



South Coast Salmon Bulletin #15 8 Decemeber, 2017 Escapement Update All salmon species - Strait of Georgia Stock Assessment

SUMMARY: This bulletin details the current in-season escapement information for major river systems in the Strait of Georgia (SG) for migrating salmon species available up to the bulletin release date. Estimates reported here are preliminary and should be interpreted with caution. Finalized estimates will be made available in the months following the escapement season.

Environmental Conditions: Lack of rain over the last week has resulted in lower river levels. With little rain in the forecast we can expect water level to drop further, however most enumeration projects have concluded for the year.

Operations: The major hatcheries, First Nations and Stock Assessment staff in SG area have conducted selected enumerations beginning as early as June (Sakinaw sockeye, summer chinook and pink runs) and counts will continue into the New Year for later coho spawners. Pink enumerations have begun on some rivers and 3 flight counts have been conducted in Jervis Inlet/Narrows Inlets. Many hatcheries and other community groups will be operating fences or conducting walks for escapement enumeration, assisting in loading spawning channels and broodstock collections.

2017 PRE-SEASON EXPECTATIONS:

Chinook: There are no formal forecasts for Chinook returns to the Strait of Georgia and are overall expected to be variable in abundance and low to near target. Expectations to the Cowichan River are for continued rebuilding and may reach the target escapement for the system (6,500 naturally spawning adults).

Coho: Coho are expected to remain in a low productivity period throughout Southern BC. Marine survivals are forecast remain similar to 2016 levels for both wild and hatchery indicators.

Pink: No formal forecast of pink populations in the Strait of Georgia.

Chum: Chum returns in 2017 are expected to be above target for southeast Vancouver Island, but below target for mid- Vancouver Island systems and Jervis Inlet: Mid-Vancouver Island Chum expected range from 154,880 to 232,300, which includes the combination of Puntledge (escapement target 60,000), Qualicum (85,000) and Little Qualicum (85,000); Nanaimo expectation range 77,200-115,800 (40,000), Cowichan 140,200-210,200 (160,000), Goldstream 26,700-40,200 (15,000) and Jervis Inlet 57,000-85,400 (110,000). These expectations for chum are highly uncertain.

Sockeye: Sockeye returns to Sakinaw were forecast at 49 adults (with a range from 8 to 130 for poor to excellent Marine Survival).

2017 OBSERVATIONS TO DATE:

Chinook: Two summer Chinook swims were conducted in the Chemainus River in June and July, and Nanaimo hatchery staff have conducted spot checks on the Nanaimo summer chinook population reporting a peak count of 960. Puntledge River summer Chinook estimate includes brood holding (379) and transfers into Comox Lake (261). Fall Chinook have been observed in the Englishman, Little Qualicum, Nanaimo River swims. The Puntledge River fall Chinook count is at 12,602. In the Qualicum River, 9,829 have been counted to date. The Cowichan fence has ~20,0000 counted to date, this estimate is preliminary and data

review is ongoing. Spawning for fall Chinook has concluded. Peak counts for most systems are above the 4 & 12 year averages.

Coho: Coho have been observed in: Puntledge (2,800), Qualicum (8,457), Little Qualicum (368), Englishman (1,727), Theodosia (469), Nanaimo River (600), Cowichan (1221), Colquitz (314), Millstream (36) and several other smaller creeks. Most enumeration projects are ending for the year.

Chum: Chum continue to enter streams this week and are still below average in most rivers. Survey crews have reported chum in Theodosia River (2,359), Puntledge (40,263) Qualicum (21,963), Little Qualicum (6,402), Sliammon (5,053), Nanaimo (82,918), Cowichan (187,000), Goldstream (6,380), Sooke River (17,354), and several other smaller streams. Spawning is concluding for chum on most systems, and most enumeration projects are ending for the year.

Pink: Pinks in all systems have spawned, and have died off. Enumerations so far include Englishman, Qualicum, Little Qualicum, Puntledge, Tsolum, Sliammon, Nanaimo, Chapman, Theodosia River, and the 5 rivers in Jervis Inlet and Narrows Inlet (Aerial surveys). Peak estimates were below average in most rivers surveyed.

Sockeye: Sakinaw sockeye escapement to Sakinaw Lake have been monitored since June. A total of 12 adults have entered the lake so far (6 males and 6 females). The system was removed on September 14th. Survey crews have observed sockeye in Qualicum (3), Englishman (1), and Nanaimo (1)

ESCAPEMENT MONITORING METHODS:

There are records of spawning salmon populations in over 165 streams or rivers across the East Coast of Vancouver Island and Mainland Inlets (DFO Statistical Areas 14 to 20, roughly Sooke to Comox and the Sunshine Coast). Indicator stocks are used to monitor the status of populations across the area. Many groups participate in the annual Strait of Georgia escapement survey, including First Nations, DFO-contracted survey crews, Hatchery Staff (SEP), University students and local stewardship groups.

Where escapement counts or surveys are conducted, the estimates are classed to one of three categories:

1. True Abundance – Indicator Systems and Fixed Site Monitoring

Full quantitative escapement assessments of indicator streams or other complete escapement counts are classified as True Abundance; fish are counted as they move upstream past a fixed location. The type of count for these systems is cumulative. The number reported in the tables below is the total number of fish that have migrated past the fixed point enumeration site as of the count date. These are generally assessed through counting operations at fishways or fences, using video recordings or sonar counting systems (e.g. DIDSON), although mark-recapture is an alternative method as well as trap and truck (e.g. Shawnigan coho). Some indicator stocks are marked (e.g. using coded-wire tags or thermally-marked otoliths) and recovery of marks in fisheries and escapement allows survival, distribution, and exploitation rate parameters to be estimated.

Estimate Classifications: Type-1, True, high resolution; Type 2, True, medium resolution

Planned Data Quality: Level 1 (High Quality)

True abundance estimates for Cowichan Chinook, Cowichan and Nanaimo Chum, Shawnigan Coho, and others when available are reported, as cumulative escapement to date, in these bulletins.

2. Relative Abundance – Intensive Monitoring

Estimates for many systems that are monitored for escapement are classified as relative abundance estimates, where there is a partial quantitative escapement assessment conducted. The type of these

survey assessments are periodic and include swim surveys, helicopter counts, bank or stream walks, tagging and index surveys. Methods are generally consistent from year to year, so relative change can be monitored. Area Under the Curve (AUC) estimates are calculated when the system was surveyed with good coverage of the population on a regular basis (from 4 to 10 surveys over the spawning season, covering the start, peak and end of the run) and Peak Live plus Dead (PL+D) estimates are used when the surveys are too far apart (longer than the expected survey life of the species for that system), or there are too few surveys to calculate an AUC.

Estimate Classifications: Type-3, Relative, high resolution; Type-4, Relative, medium resolution; Type-5, Relative, low resolution

Planned Data Quality: Level 2 (Medium or Mixed Quality) or Level 3 (Low Quality). Quality depends on the level of effort and timing relative to run timing of the species of interest.

All relative abundance systems are recorded here as the PL+D estimate up to and including the most recent survey (e.g. in-season data). The PL+D counts are only a minimum index of abundance as the final escapement estimates may be corrected for observer efficiency and estimated "survey life" of spawners (via AUC analyses).

Relative abundance estimates in hatchery systems are often monitored more closely than other systems, and may include a mixed survey type (e.g. True Abundance fence counts mixed with estimates for below fence via swim surveys). Salmon returns to Puntledge, Qualicum, and Little Qualicum and many others are in this category.

3. Presence/Absence

This category defines the estimate when only a partial count was available, and/or the count was not representative of the entire population or habitat. These are labelled as adults present, when 1 or more adults were observed, or none observed, when no fish were observed during a survey. These systems are not detailed in this bulletin. Estimate Classification: Type-6, Presence or Absence; Data Quality: Level 3

RESULTS:

In-season assessment results for hatchery and non-hatchery systems are reported in Tables 1 to 5, for Chinook, Coho, Chum, Sockeye, Pink and respectively. These tables include the type of survey, the group doing the surveys, total or peak count to date, date of last survey, and average escapement information. Four and 12 year average historic escapements, corresponding to roughly one and three generations for most species, are also included in these tables where they are available, and include adults only. Averages are total return to river, which includes total natural spawners, broodstock, and other river removals (e.g. ESSR, in-river fishing). Four year averages include years where surveys were conducted from 2013-2016. Twelve year averages include years where surveys were conducted from 2005-2016. Table 6 includes a list of the full names of enumeration participant groups.

Comparisons between current totals and average historical estimates should be interpreted with caution, especially before the runs are over. Also some counts are minimal counts due to weather and limited surveys during the peak of the run. Chinook escapement estimates are normally completed by November, Coho escapement estimates will be complete in the New Year, chum escapement estimates are normally completed by December, but final escapement totals will be calculated in the New Year.

The data presented here are preliminary in-season estimates and will be reviewed and finalized following the escapement season.

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Table 1: **Chinook** escapement counts to date for 2017 Strait of Georgia salmon surveys. Estimates include combined adults and jacks, as well as brood removals, where available a breakdown is provided below the table. Averages include total return to river.

Area	System	Survey Type/Count Type	Enumeration conducted by	Date of last count	Number of surveys	Peak Estimate	4 yr Average	12 yr Average
14	Puntledge River - summer run	Mixed/Cumulative	SEP	22-Nov	-	1,029	790	1,260
14	Puntledge River - fall run	Mixed/Cumulative	SEP	22-Nov	-	12,602	6,390	6,870
14	Qualicum River	Mixed/Cumulative	SEP	22-Nov	-	9,829	6,220	7,900
14	Little Qualicum River	Mixed/Cumulative	SEP/StAD	08-Nov	8	4,441	4,040	4,180
14	Englishman River	Periodic/PL+D	BCCF/StAD	09-Nov	7	1,113	950	830
15	Sliammon Creek	Fence/Cumulative	TFN	16-Nov	-	0	180	120
15	Theodosia River	Periodic/PL+D	TFN	06-Nov	9	32	50	50
17	Nanaimo River - summer run	Periodic/PL+D	NRSS	16-Oct	3	960	810	740
17	Nanaimo River - fall run	Periodic/PL+D	NRSS	27-Oct	5	1,557	4,080	3,820
17	Chemainus River -summer run	Periodic/PL+D	QARS/StAD	24-Jul	2	17	30	30
17	Chemainus River -summer run	Periodic/PL+D	QARS/StAD	04-Oct	1	42	98	333
18	Cowichan River - fall run	Fence/Cumulative	CT/StAD	26-Oct	-	20,000*	7,680	5,270
20	Sooke River	Periodic/PL+D	BCCF	24-Oct	3	42	647	513

Chemainus summer estimate includes 2 jacks; Little Qualicum River includes 30 jacks and 4414 removals; Nanaimo Fall estimate includes 830 jacks; Cowichan includes 5,318 jacks

Qualicum River includes 6960 removals, Puntledge includes 1691 jacks and 1878 removals/FN caught

*Preliminary estimate, Cowichan data is still under review. Jack component approximately 60%

Table 2: **Coho** escapement counts to date for 2017 Strait of Georgia salmon surveys. Estimates include combined adults and jacks, where available a breakdown is provided below the table. Averages include total return to river.

Area	System	Survey Type/Count Type	Enumeration conducted by	Date of last count	Number of surveys	Peak Estimate	4 yr Average	12 yr Average
14	Puntledge River	Mixed/Cumulative	StAD/SEP	22-Nov	-	2,800	4,160	5,710
14	Qualicum River	Mixed/Cumulative	SEP	22-Nov	-	8,457	11,750	9,440
14	Little Qualicum River	Mixed/Cumulative	StAD/SEP	08-Nov	8	368	3,940	2,700
14	Englishman River	Periodic/PL+D	StAD/BCCF	09-Nov	7	1,727	8,170	4,740
14	Rosewall Creek	Periodic/PL+D	FBSES	29-Oct	1	184	750	940
14	Wilfred Creek	Periodic/PL+D	FBSES	20-Oct	1	20	560	560
15	Sliammon Creek	Fence/Cumulative	TFN	16-Nov	-	12	130	140
15	Theodosia River	Periodic/PL+D	TFN	06-Nov	9	469	1,490	1,420
16	Anderson Creek	Periodic/PL+D	RLLS	21-Nov	5	6	180	-
16	Brittain River	Periodic/PL+D	SN	05-Dec	5	55	20	20
16	Deserted Bay River	Periodic/PL+D	SN	05-Dec	5	120	1,130	0
16	Skwakwa River	Periodic/PL+D	SN	05-Dec	5	320	1,150	810
17	Nanaimo River	Periodic/PL+D	NRSS	27-Oct	5	336	5,220	3,630
17	Chemainus River	Periodic/PL+D	QARS/StAD	04-Oct	1	0	NA	NA
18	Cowichan River	Fence/Cumulative	CT/StAD	26-Oct	-	1,221	NA	3,240
19	Goldstream River	Periodic/Mark-Recap	GVSEA	18-Nov	7	9	970	730
19	Colquitz River	Fence/Cumulative	CSSES	01-Dec	-	314	1,070	480
19	Craigflower Creek	Fence/Cumulative	EAA	23-Nov	-	455	990	480
19	Millstream River	Fence/Cumulative	GVSEA	29-Nov	-	41	990	480
19	Shawnigan Creek	Fence/Cumulative	MB&DCS	06-Dec	-	618	2,090	
20	Sooke River	Periodic/PL+D	BCCF	24-Oct	3	7	-	-

Puntledge count includes 245 jacks and 650 removals; Qualicum includes 1363 jacks, and 4839 removals

Englishman includes 539 jacks

Table 3: **Chum** escapement counts to date for 2017 Strait of Georgia salmon surveys.

Area	System	Survey Type/Count Type	Enumeration conducted by	Date of last count	Number of surveys	Peak Estimate	4 yr Average	12 yr Average
14	Puntledge River	Mixed/Cumulative	StAD/SEP	22-Nov	-	40,263	58,760	77,830
14	Qualicum River	Mixed/Cumulative	SEP	22-Nov	-	21,963	104,680	77,810
14	Rosewall Creek	Periodic/PL+D	FBSES	29-Oct	1	1,659	2,880	2,900
14	Little Qualicum River	Mixed/Cumulative	StAD/SEP	08-Nov	9	6,402	79,280	56,910
14	Englishman River	Periodic/PL+D	StAD/BCCF	09-Nov	7	670	11,390	12,700
14	Wilfred Creek	Periodic/PL+D	FBSES	20-Oct	1	860	1,230	-
15	Sliammon Creek	Fence/Cumulative	TFN	16-Nov	-	5,053	21,920	14,950
15	Theodosia River	Periodic/PL+D	TFN	06-Nov	9	2,359	25,520	23,640
15	Okeover River	Periodic/PL+D	TFN	06-Dec	8	80	8,820	5,770
16	Anderson Creek	Periodic/PL+D	RLLS	21-Nov	5	256	3,760	3,980
16	Angus Creek	Periodic/PL+D	SN/StAD	21-Nov	8	1	830	600
16	Brittain River	Periodic/PL+D	SN/StAD	06-Nov	6	190	530	450
16	Deserted River	Periodic/PL+D	SN/StAD	06-Nov	6	35,100	21,190	17,040
16	Myers Creek	Periodic/PL+D	RLLS	06-Nov	4	114	-	-
16	Skwakwa River	Periodic/PL+D	SN/StAD	06-Nov	5	4,015	11,750	8,300
16	Tzoonie River	Periodic/PL+D	SN/StAD	06-Nov	5	5,580	31,670	32,870
16	Vancouver River	Periodic/PL+D	SN/StAD	06-Nov	5	260	1,180	730
17	Nanaimo River	Mixed/Cumulative	SFN/StAD	14-Nov	-	82,918	83,610	56,510
17	Chemainus River	Mixed/Cumulative	QARS/StAD	04-Oct	-	-	19,930	12,140
18	Cowichan River	Fence/Cumulative	CT/StAD	20-Nov	-	187,000	175,250	179,520
19	Goldstream River	Periodic/PL+D	GVSEA	29-Nov	7	6,380	24,700	23,629
20	Sooke River	Periodic/PL+D	BCCF	24-Oct	3	17,358	12,288	25,635

Table 4: **Sockeye** escapement counts to date or 2017 Strait of Georgia salmon surveys.

Area	System	Survey Type/Count Type	Enumeration conducted by	Date of last count	Number of surveys	Peak Estimate	4 yr Average	12 yr Average
14	Qualicum River	Mixed/Cumulative	SEP	22-Nov	-	3	20	10
14	Englishman River	Periodic/PL+D	StAD/BCCF	09-Nov	7	1	NA	NA
16	Sakinaw Lake	Fence/Cumulative	SN/StAD	08-Sep	-	12	370	230
17	Nanaimo River	Periodic/PL+D	NRSS	27-Oct	4	1	NA	NA

Table 5: **Pink** escapement counts to date for 2017 Strait of Georgia salmon surveys.

Area	System	Survey Type/Count Type	Enumeration conducted by	Date of last count	Number of surveys	Peak Estimate	Odd-year 3 Generation Average
14	Puntledge River	Mixed/Cumulative	SEP	22-Nov	-	25,332	54,800
14	Tsolum River	Periodic/PL+D	TRSS	01-Oct	2	57,684	NA
14	Qualicum River	Mixed/Cumulative	SEP	22-Nov	-	5,819	33,970
14	Little Qualicum River	Periodic/PL+D	StAD	08-Nov	8	754	NA
14	Englishman River	Periodic/PL+D	StAD/BCCF	09-Nov	7	2,197	14,110
15	Sliammon Creek	Fence/Cumulative	TFN	16-Nov	-	450	1,600
15	Theodosia River	Periodic/PL+D	TFN	06-Nov	9	28	NA
16	Chapman Creek	Periodic/PL+D	SN	07-Nov	6	606	NA
16	Brittain River	Periodic/PL+D	SN/StAD	12-Sep	4	21,201	10,250
16	Deserted River	Periodic/PL+D	SN/StAD	12-Sep	4	38,560	172,140
16	Sechelt Creek	Periodic/PL+D	SN	02-Oct	4	4,275	45,750
16	Skwakwa River	Periodic/PL+D	SN/StAD	12-Sep	4	51,273	304,150
16	Tzoonie River	Periodic/PL+D	SN/StAD	12-Sep	4	28,952	192,110
16	Vancouver River	Periodic/PL+D	SN/StAD	12-Sep	4	15,100	NA
17	Nanaimo River	Periodic/PL+D	NRSS	27-Oct	5	49,953	77,720

Table 6: List of Enumeration Participant Groups

Acronym	Enumeration Participant Group	Acronym	Enumeration Participant Group
BCCF	British Columbia Conservation Foundation	QARS	Q'ul-Ihanumutsun Aquatic Resources Society
CSSES	Colquitz Salmonid Stewardship and Education Society	RLLS	Ruby Lake Lagoon Society
CT	Cowichan Tribes	SEP	Salmon Enhancement Program, DFO
EAA	Esquimalt Anglers Association	SFN	Snuneymuxw First Nation
FBSES	Fanny Bay Salmonid Enhancement Society	SN	Sechelt (shíshálh) Nation
GVSEA	Goldstream Volunteer Salmonid Enhancement Association	StAD	Stock Assessment Division, DFO
MB&DCS	Mill Bay & District Conservation Society	TFN	Tla'amin First Nation
NRSS	Nanaimo River Stewardship Society	VIU	Vancouver Island University