



Strait of Georgia Salmon Escapement Bulletin #4 In-season Update, 17 October, 2016

SUMMARY: This bulletin details the current in-season escapement information for major river systems in the Strait of Georgia (SG) for migrating salmon species through the week of 11-14 October. Estimates reported here are preliminary and should be interpreted with caution. Finalized estimates will be made available in the New Year.

Environmental Conditions: Water levels in the Strait of Georgia river systems are now high with substantial rainfall from multiple storms over the past week.

Operations: The major hatcheries, First Nations and Stock Assessment staff in SG area have conducted enumerations beginning as early as June (Sakinaw sockeye and summer chinook runs) and counts will continue into the New Year for later coho spawners. The Cowichan fence was installed on 19 September. A DIDSON was installed in the Nanaimo on 5 October and the Cowichan DIDSON was installed on 11 October. Many hatcheries and other community groups are also operating fences or conducting walks for escapement enumeration, assisting in loading spawning channels and broodstock collections.

2016 PRE-SEASON EXPECTATIONS:

Chinook: There are no formal forecasts for Chinook returns to the Strait of Georgia; expectations to the Cowichan River are for returns similar to 2015, and still below the target escapement for the system (6,500 naturally spawning adults).

Coho: Marine survivals are forecast to increase in 2016 from observed levels in 2015 for both wild and hatchery indicators.

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

Chum: Chum returns in 2016 are expected to be above target for southeast Vancouver Island, but near target for mid- Vancouver Island systems and below for Jervis Inlet: Mid-Vancouver Island Chum expected range from 219,000 to 328,000, which includes the combination of Puntledge (escapement target 60,000), Qualicum (85,000) and Little Qualicum (85,000); Nanaimo expectation range 73,000-109,000 (40,000), Cowichan 193,000-289,000 (160,000), Goldstream 38,000-56,000 (15,000) and Jervis Inlet 73,000-109,000 (110,000). These expectations for chum are highly uncertain.

Sockeye: Sockeye returns to Sakinaw were forecast at 388 adults. The run has now finished entering the lake, total escapement is reported in Table 5.

2016 OBSERVATIONS TO DATE:

Chinook: Major hatcheries in the SG area are currently finishing chinook broodstock collections and performing egg takes. Enumeration programs are continuing in the major chinook systems (Table 1). Cowichan chinook total includes fish that have migrated through the fence from 19 September to 14 October plus brood collection; at this time this is a minimal count as it doesn't include fish that migrated past the fence site before installation or migration from this past weekend; total will be adjusted at the end of the season with additional data from run timing and mark-recapture. On 14 October, the Cowichan fence failed, removal of materials is in progress.

Coho: Coho migration is ongoing with numbers increasing in larger systems and coho spreading up into the upper watersheds with higher river flows (Table 2).

Chum: Chum runs have begun in the major chum systems, and likely higher numbers have moved into the systems over the weekend with the high water (Table 3).

Pink: Escapement estimates for pinks are provided for major systems. Observations at this time have demonstrated low abundance (Table 4). Pinks are now finishing spawning.

Sockeye: Sakinaw sockeye total escapement was lower than the forecast this year with much lower return of hatchery fish than expected (Table 5). Few sockeye have returned to some other systems.

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). Only a subset of these streams are surveyed annually. These 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, Charter Patrols, Conservation and Protection Officers, Hatchery Staff (SEP) and local stewardship groups.

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

1. True Abundance

Full quantitative escapement assessments of indicator streams or other complete escapement counts are classified as True Abundance meaning fish are counted as they move upstream past a fixed location. The type of count for these systems is cumulative, meaning 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.

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

2. Relative Abundance

Most 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. These are categorized by Area Under the Curve (AUC) estimates or peak live plus dead (PL+D) estimates in most cases, and sometimes mark-recapture estimates. 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 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.

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, Little Qualicum, Nanaimo and Goldstream 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.

RESULTS:

In-season assessment results for hatchery and non-hatchery systems are reported in Tables 1 to 5, for Chinook, Coho, Pink, Chum and Sockeye respectively. These tables include the type of survey, the group doing the surveys, total or peak count to date, date of last survey, projected totals 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. 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 2012-2015. Twelve year averages include years where surveys were conducted from 2004-2015.

The data presented here are preliminary in-season estimates and will be reviewed and finalized following the escapement season. Projected totals are calculated from in-season data and run timings once the run is at or past the peak; before the timing of the peak of the run the projected total will be left blank since there are not enough data to predict a projected total.

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Table 1: **Chinook** escapement counts to date for 2016 Strait of Georgia salmon surveys. Counts include adults and jacks. Chinook escapement estimates are normally completed by November, so comparisons between current totals and average historical estimates should be interpreted with caution. Also some counts are minimal due to weather and limited surveys during the peak of the run.

Area	System	Survey Type/Count Type	Enumeration conducted by	Date of last count	Number of surveys	PL+D count	4 yr Average	12 yr Average
14	Puntledge River - summer run	Mixed/PL+D	SEP	13-Oct	-	843	780	1,290
14	Puntledge River - fall run	Mixed/PL+D	SEP	13-Oct	-	5,759	5,140	7,090
14	Qualicum River	Mixed/PL+D	SEP	11-Oct	-	4,559	6,290	8,080
14	Little Qualicum River	Periodic/PL+D	SEP/StAD	12-Oct	2	4,400	3,260	4,060
14	Englishman River	Periodic/PL+D	BCCF/StAD	12-Oct	4	249	890	890
15	Sliammon Creek	Fence/Cumulative	Tla'amin Nation	12-Oct	-	26	210	180
15	Theodosia River	Periodic/PL+D	Tla'amin Nation	11-Oct	3	102	N/A	N/A
17	Nanaimo River - summer run	Periodic/PL+D	Hatchery				810	710
17	Nanaimo River - fall run	Periodic/PL+D	Hatchery	12-Oct	5	1,947	3,260	3,590
17	Chemainus River -summer run	Periodic/PL+D	QARS/StAD	19-Jul	2	36	N/A	N/A
18	Cowichan River - fall run	Fence/Cumulative	Cowichan Tribes/StAD	14-Oct	-	9,109	6,660	4,780
19	Goldstream River	Periodic/PL+D	SEP/Goldstream	12-Oct	1	1		

Cowichan total includes fence count (5331 adults and 3551 jacks) plus 427 collected for broodstock

SEP = Salmonid Enhancement Program, DFO

StAD = Stock Assessment Division, DFO

BCCF = British Columbia Conservation Foundation

QARS = Q'ul-Ihanumutsun Aquatic Resources Society

Table 2: **Coho** escapement counts to date for 2016 Strait of Georgia salmon surveys. Adults only reported here unless otherwise noted with an asterisk (*). Coho escapement estimates will be complete in the New Year, so comparisons between current peak live plus dead (PL+D) counts and average historical estimates should be interpreted with caution. Also some counts are minimal counts only due to weather and limited surveys during the peak of the run.

Area	System	Survey Type/Count Type	Enumeration conducted by	Date of last count	Number of surveys	PL+D count	4 yr Average	12 yr Average
14	Puntledge River	Mixed/PL+D	StAD/SEP	13-Oct	-	2,485	4,540	6,400
14	Qualicum River	Mixed/PL+D	SEP	11-Oct	-	2,869	8,620	8,270
14	Little Qualicum River	Periodic/PL+D	StAD/SEP	12-Oct	2	2,567	3,220	N/A
14	Englishman River	Periodic/PL+D	StAD/BCCF	12-Oct	4	2,285	8,270	4,830
15	Slammon Creek	Fence/Cumulative	Tla'amin Nation	12-Oct	-	30	120	160
15	Theodosia River	Periodic/PL+D	Tla'amin Nation	11-Oct	3	707	N/A	N/A
17	Nanaimo River	Periodic/PL+D	Hatchery	12-Oct	5	2,686	3,670	3,050
17	Chemainus River	Periodic/PL+D	QARS/StAD				N/A	N/A
18	Cowichan River	Fence/Cumulative	Cowichan Tribes/StAD	14-Oct	-	3,208	N/A	N/A
19	Goldstream River	Periodic/Mark-Recap	SEP/Goldstream	12-Oct	1	93	1,150	820
19	Colquitz River	Fence/Cumulative	CSSSES				570	280
19	Craigflower Creek	Fence/Cumulative	EAA				870	350

Cowichan fence total includes 2291 adults and 917 jacks

CSSSES = Colquitz Salmonid Stewardship and Education Society

EAA = Esquimalt Anglers Association

see chinook table for other acronym definitions

Table 3: **Chum** escapement counts to date for 2016 Strait of Georgia salmon surveys. Chum escapement estimates are normally completed by December, but final escapement totals will be calculated in the New Year. Also some counts are minimal counts due to weather and limited surveys during the peak of the run.

Area	System	Survey Type/Count Type	Enumeration conducted by	Date of last count	Number of surveys	PL+D count	4 yr Average	12 yr Average
14	Puntledge River	Periodic/PL+D	StAD/SEP	13-Oct	-	3,190	51,680	85,770
14	Qualicum River	Periodic/PL+D	SEP	11-Oct	-	498	73,080	64,000
14	Little Qualicum River	Periodic/PL+D	StAD/SEP	12-Oct	2	6,470	61,210	55,100
14	Englishman River	Periodic/PL+D	StAD/BCCF	12-Oct	4	2,378	13,860	12,700
15	Sliammon Creek	Fence/Cumulative	T la'amin Nation	12-Oct	-	657	17,440	15,430
15	Theodosia River	Periodic/PL+D	T la'amin Nation	11-Oct	3	7,106	20,270	N/A
15	Okeover River	Periodic/PL+D	T la'amin Nation	12-Oct	4	180	8,240	6,400
16	Angus Creek	Periodic/PL+D	Sechelt Band	11-Oct	2	2	320	600
16	Brittain River	Periodic/PL+D	Sechelt Band/StAD				500	390
16	Deserted River	Periodic/PL+D	Sechelt Band/StAD				14,880	13,910
16	Skwakwa River	Periodic/PL+D	Sechelt Band/StAD				9,700	6,030
16	Tzoonie River	Periodic/PL+D	Sechelt Band/StAD	04-Oct	1	600	28,690	18,870
16	Vancouver River	Periodic/PL+D	Sechelt Band/StAD				70	360
17	Nanaimo River	Periodic/PL+D	SFN/StAD	12-Oct	5	19,200	66,870	51,710
17	Chemainus River	Periodic/PL+D	QARS/StAD				10,950	6,480
18	Cowichan River	Periodic/PL+D	Cowichan Tribes/StAD	14-Oct	-	137	183,420	174,570
19	Goldstream River	Periodic/PL+D	SEP/Goldstream	12-Oct	1	0	31,820	23,890

Cowichan total includes fence count only; DIDSON count not available at this time

SFN = Snuneymuxw First Nation

see chinook and coho tables for acronym definitions

Table 4: **Pink** escapement counts to date for 2016 Strait of Georgia salmon surveys.

Area	System	Survey Type/Count Type	Enumeration conducted by	Date of last count	Number of surveys	PL+D count	Even-year 3 Generation Average
14	Puntledge River	Mixed/PL+D	SEP	13-Oct	-	3,450	16,070
14	Wilfred Creek	Periodic/PL+D	FBSES	N/A	3	20	780
14	Qualicum River	Mixed/PL+D	SEP	11-Oct	-	1,366	6,250
14	Englishman River	Periodic/PL+D	StAD/BCCF	12-Oct	4	415	5,380
15	Sliammon Creek	Fence/Cumulative	Tla'amin Nation	12-Oct	-	116	N/A
17	Nanaimo River	Periodic/PL+D	Hatchery	12-Oct	5	8,087	38,280

FBSES = Fanny Bay Salmonid Enhancement Society

see chinook table for other acronym definitions

Table 5: **Sockeye** escapement counts to date or 2016 Strait of Georgia salmon surveys.

Area	System	Survey Type/Count Type	Enumeration conducted by	Date of last count	Number of surveys	PL+D count	4 yr Average	12 yr Average
14	Puntledge River	Periodic/PL+D	StAD/SEP	13-Oct	-	8	N/A	N/A
14	Qualicum River	Periodic/PL+D	SEP	11-Oct	-	0	20	10
14	Englishman River	Periodic/PL+D	StAD/BCCF	03-Oct	3	0	10	10
16	Sakinaw Lake	Fence/Cumulative	Sechelt Band/StAD	19-Sep	-	172	390	190
17	Nanaimo River	Periodic/PL+D	Hatchery	12-Oct	5	7	N/A	N/A

see chinook table for acronym definitions