Spring-Run and 48% of the Summer-Run were estimated to be able to pass the landslide and return to their spawning grounds in 2019. Since there are populations within these stock groups that are downstream of the slide, the overall mortality relative to the terminal runs were 81% for the Spring-Run 52 stock group and 39% for the Summer-Run stock group.

The Fraser Spring-Run 52 stock group spawning escapement in 2019 based on the CTC index for the aggregate was 3,054 Chinook, which is lower than the long-term average (1999-2018) of 20,349 and 9% of the parental brood. The Fraser Summer-Run 52 stock group spawning escapement in 2019 based on the CTC index for the aggregate was 5,506 Chinook, which is lower than the long-term (1999-2018) average of 19,910 and 23% of the parental brood.

The Fraser Spring-Run 42 stock group spawning escapement in 2019 based on the CTC index for the aggregate was 5,848 Chinook, which is lower than the long-term average (1999-2018) of 11,943 and 52% of the parental brood. The Nicola River escapement estimate was 3,859 and has only met the escapement goal of 9,500 once in the past 15 years.

The Harrison River (Fraser wild Fall-Run 41 stock group) escapement estimate was 45,186, which is lower than the long-term (1999-2018) of 83,754 and 45% of brood. Harrison River escapement estimate has only met the escapement goal of 75,100 once in the past eight years.

There have been four consecutive years (2016-2019) of low escapements to the three Fraser stock groups with yearling smolt life history (Spring 42, Spring 52; and Summer 52) and also to the Harrison (Fall 41). These four stock groups are of continuing conservation concern. Canadian marine and Fraser River fisheries were further restricted in 2019 to continue to address these conservation concerns.

4.2.3 FIRST NATIONS DOMESTIC AND FSC FISHERIES

WCVI FSC Fisheries and Treaty Domestic Fisheries

Somass First Nations caught Chinook by gill net, rod and reel and as bycatch during other salmon fisheries in Area 23. Catch reports for Maa-nulth Treaty harvest and WCVI Nuu-chah-nulth non-treaty First Nations harvest can be found in Appendix 4.

Strait of Georgia FSC Fisheries and Treaty Domestic Fisheries

Chinook Salmon were harvested by hook and line from the Strait of Georgia between July 15 and early October. Terminal harvests of Chinook took place in Puntledge and Qualicum Rivers in October, using hatchery brailing and hand-picking/sorting methods. Chinook Salmon were also harvested in hook and line and gill net fisheries in Cowichan and Nanaimo Rivers from late September through October. Tla'amin Treaty and other First Nations catch reports in the Strait of Georgia can be found in Appendix 4.

Johnstone Strait FSC Fisheries

Chinook Salmon were harvested primarily by hook and line in Johnstone Strait from July 15 to mid-September. Chinook were also incidentally harvested through a small number of gill net and seine net fisheries targeting Pink Salmon that took place mid- to late August. A small number of Chinook Salmon were harvested terminally in the Campbell River by hook and line. First Nations catches in Johnstone Strait can be found in Appendix 4.

Fraser River FSC Fisheries

FSC fisheries took place in the Lower Fraser River between the mouth and Sawmill Creek from August through November 2019. The total number of Chinook harvested from Chinook-directed fisheries and Chum-directed FSC openings or limited participation openings, can be found in Appendix 3 and Appendix 4. No Sockeye-directed fisheries were authorized in 2019. Sockeye, Pink, Coho, and Chum bycatch that occurred during Chinook-targeted FSC openings is also listed in those appendices.

Chinook-directed FSC fisheries took place in the Fraser River and tributaries above Sawmill Creek from April through early October 2019. The total of Chinook harvested, as well as bycatch estimates can be found in those appendices.

4.2.4 FIRST NATIONS COMMERCIAL HARVEST

Somass Economic Opportunity (EO)

In 2019, an agreement was reached with the Hupacasath and Tseshaht First Nations for an Economic Opportunity fishery. The fisheries occurred in portions of Subareas 23-1 and 23-2, in upper Alberni Inlet, including the tidal portion of the Somass River. The target species was Chinook with a bycatch of Coho allowed. There were commercial Chinook openings on August 20, August 25, September 4, September 5, September 10, September 15, September 22, and September 29. The in-season Economic Opportunity TAC for Chinook was 30,750 in 2019 but the total TAC was not caught due to rapid fish migration behavior and lower than anticipated participation in the mid-September openings. The total Chinook catch and Coho bycatch can be found in Appendix 4.

Five Nations Communal Sales Fishery

In 2019, the Department provided communal sale fishery opportunities for the Five Nations (five Nuu-chah-nulth First Nations located on the West Coast of Vancouver Island - Ahousaht, Ehattesaht, Hesquiaht, Mowachaht/Muchalaht, and Tla-o-qui-aht) that included ISBM Chinook. These opportunities were categorized as Nearshore Integrated Hook and Line and Terminal salmon fisheries.

The Nearshore fishery targeted Conuma River enhanced Chinook returns using troll and gillnet. Fishery openings occurred between July 15 and August 29. The initial in-season TAC was 2,314 Chinook.

The Terminal fishery targeted Burman River enhanced Chinook returns using troll and gillnet gear. Fishery openings occurred between August 9 and September 19. The initial in-season TAC was 2,275 Chinook.

The total Chinook catch from the Conuma-targeted fishery and the Burman-targeted fishery can be found in Appendix 4. Chum, pink and Coho were also permitted to be sold.

Fraser River Economic Opportunity and Inland Demonstration Fisheries

Economic Opportunity or inland demonstration fisheries did not occur in 2019 for ISBM Chinook in either the upper or lower reaches of the Fraser River as part of additional management actions to provide protection for Fraser Chinook stocks.

In 2019, no Economic Opportunity or demonstration fisheries occurred for Fraser Sockeye due to extremely low returns and no available Canadian Commercial TAC (CCTAC). There is currently one Inland Commercial Fishing Enterprise (CFE) operating in the Lower Fraser: Harrison Fisheries Authority. This CFE was authorized to conduct a demonstration fishery for Sockeye using gill nets in the Harrison River; however, no fishing occurred as the run size for the Harrison River Sockeye return was not sufficient to support a fishery. Therefore, there were no incidental impacts on Chinook from these fisheries.

Economic opportunity and demonstration fisheries occurred for Fraser Pink in the lower Fraser River in 2019 and were conducted by the Harrison Fisheries Authority and 16 communities from the Port Mann Bridge to Sawmill Creek. Retention of Chinook was not permitted.

In 2019, no Economic Opportunity fisheries for Fraser Chum occurred in the lower reaches of the Fraser River due to the estimated poor in-season Fraser Chum terminal return.

There are currently three Inland CFEs that have operated in the BC Interior: Okanagan Nation Alliance, Upper Fraser Commercial Fishing Enterprise, and Riverfresh (Secwepemc Fisheries Commission). Riverfresh is the only CFE that receives allocation for Chinook (S. Thompson, Summer 4_1 Chinook). In 2019, Riverfresh was not provided a Chinook-directed opportunity due to additional management actions to provide protection for Fraser Chinook Stocks.

4.2.5 COMMERCIAL FISHERIES

Area B Seine

Due to a relatively large forecast of 130,000 Chinook for Robertson Creek Hatchery, Area B seine fisheries were provided in Area 23. The fisheries occurred in portions of Subarea 23-1 and 23-2, upper Alberni Inlet, targeting Chinook with a bycatch of Coho permitted. The fisheries were operated using a pool system with only designated vessels permitted to fish. The fishery opened daily from September 2 to 6 and September 8 to 17. The Area B in-season TAC was 10,762 Chinook. The fisheries in 2019 were not as successful as 2018. This was mainly due to fish migration behaviour, which made them less vulnerable to seine gear. The total Chinook catch and Coho bycatch can be found in Appendix 4.

Area D Gill Net

Area D gill net fisheries were provided in Area 23. The fisheries occurred in portions of Subarea 23-1 and 23-2, in upper Alberni Inlet, targeting Chinook with a bycatch of Coho allowed. The fisheries were opened one night a week in the last two weeks of August. After Labour Day there were two openings nightly in early and mid-September. The fisheries occurred on August 18, August 27, September 3, and September 25. The Area D in-season TAC was 19,988 Chinook. The Area D gill net fisheries were very successful this year, with high catch rates in the August openings. The total Chinook catch and Coho bycatch can be found in Appendix 4.

In 2019, gill net fisheries occurred in Tlupana Inlet (Area 25) targeting Chinook returns to the Conuma River hatchery. Fisheries occurred discontinuously from August 12 to September 12. The total estimated catch during the Chinook-directed fishery can be found in Appendix 4.

Area E Gill Net

There were no Area E gill net fisheries for ISBM Chinook in 2019.

There were no Area E gill net commercial openings in the Fraser River (Area 29) during the 2019 season and no Chinook bycatch.

4.2.6 RECREATIONAL FISHERIES

ISBM Chinook catch and release information from all fisheries can be found in Appendix 4.

West Coast Vancouver Island

In 2019, a strong return of Chinook was expected to the Robertson Creek hatchery and a moderate return to the Conuma River hatchery. Actual returns were near forecast for Robertson Creek and above forecast for Conuma River, and provided good recreational fishing opportunities in terminal areas supported by these enhanced stocks. The annual limit for Chinook salmon in tidal waters, including these areas, was reduced from 30 to 10.

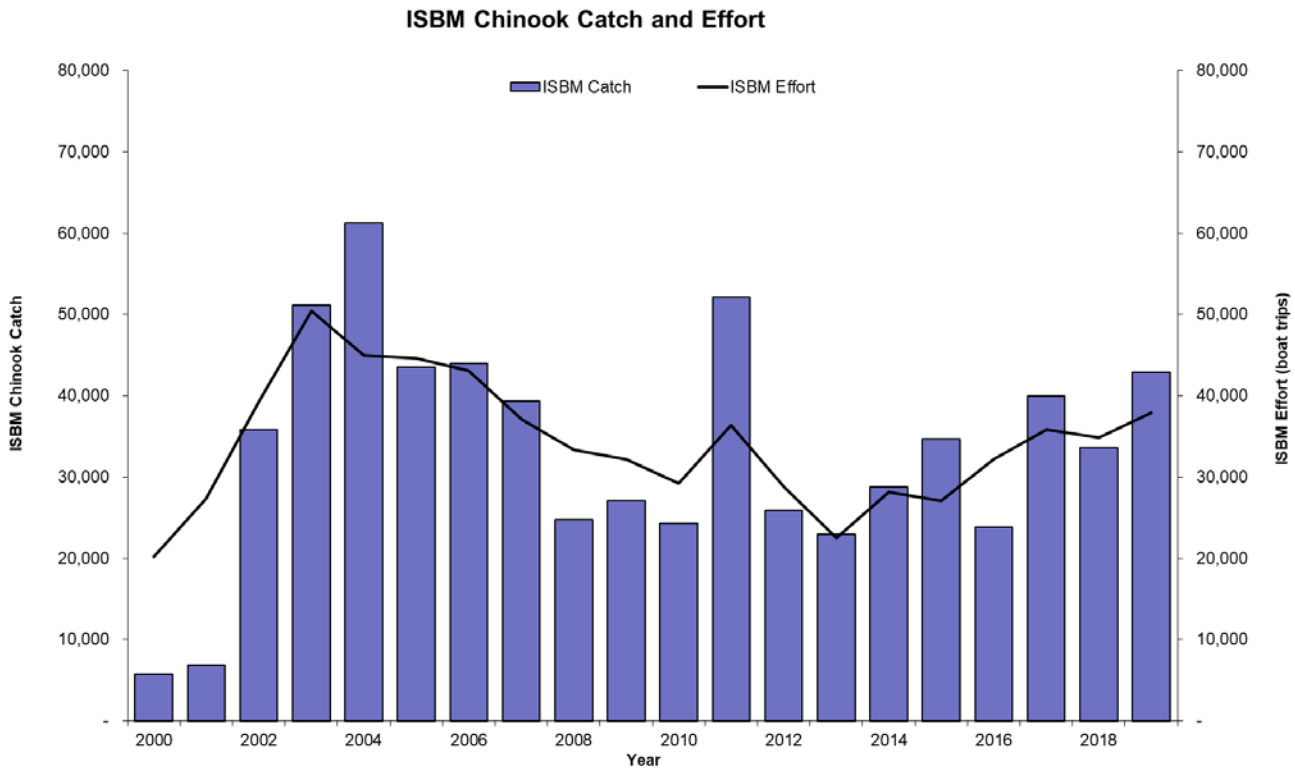


Figure 4-2 Recreational WCVI Chinook ISBM Catch and Effort, 2000 to 2019.

Inside Areas: Johnstone Strait, Strait of Georgia, and Juan de Fuca Strait

The 2019 recreational fisheries in the Inside Areas were further restricted this year to minimize impacts on returning Fraser River Chinook. Significant management measures were implemented to provide additional protection for these stocks and included maximum size limits in specific areas/times, and reductions in daily limits. Salmon closures and Chinook non-retention areas were also implemented in portions of the Fraser approach waters, Southern Gulf Islands and Juan de Fuca Strait to support the recovery of Southern Resident Killer Whales.

The following regulations were in place for the inside areas for 2019:

Queen Charlotte and Johnstone Straits (Subareas 12-1 to 12-13, 12-15 to 12-48):

- 00:01 hours January 1 to 23:59 hours April 18, 2 Chinook per day.
- 00:01 hours April 19 to 23:59 hours July 14, Chinook non-retention;
- 00:01 hours July 15 to 23:59 hours July 31, 1 Chinook per day with a maximum size limit of 80 cm;
- 00:01 hours August 1 to 23:59 hours August 29, 1 Chinook per day.

00:01 hours August 30 to 23:59 hours December 31, 2 Chinook per day.

Strait of Georgia - North - Areas 13 to 17, Area 28 and Subareas 29-1 and 29-2:

- 00:01 hours January 1 to 23:59 hours April 18, 2 Chinook per day.
- 00:01 hours April 19 to 23:59 hours July 14, Chinook non-retention;
- 00:01 hours July 15 to 23:59 hours July 31, 1 Chinook per day with a maximum size limit of 80 cm;
- 00:01 hours August 1 to 23:59 hours August 29, 1 Chinook per day.
- 00:01 hours August 30 to 23:59 hours December 31, 2 Chinook per day.

Strait of Georgia - South and Juan de Fuca - Areas 18, 19 and Subareas 20-3 to 20-7, 29-3 to 29-5 and 29-8:

- 00:01 hours January 1 to 23:59 hours April 18, 2 Chinook per day.
- 00:01 hours April 19 to 23:59 hours July 31, Chinook non-retention;
- 00:01 hours August 1 to 23:59 hours August 29, 1 Chinook per day;
- 00:01 hours August 30 to 23:59 hours December 31, 2 Chinook per day.

In consideration of the increased management measures for Fraser Chinook implemented in the Strait of Georgia and other mixed-stock areas, the previous annual finfish closure near Cape Mudge on Quadra Island and the Chinook non-retention closures near Sentry Shoals, Harwood Island, Denman Island-Hornby Island and Kitty Coleman are no longer in effect. Reductions to the annual limit to 10 Chinook salmon per year were also implemented in 2019 in BC tidal waters, including the inside areas listed above. Chinook management measures also include a minimum size limit of 62 cm in the Johnstone Strait/Queen Charlotte Strait and Strait of Georgia, and Areas South to Cadboro Point (Subarea 19-5). For the Canadian portion of Juan de Fuca Strait south of Cadboro Point, the minimum size limit is 45 cm.

Salmon fishing closures were also implemented from August 1 to October 31 in the following portions of the Southern Gulf Islands and Juan de Fuca to support SRKW:

- Subareas 18-9 and portions of 18-2, 18-4, and 18-5.
- Subareas 20-3 and 20-4.
- Subareas 29-7, 29-9, and 29-10.

- Subarea 29-6 was closed to salmon fishing from June 1 to July 31 and was Chinook non-retention from August 1 to September 30.

In 2019, marine sport fisheries were monitored by creel surveys in three main areas: 1) Juan de Fuca including Victoria (south of Cadboro Point) and Juan de Fuca Strait through Subarea 20-1; 2) Portions of the Strait of Georgia including Areas 14 through 18, that portion of Area 19 north of Cadboro Point, Areas 28 and 29; and 3) Johnstone Strait including Areas 11 to 13. Creel survey monitoring of these fisheries includes using an access point (landing site) survey for collecting catch, CPUE, and biological information combined with an aerial survey for effort counts. In addition, logbook programs, directed at estimating the sport catch by fishing guides during guided trips, were conducted in the Campbell River and intermittently throughout other areas in the South Coast. The Avid Angler program and the Area 13 remote lodges around Stuart Island provided the majority of logbook program data in 2019. Painters Lodge in Campbell River was a regular interview site in 2019 which providing guided catch as well. Electronic survey estimates from the iREC program will also be used to produce catch estimates for those areas where creel surveys did not take place.

The Johnstone Strait creel survey for Areas 11 and 12 was conducted from June through August.

The Strait of Georgia creel survey for Areas 13 and 14 was conducted from May to October, for Area 15 from June to September, for Area 16 from August to September, for Areas 17 and 18 from May to September, and for Areas 19 and the SOG portion of Area 20 from April to October.

Effort, catch and release information from marine fisheries are summarized in Figure 4-3.

Region 1 Vancouver Island Tributaries

River conditions in most tributaries on Vancouver Island were improved in 2019 compared to previous years due to an adequate snowpack, cooler temperatures over the summer and more precipitation during portions of the summer months. All systems in Region 1 that are typically open remained open in 2019, with the exception of Regions 1-1 to 1-6 that are managed using seasonal closures between July 15 to August 31. Many Chinook systems on the east and west coasts of Vancouver Island saw strong Chinook returns in 2019; particularly those from enhanced systems. These returns provided early and productive opportunities for recreational fresh water fisheries. The Campbell River, Qualicum River, Little Qualicum River, Puntledge River, Nitinat River, Somass River and Conuma River all provided some recreational opportunities to harvest Chinook stocks during this time period.

Fraser River and Tributaries

Fraser River Chinook stocks required additional management measures in 2019 due to continued concerns about poor stock status.

Fraser River Mouth (Subareas 29-6, 29-7, 29-9 and 29-10):

- January 1 to December 31, fishing for salmon was closed in this area.

Tidal Fraser River:

In the tidal waters of the Fraser River the following regulations were in place for 2019:

- January 1 to September 13, fishing for salmon was not permitted.

- September 14 to September 20, fishing for Chinook salmon was permitted but Chinook salmon could not be retained.
- September 21 to November 1, fishing for salmon was not permitted.
- November 2 to December 31, fishing for Chinook salmon was permitted but Chinook salmon could not be retained.

Non-Tidal Fraser River:

Region 2

- January 1 to November 2, fishing for salmon was not permitted.
- November 3 to December 31, fishing for Chinook salmon was permitted but Chinook salmon could not be retained.

Region 3: January 1 to December 31, fishing for salmon was not permitted on the Fraser River.

Region 5: January 1 to December 31, fishing for salmon was not permitted on the Fraser River.

Region 7: January 1 to December 31, fishing for salmon was not permitted on the Fraser River.

Fraser River Tributaries:

Fraser River Tributaries - Region 2

There were several tributaries to the Fraser River in which Chinook retention was permitted. These included:

- Alouette River: daily limit of one Chinook from September 1 to December 31;
- Chehalis River: daily limit of four with only one over 50 cm from June 1 until August 31 and a daily limit of four Chinook with only one over 62 cm from September 1 until December 31;
- Chilliwack/Vedder River: daily limit of four with only one over 62 cm from July 1 until August 31, daily limit of four with two over 62 cm from September 1 to December 31; Coquitlam River: daily limit of one Chinook from September 1 to December 31;
- Harrison River downstream of the Highway No. 7 Bridge, daily limit of four with only one over 62 cm from September 1 to December 31.

The Chilliwack/Vedder River recreational fishery was assessed from September 1 to November 15 in 2019. Catch estimates can be found in Appendix 5.

Fraser River Tributaries - Region 3

Thompson River: That portion of the Thompson River from the WTFB signs just downstream of Gold Pan Provincial Park to the easterly border of the Skihist Ecological reserve along the Thompson River located at 50°15'N, 121°31'W; this is approximately 5 km northeast of Lytton at Skihist Park.

- September 13 to September 22, daily limit of four Chinook, zero over 50 cm.

Kamloops Lake: In the waters of Kamloops lake upstream of the fishing boundary signs at the outlet of Kamloops Lake.

- August 22 to September 22, 2019 daily limit of four Chinook, only one over 50 cm.

South Thompson River: That portion of the South Thompson River from the green can buoy near outlet of Little River, including Little Shuswap Lake, to the fishing boundary sign approximately 100 m downstream of Campbell Creek.

- August 16 to September 22, daily limit of four Chinook, only two greater than 50 cm. There is a monthly quota of six Chinook from the South Thompson River.

Fraser River Tributaries - Region 5

January 1 to December 31, fishing for salmon was not permitted in any portion of the Fraser watershed in Region 5.

Fraser River Tributaries - Region 7

January 1 to December 31, fishing for salmon was not permitted in any portion of the Fraser watershed in Region 7.

Fraser River Tributaries - Region 8

Note: there is a monthly limit of four Chinook in Region 8.

Mabel Lake: That portion of Mabel Lake that is both northerly of a line drawn from a white triangular fishing boundary sign situated at the northern edge of Mabel Lake Provincial Park to the prominent point of land on the western shore; and southerly of a line drawn between two white triangular fishing boundary signs located on opposite shores approximately 1 km from Wap Creek.

- August 16 to September 12, daily limit of four Chinook, only two over 50 cm.

Middle Shuswap River: No fishing for salmon.

Lower Shuswap River: That portion of the Lower Shuswap River upstream from white triangular fishing boundary signs upstream of the Mara Bridge to Mable Lake, except no fishing in those waters 50 metres upstream and downstream of the Trinity Valley Road Bridge.

August 16 to September 12, daily limit of four Chinook, only two over 50 cm.

4.2.7 EXCESS SALMON TO SPAWNING REQUIREMENTS (ESSR) FISHERIES

The Tseshaht and Hupacasath First Nations were issued a joint Excess Salmon to Spawning Requirements (ESSR) Licence for Chinook and Coho at the Robertson Creek Hatchery facility.

The Ditidaht First Nation was issued an ESSR Licence for Chinook, Coho and Chum at Nitinat Lake and Nitinat hatchery.

The Mowachaht/Muchalaht First Nation was issued an ESSR licence to harvest Chinook, hatchery-marked Coho, and Chum from the Conuma River and hatchery.

A Chinook Salmon ESSR fishery for the Qualicum First Nation took place at the Big Qualicum hatchery September 16 – October 18, 2019, and at Little Qualicum hatchery October 9-20, 2019.

The K’ómoks First Nation was issued an ESSR licence to harvest Fall Chinook Salmon and Chum Salmon at the DFO Puntledge River Hatchery between September 27 and December 31, 2019. Harvest of ESSR Fall Chinook Salmon took place between October 8 and October 22, 2019.

There were ESSR fisheries at the Capilano hatchery in 2019 that harvested Chinook salmon.

There were ESSR fisheries at the Chilliwack hatchery in 2019 that harvested Chinook salmon.

There were ESSR fisheries at the Chehalis hatcheries in 2019 that harvested Chinook salmon.

The A-Tlegay Fisheries Society was issued an ESSR licence to harvest Chinook salmon at the DFO Quinsam River Hatchery between October 15 and November 15, 2019, however the ESSR harvest did not take place due to insufficient surplus.

No Johnstone Strait ESSR opportunities on Chinook occurred in 2019.

There were no Interior BC ESSR opportunities on Chinook in 2019

All ESSR harvest information can be found in Appendix 7.

5 FRASER RIVER

5.1 SOCKEYE SALMON

5.1.1 OBJECTIVES AND OVERVIEW

In 2019 the Fraser River Panel (FRP) adopted the p50 probability run size forecast for all run timing groups (4.8 M Fraser Sockeye) for pre-season planning purposes. At the p50 and p25 run size forecasts TAC for international sharing was available and pre-season plans took this into consideration. All fishery planning focused on staying within constraints to minimize impacts on less abundant stock groups and species of concern. Actual in-season harvest opportunities were dependent on in-season stock assessments.

Fishing plans incorporate provisions to meet escapement objectives and meet conservation objectives for stocks of concern while considering other international and domestic objectives. Fishing plans include the following assumptions and guiding principles in no particular order:

- The Fraser River Panel (FRP) operated in accordance with Chapter 4, Annex IV of the Pacific Salmon Treaty;
- The U.S. share of the annual Fraser River Sockeye Salmon total allowable catch (TAC), harvested in the waters of Washington State, was set at 16.5% of the aggregate. To the extent practicable, the FRP shall manage the United States fishery to implement a fishing plan that concentrates harvest on the most abundant management group or groups;
- It is understood that the U.S. harvest may exceed 16.5% of the TAC for one or more of the less abundant management groups by a small but acceptable amount despite concentrating the harvest in this manner;
- For computing TAC by stock management groupings, the Aboriginal Fishery Exemption (AFE) of 400,000 Fraser River Sockeye, shall be allocated to management groups as follows: The Early Stuart Sockeye exemption shall be up to 20% (maximum 80,000) of the Fraser River AFE, and the remaining balance of the latter exemption shall be based on the average proportional distribution of First Nations Food, Social and Ceremonial catch for the most recent three cycles and modified annually as required to address concerns for Fraser River Sockeye stocks and other species, and as otherwise agreed to by the Fraser River Panel;
- It was anticipated that an in-season run size estimate for Cultus Lake Sockeye would not be possible due to low abundance relative to co-migrating Sockeye stocks. As a result the Cultus exploitation rate is assumed to be the same as the exploitation rate from the similarly timed Late run stocks (excluding the Birkenhead and Birkenhead-type miscellaneous stocks), caught seaward of the confluence of the Fraser and the Harrison Rivers;
- The four run timing aggregates identified under the Pacific Salmon Treaty Annex generally contain stocks with similar timing in the marine area. Recent trends in timing of some stocks, including Raft River and North Thompson (in the Early Summer run prior to 2012), and Harrison River (in the Late run prior to 2012) Sockeye now differ substantially from the other stocks in their respective historical run timing groups. Fisheries and Oceans Canada continues to manage these stocks as part of the summer run

aggregate to better align these stocks with other stocks of similar run timing. Escapement plans, management adjustments and harvest rules have been adjusted to account for this change;

- Canada's escapement plan specified escapement requirements that varied with run size for each of the run timing aggregates;
- The Total Allowable Mortality (TAM) cap describes the upper range of the total mortality (including management adjustments and exploitation rate). The TAM cap was 60% for all run timing/management groups;
- At low abundances, low abundance exploitation rates (LAERs) are implemented to protect 80-90% of the run timing aggregate (10-20% LAER) while allowing for fisheries on more abundant co-migrating run timing groups and/or other species. In 2019 Canada's escapement plan permitted up to a 20% LAER for all stock groups with the exception of Early Stuart sockeye which permitted up to a 10% LAER;
- The allowable harvest in a LAER situation is not a target; the objective is to allow as many fish as possible to pass to the spawning grounds. In most circumstances harvests under a LAER scenario would be considered incidental harvest or bycatch only; however, in some circumstances limited directed harvest in terminal areas may be considered. All fishery impacts are to be accounted for under the LAER;
- In 2019, Early Stuart Sockeye window closures and other fishing restrictions were planned for commercial, recreational and First Nations fisheries to protect a significant proportion (90%) of the Early Stuart return. These measures included a 3-week rolling window closure based on the run timing of the Early Stuart Sockeye migration through various fishery areas. In some years, an additional week long closure has been added to the end of the Early Stuart window closure in order to protect the earliest of the early-timed Early Summer Sockeye that may have conservation concerns; and
- Conservation concerns for other Sockeye stocks and species continued to impact the planning of Sockeye fisheries. The stocks and species of concern in 2019 included: Cultus Lake Sockeye, Nimpkish River Sockeye, Sakinaw Lake Sockeye, Interior Fraser River Coho, Southern BC Chinook including Fraser River Chinook, and Interior Fraser River Steelhead.

5.1.2 STOCK STATUS

Please Note: Tables 5-2 and 5-4 are adapted from or courtesy of the Pacific Salmon Commission.

5.1.2.1 PRE-SEASON ASSESSMENT

Pre-season expectations were for a median run size (p50 level) of 4,795,000 Fraser River Sockeye Salmon with a one-in-two chance that the run size would be between 2,891,000 (p25 level) and 8,676,000 (p75 level).

Table 5-1 2019 pre-season run size abundance forecast range by management group for Fraser Sockeye

Run timing group	Probability that return will be at/or below specified run size				
	10%	**25%**	**50%**	**75%**	**90%**
Early Stuart	18,000	27,000	41,000	61,000	92,000
Early Summer	112,000	221,000	465,000	898,000	1,753,000
Summer	1,553,000	2,454,000	3,930,000	7,048,000	11,187,000
Late	111,000	189,000	359,000	669,000	1,265,000
Total	1,794,000	2,891,000	4,795,000	8,676,000	14,297,000

The pre-season diversion rate forecast for Fraser River Sockeye through Johnstone Strait was 69%. Expected Area 20 50% migration timing dates were July 5th for Early Stuart, July 30th for Early Summer, August 10th for Summer, and August 18th for Late-run Sockeye.

Pre-season spawning escapement goals at the p50 run size forecasts were 41,000 Early Stuart, 186,000 Early Summer, 1,572,000 Summer and 336,600 Late-run Sockeye for a total of 2,136,600 Sockeye spawners (Table 5-2).

Table 5-3. Fraser Sockeye 2019 Pre-season (top) and Final In-season (bottom) Values for Total Allowable Catch (TAC) and Other Management Parameters.

Date		Management Group	Total Abundance	Spawning Escapement Target	TAM	pMA	Manage-ment Adjust.	Test Fishing	Aboriginal Fishery Exemption	Total Deductions	Total Allowable Catch	Harvest (includes for AFE)	Catch to date	Mission Escape. to date	50% Migration Date Area 20	Diversion Rate To-date
June 19	Pre-season	Early Stuart	41,000	41,000	0.00	0.69	28,300	500	3,600	41,000	0	0	0	0	5-Jul	
		Early Summer	465,000	186,000	0.60	0.45	83,700	9,500	48,200	327,400	137,600	185,800	0	0	30-Jul	
		Summer	3,930,000	1,572,000	0.60	0.09	141,500	53,000	290,100	2,056,600	1,873,400	2,163,500	0	0	10-Aug	
		Late	359,000	336,600	0.06	0.56	188,500	4,000	58,100	359,000	0	0	0	0	18-Aug	
		Sockeye	**4,795,000**	**2,135,600**			**442,000**	**67,000**	**400,000**	**2,784,000**	**2,011,000**	**2,349,300**	**0**	**0**		**69%**
September 24	In-season	Early Stuart	26,000	26,000	0.00	0.69	17,900	100	2,500	26,000	0	0	46	25,908	8-Jul	
		Early Summer	94,000	94,000	0.00	0.45	42,300	1,100	8,300	94,000	0	0	1,011	92,530	29-Jul	
		Summer	360,000	360,000	0.00	0.09	32,400	5,000	31,000	360,000	0	0	5,039	339,006	19-Aug	
		Late	20,000	20,000	0.00	0.56	11,200	500	1,500	20,000	0	0	343	21,679	19-Aug	
		Sockeye	**500,000**	**500,000**			**103,800**	**6,700**	**43,300**	**500,000**	**0**	**0**	**6,439**	**479,124**		**84%**

* The TAC is determined by the run sizes and TAC deductions (spawning escapement targets, management adjustments, projected test fishing catches and AFE Exemptions) that were in effect when the the Fraser River Panel control of the last U.S. fishery area was relinquished.

** In a no TAC situation, the allowable harvest is the maximum harvest allowed under LAER management as identified in Canada's Escapement Plan. However the LAER is not a target and is usually by-catch in fisheries directed on other stocks or species with some limited directed terminal harvest. All impacts from all fisheries count towards the LAER.

*** Available Harvest = total abundance minus spawning escapement target.

**** The Fraser River Panel relinquished control of U.S. Panel Area Waters on Sept. 17th in Areas 4B, 5, 6c, 6 & 7, Sept. 21th in Area 7A, and Oct. 5th in the Apex. Oct. 5th is the final relinquishment date.

The goals for each Sockeye management group were established by applying Canada's Spawning Escapement Plan to the forecasted pre-season run size. For pre-season planning purposes, the harvest rule for Early Stuart Sockeye was constrained by a Low Abundance Exploitation Rate (LAER) limit of up to 10%. The Early Summer, Summer, and Late Sockeye LAER limits were up to 20%. Harvest rules were further constrained by a 60% Total Allowable Mortality (TAM) rate for all management groups (Table 5-4).

Table 5-5 Fraser River Sockeye Salmon 2019 Escapement Plan and Application of the Plan to each Management Group across a Range of Forecast Abundances

Management Unit	Harvest Rule Parameters: Low Abundance ER (LAER)	TAM Cap	Lower Fishery Reference Point	Upper Fishery Reference Point
Early Stuart	10%	60%	108,000	270,000
Early Summer (w/o misc)	20%	60%	100,000	250,000
Summer (w/o misc)	20%	60%	1,000,000	2,500,000
Late (w/o misc)	20%	60%	300,000	750,000

Management Unit		Pre-season Forecast Return				
		p10	p25	**p50**	p75	p90
Early Stuart	forecast	18,000	27,000	**41,000**	61,000	92,000
	TAM Rule (%)	0%	0%	**0%**	0%	0%
	Escapement Target	18,000	27,000	**41,000**	61,000	92,000
	MA	12,400	18,600	**28,300**	42,100	63,500
	Esc. Target + MA	30,400	45,600	**69,300**	103,100	155,500
	LAER	10%	10%	**10%**	10%	10%
	Available ER at Return	0%	0%	**0%**	0%	0%
	Allowable ER	10%	10%	**10%**	10%	10%
	Allowable Harvest	1,800	2,700	**4,100**	6,100	9,200
	2019 Performance					
	Projected S (after MA)	9,600	14,300	**21,800**	32,400	48,900
	BY Spawners	10,096	10,096	**10,096**	10,096	10,096
	Proj. S as % BY S	95%	142%	**216%**	321%	484%
	cycle avg S	44,409	44,409	**44,409**	44,409	44,409
	Proj. S as % cycle S	22%	32%	**49%**	73%	110%

Management Unit		Pre-season Forecast Return				
		p10	p25	**p50**	p75	p90
Early Summer (w/o RNT)	*lower ref. pt. (w misc)*	147,400	157,900	**167,900**	161,200	165,500
	upper ref. pt. (w misc)	368,400	394,600	**419,700**	403,100	413,800
	forecast (incl. misc)	112,000	221,000	**465,000**	898,000	1,753,000
	TAM Rule (%)	0%	29%	**60%**	60%	60%
	Escapement Target	112,000	157,900	**186,000**	359,200	701,200
	MA	50,400	71,100	**83,700**	161,600	315,500
	Esc. Target + MA	162,400	229,000	**269,700**	520,800	1,016,700
	LAER	20%	20%	**20%**	20%	20%
	Available ER at Return	0%	0%	**42%**	42%	42%
	Allowable ER	20%	20%	**42%**	42%	42%
	Allowable Harvest	22,400	44,200	**195,300**	377,200	736,300
	2019 Performance					
	Projected S (after MA)	61,800	122,000	**186,100**	359,400	701,500
	BY Spawners	137,845	137,845	**137,845**	137,845	137,845
	Proj. S as % BY S	45%	89%	**135%**	261%	509%
	cycle avg S	144,830	144,830	**144,830**	144,830	144,830
	Proj. S as % cycle S	43%	84%	**128%**	248%	484%

Management Unit		Pre-season Forecast Return				
		p10	p25	**p50**	p75	p90
Summer	*lower ref. pt. (w misc)*	1,109,500	1,109,500	**1,109,500**	1,109,500	1,109,500
(w. RNT & Har)	*upper ref. pt. (w misc)*	2,773,900	2,773,900	**2,773,900**	2,773,900	2,773,900
	forecast	1,553,000	2,454,000	**3,930,000**	7,048,000	11,187,000
	TAM Rule (%)	29%	55%	**60%**	60%	60%
	Escapement Target	1,109,500	1,109,500	**1,572,000**	2,819,200	4,474,800
	MA	99,900	99,900	**141,500**	253,700	402,700
	Esc. Target + MA	1,209,400	1,209,400	**1,713,500**	3,072,900	4,877,500
	LAER	20%	20%	**20%**	20%	20%
	Available ER at Return	22%	51%	**56%**	56%	56%
	Allowable ER	22%	51%	**56%**	56%	56%
	Allowable Harvest	343,600	1,244,600	**2,216,500**	3,975,100	6,309,500
	2019 Performance					
	Projected S (after MA)	1,112,600	1,112,600	**1,576,400**	2,827,100	4,487,300
	BY Spawners	977,005	977,005	**977,005**	977,005	977,005
	Proj. S as % BY S	114%	114%	**161%**	289%	459%
	cycle avg S	651,121	651,121	**651,121**	651,121	651,121
	Proj. S as % cycle S	171%	171%	**242%**	434%	689%

Management Unit		Pre-season Forecast Return				
		p10	p25	**p50**	p75	p90
Late	*lower ref. pt. (w misc)*	336,600	336,600	**336,600**	336,600	336,600
(w/o Har)	*upper ref. pt. (w misc)*	841,400	841,400	**841,400**	841,400	841,400
	forecast	111,000	189,000	**359,000**	669,000	1,265,000
	TAM Rule (%)	0%	0%	**6%**	50%	60%
	Escapement Target	111,000	189,000	**336,600**	336,600	506,000
	MA	54,400	98,300	**188,500**	198,600	323,800
	Esc. Target + MA	165,400	287,300	**525,100**	535,200	829,800
	LAER	20%	20%	**20%**	20%	20%
	Available ER at Return	0%	0%	**0%**	20%	34%
	Allowable ER	20%	20%	**20%**	20%	34%
	Allowable Harvest	22,200	37,800	**71,800**	133,800	435,200
	2019 Performance					
	Projected S (after MA)	59,600	99,500	**184,900**	336,100	504,400
	BY Spawners	68,022	68,022	**68,022**	68,022	68,022
	Proj. S as % BY S	88%	146%	**272%**	494%	742%
	cycle avg S	465,982	465,982	**465,982**	465,982	465,982
	Proj. S as % cycle S	13%	21%	**40%**	72%	108%
Allowable Harvest (TF, US, CDN)		390,000	1,329,300	**2,487,700**	4,492,200	7,490,200
Total projected spawners		1,243,600	1,348,400	**1,969,200**	3,555,000	5,742,100

Pre-season Management Adjustments (MAs) of 28,300 Early Stuart, 83,700 Early Summer, 141,500 Summer-run and 188,500 Late-run Sockeye were added to the spawning escapement targets to increase the likelihood of achieving the escapement targets. The application of a LAER for any management group indicates that spawning escapement targets are unlikely to be reached and therefore obviates the need for MAs. In 2019 this was the case pre-season for Early Stuart, as it was apparent that for the entire range of pre-season run size forecasts LAER management was necessary. Early Summer Sockeye would be in a LAER scenario around run sizes less than p50, Summer Sockeye would not be in a LAER until an abundance less than p10, and Late Sockeye would be in a LAER scenario at run sizes less than p75.

The pre-season MAs were derived from historical proportional differences between estimates (pDBEs). For all aggregates, except the Late run, the pre-season pDBEs were historical medians from all cycle years. For Late run the Panel agreed to use the weighted average of the historical odd-year median for Late run excluding Birkenhead and the all-year median for Birkenhead. If the Late run upstream timing was later than September 15th the MA would be the weighted average of the all years timing model for Late run excluding Birkenhead and the all years median for Birkenhead.

The projected Total Allowable Catch (TAC) of Fraser River Sockeye for international sharing based on the median forecasted abundances and bilaterally agreed deductions was approximately 2,011,000 Sockeye, of which 16.5% were allocated to the United States (U.S.).

Pre-season model runs indicated that if the in-season return was less than the median forecast and similar to the p25 forecast there would still be some international TAC. In Canada, at the p25 forecast, no TAC would be available for commercial or recreational fisheries directed on Sockeye and limited harvest opportunities would

be available for First Nations FSC fisheries due to management constraints (e.g. Early Stuarts, Early Summers and Lates being in LAERs). Pre-season model runs also indicated it was unlikely the Summer run TAC could be fully harvested due to the overlap in return timing with other groups that would not have TAC (Figure 8-1).

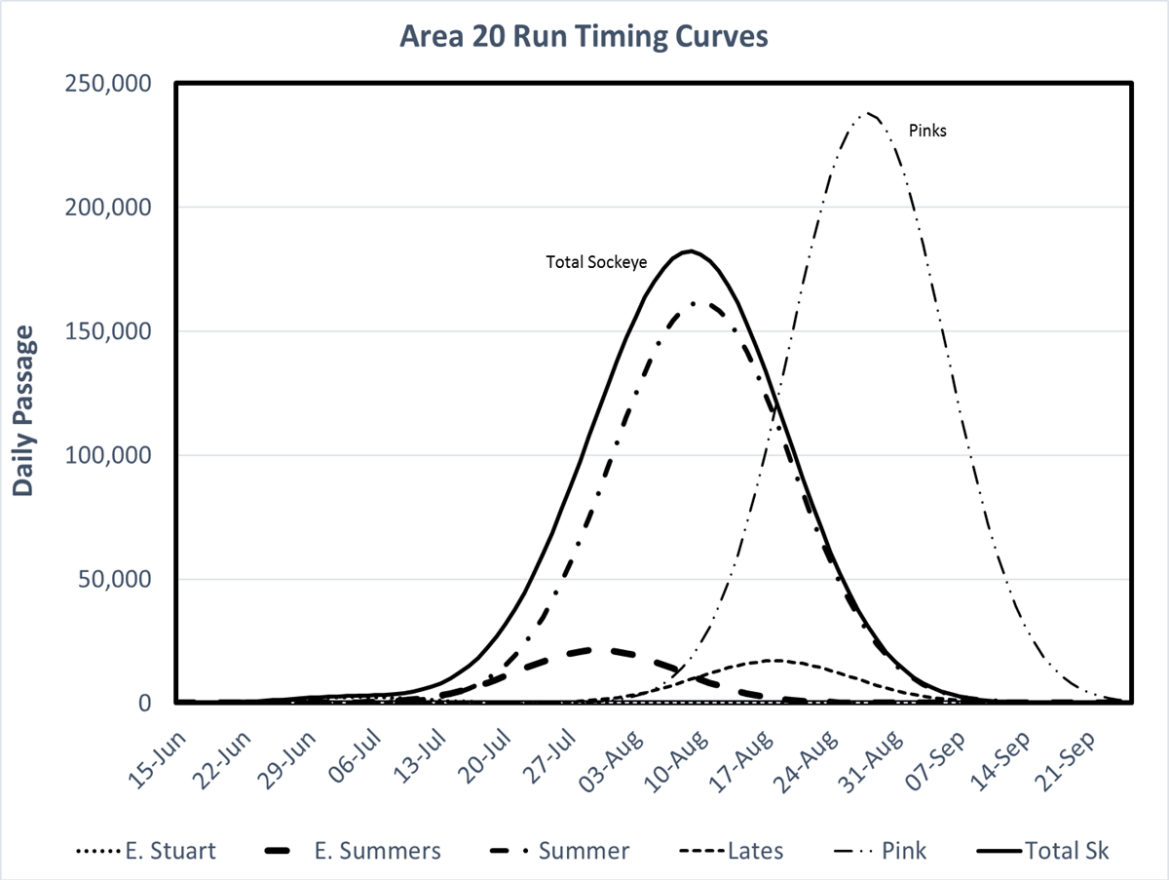


Figure 5-1 Pre-Season Projections of Daily Fraser River Sockeye Salmon Abundance by Management Group

5.1.3 IN-SEASON ASSESSMENT

Overall the marine migration timing was similar to pre-season expectations for all management groups with the exception of Summer runs which were much later than anticipated: 3 days later for Early Stuart, 1 day earlier for Early Summer, 9 days later for Summer, and 1 day later for Late-run Sockeye.

The Johnstone Strait post-season diversion rate was 84% compared to a pre-season adopted value of 69%.

Returns for all management groups were well below median pre-season forecast levels:

- The return of Early Stuarts was low: 26,000 or 37% lower than the pre-season 50% probability level (p50) forecast (41,000), i.e. closer to the p25 forecast (27,000).
- The return of Early Summers was very low: 94,000 or 80% lower than the pre-season p50 forecast (465,000), i.e. closer to the p10 forecast overall (112,000).

- The return of Summers was very low: 343,000 or 91% lower than the pre-season p50 forecast of 3,930,000. All stock groups were below the p10 forecast.

- The return of Lates was also very low: 23,000 or 94% lower than the pre-season p50 forecast of 359,000.

A landslide in the Big Bar area on the Fraser River upstream of Lillooet was discovered on June 23, 2019 and is thought to have occurred sometime between October and November 2018. It created a 5-metre-high waterfall/cascade that posed a migration passage challenge to salmon migrating to rivers and streams upstream of the slide. The Big Bar landslide had notable impacts to Sockeye passage to the spawning grounds, especially prior to August 28, 2019 when water flow decreased enough to enable greater natural Sockeye migration above the slide. In-season estimates indicated that 100% of Early Stuart, 58% of Early Summer, 90% of Summer, and 0% of Late Sockeye were expected to migrate past the Big Bar slide. Preliminary passage estimates past the slide, with very limited natural passage as well as helicopter assisted passage, were only estimated to be approximately 20% for Early Stuart, 24% for Early Summer, and 70% for Summer Sockeye. Due to uncertainty surrounding the implications of the Big Bar landslide and the low in-season return estimates, the Department decided to: (i) delay and not licence Sockeye-directed fisheries as no in-season TAC was identified, and (ii) plan fisheries directed on other species in a way that allowed as many Sockeye to reach the spawning grounds as possible by minimizing bycatch impacts to levels well below the LAER limits identified in the escapement plan. Management Adjustments had no management implications in-season, but post-season, the Big Bar landslide will impact the Difference Between Estimates (DBEs) for Early Stuart, Early Summer and Summer runs.

A Unified Command that includes all levels of government (First Nations, provincial, federal) came together to lead response operations. Information about the Big Bar Slide was communicated through DFO fishery notices on Fraser River Sockeye Updates, Fraser River Panel meetings, the Province of BC's website (https://www2.gov.bc.ca/gov/content/safety/emergency-preparedness-response-recovery/emergency-response-and-recovery/incident-summaries/big-bar-landslide-incident), and the Fraser River Aboriginal Fisheries Secretariat (https://www.frafs.ca/node/75).

Fraser River discharge was far below the mean discharge (1981 to 2010) through most of June (near minimum discharge levels part of the time), slightly below the mean for most of July despite flooding on the Chilcotin River which was accompanied by higher water levels, turbulence and debris, near the mean for most of August, and near or above the mean for September. For most of the season, the Fraser River daily water temperatures fluctuated a few degrees above the historical mean reaching historical maximum observations at a few points during the season.

5.1.4 POST-SEASON ASSESSMENT

The preliminary post-season return of adult Fraser Sockeye was estimated to be ~90% below the pre-season median forecast and the smallest return on record (1893 to 2019) (Table 5-2). The run size was ~78% below the brood year run size (2.2 M) and ~90% below the 2019 cycle line average of 4.8 M).

Even though there were no licenced Sockeye-directed fisheries in 2019, there were fisheries for other species where Fraser Sockeye were encountered, notably Chinook and Pink salmon-directed fisheries (e.g. in Canada, FSC for Chinook and Pink, commercial (including economic opportunity and demonstration) for Pink; in

Washington, in both Treaty Indian and All Citizens Pink fisheries). Fishery-induced mortality estimates were applied to all non-retained Sockeye encountered in these fisheries. There was no Fraser Sockeye TAC for international sharing, based on the calculation method set out in Annex IV, Chapter 4 of the Pacific Salmon Treaty. As such there was no U.S. share, the Canadian share of the TAC, including the Aboriginal fisheries exemption (AFE), comprised the entire TAC.

The total Canadian Fraser Sockeye catch (either directed or bycatch) can be found in Appendix 5 as well as Appendices 1 and 2. The preliminary post-season exploitation rate is estimated to be 3.3%. See Table 5-4 for preliminary projected post-season exploitation rates relative to allowable exploitation rates.

Table 5-4. Preliminary 2019 Post-Season Exploitation Rate Estimates for All Fraser Sockeye Catch by Management Group

Management Group	**Early Stuart**	**Early Summer**	**Summer**	**Late**	**Total**
Preliminary Exploitation Rate	0.7%	2.8%	3.8%	1.7%	3.3%
Allowable Exploitation Rate*	10.0%	20.0%	20.0%	20.0%	19.4%
LAER?*	Yes	Yes	Yes	Yes	Yes

*The Low Abundance Exploitation Rate (LAER) is not a target. Due to the very low returns, as well as challenges and uncertainties surrounding the Big Bar landslide in 2019, all efforts were made to minimize fisheries impacts to Fraser Sockeye.

DFO's preliminary estimates of spawning escapements to streams in the Fraser River watershed are as follows:

Table 5-5. Preliminary 2019 Fraser Sockeye Salmon Escapement Summary by Management Unit.

Management Unit	Spawning Escapement	Spawning Success	% high precision
Early Stuart	89	100%	0%
Early Summer	45,057	96.8%	45.9%
Summer	246,871	97.8%	95.6%
Late	10,822	98.9%	49.8%
Total	302,839	97.7%	

Ongoing post-season work continues on the following topics that were highlighted during the 2019 season:

1. **Impacts of the Big Bar landslide:** The effect of the Big Bar landslide on 2019 passage and escapement on the Fraser River is still being evaluated. Work to mitigate the effects of the Big Bar slide are ongoing, and potential implications for passage in 2020 or in the future are still uncertain and will require ongoing evaluation.

2. **Low productivity:** In recent years there has been declining productivity, climate change and the increased variability that accompanies it, as well as low Sockeye abundances (the two lowest on record occurred in 2016 and 2019). As part of adaptive management, DFO will be reviewing potential adjustments/improvements to current harvest control rules, alternative strategies that take into account

changing conditions and key uncertainties, and what implications there may be for future advice. Initial work will begin in 2019 through the Fraser River Sockeye Spawning Initiative (FRSSI) and is anticipated to be ongoing in 2020 and 2021. Forecast model methods may also be reviewed.

3. **Estimation of species composition and passage at Mission hydroacoustic site**: There are a variety of methods used to determine the number of Sockeye, Pink and Chinook salmon that pass by Mission. The Mission estimates are critical to in-season estimates of run size and migration timing. For example, Sockeye escapement estimates are typically based on total salmon past Mission minus Pink and Chinook. When Pink proportions increase, another method is used instead (i.e. Sockeye CPUE at Whonnock multiplied by the expansion line). Species proportions are also derived from hydroacoustic-based length data and the previous year's species-specific average lengths. These methods and others have been reviewed by the Fraser River Panel Technical Committee but remain a considerable source of uncertainty. If numbers of one species are inaccurately or imprecisely estimated it may affect in-season estimates and expectations of catch of the other species in in-river fisheries. DFO is looking to further review these methods in future years.

4. **Species and stocks of concern:** In 2017, the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) determined that of the 24 Fraser Sockeye designatable units (DUs), 8 were endangered, 2 were threatened, and 5 were of special concern. Recovery Potential Assessments are underway in 2019.

5.1.5 FIRST NATIONS FSC AND TREATY DOMESTIC FISHERIES

Due to extremely low returns and uncertainty surrounding the impacts of the Big Bar rock slide, there were no licenced Sockeye-directed fisheries in 2019. There were fisheries in both marine and in-river for other species where Fraser Sockeye were encountered, notably Chinook and Pink Salmon-directed fisheries (e.g. in Canada, FSC for Chinook and Pink).

For marine FSC fisheries, the retention of Sockeye was not authorized in 2019. First Nations were encouraged to work with the Department to plan fisheries directed at other species (e.g. Fraser Pink Salmon) where Fraser Sockeye may be present. There was very little effort and catch of other species in 2019.

For FSC fisheries in the Fraser River, licences indicated that the fishery was limited to the target species (Chinook or Pink salmon), and all efforts and attempts shall be made to return all non-target species including Sockeye Salmon, Steelhead and Sturgeon to the water alive and unharmed. In Lower Fraser Above Port Mann (APM) areas, dead Sockeye could be retained in the first FSC fishery (August 9th to 10th), after which Sockeye could not be retained. Gear-specific fishery-induced mortality estimates, as described in the IFMP, were applied to all non-retained Sockeye encountered in these fisheries.

For catch estimates, see Appendix 5.

5.1.6 COMMERCIAL FISHERIES

There were no directed commercial fisheries on Fraser River Sockeye in Canada or the United States in 2019.

5.1.7 RECREATIONAL FISHERIES

5.1.7.1 TIDAL WATERS

In southern BC in all areas except Area 23 (Barkley Sound), the marine recreational fishery was not permitted to retain Sockeye Salmon in 2019. However, the creel survey reported a small number of Sockeye kept in areas closed to Sockeye retention.

The tidal waters of the Fraser River remained closed to fishing for Sockeye Salmon in 2019.

5.1.7.2 NON-TIDAL WATERS

The non-tidal waters of the Fraser River remained closed to fishing for Sockeye Salmon in 2019.

For catch estimates, see Appendix 5.

5.1.8 EXCESS SALMON-TO-SPAWNING REQUIREMENTS (ESSR) FISHERIES

There were no ESSR opportunities directed on Fraser River Sockeye in 2019.

5.2 PINK SALMON

5.2.1 OBJECTIVES AND OVERVIEW

In 2019 the Fraser River Panel (FRP) adopted a pre-season fishing plan at the p50 probability run size forecast for Fraser Pink Salmon (5.02 M) for pre-season planning purposes. At the p50 run size forecast TAC for international sharing was available and pre-season plans took this into consideration. All fishery planning focused on staying within constraints to minimize impacts on other pink stocks and species of concern. Actual in-season harvest opportunities were dependent on in-season stock assessments.

Fishing plans incorporate provisions to meet escapement objectives and meet conservation objectives for stocks of concern while considering international and domestic objectives. Fishing plans include the following assumptions and guiding principles (in no particular order):

- The FRP operated in accordance with Chapter 4, Annex IV of the Pacific Salmon Treaty;
- The U.S. share of the annual Fraser River Pink Salmon total allowable catch (TAC), harvested in the waters of Washington State shall not exceed 25.7% of the TAC;
- Canada’s escapement plan specified escapement requirements that varied with run size;
- The escapement target varies with run size and the maximum exploitation rate cap was 70%;
- Harvest of Fraser Pink Salmon may be constrained by the management objectives for Fraser Sockeye and for other stocks or species of concern, particularly Interior Fraser River (IFR) Coho Salmon and IFR Steelhead;
- Due to conservation concerns alternative fishing gear and fishing strategies may be employed to access Fraser Pink TAC. Alternative gears used in the past have included beach seines, shallow seines, and fish wheels in the Fraser River. In the marine areas, varying fishing strategies and gear are considered such as allowing purse seines with independent observer coverage to access areas at the mouth of the river and possibly within the river.

- Further, when Pink TAC is available and there are bycatch constraints for other species (i.e. Fraser Sockeye) the Department may consider decision rules similar to recent years where the total Sockeye mortalities associated with a gear specific Pink fishery is 1% or less for Sockeye. This calculation takes into account the release mortality rate of the gear being used to harvest Pink Salmon as well as the estimated proportion of Sockeye expected to be encountered in the fishery.

5.2.2 STOCK STATUS

Please Note: Figure 5-1 and Table 5-2 are adapted from or courtesy of the Pacific Salmon Commission.

5.2.3 PRE-SEASON ASSESSMENT

Pre-season expectations were for a median run size (p50 level) of 5.02 million Fraser River Pink Salmon with a 50% chance that the run size would be between 3.58 million (at p25) and 7.51 million (p75).

Pre-season expectations of diversion rate for Fraser River Pink through Johnstone Strait was 50% and the projected Area 20 50% migration timing date was August 28th.

The pre-season spawning escapement target was 4.48 million Fraser River Pink spawners at the median forecast (p50).

Harvest constraints were established by applying Canada's Fraser Pink Escapement Plan to the forecasted pre-season run size distribution. The harvest rate for Fraser River Pink Salmon varied with abundance and was constrained by a 70% exploitation rate.

The projected Total Allowable Catch (TAC) of Fraser River Pink for international sharing based on the median forecasted abundance and bilaterally agreed deductions was 535,600 Fraser Pink, of which 25.7% were allocated to the United States (U.S.).

Table 5-6 Fraser Pink Escapement Plan and Application Across a Range of 2019 Forecast Abundances

2019 Fraser Pink Escapement Plan

Run Size	Escapement Plan
Less than 7.059M	Exploitation rate increases linearly from 0% at run size =0 to 15% at run size = 7.059M
Between 7.059M-20M	Fixed Escapement. Escapement goal = 6,000,000
Greater than 20M	Exploitation Rate Cap = 70%

	2019 Pre-season Forecast Return				
	p10	p25	**p50**	p75	p90
forecast	2,530,000	3,577,000	**5,018,600**	7,513,000	10,610,000
escapement target	2,394,000	3,305,000	**4,483,000**	6,000,000	6,000,000
allowable ER	5%	8%	**11%**	20%	43%
Available Harvest (TF, US, CDN)	136,000	272,000	**535,600**	1,513,000	4,610,000

5.2.4 IN-SEASON ASSESSMENT

Marine migration timing was 11 days earlier than pre-season expectations which created more run timing overlap with the very weak Sockeye returns. The Pink Area 20 peak return timing of August 17th was also the earliest on record (1959 to 2019).

The Pink salmon return was bimodal with a larger second mode, and the return timing spread of 19 days was the narrowest for the years 1987 to 2019, and the longest Pink travel time of 23 days from Area 20 to Mission for the years 2009 to 2019, all of which contributed to significant challenges in estimating return abundance in season.

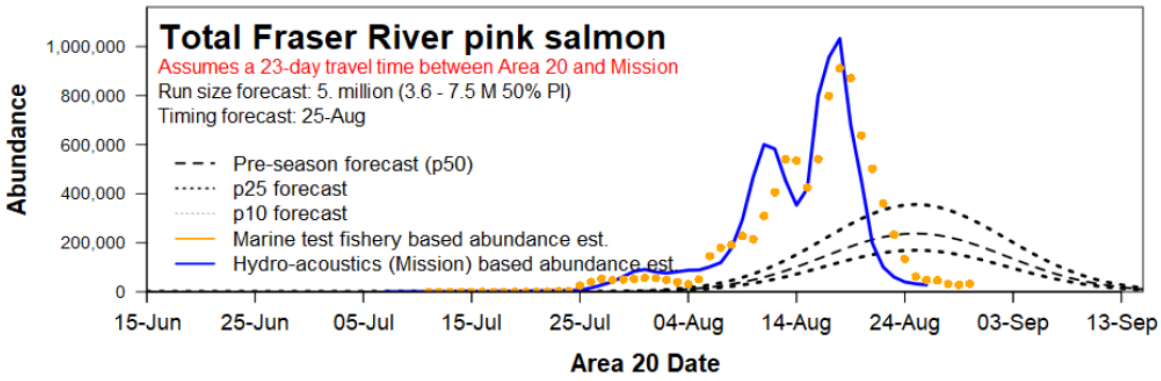


Figure 5-2 Pre-Season Projections and In-Season Reconstruction of Daily Fraser River Pink Salmon Abundance

The Johnstone Strait diversion rate was estimated to be 11% which was much lower than the pre-season forecast of 50%. This was the lowest Pink northern diversion rate between 1987 and 2019.

The total estimated Pink return (Table 5-7) of 8.9 million was substantially above (approximately 73%) the median pre-season forecast of 5.019 million.

The TAC of Fraser River Pink for international sharing based on the final Fraser River Panel adopted in-season run size (8.9 million) was 2,882,900 Pinks, of which 25.7% (740,900) were allocated to the U.S. and the remainder to Canada (2,142,000).

Table 5-8 2019 Pre-Season (top) and Post-Season (bottom) Values for TAC and Other Management Parameters.

Date	Management Group	Total Abundance	Spawning Escapement Target	Test Fishing	Total Deductions	Total Allowable Catch	Harvest (includes for AFE)	Catch to date	Mission Escape. to date	% Migrati Date Area 20	Diversion Rate To-date
June 19	**Pre-Season Pink**	**5,018,600**	**4,483,000**	**7,200**	**4,490,200**	**528,400**	**528,400**	**0**	**0**	28-Aug	**50%**
September 24	**In-Season Pink**	**8,900,000**	**6,000,000**	**23,500**	**6,023,500**	**2,876,500**	**2,876,500**	**263,087**	**8,463,160**	17-Aug	**11%**

* The TAC is determined by the run sizes and TAC deductions (spawning escapement targets, management adjustments, projected test fishing catches and AFE Exemptions) that were in effect when the Fraser River Panel control of the last U.S. fishery area was relinquished.
** Available Harvest = total abundance minus spawning escapement target.
*** The Fraser River Panel relinquished control of U.S. Panel Area Waters on Sept. 17th in Areas 4B, 5, 6c, 6 & 7, Sept. 21th in Area 7A, and Oct. 5th in the Apex. Oct. 5th is the final relinquishment date.

A landslide in the Big Bar area on the Fraser River upstream of Lillooet was discovered on June 23, 2019 and is thought to have occurred sometime between October and November 2018. It created a 5 metre high waterfall/cascade that posed a migration passage challenge to salmon migrating to rivers and streams upstream of the slide. The Big Bar landslide had notable impacts to fish passage to the spawning grounds, especially prior to late August when water flow decreased enough to enable greater natural migration above the slide. It is unknown what proportion of Fraser Pinks were expected to migrate past the Big Bar slide, however expert

opinion suggests the range was between 5 and 30%. It was noted in-season that although natural passage of Pink Salmon was observed, mainstem spawning was prevalent directly downstream of the slide. Due to uncertainty surrounding the implications of the Big Bar landslide and the very low in-season Sockeye return estimates, the Department decided to plan fisheries directed on species other than Sockeye, including Pink fisheries, in a way that allowed as many Sockeye to reach the spawning grounds as possible. This included measures to minimize bycatch impacts such as requiring the use of selective fishing gear like shallow seines, beach seines, and fish wheels.

A Unified Command that includes all levels of government (First Nations, provincial, federal) came together to lead response operations. Information about the Big Bar Slide was communicated through DFO fishery notices on Fraser River Sockeye Updates, Fraser River Panel meetings, the Province of BC's website (https://www2.gov.bc.ca/gov/content/safety/emergency-preparedness-response-recovery/emergency-response-and-recovery/incident-summaries/big-bar-landslide-incident), and the Fraser River Aboriginal Fisheries Secretariat (https://www.frafs.ca/node/75).

Fraser River discharge was far below the mean discharge (1981 to 2010) through most of June (near minimum discharge levels part of the time), slightly below for most of July, near the mean for most of August, and near or above the mean for September. For most of the season, the Fraser River daily water temperatures fluctuated a few degrees above the historical mean, reaching historical maximum observations at a few points during the season. Although Fraser River discharge and temperature can have effects on salmon migration, environmental conditions rarely play the same kind of role in Pink management as they do for Fraser Sockeye given timing and migration differences between the species as well as the lack of terminal escapement estimates for Pink Salmon.

5.2.5 POST-SEASON ASSESSMENT

The post season return of Fraser Pink is provided in Table 5-9. The 2019 Fraser Pink return was ~73% higher than the median forecast (5.0 M) and ~145% higher than the brood year (3.5 M).

Fraser River Pink Salmon catch numbers are available in Appendix 5. Canadian catch occurred in Pink-directed First Nations Food, Social and Ceremonial (FSC), economic opportunity, and demonstration fisheries, as well as recreational fisheries and very limited commercial fisheries. The post-season exploitation rate is estimated to be 6.2%, which is well below the preliminary post-season allowable exploitation rate of 32%.

DFO spawning escapement enumeration programs are not conducted on Fraser Pink Salmon. Spawner abundance is estimated indirectly by subtracting the total estimated catch from the total estimated run size.

Total Allowable Catch (TAC) calculated for Fraser Pink was based on the calculation method set out in Annex IV, Chapter 4 of the Pacific Salmon Treaty and the July 7, 2017 Commission Guidance. In these calculations, the TAC is fixed on the date that Panel control of the last U.S. Panel Area was relinquished (October 5th in 2019).

Ongoing post-season work will continue to review 2019 assessment challenges, some of which include:

1. **Impacts of the Big Bar landslide:** The effect of the Big Bar landslide on 2019 passage and escapement on the Fraser River is still being evaluated. Work to mitigate the effects of the Big Bar

slide going forward are ongoing, and potential implications for passage in the future are still uncertain and will require ongoing evaluation.

2. **In-season data used to estimate the daily abundance of Pink Salmon, including**: test fishery expansion lines and the incorporation of various data sources (e.g. U.S. Area 7 commercial fishery data has proven useful in a number of years but was not in 2019), daily passage of Pink Salmon past the Mission hydroacoustic site including high density passage days, and the incorporation of behaviour anomalies observed (spread of the run and migration speed) into assessment tools.

5.2.6 FIRST NATIONS DOMESTIC AND FSC FISHERIES

The Marine area was open for First Nations directed FSC harvest on Fraser Pink Salmon and First Nations were encouraged to work with the Department to plan fisheries using selective gear and to fish in areas that would have reduced impact on co-migrating Fraser River Sockeye. There was very little effort and catch in Marine area Fraser Pink FSC fisheries in 2019.

There were directed harvest opportunities for Fraser Pinks in First Nations FSC fisheries in the Fraser River where only selective gear was permitted (e.g. shallow seines, beach seines, fish wheels, dip nets and rod and reel). Incidentally caught Pink Salmon were also licensed for retention in the lower and mid-Fraser.

There were no provisions for directed Pink Salmon harvest for FSC-type purposes in any Final Agreements.

See Appendix 5 for estimates of kept Fraser Pink catch.

5.2.7 FIRST NATIONS COMMERCIAL HARVEST

There were Comprehensive Fisheries Agreements (CFAs) signed for Pink Salmon for commercial purposes in the Fraser River. Limited First Nations commercial Economic Opportunity (EO) and demonstration beach seine and fish wheel fisheries occurred September 17th to 27th. See Appendix 5 for catch estimates.

5.2.8 COMMERCIAL FISHERIES

There was Fraser Pink Commercial TAC identified in-season and there were limited commercial fishery openings in Canada. Commercial Area B seine and Area H troll Fraser Pink ITQ demonstration fisheries occurred in Area 29 from September 14th to 17th with very minimal effort and catch. By the time TAC was identified and the commercial fisheries opened, most Pink Salmon had already migrated through the terminal marine area and into the river. See Appendix 5 for catch estimates.

5.2.9 RECREATIONAL FISHERIES

5.2.9.1 TIDAL WATERS

Fraser River Pink harvest opportunities were available in marine areas with a daily limit of four Pink Salmon in 2019. These recreational harvest opportunities occur where Fraser Pink salmon are present along with other Southern and US origin Pink salmon.

In the tidal waters of the Fraser River, the retention of Pink Salmon was permitted from September 14 to September 20 and from November 2 to December 31 with a daily limit of four. From September 20 until November 1 the window closure to protect Steelhead Trout was in place and fishing for any species of salmon was closed.

The in-river tidal Fraser River recreational fishery was assessed from September 14 to September 20 and from November 2 to November 30. Catch estimates can be found in Appendix 5.

5.2.9.2 NON-TIDAL WATERS

Region 2:

Non-tidal Fraser River - In 2019, the retention of Pink Salmon was not permitted in the non-tidal Fraser River due to concerns for co-migrating Sockeye.

Chilliwack River – From July 1 to December 31, the retention of two pink salmon per day was permitted from a line between two fishing boundary signs on either side of the Chilliwack River 100 m from the confluence of the Chilliwack River and Slesse Creek downstream including that portion of the Sumas River from the Barrow Town Pump Station downstream to fishing boundary signs near the confluence with the Fraser River.

Harrison River – From January 1 to December 31, the retention of two pink salmon per day was permitted in those waters from the Hwy 7 Bridge downstream to the confluence with the Fraser River.

In 2019, the Chilliwack River recreational fishery was assessed from September 1 to November 15. Catch estimates can be found in Appendix 5. No assessment was conducted on the recreational fishery occurring on the Harrison River.

Region 3:

Pink Salmon retention did not occur due to concerns for co-migrating Sockeye.

Region 5:

Recreational Pink Salmon fisheries did not occur due to concerns for co-migrating Chinook salmon and the Big Bar rock slide.

5.2.10 EXCESS SALMON-TO-SPAWNING REQUIREMENTS (ESSR) FISHERIES

There were limited ESSR fisheries for Fraser Pink Salmon in 2019. There were licences issued for ESSR fisheries that included Pink salmon that were in surplus of escapement requirements at the Chilliwack, Chehalis, and Inch Creek hatcheries, as well as the Weaver Creek spawning channel. However Pink Salmon were only harvested at the Chilliwack Hatchery. See Appendix 7 for catch estimates.

6 SOUTHERN BC COHO

6.1 OBJECTIVES AND OVERVIEW

Coho stocks in Southern BC are managed domestically and through international Abundance Based Management provisions which are outlined in the Pacific Salmon Treaty. Harvest levels are outlined in the Treaty's Southern Coho Management Plan, which provides maximum exploitation rates dependent on abundance, and it is Canada's responsibility to ensure that its domestic stocks are not harvested beyond the maximum exploitation rate as outlined in the Treaty.

In Southern BC, Coho management measures in commercial and recreational fisheries are implemented based on their impacts to specific stocks. Southern BC Coho management is primarily based on managing Interior Fraser River, Lower Fraser River, Strait of Georgia, Johnstone Strait and West Coast Vancouver Island (WCVI) Coho stocks or Management Units (MUs).

The Canadian objective for Interior Fraser River (IFR) Coho in 2019 was to manage Canadian fisheries in a highly precautionary manner with fisheries management measures similar to those in place prior to 2014. This approach was expected to achieve an overall exploitation rate in Canadian waters within the 3 to 5% range.

Assessments of IFR Coho salmon stocks in the mid-1990s revealed that alarming declines in spawning populations were occurring at many spawning sites. Low marine survival rates in combination with excessive fishery impacts were identified as key factors in this decline. Beginning in 1997, DFO implemented a number of fishery management measures to reduce the harvest impacts on these stocks. In most years since that time, Canadian fisheries impacting these stocks have been curtailed to limit the exploitation rate to 3% or less, with an additional 10% permitted in U.S. fisheries (as per the Pacific Salmon Treaty management regime).

Currently, there is no evidence that IFR Coho has departed from the 'low' productivity regime that has persisted since the 1994 return year. Current productivity is still well below that of the relatively high productivity period of 1978-1993. However, there have been improved returns of Coho in Northern B.C., WCVI, and inside Strait of Georgia stocks in recent years.

No specific management measures were in place in 2019 to protect Strait of Georgia Coho stocks beyond measures put in place for IFR Coho.

Management measures in place for WCVI Coho provided opportunities for recreational and commercial fisheries harvest in WCVI areas where IFR Coho were not considered to be impacted. These were largely terminal opportunities in portions of Area 23-27, where stock composition information showed that IFR Coho are not present. In WCVI areas/times where IFR Coho are known to be prevalent, non-retention of unmarked Coho remained in effect.

Coho catch and release information from all fisheries can be found in Appendix 4.

6.2 STOCK STATUS

6.2.1 STOCK STATUS - UPPER FRASER RIVER

Interior Fraser

The preliminary estimate for Coho returns to the Interior Fraser in 2019 is 44,400.

6.2.2 STOCK STATUS – LOWER FRASER RIVER

Currently there is no whole system escapement estimate available for Lower Fraser River (LFR) Coho.

A hatchery Coho indicator stock at Inch Creek hatchery provides estimated rates of survival and minimum estimates of exploitation on marked LFR Coho. Catch monitoring and escapement work in support of the Inch Creek indicator program produced data for survival information for the 2016 brood. Survival for coded-wire-tag marked LFR Coho from the 2016 brood was estimated to be 2.8%. .

6.2.3 STOCK STATUS - STRAIT OF GEORGIA

Coho salmon production within the Strait of Georgia (SoG) has declined dramatically since the early 1990s. Marine survivals have been fluctuating the 1 to 4% range. 2019 escapement estimates were in most cases below recent average and similar to pre-season expectations based on recent returns and ocean conditions throughout the SoG.

Hatchery stocks

Coho returns to most hatcheries north of Nanaimo were average to below average in 2019. Escapement to the Puntledge River was near the 12-year average at 6,179 but down from 2018 (8,169). The Big Qualicum River, which had a significant mortality of smolts in 2018, had as expected a poor return in 2019 with 2,700 fish compared to the 12-year average of 10,520. Swim surveys of the Little Qualicum River suggest abundance for this system was near the recent 4-year average at 2,100 fish. Similarly, Nanaimo River returns were close to the 4-year average at 2,800. In the southern Strait of Georgia, Coho escapements were variable, some below average and some above average.

Wild stocks

Observed counts on the Englishman River were near the 4-year average in 2019 with an AUC (Area Under the Curve) estimate of 5500 adults. Returns to the Colquitz River (near Victoria) were reported to be 25% of the 4-year average at 116 fish.

New Coho escapement and survival indicators are currently under development in several systems with PST funding. A camera was operated at the Sakinaw Lake fence for the first time producing a count of 570 adults and 270 jacks. A camera was also operated in the Skutz Falls fishway at Cowichan River producing a count of 8,271 adult Coho. A PIT tag program was used to expand the count to a population estimate of 16,534 fish.

Black Creek is the primary wild stock indicator in the SoG. Limited fall rains allowed crews to operate the counting fence continuously through the Coho migration window without the fence being over-topped by high flows. Video counts from periods when the fence was open were added to the number handled at the fence to create the final estimate of 976 adult Coho and 2,909 jacks in fall 2019. The parental brood year (2016) estimate was 4,000 adults. The 2019 return was approximately 25% of its parental brood, but is within the range of survival rates in recent years.

The smolt production contributing to 2019 return was 40,309. This was below the 24-year average smolt production of 51,109 smolts.

6.2.4 STOCK STATUS - WEST COAST VANCOUVER ISLAND

In most recent years, spawning abundances for wild West Coast Vancouver Island (WCVI) Coho populations are near historic levels. However, the overall production of WCVI Coho has likely fallen from historic levels as spawning abundances have not increased despite reductions in harvest of these stocks. Hatchery production has also been reduced. Initial surveys suggest that 2019 escapement is below recent-year averages in most systems.

6.2.5 STOCK STATUS - JOHNSTONE STRAIT AND MAINLAND INLET

The Keogh River plays an important role as the wild Coho indicator stock for the upper Johnstone Strait area. Historically, the Keogh River adult Coho Salmon return has averaged 2,586 (range: 230 to 9,465), while the juvenile abundance has averaged 62,213 (range 26,940 to 110,565). Following a peak in adult abundance in 2014 (9,465), annual escapement decreased to reach its lowest level in 2016 (230). Returns have increased modestly since, and the final estimate of adult Keogh River Coho Salmon in 2019 was 749 fish. The 2020 enumeration program is ongoing and estimates will be provided as they become available. The number of migrant Coho smolts in 2020 (86,770) was higher than in 2019 (71,779), despite low adult abundance for the brood year (405 adults), suggesting continuation of high freshwater productivity that first began in 2011. Coho tend to be extremely productive at low abundance, and individual productivity has increased dramatically in recent years, peaking with the 2016 brood year at 270 smolts per spawner (average 38 smolts per spawner, brood years 1998 to 2015). Expectations in 2020 are for below-average returns, but with the hope that marine conditions improve to result in a positive trend in Coho returns.

Quinsam River Hatchery is the Coho marine survival indicator for Area 13. In 2019, the Quinsam Coho return of ~3,300 adults is well below both the 4- and 12-year escapement averages. Seven thousand jacks are also estimated to have returned to the Quinsam this year, surpassing the adult returns by more than 2-fold. The 2019 adult return is lower than expected, indicating poorer than anticipated marine survival. Expectations in 2020 are for below-average returns with low survival conditions continuing.

In 2019, Village Bay Creek on Quadra Island continued with video monitoring of returning Coho. A total of 700 adults were counted through the fence; more than triple the 2016 escapement. The 2019 return was higher than expected, and exceeds the 4- and 12-year escapement averages. This system appears to be bucking the poor escapement trend widely seen in the local area.

Heydon Bay Creek in Loughborough Inlet is in the process of being developed into a mainland inlet Coho indicator system. One hundred and fifty Coho were counted through the fence in 2019, which is well below the historical average (as determined during the period the fence was in operation prior to 2013).

Extensive escapement reports for Coho in many systems are indicating below-average escapements in 2019. As anticipated, Coho marine survivals over the past year were poor, and similar conditions are expected through 2020; consequently, a continued trend of low escapement is anticipated next year.

6.3 First Nations Domestic and FSC Fisheries

WCVI FSC and Treaty Fisheries

First Nations Coho catch reports are preliminary at this time. Estimates based on catch reports from Maa-nulth Treaty harvest and WCVI Nuu-chah-nulth non-treaty First Nations harvest can be found in Appendix 4.

Lower Fraser

There were no Coho-directed fisheries in the Lower Fraser in 2019. Both hatchery-marked and wild Coho were authorized to be retained in FSC fisheries before and after the Interior Fraser Coho window closure. During the window closure, harvest was limited to hatchery-marked Coho. The total hatchery-marked and wild Coho harvested and released during Chinook, Pink and Chum FSC fisheries can be found in Appendix 5.

BC Interior

FSC fisheries in the area target Sockeye, Chinook or Pink salmon. In 2019, First Nations harvesters were requested to release unharmed any incidentally caught Coho. Directed opportunities on Coho are permitted in terminal areas subject to abundance. In 2019, a small fishery took place based on data obtained at the Dunn Creek enumeration fence. Dunn Creek is a tributary to the North Thompson River. The total Coho catch (either directed or bycatch) in First Nations fisheries can be found in Appendix 5.

Strait of Georgia FSC Fisheries and Treaty Domestic Fisheries

There were no Coho Salmon-directed fisheries in the Strait of Georgia in 2019. Coho Salmon were harvested terminally in Puntledge, Qualicum, Nanaimo, and Cowichan Rivers using hatchery brailing and hand-picking/sorting methods, hook and line, and gill net. Estimates based on catch reports from Tla'amin Treaty harvest and non-treaty First Nations harvest can be found in Appendix 4.

Johnstone Strait

Small numbers of Coho Salmon were harvested in Johnstone Strait by hook and line and gill net between late May and late September. Terminal harvest of Coho Salmon by hatchery brailing and hand-picking/sorting methods took place in the Quinsam River in mid-October. Estimates for the Johnstone Strait are found in Appendix 4.

6.4 First Nations Commercial Harvest

WCVI Economic Opportunity

In 2019, DFO reached an agreement with Hupacasath and Tseshaht First Nations for an Economic Opportunity (EO) fishery targeting Coho in Subareas 23-1 and 23-2. The fishery took place in upper Alberni Inlet in the tidal portions of the Somass River south to Hocking point. The allocation for Coho was 3,000 pieces. Directed Coho EO fisheries occurred on September 22 and September 29, but catch in these openings were poor. Most of the Coho catch retained in 2019 was bycatch from EO Chinook-directed fisheries which took place in late August and September. The total Coho catch from these fisheries can be found in Appendix 4.

Five Nations Communal Sales Fishery

In 2019, communal sale fishery opportunities for the Five Nations (five Nuu-chah-nulth First Nations located on the West Coast of Vancouver Island - Ahousaht, Ehattesaht, Hesquiaht, Mowachaht/Muchalaht, and Tla-o-qui-aht) included southern BC Coho. These opportunities are categorized as: offshore integrated hook-and-line communal sale fisheries; nearshore integrated hook-and-line communal sale fisheries; or terminal communal sale fisheries. The TAC for the offshore fishery was 2,000 Coho (hatchery-marked only) and for the nearshore fishery was 1,200 (hatchery-marked and unmarked).

There was no directed Coho Five Nations communal sale fishery in 2019; however, hatchery-marked Coho retention for sale was permitted in the offshore integrated hook-and-line fishery. Both hatchery-marked and unmarked Coho were permitted to be sold in the nearshore integrated hook-and-line communal sale fishery and the terminal communal sale fishery. Total Coho catch in these fisheries can be found in Appendix 4.

Lower Fraser

There were no directed Coho fisheries authorized in the Lower Fraser in 2019.

In 2019, Fraser Pink EO and demonstration fisheries took place in the Fraser River with the Harrison Fisheries Authority, and 16 communities from Port Mann Bridge to Sawmill Creek; retention of hatchery-marked and unmarked Coho was not permitted in these fisheries. The total hatchery-marked and unmarked Coho encountered and released in Pink EO/demonstration fisheries can be found in Appendix 5.

BC Interior

There were no EO or demonstration fisheries in the BC Interior (Fraser River above Sawmill Creek) targeting Coho in 2019.

6.5 COMMERCIAL FISHERIES

Southern BC commercial fisheries are regulated so that impacts on Coho, in particular Interior Fraser Coho stocks, are minimized. Retention of Coho bycatch was not permitted in most of these fisheries in, including the Fraser River. Some limited opportunities for Coho retention occurred in terminal fisheries targeting Chinook and Sockeye in areas where Interior Fraser River Coho were not present.

WCVI Offshore Area Coho

Coho retention was not permitted in the 2019 Area G WCVI AABM Chinook troll fishery.

WCVI Terminal Area Coho

In 2019, Chinook-targeted commercial gill net and seine fisheries occurred in Area 23 (Alberni Inlet). Retention of both hatchery-marked and unmarked Coho were permitted. The total Coho bycatch can be found in Appendix 4.

Coho retention in other terminal WCVI commercial fisheries was not permitted in 2019. The total WCVI Coho bycatch in commercial terminal fisheries can be found in Appendix 4.

6.6 RECREATIONAL FISHERIES

6.6.1 TIDAL WATERS

Tidal recreational fisheries can be categorized as occurring in: mixed-stock areas, where multiple stocks are found concurrently in the same fishing area, and in terminal areas where local stocks dominate the catch. Areas where mixed stocks occur typically have more restrictive management measures in place that are designed to protect Interior Fraser Coho stocks. In terminal areas, opportunities may be permitted based on abundance forecasts, and local enhancement programs where Coho stocks are enhanced. The table below outlines the areas in Southern BC and the general Coho regulations pertaining to them.

Table 6-1 Southern BC Coho Fishery Regulations in 2019

Mixed stock fishing area	Daily Limit (marked or unmarked)	Size Limit	Coho Season
Johnstone Strait	2, 1 may be unmarked	30 cm.	June 1 – Jul 31
Johnstone Strait	2 marked	30 cm.	Aug 1 – Dec 31
Northern Georgia Strait	2 marked	30 cm.	June 1 – Dec 31
Southern Georgia Strait	2 marked	30 cm.	June 1 – Dec 31
Southern Georgia Strait (19)	2, 1 may be unmarked	30 cm.	Oct 1 – Dec 31
Juan de Fuca Strait	2 marked	30 cm.	Jun 1 – Dec 31
Juan de Fuca Strait (20-5 to 20-7)	4, 1 may be unmarked	30 cm.	Oct 1 – Dec 31
WCVI - Inshore	2	30 cm.	June 1 – Dec 31
WCVI - Offshore	2 marked	30 cm.	June 1– Dec 31

* for specific management measures in specific areas refer to the information provided in the Fishery Notices.

Catch and release information for Coho can be found in Appendix 4.

WCVI - Inshore

In 2019, hatchery marked Coho retention was increased to 4 per day (with unmarked retention remaining 2 per day) in Areas 23 and 25 where stocks are supported by hatchery production.

Tidal Waters Fraser River

In the tidal waters of the Fraser River downstream of the CPR Bridge at Mission, BC, from November 2 to December 31 the retention of two hatchery-marked Coho per day was permitted.

This recreational fishery was assessed from November 2 to November 30, 2019. Catch estimates can be found in Appendix 5.

6.6.2 NON-TIDAL WATERS

Region 1 Vancouver Island Tributaries

Fresh water conditions continued to remain favourable in 2019 compared to past years and no additional restrictions were in effect on Vancouver Island due to drought-like conditions.

Northern Vancouver Island

Typical non-tidal openings for Coho were available on:

- Campbell/Quinsam River from October 1 to December 31 for four per day, two of which could be marked over 35 cm;
- Cayeghle River (including the Colonial River) from April 1 to March 31 for one per day;
- Cluxewe River from April 1 to March 31 for two per day, hatchery-marked only;
- Kokisilah River from April 1 to March 31 for one per day, maximum size limit of 35 cm;
- Nahwitti River from April 1 to March 31 for one per day; and
- Quatse River from June 15 to March 31 for two per day, hatchery-marked only.

Anglers were restricted to the use of barbless hooks. Catch is not estimated in these freshwater fisheries.

Strait of Georgia

In 2019 Coho openings were provided on:

- Cowichan River from November 8 to December 31 for one Coho per day, minimum size limit of 25 cm;
- Nanaimo River from November 1 to December 31 for 2 hatchery-marked only Coho per day, minimum size limit of 25 cm;
- Puntledge River from October 1 to November 30 for 1 hatchery-marked only Coho per day, minimum size limit of 25 cm; and
- Chemainus River from October 15 to March 31 for one per day, maximum size limit of 35 cm.

Catch is not estimated in these freshwater fisheries.

West Coast Vancouver Island

Typical non-tidal openings for Coho were available on:

- Somass/Stamp River from August 25 to December 31 the daily limit was two, hatchery-marked or unmarked. A single, barbless hook restriction is in effect all year and there was a bait restriction in the Upper Somass and Stamp rivers from May 1 to October 31.

- Nitinat River from October 15 to December 31 the daily limit for Coho was two, hatchery-marked or unmarked. A two-week closure occurred between October 1 and October 14 to protect Chinook salmon during their peak spawning period. The area above Parker Creek is closed to fishing. A single barbless hook restriction and bait restriction is in effect all year.

- Conuma River from August 25 to December 31with a daily limit of two Coho, hatchery-marked or unmarked.

- Washlawlis River and Waukwass River and other west coast rivers are open year-round with a daily limit of one Coho, hatchery-marked or unmarked. Barbless hooks are required. No creel survey information is collected. Other rivers receiving some directed catch and release effort for Coho stocks are the Wakeman, Artlish, Zeballos, Tahsis, Burman, Ash, Taylor, Pacheena, Toquart and Leiner. The quota for all west coast streams, unless identified above, is zero (0).

Catch is not estimated in these freshwater fisheries.

Non-tidal Fraser River and Tributaries

Region 2: The retention of two hatchery-marked Coho per day was permitted once the majority of the Interior Fraser wild Coho population was through the area and following the Steelhead window closure in the following area:

- From the CPR Bridge at Mission, BC upstream to the Highway #1 Bridge at Hope - November 3 to December 31.

In 2019, no assessment was conducted on this Fraser River recreational fishery in Region 2.

There are no directed Coho openings in the Fraser River or tributaries upstream of the Highway #1 Bridge at Hope, BC. This includes all of Regions 3, 5, 7 and 8.

The following tributaries to the Fraser River in Region 2 were open during the dates stated below:

- Alouette River and De Boville Slough from October 1 to December 31 for one hatchery-marked Coho per day.

- Coquitlam River from September 1 to December 31 for one hatchery-marked Coho per day.

- Kanaka Creek from November 1 to November 30 for one hatchery-marked Coho per day.

- Chilliwack River/Vedder for four hatchery-marked Coho per day from January 1 to March 31 and from July 1 to December 31.

- Chehalis River from January 1 to December 31 for four hatchery-marked Coho per day.

- Harrison River for four hatchery-marked Coho per day from January 1 to March 31 and from September 1 to December 31.

- Nicomen Slough, Norrish Creek and the Stave River for four hatchery-marked Coho per day from January 1 to December 31, with only two over 35 cm.

In 2019, the Chilliwack/Vedder recreational fishery was assessed from September 1 to November 15 and the Nicomen/Norrish fishery was assessed from October 1 to December 15. Catch estimates can be found in Table 5. No assessments were conducted on the recreational fisheries occurring on the remaining rivers listed above.

During 2019, there were limited non-tidal openings for hatchery-marked Coho on the following systems which enter Boundary Bay:

- Little Campbell River, Nicomekl River and the Serpentine River one hatchery-marked Coho per day from September 1 to December 31.

These recreational fisheries were not assessed in 2019.

6.7 Excess Salmon-to-Spawning Requirements (ESSR) Fisheries

WCVI ESSR Fisheries

The Somass First Nations were issued an ESSR licence at the Robertson Creek Hatchery in 2019 that included Coho and Chinook salmon. The Ditidaht First Nation was issued an ESSR Licence for Chinook, Coho and Chum at Nitinat Lake and Nitinat hatchery.

The Mowachaht/Muchalaht First Nation was issued an ESSR licence at the Conuma Hatchery in 2019 that included hatchery marked Coho and Chinook salmon, however no Coho were harvested.

All ESSR harvest information can be found in Appendix 7.

Lower Fraser ESSR Fisheries

In 2019, there were ESSR fisheries at the Capilano, Chilliwack, Inch Creek and Chehalis hatcheries; harvest of Coho Salmon was permitted. All ESSR harvest information can be found in Appendix 7.

Strait of Georgia ESSR Fisheries

A Coho salmon ESSR fishery for Qualicum First Nation took place at Big Qualicum hatchery from November 15 – December 16, 2019. See Appendix 7 for catch numbers.

Johnstone Strait ESSR Fisheries

For 2019, there were no ESSR opportunities on Coho in Johnstone Strait.

7 SOUTHERN BC CHUM

7.1 JOHNSTONE STRAIT CHUM SALMON

7.1.1 OBJECTIVES AND OVERVIEW

The Johnstone Strait Chum Salmon fishery targets Southern BC Chum that spawn primarily in the Fraser River and in tributaries of Johnstone Strait and the Strait of Georgia. This fishery also intercepts a small proportion of Puget Sound Chum. Since 2002, the Johnstone Strait Chum fishery as been managed using a 20% fixed exploitation rate (ER) strategy. This approach has provided predictable harvest opportunities for the commercial sector, and has increased the probability of meeting escapement goals across the many populations contributing to this fishery. Of the 20% exploitation rate, 15% is allocated to commercial fisheries and the remaining 5% is set aside for test fisheries, First Nations FSC, sport harvesters, and to also provide a buffer to commercial exploitation. Since the implementation of this management strategy, annual fisheries have been planned well in advance of the Chum return.

On July 11th 2019, the Government of Canada and the Province of British Columbia announced a joint Steelhead Action Plan identifying new conservation measures for Thompson and Chilcotin Steelhead Trout (two population components of the Interior Fraser River (IFR) Steelhead aggregate). Based on our current understanding, there is considerable overlap in the timing and location of the return migration of IFR Steelhead and several South Coast salmon fisheries. The timing of this stock of concern is particularly overlapped with that of Fraser River Chum. Given the potential for salmon fisheries to incidentally harvest co-migrating IFR Steelhead, the Steelhead Action Plan outlines a series of window closures for fisheries occurring in times and areas that overlap with the IFR Steelhead migration, in both marine and freshwater fishing areas.

The announcement of these closures precipitated significant changes to the 20% fixed exploitation rate strategy for the Johnstone Strait Chum fishery. In 2019, the pre-season commercial fishing plan was modified to maintain opportunity in Johnstone Strait, while ensuring that fishing did not occur within the outlined IFR Steelhead closure times and areas. With the window closures reducing access to the earlier timed components of the Inside Southern Chum (ISC) run, fisheries were planned at a reduced exploitation rate (below the typical 20% ER).

As outlined in Chapter 6 of the Pacific Salmon Treaty, commercial Chum fisheries in Johnstone Strait are suspended when it is estimated that less than 1.0 million Chum salmon will migrate through Johnstone Strait. Early indications from the Johnstone Strait test fishery were that ISC abundance was tracking below the 1.0 million critical threshold. On October 7, 2019, the US was notified, as per the treaty language, that the aggregate Chum Salmon abundance for ISC through Johnstone Strait was predicted to be below the 1.0 million critical threshold, based on the Johnstone Strait test fishery. In accordance with the Pacific Salmon Treaty, below this critical threshold Canada shall only conduct assessment fisheries and non-commercial fisheries. Therefore, Canada also suspended operation of commercial fisheries that target Chum Salmon in Johnstone Strait as of October 7. Chum catch and release information from all fisheries can be found in Appendix 4.

7.1.2 STOCK STATUS

Mixed Stocks

In 2019, the main components of the Inside Southern Chum (ISC) return were expected to be both Fraser and non-Fraser stocks. These stocks are typically dominated by four-year-old fish, and the abundance of the 2015 brood return that out-migrated in 2016 was below average. Other salmon species that out-migrated in 2016 had encountered poor survival conditions (i.e. local Pink and Coho returns in 2017 were poor). The pre-season expectation for ISC was therefore for below to near target returns to the area. Based on the very strong 2016 brood year, it was expected that the age 3_1 component would contribute more than average to the 2019 Chum return.

The Johnstone Strait test fishery, which ran from September 10th through October 24th, provided timing and abundance information for the 2019 return, which is important in assessing the performance of the 20% fixed exploitation rate strategy. It also provided an index of abundance, used to determine the likelihood of the number of returning Chum being over the 1.0 million critical level (requirement for commercial openings). From the onset of the program, the Chum catch per unit effort (CPUE) in the test fishery was well below what was encountered during 2010, one of the lowest Chum returns on record (1980-2018). On October 7th it was determined that the ISC index of abundance was likely below the 1.0 million critical level (Figure 11-1) and any planned Johnstone Strait commercial mixed stock fisheries were suspended. The Chum CPUE from the test fishery continued to track well below 2010 for the remainder of the season (Figure 11-1), and wound up being the lowest on record. The age composition derived from the test fishery and commercial samples exhibited a lower than average contribution of 4-year-olds throughout the season, confirming the reduced survival of the 2015 brood.

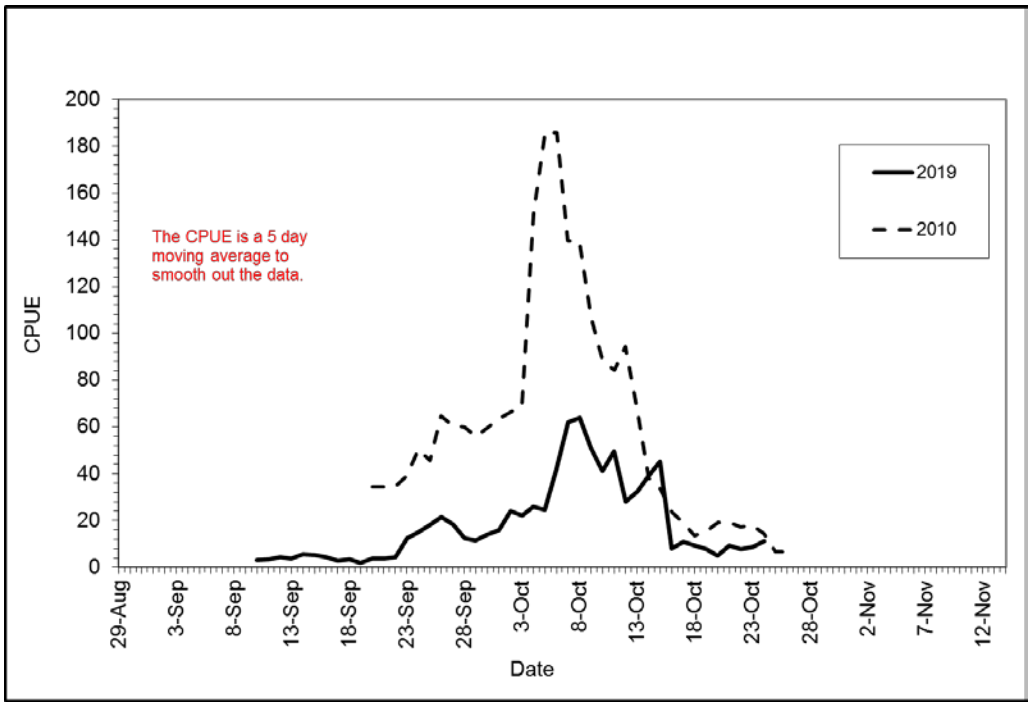


Figure 11-7-1 2019 Johnstone Strait Chum Test Fishery Catch per Unit Effort (CPUE) compared to 2010 (one of the lowest returns in recent years).

Terminal returns

Although escapement monitoring is limited, summer Chum returns tended to be well below average.

Escapements and catches of ISC aggregate returns (Johnstone Strait, Strait of Georgia and Fraser combined) were well below average and most populations were well below their respective escapement goals throughout the ISC area.

7.1.3 FIRST NATIONS DOMESTIC AND FSC FISHERIES

Johnstone Straits First Nations fisheries for Chum Salmon were not restricted in 2019. Chum Salmon harvests took place using gill nets and seine nets in Johnstone Strait as early as August, with most of the effort in October. The total Chum Salmon catch in the Johnstone Strait FSC fishery can be found in Appendix 4.

7.1.4 FIRST NATIONS COMMERCIAL HARVEST

There was no First Nations commercial harvest of Johnstone Strait Chum in 2019.

7.1.5 COMMERCIAL FISHERIES

Commercial Chum fisheries in 2019 were planned as per the Pacific Salmon Treaty, however a modified approach was taken to maintain opportunity in Johnstone Strait while aligning with the intent of the Interior Fraser Steelhead rolling window closure. Fisheries are usually scheduled to achieve a 20% fixed exploitation rate (ER) on Inside Southern Chum (ISC) stocks passing through Johnstone Strait with 15% ER for commercial and 5% ER for test, FSC, recreational and a commercial buffer. Shares of the 15% commercial ER are usually shared among the Area B seine (11.55%), Area D gill net (2.55%), and Area H troll fleets (0.9%). With the Steelhead window closure reducing access to a portion of the ISC, the 2019 fisheries were planned pre-season to a reduced commercial ER of 9.83%, shared between the Area B seine (6.54%), Area D gill net (2.27%), and Area H troll (1.01%) fleets.

As returns were below the critical threshold abundance, there were no commercial Chum fisheries in Johnstone Strait directed at southern Chum in 2019.

7.1.6 RECREATIONAL FISHERIES

7.1.6.1 TIDAL WATERS

The marine recreational daily limits for Chum are four (4) with a possession limit of eight (8) salmon. Chum opportunities are typically opened at full limits in the Johnstone Strait area, but may be reduced if Chum returns are low. Peak participation in the recreational Chum fishery typically occurs over the Thanksgiving weekend in mid-October, and activity is usually driven by abundance. The Strait of Georgia creel survey for Areas 13 and 14 was conducted from May to October. Recreational catches were reported as very low, as Chum abundance in the marine area was poor in 2019. The majority of the recreational Chum Salmon fishing effort occurs in Area 13, which is included in the Strait of Georgia catch estimate.

7.1.6.2 NON-TIDAL WATERS

There are no Chum-retention fisheries in non-tidal waters in the Johnstone Strait area. Some catch-and-release fisheries do take place, and are considered to very minimal.

7.1.7 EXCESS SALMON-TO-SPAWNING REQUIREMENTS (ESSR) FISHERIES

There were no ESSR opportunities for Johnstone Strait Chum in 2019.

7.2 FRASER RIVER CHUM

7.2.1 OBJECTIVES AND OVERVIEW

Chum Salmon return to the Fraser River from September through December, with the typical peak of migration through the lower river occurring from mid- to late October. Spawning locations are predominately located in the Fraser Valley downstream of Hope, BC, with major spawning aggregations occurring within the Harrison River (including Weaver Creek and Chehalis River), the Stave River, and the Chilliwack River. No spawning locations have been identified upstream of Hell's Gate.

The escapement objective for Fraser River Chum is 800,000. Since 2001, this objective has been achieved in all but four years; escapement to spawning grounds in 2009, 2010, 2017, and 2018 did not meet the escapement goal, with approximately 460,000, 590,000, 620,000, and 650,000 returning to spawn in those years, respectively.

Fraser River Chum are typically harvested in Johnstone Strait, the Strait of Georgia, U.S. waters of Area 7 and 7A, and in the Fraser River.

Within the Fraser River, Chum-directed fisheries include First Nations FSC fisheries, recreational fisheries, and commercial fisheries. In recent years, significant conservation measures have been implemented in-river during the Fraser River Chum migration period to protect co-migrating stocks of concern (including Interior Fraser River (IFR) Coho and IFR Steelhead). Depending on the fishery, these measures have included both time and area closures and gear restrictions. These conservation measures have restricted Fraser River commercial Chum fishing opportunities in recent years.

To address conservation concerns for IFR (Thompson and Chilcotin) Steelhead, the Department implemented management measures for 2019 to reduce the incidental impacts of Chum fisheries on co-migrating IFR Steelhead. Moving window closures 42 days in duration were put in place for all commercial salmon fisheries located along the migratory route of Thompson and Chilcotin River Steelhead, including Southern BC marine waters and the Fraser River and tributaries downstream of Thompson and Chilcotin River Steelhead spawning areas. This 42-day rolling window closure also applied to recreational salmon fisheries within the Fraser River and tributaries (including areas immediately off the Fraser River mouth). Commercial troll fisheries in the marine area and First Nations' Food, Social, and Ceremonial (FSC) salmon fisheries occurring within the Fraser River and tributaries downstream of Thompson and Chilcotin River Steelhead spawning areas were subjected to a 27-day moving window closure.

7.2.2 STOCK STATUS

The number of adult Chum Salmon returning to the Fraser River each fall (terminal return) is estimated in-season with a Bayesian model based on Albion test fishery catch.

The Fraser River Chum test fishery at Albion operated every other day from September 1 until October 19, alternating days with the Albion Chinook test fishery. From October 21 until November 9, the Chum net fished every day, and then every other day from November 11 until November 23. Total Chum catch for the Albion test fishery can be found in Appendix 2.

For fishery planning purposes, DFO provided a provisional in-season terminal return estimate on October 16 of 564,000 Chum Salmon. The estimated 50% migration date of the run was October 24. Because the model estimated a 50% migration date 9 days later than average, an alternate estimate was also provided that assumed the 50% migration date was the same as average (October 17). This resulted in a median run size estimate of 414,000 Chum Salmon.

A subsequent estimate of Fraser River Chum terminal return was provided on October 23. The estimated terminal return on that date was 518,000 (80% probability that the run is between 407,000 to 661,000), with a 50% migration date through the lower river of October 22. This peak date is later than that observed in recent years (average peak date from 1997-2018 is October 17). It was estimated there was a 1% probability that the run would exceed the escapement goal of 800,000.

Additional in-season terminal return estimates were not provided, as subsequent test fishing information was consistent with a run size of 518,000.

Fraser River Chum Salmon return to numerous spawning locations in the lower Fraser River and its tributaries. Spawning escapement for Fraser River Chum Salmon is currently assessed for five of the largest Chum producing systems, as well as for a number of smaller tributaries. The largest observed escapement of Fraser River Chum (greater than 3 million fish), was seen in 1998. From 1999 to 2010, Fraser Chum Salmon escapement (for the annually assessed systems) trended downward. The escapement decline was then halted and reversed with an estimated 1.1 million spawners reported in 2011. Spawning escapement had remained stable through 2016 and achieved the escapement goal in each year (2011-2016 estimated escapement averaged 1.3 million spawners). However, the escapements in both 2017 (660,000) and 2018 (690,000) were estimated to be below the escapement goal of 800,000 Chum Salmon spawners. The preliminary estimate of Fraser River Chum Salmon escapement is 300,300; this is significantly below the escapement goal and is the third year in a row where the escapement goal has not been met.

7.2.3 FIRST NATIONS DOMESTIC AND FSC FISHERIES

First Nations Food, Social and Ceremonial (FSC) Chum-directed gill net fisheries commenced October 25 (below Port Mann Bridge) and October 26 (above Port Mann Bridge), following closures to protect co-migrating Interior Fraser River Coho (IFR Coho) and Interior Fraser River Steelhead (IFR Steelhead).

The total Fraser River Chum catch (either directed or bycatch) in First Nations FSC fisheries can be found in Appendix 5.

7.2.4 FIRST NATIONS COMMERCIAL HARVEST

In 2019, there were no Chum-directed economic opportunity or demonstration fisheries in the Lower Fraser due to a poor in-season Chum Salmon terminal return estimate. However, during the Pink Salmon economic opportunity beach seine fishery for the Harrison Fisheries Authority and the 16 signatory communities on

September 17-21, and the Pink Salmon economic opportunity access from the Yale First Nation's fish wheel on September 19-25, retention and sale of Chum Salmon was permitted.

The total Fraser River Chum catch (either directed or bycatch) in First Nations Commercial fisheries can be found in Appendix 5.

7.2.5 COMMERCIAL FISHERIES

Area B

There were no Area B fisheries in Area 29 for Sockeye or Chum salmon in 2019 and, therefore, no catch of Chum Salmon to report.

Area E

Commercial salmon fisheries in the lower Fraser River (below Mission) remained closed during the Interior Fraser River (IFR) Coho window closure, and further closures were in place until later in October to meet the IFR Steelhead management objectives. There were no Area E fisheries in the Fraser River for Fraser Chum in 2019 and, therefore, no catch of Chum Salmon to report.

Area H

There were no Area H fisheries in Area 29 for Sockeye or Chum salmon in 2019 and, therefore, no catch of Chum Salmon to report.

7.2.6 RECREATIONAL FISHERIES

7.2.6.1 TIDAL WATERS

In most southern BC marine waters, the daily limit for Chum Salmon was four (4) in 2019.

Tidal Fraser River:

January 1 to September 13, 2019, this area was closed to fishing for salmon.

September 14 to September 20, open to the retention of Chum Salmon with a daily limit of four (4).

September 20 to November 12, this area was closed to fishing for all species of salmon to protect Interior Fraser River Steelhead.

November 23 to December 31. Chum retention was not permitted following the end of the Interior Fraser River Steelhead window closure due to the low returns of Chum Salmon to the Fraser River in 2019.

An assessment of the in-river tidal Fraser River recreational fishery occurred from September 14 to September 20 and from Nov.2 to Nov.30. Catch estimates can be found in Appendix 5.

7.2.6.2 NON-TIDAL WATERS

Chum salmon fisheries only take place in Region 2 of the Fraser River downstream of the Highway No. 1 Bridge at Hope, BC. Above Hope the number of Chum Salmon likely to be encountered is very low. Chum Salmon are not known to migrate into Regions 3, 5, 7 or 8.

Non-tidal Fraser River:

January 1 to November 2, 2019, closed to fishing for salmon.

November 3 to December 31, the non-tidal Fraser River from the CPR Bridge at Mission, BC to the Highway No. 1 Bridge at Hope, BC was open to fishing for salmon. The retention of Chum Salmon was not permitted, however, due to the low returns of Chum Salmon to the Fraser River.

Fraser River Tributaries

The following Fraser River tributaries were open to Chum Salmon retention during the dates noted in 2019.

- Alouette River – October 1 to 17, daily limit of one (1) Chum Salmon.
- Chilliwack and Vedder Rivers – July 1 to October 22, daily limit of one (1) Chum Salmon.
- Harrison River – April 1 to October 17, daily limit of two (2) Chum Salmon.
- Nicomen Slough – April 1 to October 17, daily limit of two (2) Chum Salmon.
- Stave River – April 1 to October 17, daily limit of two (2) Chum Salmon.

The Chilliwack and Vedder Rivers recreational fishery was assessed from September 1 to November 15 in 2019. Catch estimates can be found in Appendix 5. In 2019, no assessment was conducted on the fisheries in the Alouette, Harrison and Stave Rivers; however, the Nicomen Slough/Norrish Creek fishery was assessed from October 1 to December 15, 2019. Catch estimates can be found in Appendix 5.

The following systems that flow into Boundary Bay were open to Chum Salmon retention during the dates noted.

- Serpentine River – October 1 to October 31, 2019, daily limit of one (1) Chum Salmon.

This fishery was not assessed.

7.2.7 EXCESS-TO-SPAWNING REQUIREMENT (ESSR) FISHERIES

There were ESSR fisheries at the Chilliwack hatchery in 2019 that harvested Chum Salmon.

There were ESSR fisheries at the Inch Creek hatchery in 2019 that harvested Chum Salmon.

There were ESSR fisheries at Chehalis hatchery in 2019 that harvested Chum Salmon.

All ESSR harvest information can be found in Appendix 7.

7.3 STRAIT OF GEORGIA CHUM

7.3.1 OBJECTIVES AND OVERVIEW

Strait of Georgia Chum fisheries consist of terminal opportunities for Chum returning to their natal spawning streams. Many of the terminal fishing areas have enhancement facilities and/or spawning channels associated with adjacent river systems. Terminal fishery strategies consist of monitoring and assessing stocks (escapement and returning abundance), with the objective of ensuring adequate escapement and providing harvest opportunities where possible. Stock assessments may include test fisheries, escapement enumeration including swim surveys, stream walks, channel entry counts, fence counts, sonar (DIDSON) counts and over flights. In some areas where stocks receive considerable enhancement or where stocks have above average productivity, limited fishing may occur prior to escapement objectives being reached.

7.3.2 STOCK STATUS

Historically, Chum returns have been highly variable relative to brood year escapements. For 2019, the forecasts were as follows:

- Jervis/Narrows Inlet Chum abundance was expected to be below the target level,
- Mid-Vancouver Island systems were expected to vary from well below to near the target level,
- Nanaimo was forecasted to be well above target levels,
- Cowichan was forecasted to be at target level,
- Goldstream Chum abundance was forecasted to be above to well above the target levels.

All of these forecasted expectations are highly uncertain and a review of the procedures and data used for forecasting these systems is planned for the near future.

Conditions for returning Chum migration and spawning in October began with drier conditions followed by significant rainfall. The end of October through mid-November were marked by below average precipitation. River levels were moderate during the peak of migration and spawning providing suitable conditions in most systems.

Returns for the Jervis/Narrows Inlet aggregate (which includes Brittain River, Skwawka River, Deserted River, Vancouver River and Tzoonie River) continued to be poor following several record-low counts in 2018. Returns came in consistently below forecast for mid-Vancouver Island systems and escapement targets were not met. Puntledge River counts were less than 20% of the 4 year average while Little Qualicum escapements were similarly poor. Big Qualicum returns did not surpass 3,000 and were less than 5% of the 15 year average. South Island systems fared slightly better with Nanaimo River reaching about 50% of the escapement target at 22,000. Cowichan River escapement was stronger at 95K but still below the forecast and target of 160K (Table 7-1). Goldstream River was the only system to reach the escapement target but fell short of the forecast.

Table 7-1 Strait of Georgia Chum Spawning Escapements

System	Target Escapement Target	2019 Forecast Expected Range	2019 Escapement	% of Target
Jervis Inlet	85K	43K – 64K	6.6K	8%
Mid-Island	230K	176K – 264K	18K	8%
Puntledge	60K	31K - 47K	6.5K	11%
Little Qualicum	85K	70K - 106K	9.5K	11%
Big Qualicum	85K	74K-111K	2K	2%
Nanaimo	40K	60K – 90K	22K	55%
Cowichan	160K	129K – 194K	95K	59%
Goldstream	15K	28K – 42K	21.5K	143%

7.3.3 FIRST NATIONS DOMESTIC AND FSC FISHERIES

Strait of Georgia First Nations fisheries for Chum Salmon were not restricted in 2019. There were few Chum Salmon fisheries in the marine mixed stock areas as well terminally and within rivers. FSC Chum Salmon catch reports from Tla'amin Treaty and non-Treaty First Nations in the Strait of Georgia can be found in Appendix 4.

7.3.4 FIRST NATIONS COMMERCIAL HARVEST

Area 14

Discussions with the K'omoks First Nation occurred around the harvest of surplus Chum for a Demonstration Fishery, however the Chum returns were poor and no commercial demonstration fisheries occurred.

Area 17

Pre-season discussions with the Nanaimo First Nation occurred to identify potential triggers and develop fishing plans to harvest surplus Nanaimo River Chum. During the season communication happened on a day to day basis to discuss stock status and potential fishing opportunities in Area 17. In 2019 there were no First Nations commercial fisheries in Area 17.

Area 18

A bi-weekly conference call was held with the Cowichan Fisheries Harvest Roundtable to discuss stock status and potential fishing opportunities in Area 18. In 2019 there were no First Nations commercial fisheries.

Area 19

At pre-season meetings with Saanich Tribes potential triggers and fishing plans were made to harvest surplus Goldstream Chum. In 2019 there were no First Nations commercial fisheries.

7.3.5 COMMERCIAL FISHERIES

There were no commercial Chum fisheries in the Strait of Georgia in 2019. In all mid-Vancouver Island streams, except the Goldstream River, Chum returns did not reach target escapements.

Area 14

Chum returning to this area have been enhanced since the late 1960s and terminal fisheries have occurred in October and November since the 1970s. The returning Area 14 Chum abundance is forecasted pre-season using brood escapement, average survival and age composition. In-season run strength is assessed from any early catches, visual observations at river estuaries and by escapement counts to the three major river systems.

The Area 14 Chum fishery is directed at the enhanced stocks of three systems: Puntledge, Qualicum and Little Qualicum Rivers. The Qualicum River is often referred to as the 'Big' Qualicum River, to better distinguish it from the Little Qualicum River. The escapement goals for the three river systems are 60,000 for Puntledge River, 85,000 for Little Qualicum River, and 85,000 for Qualicum River, adding up to an overall interim escapement goal of 230,000 Chum, not including enhancement facility requirements (about 10,000 Chum, bringing the total escapement goal to 240,000).

Area 14 commercial Chum fisheries are managed based on forecasted abundance. In-season, the management strategy for considering fishery openings falls under one of two categories; Area 14 pre-season forecast greater than or less than 340,000 Chum. When the pre-season forecast is greater than 340,000, early Chum openings can target up to 65% of the anticipated surplus above 340,000. When pre-season forecast is less than 340,000, an early-timed small fleet gillnet fishery may be used to evaluate the mid-Vancouver Island aggregate abundance.

In 2019 the mid-Vancouver Island aggregate was managed based on the pre-season forecast of less than 340,000 Chum. Preparations for an Area D gill net assessment fishery were made should Chum returns perform better than expected. However, Chum returns were extremely poor and no assessment or commercial Chum fisheries occurred in Area 14 in 2019. Escapement targets were not met; total Chum returns to the Puntledge, Qualicum, and little Qualicum, as of November 13, was 21,626.

Area 16

This fishery targets wild Chum stocks returning to river systems in the Jervis Inlet area. The main systems are Tzoonie, Deserted and Skwawka Rivers. The overall escapement goal for rivers in Jervis/Narrows Inlet is 85,000. Terminal fisheries may occur in these areas when the individual or combined escapement goals have been assured, but fishing opportunities do not occur on a regular basis. There were no fisheries in Area 16 in 2019.

Area 17

This fishery is a terminal fishery targeting Nanaimo River stocks. The Nanaimo River Chum stocks are supplemented by the Nanaimo River hatchery. Hatchery supplementation occurs is on a sliding scale, where increased enhancement occurs during poor escapement years. Escapements fluctuate annually and fishery openings are planned in-season based on escapement estimates. The overall escapement goal for the Nanaimo River is 40,000.

Nanaimo River assessments include swims by Nanaimo River Hatchery staff, a sonar counting system (DIDSON) and spot counts or helicopter counts by DFO during the peak of the return when possible. The DIDSON was installed and operational on October 2. In-season assessments indicated that the escapement goal was unlikely to be met.

In 2019, there were no commercial fisheries for Nanaimo River Chum.

Area 18

This fishery is directed at Cowichan River stocks, with some incidental harvest of Goldstream-bound Chum. Fishery openings in mid- to late-November are limited to Satellite Channel, to minimize impacts on Goldstream stocks. Chemainus River stocks may also be impacted if fisheries occur earlier in November, but likely to a lesser extent.

Fishery openings are planned in-season based on escapement estimates from a DIDSON counter. Management is also guided by advice from the Cowichan Fisheries Roundtable and the Mid-Vancouver Island (MVI) Chum Subcommittee, and an in-season Chum Escapement Forecast Tool based on the DIDSON count and date. The overall escapement goal for the Cowichan River is currently 160,000 Chum passing by the DIDSON counter.

A bi-weekly conference call was held with the Cowichan Fisheries Roundtable to discuss stock status and potential fishing opportunities in Area 18. In 2019 there were no commercial fisheries for Cowichan River Chum.

Area 19

This fishery is directed primarily at Goldstream River stocks, although some Cowichan River Chum salmon are also harvested. Fisheries are planned in-season based on escapement estimates. Area 19 falls under the same management regime as Area 18. The overall escapement goal for the Goldstream River is 15,000. Weekly stream walks are conducted on Goldstream River by Goldstream Hatchery staff to estimate Chum escapement. In 2019, enumerations began on October 2.

In 2019 there were no commercial fisheries for Goldstream River Chum.

7.3.6 RECREATIONAL FISHERIES

7.3.6.1 TIDAL WATERS

Marine recreational Chum fisheries are subject to the normal salmon daily and possession limits (limit of four per day and possession of eight), and are typically open throughout the area. The majority of the recreational effort directed at Chum Salmon in the Strait of Georgia occurs in the upper portions of Discovery Passage between Seymour Narrows and Chatham Point, not far from Campbell River. The annual Brown's Bay Charity Chum derby which took place on the weekend of October 25-27 is usually the most active Chum recreational fishery in the area. Catches in the derby were reported to be very low, likely based on the lower abundances of Chum observed in 2019. There was a creel survey during the month of October in the Strait of Georgia (Areas 13-14).

Marine Chum fisheries also occur in the approach waters of the Puntledge, Qualicum, Little Qualicum, Nanaimo and Cowichan Rivers on Vancouver Island, as well as in Howe Sound, with effort increasing with Chum abundance. Due to the poor Chum abundances observed in the marine area, effort in 2019 was minimal. Catch estimates for chum in the marine recreational fisheries can be found in Appendix 4.

7.3.6.2 NON-TIDAL WATERS

Chum fisheries in Region 1 were largely non-retention fisheries in 2019 due to low abundance. Normally the Courtenay, Cowichan, Nanaimo, Puntledge and Qualicum Rivers on Vancouver Island provide Chum opportunities commencing in October but these all became non-retention fisheries on November 1, 2019. Recreational freshwater retention opportunities are typically based on escapement estimates from hatchery operations, and where escapement goals are expected to be met, opportunities are provided.

7.3.7 EXCESS SALMON-TO-SPAWNING REQUIREMENTS (ESSR) FISHERIES

The Qualicum First Nation was issued an ESSR Licence for Chum in 2019, however no Chum ESSR was executed.

An ESSR licence for the Snuneymuxw First Nation for Chum and hatchery-marked Coho was developed; however, due to poor Chum returns the licence was not issued.

The K'ómoks First Nation was issued an ESSR licence to harvest Chum Salmon and Fall Chinook Salmon at the DFO Puntledge River Hatchery between September 27 and December 31, 2019. There were no surplus Chum Salmon available so an ESSR harvest did not take place.

There were no ESSR fisheries at the Capilano hatchery in 2019 that included Chum Salmon.

7.4 WEST COAST VANCOUVER ISLAND CHUM

7.4.1 OBJECTIVES AND OVERVIEW

Commercial Chum Salmon fisheries normally occur in West Coast Vancouver Island (WCVI) from late September to early November in years of Chum abundance. The majority of Chum fishing on WCVI takes place adjacent to Nitinat Lake (Area 21). In some years there have been limited-effort gill net fisheries in Barkley Sound (Area 23), Clayoquot Sound (Area 24), Nootka Sound and Esperanza Inlet (Area 25) and Kyuquot Sound (Area 26).

Commercial fisheries for WCVI Chum employ a two-tiered strategy for managing harvest; either a constant harvest rate strategy or a surplus-to-escapement goal strategy.

1. Fixed Harvest Rate Strategy (fisheries targeting natural origin stocks, hatchery stocks at low abundance):

For those fisheries where a significant component of the target stock is from naturally spawning populations, a constant harvest rate strategy of 10 to 20% is implemented. The maximum harvest rate is set at a precautionary level relative to stock-recruit derived optimal exploitation rates for WCVI Chum; which are in the order of 30 to 40%. This approach allows limited harvest while protecting the biodiversity of Chum stocks and permitting

rebuilding when the population is low. In areas of low quality data or only naturally spawning stocks, including Barkley (Area 23), Clayoquot Sound (Area 24), Esperanza Inlet (Area 25) and Kyuquot Sound (Area 26), the maximum allowable harvest rate is 10 to 15%. In Nootka Sound, up to 20% harvest is permitted given the prevalence of hatchery production in the area. The harvest rate is controlled by limiting effort (i.e. number and duration of openings and, in some areas, the number of permitted vessels) and limiting fishing areas to approach areas only (i.e. to those areas where fish are migrating not holding).

Since 2013, a fixed harvest rate strategy has also been used to harvest Nitinat Hatchery Chum when the stock abundance is considered above the lower fishery reference point but below the target fishery reference point. The maximum harvest rate for the Nitinat stock is 25% when it is below the target fishery reference point.

2. Surplus-to-Escapement Goal Strategy (fisheries targeting hatchery stocks at high abundance):

For fisheries that target primarily hatchery surpluses, the allowable harvest rate is determined by the escapement goal when it is determined the stock above the Upper Fishery Reference Point and broodstock capture targets have been or will be met. These fisheries occur only in 'terminal areas', defined as an area in close proximity to the origin watershed of the target stock where little or no interception of other stocks occurs. Surplus to escapement goal fisheries for Conuma Hatchery stock have occurred within the Tlupana Inlet portion of Area 25. Surplus to escapement goal fisheries for Nitinat Hatchery stock have occurred in Area 21 near the mouth of Nitinat Lake or in Area 22 in Nitinat Lake. All Nitinat and Conuma hatchery Chum are thermally marked, which allows for assessment of the hatchery contribution to fisheries and spawning.

7.4.2 STOCK STATUS

The current stock status is considered poor. Over the last three brood cycles, naturally spawning populations have been below target abundance in most years despite the precautionary harvest regime. In addition, hatchery production levels have declined in recent years partially as a result of low abundance (i.e. hatcheries have not been able to achieve brood-stock targets in some years). In recent years, overall catches have declined relative to historic levels. There was some improvement observed for the Nitinat Hatchery stock in 2016 and 2017 but returns in 2018 and 2019 were low.

7.4.3 FIRST NATIONS FSC AND TREATY FISHERIES

The 2019 WCVI FSC Chum reported catch (to date) can be found in Appendix 4 which includes fish retained for food, social and ceremonial purposes from Nuu-chah-nulth First Nations and Treaty harvests from Maa-nulth Nations.

7.4.4 FIRST NATIONS COMMERCIAL HARVEST

WCVI Economic Opportunity (EO)

In 2019, an agreement was reached with the Hupacasath and Tseshaht First Nations (Somass First Nations) for an Economic Opportunity (EO) fishery targeting Chum (Area 23). The pre-season forecast was 31,000, which was below the lower reference point of 48,000 and no commercial surplus was identified in-season; therefore, there was no EO fishery for Chum in 2019.

Five Nations Communal Sales Fishery

In 2019, the Department provided communal sale fishery opportunities for the Five Nations (five Nuu-chah-nulth First Nations located on the West Coast of Vancouver Island - Ahousaht, Ehattesaht, Hesquiaht, Mowachaht/Muchalaht, and Tla-o-qui-aht) that included WCVI Chum. These opportunities were categorized as Nearshore Integrated Hook and Line communal sale fisheries.

The Nearshore fishery targeted Nootka Sound Chum using troll and gillnet. One fishery opening occurred on September 25 however there was no effort and therefore no catch.

7.4.5 COMMERCIAL FISHERIES

Commercial fisheries on the WCVI targeted three Chum stocks in 2019: Nootka (Area 25), Esperanza (Area 25) and Kyuquot (Area 26).

Nitinat (Area 21/121)

In 2019, the preseason forecast for Nitinat Chum was of 362,000. This forecast allowed for commercial Area E gill net and Area B seine fisheries. Due to ongoing declines in Interior Fraser River (IFR) Steelhead escapement, DFO implemented a precautionary approach to the management of those fisheries in southern BC that are likely to impact this stock of concern. In Areas 21 and 121, a fishing window closure was in took place from September 11 to October 22 to address IFR Steelhead bycatch concerns. Following the window closure, fisheries were permitted within a two mile boundary of the shore line between Bonilla Point and Pachena Point. Due to an extremely low Chum return, escapement goals to the Nitinat system were not met in season; therefore, no commercial fisheries were authorized in 2019.

Nootka Sound (Area 25)

Based on pre-season forecasts no fisheries were planned in Nootka Sound. A “Stage 1” limited-effort assessment fishery was initiated in-season due to higher than expected Chum bycatch in early September Chinook fisheries. Effort was limited to a maximum of two Area D gill net vessels and was open for 1.5 days per week during daylight hours. Catch rates were low and the fishery was discontinued after 2 weeks. The total catch for the Nootka Sound Area D gill nets can be found in Appendix 4.

Esperanza Inlet (Area 25)

Based on pre-season forecasts, a limited effort gill net Chum fishery opened in Esperanza Inlet on September 25, 2019. Effort was limited to a maximum of five vessels. The fishery was open for 1.5 days per week during daylight hours for 4 weeks. The total catch for the Esperanza Inlet Area D gill nets can be found in Appendix 4.

Kyuquot Sound (Area 26)

Based on pre-season forecasts, a limited effort gill net Chum fishery opened in Kyuquot Sound on September 25, 2019.

Effort was limited to a maximum of four vessels the fishery was open for 1.5 days per week during daylight hours for 3 weeks. The total catch for the Kyuquot Sound Area D gillnet fishery can be found in Appendix 4.

7.4.6 RECREATIONAL FISHERIES

7.4.6.1 TIDAL WATERS

The WCVI recreational fishery is open year-round with a daily limit of four (4) and possession limit of eight (8) Chum. Anglers are restricted to the use of barbless hooks and there is a minimum size limit of 30 cm. In both offshore and inshore areas of WCVI the recreational catch of Chum is minimal non-tidal recreational.

Recreational freshwater opportunities are typically based on escapement estimates from hatchery operations, and where escapement goals are expected to be met, opportunities are provided. Chum returns to the WCVI were very low in all systems in 2019. Daily and possession limits are typically half of those provided in marine waters, with daily limits on most rivers being two (2) per day and four (4) in possession. Catch is not estimated in these freshwater fisheries. Chum catch and effort from this fishery is low.

Chum retention fisheries took place in the Nitinat River on Vancouver Island from September 27 to 30, and from October 15 to December 31, with a daily limit of two (2) per day and four (4) in possession.

7.4.7 EXCESS SALMON TO SPAWNING REQUIREMENTS (ESSR) FISHERIES

The Ditidaht First Nation was issued an ESSR Licence for Chinook, Coho and Chum at Nitinat Lake and Nitinat hatchery. The Mowachaht/Muchalaht First Nation was issued an ESSR licence to harvest Chinook, hatchery-marked Coho, and Chum from the Conuma River and hatchery; however no surplus was identified in-season for Chum.

The total Chum ESSR catch can be found in Appendix 7.

There were no other Chum ESSR fisheries on the WCVI in 2019.

8 APPENDICES

8.1 APPENDIX 1: CATCHES IN CANADIAN TREATY LIMIT FISHERIES, 2003 TO 2019

Fisheries/Stocks	Species	2019	2018	2017	2016	2015	2014	2013	2012	2011	2010	2009	2008	2007	2006	2005	2004	2003
Stikine River (all gears)	Sockeye	16,213	16,915	41,749	86,729	60,046	42,800	36,146	30,352	55,623	50,543	48,049	33,614	59,237	101,209	85,890	84,866	58,784
	Coho	5,228	3,685	5,502	5,346	5,619	4,992	4,835	5,748	4,703	4,952	5,061	2,398	47	72	276	275	190
	Chinook-lg	570	-	593	2,731	4,157	3,308	3,415	4,573	2,307	1,766	2,330	7,860	10,576	15,776	18,997	3,857	1,396
	Chinook-jk		-	788	794	1,537	759	1,594	1,213	1,165	1,001	714	1,067	1,735	2,078	2,177	2,574	1,052
Taku River (commercial gill net)	Sockeye	21,486	17,948	30,209	37,624	19,747	17,872	21,163	30,209	24,012	20,211	11,057	19,445	16,564	21,093	21,932	19,860	32,730
	Coho	12,239	9,503	7,726	9,513	7,886	14,568	10,374	8,689	6,102	10,349	5,649	4,866	5,399	9,180	6,860	5,954	3,168
	Chinook-lg	5	-	246	1,021	868	2,472	738	1,909	2,333	4,658	7,031	1,184	862	7,312	7,534	2,074	1,894
	Chinook-jk		-	88	205	-	657	N/A	478	514	697	1,183	330	337	198	821	334	547
Alsek River (all gear)	Sockeye	653	-	644	815	1,084	1,140	508	1,786	2,110	1,716	717	-	1,340	1,327	594	2,122	2,795
	Coho	10	-	-	-	-	-	29	N/A	29	7	3	34	1	-	71	127	192
	Chinook	37	-	74	10	87	39	73	85	214	294	125	7	41	19	114	185	228
Areas 3 (1-4)* (commercial net)****	Pink	-	101,267	704,450	430,435	80,266	450,671	1,249,570	118,164	160,757	30,686	404,460	8,330	1,740,270	228,378	878,552	402,459	667,103
Area 1 (commercial troll)****	Pink	60,003	266	38,763	32,343	41,551	31,775	84,216	57,013	52,221	19,948	60,402	29,295	61,276	34,854	39,430	27,751	98,347
North Coast AABM** (troll + sport)	Chinook	88,001	106,976	143,330	190,180	158,903	221,001	115,914	120,305	122,660	136,613	109,470	95,647	144,235	215,985	243,606	241,508	191,657
		42,801+ 45,200	70,276 + 36,700	97,730 + 45,600	147,381+ 42,800	106,703 + 52,200	172,001 + 49,000	69,264 + 46650	80,256 + 40050	74,660 + 48000	90,213 + 46400	75,470 + 34,000	52,147 + 43500	83,235 + 61000	151,485 + 64500	174,806 + 68,800	167,508 + 74,000	137,357 + 54,300
West Coast Vancouver Island AABM (troll + sport + FN)	Chinook	66,992	76,958	103,260	93,294	113,293	178,558	108,710	130,719	206,569	137,660	125,488	143,817	139,150	145,970	195,791	210,875	179,706
		23,195+ 35,418+ 8,378	28,840 + 45,233 + 2,885	54,411 + 46,707 + 2143	55,168 + 37,809 + 317	60,572 + 48,775 + 3,946	127,177 + 48,365 + 3,655	43,043 + 61,712 + 3955	62,573 + 61,822 + 4300	123,930 + 78,350 + 4289	79,123 + 52,698 + 5839	53,191 + 68,775 + 3381	89,704 + 50,319 + 3794	87,921 + 46,229 + 5,000	103,978 + 36,992 + 5,000	143,614 + 52,177	168,837 + 42,038	152,677 + 27,029
Fraser River Canadian Commercial Catch	Sockeye	-	3,682,561	-	-	-	7,945,474	2,124	-	443,000	9,305,104	-	16,942	-	4,633,623	137,000	1,993,800	1,042,986
	Pink	6	91,337	-	-	452	-	2,855,441	-	4,751,800	-	1,442,840	-	333,300	68,325	338,000	-	1,149,189
Fraser River U.S. Commercial Catch	Sockeye	-	989,459	-	-	44,100	691,000	4,609	105,100	266,000	1,970,000	-	49,800	3,900	701,300	-	192,200	244,000
	Pink	232,904	-	105,930	-	334,700	-	3,057,222	-	2,893,400	-	2,726,230	-	377,600	-	-	-	773,000
West Coast Vancouver Island (commercial troll)	Coho	2,920	-	331	774	18,126	32,992	5,499	1,988	-	458	-	369	1,424	2,399	5,989	-	-
Johnstone Strait (commercial catch)***	Chum	-	52,139	401,957	1,333,478	492,841	318,984	597,003	391,324	751,560	62,510	510,708	298,931	494,944	800,363	787,226	1,089,100	1,026,029

*AREA 5-11 CATCHES INCLUDED PRIOR TO 1995 AND EXCLUDED FROM 1995-1998 INCLUSIVE. NOT PART OF 1999 ANNEX IV PROVISIONS.

** NORTH COAST CATCH EXCLUDES TERMINAL EXCLUSION CATCHES OF 6,000 ('91), 6,100 ('92), 7,400 ('93), 6,400 ('94), 1,702 ('95), 16,000 ('96), 5,943 ('97), and 2,182 in 1998. NO TERMINAL EXCLUSION IN THE 1999 AGREEMENT - COVERED UNDER THE AABM ARRANGEMENT; CENTRAL COAST AREAS NOT PART OF 1999 ANNEX IV PROVISIONS.

*** CANADIAN CATCH INCLUDES COMMERCIAL, FSC AND TEST-FISH CATCHES IN AREAS 11-13 FOR 1991-94 INCLUSIVE, AND IN AREAS 12-13 FOR 1995 TO 2004 INCLUSIVE. 2002-PRESENT, CATCHES FROM FISHERIES MANAGED TO FIXED HARVEST RATE OF 20%.

****ALL PINK CATCHES FOR ALL YEARS (1995-2012) IN AREAS 3(1-4) AND AREA 1 HAVE BEEN UPDATED TO REFLECT FINAL ESTIMATES.

NOTE 1: WCVI CHINOOK CATCHES FROM 1995-1998 ARE REPORTED BY CALENDAR YEAR; CATCHES FROM 2008-1999 ARE REPORTED BY CHINOOK YEAR (OCT-SEPT)

NOTE 2: 1999 CATCHES ARE REPORTED ACCORDING TO FISHERIES/STOCKS UNDER THE 1999 ANNEX IV PROVISIONS.

8.2 APPENDIX 2: TRANSBOUNDARY CATCH TABLE

Licence Group	Fishing Area	Sockeye Kept	Sockeye Released	Coho Kept	Coho Released	Pink Kept	Pink Released	Chum Kept	Chum Released	Chinook Kept	Chinook Released
First Nations FSC and Treaty											
	Stikine	5,401								570	
	Taku	105		107						10	
	Alsek	648								32	
Total First Nations FSC Catch		**6,154**		**107**						**612**	
Commercial											
	Stikine	10,812		5,228							648
	Taku	21,395		12,145							135
Total Commercial Catch		**32,207**		**17,373**							**783**
Recreational											
	Alsek	5		10						5	
Total Recreational Catch		**5**		**10**						**5**	
TOTALS		**38,366**		**17,490**						**617**	**783**

8.3 APPENDIX 3: NORTHERN BC CATCH TABLE

Licence Group	Fishing Area	Sockeye Kept	Sockeye Released	Coho Kept	Coho Released	Pink Kept	Pink Released	Chum Kept	Chum Released	Chinook Kept	Chinook Released
First Nations FSC and Treaty											
	Skeena	28,205		613	-	8,072		34	3	4,659	
	Nass	53,829		2,288		6,542		157		6,555	
	Central Coast	1,949		382		8		498		2,520	
Total First Nations FSC Catch		**83,983**	**-**	**3,283**	**-**	**14,622**	**-**	**689**	**3**	**13,734**	**-**
Commercial											
Area C Gillnet	North & Central Coast	20,747	28	11	1,991	20,794	151	91,352	457	5,109	896
Demo	Central Coast			2,388		1,456					
Area F Troll	Haida Gwaii AABM	-	952	22,002	27	3,723	1,311	891	827	42,801	4,425
Area F Troll	Haida Gwaii Pink/Coho	11	1,739	155,195	173	56,280	6,108		2,573		35,673
Total Commercial Catch		**20,758**	**2,719**	**179,596**	**2,191**	**82,253**	**7,570**	**92,243**	**3,857**	**47,910**	**40,994**
Recreational											
	Skeena/Nass	49	219	23,904	2,292	3,471	6,282	62	12	16,052	11,150
	Central Coast			16,270		944		221		8,431	
	Haida Gwaii	125	-	36,100	15,300	910		700		45,200	24,000
Total Recreational Catch		**174**	**219**	**76,274**	**17,592**	**5,325**	**6,282**	**983**	**12**	**69,683**	**35,150**
TOTALS		**104,915**	**2,938**	**259,153**	**19,783**	**102,200**	**13,852**	**93,915**	**3,872**	**131,327**	**76,144**

8.4 APPENDIX 4: SOUTHERN BC CATCH TABLE

Not including Fraser River – see Appendix 5

Licence Group	Fishing Area	Sockeye Kept	Sockeye Released	Coho Kept	Coho Released	Pink Kept	Pink Released	Chum Kept	Chum Released	Chinook Kept	Chinook Released
First Nations FSC and Treaty											
	WCVI - Inshore ISBM			1,582	341			1,738	700	5,551	
	WCVI - Offshore AABM			2,364	15	99		17		1,450	10
	Strait of Georgia	1		1,560		14		322		1,024	8
	Johnstone Strait		302	635	4	7,561		7,878	100	358	3
Total First Nations FSC Catch		1	302	6,141	360	7,674	-	9,955	800	8,383	21
First Nations Commercial											
EO	WCVI - Inshore ISBM			659						26,424	
Total First Nations Commercial Catch				659						26,424	
T'aaq-wiihak											
	WCVI - Offshore AABM	2	20	188	1,195	172	512	1	15	7,123	277
	WCVI - Inshore ISBM			94				38		3,058	
Total T'aaq-wiihak Catch		2	20	282	1,195	172	512	39	15	10,181	277
Commercial											
Area B	WCVI - Inshore			2,744			1		2	6,562	254
Area D	WCVI - Inshore		1	176	58			6,897	2	38,913	22
Area G	WCVI - Offshore		4		7,445	117	175	1	12	23,195	557
Total Commercial Catch		-	5	2,920	7,503	117	176	6,898	16	68,670	833
Recreational											
	Johnstone Strait	9	111	2,278	4,206	4,094	3,219	14	14	11,228	14,681
	Strait of Georgia	34	410	6,502	34,384	20,702	10,502	448	12	45,974	132,648
	Juan de Fuca	-	177	8,811	27,947	29,262	17,652	50	50	12,355	20,775
	WCVI - Inshore ISBM	28	14	19,028	10,542	989	1,147	6	-	51,430	29,323
	WCVI - Inshore AABM	570	-	8,836	8,147	230	55	-	-	20,155	29,099
	WCVI - Offshore AABM	-	5	9,392	23,719	1,623	2,246	-	-	15,712	8,689
Total Recreational Catch		641	717	54,847	108,945	56,900	34,821	518	76	156,854	235,215
TOTALS		**644**	**1,044**	**64,849**	**118,003**	**64,863**	**35,509**	**17,410**	**907**	**270,512**	**236,346**

8.5 APPENDIX 5: FRASER RIVER CATCH TABLE

Licence Group	Fishing Area	Sockeye Kept	Sockeye Released	Coho Kept	Coho Released	Pink Kept	Pink Released	Chum Kept	Chum Released	Chinook Kept	Chinook Released
First Nations FSC and Treaty											
	Fraser	9,942	3,854	225	935	37,239	17,657	15,827	28	29,238	390
Total First Nations FSC Catch		9,942	3,854	225	935	37,239	17,657	15,827	28	29,238	390
First Nations Commercial											
	Fraser		377	1	1,034	220,936	15,035	30	133	1	932
Total First Nations Commercial Catch			377	1	1,034	220,936	15,035	30	133		932
Commercial											
	Fraser										
Total Commercial Catch											
Recreational											
	Fraser	0	0	18,474	10,525	5,709	4,729	923	8,887	12,236	4,869
Total Recreational Catch		0	0	18,474	10,525	5,709	4,729	923	8,887	12,236	4,869
TOTALS		**9,942**	**4,231**	**18,700**	**12,494**	**263,884**	**37,421**	**16,780**	**9,048**	**41,474**	**6,191**

8.6 APPENDIX 6: TEST FISHING CATCH TABLE

Test-Fisheries	Start Date	End Date	Boat Days	Sockeye kept	Sockeye released	Coho kept	Coho released	Pink kept	Pink released	Chum kept	Chum released	Chinook kept	Chinook released	GRAND TOTAL
Albion Chinook Gillnet	21-Apr-19	20-Oct-19	158	73	-	8	-	179	-	369	-	1,675	-	**2,304**
Albion Chum Gillnet	1-Sep-19	23-Nov-19	52	10	-	75	-	568	-	3,436	-	521	-	**4,610**
Mquqwin / Brooks Chinook Troll	20-Jul-19	27-Aug-19	16	-	3	368	-	15	53	-	-	339	5	**783**
Juan De Fuca Chum Seine	1-Oct-19	8-Nov-19	24	-	-	-	157	-	-	694	68	-	11	**930**
Area 12 Chum Seine	12-Sep-19	24-Oct-19	56	-	32	4	151	2	695	4,489	230	1	47	**5,651**
Naka Creek Sockeye Gillnet *	-	-	-	-	-	-	-	-	-	-	-	-	-	**-**
Area 13 Sockeye Seine	10-Aug-19	23-Aug-19	14	1,500	3,176	-	43	3,234	45,101	-	74	-	74	**53,202**
Area 23 Sockeye Seine	10-Jun-19	16-Jul-19	14	3,953	6	-	1	-	1	-	-	-	126	**4,087**
Blinkhorn Sockeye Seine	25-Jul-19	30-Aug-19	36	2,883	2,884	-	254	698	36,003	-	378	-	401	**43,501**
Round Island Sockeye Gillnet	11-Jul-19	11-Aug-19	32	172	-	57	49	221	-	13	-	29	16	**557**
Round Island Sockeye Gillnet AT 90 Mesh Net Study **	1-Aug-19	30-Jul-19	20	133	-	56	51	223	1	12	-	32	22	**530**
San Juan Sockeye Seine	26-Jul-19	30-Aug-19	36	614	51	-	2,208	8,540	66,783	3	1	-	1,758	**79,958**
San Juan Sockeye Gillnet	10-Jul-19	13-Aug-19	68	236	-	52	150	721	-	9	-	162	315	**1,645**
Whonnock Gillnet	24-Jun-19	28-Sep-19	96	463	-	179	-	5,252	-	102	-	1,102	-	**7,098**
Cottonwood Gillnet	12-Jul-19	16-Sep-19	66	222	-	30	48	2,977	-	9	-	267	47	**3,600**
Qualark Gillnet	2-Jul-19	29-Sep-19	90	558	-	1	17	585	-	-	-	651	12	**1,824**
Tyee				2,205		224		1,180		126		380		**4,115**
Grand Total				**13,022**	**6,152**	**1,054**	**3,129**	**24,395**	**148,637**	**9,262**	**751**	**5,159**	**2,834**	**214,395**

All test fish catches include assessment and non-assessment sets

* Did not operate in 2019

** New for 2019

Note: Jacks are included in the above test fishing catches, if encountered

8.7 APPENDIX 7: ESSR CATCH TABLE

Hatcheries	Sockeye kept	Sockeye released	Coho kept	Coho released	Pink kept	Pink released	Chum kept	Chum released	Chinook kept	Chinook released	GRAND TOTAL
Robertson Creek	-	-	4,375	-	-	-	-	-	18,811		**23,186**
Quinsam River					241,016						**241,016**
Puntledge River									6,840		**6,840**
Nitinat River	-	-	11	-	-	-	11,387	-	3,436	-	**14,834**
Conuma River	-	-	-	-	-	-	-	-	1,991	-	**1,991**
Weaver Spawning Channel											**-**
Chehalis Hatchery	-	-	-	-	-	-	-	-	-	-	**-**
Inch Hatchery	-	-	3,241	-	-	-	1,056	-	-	-	**4,297**
Chilliwack Hatchery	-	-	24,834	-	22	-	1,462	-	3,333	-	**29,651**
Capilano Hatchery	-	-	3,326	-	-	-	-	-	1,449	-	**4,775**
Tenderfoot Hatchery											**-**
Big Qualicum River			1,186		13,493		-		3,561		**18,240**
Little Qualicum River							-		1,367		**1,367**
											-
											-
Grand Total	**-**	**-**	**36,973**	**-**	**254,531**	**-**	**13,905**	**-**	**40,788**	**-**	**346,197**

Big Bar Landslide: Update

Pacific Salmon Commission

October 21, 2020

Canada

Presenters

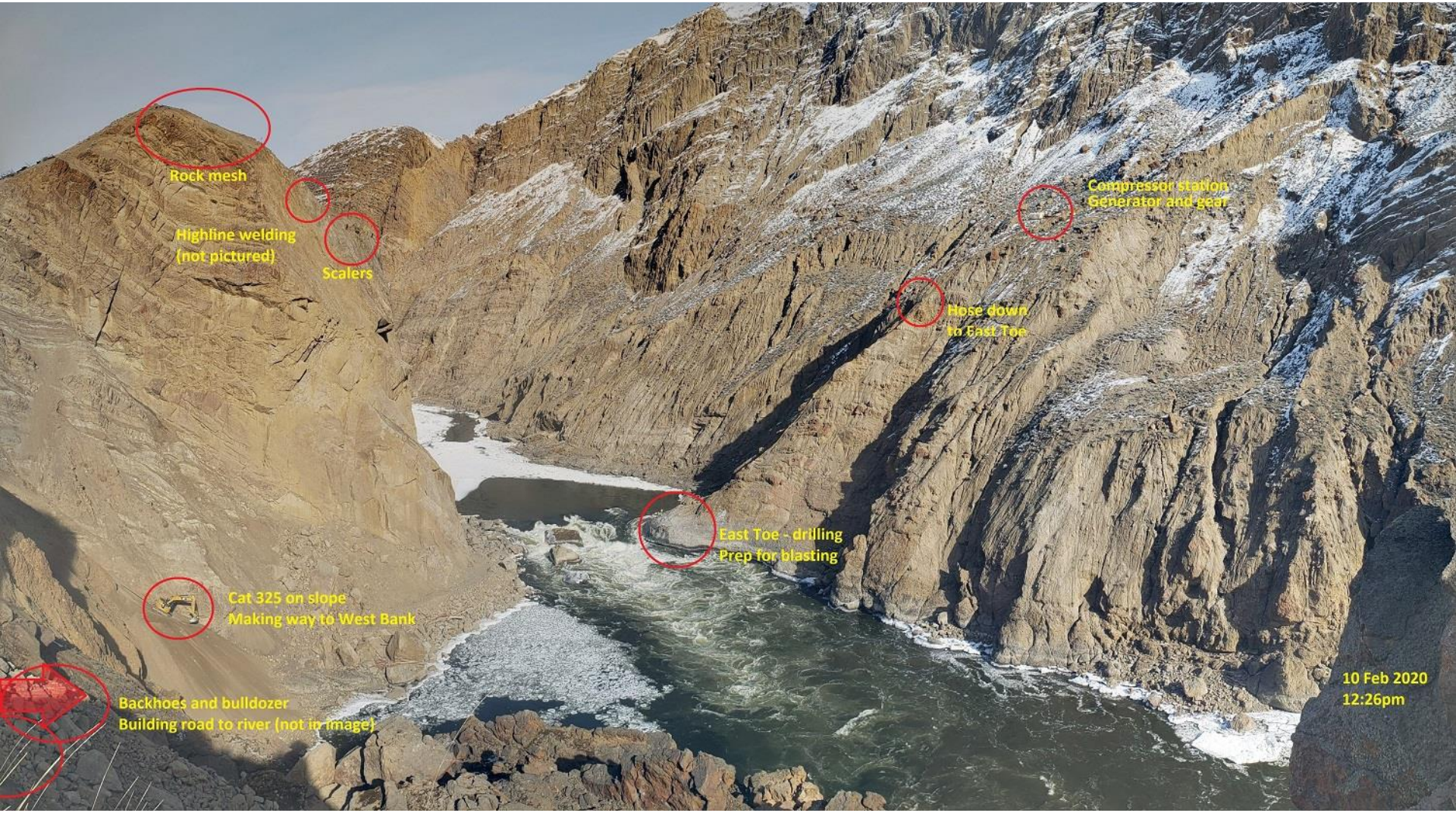
- **Rebecca Reid**
  - Regional Director General – Pacific Region, Fisheries & Oceans Canada
- **Gwil Roberts**
  - Director – Big Bar Landslide Response, Fisheries & Oceans Canada

Partnerships

- From the onset of the response to the Big Bar landslide, First Nations governments, the Province of British Columbia and the DFO have worked in partnership.

- Other collaborations include:
  - Joint Executive Steering Committee
  - First Nations Leadership Panel
  - Technical Working Groups

February 10, 2020



September 2020

Progress Video

https://tinyurl.com/bigbarPSC

Winter Construction Milestones

West Bank	East Toe	Channel Work (In River)
• Removal of loose rock • Installation of rock fall protection • Gain access to the boulders in the river channel • Construct overland temporary access for heavy equipment	• Drill and blast the rock along the east bank of the river (the East Toe) to increase the width of the river channel • Widen the narrow part of river to help reduce the speed of the water in the area of the slide.	• Drill and blast large boulders that fell into the river channel • Remove additional up-stream in-water slide material

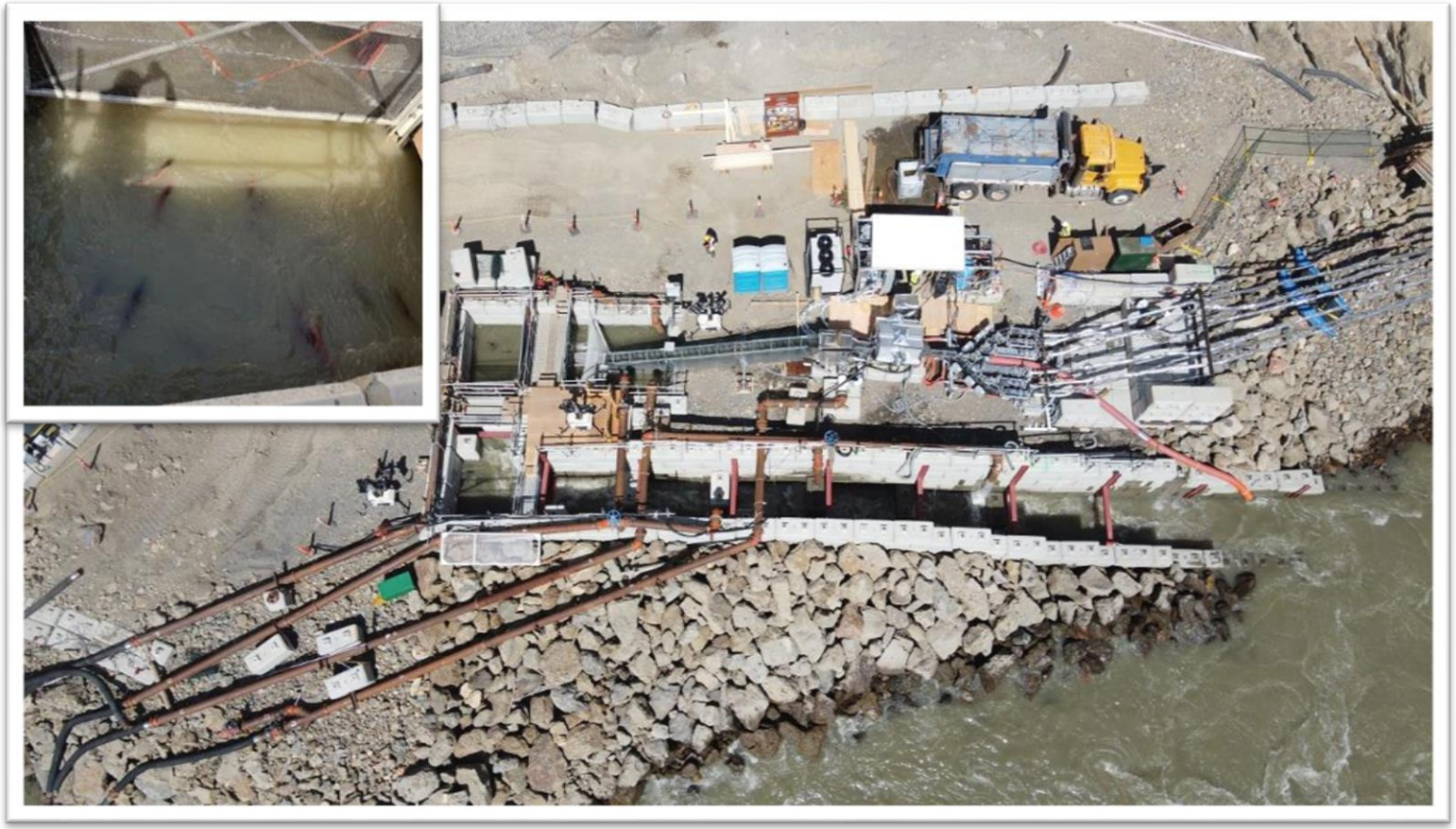
Before & After Second East Toe Blast

- April 11- 2nd East Toe Blast video: https://twitter.com/DFO_Pacific/status/1250151391206748163

"Nature-like" Fishway

Alternative Fish Passage Systems

Concrete Fish Ladder & Whooshh Passage Portal™



Whooshh™ Tubes

Steep Pass

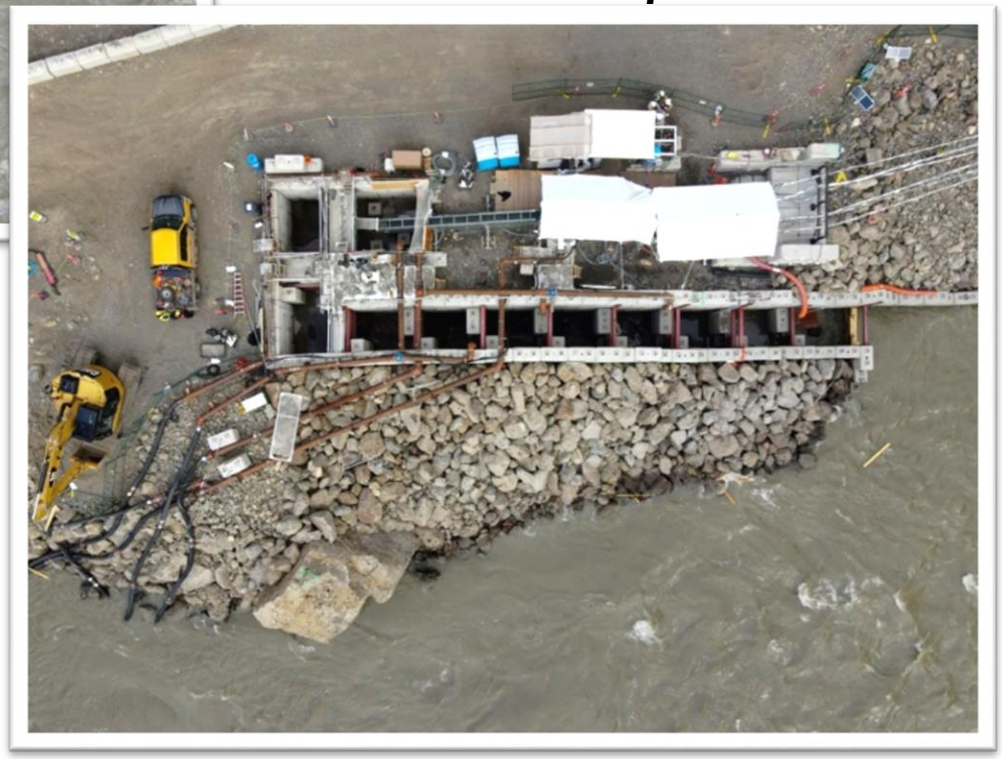
Truck & Transport

French Bar Creek - Holding Facility

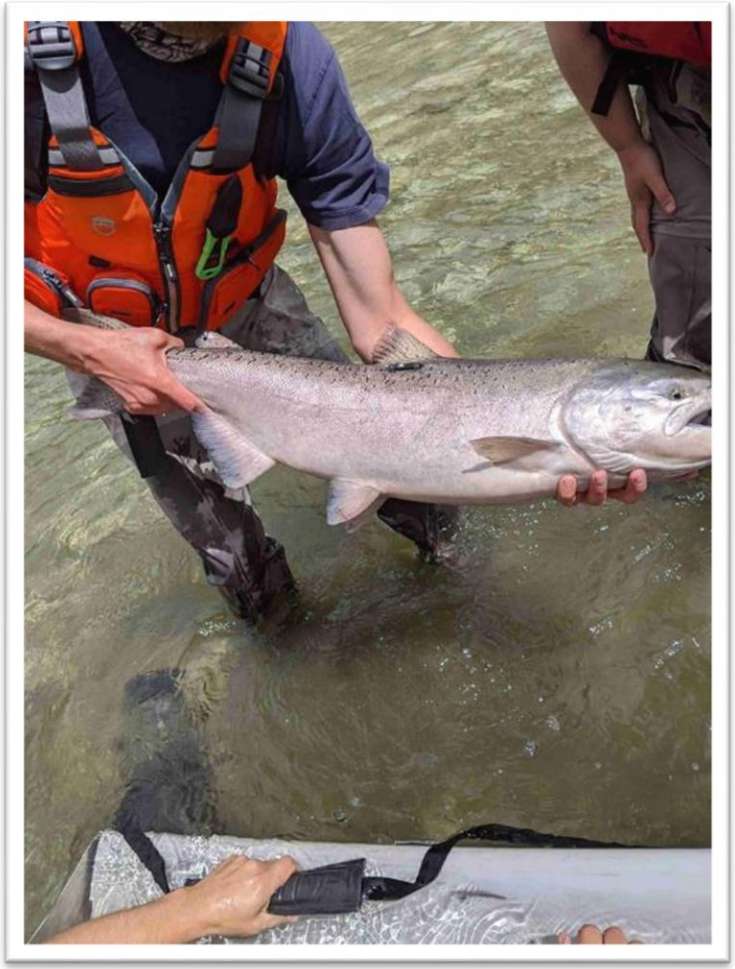
Water Levels

July 2020

September 2020



First Chinook Tagged – June 8



Radio Tagging at the Slide Site

Fish Wheel in Lillooet

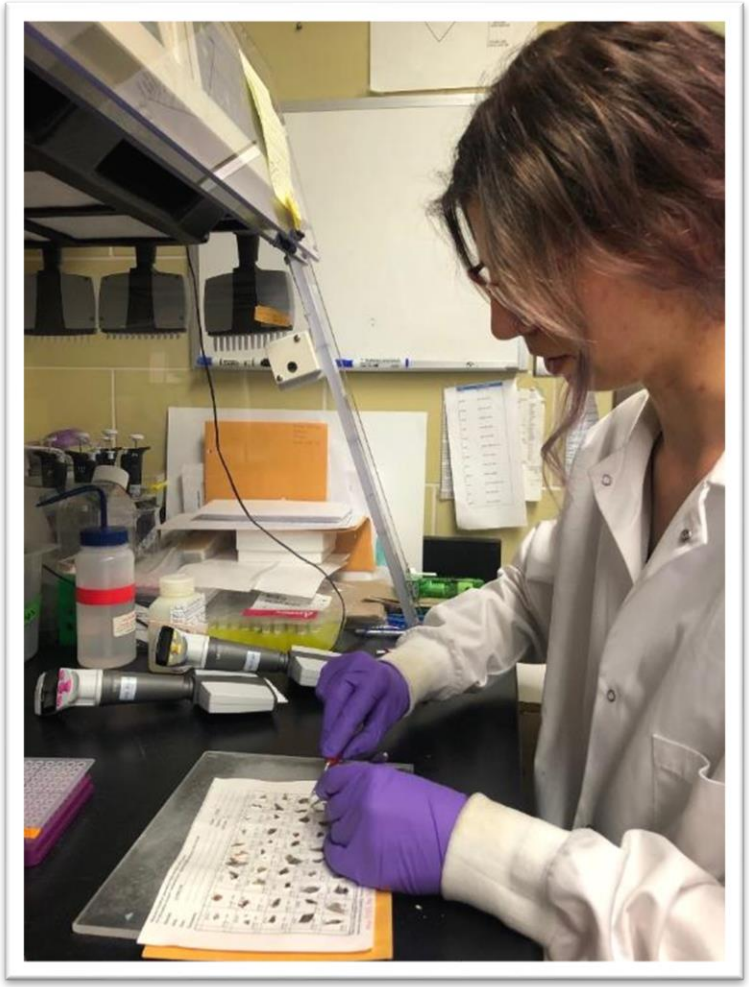
Conservation Enhancement

- **Team of internal and external experts developed:**
  - plan based on response to winter work success
  - sockeye and chinook population priorities

- **Brood collection at slide site and natal streams** (led by Upper Fraser Fisheries Conservation Alliance) **completed**:
  - 160,000 chinook eggs collected, 68,000 eyed eggs
  - 240,000 Early Stuart & 19,500 Bowron sockeye eggs collected – being counted
  - Eggs moved to hatcheries and reared until release in summer 2021

French Bar Creek Enhancement

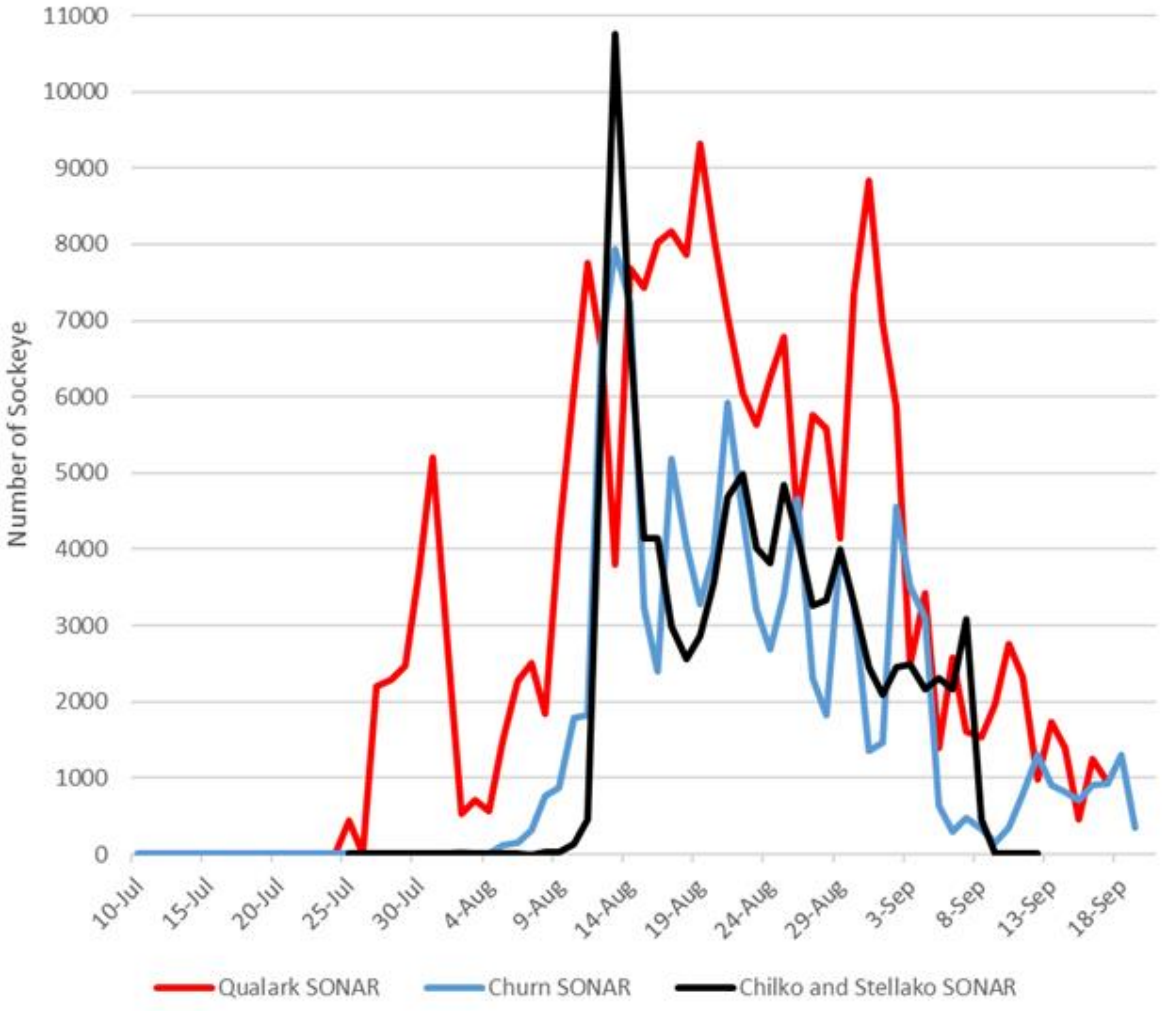
DNA Extraction



To date, approximately:

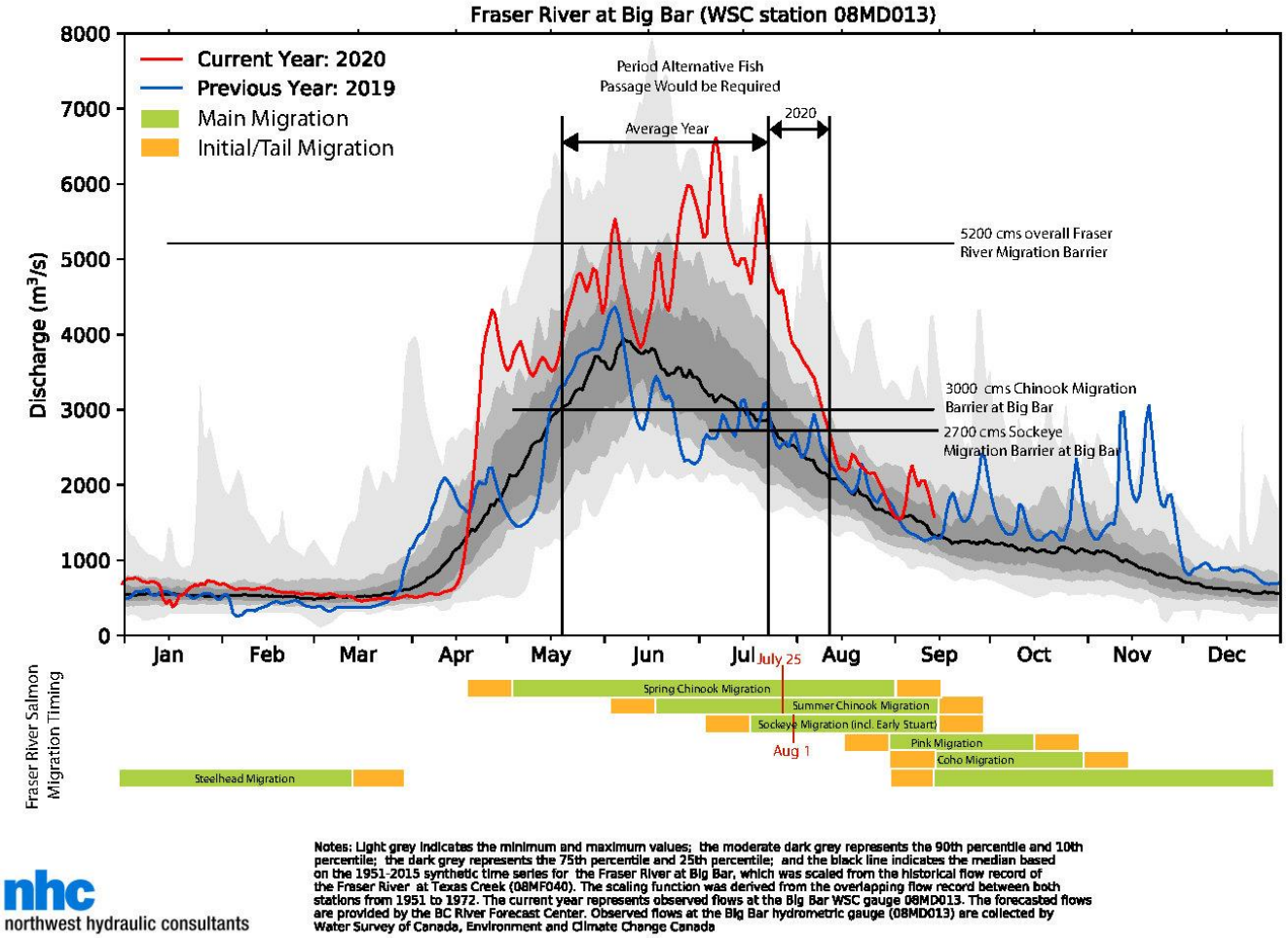
- **161,000** salmon - detected 40 km upstream of the slide site
- **8,200** salmon - transported over the slide using the Whooshh™
- **970** salmon - radio tagged
- **414** sockeye and **118** chinook - collected to support emergency conservation enhancement efforts

Preliminary Sonar Results



- Radio tagging and sonar passage thresholds match
- Sonar profiles between escapement programs and Churn Creek match
- Qualark and Churn Creek provide hints to where delays lead to mortality

2020 Migration



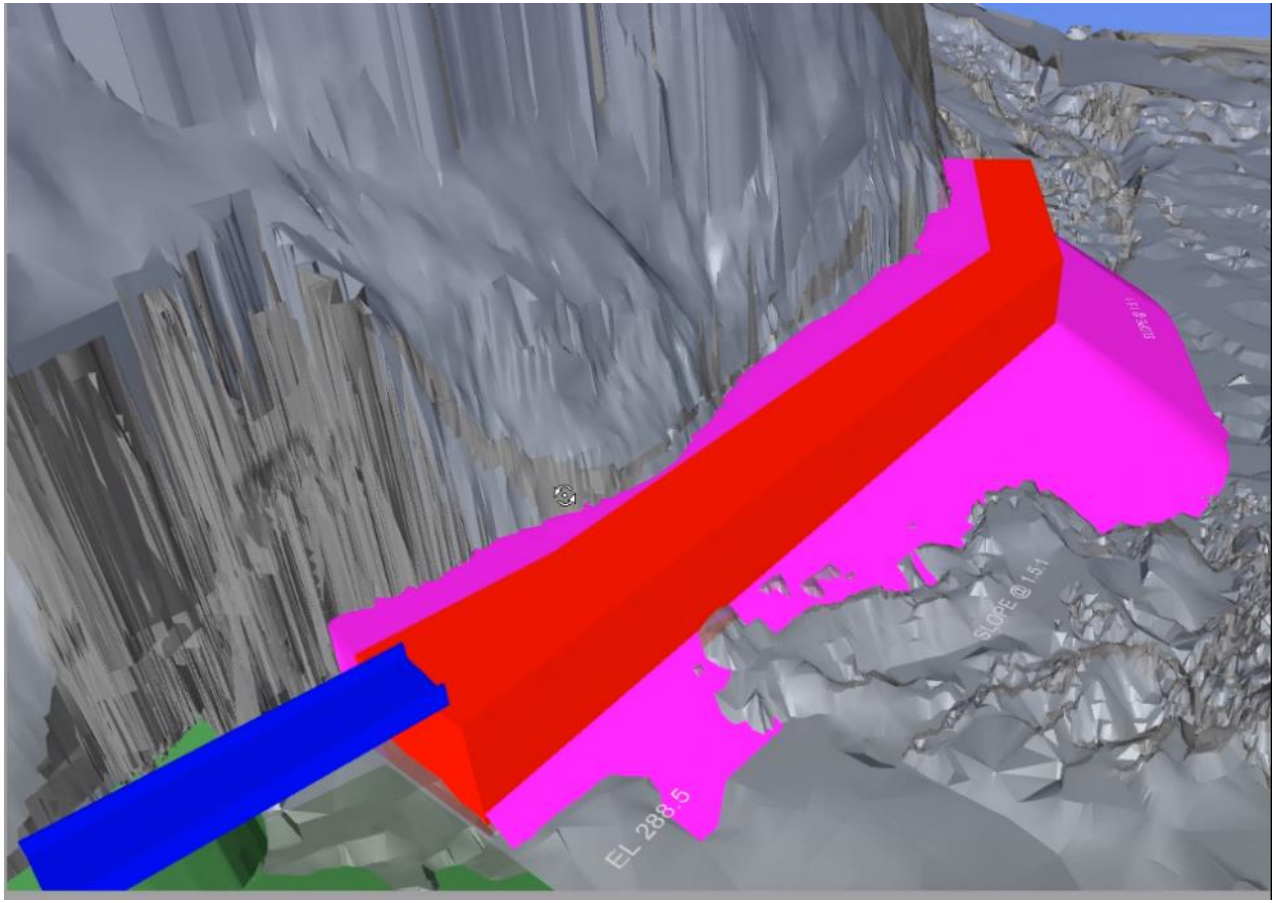
Notes: Light grey indicates the minimum and maximum values; the moderate dark grey represents the 90th percentile and 10th percentile; the dark grey represents the 75th percentile and 25th percentile; and the black line indicates the median based on the 1951-2015 synthetic time series for the Fraser River at Big Bar, which was scaled from the historical flow record of the Fraser River at Texas Creek (08MF040). The scaling function was derived from the overlapping flow record between both stations from 1951 to 1972. The current year represents observed flows at the Big Bar WSC gauge 08MD013. The forecasted flows are provided by the BC River Forecast Center. Observed flows at the Big Bar hydrometric gauge (08MD013) are collected by Water Survey of Canada, Environment and Climate Change Canada

nhc northwest hydraulic consultants

- Significant barriers to migration at 5,200 m^3/s and higher
- **Chinook** - 'unimpeded threshold' (~3,000 m^3/s) appears to be much lower than the maximum threshold (~3,750 m^3/s)
- **Sockeye** - similar pattern observed, but still being validated

Next Steps

- **GOAL:** To plan, evaluate and implement a permanent solution to restore fish passage at the slide site



Next Steps

- **GOAL:** To plan, evaluate and implement a permanent solution to restore fish passage at the slide site
- **RECOMMENDATION:** According to options analysis, a permanent fishway is the best long-term solution to provide certain and reliable fish passage in the shortest timeframe
- **ACTION:** DFO is working with Public Services and Procurement Canada to develop an approach for the upcoming winter work season and beyond
- **CONSIDERATIONS:**
  - Remote location
  - Work is only possible during low water levels in the Fraser River
  - Project is expected to take between two and three years to complete

More Information

Progress Video: https://fisheriesandoceanscanada.box.com/s/zd2goanpgtqhk3axknzj38dvfvn8pbia

Images: Province of BC's Flickr channel contains images of the work underway at the slide site:

- Big Bar Landslide 2020
- Big Bar Landslide 2019

Salmon counts: daily counts of fish passage and weekly counts of emergency enhancement efforts available on DFO's website.

Information Bulletins: published bi-weekly on DFO's website.

Chinook Interface Committee Report to the Pacific Salmon Commission.

2020 PSC Fall Meeting

The CIG met twice during this week with a focus on agenda items from our last report to the Commission in February 2020. The following reports our work and recommendations for the Commission's consideration.

1) **CWT&R and CEII Work Group Terms of Reference (TOR):** Canada provided a draft TOR on September 1, 2020 and the U.S. and Secretariat subsequently provided minor edits for consideration by Canada. The draft TOR provides for the Work Group to include up to four members from each Party. The Parties would appoint members with appropriate expertise, and could draw members from outside the PSC forum. It was recognized that Work Group members would not include Commissioners. The draft TOR suggests consideration of workshops to promote communication and advances in stock assessment, with abstracts from workshop presentations posted in a timely manner on the PSC website as a PSC Special Report, as well as an addendum in the relevant PSC annual report.
    - CIG recommends the Commission adopt the CWT&R and CEII Terms of Reference, October 22, 2020 version (Attachment 1).

2) **Mark Selective Fisheries Terms of Reference (MSF TOR):** U.S. provided a draft on September 2, 2020. Canada provided edits to the U.S. draft MSF TOR on October 21, 2020 that were accepted.
    - CIG recommends the Commission adopt the MSF Terms of Reference, October 22, 2020 version (Attachment 2).

3) **Incidental Mortality (IM) Literature Review**: The CTC co-chairs reported that the full CTC is now reviewing a draft summary of recent studies on IM. The CTC proposed providing this information in a memorandum to the Commission by the end of October 2020. A full technical report, including the summary of recent studies and recommended standards for the desired level of precision and accuracy of data required to estimate incidental mortality, is planned for completion in October 2021. The CTC co-chairs noted that any changes in incidental mortality rates or encounter estimates may affect the time series of abundance from the PSC Chinook Model and the underlying data used to establish the IM limits in paragraph 4(f).

4) **CTC Work Plan**: CIG discussed the heavy CTC workload, shared perspectives, priorities, and the added support of the CTC Coordinator. In order to promote as much progress as possible, the CIG proposes to monitor the progress of the CTC, address any questions that might arise regarding the tasks, and identify priorities if challenges are encountered in completing the many tasks. The CIG plans initial check-ins with the CTC at the January and February 2021 PSC meetings, with additional check-ins later in the year and as needed.
    - CIG recommends the Commission accept the 2021 CTC Work Plan.

5) **Okanagan Chinook Workgroup Work Plan**: Okanagan co-chairs reported on the 2021 work plan, which is a continuation of work not completed in 2020 due to COVID-19 restrictions including a series of workshop webinars for 2021.
    - CIG recommends the Commission accept the 2021 Okanagan Chinook Workgroup Work Plan with the understanding that the Workgroup will be looking to streamline the number of webinars to make them as efficient as possible.

6) **CYER Workgroup Work Plan**: The CYER co-chairs reported on the 2021 work plan and coordination with the CTC, SFEC, and CIG in 2021. For the February 2021 meeting, CYER anticipates completion of the technical analyses and initiation of a series of discussions with the CIG on a transition plan to facilitate the estimation of exploitation rates on unmarked Chinook salmon, as represented by the CWT indicator stocks that migrate through mark-selective fisheries. The transition plan would include short- and long-term methods to estimate calendar year exploitation rates (CYERs) on natural-origin Chinook salmon (as represented by the CWT indicator stocks), and potential modifications to marking, tagging, sampling, fishery monitoring, and information management to improve our ability to estimate exploitation rates across PSC Chinook fisheries in the future.
    - CIG recommends the Commission accept the 2021 CYER Workgroup Work Plan.

7) **COVID-19 Impacts**: The CIG discussed the potential impacts of COVID related reductions in stock and fishery assessments, particularly the lack of tagging for some Canadian indicator stocks. The CIG intends to continue to monitor this in the future, and recommends to the Commission that methods to fill any data gaps be addressed through bilateral technical teams. This issue will be further discussed in a subsequent CIG meeting likely in January.

SUMMARY OF RECOMMENDATIONS:

1) CIG recommends the Commission adopt the CWT&R and CEII Terms of Reference, October 22, 2020 version.

2) CIG recommends the Commission adopt the MSF Terms of Reference, October 22, 2020 version.
3) CIG recommends the Commission accept the 2021 CTC Work Plan.
4) CIG recommends the Commission accept the 2021 Okanagan Chinook Workgroup Work Plan with the understanding that the Workgroup will be looking to streamline the number of webinars to make them as efficient as possible.
5) CIG recommends the Commission accept the 2021 CYER Workgroup Work Plan.

Attachment 1: CWT&R and CEII Terms of Reference

CWTR and CEII Work Group
Terms of Reference
October 22, 2020 for Chinook Interface Group Consideration

Chapter 3 Reference:

The parties shall create and maintain a work group to discuss the programs initiated in sub-paragraphs (c) and (d) by 2020. The work group shall:

(i) *Create opportunities for the exchange of project results and conclusions, advancements in knowledge, and discussion of the direction of these programs between the Parties, management entities, and knowledgeable individuals;*

(ii) *Review project results and conclusions from these programs and provide these reviews to the project proponents and the Commission; and,*

(iii) *Identify, for the Commission, changes to projects or suggest new projects to fill gaps in knowledge.*

Background:

The two programs to be supported by this group are the result of commitments in Chapter 3:

- Section 2(c) to "implement through their respective domestic management authorities, a 10 year Chinook salmon CWT&R program that begins in 2019 that provide timely data to implement this chapter, via improvements and studies designed to improve CTC and CWT workgroup data standards and guidelines…" The purpose of the CWT&R program is described in paragraphs 2(c)(i)-2(c)(v).
- Chapter 3, Section 2 (d) to "implement through their respective domestic management authorities, a 10 year Chinook salmon CEII program that begins in 2019 that provide timely data to implement this chapter, via objective and repeatable methodologies in data limited situations and in others through improvements and studies designed to achieve CTC data standards, guidelines and analysis schedules…" The purpose of the CEII program is described in paragraph 2(d).

The work group is intended to support the Parties in reviewing these programs and progress, and to assist each Party as it makes decisions on priorities and allocations with its respective domestic management authorities.

Membership:

Given the changes in the chapter for both AABM and ISBM fisheries and the improvements to these programs to support those changes, membership will consist of up to four representatives from each Party with the appropriate expertise from existing PST Committees or other expertise as required.

Role:

The parties shall create and maintain a work group to discuss the programs initiated in sub-paragraphs 2 (c) and (d) by 2020.

The work group shall:

(i) Create opportunities for the exchange of project results and conclusions, advancements in knowledge, discussion of the direction of these programs between the Parties, management entities, and knowledgeable individuals;
(ii) Review project results and conclusions from these programs and provide these reviews to the project proponents and the Commission; and
(iii) Identify, for the Commission, changes to projects or suggest new projects to fill gaps in knowledge.

To fulfill these tasks, the work group shall consider convening, in conjunction with an existing PSC meeting and with the assistance of the Secretariat, workshops targeted at specific Chinook stock assessment topics selected in consultation with the CTC, CYER WG, and SFEC. Discussions during the sessions would promote understanding of the challenges, advances, and potential further improvements in stock assessment in the PST area. In order to further enhance communication and address the requirements of paragraph 2(e) i-iii, abstracts from the presentations would be published as a PSC Special Report and included as addenda in the relevant annual report of the Pacific Salmon Commission, as appropriate.

Meetings:

The workgroup will meet 2-3 times per year to complete these tasks. Workgroup meetings will occur by videoconference or in conjunction with existing PSC meetings in order to minimize costs and travel time. Travel costs of the work group members will be covered by their respective national sections.

Attachment 2: MSF Terms of Reference

Terms of Reference
Mark Selective Fisheries Fund
October 22, 2020

Background

Chapter 3, paragraph 4(g)(v) of the Pacific Salmon Treaty requires the U.S. to establish, subject to the availability of funds, a Mark Selective Fishery Fund (Fund) to address equipment, operations, and other implementation funding needs associated with mass marking and mark-selective fisheries (MSF):

> *"subject to the availability of funds, the U.S. shall establish a Mark Selective Fishery Fund (Fund). The Fund shall be administered by the Commission to assist fishery management agencies with equipment and operations, as needed, to mass-mark hatchery produced Chinook salmon, to estimate incidental mortality, and to maintain and improve the ability to estimate exploitation rates on Chinook salmon indicator stocks that are encountered in MSF, including improvements and development of bilateral analytical tools. The Commission shall adopt procedures to solicit proposals from U.S. and Canadian management entities for the use of the Fund, be advised on the merits of proposals by specialists as it determines appropriate, and make funding decisions."*

This Terms of Reference describes the process the Parties will use to implement Chapter 3, paragraph 4(g)(v) including the solicitation, evaluation, and selection of projects.

Fund Initiation and Administration

The U.S. provided $75,000 USD to initiate the Fund in 2019 and an additional $1.75M USD in 2020. The U.S. may provide additional funding in subsequent years as needs are identified and if additional funding becomes available.

The Fund will be administered by the Secretariat of the Pacific Salmon Commission (PSC) at the direction of the Commission. The Secretariat may assess an administration fee of up to 10% of the expended value of the contracts administered.

Purpose of the Fund

Since the level and duration of U.S. contributions to the Fund are uncertain, the highest priority shall be provided to one-time equipment purchases or short-term (duration of ≤ 3 years) studies rather than supporting ongoing annual programs. Programs shall: 1) assist fishery management agencies with equipment purchases to mass-mark hatchery produced Chinook salmon or to detect coded-wire tags in the landed catch and spawning escapements; 2) provide an independent estimate of incidental mortality in mark-selective fisheries in order to evaluate or calibrate an on-going method; or 3) implement short-term studies or develop bilateral tools to maintain and improve exploitation rate estimates on Chinook indicator stocks that are encountered in MSFs.

Implementation and Administration Responsibilities

The Commission shall:

1) Establish a bilateral MSF Fund Committee (MSFC) comprised of no more than 4 representatives from each Party to advise the Commission on the merits of project proposals and review project implementation;
2) Identify at the February Annual PSC meeting the amount of funding that will be available for projects in that year. Fifty percent of the funding allocated in any year will be available to each Party, unless otherwise determined by the Commission; and
3) Review the merits of proposals and select projects for funding at the October PSC Executive meeting.

The Parties shall:

1) Appoint MSFC members with expertise in mass marking and estimating incidental mortality and exploitation rates for stocks subject to MSF; and
2) Cover the travel costs of the MSFC members by their respective national sections.

The PSC Secretariat shall:

1) Provide administrative and logistical support for bilateral meetings of the MSFC;
2) Distribute a Request For Proposals (RFP) to solicit proposals annually as directed by the Commission;
3) Provide administrative support, including preparation and oversight of contracts for deliverables, manage payments to project proponents, and maintain records of project documents including final reports and accounts for financial information; and
4) Maintain a library of reports for projects supported by the Fund and make such reports available to the Commission, Panels, and Technical Committees.

The duties of the MSFC are:

1) Work with the Secretariat to develop an RFP, consistent with this Terms of Reference, that is intended to serve for each year in which project proposals are solicited;
2) Develop criteria to evaluate proposals by considering:
    - Significance of the candidate coded-wire tag indicator stock or fishery to effective implementation of Chapter 3;
    - Potential improvement to the accuracy or precision of estimates of incidental mortality or exploitation rates in MSF;
    - Analyses, recommendations, and applicable bilateral data standards developed by the Ad-hoc Workgroup on Calendar Year Exploitation Rates, Selective Fishery Evaluation Committee, and Chinook Technical Committee;
    - Consistency of the proposed approach with best available science and technical methods, if applicable;
    - Cost of the project relative to expected benefits; and
    - For multi-year projects, the effectiveness in achieving project objectives.
3) Develop a concise format for project proposals;
4) Annually provide to the Commission a report with the score of each proposed project as determined by each member of the MSFC; and any comments needed to qualify the scores for a proposal.

5) Review project reports and present this information annually to the Commission, summarizing findings, accomplishments, and issues arising during project implementation; and
6) At the conclusion of the program, provide a summary report to the Commission.

Timeline

The annual timeline for the Fund summarized below complements the schedule described in the PSC Memorandum of Understanding of the PSC Concerning Mass Marking and Mark Selective Fisheries (February 2004 Policy Statement).

1) At the February PSC meeting: the Commission shall identify the amount of funding that will be available for projects in that year.
2) By May 31: the MSFC will develop an RFP.
3) By June 1: the RFP will be published by the Secretariat and provided to management entities.
4) By August 1: completed proposals will be submitted to the Secretariat. Upon closing, the Secretariat will distribute proposals to members of the MSFC for review.
5) By mid-September: the MSFC will meet (in-person or via webinar) to discuss and score the proposals.
4) By October 1: the MSFC will provide its recommendations to the Commission.
5) At the October PSC Executive meeting: the Commission will review and select projects for funding, and the Secretariat will promptly notify the project proponents.
6) At the February PSC meeting (beginning in 2023): the MSFC will provide an annual summary of project results.

PSC Chinook Technical Committee

CHINOOK TECHNICAL COMMITTEE WORK PLAN 2020-2021

Panel / Committee: The Chinook Technical Committee (CTC) reports to the Pacific Salmon Commission.

Date: October 19-23, 2020

Update on Bilateral Tasks Assigned Under Current PSC Agreement:

CTC Work Plan Tasks Assigned for 2020

1. 2020 Legacy Annual Tasks

- 2020 Chinook exploitation rate analysis (ERA) – *Completed*
- 2020 Chinook Model calibration of old and new models – *Completed*
- 2020 Catch and Escapement (C&E) report – *Completed*
- 2019 Calibration and Exploitation Rate Analysis (CLB&ERA) report – *Nearing completion*
- 2020 Calibration and Exploitation Rate Analysis (CLB&ER) report – *In progress*

2. 2020 New Annual Tasks

- Report stock-specific mark-selective fisheries (MSF) impacts, starting 2020 – *Pending development and implementation of MSF algorithms.*
- Summarize catch and escapement indicator improvement (CEII) and coded wire tag & recovery (CWT&R) programs, starting 2020 – *Deferred; work on this task cannot occur until funding is secured for the CEII and CWT&R programs.*
- Report on incidental mortalities (IMs) – *Completed*; *the CTC reported on IMs in the 2020 C&E report.*

- Report data underlying the hatchery add-on calculations – *Completed; the CTC provided a summary of information used to determine the allowable exclusion or hatchery add-on in the 2020 C&E report.*

3. 2020 Ad Hoc Tasks

- Standards for IM data – *In progress; literature review expected October 2020 and development of standards is planned for completion in October 2021.*
- Documentation of the Phase 2 base period recalibration – *In progress; recalibration process is complete.*
- Documentation of selection of maturation rate and environmental variable assumptions for use in Chinook Model projections – *Completed.*
- Implementation of calendar year exploitation rates (CYERs) – *In progress; through coordination with the Selective Fishery Evaluation Committee (SFEC) and CYER workgroup.*
- Investigate and implement MSF algorithms in the annual ERA – *In progress; through coordination with SFEC and CYER workgroup.*
- Escapement goals presented for review and acceptance will be evaluated by the CTC – *Proposed escapement goals for Skagit River Spring Chinook and Skagit River Summer/Fall Chinook were brought forward in September2020 and are currently undergoing CTC review.*
- Use of the Data Generation Model (DGM) in evaluating single index tags (SIT) and double index tags (DIT) methods for estimating MSF impacts – *In progress.*
- Restructuring of annual reports – *In progress; C&E report modified to accommodate the 2019 PST Agreement.*
- Prior to conducting the annual ERA, the CTC will identify at the estimation level (i.e., the area, gear, and time period strata for which recoveries are estimated), the fisheries and escapement for which use of an indirect method would ensure complete inclusion of known fishery impacts or account for the entire escapement. The CTC will summarize the identified situations and apply a preliminary proposal for an indirect method. – *In progress; through coordination with the CYER workgroup.*

CTC Work Plan Tasks Proposed for 2021 – see Appendix I – CTC Implementation Plan

1. Legacy Annual Tasks

- 2021 Chinook ERA – *Planned for February and March.*
- 2021 Chinook Model calibration – *Planned for March.*
- 2021 Catch and Escapement (C&E) report – *Anticipated completion in June.*
- 2021 Calibration and Exploitation Rate Analysis (CLB&ERA) report – *Anticipated initiation in June.*

- 2019 and 2020 Calibration and Exploitation Rate Analysis (CLB&ERA) reports – *Anticipated completion in October (2019 report) and April (2020 report).*

2. New Annual Tasks

- Report stock-specific MSF impacts, starting 2021 – *Pending development and implementation of MSF algorithms.*
- Summarize CEII and CWT&R programs, starting 2020 – *Deferred; work on this task cannot occur until funding is secured for the CEII and CWT&R programs.*
- Report on IMs – *Planned for June 2021*; *the CTC will report annually on IMs in the C&E report, and if necessary, evaluate the causes of significant changes in rates or patterns.*
- Report data underlying the hatchery add-on calculations – *Planned for June 2021; the CTC will provide a summary of information used to determine the allowable exclusion or hatchery add-on, in the annual C&E report.*

3. Ad Hoc Tasks

- Restructuring of annual reports – *In Progress; the CTC is working to (1) restructure existing annual reports to align with new reporting requirements specified in the 2019 PST Agreement; (2) develop a new summary annual report; and (3) automate generation of tables and figures where possible to increase the efficiency of report production and reduce the time consumed each year by the CTC. The CTC has formed workgroups to address these tasks. This may require additional resources in the near term to meet CTC obligations under the new PST Agreement.*
- Documentation of Phase 2 base period calibration (BPC) of the PSC Chinook Model – *In progress.*
- Standards for IM data – *In progress; anticipated completion of literature review in October 2020. Development of standards is planned for completion in October 2021.*
- Develop and implement MSF algorithms in the annual ERA – *In progress; this task is a carry-over from the 2019 and 2020 Work plans, and is a necessary precursor to Appendix A, task 1 (g). The CTC-Analytical Working Group (AWG) met with SFEC-AWG in June 2019 to begin developing methods for incorporating MSF algorithms into the ERA. Representatives from the CTC have been meeting regularly with the CYER workgroup to achieve this task. Meetings between the CTC-AWG, the CYER workgroup and the SFEC-AWG will also occur to move this work forward.*
- Implementation of CYERs – *Pending; in coordination with the CYER workgroup and SFEC.*
    - Develop data standards for the application of CYER as a metric – *In progress; this work began in 2020 with anticipated completion in 2021.*
    - Describe any adjustments of terminal fishery impacts for exploitation rate indicator stocks – *The CTC understands this is a priority and intends to initiate work following the annual model calibration.*

    - Develop procedures to adjust CYERs for MSFs by 2021. Add to annual report – *In progress.*
    - Additionally, the CYER workgroup submitted a report to the CIG on September 12, 2019 that contained several recommendations that will require CTC involvement – *Pending Commission direction.*
- Evaluate alternative metrics for individual stock based management (ISBM) – *Scheduled to begin in 2021, contingent on successful implementation of CYER metric.*
- Escapement goals presented for review and acceptance will be evaluated by the CTC – *Proposed escapement goals for Skagit River Spring Chinook and Skagit River Summer/Fall Chinook were brought forward in September 2020 and are currently undergoing CTC review; the CTC anticipates that agencies may submit goals for review in 2021.*

Obstacles to Completing above Bilateral Tasks:

Loss of Experienced Membership

The CTC is still recovering from the effects of many retirements and departures of long-standing members with substantial institutional knowledge. These include Larrie LaVoy, Dr. Marianna Alexandersdottir, Dr. John H. Clark, Robert Clark, Dr. Robert Kope, Dr. Gayle Brown, Dawn Lewis, Andy Gray, and Richard Bailey. While the CTC continues to be comprised of talented members, there is a concern for loss of institutional knowledge and expertise. These losses are anticipated to delay some annual tasks and anticipated tasks within the new Agreement. On a positive note, the CTC has gained several skilled new members.

COVID-19 Impacts

The inability to meet in person since February of 2020 has not halted progress on CTC tasks but has impacted timelines and efficiency (see accompanying memo regarding COVID-19 impacts to CTC tasks).

Time Constraints

As in previous years, the primary obstacle is the amount of time and effort required to complete the large number of tasks assigned to the CTC under the 2019 Agreement and the technical complexity of those tasks. Although the formation of smaller CTC workgroups to address individual assignments creates some efficiency, the necessity of assigning CTC members to multiple workgroups creates bottlenecks.

Funding Constraints

In the past, meeting costs have had the potential to impact the CTC's ability to complete the ERA, PSC Chinook Model calibration, and annual reporting and anticipated tasks within the new agreement. However, this may not be an issue in 2021 if virtual meetings continue to be the norm due to COVID-19 concerns.

Policy Issues

The CTC anticipates several new policy issues may emerge due to the implementation of the 2019 PST Agreement.

Outline of Other Panel / Committee Tasks or Emerging Issues:
None identified.

Potential Issues for Commissioners, including enhancement activities reported under Article V:

Succession Planning and Training

2020 follows 2019 as another year with retirements of senior CTC members and more departures are expected in 2021. A transition plan to train new CTC members and transfer knowledge and expertise is needed to maintain understanding of the PST management framework for Chinook salmon and of the tools used to implement it. Severe time constraints imposed by ongoing work often interfere with this important activity. Succession planning is another task that needs to be an explicit element of the CTC work plan.

The CTC has identified some activities to improve transfer of knowledge and responsibilities to new CTC members. These would contribute to succession planning and are outlined below:

1. Improve documentation of the incomplete or outdated quantitative methods, data, and computer programs employed by the CTC.
    - A proposal has been submitted to the Northern Endowment Fund and the Southern Endowment Fund by PSC staff and CTC co-chairs to support CTC efficiency. The production of documentation was a key element of the proposal.
2. Look for training opportunities that could improve the functioning of the CTC and increase the value of in-person meetings.
    - The February 2020 training session on leading effective technical meetings offered to technical committee members successfully improved the committee's ability to carry out more efficient meetings.
    - *Recommendation:* A workshop on version control software (e.g., GitLab) would be useful training for committee members.

Improving Efficiency

1. *Meeting Management & Coordination*: In 2020, the Commission provided the CTC with funds to hire a Technical Committee Coordinator (Jessica Gill) and this position has proven to be a positive addition to the CTC. The assistance with agenda development, meeting scheduling, meeting minutes, document distribution, and tracking of work products and action items has greatly improved the efficiency of the CTC and has helped mitigate the impacts from the lack of in-person meetings due to COVID-19.
2. Increase the efficiency of report production and reduce the time consumed each year by the CTC.
    - The CTC is exploring ways to streamline and automate annual reports, by building on recent Coho Technical Committee (CoTC) experience and new server capacity made available by the PSC.
    - Agency support for additional training opportunities in new tools (e.g., R and Shiny) would be beneficial.

3. Complete projects currently underway that are aimed at greatly increasing efficiencies in annual work and in carrying out special investigations (i.e., ERA, modelling tools, and R package ForecastR).
    - Support provided by the Commission through dedicated assistance by Mark McMillan has provided significant improvements to the CTC database and modelling systems.

Development of New Tools

The model currently used by the CTC was initially developed about 30 years ago and relies on base period data that is nearly 40 years old. Chinook populations are experiencing changes in life history parameters, stock distributions, productivity, and increased environmental variability resulting in degraded performance of the current model. Some of the recently appointed CTC members bring with them skills with innovative analytical tools and applications that could potentially improve the management of Chinook fisheries. The CTC will encourage the development and evaluation of alternative tools and management strategies that may offer better performance than the current management regime.

Development of a Research and Development Team

Given the changing environment and duration of the PST, the modeling approaches used by the CTC need to be continuously tested, updated and new methods (such as management strategy evaluation) may need to be developed. Ideally, the CTC would like to find time for some members to explore and test new techniques to improve the current methods. This research effort is necessary to ensure better understanding of Chinook populations and that management outcomes are based on the best available science and technology.

Documentation

Due to tight timelines for producing yearly analyses and reports, the CTC has been remiss in the past in adequately documenting new computer programs and analyses as well as changes to existing programs and analyses. This has slowed the progress of developing new tools and techniques due to the necessity of retracing our steps to identify the current algorithms in use. The CTC will endeavor to make documentation a higher priority moving forward. Version control software, the development of a software protocols document, and the use of Markdown to document model adjustments has helped the CTC increase the documentation of analyses and programs.

Potential Issues for Committee on Scientific Cooperation

The CTC has learned that the CoTC has interest in convening an electronic conference to deal with incorporation of environmental information into salmon management. While the CTC sees value in this conference, there is uncertainty regarding the ability to contribute based on competing priorities. However, the CTC notes the following:

1. Recent studies and presentations at workshops have provided evidence of various types of demographic changes in Chinook populations such as declining mean size at age,

increasing mean maturation rates, and even decreasing fecundity at age in females. A review of the accumulating evidence for these types of population level changes, the geographic extent of such changes, the occurrence of discernible trends, the possible causal factors such as long-term environmental changes and their influence on output from management models would be helpful to the CTC. The ability of the Chinook Model to generate accurate abundance forecasts is tied to algorithms that generate age compositions of fish vulnerable, by size, in fisheries. It is crucial to understand whether historical methods can no longer be expected to work as they once did and whether alternative methods must be developed or new approaches to generating inputs to forecasting procedures are needed.

2. The PSC should consider establishing a coastwide, multi-species forum under the oversight of the Committee on Scientific Cooperation to share developments and advice regarding adaptation of Pacific salmon management approaches to environmental change. There is strong evidence that environmental change is occurring and accelerating to a degree such that past experience cannot be expected to serve as a reliable basis to forecast the future. Increases in uncertainty, variability, and directional change are expected to alter hydrology, precipitation, water temperatures and growth patterns which, in turn, are likely to affect the survival, productivity, abundance, distribution, and migration patterns of Pacific salmon. The forum should provide reporting of significant developments in the knowledge base as well as vetting of recommendations for monitoring and reporting systems, and potential adaptation strategies.

Proposed Meeting Dates and Draft Agendas:

Additional CTC meetings may be required, depending on the number and scope of additional tasks assigned.

Meeting	Dates	Location[1]	Meeting Objectives
2020			
PSC Fall Session	Oct 19-23	Webinar	CTC co-chairs attend
US CTC LOA	Dec 1-2	Webinar?	LOA project presentations, RFP
CTC-AWG+	Dec 2-4	Webinar	BPC Documentation; IM Standards
2021			
PSC Post-season	Jan 11-15	Webinar	IM Standards; CLB&ERA
PSC Annual	Feb 8-12	Webinar	IM Standards; report restructuring; ERA
CTC-AWG	Feb 22-26 (Feb 17-26)[2]	Portland, OR (Webinar)	ERA
CTC-AWG	Mar 15-19 (Mar 10-19)[2]	Vancouver, BC (Webinar)	Model Calibration
CTC Bilateral	Apr 26-30	Seattle, WA (Webinar)	C&E; report restructuring; CYERs; IM Standards
CTC-AWG/CYER/SFEC	May 17-21	Olympia, WA (Webinar)	MSFs, coding Coshak in R
CTC Bilateral	Jun 7-11	Bend, OR	C&E; CLB&ERA report; CYERs; IM changes; hatchery addon; IM Standards report
CTC Bilateral	Sept 20-24	Kelowna, BC	CLB&ERA report; Work plan; Finalize IM Standards report
CTC-AWG/CYER/SFEC	Oct 4-8	Seattle, WA	MSFs, coding Coshak in R
PSC Fall Session	Oct 18-22	Sitka, AK	CTC co-chairs attend
US CTC-LOA	Dec 2-3	Portland, OR	LOA project presentations, RFP

[1] Due to the COVID-19 pandemic and PSC guidance, meeting schedule assumes virtual meetings through February 2021. While there is uncertainty beyond February 2021 and it is understood that virtual meetings may need to continue, the CTC has provided proposed meeting locations to aid in planning in the event that travel may resume.

[2] Additional dates added if meeting is held via webinar.

Status of Technical or Annual Reports:

The 2020 C&E report is complete. The 2019 CLB&ERA report will be completed by the end of October 2020 and the 2020 CLB&ERA report will be completed in 2021. Obstacles to completing annual reports in a timely manner include workloads, competing priorities, working remotely because of COVID-19, and changeover in CTC membership. An additional obstacle for 2021 reports is the need to incorporate new reporting requirements associated with the 2019 PST Agreement.

Comments:

The CTC has assessed tasks listed in Appendix A of Annex IV, Chapter 3 of the recently completed 2019 PST Agreement to assess timelines and workload. The updated CTC Implementation Plan (Appendix I) represents the CTC's understanding of the timeline for completion of the CTC tasks identified in Appendix A.

APPENDIX I – CHAPTER 3 IMPLEMENTATION PLAN 2019-2028

The CTC has organized the Chapter 3 Appendix A tasks into four categories: legacy annual tasks, new annual tasks, ad hoc tasks, and conditional tasks. A 10-year plan is also provided.

1. Legacy Annual Tasks

The CTC will discuss changes to the structure of annual reports to reflect new obligations in the 2019 PST Agreement. We will also strive to reduce the size of annual reports, improve readability, and explore strategies to expedite production.

App A	Task	Timelines	
		Original	Proposed Changes
9	Report fishery performance at Annual Meeting	Feb	
1(h), 8, 6	Provide annual calibration, post-season abundance indices (AIs), pre-season comparisons, and catch deviations for aggregate abundance based management (AABM) fisheries	1 Apr	
1(b), 3(a), 3(b)	Report on catches, terminal exclusions, hatchery add-ons, harvest rate indices (HRIs), IMs, and ERs	June	
4, 11	Evaluate ISBM fishery performance, and starting in 2023, CYER average, and overages		
1(c)	Report escapements and evaluate stock status		

2. New Annual Tasks

App A	Task	Timelines	
		Original	Proposed Change
1(g)	Report stock-specific MSF impacts, starting 2020	May	2021
1(i)	Summarize CEII and CWT&R programs, starting 2020	June	2022
3(c)	Describe the causes of significant changes in IMs	June	
7	Report data underlying the hatchery add-on calculations	June	

3. Ad Hoc Tasks

App A	Task	Timelines	
		Original	Proposed Change
14	Complete BPC Phase 2 by February 2019	Feb 2019	Complete
2	Standards for IM data by February 2020	Feb 2020	Oct 2021
5	Complete Data Generation Model	2020	Complete
5	Evaluate alternative metrics for ISBM	2021	
	*Investigate and implement MSF algorithms in the annual ERA[1]**	2020	
	*Evaluate representativeness of CWT indicator stocks of wild/hatchery stocks they are intended to represent**	TBD	
5	Procedures to adjust CYERS for MSFs by 2021[1]. Add to Annual Report.	2021	
5	Describe adjustments of terminal fishery impacts for ER stocks[1]	2021	
13	Draft outline for 5-year review by January 2023	Jan 2023	
14	Complete BPC Phase 3	2023	
1(e)	Recommend standards for the minimum assessment program required to effectively implement Chapter 3	TBD	
1(f)	Recommend research 3(c), 7, and associated costs, to improve implementation of Chapter	TBD	

** Work plan tasks not included in App. A.*

[1] In Progress (in conjunction with the CYER workgroup and SFEC)

4. Conditional Tasks

App A	Task
11(b)	If ISBM overage, provide plan to improve performance in meeting objectives
10(b)	If AABM overage, provide plan to improve performance in meeting objectives
1(a)	Identify concerns with Chapter or effectiveness of actions in reaching objectives, as requested
1(d)	Evaluate, review or recommend escapement objectives; as requested
12	Up to two review(s) of CPUE based approach, if requested

Ten-Year Implementation Plan:

The CTC has made a preliminary assessment of tasks listed in Appendix A of Annex IV, Chapter 3 of the recently finalized 2019 PST Agreement to assess timelines and workload. The table following on the next page is the CTC's understanding of the timeline for completion of CTC tasks identified in Appendix A. Items in red indicate that the task has been delayed, and yellow items indicate potential delay.

App A	Task	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
9	Report to PSC at Annual meeting on (a) AABM management error, (b) AABM model error and performance, (c) recommendations for minimizing deviations between pre- and post-season fishery limits, and (d) status towards achieving stock-specific management objectives.	Feb	Feb	Feb	Feb	Feb	Feb	Feb	Feb	Feb	Feb
1 (h)	Provide annual calibrations of the Chinook Model with pre-season and post-season abundance indexes by April 1 of each year.	1-Apr	1-Apr	1-Apr	1-Apr	1-Apr	1-Apr	1-Apr	1-Apr	1-Apr	1-Apr
8	Provide the first post-season AI estimates for AABM fisheries using the Chinook Model and compare (a) CPUE-based tiers for SEAK and (b) AIs for NBC and WCVI AABM fisheries.	X	X	X	X	X	X	X	X	X	X
6	Determine annually if deviations have occurred between the observed catches and both the pre-season and post-season allowable catches for the SEAK, NBC, and WCVI AABM Treaty Chinook catches.	X	X	X	X	X	X	X	X	X	X
1(b)	Report annually on catches, terminal exclusions, hatchery add-ons, harvest rate indices, estimates of incidental mortality, and exploitation rates that apply best available information to account for MSF impacts for all Chinook fisheries and stocks harvested within the Treaty area.	X	X	X	X	X	X	X	X	X	X
1(c)	Report annually on naturally spawning Chinook stocks in relation to the agreed MSY or other agreed biologically-based escapement objectives, rebuilding exploitation rate objectives, or other metrics and evaluate trends in the status of stocks and report on progress in the rebuilding of naturally spawning Chinook stocks.	X	X	X	X	X	X	X	X	X	X
1 (g)	Annual report on stock-specific MSF impacts.		X	X	X	X	X	X	X	X	X
1 (i)	Annual summary of CEII and CWT&R programs.		X	X	X	X	X	X	X	X	X
3 (a)	An evaluation of estimates of encounters and incidental mortalities in all fisheries subject to this Treaty.	X	X	X	X	X	X	X	X	X	X
3 (b)	Post-season estimates of incidental mortality that includes incidental mortality from MSF, and total mortality.	X	X	X	X	X	X	X	X	X	X

App A	Task	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
3 (c)	Description of the causes (if identifiable) of significant changes in rates or patterns of incidental mortalities in fisheries relative to paragraph 4(a) and 4(f) of this Chapter for AABM fisheries (1999-2016) and paragraph 5 of this Chapter for ISBM fisheries (1999-2015).	X	X	X	X	X	X	X	X	X	X
4	Evaluate the ISBM fishery performance relative to the obligations set forth in paragraph 5 of this Chapter and report annually to the Commission.	X	X	X	X	X	X	X	X	X	X
7	Provide detailed information concerning any catches of Chinook associated with paragraphs 6(i) and 6(j), and a summary of information used to determine the allowable exclusion or hatchery add-on, in the annual catch and escapement report.	X	X	X	X	X	X	X	X	X	X
11	For ISBM fisheries, the CTC shall annually compute and report metrics described in paragraph 5 (a) ;and	X	X	X	X	X	X	X	X	X	X
	Provide 3-year running avg for CYERs and evaluate performance (by 2023).				TBD	X	X	X	X	X	X
11 (b)	If ISBM overage, shall provide to the Commission a plan to improve the performance of pre-season, in-season and other management tools so that the deviations between the CYERs and the CYER limits are narrowed to a maximum level of 10% when limits apply (Attachment I).				TBD	TBD	TBD	TBD	TBD	TBD	TBD
10 (b)	If AABM fisheries have overages for 2 consecutive years, the CTC shall recommend to the Commission a plan to improve the performance of pre-season, in-season and other management tools so that the deviations between catches and post-season fishery limits to AABM fisheries are narrowed to a maximum level of 10%.	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
14	Complete BPC Phase II by February 2019.	Feb									
14	Complete BPC Phase III by 2023.	X	X	X	X	X					
2	Standards for the desired level of precision and accuracy of data required to estimate IM.			Oct							
5	Complete the Data Generation Model.		X								
	Complete evaluation of alternative metrics for the evaluation of ISBM fisheries.			X							

App A	Task	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
	Develop data standards for the application of CYER as metric			X							
	Description of procedures used to adjust CYERS in order to capture MSFs (by 2021). Add to Annual Report.			X							
	Describe any adjustments of terminal fishery impacts for the exploitation rate indicator stock.			X							
13	By January 2023, develop a draft outline for a five-year review to evaluate the effectiveness of harvest reduction measures that are taken for AABM and ISBM fisheries.				X						
1 (a)(i)	Upon request, ID concerns with consistency in Chapter.	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
1 (a)(ii)	Upon request, ID concerns on the effectiveness of the actions in attaining the specified objectives.	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
1 (d)	Evaluate and review existing escapement objectives; when requested, recommend goals.	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
1 (e)	Recommend standards for the minimum assessment program required to effectively implement Chapter.	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
1 (f)	Recommend research projects, and associated costs, to improve implementation of Chapter.	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
12	Up to 2 review(s) of CPUE based approach, if requested.	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD

PACIFIC SALMON COMMISSION WORK PLAN
[2020-2021]
October 1, 2020

Panel / Committee:
The Okanagan Working Group (OWG) reports to the Pacific Salmon Commission.

Date: *PSC Fall Meeting, October 19-23, 2020.*

Update on Bi-lateral Tasks Assigned Under Current PSC Agreement:
The Pacific Salmon Commission approved the following work plan tasks to the OWG in February 2020:

1) Report historical and recent escapement abundance estimates of hatchery- and natural-origin summer Chinook in the U.S. and Canadian sections of the Okanagan River through 2019.
    a. Escapement has been reported for 2019, but further analysis is needed to generate estimates for hatchery- and natural-origin spawners.
2) Conduct an exploitation rate analysis for Okanagan summer Chinook with CWT recovery data through 2018 and report the CWT statistics (e.g. mortality distribution tables, survival rates, maturation rates).
    a. The exploitation rate analysis was completed through 2018.
3) The Parties recognize the value of creating a baseline assessment of the current productivity and capacity of Okanagan River Summer Chinook against which to measure the benefits of future habitat restoration and enhancement actions. The workgroup will coordinate a management entity exploration of alternative approaches to create such a baseline assessment. Alternatives may include a monitoring program for juvenile production, an analysis of spawner and recruit data, the use of habitat-based production models, or other approaches as appropriate.
    a. Our plan was to engage the expertise at the Workshop (#4), however the workshop has not yet occurred due to COVID19, and this item has been carried forward to the 2020/1 work plan.
4) Organize a workshop with the management entities that could be involved in a bilateral supplementation program for Okanagan summer Chinook. Identify U.S. and Canadian supplementation objectives. Review the current supplementation circumstances relative to the objectives. Identify any issues and options to address the issues. Summarize the findings and any recommendations for the Commission.
    a. Our plan was for the Workshop (#4) was affected by COVID19, and this item has been carried forward to the 2020/1 work plan via remote teleconferencing approaches.
5) Have a session at the workshop (#5) with the management entities and others about the potential survival issues for juvenile and adult summer Chinook in the U.S. and Canadian sections of the Okanagan River. Examine the current survival

monitoring projects relative to these issues and identify any gaps or modifications to existing study designs to learn about locations where the Okanagan summer Chinook may be experiencing poor survival. Summarize findings and recommendations for the Commission.
    a. This item was affected by COVID19, and it has been carried forward to the 2020/1 work plan via remote teleconferencing approaches.
6) Have a session at the workshop to review the current escapement monitoring programs that the management entities use for summer Chinook in the U.S. and Canadian sections of the Okanagan River. Review the current escapement estimates relative to the CTC bilateral data standards for Chinook escapement indicator stocks. Develop the study design recommendations that could help the management entities achieve these CTC data standards and summarize them for the Commission.
    a. This item was affected by COVID19, and it has been carried forward to the 2020/1 work plan via remote teleconferencing approaches.
7) At the workshop, have a session about the potential invasion of Northern Pike into the Okanagan River. Review the monitoring and control programs currently happening in the Columbia River upstream of Grand Coulee Dam. Seek advice from the management entities and other experts about the steps and methods to prevent the spread of Northern Pike into the Okanagan River. Summarize the findings and recommendations for the Commission.
    a. This item was affected by COVID19, and it has been carried forward to the 2020/1 work plan via remote teleconferencing approaches.

Obstacles to Completing above Bi-lateral Tasks:

The extent and duration of the circumstances associated with COVID19 was not anticipated, however for the next year the OWG will use remote teleconferencing approach to complete the tasks as best as can be done.

Outline of Other Panel / Committee Tasks or Emerging Issues:

At the 2019 Fall Meeting, the Commission identified that it will maintain the ad hoc Bilateral Okanagan Chinook Work Group, which will a) not be constituted under Article II of the Treaty; but will nonetheless b) provide an annual work plan for the Commission (initially in January 2020, and ongoing at the October Fall Meeting).

The OWG work plan tasks for this year are to:

1. Report historical and recent escapement abundance estimates of hatchery- and natural-origin summer Chinook in the U.S. and Canadian sections of the Okanagan River through 2020.
    a. This task will add another year of data collected by the management entities to the current analysis by the OWG and it would be included with the description of the escapement programs described in #7 below.

2. Conduct an exploitation rate analysis for Okanagan summer Chinook with CWT recovery data through 2019 and report the CWT statistics (e.g. mortality distribution tables, survival rates, maturation rates).
    a. This task will add another year of data to the current analysis by the OWG.
3. The Parties recognize the value of creating a baseline assessment of the current productivity and capacity of Okanagan River Summer Chinook against which to measure the benefits of future habitat restoration and enhancement actions. The workgroup will coordinate a management entity exploration of alternative approaches to create such a baseline assessment. Alternatives may include a monitoring program for juvenile production, an analysis of spawner and recruit data, the use of habitat-based production models, or other approaches as appropriate.
    a. A teleconference will be used identify and coordinate approaches.
4. Organize several virtual workshops with the management entities that could be involved in a bilateral supplementation program for Okanagan summer Chinook. Identify U.S. and Canadian supplementation objectives. Review the current supplementation circumstances relative to the objectives. Identify any issues and options to address the issues. Summarize the findings and any recommendations for the Commission.
    a. If the circumstances with COVID19 change by the summer of 2021, an in-person workshop maybe planned for July to achieve work plan items #4-7.
5. A teleconference with the management entities and others will focus on the potential survival issues for juvenile and adult summer Chinook in the U.S. and Canadian sections of the Okanagan River. The current survival monitoring projects relative to these issues will be reviewed and examined to identify any gaps or modifications to existing study designs to learn about locations where the Okanagan summer Chinook may be experiencing poor survival. Findings and recommendations will be summarized for the Commission.
6. A teleconference with the management entities and others will review the current escapement monitoring programs that the management entities use for summer Chinook in the U.S. and Canadian sections of the Okanagan River. The current escapement estimates will be reviewed relative to the CTC bilateral data standards for Chinook escapement indicator stocks. Any new escapement methodologies will be communicated to the OWG and other for review and feedback on study design recommendations that could help the management entities achieve these CTC data standards and summarize them for the Commission.
7. A teleconference with the management entities and others will focus on the potential invasion of Northern Pike into the Okanagan River. The monitoring and control programs currently happening in the Columbia River upstream of Grand Coulee Dam will be reviewed, and advice will be sought from the management entities and other experts about the steps and methods to prevent the spread of Northern Pike into the Okanagan River. The findings and recommendations will be summarized for the Commission.

Potential Issues for Commissioners, including enhancement activities reported under Article V:

Development and implementation of a bilateral supplementation program involves multiple entities.

Several short virtual teleconferences will be used instead of in-person meetings, depending on the COVID19 situation. If the COVID19 changes by the summer 2021, an in person workshop approach may be planned. Resources for the workshop could become an issue and the OWG requests that funding be provided by the national sections for travel and per diem costs. If the Commission could sponsor this then it would indicate good support to initiate these efforts. A working group meeting can be tacked on to the workshop to facilitate other work tasks (e.g. escapement review, biologically-based management objectives, etc.).

Potential Issues for Committee on Scientific Cooperation

None identified.

Proposed Meeting Dates and Draft Agendas:

Meeting	Dates	Location	Meeting Objectives
OWG-Task List Planning	Oct/Nov (TBD)	Conference Call & email	Outline more detailed plans to complete prioritized task(s) from Commission
OWG Escapement Method Workshop	Nov	Teleconference	1 day meeting for escapement methods review (task 6), OWG conference calls and email to summarize findings and next steps
OWG Survival Workshop	Dec	Teleconference & email	1 day meeting for summer Chinook survival in Okanagan River (task 5), OWG conference calls and email to summarize findings and next steps
Supplementation workshop	January	Teleconference & email	1-2 day meeting for summer Chinook bilateral supplementation program (task 4), OWG conference calls and email to summarize findings and next steps
Northern Pike monitoring workshop	February	Teleconference & email	1 day meeting for review/planning of northern pike monitoring and control approaches (task 7), OWG conference calls and email to summarize findings and next steps
CWT Exploitation Rate Analysis	March	email	Task 2 analysis conducted during Chinook Technical Committee's Exploitation Rate Analysis
Escapement Reporting	March	email	Task 1 reporting
Baseline of current productivity	May	Teleconference & email	1 day meeting regarding baseline for productivity and capacity approaches (task 3), OWG conference calls and email to summarize findings and next steps
Reporting	June-July	Teleconference & email	Develop summary report for Commission
PSC Fall Session	Oct (TBD)	(TBD)	OWG co-chairs attend and present supplementation plan and options to Commission, results from tasks

Status of Technical or Annual Reports:

The OWG has not yet developed a report summarizing the results from the recent escapement and exploitation rate analysis.

Comments:

None.

PACIFIC SALMON COMMISSION WORK PLAN
2020 – 2021 Annual Cycle

Panel / Committee: Calendar Year Exploitation Rate Workgroup (CYER WG)

Date: Presented at October 2020 Fall Session

Update on Bilateral Tasks Assigned Under 2019 PSC Agreement:
The PSC approved the tasks proposed in the October 9, 2019 report "Collaborative Improvements of Estimates of Calendar Year Exploitation Rates". Progress on those tasks is summarized below:

Recommendation 1a. Conduct Readiness Questionnaire. Conduct a bilateral process similar to the CYER Readiness Questionnaire every two years to re-assess the CWT program, focus improvements, and target funding to priority improvements. Some refinements and additions to the questionnaire, such as an assessment of the quality of estimates of landed catch, encounters, and incidental mortality, will also help to further inform and drive improvements in the CWT program.

Target Completion Date: Fall 2021
Projected Completion Date: Fall 2022 (delay one year)
Status Summary: The CYER WG recommends delaying this task for one year in order to provide agencies with the time to address previous recommendations and for the CYER WG to complete its work relative to mark-selective fisheries.

Recommendation 3b. Review Terminal Area Adjustments. Request that the CTC accelerate the completion of Appendix A, task 5 (documentation of methods used to adjust the CWT recoveries for the Robertson Creek, Quinsam River, Queets River, Salmon River, and Elk River CWT indicator stocks), recommend improvements, and identify any research necessary to verify assumptions.

Target Completion Date: November 2020
Projected Completion Date: November 2020
Status Summary: The CTC will document current terminal area adjustment methods (draft completed) and the CYER WG will take the lead on recommending improvements and identifying research to verify assumptions (in progress).

Recommendation 3c. Indirect Methods Recommendations. Task a workgroup with providing recommendations on the application of indirect methods and identifying priority fisheries for the transition to direct estimation of CWT recoveries.

Target Completion Date: December 31, 2020
Projected Completion Date: December 31, 2020
Status Summary: The workgroup has completed a draft risk assessment framework to inform the identification of priority fisheries to transition to direct estimation of CWT recoveries and has compiled information for most fisheries where indirect methods are used or where estimates of CWT recoveries are lacking. The CYER WG

anticipates collecting information on the remainder of the fisheries and completing the risk assessment in the fall of 2020.

Recommendation 4a. Tagging and Sampling Recommendations. Task a workgroup with recommending to the CIG by January 2020 proposed tagging levels for the five CWT indicator stocks with insufficient tag recoveries or increases in fishery sampling rates to address this concern.

Target Completion Date: January 2020 PSC Meeting
Actual Completion Date: January 2020 PSC Meeting
Status Summary: The CYER WG completed work on tagging and sampling recommendations and the PSC sent a letter to management entities on March 11, 2020.

Recommendation 5a. Assess MSF Effects on Exploitation Rates. Task a workgroup with updating the information on the proportion of landed catch of the CWT indicator stocks occurring in MSFs (Table 4.1 in TCCHINOOK (18)-01) and estimating the return rates to the hatchery for existing DIT groups. The absence of a significant difference (assuming a robust sampling program) between the return proportions of the marked and unmarked components of a DIT pair would indicate that no MSF adjustment is needed to represent unmarked, natural-origin Chinook with the current intensity of MSFs. Alternatively, pairing the analyses of DIT return rates with the proportion of landed catch in MSFs will help inform decisions regarding the conditions under which adjustments in CWT recoveries are necessary to accurately represent fishery exploitation rates on natural-origin Chinook salmon.

Target Completion Date: February 2020 Commission Meeting
Actual Completion Date: February 2020 Commission Meeting
Status Summary: The CYER WG completed the evaluation and concluded that a significant difference was present in the return rates for marked and unmarked for some Chinook salmon stocks.

Recommendation 5b. Evaluate Alternative MSF Estimation Methods. If significant differences in return rates are identified, request that the workgroup:

i) Estimate the CYERs in ISBM fisheries for each CWT indicator stock in 2009-2015 using the methods described above or other methods developed by the workgroup and provide a summary of the strengths and weaknesses of each approach.

The CYER WG is addressing this task through two steps: 1) simulation analysis of alternative MSF estimation methods; and b) application of MSF estimation methods to CWT indicator stocks.

Step 1. Simulation Analysis of Alternative MSF Estimators
Target Completion Date: September 30, 2020
Projected Completion Date: January 2021 PSC Meeting
Status Summary: The CYER WG is evaluating alternative MSF estimation methods by simulating CWT recoveries datasets and comparing the true values with the estimates from alternative methods. The Data Generation Model (DGM), previously

developed by a consultant for the Chinook Technical Committee, will be used to simulate fishery scenarios and create CWT recoveries for analysis. Progress has been slowed by an error in the DGM, but recommendations regarding the most appropriate estimation methods for particular stock life-history/exploitation patterns are expected by the February 2021 PSC meeting.

Step 2. Application of MSF Methods to CWT Indicator Stocks
Target Completion Date: September 30, 2020
Projected Completion Date: June 2021
Status Summary: Completing this task will require the incorporation of the MSF estimation methods in the cohort analysis program used by the CTC for the annual exploitation rate analysis. The CTC has recognized that it would be beneficial to modernize the cohort analysis computer code since much of it was written more than 30 years ago. To avoid incorporating MSF estimation methods into two computer programs (i.e., old and new cohort analysis), the CTC and CYER WG have prioritized in 2020 the modernization of the cohort analysis program. When that is completed, the MSF methods developed through Step 1 will be added to the cohort analysis program and applied to the CWT indicator stocks.

ii) Identify and contrast at a coarse scale (i.e., fisheries at a level of resolution similar to Table 2-3 in SFEC (19)-01) the changes in tagging, catch sampling, fishery monitoring, CWT sampling, information management, and analytical methods needed to implement the potential solutions evaluated in 5(b)(i).

Target Completion Date: September 30, 2020
Projected Completion Date: February 2021 PSC Meeting
Status Summary: CYER WG work on this task will be initiated when the Simulation Analysis of Alternative MSF Estimators (5b(ii) Step 1) has been completed.

Recommendation 5c. Develop MSF Transition Plan. Building upon the information from 5a and 5b, CIG discussions, and Commission direction, task a workgroup with developing a transition plan for consideration by the Commission at the January 2021 meeting. The transition plan could include short- and long-term methods to estimate CYERs on natural-origin Chinook salmon, and a time schedule for implementation of recommended changes to tagging, sampling, fishery monitoring, information management, and analytical methods.

This is the primary task that the CYER WG anticipates undertaking in 2021. As discussed above, we now project that periodic (perhaps 3-5 in 2021) discussions with the CIG could be initiated at the February 2021 PSC meeting. Further discussion with the CIG is needed to identify what additional information might be needed and the preferred process to complete this task.

Obstacles to Completing above Bi-lateral Tasks:
None identified, although this is a challenging task.

Outline of Other Panel / Committee Tasks or Emerging Issues:
None identified.

Potential Issues for Commissioners, including enhancement activities reported under Article V:
Implementing improvements to tagging, sampling, and analytical methods to account for MSFs is critically important to assess compliance with the ISBM provisions of the updated Chinook Chapter. Although methods do not have to be identical across all fisheries, they must be coordinated and complementary to enable bilateral estimation of exploitation rates. Developing that complementary approach will likely be challenging.

Potential Issues for Committee on Scientific Cooperation
None identified.

Proposed Meeting Dates and Draft Agendas:
Meetings will be coordinated with the CTC and SFEC in order to maximize the efficiency of the work of the CYER WG. See Table 1 for proposed schedule.

Status of Technical or Annual Reports:
The CYER WG anticipates completing reports on Indirect Methods and MSF Estimation Methods during 2020-2021.

Comments:
None

Table 1. Proposed schedule of meetings for the CYER WG from November 2020 through October 2021.

Dates	Location	Meeting Objectives
2020		
November 17, 19	Webinar	***3b. Review Terminal Area Adjustments***. Finalize recommendations regarding improvements and research necessary to verify assumptions. ***3c. Indirect Methods Recommendations*** Review draft recommendations regarding priority fisheries for transition to direct estimation of CWT recoveries or implementation of indirect methods. ***5b i). Step 1. Simulation Analysis of Alternative MSF Estimators.*** Review preliminary results and identify any additional analyses. ***5b i). Step 2. Application of MSF Methods to CWT Indicator Stocks.*** Review preliminary results from application of updated cohort analysis. ***5b ii). Modifications to tagging, marking, and fishery sampling programs***. Identify information needed to assess program modifications necessary for implementation of MSF estimation methods.
December 15, 17	Webinar (w/ SFEC)	***3c***. ***Indirect Methods Recommendations*** Finalize report regarding priority fisheries for transition to direct estimation of CWT recoveries or implementation of indirection methods. ***5b i). Step 1. Simulation Analysis of Alternative MSF Estimators.*** Finalize preliminary recommendations regarding the performance of alternative MSF estimators for different stock migration and fishery patterns. ***5b i). Step 2. Application of MSF Methods to CWT Indicator Stocks.*** Review results from application of updated cohort analysis; identify steps to incorporate MSF estimation methods. ***5b ii). Modifications to tagging, marking, and fishery sampling programs***. Review information collected regarding current tagging, marking, and fishery sampling programs.
2021		
January 11-15	CIG Webinar	A. Review CYER WG recommendations regarding: 1) improvements and research necessary to verify assumptions (***3b***); .and 2) priority fisheries for transition to direct estimation of CWT recoveries or implementation of indirect methods (***3c).*** B. Discuss proposed process to develop transition plan (***5c***).
January 19, 21	Webinar (w/ SFEC)	***5b i). Step 2. Application of MSF Methods to CWT Indicator Stocks.*** Review progress in implementing MSF estimation methods and resolve technical questions. ***5b ii). Modifications to tagging, marking, and fishery sampling programs***. Review preliminary recommendations regarding modifications to tagging, marking, and fishery sampling programs.
February 2, 4	Webinar	***5b i). Step 2. Application of MSF Methods to CWT Indicator Stocks.*** Review progress in implementing MSF estimation methods and resolve technical questions.

		5b ii). Modifications to tagging, marking, and fishery sampling programs. Finalize recommendations regarding modifications to tagging, marking, and fishery sampling programs.
February 8-12	CIG Webinar	A. Review CYER recommendations regarding: 1) performance of alternative MSF estimators (***5b i) Step 1***); and 2) modifications to tagging, marking, and fishery sampling programs (***5b ii***). B. Finalize process to develop transition plan (***5c***).
March 15-19	Webinar (w/ CTC)	***5b i). Step 2. Application of MSF Methods to CWT Indicator Stocks.*** Review progress in implementing MSF estimation methods, resolve technical questions, and identify data needs for exploitation rate analysis.
April 26-29	Webinar (w/ CTC)	***5b i). Step 2. Application of MSF Methods to CWT Indicator Stocks.*** Review progress in implementing MSF estimation methods, resolve technical questions, and identify any gaps in data needs for exploitation rate analysis.
May 17-21	Webinar (w/ CTC and SFEC)	***5b i). Step 2. Application of MSF Methods to CWT Indicator Stocks.*** Review preliminary application of MSF to CWT indicator stocks.
May	CIG Webinar	***5c. Develop MSF Transition Plan***. Discuss proposed alternatives for modifications to tagging, marking, and fishery sampling programs.
June 7-11	Webinar (w/ CTC)	***5b i). Step 2. Application of MSF Methods to CWT Indicator Stocks.*** Finalize preliminary application of MSF to CWT indicator stocks.
July	CIG Webinar	***5c. Develop MSF Transition Plan.*** Review preliminary transition plan.
September	CIG Webinar	***5c. Develop MSF Transition Plan.*** Review preliminary transition plan.
October	Webinar w/ CTC and SFEC	***5c. Develop MSF Transition Plan.*** Review preliminary transition plan.

PSC Chinook Technical Committee

TO: Chinook Interface Group and Pacific Salmon Commissioners
FROM: John Carlile, Jon Carey, and Antonio Velez-Espino; CTC Co-chairs
DATE: September 30, 2020
SUBJECT: COVID-19 Impacts on Chapter 3 of the Pacific Salmon Treaty
CC: Chinook Technical Committee, John Field, Jessica Gill, Julie Ehrmantraut, Shannon Belfray, Courtney Hann

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COVID-19 Impacts on Chapter 3 of the Pacific Salmon Treaty Implementation

September 30, 2020

On a July 10, 2020 webinar, the Commission discussed the potential for the COVID-19 pandemic to disrupt Treaty implementation. To help fully understand these potential impacts, the Commission requested that each committee provide supplemental information that addresses six specific topics. The Chinook Technical Committee (CTC) approached this task by first gathering regional information on COVID-19 impacts from management entities as they related to: (1) escapement assessment and sampling, (2) marking and tagging, (3) fishery sampling, and (4) catch estimation. This allowed the CTC to identify data gaps (Table 1) and better understand the potential magnitude of impacts on Chapter 3 implementation. The following are implications and challenges that have been bilaterally identified, which may change as additional information becomes available regarding impacts.

1. *Implications for2020-2021 annual commitments*

The CTC does not expect core functions (i.e., Exploitation Rate Analysis (ERA), model calibration) to be impacted for the 2020-2021 cycle. Some work products might be slightly delayed, though model calibration and the annual ERA process should be completed on time. Impacts of COVID-19 on Chinook salmon stock and fishery assessments under the jurisdiction of

the Pacific Salmon Treaty during 2020 are primarily on marking and tagging operations, especially in British Columbia where the majority of exploitation rate indicator stocks were released without marks and tags (Table 1). Coded-wire tag (CWT) sampling rates for the majority of fisheries remain similar to previous years, as does catch accounting (Table 1). Impacts on escapement estimates throughout the coast have been and are expected to remain limited (Table 1).

2. *Implications for Chapter implementation over the duration of the chapter*

The impacts of marking and tagging operations that were reduced or eliminated will begin to manifest in 2022, when fish from brood years 2018 (yearling stocks) and 2019 (fingerling stocks) start recruiting to fisheries and extend to 2025. The CTC is actively discussing what the implication of this means for the Chinook Model and evaluation of Individual Stock Based Management (ISBM) fisheries using Calendar Year Exploitation Rates (CYERs). These discussions could result in *ad hoc* assignments. Timelines on deliverables, especially ad hoc tasks, will be impacted until early 2022. This is due to slower progress while meeting in webinar format, as well as staffing reductions, furloughs, and individual telework situations.

3. *Mitigation plans if gaps exist (how will they catch up)*

COVID-19 has primarily impacted marking and tagging operations. These effects will begin to manifest in 2022 in the ERA and CYERs and seen through at least analysis year 2026. Sensitivity analyses on the impact of reduced (or no) CWT tagging for indicator stocks could occur, if requested.

4. *Reviewed implementation plan and timelines*

See the CTC implementation plan (Appendix I of CTC workplan). COVID-19 has impacted the ability of the CTC to meet in-person, which has reduced efficiencies and influenced timelines.

5. *Actions being taken to better enable work to be done for 2021*

Given the likelihood of continued virtual meetings through at least spring 2021, the AWG has extended their annual ERA and model calibration meetings by three days each in order to account for the inefficiencies and difficulties that arise when conducting this highly technical work in a virtual environment.

Additional actions by management entities that will benefit Chapter 3 implementation include the purchase of two tagging trailers in Southeast Alaska, which could increase marking and tagging operations. In B.C., increased iREC survey selection rates were implemented in response to COVID-19 impacts on creel surveys, but they are now standard practice and will continue regardless of COVID-19 concerns.

6. *Impacts to models used to set fishery limits and evaluate fishery performance/compliance under the Treaty*

Effects to the ERA and Chinook Model calibration for 2021 are expected to be minimal, as changes or delays in fishery sampling, catch estimates, and escapement assessment programs

are not expected to have significant impacts. Beginning in 2022, CWT data from missing brood years which are used in the PSC Chinook Model to help set Aggregate Abundance Based Management (AABM) fishery limits and evaluate performance will need to be addressed. This will likely impact CYER estimates as well. Potential ways to address missing brood years are through averages or infilling techniques, which are currently in practice for exploitation rate scalar (FP) files in the model. Similar techniques are also used in the ERA.

Table 1. Impacts of COVID-19 on data and information relevant to Chapter 3 of the Pacific Salmon Treaty.

	No Data	Some data	Normal data
Southeast Alaska (SEAK) / Transboundary (TBR)			
Escapement Monitoring & Sampling			All SEAK & TBR stocks
Fishery Sampling			SEAK troll, sport, net
Marking & Tagging	Little Port Walter		SEAK hatcheries & wild tagging
Catch Accounting			SEAK troll, sport[1], and net
British Columbia[2] (BC)			
Escapement Monitoring & Sampling			All BC stocks[3]
Fishery Sampling		NBC AABM Sport[1], NBC ISBM Sport[1]	Food, Social, and Ceremonial fisheries, Comm, Sport[1]
Marking & Tagging	Kitsumkalum Sub-yearlings, Kitsumkalum Yearlings, Middle Shuswap, Atnarko, Big Qualicum, Chilliwack, Harrison, Puntledge Summers, Robertson Creek	Cowichan, Lower Shuswap, Quinsam	Phillips, Chilko, Nicola[3]
Catch Accounting			All BC Fisheries[1]
Washington Coast (WAC) / Puget Sound (PS)			
Escapement Monitoring & Sampling			All PS / WAC stocks[3]
Fishery Sampling			All PS / WAC fisheries[1]
Marking & Tagging			No exploitation rate indicator stocks impacted
Catch Accounting			All PS / WAC fisheries[1]
Columbia River			
Escapement Monitoring & Sampling			All Columbia / Snake stocks

Fishery Sampling			Below Bonneville[1], Above Bonneville[1]
Marking & Tagging	Hanford Wild	Spring Creek Hatchery, Lewis River Wild	Lyons Ferry Sub-yearlings, Lyons Ferry Yearlings, Lower River Hatchery, Columbia River Summer, Willamette Spring Hatchery, Cowlitz Tule, Upriver Brights[4]
Catch Accounting			Below Bonneville, Above Bonneville[1]
Oregon Coast (ORC)			
Escapement Monitoring & Sampling			All ORC stocks[3]
Fishery Sampling			ORC comm, rec, terminal sport[3]
Marking & Tagging			All ORC stocks
Catch Accounting			ORC comm, rec, terminal sport[3]

[1] Effort, fisher behavior, and fishery regulations limited impact on sampling rates

[2] Ageing and CWT processing backlogged, but is not anticipated to effect CTC activities

[3] Not expected to be impacted by COVID-19

[4] URB were not PIT tagged

Summary of COVID-19 Impacts to Southeast Alaska Chinook Assessments

Written September 8, 2020

The State of Alaska does not anticipate any implications for meeting annual Treaty commitments nor does the state anticipate implications for Chapter 3 implementation resulting from Chinook stock and fisheries assessment in Southeast Alaska.

Escapement Assessment and Sampling:

All projects are operational; business as usual.

Marking and Tagging:

Wild coded wire tagging (CWT) projects were fully operational, with one modification on the Chilkat River project. Since we CWTd fry last fall from the same broodyear, we had the luxury of foregoing CWTing this spring while still meeting project objectives. The crews clipped adipose fins but did not tag which helped limit close interactions among staff. This issue was specific to Chilkat as it is located on the road system allowing staff to go home each night vs a remote field site where staff are isolated and treated as a family unit.

All hatcheries are marking and tagging Chinook as usual. Two tagging trailers have been purchased in 2020 and may actually result in an increase in marking and tagging at some facilities.

The exception is the federal NOAA Fisheries Little Port Walter research facility which has suspended marking and tagging operations.

Fishery Sampling:

Fisheries continue to be sampled at rates similar to, and for some fisheries above, past years.

Commercial

Based on preliminary numbers the overall CWT sampling rate through week 31 for SEAK commercial troll, seine and gillnet (spring, terminal and traditional harvest) is 38%. This does not include Metlakatla Indian Community, confiscated or Private Non-Profit hatchery fish.

Troll

The traditional SEAK Winter Troll Fishery was sampled for CWT at 49%. The traditional Spring Troll fisheries were sampled for CWT at 63%, while terminal Spring Troll Fisheries were sampled at 72%. The first Summer Troll Chinook retention period was sampled for CWT at 29% and the Summer Terminal Troll Fisheries through July were sampled at 82%.

Purse Seine

The traditional purse seine fisheries have been sampled at 100% through week 31. Note that seine retention for large Chinook did not begin until Week 32. The terminal purse seine fisheries through week 31 have been sampled at a rate of 43%.

Gillnet

The traditional gillnet fisheries have been sampled at 33% through week 31. The terminal gillnet fisheries were sampled at 55% through week 31.

Sport

The sport fish creel program modified its operational period and sampling in 2020 in two primary ways to minimize risks associated with COVID-19. These included a program start date delayed by 2–4 weeks (2 on outer ports and 4 on inner ports), and changes to

how creel technicians interacted with sport anglers and sampled fish. The port of Elfin Cove was not sampled in 2020 owing to the logistical inability to easily extract staff if necessary. The modifications only contributed to a slight decrease in sampling rates of the Chinook fishery, as most occurred while restrictive management actions were in place to protect SEAK & TBR wild stocks this spring and participation was low during that timeframe. Sampling rates are anticipated to be approximately 18% region wide.

Catch Estimation:

Commercial

Catch accounting has proceeded per usual.

Sport

See description of field operations under "Sampling". The most significant creel program modifications (delayed program start dates) occurred while restrictive management actions were in place to protect SEAK & TBR wild stocks; during that timeframe sport fishing effort was low in all ports, including the one port not directly monitored (Elfin Cove), and therefore estimation of Treaty catch and overall catch accounting is similar to past years.

Summary of COVID-19 Impacts to Canadian Chinook Assessments

Written September 15, 2020

Five types of activities supporting Chapter 3 obligations could have been impacted by the suspension of lab and field activities due to COVID-19: CWT tagging, marking and release of indicator stocks, biological sampling for CWTs in commercial, recreational and First Nations fisheries, lab processing for CWTs and scales, catch estimation in recreational fisheries, and escapement assessment

Coded-wire Tag Application and Releases:

The majority of CWTs applied to Chinook by the Salmonid Enhancement Program (SEP) are conducted in the spring (March through May). In 2020, the impacts of COVID-19 pandemic resulted in most Chinook PST indicator stocks being released without CWTs and fin clips. There were only four sub-yearling stocks that received CWTs. These included Phillips, Cowichan, Lower Shuswap, and Quinsam. Of these stocks, tagging totals were well below pre-planned targets, except for Phillips. Due to the larger potential tagging window for yearling-release indicator stocks, no tagging target shortfalls are expected for these stocks: a limited number of Chilko brood were tagged successfully, and Nicola tagging is expected to be completed by Fall 2020. Kitsumkalum typically includes fry (KLM) and yearling (KLY) releases for each brood year. None of the Kitsumkalum fish from the 2019 brood year were marked.

Table 1. Interim 2020 marking summary of Chinook indicator stocks (2019 BY).

2020 Chinook Marking					
Program	Stage	Tags applied	Unmarked	Released?	Notes
Atnarko R	Smolt 0+		1,924,871	Y	
Big Qualicum R	Smolt 0+		3,418,046	Y	
Chilko R	Smolt 1+	30,970	0	N	Tagged at Inch Creek: Jul 2020
Chilliwack R	Smolt 0+		2,231,008	Y	
Cowichan R	Smolt 0+	200,170	151,000	Y	
Harrison	Smolt 0+		365,653	Y	
Kitsumkalum	Fed Fry	0	253,000	Y	All 2019 brood released unmarked
Nicola R	Smolt 1+	TBD		N	Tagging to be completed Fall 2020
Phillips R	Smolt 0+	83,217	8,381	Y	
Puntledge R	Smolt 0+		264,239	Y	
Quinsam R	Smolt 0+	237,414	2,457,452	Y	
Robertson Cr	Smolt 0+		6,397,220	Y	
Shuswap R Low	Smolt 0+	60,223	493,377	Y	
Shuswap R Up	Smolt 0+		169,200	Y	

CWT sampling and lab processing:

Covid-19 work stoppages had limited impact on Chinook sampling programs due to many regional Chinook closures through to the end of July. Contracted fishery sampling and CWT lab services commenced return-to-work in mid-July. Fishery sampling of commercial and First Nations fisheries under contract commenced at full capacity in August, following implementation of COVID-safety protocols, acquisition of personal protective equipment, and training of technicians. Sampling of West Coast Vancouver Island First Nations fisheries occurred

at full capacity in July as sampling is performed by local First Nations technicians. Sampling of recreational fisheries was ongoing as year-round salmon head recovery depots remained in place during the COVID-19 work stoppage. With the return-to-work of contracted sampling technicians, seasonal recreational fishery salmon head recovery program depots coincided with Chinook fishing opportunities. In NBC the head recovery depots remained active but internet recreational catch reporting (iREC) information will be required to estimate adipose fin clip incidence and catch due to reduced access to catch in the AABM fishery and reduced sampling in the ISBM creel survey.

CWT lab activities commenced in a reduced format with existing contracted personnel as COVID-safety measures were implemented. Full capacity did not commence until mid-August as additional lab technicians were hired and trained. There is a significant backlog of samples to be processed that will be managed with additional lab staffing or overtime to meet timeliness requirements for Chinook indicator stocks.

Salmon Ageing lab activities commenced in a reduced format with a return-to-work as an essential service in July, but full capacity is not yet in place as DFO continues to operate under limited 'phase 1' return-to-work protocols. There is a significant backlog of samples to be processed that will undergo a prioritization exercise in order to meet timeliness requirements for Chinook indicator stocks.

Catch Monitoring and estimation:

Catch monitoring methods have returned to normal in most areas. Recreational creel surveys are being conducted as expected preseason, after the delayed start that canceled some May surveys and lead to incomplete (biased) June surveys. Catches were significantly lower in NBC AABM Sport fisheries due to a travel ban to Haida Gwaii. It is not clear yet how the travel ban will affect participation in the lodge logbook survey, a major component of the catch estimate. The ability for the creel surveyors to observe and sample Chinook caught in NBC ISBM fisheries appeared to be reduced so observations are expected to be lower in 2020. Commercial Chinook fisheries monitoring by logbook reporting, and by dockside monitoring, have proceeded as normal. Food, Social, and Ceremonial (FSC) fisheries monitoring is unaffected. However, landing locations by the NBC troll fishery have changed with fewer landings in Haida Gwaii and a larger proportion of frozen product landed which may influence sampling opportunities.

One positive change is the heightened level of sampling and response rate in the iREC survey. We are surveying more people, and response rates have been much higher (~50% relative to ~33% typical), so precision will be improved; changes also improved accuracy. The increased survey selection rates were implemented in response to COVID-19 impacts on creel, but they are now standard practice and will continue regardless of COVID-19 concerns.

Escapement assessment:

No foreseeable issues are expected for escapement programs run by DFO stock assessment staff. Most escapement programs lead by DFO's Salmon Enhancement Program (SEP) and stock assessment staff are still planned to be conducted although in reduced format (i.e., less emphasis on wild vs. hatchery broodstock selection). There are a limited number of scenarios in which SEP supports escapement assessment activities by stock assessment staff. For these limited scenarios, it is anticipated that SEP support will proceed on target. Escapement

estimates relying on scale data (e.g., jack/male classifications are confirmed via scale and CWT readings) may be delayed due to the Ageing Lab backlog.

Although at this time it appears broodstock collection activities for Chapter 3 indicators will be on target, hatchery staff continue to adapt to COVID-19 operational protocols which has the potential to reduce staff capacity to conduct fish and gamete collection activities. It also important to note that SEP broodstock collection for several of the Chinook indicator programs is heavily, or entirely reliant on support from DFO stock assessment group (e.g., Harrison, Shuswap, Nicola, and Chilko programs). Kitsumkalum Chinook escapement assessment, broodstock collection and hatchery programs are operated entirely by DFO stock assessment. As such, new or unforeseen COVID-related implications on regular operations within either program, SEP or stock assessment, have the potential to result in broodstock/egg target shortfalls.

Summary of COVID-19 Impacts to Puget Sound and Washington Coastal Chinook Assessments

Written September 17, 2020

Please document any changes (or anticipated changes) to normal operations as a result of COVID-19 disruptions. If no changes to normal operations occurred, please indicate that.

Escapement Assessment and Sampling:
No impacts currently anticipated, however, currently planned furloughs (and any potential additional furloughs) for WDFW staff may impact staff availability for surveys. Furloughs occurred 1 day per week during July and are scheduled to occur 1 day per month through November 2020. It is also likely that additional furloughs will occur during the 2021-23 biennium.

Marking and tagging:
Marking and tagging at WDFW and cooperative programs generally occurred as planned. An exception was at the Glenwood Springs hatchery, where about 300k juvenile Chinook were otolith marked but not clipped or tagged. In general, tagging and marking at Tribal facilities seem to have occurred as planned, except for some mass marking of untagged fish that did not occur, which should not affect CTC business.

Fishery Sampling:
Fishery sampling in State fisheries is occurring using protocols similar to past years. Sample rates may be slightly reduced due to COVID-related safety measures to protect staff and furloughs for WDFW staff. Furloughs occurred 1 day per week during July and are scheduled to occur 1 day per month through November 2020. It is also likely that additional furloughs will occur during the 2021-23 biennium.

Catch Estimation:
Catch estimation in State fisheries is expected to occur at levels similar to previous years. Recreational fisheries were closed statewide beginning March 25, 2020. They remained closed until a phased re-opening began on May 5, 2020, in a manner consistent with the preseason plan and inseason monitoring information. State and tribal fishing effort in ocean areas has been reduced by varying degrees due to COVID-related restrictions for charter boat operators and the ongoing closure of Neah Bay and La Push, two main ports providing access to coastal waters north of the Queets River. Preliminary estimates to date suggest that less than 25% of the total North of Falcon Chinook quota of 89,000 has been caught.

Summary of COVID-19 Impacts to Columbia River Chinook Assessments

Written September 23, 2020

Escapement Assessment:

Operations in the Columbia and Snake rivers were not impacted (Ryan Lothrop, WDFW, Ethan Clemons, ODFW, Christine Kozfkay, IDFG).

Marking and Tagging:

Upper Columbia (Columbia River from McNary to Canadian Border)

Well's Hatchery Subyearling and Yearling Summer Chinook

Operations were not impacted (Brad Hostetler, Grant County PUD).

Priest Rapids Hatchery Upriver Brights

CWT and Mass marking (AD clip) of URBs was completed at Priest Rapids Hatchery this spring. Hatchery staff did not PIT tag any URBs this year due to COVID-related issues (Brian Lyon, WDFW).

Hanford Wild Upriver Brights

CWT tagging of Hanford Wild Upriver was not conducted this year due to COVID-related health and safety concerns. CWT tags from this stock are not used for the CTC model (Jeff Fryer, CRITFC).

Snake River

Lyon's Ferry Subyearling and Yearling Fall Chinook

No significant impacts. All Lyon's Ferry Hatchery releases were healthy. Yearlings were released in Mid-march. This is the second year of rearing subyearlings in the lake at Lyon's Ferry Hatchery and these fish were released 2-3 weeks earlier than the previous year. Marking and tagging of brood year 2019 yearlings was also conducted and resulted in 47,000 fewer fish than the production goal (Derek Gloyn, IDFG).

Upstream of Bonneville to McNary Dam

Spring Creek Hatchery Tule Fall Chinook

USFWS suspended marking for 6 weeks from about March 23rd to May 05. All fall Chinook releases were not marked, but about 62% of the AD clipping and 75% of the CWTing (405k ADCWT and 405k CWT) were completed before suspending marking. This equals roughly 7M marked and/or tagged of the 11M released. (Jesse Rivera, USFWS).

Below Bonneville Dam

Bonneville and Big Creek Hatchery Tule Fall Chinook

ODFW has tagged and marked 6.2 M at Bonneville and 3.8M at Big Creek hatcheries.

Cowlitz Salmon Hatchery Tule Fall Chinook

COVID-19 did not impact marking and tagging goals, but operations were adjusted significantly to achieve these goals. However, Cowlitz Salmon Hatchery failed to meet the broodstock collection goal and this is reflected in reduced marking and tagging numbers (Sam Gibbons, WDFW).

Lewis River Wild Bright Fall Chinook

COVID-19 challenges around the state did limit the number of days that a crew was available for the Lewis River wild bright Chinook marking/tagging efforts. Tagging could not be spread across late May and June as normal. This resulted in fewer fish than normal being tagged this year (Bryce Glaser, WDFW).

Willamette River Spring Chinook

ODFW has tagged and marked over 7 million Willamette River Spring Chinook throughout the basin. No impacts from COVID-19 are noted.

Fishery Sampling: Columbia River Mainstem and Washington State Tributary Recreational

Columbia River from Bonneville Dam to Canadian Border and Snake River

All WA state recreational fisheries (and jointly managed waters with Oregon) closed statewide March 25 through May 4, 2020; fisheries within WA state (and jointly managed waters with Oregon) have been managed and remained open as in past years and were not impacted by COVID-19. ODFW closed mainstem recreational fisheries on March 26th till the Columbia River Compact agreed to reopen several recreational fisheries beginning on May 5th. Staff were able to sample and monitor fisheries when open, with limited impacts to sample rates (and associated CWT sampling), while operating more slowly and/or with fewer staff in confined spaces to accommodate social distancing guidelines. Prior to June 22nd, there were no Treaty commercial fisheries for salmon. Prior to August 10th, there were no mainstem commercial fisheries below Bonneville Dam. Tribal commercial effort in the area from Bonneville Dam upstream to McNary Dam is usually estimated via aerial surveys, however, none occurred prior to the onset of the fishery on June 22nd. (Ryan Lothrop, WDFW and Ethan Clemons, ODFW).

Below Bonneville Dam

WA state (and jointly managed waters with Oregon) recreational fisheries closed statewide March 25 through May 4, 2020; fisheries within WA state (and jointly managed waters with Oregon) have been managed and remained open as in past years and were not impacted by COVID-19. ODFW closed mainstem recreational fisheries on March 26th till the Columbia River Compact agreed to reopen several recreational fisheries beginning on May 5th Staff were able to sample and monitor fisheries when open, with limited impacts to sample rates (and associated CWT sampling) while operating more slowly and/or with fewer staff in confined spaces to accommodate social distancing guidelines. Recreational effort in the area downstream of Bonneville Dam is usually estimated via boat/trailer counts by aerial surveys, however, this practice was temporarily curtailed and replaced by boat based effort counts. By June 22nd staff was able to revert back to aerial counts. Non-treaty commercial off-channel (Select Areas) remained opened during the winter, spring and summer time-periods.

No appreciable impacts noted by the field program in Oregon (Ethan Clemons, ODFW).

Catch Estimation:

Columbia River from Bonneville Dam to Canadian Border and Snake River

WA state recreational fisheries closed statewide March 25 through May 4, 2020; fisheries have been managed and remained open as in past years and were not impacted by COVID-19. Staff were able to sample and monitor fisheries when open, with limited impacts to sample rates (and associated CWT sampling) while operating more slowly and/or with fewer staff in confined spaces to accommodate social distancing guidelines. Catch estimation is not expected to be impacted at any measurable level (Ryan Lothrop, WDFW). Fisheries open on the Oregon side have been

sampled and estimated per normal protocol with minimal impact for social distancing (Ethan Clemons, ODFW).

Below Bonneville Dam

WA state (and jointly managed waters with Oregon) fisheries closed statewide March 25 through at least May 5, 2020. Staff were able to sample and monitor fisheries when open, with limited impacts to sample rates (and associated CWT sampling) while operating more slowly and/or with fewer staff in confined spaces to accommodate social distancing guidelines Recreational effort in the area downstream of Bonneville Dam is usually estimated via boat/trailer counts by aerial surveys, however, this practice was temporarily curtailed and replaced by boat based effort counts. By June 22nd staff was able to revert back to aerial counts. Catch estimation is not expected to be impacted at any measurable level. Fisheries open on the Oregon side have been sampled and estimated per normal protocol with minimal impact for social distancing (Ethan Clemons, ODFW).

Summary of COVID-19 Impacts to Coastal Oregon (not including Columbia River) Chinook Assessments

Written September 16, 2020

Escapement Assessment:

No specific impacts are anticipated to those escapement assessment programs targeting Chinook. A portion of those budgets that support spawning ground surveys statewide were reduced due to changes in consumer spending with COVID 19. Consequently those programs supported through these funds have been streamlined to provide maximum efficiency and coverage possible under the circumstances.

Marking and Tagging:

Covid-19 has not impacted production, marking or tagging of Oregon hatchery Chinook production, including the standard suite of CWT indicators. No significant impacts from COVID-19 to Oregon's CWT programs have been documented to date.

Fishery sampling:

Ocean

No significant impacts to those sampling programs on Ocean Chinook salmon fisheries have been noted. There have been changes to sampling protocols to account for social distancing, but normal sampling targets have been attained. As of our last update, commercial troll salmon fisheries have been sampled at a 50% sample rate overall. Recreational ocean salmon fisheries have been sampled at a 34% overall sampling rate in the same assessment. Anecdotally, as with other recreational fishing during COVID-19, we have seen relatively high participation in ocean salmon fisheries (compared to forecasted salmon abundances).

Terminal basin sport

Those sampling programs deployed to assess terminal coastal Oregon Chinook fisheries are just now being initiated and are not expected to experience significant impacts due to COVID-19.

Catch estimation:

Ocean

No significant impacts to those catch estimations of Ocean Chinook salmon fisheries have been noted.

Terminal basin sport

Those catch estimation programs deployed to assess terminal coastal Oregon Chinook fisheries are just now being initiated and are not expected to experience significant impacts due to COVID-19.

September 29, 2020

PACIFIC SALMON COMMISSION WORK PLAN
2020-21

Panel / Committee:

- *Southern Panel; reports to the Pacific Salmon Commission.*
  - *Coho Technical Committee (CoTC); reports to the Southern Panel.*
  - *Chum Technical Committee (ChumTC); reports to the Southern Panel.*

This work plan includes a summary of the work plans submitted by both the Coho and Chum technical committees, and as such does not include all the detail in those work plans. This is not intended to deny the importance of that detail, only to provide a high-level summary of it for Commissioners.

Date: *October 19-23, 2020 -- PSC Executive Session, Webinar*

Update on Bi-lateral Tasks Assigned Under Current PSC Agreement:

Southern Panel:

- *Annual Post Season Review – A detailed bilateral review of the 2019 coho, chum and chinook salmon abundances, fishery performances, and preliminary estimates of escapement levels was conducted at the January 2020 PSC post-season meeting.*
- *Present updates on the development of management objectives/breakpoints for Coho management units for the Southern Coho Management Plan of Chapter 5.*
- *Conduct pre-season data exchanges.*
- *Work on developing a bilateral process per the new Southern Coho Agreement (Chapter 5, Paragraph 11b and 11c new language)*
- *Review and recommend priorities for Southern Endowment Fund Committee consideration.*
- *Update reporting requirements, and assign work as required for completion.*

Coho Technical Committee:

The following list includes updates on the status of ongoing tasks from previous work plans, as well as descriptions of bilateral tasks planned for 2020-21:

- Post Season ER Estimates for Coho Management Units. In 2020, the CoTC completed the annual post-season report for the 2018 fishing season.
- Development of a new reporting tool to facilitate post-season ER reporting that is in an R package and combines the former East Coast Vancouver Island and Mainland Inlets MUs into a single Strait of Georgia MU for the annual post-season ER report.
- Work to update a periodic report to cover the catch years 1986–2018 continues; updates were provided to the Coho Workgroup and Southern Panel on producing an electronic format for the Periodic Report. Programs were developed to facilitate generation of tabular summaries of data for the Periodic Report. Tables and figures are now easily updated using R code and a draft of the report will be

made available in early 2021.The annual information exchange for fishery planning was performed.

- Regional fishery planning model development. Bilateral interaction for the CoTC was centered on model improvements to improve efficiencies in production of estimates of post-season exploitation rates provided to the Southern Panel. A current Southern Fund project is looking into validating model generated exploitation rates using CWT-based cohort analyses and exploitation rate analyses. In addition, mark rates are being compared between model-based estimates and direct sampling programs. A sensitivity analysis is also being undertaken. The goal of this project is to evaluate the effects of abundance changes of influential Coho stocks on the exploitation rate of other model stocks to determine which forecasts of abundance have the greatest effect on key wild stocks. Results could be used to inform decision makers about prioritizing the timing and availability of forecast information and allocation of limited stock assessment resources. Project completion is tentatively scheduled for summer 2021.

- Beginning in March 2020, all CoTC and Coho Workgroup (CoWG) meetings were held remotely due to COVID-19. During the July 2020 CoWG meeting, the implementation plan for the 2019 Southern Coho Agreement was reviewed and the CoTC provided informational presentations on ocean conditions, electronic hosting of the periodic report, issues relating to conducting remote meetings, introductory briefing on CoTC/Southern Panel use of PSC Sharepoint (provided by PSC staff member John Son), organization and operation of the CoTC Sharepoint site, creation of a library for publications, concerns regarding limitations of staffing and support for coho-related stock and fishery assessments, and ideas for assessing and responding to environmental change

- Complete MU descriptions. An outline of requirements was developed in 2003 and reviewed in 2009. A Coho database has been developed for U.S. stocks. Draft descriptions were prepared for Canadian MUs and will be finalized once reference points are determined. Draft descriptions for most US MUs were completed in 2012, reviewed by local fishery managers, and are currently being finalized.

- Assessment Framework. A presentation was made to the Southern Panel at the February 2012 Annual Meeting in Vancouver describing a draft framework to identify the biological and fishery assessments required for implementation of the Treaty provisions for Coho. No subsequent modifications have been made. The framework provides guidelines or criteria to help evaluate the adequacy of available information and the capacity of assessment programs to produce information required to implement the current Southern Coho Agreement and develop a new Southern Coho Agreement, highlights issues relating to CWT data for coho, and presents information needs within a decision-theoretic framework to help inform policy deliberations of relationships between uncertainty, risk, and potential requirements for assessment programs. Criteria discussed include: 1) conservation risk and stock outlook; 2) loss of fishing opportunity; and 3) costs for monitoring and assessment.

- Environmental Change. The CoTC has established an environmental change workgroup. Plans for addressing environmental change were shared with the Southern Panel and CoWG during the 2019-20 cycle. The CoTC subgroup on Environmental Change developed recommendations for near term (1-2 years) and intermediate term (5-10 years) actions and measures that should be reviewed in conjunction with the Committee on Scientific Cooperation. For the 2020-2021 cycle, the CoTC is planning to convene a half-day electronic conference to share information regarding the incorporation of environmental information into salmon management during the spring of 2021. Projected participation in the electronic conference is 100; the format is tentatively planned to consist of approximately 6 presentations and facilitated plenary discussions. Assistance from the PSC is requested for hosting and recording the conference.

Chum Technical Committee:

- *Beginning work on the draft report covering 2018 fisheries and research will be a principal focus during the PSC meetings in January 2021.*
    - *Continue to work on the bilateral implementation plan for Chapter 6*
- *The committee's other focus will be continued development of aspects of the strategic plan (see attached Figure).*
- *To provide updates on any approved 2020 SEF projects: Currently 3 Chum salmon projects are being conducted in 2020:*
    - **Juan de Fuca Strait Chum Salmon Sampling program, Year 5**
    - **Puget Sound Chum salmon GSI, Year 3**
    - **Chum Salmon Baseline and GSI in Southern Boundary Region, Year 1**
- *Work on 2020 reports associated with SEF projects for later submission*
- *Review of SEF priorities and ensure projects are ready for 2021 implementation should funding materialize.*
- *Identify additional sampling requirements to complete and/or update the existing baseline collections*
- *Seeking other funding opportunities or resources to help with the database development, and other priority items such as the Escapement Reference Point development (Update on Holt et al. work).*

Obstacles to Completing above Bi-lateral Tasks:

Southern Panel:

- To accomplish the above bi-lateral tasks, we will need the Commissioners' support to hold the requested number of meetings during 2020 that are noted below in the subsection, "Proposed Meeting Dates and Draft Agendas."

Coho Technical Committee:

- An implementation plan for the 2019 Southern Coho Agreement continues to be developed. Efforts of the CoTC are focused on improving CoTC efficiencies, stock and fishery assessments, and proactively dealing with uncertainties relating to environmental change.

- The new Agreement also contains a provision requiring the Parties to bilaterally exchange projected ERs upon completion of their respective domestic preseason fishery planning processes. Canada needs to complete two domestic approval processes for implementation of the new Coho Agreement. First, a domestic consultation process for establishing a framework for determining the status and allowable ERs for its Coho MUs is currently underway and it is expected to be completed and the framework approved for implementation by the end of December 2018. Second, Canada must determine the technical and policy details for exchanging projected ERs on Coho MUs and obtain administrative approval; the timeframe for completion of this process has not yet been established. In July 2020, Canada reported that no substantive changes resulted from its domestic fishery planning processes from the information shared via the March data exchange. Those expectations were incorporated into US fishery planning processes of the Pacific Fishery Management Council and thus, Canada did not provide estimates of projected ERs following Canadian domestic planning processes.
- Staffing and funding levels to support implementation of the new Coho Agreement are uncertain. The CoTC is concerned about: (1) the capacity of both Parties to maintain catch sampling and stock monitoring programs, and to provide required inputs into joint management planning models; (2) the need for additional dedicated staff to participate in activities of the CoTC; (3) the need to improve information exchange on preseason FRAM runs for impact projections (preseason model runs from Canada are needed to provide projections of planned fishery impacts on MUs); (4) the lack of established monitoring and reporting systems to assess impacts of environmental change; and (5) lack of adequate CoTC meeting space at the Portland Embassy Suites. In February 2020, Gary Morishima met with PSC staff regarding issues pertaining to support for CoTC activities.

Chum Technical Committee:

- While support from the Southern Endowment Fund has facilitated our efforts to implement the ChumTC strategic plan, time constraints for committee members remains a challenge to task completion. At this point in time, it seems unlikely that the ChumTC will meet in person during 2021, sue to COVID-19. While this lack of in-person ChumTC meetings will be mitigated by continuing to hold additional virtual meetings, work progress may progress slower than expected.

Outline of Other Panel / Committee Tasks or Emerging Issues:

Coho Technical Committee:

Budget availability and timing remain of concern. The capacity of the Parties to undertake assignments is being challenged by agency staffing and budget constraints and limitations of funding to support PSC related activities. The PSC and domestic management entities should be made aware of the need to address workforce and budgetary shortfalls reported by the three sub-groups that convened at the CoTC/CoWG meeting in Nanaimo BC in June 2019. Canada has appointed additional members to the CoTC; U.S. CoTC membership changes include the retirement of Andy Rankis, addition

of Marlene Bellman, and Rishi Sharma relocating to join the Food and Agricultural Organization in Rome, Italy. Concerns regarding the exacerbation of uncertainty in staffing and budget limitations, including impacts on agency capabilities due to COVID-19, were also discussed during the remote July 2020 CoWG meeting. Uncertain appropriations and budget allocation decisions for both the U.S. and Canada impede the capacity of the CoTC to plan its schedule and complete tasks. The CoTC and CoWG may need to revise the workplan once budgetary and staffing limitations and requirements are clarified.

- Due to uncertainty regarding COVID, the CoTC plans to work remotely for the entire 2020-21 cycle. Remote collaboration will be a learning experience. A number of Issues which have arisen were discussed during the July 2020 CoWG meeting, including:
    - There is a need to standardize meeting platforms to the extent feasible – agency restrictions and the wide variety of meeting platforms has increased the difficulty of convening and conducting remote meetings. For the most part, the CoTC expects to rely upon agency-supported platforms to the maximum extent feasible. Support from PSC staff will be needed to arrange CoTC-Southern Panel meetings.
    - There is a potential for remote meeting burnout. CoTC is planning to limit meetings from 2-4 hours in length to increase productivity and maintain attention span.
    - Complications can and have arisen with variable capabilities to work remotely, e.g., connection reliability, band width. Support and assistance from PSC staff will be needed to host large meetings and work though connection and information sharing issues.
    - With remote meetings, there is a potential for participants to be distracted by other activities and responsibilities, increasing the need for maintaining official minutes, calendars, and reporting systems.
    - With multiple workgroups within the CoTC, there is a need for the PSC to provide scheduling support, such as meeting calendars, quick contact information for participants, and potential recording of meetings.
    - Guidelines for meeting conduct – protocols for participation and meeting control/facilitation, including public participation, password protection for read and edit authority, version tracking, separation of working from public information, privacy and security – are needed.
    - In the event that more normal activities resume, adjustments to meeting schedule and arrangements will be requested as needed. Anticipate that special precautions and adjustments to previous meeting arrangements will be needed should in-person meeting resume, including: (a) adequate meeting space will be needed for health and safety; (b) availability of sanitation stations; (c) isolation protocols; (d) contact tracing.
- Per PSC request, a separate report on COVID-related impacts is attached. In addition to impacts on PSC assignments, the CoTC wishes to note that COVID is expected to affect agency budgets and operations. Specific impacts are uncertain at this time, but

adjustments to hatchery production, stock and fishery monitoring and assessment programs are under consideration.

- A process is needed to provide the CoTC with the opportunity to review relevant proposals that are submitted for Southern Endowment Fund support and receive copies of progress and final reports for SEF projects involving CoTC priorities.

Big Bar Slide.

In late October 2018, the Big Bar landslide occurred in the upper Fraser River in the vicinity of Lillooet which resulted in a 5 meter high blockage that obstructed passage of several species of salmon, including Interior Fraser Coho. A preliminary estimate indicates that about 12% of the spawning area utilized by Interior Fraser Coho occurs upstream of the Big Bar slide. Substantial amounts of staff from DFO, First Nations, and partners and funding has been devoted to address this situation, but it is unclear how long salmon passage will continue to be affected. DFO will provide occasional updates to the CoTC and CoWG on the impacts of the Big Bar Slide on the Interior Fraser Management Unit and efforts to remediate passage problems.

Potential Issues for Commissioners

Coho Technical Committee:

- Transition to a new Southern Coho Agreement. This proposed workplan anticipates that CoTC efforts during this cycle reflect a transition and redirection of some old assignments and redirection of resources to new tasks in anticipation that measures to begin work under the PSC annex will be put in place within the current cycle. Additional resources will be required for addressing requirements under the new Agreement. In July the CoTC and CoWG met to continue development of an implementation plan for the 2019 Southern Coho Agreement. Continued deliberation with the Coho Workgroup and Commissioners will be needed regarding CoTC priorities.
- Guidance will be needed regarding establishment of a process to provide the CoTC with the opportunity to review relevant proposals that are submitted for Southern Endowment Fund support. In addition, progress and final reports for Southern Endowment Fund projects involving Coho should be routinely provided to CoTC for information.

Chum Technical Committee:

- Uncertainty on how the fall and winter activities will proceed with the uncertainties around COVID-19. Existing programs at this time are unaffected but that could change.

Potential Issues for Committee on Scientific Cooperation

The PSC could consider establishing a coast-wide, multi-species forum under the oversight of the Committee on Scientific Cooperation to share developments and advice regarding adaptation of Pacific salmon management approaches to environmental change.

There is strong evidence that environmental change is occurring and accelerating to a degree such that past experience cannot be expected to serve as a reliable basis to forecast the future. Increases in uncertainty, variability, and directional change are expected to alter hydrologic, precipitation, and temperature patterns which, in turn, are likely to affect the productivity, abundance, distribution, and migration patterns of Pacific salmon. The forum should provide reporting of significant developments in the knowledge base as well as vetting of recommendations for monitoring and reporting systems, and potential adaptation strategies. The CoTC has initiated planning for an electronic conference on incorporating environmental information into salmon management tentatively scheduled to be convened in 2021. A meeting between the CoTC and CSC is recommended to discuss and review recommendations for addressing environmental change in management of Pacific Salmon.

Proposed Meeting Dates and Draft Agendas

Proposed meeting dates and key activities planned for Southern Panel, Coho Technical Committee (CoTC), Coho Working Group (CoWG), and Chum Technical Committee (ChumTC) are listed in the following section. Additionally, a summary table by meeting date in the 201-22 work cycle is provided below. Attendance of panel and committee members may be dependent on available resources.

Southern Panel Meeting Schedule:

- *January 11-15, 2021 – PSC Post Season Meeting, Webinar.*
- *February 8-12, 2021 – PSC Annual Meeting, Webinar*
- *Manager-to-Manager Review Meeting – March 2021 – date TBD – Webinar*
- *Also, see Coho Working Group meeting schedule in the table below, which will include a subset of Southern Panel members.*

Coho Technical Committee (CoTC) and Coho Working Group Proposed Meeting Schedule (for the 2020-21 cycle, all meetings are assumed to be virtual via remote electronic platforms):

- *December 2020/January 2021 – SFEC presentation on Coho DIT report to CoTC meeting; coordination of model workgroup for preparation of 2019 ER Report; .*
- *January 2021*
    - *CoTC dates flexible to continue work on assignments. Main task will focus on preparing for estimation of 2019 exploitation rates and work with CoWG to revise workplan in light of instructions from PSC Executive Session; briefing of CoTC on status of FRAM Model evaluation project and receive input from committee members; update on periodic report; planning for electronic conference on environmental change.*
    - *Two remote meetings between the CoTC and Southern Panel are anticipated during the January Post Season meeting.*
- *February 2021*
    - *CoTC – dates flexible. Preparation of 2019 ER report; planning for electronic conference on environmental change; continue working on periodic report.*

- *Three remote meetings between the CoTC and Southern Panel are anticipated during the February Annual PSC meeting to report2019 ERs and provide a briefing on environmental conditions.*
- *Review draft Strategic Plan.*
- *Identify priorities for Southern Endowment Fund support.*

- *March 2021 – Coho Working Group; Panel chairs and select members.*
  - *Annual manager-manager information exchange. Exchange preseason stock forecasts and fishery plans.*
- *April 2021 – CoTC-SFEC meeting to discuss Coho DIT Report*
- *June 2021 – Electronic Conference on Environmental Change*
- *July 2021 –CoTC, SFEC, and CoWG*
  - *Review draft strategic plan for Southern Coho.*
  - *SFEC presentation of Coho DIT report to Southern Panel*
  - *Review methods for determining status of Canadian MUs, bilateral exchange of projected ER caps upon completion of domestic preseason fishery planning processes, and stock and fishery assessment programs for implementation of the new Coho Agreement.*
  - *Review estimates of ERs for MUs resulting from domestic planning processes.*
  - *Review Periodic Report and CoTC priorities. Initiate discussion of implications of environmental change for Southern Coho Management.*
- *Sept 2021 – CoTC/CSC meeting*
  - *Initiate deliberations between the CoTC and CSC on recommended actions for implementing the Environmental Change provisions of the new Southern Coho Agreement and to further explore alternative approaches for monitoring, evaluating, and addressing environmental change for management of Southern Coho and other species of Pacific salmon.*

<u>Chum Technical Committee Proposed Meeting Schedule:</u>

- *January 11– 15, 2021 – PSC Post-Season Meeting (Webinar)*
  - *Review and discuss preliminary post-season 2020 fisheries information*
  - *Collate and review report items for 2018 final post-season report*
  - *Continue work on Southern Chum genetic baseline inventory and expansion for adequately identifying stock origin of fish in mixed stock fisheries on both sides of the border*
  - *Continue to evaluate and test the ChumGEM model*
    - *Presentation on CHUMGEM progress, issues and next steps*
  - *Updates on any completed SEF programs related to Chum*
  - *Review and discuss research and analysis activities essential to the Committee tasks*
  - *Review Chum Strategic plan and update*
  - *Provide any bilateral analyses, as requested by the Southern Panel.*

- *February 8 – 12, 2021 – PSC Annual Meeting (Webinar)*
    - *Continue work on 2018 annual report.*
    - *Address any specific tasks assigned to the Committee by the Southern Panel at the January meeting*
    - *Continue work on tasks not completed at the January meeting*
    - *Assign workgroups and workgroup tasks for items still pending at the end of the February meeting*
    - *SEF projects for 2021 should be identified and program planning initiated*
    - *Start to develop new SEF priorities document for upcoming call*
    - *Initiate 2019 annual report*

- *May 2021 – PSC Chum TC Spring Meeting, location to be determined*
    - *Finalize 2018 annual report for submittal*
    - *Continue to define and develop Tier 2 components of the Southern Chum Strategic Plan*
    - *Review status of all SEF related projects and develop plan for new submission following identified priorities*

Proposed Schedule of Meetings for 2020-21: PSC Southern Panel, CoTC, CohoWG, ChumTC			
When	**Who**	**Location**	**Purpose/ Primary Tasks**
December 2020 (dates TBD; remote)	CoTC & SFEC	Remote	SFEC presentation of COHO DIT Report. Review status of Periodic Report and electronic hosting system. Planning for preparation of 2019 ER Report.
Jan 2021 PSC Post Season Meeting	Southern Panel CoTC ChumTC	Remote	Southern Panel • Annual Post Season Review • Work on developing a bilateral process per the new Southern Coho Agreement (Chapter 5, Paragraph 11b and 11c new language). • Present updates on the development of management objectives/breakpoints for Coho management units for the current Southern Coho Management Plan of Chapter 5. • Plan priority activities for future work. Coho Tech Committee • Continue work on assignments, specifically preparing for estimation of 2019 exploitation rates and work with CoWG to revise workplan in light of instructions from PSC Executive Session. Chum Tech Committee • Review and discuss preliminary post-season 2019 fisheries information • Collate and review report items for 2017 final post-season report • Continue work on Southern Chum genetic baseline inventory and expansion for adequately identifying stock origin of fish in mixed stock fisheries on both sides of the border. • Continue to evaluate and test the ChumGEM model o Presentation on ChumGEM progress, issues and next steps. • Updates on any completed SEF programs related to Chum • Review and discuss research and analysis activities essential to the Committee tasks • Review Chum Strategic plan and update • Provide any bilateral analyses, as requested by the Southern Panel.
Feb 2021 PSC Annual Meeting	Southern Panel CoTC ChumTC	Remote	Southern Panel: • Pre-season data exchanges. • SEF priorities developed and presented by technical committees and endorsed by Panel. • Ocean Indicators presentation. • Update reporting requirements, and assign work as required for completion. Coho Tech Committee: • Use Coho Model to perform 2019 post-season assessment of impacts. • Present annual review of exploitation rates to Southern Panel. • Briefing on ocean environmental conditions and progress on Periodic Report. • SEF projects for 2020-2021 should be identified and program planning initiated. • Review draft Strategic Plan. I Chum Tech Committee: • Continue work on 2017 annual report. • Address any specific tasks assigned to the ChumTC by the Southern Panel at the January meeting • Continue work on tasks not completed at the January meeting • Assign workgroups and workgroup tasks for items still pending at the end of the February meeting • SEF projects for 2020-2021 should be identified and program planning initiated • Start to develop new SEF priorities document for upcoming call • Initiate 2018 annual report

Proposed Schedule of Meetings for 2020-21: PSC Southern Panel, CoTC, CohoWG, ChumTC			
When	**Who**	**Location**	**Purpose/ Primary Tasks**
March 2021 (1 day; date TBD)	Coho Working Group (CoWG); Panel chairs, select members	Remote	Annual manager-manager information exchange. Exchange preseason stock forecasts and fishery plans.
May 2021 (dates TBD)	ChumTC	TBD	• Finalize 2017 annual report for submittal • Continue to define and develop Tier 2 components of the Southern Chum Strategic Plan • Review status of all SEF related projects and develop plan for new submission following identified priorities
April 2021	CoTC & SFEC	Remote	• Discuss Coho DIT Report
June 2021	CoTC & invited participants	Remote	• Electronic conference on environmental change and salmon management
July 2021	Coho Working Group + CoTC	Remote	• Review draft strategic plan for Southern Coho. • Review methods for determining status of Canadian MUs, bilateral exchange of projected ER caps upon completion of domestic preseason fishery planning processes, and stock and fishery assessment programs for implementation of the new Coho Agreement. • Review estimates of ERs for MUs resulting from domestic planning processes. • Review Periodic Report and CoTC priorities. Initiate discussion of implications of environmental change for Southern Coho Management. • Discuss Coho DIT report with Coho Working Group
Sept 2021 (dates TBD)	CoTC & CSC	Remote	Initiate exploration of alternative approaches for addressing environmental change for management of Southern Coho.

Status of Technical or Annual Reports:

Southern Panel:

- *To be reviewed at the January 2021 Post Season meeting, with a plan developed to complete outstanding reporting requirements.*

Coho Technical Committee:

- *Annual reporting by the CoTC is limited to production of estimates of exploitation rates. 2018 post-season estimates of exploitation rates were presented to the Southern Panel at the February 2020 meeting.*
- *Work plans and status were reviewed through presentations at 2020 PSC meetings.*
- *Tools were developed to improve report generation capabilities using data generated by Backwards FRAMA Southern Endowment Fund project was initiated to evaluate FRAM performance.*
- *Efforts to update the periodic report and transition to electronic hosting were initiated and progress on development was reported to the CoWG in July 2020.*
- *Draft descriptions for most U.S. MUs undergoing review. Completion of Canadian MU descriptions are pending determination of MU reference points anticipated in 2021.*
- *Annual report on CoTC priorities was developed for the Southern Fund Committee.*

Chum Technical Committee:

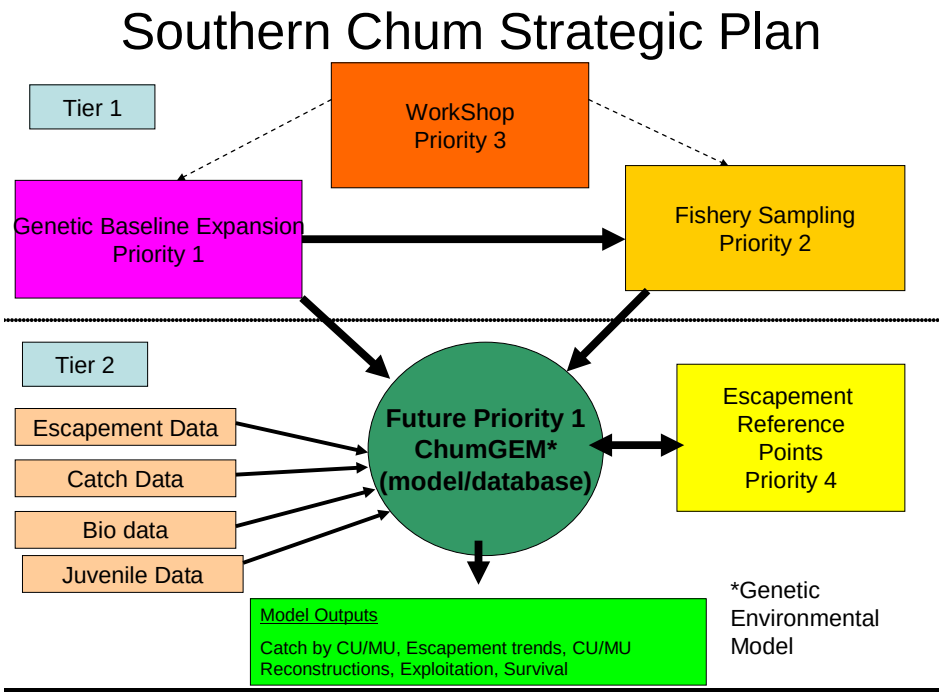
- *The committee anticipates having the 2017 Annual Report complete very soon.*
- *The committee anticipates having the 2018 Annual Report complete by the end of the February meeting in 2021.*

Comments:

Coho Technical Committee:

The CoTC workplan reflects redirection of efforts to support emphasis areas anticipated under the Southern Coho Agreement. The proposed priority list for CoTC during the 2020-21 cycle follows (high to low): (1) Generate estimates of 2019 ERs for MUs; (2) Informational outlook for 2021 ocean conditions; (3) Information exchange for 2021 preseason fishery planning; (4) Update periodic report; (5) Evaluate and improve performance of Coho FRAM; (6) explore alternative approaches for addressing environmental change and management of Southern Coho; (7) initiate deliberations regarding status determinations for Canadian MUs; (8) review Coho DIT report; (9) all other assignments to be undertaken on time available basis.

Chum Technical Committee:



PACIFIC SALMON COMMISSION
COVID-19 IMPACTS

Panel: Southern Panel

Responders: Co-Chairs

Date: **Sept 29, 2020**

NOTE: The information provided in this report represent the status as of end-September 2020. COVID has affected ability of Southern Panel representatives (and the entities or groups that they represent) to conduct our business under the current 2019-20 Work Plan, and this is expected to continue into the upcoming cycle. It is expected that operational capabilities may be limited in some ways that will necessitate adjusting priorities in response to changing circumstances.

The following is general information on COVID-19 Treaty implementation.

a. Implications for annual commitments: Internal communications require additional time.

The ability to exchange, review, discuss and address items of the work plan will be affected by the types of communication and meeting platforms available to the bilateral Southern Panel, co-chairs, and its members. This involves coordinating and planning on meeting dates, agendas, and materials, and to host/facilitate effective virtual meetings.

We expect continued need to be able to operate under the dynamic and fluid nature that COVID imposes on the Southern Panel. The Panel is committed to conducting the meetings identified in our Work Plan, recognizing that this may need to be adjusted in response to limitations COVID may place members of the Panel or the entities or groups they are affiliated with. It may affect ability of members of the Panel or technical committees to participate fully in meetings identified in the 2020-21 Work Plan. This may also entail reduced agenda items and activities than what we would commonly undertake at in-person meetings.

As such, the Panel will strive to address the core priority areas of the Chapter 5 and 6 of the Pacific Salmon Treaty to ensure we are meeting obligations as set forth in those chapters. Our ability to do this will be influenced by how efficient we can be with our meeting times and agendas that we conduct virtually. The Panel also recognizes that our ability to communicate will also be challenged by other workload issues that members of the Panel may have outside of the Panel itself.

b. Implications for chapter implementation over the duration of the chapter:

The Southern Panel is continuing to develop and refine the implementation plans for Chapter 5 and 6 of the treaty. As we review and refine these documents, we are also considering how to prioritize the obligations of each chapter (applicable provision, deadline/dates, how it is to be

achieved, etc.) to ensure we comply with those particular non-discretionary provisions. At times, this may mean that other provisions considered to be less as critical, are delayed for review and implementation.

The intent of the Panel is to be responsive to the needs of the Chapter and to accomplish as much of the Work Plan and corresponding activities as we can in the face of limitations or disruptions to this work that the COVID pandemic may cause. This is dependent upon ability of members of the Panel or technical committees to participate fully in meetings identified in the 2020-21 Work Plan. A key aspect is to ensure that we have "critical mass" to conduct the bilateral meetings and activities as set forth in the Work Plan. It is common to not have full attendance at meetings given schedules, activities and work loads of panel members that may compete with that of the Panel, and COVID only adds to that challenge.

c. Mitigation plans if gaps exist (how you will catch up): one way to maintain momentum and catch-up would be to hold more meetings virtually throughout the year.

As the Southern Panel undertakes implementation of the 2020-21 Work Plan, we will be prioritizing the core or critical work items to complete in this cycle, and to make adjustments as necessary to accomplish our work. This may involve reducing the number of hours or meeting days, from what we would ordinarily plan for, to address agenda items and work elements as we move through our planned 2020-21 calendar and schedule.

As we do so, we will be contemplating hosting/facilitating additional meetings/calls if necessary. While it is difficult to project what that might entail at this time, we think we can address this on a case-by-case basis should we see the need for additional work and time for any particular work item. The Panel supports a flexible approach to our Work Plan to be able to adapt and respond to changes or disruptions that we may experience in this next year.

We will communicate with the PSC in as much advance as possible situations where we anticipate some delays or obstacles to successfully completing key elements of our Work Plan, and to offer potential ways to address those items moving forward.

d. Reviewed implementation plan and timelines

None reported.

e. Actions being taken to better enable work to be done for 2021

We have some experience with doing these meetings virtually in 2020. While it is not ideal and there are specific challenges and difficulties associated with virtual meetings, we have been able to conduct our work and activities in support of treaty implementation for Chapters 5 and 6.

This will likely get better as we build upon our experiences so far with conducting virtual meetings.

f. Impacts to models used to set fishery limits and evaluate fishery performance/compliance under the Treaty

The following is noted by the Coho Technical Committee: the biggest impact on the FRAM will be the ability of Canada to compile the appropriate data needed for post-season ER estimation and for pre-season fishery planning. Setting a deadline and committing senior managers in each Area to the deadline should help.

As mentioned previously, the US may have additional uncertainty in several forecasts which are used under the PST to set fishery limits. The data needed for post-season ER estimation is anticipated to be available and would not be impacted.

The following is noted by the Chum Technical Committee: US chum fishery limits for the Southern Boundary Areas are prescribed directly in Chapter 6. Fishery performance (i.e. catches) and Treaty compliance will be reported as usual in the 2020 post-season report.

PACIFIC SALMON COMMISSION
COVID-19 IMPACTS

Technical Committee: CoTC

Responders: Consolidated Information From CoTC members

Date: **Sept 14, 2020**

NOTE: The information provided in this report represent the status as of mid-September 2020. COVID has reduced revenues and agency budgets are currently under review. Substantial changes in operational capabilities may result from adjusting priorities in response to budget austerity requirements.

On a July 10th webinar, the Commission requested each technical committee to review the potential for the pandemic to disrupt Treaty implementation. To fully understand the impacts, the Commission asks that each Technical Committee provide a written report by **October 1** on COVID-19 Treaty implementation.

a. Implications for annual commitments: Internal communications require additional time.

The acquisition of Canadian data needed for the post-season analysis is always time consuming and this will be amplified with the remote work environment implemented for Covid-19 including the January and February 2021 meetings. Within Canada, senior management for each Area will need to commit to a data delivery deadline of January 6, 2021. Without this commitment it is unlikely Canada will have the numbers to run the post-season analysis.

WDFW staff were required to furlough for 4 days in July and 1 day in each month from August-November to offset a COVID-related shortfall in State Funds. It remains uncertain whether mandatory furloughs will continue into 2021. Despite this, all field work to support the Treaty (e.g., smolt trapping, creel surveys) were completed in 2020. Impacts are anticipated to be minimal unless furloughs are increased.

ODFW: Fisheries sampling, including applying and recovery of CWTs and field work were performed as usual and the same is expected during spawning ground surveys and future fishery sampling.

Puget Sound Tribes: staff have managed to keep sampling staff during the coho fisheries. Escapement surveys will take place as any other year, in coordination with WDFW staff. Tribal mass marking and tagging occurred as planned during the 2020 COVID outbreak and it is anticipated that they could fulfill that responsibility again next year. Tulalip tribes could not run the smolt traps in the Snoqualmie and Skykomish (March-May) due to COVID, so smolt trap production estimates will not be available for 2020. As a consequence, the forecast methodology for the 2021 Snohomish run will be modified. These types of impacts may increase uncertainty in

final forecasts, which are used under the PST for setting annual ER caps in preseason planning of fisheries.

b. Implications for chapter implementation over the duration of the chapter:

Much of the work of the CoTC occurs during the post-season and annual meetings in January and February, respectively. The biggest impact of COVID is a slow-down in communications and a lack of momentum on work plan items resulting from CoTC members working in isolation; this will slow implementation of Chapter 5, particularly incorporation of environmental variability into the decision-making context.

c. Mitigation plans if gaps exist (how you will catch up): one way to maintain momentum and catch-up would be to hold more meetings virtually throughout the year.

Furloughs by WDFW staff are not expected to reduce productivity.

Washington tribes have given staff flexibility to work remotely when possible. Considerations should be given to not schedule meetings excessively.

d. Reviewed implementation plan and timelines

None reported.

e. Actions being taken to better enable work to be done for 2021

WDFW developed COVID-Safety Protocols to enable field staff to continue with population monitoring during the pandemic. Results from this work will inform pre-season models used to set fishery limits and evaluate fishery performance/compliance (e.g. forecasts, harvest rates, etc.). Besides webinars, consider in-person meeting in late Spring (if people are able to get vaccinated), because a lot of coordination needed for joint model runs. Perhaps also consider postponing joint model runs (annual report) until in person meeting can be arranged. If not possible, I think the CoTC has enough expertise to provide annual reporting through remote meetings.

f. Impacts to models used to set fishery limits and evaluate fishery performance/compliance under the Treaty

The biggest impact on the FRAM will be the ability of Canada to compile the appropriate data needed for post-season ER estimation and for pre-season fishery planning. Setting a deadline and committing senior managers in each Area to the deadline should help.

As mentioned previously, the US may have additional uncertainty in several forecasts which are used under the PST to set fishery limits. The data needed for post-season ER estimation is anticipated to be available and would not be impacted.

PACIFIC SALMON COMMISSION
COVID-19 IMPACTS

Technical Committee: Chum

Responders: US Co-managers of Southern Boundary Area chum fisheries

Date: Sept. 22, 2020

On a July 10th webinar, the Commission requested each technical committee to review the potential for the pandemic to disrupt Treaty implementation. To fully understand the impacts, the Commission asks that each Technical Committee provide a written report by **October 1** on COVID-19 Treaty implementation.

a. Implications for annual commitments

To date, there has been little impact on the US annual commitments specified in Chapter 6 of the Treaty. At this time, it is not expected that COVID-19 will affect any prescribed fishery monitoring obligations for US chum fisheries in the South Boundary Area (US Areas 4B/5/6C and 7/7A). It remains somewhat unclear the degree to which certain US in-season and post-season assessment activities (e.g. test fisheries and escapement monitoring) might be affected by the pandemic, although no specific obstacles are identified at this time, and these activities do not directly contribute to the US fulfilling its Treaty commitments as detailed in Chapter 6.

b. Implications for chapter implementation over the duration of the chapter

Currently, no direct impediments to Chapter 6 implementation due to COVID-19 are identified by US Tribal fishery managers. However, Tribal government revenues have, in some cases, been impacted to a degree by the pandemic, and Tribal natural resource budgets may be under review. It is not expected at this time that there would be cutbacks to US monitoring activities in a way that would compromise Chapter 6 implementation.

c. Mitigation plans if gaps exist (how you will catch up)

The Chum Technical Committee has held monthly virtual meetings instead of meeting in person in May as originally planned. It is anticipated that this will continue.

d. Reviewed implementation plan and timelines

The Chum Technical Committee is engaged in activities in support of the bilateral Chapter 6 implementation work plan, and some of the committee's activities have been affected by the pandemic. In-person meetings have been cancelled in favor of virtual meetings. Progress has continued toward development of the chum run reconstruction model (ChumGEM), although at a somewhat slower pace.

e. Actions being taken to better enable work to be done for 2021

The outcome of the 2020 chum fishery monitoring efforts will inform Tribal fishery managers on what will need to be done differently in 2021, if the pandemic is still active next year.

The Chum Technical Committee expects to continue holding periodic virtual meetings to ensure that its Chapter 6 implementation work will continue.

f. Impacts to models used to set fishery limits and evaluate fishery performance/compliance under the Treaty

None. US chum fishery limits for the Southern Boundary Areas are prescribed directly in Chapter 6. Fishery performance (i.e. catches) and Treaty compliance will be reported as usual in the 2020 post-season report.

PACIFIC SALMON COMMISSION WORK PLAN, 2020-2021

Panel / Committee

- ***Transboundary Panel*** *(reporting to the Pacific Salmon Commission)*
- ***Transboundary Technical Committee*** *(reporting to the Transboundary Panel)*
- ***Enhancement Sub-Committee*** *(Reporting to the Transboundary Panel and Transboundary Technical Committee)*

Date *For review at the Executive Session of the Commissioners on October 19–23, 2020 (Webinar), with updates provided at the Executive Session and reporting presented at the Post-Season Meeting on January 11–15, 2021 (Webinar) and the Annual Meeting on February 8–12, 2021 (Webinar).*

Update on Bi-lateral Tasks Assigned Under the Current Agreement

1) Review Pacific Salmon Treaty - Chapter 1 Implementation Plan activities (update on Transboundary Panel and Transboundary Technical Committee tasks).

At the Pacific Salmon Commission's 2019 Post-Season meeting (January 2020), the Commission endorsed the Transboundary Rivers Chapter Implementation Plan (for the 2019 to 2028 Annex period). The Transboundary Panel will review Implementation Plan Activities, associated Timelines and anticipated Outcomes in order to determine if additional efforts are required to achieve stated objectives or if any amendments are proposed. Transboundary Panel Co-Chairs will report on progress and identify any recommended changes or adjustments proposed.

2) Review and Implement Abundance-Based Management Fishery Regimes.

Under Chapter 1, abundance-based management fishery regimes are in place for: Taku River Chinook, sockeye, and coho salmon; and Stikine River Chinook and sockeye salmon. The Agreement calls for development and implementation of abundance-based regimes for Stikine River coho salmon, Alsek River Chinook and sockeye salmon and periodically reviewing and updating existing escapement goals as new information is collected within the current Annex period. The Transboundary Panel will receive post-season reports, pre-season outlooks, and receive presentations on proposed management strategies for Transboundary salmon stocks which are currently administered under abundance-based regimes.

3) Continue existing and expand joint enhancement programs designed to produce 100,000 enhanced sockeye salmon returning to (each) the Taku and Stikine rivers.

The Parties renewed efforts are focusing on expanding sockeye salmon enhancement programs in both the Stikine and Taku Rivers. In the recent decade enhanced production has contributed directly to existing fisheries approximately 35,000 fish and 6,000 fish per year in the Stikine and Taku rivers, respectively. Directed near-term efforts are focused on expansion of existing Taku River programs (Tatsamenie, Trapper Lake, and King Salmon) as well as exploring new project developments on mainstem stocks for both rivers and in the Iskut drainage on the Stikine River. The Transboundary Panel will develop a Stikine Enhancement Production Plan (SEPP) and a Taku Enhancement Production Plan (TEPP) for the coming year (2021), for presentation at the Pacific Salmon Commission Annual meeting in February 2021. The Transboundary Panel will also receive the final report on the 2019 Taku Enhancement Production Plan results which will confirm: 1. Planned egg take (2019 TEPP); 2. Actual

egg take (2019); 3. Fry release completed (2020); 4. Actual egg take (2020) – including reference to planned egg take; 5. Enhanced adults that returned in 2020 (resulting from 2015 and 2016 TEPP).

4) Harvest sharing performance.

Pursuant to Paragraph 4, Chapter 1, of the Pacific Salmon Treaty, the Transboundary Panel completes an annual review of catch and escapement performance (overage/underage) for treaty-defined stocks and fisheries. The review is intended to identify any occurrences of harvest overage or underage, and in cases where situations exist, enable the respective Party to develop and present proposed actions in response for implementation in the upcoming season. The Paragraph 4 review is completed by the Transboundary Panel with results and any associated recommendations presented to Commissioners at the Pacific Salmon Commission Annual in February 2021.

5) Assessment (Test) fisheries.

Pursuant to Paragraph 2, Chapter 1, of the Pacific Salmon Treaty, the Transboundary Panel may recommend implementation of assessment fisheries to facilitate determination of in-season abundance of a Transboundary salmon stock(s). Based on a proposal(s) from the Transboundary Technical Committee, the Transboundary Panel will consider a recommendation regarding implementation of a bilateral test fishery(s) for the coming season. A recommendation will be presented to Commissioners at the Pacific Salmon Commission Annual in February 2021.

<u>Obstacles to Completing above Bi-lateral Tasks</u>

1) ***Limitation's on conducting bilateral or unilateral field and stock assessment projects resulting from public health measures or operational constraints associated with COVID-19 measures.***

2) ***The Parties shall improve procedures for coordinated and cooperative management of the fisheries on transboundary river stocks.***

With the renewal of Chapter 1 effective 2019, the Transboundary Panel has initiated work through the Transboundary Technical Committee to advance development of an abundance-based management regime for Stikine River coho salmon. In order to achieve scientific relevance, several years of data collection and associated analysis will be required to identify either an interim or a biologically based spawning escapement goal. Exploratory assessment programs were implemented in 2019 with the intent to continue to refine and focus specific efforts in 2020. Technical challenges remain in determining viable abundance estimate programs that will provide reliable information on adult coho salmon returns to the Stikine River. The development of an abundance-based harvest sharing arrangement is contingent on establishing a method to estimate annual escapements and ultimately develop a spawning escapement goal. The Transboundary Panel will receive a presentation on the current status of the assessment program development which will identify progress and any anticipated challenges.

Similarly, the Panel has initiated work through the Transboundary Technical Committee on the Alsek River for Chinook and sockeye salmon. A preliminary analysis of the study site was conducted in August of 2020 and capital needs have been identified. Spawning escapement goals will need to be revised and a reliable and fiscally realistic inseason assessment program will need to be developed in the lower Alsek River. The Transboundary Panel will receive an update on the current status of the assessment program development which will identify progress and any anticipated challenges.

The Transboundary Panel will continue to explore enhancement program initiatives to achieve progress towards achieving bilateral sockeye salmon objectives (100,000 annually) in both the Taku and Stikine rivers. Identification of suitable enhancement project sites and achieving requisite (domestic) Canadian endorsements and approvals have hampered progress. Focused efforts are currently underway to advance Trapper Lake (Taku) and explore Mainstem (Stikine) enhancement project development in 2020.

Outline of Other Panel / Committee Tasks or Emerging Issues

In February 2017 the Northern Panel tasked a sub-committee of the Northern Boundary Technical Committee (northern coho sub-committee) to produce a report on the state of knowledge on the status of northern coho salmon stocks in advance of the 2020 season. As coho salmon originating from the Transboundary Rivers are a significant component of the northern coho salmon stock "aggregate", technical representatives from the Transboundary Technical committee have participated as members of the northern coho sub-committee to facilitate completion of the report.

Potential Issues for Commissioners, including enhancement activities reported under Article V

Securing required Canadian (domestic) endorsements and regulatory approvals have precluded achieving 100,000 enhanced sockeye salmon production objective in both the Taku and Stikine River systems. The Canadian Taku River fishery harvest share was reduced by 12% below the full allocation for the 2019 season (Chapter 1, section 3.(b),(I)) while the Canadian Stikine River fishery harvest share was reduced by 3% (Chapter 1, section 3.(a),(C),(vii)). Continued failure to achieve the 100,000 enhanced production objective will result in additional Canadian Stikine River fishery harvest share reductions beginning in the 2024 season and will limit the Canadian Taku River fishery harvest share to well below the harvest share allocation available at the 100,000 enhanced sockeye salmon production level. Recent declines observed in wild Stikine sockeye salmon egg to smolt rates (in Tahltan Lake) have constrained enhanced sockeye salmon egg takes / fry releases and will result in declines in resulting enhanced sockeye salmon production in future years.

Potential Issues for Committee on Scientific Cooperation

None

Proposed Meeting Dates and Draft Agendas

Transboundary Panel

1. Pacific Salmon Commission 2020 Post-Season Meeting (January 11 to 15, 2021)
   Location: Webinar
   Section Meetings: Monday January 11
   Bilateral Sessions: Tuesday January 12 to Thursday January 14 (TBC)
   Attendance: Full Panel membership and selected supporting Transboundary Technical and Enhancement Sub-Committee representatives via webinar (30 total)
   Draft Agenda:
   - Review 2020 U.S. and Canadian fisheries in the Taku, Stikine and Alsek rivers, terminal abundance and spawning escapements

- Summary of juvenile Chinook and coho salmon coded wire tagging on the completed on the Taku and Stikine rivers
- Salmon passage in 2020 past the Stikine (Tahltan) River landslide and update on passage remediation efforts
- Review Taku and Stikine River enhanced sockeye salmon production in 2020
- Review overage/underage fishery and escapement performance in 2020 (Ch. 1, Paragraph 4).
- Presentation of enhanced sockeye salmon fry out-plants in the Taku and Stikine rivers completed in 2020 (i.e. presentation of SEPP and TEPP results)
- Reporting on egg takes and enhancement activities that took place in 2020
- Update on status of Alsek River sockeye and Chinook salmon stock assessment program development
- Review of preliminary SEPP and TEPP programs proposed for 2021 – *To include new column on egg to adult survival ratios for individual programs*
- Initial presentation on Stikine River sockeye salmon biological escapement goal and assessment program review

2. Pacific Salmon Commission 2020 Annual Meeting (February 8 to 12, 2021)
   Location: Webinar
   Section Meetings: Monday, February 8
   Bilateral Sessions: Tuesday February 9 and Thursday February 11 (TBC)
   Attendance: Full Panel membership and selected supporting Transboundary Technical and Enhancement Sub-Committee representatives (30 total).
   Draft Agenda:
   - Presentation of bilateral 2021 Stikine, Taku and Alsek rivers salmon outlooks
   - Fishery management strategies and actions proposed for 2021 season
   - Development of bilateral recommendations for assessment fisheries in 2021
   - Final review of 2021 SEPP and TEPP and associated recommendations
   - Northern Endowment Fund – update on projects under consideration for funding in the Transboundary Rivers geographic area (2021)
   - Follow-up to questions and issues that arose from post-season meeting

Note – Transboundary Panel Co-Chairs report to Commissioners on Friday February 12

Transboundary Technical Committee and Enhancement Sub-Committee

1. Fall Post-Season (December 3-4, 2020)
   Location: Webinar
   Attendance: Full committee meeting with up to 13 USTTC and 13 CDNTTC in attendance
   Draft Agenda:
   - Finalize 2020 Preliminary post-season report including:
     - Review Canadian and U.S. Fisheries (catches, management actions, PST compliance): Stikine, Taku, Alsek rivers
     - Stock assessment projects: juvenile CWT, MR, Chinook, coho, and sockeye salmon radio-telemetry, Nahlin DIDSON, CPUE, aerial surveys, CWT recoveries, GSI baseline development/analysis, weir counts, assessment fisheries, wild/enhanced components, creel/catch sampling, spawning ground surveys

  - Escapements: Stikine: drainage-wide Chinook salmon and Tahltan Lake and mainstem sockeye salmon; Taku: drainage-wide Chinook, sockeye, and coho salmon; Alsek: drainage-wide and Klukshu River Chinook and sockeye salmon
- Taku and Stikine rivers 2021 Chinook salmon forecasts
- Tahltan River telemetry and landslide and remediation update
- Alsek River salmon assessment programs
- Stikine River coho salmon assessment development
- Taku River sockeye salmon stock assessment update and new escapement goal summary.
- Sockeye Enhancement projects and programs:
  - Review of 2020 activities (proposed/planned)
  - 2021 SEPP and TEPP development (draft)
  - Enhancement planning: 2020 egg-takes and out-plants (from 2019 egg takes).
- Review overage/underage fishery performance and escapement spreadsheet
- Review/finalize outstanding final catch and escapement reports
- Discuss Northern Endowment Fund projects in the Transboundary Rivers area
- Report publication schedule

2. Winter Preseason (late February/early March 2021)
   Location: Webinar
   Attendance: Full committee meeting with up to 13 USTTC and 13 CDNTTC in attendance
   Draft Agenda:
   - 2021 stock assessment program planning – Stikine, Taku, Alsek rivers
   - Run outlooks (Chinook, sockeye, and coho salmon) – Stikine, Taku, Alsek rivers
   - Preliminary fishery management plans 2021
   - Genetic baseline update and sampling plan 2021
   - Enhancement sub-committee sockeye salmon enhancement programs and projects (planning for 2021) including hatchery activities, egg-take targets, assessment studies, data summary updates and 2021 management plan

3. Spring Management (March 2021)
   Location: Webinar
   Attendance: Limited attendance
   Draft Agenda:
   - Transboundary Technical Committee Management Plan 2021
     - U.S. management plans and activities
     - Canadian management plans and activities
     - Joint activities
   - SEPP and TEPP
   - Follow-up and final publication.

Status of Reports

Transboundary:

- *"Final Estimates of Transboundary River Production, Harvest and Escapement and a Review of Joint Enhancement Activities in 2020"* – January 2021

- *"Salmon Management and Enhancement Plans for the Stikine, Taku, and Alsek Rivers, 2021"* – April 2021

PACIFIC SALMON COMMISSION
Transboundary Panel (Chapter 1) Implementation Update 2020-2021

Recognizing the potential for the COVID-19 pandemic to disrupt Pacific Salmon Treaty implementation activities, the Transboundary Panel Co-Chairs submit the following information to provide the Commission with an update on Chapter 1 implementation activities disrupted by operational restrictions related to the COVID-19 pandemic:

Implications for Annual Commitments

The Transboundary Panel and Technical Committee's do not any expect core functions (i.e., annual meetings, annual data reports and management plans) to be significantly impacted for the 2020-2021 cycle. Bilateral meetings will be virtual and country-specific meetings will be mostly virtual with some in-person meetings. Panel and Committee Co-Chairs are confident that virtual meeting formats will be sufficient to deliver information however fulsome discussions between the Parties may be challenging to administer, in particular in the event that complex or controversial matters emerge during the course of bilateral meetings. The other aspect that will be lost through virtual meeting administration will be the side bar discussions Panel and Technical committee members often have after or before bilateral sessions, which may create particular challenges for maintaining effective working relationships and orienting / introducing new members.

Core bilateral research and management programs were slightly delayed this season at startup or were terminated early; however, in all cases data in support of Chapter 1 obligations were gathered as necessary through adjustments made by both Parties. Adjustments to bilateral program delivery supporting Chapter 1 obligations may need to continue to be implemented in the short term in response to existing or emerging public health protocols and requirements, however given the essential nature of bilateral collaboration in field projects the Parties remain committed to continued cooperation to continue to achieve successful project outcomes in the long-term.

Implications for chapter implementation over the duration of the chapter

COVID-19 has impacted the ability of the Panel and Committee's to meet in-person and virtual meetings will be relied upon as a result. For the short-term this is not expected to reduce efficiencies; however, if this carried on for multiple years, it is anticipated this would have a negative effect on maintaining and building professional relationships among members as in-person meetings are often more in-depth, are more personal and help to establish positive and constructive working relationships.

Disruption of key activities identified in the Chapter 1 Implementation Plan resulting from COVID-19 restrictions was effectively mitigated through the Parties cooperative efforts implemented during the 2020 operational season. Notably, program adjustments were specifically implemented to successfully deliver: Coded Wire Tagging projects (Para. 3(a)(iii) and 3(b)(iii)), smolt and adult assessment programs (Para. 3(a)(i)(a&b), 3(b)(i) and 3(b)(ii)), and development of new assessment programs (Para. 2 and 3(c)). Overall the Parties continue to remain on track towards achieving the objectives and timelines identified in the Chapter 1 Implementation Plan.

Given the international nature of bilateral program delivery in the Transboundary Rivers, one area of uncertainty is posed by international travel restrictions. Although program delivery disruptions resulting from transit across the international border by program staff were effectively mitigated through active engagement with the Canadian Border Services Agency and U.S. Department of Homeland Security - Customs and Border Protection, some uncertainty remains around potential future restrictions (i.e. in 2021).

Mitigation plans if gaps exist (how you will catch up)

Delays in some projects and initiatives can be overcome through implementation of bilateral adjustments as it is early in the annex period. Prolonged or increasing disruption of bilateral activities resulting from COVID-19 may create specific challenges for certain project timelines, however specific implications will be contingent on future restrictions or limitations (which are yet unknown).

Reviewed implementation plan and timelines

The Transboundary Panel and Technical Committee Co-Chairs have reviewed activities, timelines and processes / outcomes specified within the Chapter 1 Implementation Plan and are confident that the Parties continue to remain on track towards achieving bilateral objectives. At this time no specific adjustments to the Implementation Plan are recommended.

Actions being taken to better enable work to be done for 2021

Planning for impacts of COVID-19 to field operations will begin earlier than occurred 2020 as the Parties have greater awareness of the situation and experience with potential operational considerations and implications. Experience gained in the 2020 season will be used as a foundation to evaluate how projects occurred and how the parties collaborated successfully to deliver projects. Detailed action plans were in place for all field operations covering various health and safety nuances associated with COVID-19 will be utilized again for the 2021 season. Proactively, the Parties plan to engage Canadian Border Services Agency and U.S. Department of Homeland Security - Customs and Border Protection to identify international travel requirements associated with Transboundary program delivery in 2021 at an early stage.

Impacts to models used to set fishery limits and evaluate fishery performance /compliance under the Treaty

None anticipated.

PACIFIC SALMON COMMISSION WORK PLAN
2020-2021

Panel / Committee:

Northern Panel (reporting to the Pacific Salmon Commission)
Northern Boundary Technical Committee (NBTC; reporting to the Northern Panel)

Date:

For review at the Executive Session of the Commissioners on October 19 to 23, 2020 (Webinar), with updates provided at the Executive Session and reporting presented at the Post-Season Meeting on January 11 to 15, 2021 (Webinar) and the Annual Meeting on February 8 to 12, 2021 (Webinar).

Update on Bi-lateral Tasks Assigned Under Current PSC Agreement:

1) *Review progress of Canada's comprehensive escapement goal analysis for Nass and Skeena river sockeye salmon.*

   Several tasks identified in the Chapter 2 Joint Implementation Workplan need to be reviewed, discussed, and agreed upon: bilateral NBTC and panel agreement on source data for escapement goal analyses (July 2020); CSAS review of escapement goal analyses (April 2021); and independent reviewer recommendations from CSAS and overall process (July to September, 2021).

2) *Review progress of U.S. District 104 pink salmon harvest pattern analysis.*

   The Chapter 2 Joint Implementation Workplan states that the U.S. should have the pink salmon harvest pattern analysis report completed and submitted to the independent contractors for review by July 2021. The draft report has been reviewed by both parties and is currently under review by the independent contractors.

Obstacles to Completing above Bi-lateral Tasks:

None.

Outline of Other Panel / Committee Tasks or Emerging Issues:

In February 2017 the Northern Panel tasked a sub-committee of the NBTC (Northern Coho Sub-Committee) to produce a report on the state of knowledge on the status of northern coho salmon stocks in advance of the 2020 season. A final report for this assignment was not available at the 2020 postseason meeting as planned; instead, a final report(s) will be presented at the 2021 postseason meeting. Because coho salmon originating from the Transboundary Rivers are a significant component of the northern coho salmon stock "aggregate", technical representatives from the Transboundary Technical committee have participated as members of the Northern Coho Sub-Committee to facilitate completion of the assignment.

Potential Issues for Commissioners, including enhancement activities reported under Article V:

None.

Potential Issues for Committee on Scientific Cooperation

None.

Proposed Meeting Dates and Draft Agendas:

Pacific Salmon Commission 2020 Post-Season Meeting (January 11 to 15, 2021)
Location: Webinar

Northern Panel
Section Meetings: Monday January 11 to noon Tuesday January 12
Bilateral Sessions: Noon Tuesday January 12 to Thursday January 14
Attendance: Full Panel membership and selected supporting NBTC representatives via webinar (~30 total).

Draft Agenda for bilateral sessions:

- Post season reports from both Canada and the U.S. regarding the 2020 salmon season
    - Review Northern Boundary Area fisheries for 2020 and compliance with provisions of the 2019 PST Agreement
    - Review and approve NBTC's update of the 2019 allowable and actual harvests of sockeye and pink salmon, as specified in Annex IV, Chapter 2
    - Review preliminary 2020 allowable and actual harvests of sockeye salmon and final 2020 allowable and actual harvests of pink salmon
- Review progress of Canada's comprehensive escapement goal analyses for Nass and Skeena river sockeye salmon
- Review progress of U.S. District 104 pink salmon harvest pattern analysis
- Presentation on final report(s) of the state of knowledge for northern coho salmon stocks

Northern Boundary Technical Committee

Meeting times: Monday January 11 to noon Tuesday January 12
Attendance: Full Northern Boundary Technical Committee membership via webinar

Draft Agenda for NBTC meeting:

- Complete the 2019 Boundary Area sockeye salmon and 2019 pink salmon run reconstructions, update the cumulative Annual Allowable Harvest sharing agreements, and submit to the Northern Panel for approval
- Present a preliminary 2020 Boundary Area sockeye salmon run reconstruction and final pink salmon run reconstruction.
- Review status of the sockeye run reconstruction model for providing a recommendation to the Northern Panel by January 2022 regarding the creation of a simpler run reconstruction model using genetic data

Pacific Salmon Commission 2020 Annual Meeting (February 8 to 12, 2021)
Location: Webinar

This meeting will occur only if needed as determined appropriate by the Panel in January at the post-season meeting.

Status of Technical or Annual Reports:

The Canadian section of the 2019 NBTC Annual Report is overdue but will be completed prior to the January session. A draft of the Alaska section of the NBTC Annual Report for 2020 fisheries is expected to be available for the January 2021 meeting.

Comments:

None.

PACIFIC SALMON COMMISSION
Northern Panel (Chapter 2) Implementation Update 2020-2021

Recognizing the potential for the COVID-19 pandemic to disrupt Pacific Salmon Treaty implementation activities, the Northern Panel Co-Chairs submit the following information to provide the Commission with an update on Chapter 2 implementation activities disrupted by operational restrictions related to the COVID-19 pandemic.

Implications for Annual Commitments

The Northern Panel and Northern Boundary Technical Committee do not any expect core functions (i.e., annual meetings, annual data reports and management plans) to be significantly impacted for the 2020-2021 cycle. Bilateral meetings will be virtual and country-specific meetings will be mostly virtual with some in-person meetings. Panel and Technical Committee Co-Chairs are confident that virtual meeting formats will be sufficient to deliver information; however, fulsome discussions between the Parties may be challenging to administer, in particular in the event that complex or controversial matters emerge during the course of bilateral meetings. The other aspect that will be lost through virtual meeting administration will be the side bar discussions Panel and Technical Committee members often have after or before bilateral sessions, which may create particular challenges for maintaining effective working relationships and orienting / introducing new members. The data to support Chapter 2 obligations were gathered in 2020 as necessary through adjustments made by both Parties.

Implications for chapter implementation over the duration of the chapter

COVID-19 has impacted the ability of the Panel and Technical Committee's to meet in-person and virtual meetings will be relied upon as a result. For the short-term this is not expected to reduce efficiencies; however, if this persisted for multiple years, it is anticipated this would have a negative effect on maintaining and building professional relationships among members as in-person meetings are often more in-depth, are more personal and help to establish positive and constructive working relationships.

Mitigation plans if gaps exist (how you will catch up)

Delays in some projects and initiatives can be overcome through implementation of bilateral adjustments as it is early in the annex period. Prolonged or increasing disruption of bilateral activities resulting from COVID-19 may create challenges for certain project timelines, however, specific implications will be contingent on future restrictions or limitations (which are yet unknown).

Reviewed implementation plan and timelines

The Northern Panel and Technical Committee Co-Chairs have reviewed activities, timelines and processes / outcomes specified within the Chapter 2 Implementation Plan and are confident that the Parties continue to remain on track towards achieving bilateral objectives. At this time no specific adjustments to the Implementation Plan are recommended.

Actions being taken to better enable work to be done for 2021

Experience gained in the 2020 season will be used as a foundation to evaluate how projects occurred and how the parties collaborated successfully to deliver projects. Detailed action plans were in place for all field operations covering various health and safety nuances associated with COVID-19 will be utilized again for the 2021 season.

Impacts to models used to set fishery limits and evaluate fishery performance /compliance under the Treaty

None anticipated.

PACIFIC SALMON COMMISSION

ESTABLISHED BY TREATY BETWEEN CANADA
AND THE UNITED STATES OF AMERICA
MARCH 18, 1985

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PACIFIC SALMON COMMISSION WORK PLAN 2020-2021

Panel / Committee: Fraser River Panel and Fraser River Panel Technical Committee

Date: Provided at PSC Executive Session via Teams on October 19-21, 2020.

Update on Bi-lateral Tasks Assigned Under Current PSC Agreement:

The Panel continued implementation of Chapter 4 of the Pacific Salmon Treaty for the 2020 Sockeye salmon season.

Obstacles to Completing above Bi-lateral Tasks:

There were no major obstacles to Panel implementation of the Fraser River Sockeye and Pink Salmon chapter (Chapter 4 of the Pacific Salmon Treaty) in 2020. A detailed report documenting COVID-19 impacts and the implications to implementation of Chapter 4 through 2028 was submitted to Commissioners October 1, 2020.

Outline of Other Panel / Committee Tasks or Emerging Issues:

1. In 2019 a report to the Commissioners for the October meeting was provided by members of the Fraser Strategic Review Committee (FSRC). The Commissioners accepted that Qualark was the preferred hyrdoacoustics site; however, three challenges needed to be overcome before a move to Qualark could occur: (1) In-season assessment of Fraser River Pink salmon escapement (2) Assessment of Sockeye populations spawning below Qualark and (3) mitigating the additional 2-3 day migration time for Sockeye to migrate past Qualark. The Commissioners asked that the challenges (technical concerns) and issues to address these concerns along with costs be presented at the January 2020 meeting. The memo was presented to Commissioners at the January meeting, but not all reviewers from Canada were able to review the document and thus was considered a draft pending final review from Canada. A final review from Canada is still pending. At the February 2020 meeting, the FSRC was dissolved.
2. Over the past year discussions have ensued between PSC Secretariat Staff, DFO and Sumas First Nation (FN) regarding the use of the transecting vessel at the Mission hydroacoustic site during FN fishery openings have occurred. A verbal agreement was reached prior to the start of the 2020 season whereby the PSC would not operate the transecting vessel during the opening hours of the fishery. This was also agreed to by the Fraser River Panel at the June pre-season meeting. However, further data analysis is required to better understand the impact on the data when the vessel is not operated during these fishery openings. Work will continue this fall and next spring and the results will be presented to the Panel before the start of the 2021 fishing season.
3. Outcomes and recommendations from the Test Fishery Review process will continue to be utilized by the Panel in making decisions on the annual test-fishing regime. In some cases, the Review recommendations resulted in the need for new research to inform their utility to the Panel decision process. Work in these areas will continue. As well, outcomes need to be considered in conjunction with

the hydro-acoustics review in providing recommendations for an overall Fraser Sockeye and Pink salmon assessment approach for the future.

Potential Issues for Commissioners:

1. One continuing issue for the Commissioners following the 2020 fishing season is the cost of Panel-related test fisheries and the use of revolving funds in 2021 and beyond to cover potential shortfalls. Returns of Fraser Sockeye were the lowest on record (run size = 293,000) in 2020. As a result, only Sockeye needed for biological sampling and those incidentally killed in gillnet test fisheries were retained in the test-fishing program. This resulted in a significant shortfall, requiring resources from the Test Fishery Revolving Fund (TFRF) to cover the costs for the 2020 test-fishing program. Following 2020, the TFRF balance has been reduced from $1,247,000 on 31 March 2020 to approximately $830,000 by March 2021 (projected).
   While a forecast for the 2021 Sockeye return year will not be available until February, the parent year Sockeye escapement in 2017 was low (940,000 Sockeye, 1.5 million less than the brood year escapement). This, in combination with the poor Sockeye return in 2019 and 2020, suggests that the 2021 returns will likely not be sufficient for the retention of payfish to cover the cost of the 2021 test fishery program. Pink salmon returns in 2021 are also uncertain but may provide some level of abundance that would permit retention of payfish. Assuming the test fishing program run in 2021 is similar to the one in 2019, the potential deficit could range from $500,000 (if returns are similar to 2017) to $829,000 (if returns are similar to 2019). If Sockeye and Pink salmon returns and test fishery catches are lower than in 2019, it is anticipated that the TFRF balance may be sufficient to cover the potential deficit for 2021. Given the very poor Sockeye returns in recent years, prospects for a decent return in 2022 are highly uncertain. Future contributions to the TFRF may need to be considered prior to the 2022 season. The Panel's test fishery review did not identify significant cost savings which would reduce the size of the potential deficit (or increase the size of the potential surplus) beyond the cost-reduction actions the Panel has taken in recent years.

2. The Big Bar rockslide continued to be an issue for the 2020 season despite mitigation efforts winter/spring of 2020. The mitigation efforts improved the natural salmon passage past the slide by increasing the discharge threshold above which salmon passage using the natural fishway is possible. Unfortunately, discharge levels rivaled historical maxima in the Fraser River watershed throughout July 2020, causing delays in the upstream migration, especially for the early timed Early Stuart and Early Summer runs. Some of the salmon that managed to reach Big Bar despite the high discharge levels were transported past the slide using the Whooshh system which also experienced difficulties due to the near record high discharge levels. Once discharge levels decreased in August, the majority of the Sockeye and Chinook salmon that made it to Big Bar were able to migrate past the slide using the natural fishway. The impact of both the natural fishway and the Whooshh system will be assessed further during the off-season to continue improving salmon passage for 2021 and beyond. In addition, other options to improve passage will be evaluated in the near future. Further work will also be required to provide in-season assessments of the impact of the Big Bar slide on the management adjustment (MA) estimates in time to guide fisheries management decisions, especially when thinking ahead towards the 2022 season.

Potential Issues for Committee on Scientific Cooperation

1. The work of the Committee on tracking environmental anomalies will be of great interest to the Fraser River Panel especially considering the poor Sockeye returns over the last few years.

2. The assessment of Fraser River Sockeye traditionally has relied on hydroacoustic estimates at Mission in combination with species composition estimates from in-river test fisheries. The low Sockeye abundances in recent years have increased the relative abundance of other comigrating species within the Fraser River, especially Chinook and this has required a greater focus on accurately estimating Chinook abundance in addition to Sockeye salmon, using a variety of different data sets and methods. This has resulted in a need for integrated data and information, not just for Fraser River Sockeye salmon but also for other co-migrating salmon species. The Fraser River Panel is probably not the only PSC panel wanting to combine information from various salmon species. The Committee on Scientific Cooperation could support this type of multispecies work by exploring how to make the data and information for integrated multispecies models more available and accessible across different Technical Committees and Panels.

Proposed Meeting Dates and Draft Agendas:

October 19-21, 2020 PSC Executive Session

Present the 2020-2021 Fraser Panel/Fraser River Panel Technical Committee Work Plan to the Commission.

Request an update on the development of a comprehensive test-fishing policy.

Special issues the Panel will address by the conclusion of the Annual meeting cycle include:

1. Review and provide a report to the Commission on the 2020 implementation of Chapter 4 of the Pacific Salmon Treaty.
2. Address management performance and accountability issues, including a review of "2020 Fraser Management Plan Principles and Constraints" and consistency in managing all fisheries to meet bilateral objectives.
3. Continue to review the technical information and modeling work being used as the basis for the Fraser Panel's Management Adjustments, as well as additional in-season information that has been used when applying Management Adjustments in-season, including information from the Big Bar landslide. Review the procedure for incorporating these adjustments into in-season management of Fraser Sockeye.
4. Compare in-season estimates of Sockeye run size by management group with observed spawning escapements, catches and any applied management adjustments, including a review of upstream migration timing, en route mortality and spawning success of late-run stock components. Where differences are observed, evaluate the potential causes of observed differences, including consideration of the potential contribution of fishery induced mortalities to any discrepancies. Compare the observed differences to the projected differences based on the Management Adjustments adopted by the Panel in-season.
5. The Panel will prepare recommendations on 2021 Fraser Sockeye and Pink salmon related proposals to the Southern Endowment Fund (SEF) Committee. The Panel developed a list of specific funding priorities, which was used in the SEF call for proposals, so that applications will be focused on work of the most value to the Panel.

6. Review issues concerning the management of Fraser Sockeye and Pink salmon, including escapement goal determination, documentation of escapement levels, and variations in marine area migration timing and diversion that result in stock and/or species overlap and management complications in Panel fishery harvest areas.
7. The Panel will continue discussions on methods for determining allowable impacts on non-targets stocks and species, and necessary conservation actions, in Panel Area fisheries.
8. The Panel will determine whether further revision of stock management group assignments for individual stocks is warranted following the changes made to the stock aggregations in 2012, and whether the stocks would be more appropriately managed as part of other stock management groups for 2021 and beyond.

January, 2021 PSC Post-Season Meeting

Each National Section shall conduct detailed reviews of the 2020 Fraser River Sockeye salmon return, fishery performance, special conservation actions and escapement levels and provide a summary of this information to the Commission.

February, 2021 PSC Annual Meeting

The Panel shall continue discussions of any unresolved special issues.

The Panel shall address "Other Activities" identified for the Panel in the 2020/2021 Work Plan.

The Panel will initiate the 2021 Pre-Season Planning process consistent with the provisions of the renewed Annex IV, Chapter 4 of the Pacific Salmon Treaty, and any guidance provided by the Commission. The Panel will require meetings in late-April or early May and June 2021 in addition to the PSC Annual Meetings to complete pre-season planning tasks.

Outline of Other Activities of the Fraser River Panel for the 2020/2021 Cycle

This list includes special items/topics of less time sensitive nature or one-time projects.

1. Continue development of an improved Fraser Sockeye and Pink salmon fishery planning model. The Panel will facilitate, monitor and provide guidance as necessary to the efforts of the PSC Staff and Fraser River Panel Technical Committee to complete the development of the new Fraser Fishery Pre-season Planning Model.

2. Continue work on Hydro-acoustics: The Panel will continue work on Hydro-acoustics as directed by the Commissioners; including the continuation of work to assess the accuracy of acoustic abundance estimates and how these estimates relate to spawning ground estimates.

3. Continue work to advance recommendations from the Test-Fishing review: The Panel will continue to implement test-fisheries in the most cost-effective manner possible, while obtaining information required to inform in-season run size decisions.

4. Evaluate Panel-Approved Test-Fisheries and potential use of data from other sources. The Panel will review the work done by various SEF projects in 2018, 2019 and 2020 that evaluated the usefulness of current as well as alternative data for in-season assessment and management. The Panel continued to identify this research as an SEF priority for 2021.

5. Review 2020 Test Fisheries and develop a Test Fishing Plan for the 2021 Season. The plan will incorporate any changes and recommendations from the Test Fishery Review and follow-up projects, and/or use of data from other sources that could improve in-season assessments. More discussion is required to address shortfalls from the 2019/2020 test fishery program and expectations for future years. This includes further discussion exploring if the Cottonwood test fishery could be moved or adjusted to increase catches, and if the Area 20 test fishery will require different net materials in the future.

6. Review progress in completing the Canadian Fraser River Sockeye Spawning Initiative and Recovery Potential Assessment: Further updates will be provided to the Panel in 2021.

7. PSC staff will provide a progress report on the sampling programs at Mission and Qualark, including any issues that arose from modifications made to the programs in 2020.

8. The Technical Committee will review data updates to the Fraser Sockeye catch and exploitation rate files, and make revisions as needed. Work will include advancement on the Run Size Adjustment process.

9. The Technical Committee will draft a memo on data sharing and co-ordination so that changes to production data can be tracked from various data sources.

10. Administrative Issues: Review and approve outstanding Panel minutes and Fraser River Panel Annual Reports.

11. Review the PSC proposed budget for 2021 Fraser River Panel Programs.

Status of Annual Reports:

Fraser River Annual Reports up to and including 2018 are complete and have been posted to the PSC website. The 2019 report has yet to be sent for review to the Parties; however, it is anticipated this will happen by the end of the year. The 2020 Annual Report will be sent to the Parties for review spring 2021.

Fraser River Panel Meeting Schedule[1,2]

December, 2020 – 4 days	Forecast meeting (& RSA?) Meeting	Virtual
January 11-15, 2021	PSC Post-Season Meeting	Virtual
February 8-12, 2021	PSC Annual Meeting	Virtual
March, 2021– 1 day	FRPTC Model Inputs	Virtual
April, 2021 – 2 days	Fraser River Panel Technical Committee	Victoria or Virtual
April, 2021 – 2 days	Fraser River Panel Pre-Season Planning	Victoria or Virtual
May, 2021 – 2 days	Technical Modeling Meeting (RSA?)	Vancouver
June, 2021 – 2 days	Fraser River Panel Technical Committee	Suquamish
June, 2021 – 2 days	Fraser River Panel Pre-Season Planning	Suquamish
July 6, 9, 13, 16	Fraser River Panel – In-Season Meeting	Calls
July 20, 23, 30	Fraser River Panel – In-Season Meeting	Calls
July 27, 2021	Fraser River Panel – In-Season Meeting	Richmond
August 6, 13, 20, 27, 31	Fraser River Panel – In-Season Meeting	Calls
August 3, 2021	Fraser River Panel – In-Season Meeting	Richmond
August 10, 2021	Fraser River Panel – In-Season Meeting	Richmond
August 17, 2021	Fraser River Panel – In-Season Meeting	Richmond
August 24, 2021	Fraser River Panel – In-Season Meeting	Richmond
September 3, 7, 10, 14	Fraser River Panel – In-Season Meeting	Calls
September 28-30, 2021	Fraser River Panel – Post-Season Meeting	?

1 – This schedule will be reviewed for opportunities to improve upon efficiency and reduce Panel costs.

2 – Both parties may choose to schedule pre-meeting caucuses virtually or in-person before Panel meetings

PACIFIC SALMON COMMISSION

ESTABLISHED BY TREATY BETWEEN CANADA
AND THE UNITED STATES OF AMERICA
MARCH 18, 1985

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Implications of COVID-19 on implementation of Chapter 4 (Fraser River sockeye and pink salmon)

The corona virus pandemic and related COVID-19 disease has prompted a number of local, provincial/state/tribal, and federal government restrictions on the movement of people and conduct of business. This document provides an overview impacts related to coronavirus (the virus) on the 2020 implementation of Chapter 4 and the anticipated implications for the remainder of the duration of the Chapter. Overall, the impact of the virus on implementation of Chapter 4 in 2020 has been limited and this is expected to remain the case for the duration of the chapter provided that local, provincial/state/tribal and federal government restrictions do not increase.

a) Impact of the virus and COVID-19 on the 2020 commitments
   - Since the start of the pandemic (March- September 2020), all Fraser River Panel meeting have been held virtually. The virtual meeting software, GoTo Meeting, however, had certain drawbacks and created unnecessary challenges that may be avoided when using a different virtual meeting software with more organizer control options, including a separate dial-in line for non-Panel and non-Technical Committee members, with different permissions when contributing to the meeting.
   - Preseason, all the necessary pre-season information has been available to the Fraser River Panel. In the case of the pre-season timing and diversion rate forecasts, the use of alternative models based on historical cycle line data was required, instead of the standard models, given the fact that the release of oceanic data supplied by NASA and NOAA had been delayed due to the virus.
   - In the spring of 2020, some DFO data collection programs were cancelled that will impact management seasons beyond 2020:
     - The 2020 Chilko & Cultus sockeye smolt enumeration program. In the past, Chilko smolt data have been essential to produce the Chilko run size forecast. The lack of 2020 Chilko data will impact the forecast for 2022. It was noted that the forecast based on smolt data, however, overestimated run sizes in recent years. For 2020, a spawner based forecast using the Larkin model was produced instead. In addition to providing data for the forecast, the Chilko smolt data is also used to generate historic time series of freshwater and marine survival. The lack of Chilko data for 2020 will result in a gap in the time series. Similar complications will arise from the lack of Cultus smolt data, but given the much lower Cultus abundances, the impact on the total Fraser River forecast or the forecast of the Late-run management group will be less pronounced.
     - Juvenile sockeye data collection at Mission and in the Strait of Georgia in 2020. The relative abundance of 2020 smolts is used in combination with in-season estimates of the Early Shuswap return in 2022 to predict the in-season run size of Late Shuswap salmon. Traditionally, a variety of different data sets is used to evaluate the relative abundance. In addition to juvenile data collected at Mission, the method has also relied

on juvenile data collected in the Strait of Georgia and Discovery Passage. Neither DFO program operated in 2020. A relatively small sample was collected from the Discovery Islands area by the Hakai Institute, but this collection was delayed compared to other years and may lack the earlier part of the juvenile outmigration.

- The 2020 Fraser River pink salmon fry enumeration program. The pink salmon fry data has been the main data set used to produce the pink salmon forecast. Given the lack of spawning ground enumeration data for pink salmon, the forecast for 2021 will need to rely on alternative naïve models based on past returns.

- Pre-season, PSC staff developed and outlined changes for the PSC in-season programs and provided a memo to the Fraser River Panel detailing these changes for each program (test fishing, hydroacoustics, sample shipments, genetic stock ID and scale reading, stock assessment). Detailed plans for each program are attached.
- In-season, all necessary information was available for the Fraser River Panel to make the necessary fisheries management decision(s). Below is a summary of the important impacts of the virus on the in-season assessment programs.
    - All Fraser River Panel approved test fisheries were run in 2020.
    - All hydroacoustic systems at Mission were operational in 2020. In-season challenges were caused by high discharge levels, not due to the virus.
    - DNA samples were analyzed as normal at the Pacific Biological Station in Nanaimo.
    - Scale samples were analyzed as normal by PSC Staff
    - Shipping services in the summer of 2020 remained reduced compared to normal and the transport of scale samples had been impacted. Reduced shipping services required timelines to be adjusted, causing Areas 20 and Whonnock genetic stock identification data to be one day less up to date than in other years. Interim results for the missing day of data were provided using scale pattern analyses or through model projections.
- In-season, the traditional in-person panel meetings were replaced by virtual meetings. Fraser River Panel members noted the challenges associated with a lack of in person communication. The consequences of a lack of in-person communication might have been much more pronounced during a season where more challenging fisheries management decisions had to have been made.
- Post-season, spawning ground enumerations programs have not been impacted by the virus and have proceeded as planned.

b) Impact of the virus on future commitments over the duration of the chapter
    - Meeting and personnel issues:
        - Fraser River Panel meetings will continue to take place online given the travel restrictions that are still in place, but this is not expected to impact chapter implementation.
        - The lack of in-person communication in-season will continue to be a challenge in future years, especially during seasons with fishing opportunities.
        - If WDFW continues to have furlough days in the future due to the virus, alternative arrangements may be needed for these staff to attend in-season meetings.
    - Data collection and assessment programs:
        - Following the experience gained since the start of the pandemic, data collection programs both on juveniles as well as returning adults and spawners, are likely to move

forward in future years. However, some local government jurisdictions may reduce access due to the virus so some of the programs associated with local communities may not operate.

- It is unknown at this time if release of oceanic data supplied by NASA and NOAA will continue to be delayed due to the virus, which would impede the use of environmental data to forecast timing and diversion rates for Fraser sockeye and pink salmon and result in the use of historical data instead.
- DNA sample sizes were smaller than normal in 2020 but assuming normal sample sizes in future years, there may be delays in the processing of DNA samples at the Pacific Biological Station.
- Alternative arrangements for shipping samples from the US to Canada may need to be considered prior to the 2021 season given the current travel restrictions.

PACIFIC SALMON COMMISSION
SELECTIVE FISHERY EVALUATION COMMITTEE WORK PLAN
October 2020 – September 2021

Panel / Committee:
Selective Fishery Evaluation Committee (SFEC).
SFEC Reports to the PSC Commissioners.

Date:
October 19-23, 2020 (Executive Session)

Update on Bi-lateral Tasks:

The PSC established the SFEC to assess impacts of mass marking and mark-selective fisheries on the viability of the coded wire tag (CWT) system. The SFEC has three components: (1) an Oversight Committee, comprised principally of the Co-Chairs of the PSC SFEC, Coho, Chinook, and Data Sharing Committees; (2) an Analytical Work Group (SFEC AWG), which is responsible for developing methods and conducting analyses of impacts of mass marking and mark-selective fisheries on the viability of the CWT program; and (3) a Regional Coordination Work Group (SFEC RCWG) which coordinates information sharing on mass marking and regional sampling programs, including electronic tag detection

A. SFEC assignments for 2019 - 2020

Annual Tasks

1. Review of mark-selective fisheries (MSF) proposed for 2020 – *Completed.*
2. Review of proposed mass marking (MM) activities for 2020 – *Completed.*
3. Compile annual report summarizing review of MSF and MM proposals for 2020 – *Expected completion in Fall 2020; Review of Mass Marking and Mark-Selective Fishery Activities Proposed to Occur in 2020.*
4. Request finalized MSF plans and early notice of future MSF and MM plans from agencies in May – *Memo will be attached to the 2021 request for proposals.*

A letter to agencies requesting the completion of proposal templates for MM and MSF activities planned for 2021, an update of the finalized fisheries that occurred in 2020, and early notice of future MSF and MM plans from agencies will be distributed in October by the PSC Secretariat. Agencies have been requested to submit proposals to the PSC Secretariat by November 1. The letter also reminds agencies that post-season reports of MSFs are required as part of the MOU.

Other Tasks 2020

1. Coho Double Index Tag (DIT) Report (Brood Years 1998-2011) – Final draft *spring/summer 2020. In review by committee. All edits due by October, 16, 2020.*.
2. Provide support to other PSC Technical Committees for estimating impacts of MSFs on naturally spawning Chinook and Coho stocks. – *Joint SFEC/Chinook*

Technical Committee(CTC)/Calendar Year Exploitation Rate (CYER) workgroup meeting October, 2020.

B. SFEC Tasks for 2020 - 2021

Annual Tasks

1. Review of mark-selective fisheries and mass marking activities proposed for 2021 – *November 16-19, 2020.*
2. Compile annual report summarizing review of MSF and MM proposals for 2020 – *Draft November 16-19, 2020; final early 2021.*

Other Tasks 2020 – 2021

1. Discuss and outline next steps for working with Technical Committees (CTC, CoTC, and CYER workgroup) on assessing impacts on naturally spawning Chinook and Coho stocks – *During annual meeting November 2020 and conference call in December.*
2. Provide support to other PSC Technical Committees for estimating impacts of MSFs on naturally spawning Chinook and Coho stocks. –
    a. Webinars with the CYER workgroup – *December 2020, January 2021.*
    b. *Joint SFEC AWG/CTC/CYER meeting to be conducted May and October 2021.*
    c. *Joint SFEC AWG/CoTC: SFEC presents DIT report to CoTC by webinar – December 2020.*
    d. *Joint SFEC AWG/CoTC virtual meeting to prepare DIT report presentation to Southern Panel – Spring 2021*

<u>Obstacles to Completing above Bi-lateral Tasks:</u>

Post-Season Reports: Two post-season reports on MSFs are required for each MSF prosecuted to provide data needed by the Chinook (CTC) and Coho (CoTC) Technical Committees for implementation of PSC fishing regimes and for analysis of MSF impacts. The first report is to be submitted by the agencies prior to the PSC annual post-season meeting following the year in which the fishery was conducted. The SFEC continues to recommend that these tables with post-season information be included in the annual post-season reports submitted to the PSC by the US and Canada for the post-season meeting in January to simplify MSF reporting by agencies.

The timeliness and consistency of agencies in providing first post-season reports for MSFs still needs to be improved. SFEC members have worked with agency staff through

personal contact to obtain some of the requested data, but detailed stock-age-fishery impacts of MSFs on unmarked fish have not been forthcoming.

The second MSF report is to be provided by agencies prosecuting MSFs not later than November 30th following the year in which the MSF fishery occurred. This report is to provide stock-age-fishery estimates of mortalities of unmarked fish in MSFs. These reports are available in an online reporting system for Puget Sound Chinook salmon MSFs, but SFEC has not received any of the second type of MSF reports for other MSFs. Availability of the information requested in the post-season reports would facilitate SFEC and other technical committees to estimate impacts of MSFs on naturally spawning Chinook and Coho stocks as required in the 2019 PST agreement.

Inability to estimate impacts of mixed-bag fisheries: Proposals for Chinook and Coho MSFs from all agencies include various forms of mixed-bag regulations (e.g., daily bag of 2 Coho, 1 of which can be unmarked), with varying degrees of complexity; further, the incidence of mixed-bag regulations is increasing. Because of the on-going variation of regulations employed for MSFs, the SFEC is unable to develop standardized methods for estimation of mortalities of unmarked fish. Additionally, catch sampling programs and analytical methods are generally inadequate to estimate impacts on marked and unmarked fish under these varying mixed-bag regulations. A description of the estimation methods being employed or planned to estimate MSF impacts in mixed-bag fisheries will be requested from agencies submitting MSF proposals such regulations in 2019 proposals. Without these improvements, the increasing incidence of mixed-bag fisheries will continue to reduce the accuracy of estimates of MSF impacts on unmarked fish.

COVID19 impacts: The COVID-19 pandemic has prevented the SFEC from convening in-person meetings of the committee, its work groups, and joint meetings with other technical committees. The proposed schedule below reflects our intent to perform as much of the MM and MSF review, analyses, and report development, and work with other technical committees as possible via independent evaluation, emails, and webinars. We do not anticipate meeting in person until late 2021.

Outline of Other Panel / Committee Tasks or Emerging Issues:

The CTC has been incorporating estimates of fishery impacts on some unmarked naturally spawning stocks in its annual Model Calibration and CWT Exploitation Rate reports. The methods need to be expanded to all exploitation rate indicator stocks by 2021. Review of recoveries of Chinook DIT releases in non-selective (NSF) and mark-selective fisheries and escapements, and their utility for estimation of impacts on unmarked fish in MSFs, is in progress by the SFEC-AWG and CTC-AWG. This work is of high priority.

The SFEC has begun work with the CTC and will begin working with the Calendar Year Exploitation Rate (CYER) Workgroup to incorporate MSF algorithms in the annual exploitation rate analysis (ERA), the PSC Chinook Model, and the annual Coastwide Chinook Model calibration. The SFEC can best aid in this process by providing information on the time, area, and associated regulations of MSFs that have occurred so that CWT recoveries can be properly identified to NSF or MSF. Specification of the

regulations associated with a particular MSF will guide the choice of appropriate algorithm to assess the MSF impacts to a stock. Currently this information is not readily accessible for incorporation into the CTC's exploitation rate analysis.

A meeting between SFEC-AWG and CoTC will be required to discuss the Coho DIT report results. CWT-based CoTC post-season cohort reconstruction methods for direct estimation of MSF impacts are not feasible given the reduction of DIT programs. Due to a combination of factors, including reduced survival, reduced tagging, and reduced exploitation, tag recovery is inadequate for most, if not all, of our Coho stocks to utilize methods developed by the CoTC to estimate production expansion factors and exploitation rates. Therefore, CoTC relies on assumption-based methods, such as Backwards Coho FRAM to estimate post-season MSF and NSF exploitation rates and total mortalities of unmarked and marked fish.

Potential Issues for Commissioners:

Timely and accurate information via post-season reports on prosecuted MSFs is needed by the SFEC to assess the impacts of MM and MSFs on the CWT system. Little can be done without the post-season information from MSFs, but to-date, workload and other agency issues have resulted in few submissions. As noted above, post-season reports providing estimates of stock-age-fishery mortalities of unmarked fish have not been submitted to SFEC for all MSFs. This does not mean that the data are unavailable. It will, however, require some effort to compile the information to aid the other technical committees, e.g., the CTC, in estimating MSF impacts. WDFW and NWIFC have developed a prototype reporting system that could expedite reporting of data from these agencies.

Further joint SFEC-CTC-CYER meetings will be needed to develop algorithms and methods to incorporate the capacity to evaluate MSFs in the PSC Chinook Model. MSFs have been implemented at a spatial and temporal scale that is much finer that that employed in the CTC Model.

Several agencies have dropped or are dropping DIT releases and are not recovering CWTs from unmarked DIT fish due to budget constraints. DIT groups require the release of paired groups of tagged fish (marked and unmarked) and the use of electronic tag detection in recovering unmarked DIT fish from fisheries and escapements. An additional complicating factor is the reporting of DIT recoveries in sub-sampled escapements without information required for expansion. DITs have two uses in evaluation of MSFs and estimation of their impacts. First, DITs with a marked and unmarked tag group provide the ability to quantify differences in mortalities between marked and unmarked fish as a result of MSFs for indicator stocks. Reduced mortality on unmarked stocks is a primary goal of MSFs according to the PST (e.g., Chapter 3, paragraph 5(a)). The second use of DITs is to provide information to help bound estimates of stock-age-fishery mortalities of unmarked fish, required to maintain the viability of the coastwide CWT program.

SFEC is concerned that the Canadian catch sampling and reporting system is not fully aligned with the complexity of MSF regulations. Absent alignment, it is difficult to evaluate MSF impacts and comparing recoveries of DIT groups is not possible.

Potential Issues for Committee on Scientific Cooperation

None identified.

Proposed SFEC Meeting Dates and Draft Agendas:

When	Who	Location	Purpose/ Draft Agenda items
October 5-9, 2020	Joint CTC-AWG, SFEC – AWG, and CYER	Webinar	Get update from CYER workgroup on work pertaining to incorporating MSF impacts to the annual Chinook exploitation rate analysis. Continue to work with CTC AWG to incorporate MSF data into CTC databases, exploitation rate analyses, and the Chinook Model.
November 16 - 19, 2020	SFEC RCWG, AWG	Webinar	Review annual proposals for MM and MSFs submitted by agencies. Request clarifications from agencies as needed. Prepare summary report for PSC Commissioners. Review and revise format and content of post-season MSF reports, as necessary. Review COVID-19 impacts to planned 2021 marking and tagging activities.
Dec 15, 17, 2020	SFEC – AWG and CYER workgroup	Webinar	Review progress on implementing MSF estimation methods to indicator stocks. Review information collected regarding current tagging, marking, and fishery sampling programs.
Jan. 11 - 15, 2021 (PSC Annual Post-season Meeting)	SFEC	Webinar (Tentative)	Webinar as schedules allow to finalize annual report or receive feedback on Coho DIT report.
January 19, 2021	SFEC-AWG and CYER	Webinar	Review progress on implementing MSF estimation methods to indicator stocks. Review preliminary recommendations regarding modifications to current tagging, marking, and fishery sampling programs.

Feb. 8-12, 2021 (PSC Annual Meeting)	SFEC Co-chairs	Portland, OR (Webinar)	SFEC Co-chairs report to PSC and identify any issues or concerns regarding agency proposals for 2021 MM and MSF, and status of post-season reporting.
Spring/ Summer 2021	SFEC AWG	TBD	Meet with CoTC to discuss Coho DIT report and incorporation of MSF impacts to CoTC analyses. Meeting dates to be established after review of Coho DIT report which is in final draft form.
May 17-21, 2021	SFEC-AWG, CTC AWG, and CYER	Olympia, WA	Work with CTC AWG to incorporate MSF data into CTC databases, exploitation rate analyses, and the Chinook Model.
October 4-8, 2021 (Tentative)	SFEC-AWG, CTC AWG, and CYER	Seattle, WA	Continue to work with CTC AWG to incorporate MSF data into CTC databases, exploitation rate analyses, and the Chinook Model.

Status of Reports:

Technical or Annual Reports. The report reviewing MM and MSF proposals for 2020 was delayed owing to COVID-19 work interruptions. The final draft of the report is in preparation, with publication expected by mid-October. SFEC members received a final draft of the Coho DIT report (brood years 1998-2011), and final edits are due from all members by mid-October, with expected publication in November.

Comments:

Include any additional comments not included above that you think that would be useful to the Commissioners.

PACIFIC SALMON COMMISSION WORK PLAN
2020-2021

Panel / Committee:

Joint Technical Committee on Data Sharing (TCDS) and its subcommittee Data Standards Work Group (DSWG).

The Joint Technical Committee on Data Sharing functions as a steering committee for Coded Wire Tag (CWT) data sharing issues and liaises with the Chinook Technical Committee (CTC), Selective Fishery Evaluation Committee (SFEC), and Coho Technical Committee (CoTC) to improve CWT data to better support their analytical work to meet Treaty obligations. This Committee defines requirements needed for bi-lateral CWT data exchange and additional verification rules that would improve the integrity of the data.

The Data Standards Working Group (DSWG) sub-committee reviews requirements established by the TCDS, makes recommendations on how to implement them, and does the work of modifying the bi-lateral data exchange standards and verification process.

Data Sharing reports directly to the Commissioners.

Date:

This work plan will be presented to the commission during the 2020 Fall Session October 19-23, 2020 over Webinar.

Update on Bi-lateral Tasks Assigned Under Current PSC Agreement:

There were no specific bi-lateral tasks for this committee under the 1999 or 2008 PSC agreement other than the general agreement as described in the 1985 Memorandum of Understanding to maintain and make improvements to the CWT system. Since 1985, TCDS and DSWG have been maintaining and updating the CWT data exchange standards and verification process.

Following the work of the CWT Expert Panel, the CWT Workgroup and the CWT Improvement Team, we understand that the Commissioners want the TCDS to continue in the role of examining issues pertaining to CWT data. The new data specification standards that the committee may complete in 2020/21 will support analytical work of the joint committees and improve confidence levels, quality and accuracy of the data.

The onset of COVID-19 and the resulting disruptions have made it difficult to make progress on the TCDS work tasks. Other technical committees and their associated members have prioritized responding to impacts result from COVID-19 health measures, with the TCDS task being a lower priority. However, with the coming year, Data Sharing Technical Committee will work to formalize feedback from other

technical committees and approve changes for an improved CWT data exchange specifications.

Obstacles to Completing above Bi-lateral Tasks:

1) Data Sharing Committee Membership

   Participation at meetings and progress on addressing data sharing issues may be a low priority for members with other competing PSC Committee activities or the PST negotiations workload.

   Limited work has been accomplished by the Data Sharing Committee, with preliminary work on engaging other PSC technical committees during the past year (2019 / 2020). Further work on engaging other technical committees is needed to ensure that the CWT data exchange specification is meeting their needs and that proposed changes align with their analytical methods.

Outline of Other Panel / Committee Tasks or Emerging Issues:

None

Potential Issues for Commissioners, including enhancement activities reported under Article V:

None

Potential Issues for Committee on Scientific Cooperation

None

Proposed Meeting Dates and Draft Agendas:

When	Who	Location	Purpose
Jan 11-15, 2021	TCDS Co-Chair(s) @ CTC-AWG	Webinar	Present a summary of proposed CWT data exchange specifications and solicit input.
May 4th, 2021	TCDS	Webinar	Review DSWG recommendations and timelines for implementation of updates to CWT data exchange specifications.
June 8 & 9, 2021	TCDS	Webinar	Review and approve DSWG recommendations and timelines for implementation of updates to CWT data exchange specifications. An in-person meeting will occur only if there are significant issues to resolve that cannot be effectively addressed by the January 2020 conference call.
Aug 24 & 25, 2021	DSWG	Webinar	Finalize documentation of updates to CWT data exchange specifications. Review new proposals for

When	Who	Location	Purpose
			changes/improvements for data exchange.
Sept 14 & 15, 2021	TCDS	Webinar	Complete CWT data sharing report containing new data exchange specifications. Review new requirements for changes/improvements for data exchange.

Status of Technical or Annual Reports:

DSWG has developed a standard formal process for documentation and review of proposals for change. By Sept 2021, TCDS will complete a report containing updated data exchange standards and an implementation plan for improvements to CWT data sharing.

Comments:

No additional comments.

PACIFIC SALMON COMMISSION ROSTER

Slate of Officers
November 13, 2020
Highlighted = FY 2020 / 2021 updates

OFFICE	COUNTRY	REPRESENTATIVE
Commission Chair	Can	Rebecca Reid
Commission Vice-Chair	U.S.	Doug Vincent-Lang
Fraser River Panel Chair	Can	Jennifer Nener
Fraser River Panel Vice-Chair	U.S.	Lorraine Loomis
Northern Panel Chair	Can	Sandra Davies
Northern Panel Vice-Chair	U.S.	Lowell Fair
Southern Panel Chair	Can	Laura Brown
Southern Panel Vice-Chair	U.S.	Laurie Peterson
Transboundary Panel Chair	Can	Steve Gotch
Transboundary Panel Vice-Chair	U.S.	Troy Thynes
Stan. Comm. on F&A - Chair	Can	Andrew Thomson
Stan. Comm. on F&A - Vice-Chair	U.S.	Ron Allen
Stan. Comm. on Scientific Cooperation - Chair	Can.	Carmel Lowe
Stan. Comm. on Scientific Cooperation - Vice-Chair	U.S.	Scott McPherson
Technical Committee on Data Sharing - Co-Chair	Can	Nicholas Komick
Technical Committee on Data Sharing - Co-Chair	U.S.	George Nandor
Fraser River Panel Technical Committee - Co-Chair	Can	Jamie Scroggie
Fraser River Panel Technical Committee - Co-Chair	U.S.	Gordon Rose
Northern Boundary Technical Committee - Co-Chair	Can	Steve Cox-Rogers
Northern Boundary Technical Committee - Co-Chair	U.S.	Bo Meredith
Transboundary Technical Committee - Co-Chair	Can	Bill Waugh
Transboundary Technical Committee - Co-Chair	U.S.	Edgar Jones
Enhancement Subcommittee of the Transboundary Technical Committee - Co-Chair	Can	Corino Salomi
Enhancement Subcommittee of the Transboundary Technical Committee - Co-Chair	U.S.	Garold Pryor
Joint Chinook Interface Group Co-Chair	Can.	Andrew Thomson
Joint Chinook Interface Group Co-Chair	U.S.	Phil Anderson
Joint Technical Committee on Chinook - Co-Chair	Can	Antonio Velez-Espino
Joint Technical Committee on Chinook - Co-Chair	U.S.	John Carlile
Joint Technical Committee on Coho - Co-Chair	Can	John Holmes
Joint Technical Committee on Coho - Co-Chair	U.S.	Gary Morishima
Joint Technical Committee on Chum - Co-Chair	Can	Pieter van Will
Joint Technical Committee on Chum - Co-Chair	U.S.	Bill Patton
Selective Fishery Evaluation Committee - Co-Chair	Can	Rob Houtman
Selective Fishery Evaluation Committee - Co-Chair	U.S.	Kristen Ryding