

2018 EARLY SUMMER RUN SOCKEYE

Preliminary Escapement Estimates

Preliminary escapement estimates are based on in-season data that have not been fully verified. Changes in preliminary estimates are likely.

Background

The Early Summer Run consists of several populations scattered throughout the Fraser River watershed in seven geographic areas (Lower Fraser, Seton-Anderson, North Thompson, South Thompson, Chilcotin, Nechako and Upper Fraser) and includes 10¹ of the 24 current Conservation Units (CU) that have been identified for Fraser Sockeye (Grant et al. 2011). Populations within this timing group enter the lower Fraser River from mid-July to mid-August and migrate immediately upstream to terminal spawning areas. Spawners begin arriving on the spawning grounds in early August, with peak of spawning from late August to mid-September. Die-off is generally complete by late September.

Of the ten current CUs in the Early Summer Run aggregate, two have been designated as RED status (Bowron-ES and Taseko-ES), three as AMBER status (Nahatlatch-ES, North Barriere-ES and Shuswap-ES), three as AMBER/GREEN status (Nadina-Francois-ES, Chilliwack-ES and Anderson-Seton-ES), one as GREEN status (Pitt-ES) and one as data deficient (Chilko-ES) in the 2017 Wild Salmon Policy biological status evaluations (DFO 2018). These status designations align closely with the recent COSEWIC (Committee on the Status of Endangered Wildlife in Canada) status assessment conducted on Fraser Sockeye (COSEWIC 2017).

The 2014 Early Summer Run brood year escapement was the second largest on record for this dominant cycle year at 647,898 spawners with an average spawning success of 91.6% (8.4% pre-spawn mortality). The largest escapements in 2014 were observed in the Eagle River (210,956), Scotch Creek (135,134) and Seymour River (95,156).

Escapement Estimation

The 2018 escapement estimation plan was based on a pre-season spawning escapement goal of 862,000 at the 50% probability forecast using standard enumeration methodology based on the number of spawners expected to return by population (Andrew and Webb, 1987). Typically, low precision visual surveys are used to enumerate populations with expected escapements of less than 75,000 spawners and high precision methods (hydroacoustics, enumeration fences or mark-recaptures) are used for populations with expected escapements of greater than 75,000 spawners.

The 2018 escapement estimation plan had five components:

1. Visual Surveys

Most Early Summer Run populations had expected escapements of less than 75,000 spawners; consequently, they were assessed visually on foot, by boat or by helicopter. Survey frequency ranged from weekly coverage on most systems, to single surveys for remote or difficult to access systems. Where single surveys were used, the survey was timed to coincide with expected peak abundance using temporal patterns in nearby populations.

On each visual survey the entire spawning area is assessed with counts of live and dead Sockeye collected. For ground surveys, the sex and spawning success (females only) is recorded for all carcasses recovered. After enumeration, all recovered carcasses are chopped in half with a machete to avoid re-counting on subsequent surveys.

¹ The Kamloops-ES CU is included in the Summer Run aggregate.

For each stream the total escapement is the sum of the maximum count of live spawners and the cumulative count of recovered carcasses through the date of the peak live count multiplied by an index expansion factor. The total escapement for a stream is reported by males, females and jacks in three steps:

- The total jack recovery is adjusted by applying an expansion factor of 1.26 (Andrew and Webb MS, 1987). The adjusted carcass recovery totals are then used to calculate the proportion of adult males, females and jacks for each stream;
- If the adult carcass recovery sample (excluding unsexed carcasses) is both temporally and spatially representative throughout the die-off period, then the estimate is stratified by adult males, females and jacks on the basis of the proportions calculated above;
- If the total adult carcass recovery is not considered both temporally and spatially representative throughout the die-off period, then the adult sex ratio, jack composition and female spawning success is estimated from a nearby stream or population aggregate. Jacks are excluded from this calculation if none were observed during surveys of the stream in question.

The average female spawning success is calculated from the weighted daily estimates of female egg retention (0%, 50% or 100%) in the female carcass recovery sample. The effective female escapement is the product of the total female escapement and the average female spawning success (excluding Sockeye killed for biological samples).

Visual surveys were conducted by DFO Fraser River Stock Assessment and Carrier Sekani Tribal Council (Nechako system).

2. Carcass Surveys

Escapement to the Gates Creek spawning channel was assessed after loading was complete by conducting a complete carcass census within the channel (operated by N'Quatqua Fisheries and managed by DFO, Salmonid Enhancement Program). Escapements to three lake spawning populations (Chilliwack, Nahatlatch and Taseko lakes) were assessed by DFO (Fraser River Stock Assessment) using a carcass recovery effort expansion (Andrew and Webb, 1987). The sex specific escapement (including jacks) and female spawning success are estimated from carcasses recovered during foot surveys using the methods as described for visual surveys.

3. Enumeration Fences

Escapement to Scotch Creek was assessed using a manual counting fence operated by the Secwepemc Fisheries Commission. The total escapement is estimated from the sum of the daily net upstream counts through the fence. The sex specific escapement (including jacks) and female spawning success are estimated from carcasses recovered during foot surveys using the methods as described for visual surveys.

4. Hydroacoustics (DIDSON / ARIS)

Escapements to the Eagle and Nadina river systems were assessed using hydroacoustic imaging systems (DIDSON and/or ARIS). The Nadina River project was conducted jointly by DFO Fraser River Stock Assessment and Carrier Sekani Tribal Council. The procedures used to analyse the sonar data to estimate total escapement are similar to those described in Cronkite et. al (2006). The sex specific escapement (including jacks) and female spawning success are estimated from carcasses recovered during foot surveys using the methods as described for visual surveys.

5. Mark-Recapture

Escapement to the Seymour River was assessed using mark-recapture methods. The procedures used to analyse the mark-recapture data and estimate the sex specific escapements (including jacks) and female spawning success are similar to those described in Schubert 2007.

Escapements

The preliminary 2018 Early Summer Run Sockeye spawning escapement estimate totals 787,091 of which 382,849 are adult males, 403,374 are adult females and 868 are jacks (Table 1). This is the second largest Early Summer Run Sockeye spawning escapement on record (all cycles). It is 21% above the 2014 brood year of 647,898 and over three times the cycle year average of 245,318 (Figure 1). It exceeds the in-season spawning escapement target of 720,000, is 62% of the Pacific Salmon Commission (PSC) in-season estimate of potential spawning escapement² of 1,278,000 and is 97% of the in-season projected spawning escapement³ of 813,700.

The largest Early Summer Run escapements in 2018 were observed in the Eagle River (242,603), Nadina River (193,966) and Seymour River (108,490). Preliminary estimates of escapement and spawning success by spawning site are reported in Table 1.

Despite less than ideal conditions in the Fraser River during their migration most Early Summer Run Sockeye were reported to be in good condition on arrival to the spawning grounds. For the month of August, Fraser River water temperatures at Hope were as much as 2.5°C above average, ranging between 17°C and 20.5°C (DFO Fraser River Environmental Watch 2018). During the same period, Fraser River discharge at Hope was as much as 37% below average, ranging between 1,800 m³/s and 3,300 m³/s (Environment Canada 2018a). Spawning success was highly variable throughout the watershed ranging from 67% to 100%. The overall spawning success for the Early Summer Run aggregate is an estimated 79.9% (20.1% pre-spawn mortality), below the long term average of 89.7%.

Sockeye arrival timing to the spawning grounds was within normal ranges in most areas of the watershed in 2018. Protracted arrival and spawning was observed in the Nechako (Glacier Creek) and Upper Fraser (Upper Bowron River) systems where fresh Sockeye were still observed into early and mid-October, respectively. Water levels on the spawning grounds were below normal for the majority of the Sockeye arrival and spawning periods in most areas of the watershed but were not reported to be limiting Sockeye access to historical spawning areas. Several significant rain events in late August and September resulted in record high water levels in streams in the northeast portion of the South Thompson system, most notably in the Eagle, Anstey and Seymour rivers. Water temperatures were within acceptable ranges (4.5°C to 18.0°C) throughout the spawning period for the majority of the Early Summer Sockeye spawning streams.

- **Lower Fraser** – This area includes several Early Summer Sockeye spawning sites in three CUs (Chilliwack-ES, Nahatlatch-ES and Pitt-ES). As most Lower Fraser Early Summer Run populations can have a relatively large 5 year old component, both the 2013 and 2014 brood years are expected to have contributed to the 2018 returns to these systems. Results from samples collected on the spawning grounds are not yet available to confirm age composition.
 - **Chilliwack-ES:** The preliminary 2018 escapement to this CU totals 2,341 spawners (Table 1). This escapement is 67% of the 2014 brood year escapement of 3,470 and 83% of the recent cycle average of 2,807 (Fig. 2a). Spawning success is an estimated 81.6% in 2018, below the long term average of 91.8%.

² The potential spawning escapement is the number of Sockeye estimated past the PSC hydroacoustic site in the Lower Fraser River at Mission minus estimates of catch above Mission.

³ The projected spawning escapement is the potential spawning escapement adjusted to account for historic differences between the Mission hydroacoustic estimates of fish passage and the spawning grounds estimates.

- **Nahatlatch-ES:** The preliminary 2018 escapement to this CU totals 2,497 spawners (Table 1). This escapement falls in between the 2013 and 2014 brood year escapements of 2,115 and 3,873, respectively and is 68% of the recent average of 3,655 (Fig. 2b). Spawning success is an estimated 90.0% in 2018, similar to the long term average of 91.0%.
 - **Pitt-ES:** The preliminary 2018 escapement to this CU totals 13,949 spawners (Table 1). This escapement falls well below the 2013 and 2014 brood year escapements of 59,279 and 36,507, respectively and the recent average of 54,234 (Fig. 2c). Spawning success is an estimated 96.8% in 2018, above the long term average of 89.6%.
- **Seton-Anderson** – This area has one Early Summer Run CU (Anderson-Seton-ES) with two consistent Early Summer Sockeye spawning sites (Gates Creek and Gates Creek Spawning Channel).
 - **Anderson-Seton-ES:** The preliminary 2018 escapement to this CU totals 4,210 spawners (Table 1). This escapement is 25% of the 2014 brood year of 16,928 and 64% of the post spawning channel cycle average of 6,606 (Figure 3d). Spawning success to the system is an estimated 75.2%, similar to the long term system average of 74.2%
- **South Thompson** – This area has one Early Summer Run CU (Shuswap-ES) with approximately 20 Early Summer Run spawning sites on this dominant cycle year.
 - **Shuswap-ES:** The preliminary 2018 escapement to this CU totals 496,263 spawners (Table 1). This escapement is the third largest on record (all cycle years). It is just below the 2014 brood year of 501,940 and well above the long term cycle average of 190,933 (Figure 3b). The 2018 escapement to the Upper Adams River is the largest on record for the cycle. Counting conditions in glacially influenced streams in the system ranged from excellent at the Upper Adams River to very poor in the Perry River. Water levels in the system were highly variable throughout the Sockeye arrival and spawning periods ranging from below average in early August to at or near record high levels in some streams in the northeast portion of the watershed in late August and September, most notably in the Eagle, Seymour and Anstey rivers. Spawning success in the system was highly variable ranging from 76.2% to 100%. The overall spawning success for the system is an estimated 86.2%, below the long term average of 93.4%.
- **North Thompson** – This area has one Early Summer Run CU (North Barriere-ES) with two spawning sites (Upper Barriere River and Harper Creek).
 - **North Barriere-ES:** The preliminary 2018 escapement to this CU totals 2,430 spawners (Table 1). This escapement is 21% of the 2014 brood year of 11,467 and 48% of the cycle average of 5,057 (Figure 3d). Spawning success is an estimated 93.8%, above the long term system average of 90.0%.
- **Chilcotin** – This area has two Early Summer Run CUs (Taseko-ES and Chilko-ES), one of which (Chilko-ES) is enumerated in aggregate with the Chilko-S CU and is reported with the Summer Run timing group.
 - **Taseko-ES:** The preliminary 2018 escapement to this CU totals 70 spawners (Table 1). This escapement is the lowest observed on this cycle. It is 61% of the 2014 brood year of 114 and 5% of the cycle average of 1,376 (Figure 3d). Due to limited carcass availability the reported sex ratio and spawning success estimates are assumed.

- **Nechako** – Historically this area has one Early Summer Run CU (Nadina-Francois-ES) with two Early Summer Run Sockeye spawning sites on this cycle year (Nadina River, Nadina River Spawning Channel). Spawners were also observed in Glacier Creek in 2018, the first time on this cycle year.
 - **Nadina-Francois-ES:** The preliminary 2018 escapement to this CU totals 256,795 spawners (Table 1). This escapement is the largest on record (all cycle years) to this CU. It is over 4 times the brood year of 61,389 and well above escapement levels historically observed on this cycle (Figure 3e). Extreme wildfire activity in the immediate vicinity of the Nadina River and spawning channel limited access to the area through the majority of the Sockeye arrival period. Prior to evacuation, the channel operator turned on the water in the channel to allow Sockeye to enter passively (without a counting fence). As a result, the reported estimate of escapement to the Nadina River channel is based on an aerial live count conducted by DFO Stock Assessment and Carrier Sekani Tribal Council staff on September 16th. The reported escapement to the CU was derived using daily estimates of Nadina bound Sockeye through the Stellako River sonar site using historical stock composition (DNA) and radio-tagging data. Results from DNA samples collected in 2018 to estimate stock composition through the Stellako sonar site are not yet available but are expected for near final estimates. The reported escapement to the Nadina River is the difference between the sonar derived CU system estimate and the visual based estimates of the spawning channel and Glacier Creek. Water levels in the system were at or near record low levels for the majority of the Sockeye arrival and spawning period. During escorted visits to the channel, the channel operator reported high pre-spawn mortality on the earliest arrivals (final carcass recovery data from the channel is not yet available). High pre-spawn mortality levels were also observed in the earliest arrivals in the river. The period of arrival and spawning was notably protracted in 2018 with fresh Sockeye observed arriving throughout the spawning period which extended as late as early October in Glacier Creek. Spawning success in the system is an estimated 66.7%, well below the long term average of 90.5%.
- **Upper Fraser** – This area has one current Early Summer Run CU (Bowron-ES) and two CUs that require validation (Upper Fraser River-Type and Indian/Kruger-ES)⁴.
 - **Bowron-ES:** The preliminary 2018 escapement to this CU totals 8,406 spawners (Table 1). This escapement is below the 2014 brood year of 12,064 but above the cycle average of 6,024 (Figure 3f). The period of arrival and spawning was protracted in 2018 with reports of small numbers of fresh Sockeye in the system into October. Spawning success is an estimated 98.7% in 2018, above the long term average of 91.7%.
 - **Upper Fraser River-Type**⁴: This area has three historical Sockeye spawning sites on record on this cycle year. Historical escapements to this area range from 146 to 544 spawners (Figure 4a). Surveys in this area have not been consistent throughout the time series but have increased in frequency in recent years as part of ongoing efforts to determine if the system meets the criteria of a WSP CU. The Lower Bowron River was the only site surveyed in this area in 2018; no spawning Sockeye were observed (Table 1).
 - **Indian/Kruger-ES**⁴: This area has one historical Sockeye spawning site on record (Indianpoint Creek). The preliminary 2018 escapement estimate to this area totals

⁴ Further research is required to determine if meets the criteria of a CU as defined under the Wild Salmon Policy (Grant et. al, 2011).

130 spawners (Table 1). Surveys of this area have been inconsistent through the time series but have increased in frequency in recent years as part of ongoing efforts to determine if the system meets the criteria of a WSP CU. Prior to 2018, the last Sockeye observations in this system were in 1986 (Figure 4b).

References

- Andrew, J.H., and T.M. Webb. MS 1987. Review and assessment of adult Sockeye salmon enumeration programs on the Fraser River. Prepared by Environmental and Social Systems Analysis Ltd. for the Department of Fisheries and Oceans.
- COSEWIC. 2017. COSEWIC assessment and status report on the Sockeye Salmon *Onchorhynchus nerka*, 24 Designatable Units in the Fraser River Drainage Basin, in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. xli + 179 pp. .
(<http://www.registrelepsararegistry.gc.ca/default.asp?lang=en&n=24F7211B-1>).
- Cronkite, G.M.W., Enzenhofer, H.J., Ridley, T., Holmes, J., Liljia, J., and Benner, K. 2006. Use of high-frequency imaging sonar to estimate adult sockeye salmon escapement in the Horsefly River, British Columbia. Can. Tech. Rep. Fish. Aquat. Sci. 2647: vi + 47 p.
- DFO. 2018. The 2017 Fraser Sockeye Salmon (*Oncorhynchus nerka*) integrated biological status re-assessment under the Wild Salmon Policy. DFO Can. Sci. Advis. Sec. Sci. Advis. Rep. 2018/017.
- DFO Fraser River Environmental Watch. 2018. Fraser River Environmental Watch Report August 30, 2018. <http://www.pac.dfo-mpo.gc.ca/science/habitat/frw-rfo/index-eng.html>.
- Environment Canada. 2018a. Real-Time Hydrometric Data Map Search (Fraser River at Hope [08MF005]). http://wateroffice.ec.gc.ca/index_e.html.
- Grant, S.C.H., MacDonald, B.L., Cone, T.E., Holt, C.A., Cass, A., Porszt, E.J., Hume, J.M.B & Pon, L.B. 2011. Evaluation of Uncertainty in Fraser Sockeye (*Oncorhynchus nerka*) Wild Salmon Policy Status using Abundance and Trends in Abundance Metrics. Can. Sci. Advis. Sec. Res. Doc. 2011/087. viii + 183 pp.
- Schubert, N.D. 2007. Estimating the 1995 Fraser River sockeye salmon (*Oncorhynchus nerka*) escapement. Can. Tech. Rep. Fish. Aquat. Sci. 2737: ix + 71p

TABLE 1. 2018 PRELIMINARY EARLY SUMMER RUN SOCKEYE SALMON ESCAPEMENT SUMMARY

WATERSHED AREA / CONSERVATION UNIT	PEAK SPAWNING	TOTAL POPULATION	ADULTS	JACKS	MALES	FEMALES	% SPAWN	EFFECTIVE FEMALES*	REMARKS
<u>LOWER FRASER</u>									
<u>Chilliwack-ES</u>									
Chilliwack Lake		100	100	0	48	52	92.3%	48	
Chilliwack River, upper (Dolly Varden Creek)	Aug. 21-27, 2018.	2,241	2,241	0	1,099	1,142	81.1%	927	
Sub Total:		2,341	2,341	0	1,147	1,194	81.6%	975	
<u>Nahatlatch-ES</u>									
Nahatlatch Lake		87	87	0	45	42	90.0%	38	Nahatlatch system composite sex ratio and % spawn applied.
Nahatlatch River	Sep. 6-12, 2018.	2,410	2,410	0	1,249	1,161	90.0%	1,045	Nahatlatch system composite sex ratio and % spawn applied.
Sub Total:		2,497	2,497	0	1,294	1,203	90.0%	1,083	
<u>Pitt-ES</u>									
Corbold Creek ¹	Sep. 6-13, 2018.	3,479	3,479	0	1,688	1,791	96.8%	1,733	U. Pitt R. system composite sex ratio and % spawn applied.
Fish Hatchery Creek ¹	Sep. 13-19, 2018.	13	13	0	6	7	96.8%	7	U. Pitt R. system composite sex ratio and % spawn applied.
North Boise Creek ¹		0	0	0	0	0	0.0%	0	
Pitt River, upper	Sep 6-12, 2018.	9,803	9,803	0	4,756	5,047	96.8%	4,884	U. Pitt R. system composite sex ratio and % spawn applied.
Slough Creek ¹	Sep. 6-13, 2018.	11	11	0	5	6	96.8%	6	U. Pitt R. system composite sex ratio and % spawn applied.
South Boise Creek ¹	Sep. 7-13, 2018.	445	445	0	216	229	96.8%	222	U. Pitt R. system composite sex ratio and % spawn applied.
Upper Pitt Channel ¹	Sep. 6-13, 2018.	198	198	0	96	102	96.8%	99	U. Pitt R. system composite sex ratio and % spawn applied.
Sub Total:		13,949	13,949	0	6,767	7,182	96.8%	6,951	
AREA TOTAL:		18,787	18,787	0	9,208	9,579	94.0%	9,009	
<u>SETON-ANDERSON</u>									
<u>Anderson-Seton-ES</u>									
Anderson Lake - shore		0	0	0	0	0	0.0%	0	
Gates Channel		1,632	1,487	145	570	917	81.9%	751	
Gates Creek	Sep. 6-12, 2018.	2,578	1,873	705	793	1,080	69.6%	752	
AREA TOTAL:		4,210	3,360	850	1,363	1,997	75.2%	1,503	
<u>SOUTH THOMPSON</u>									
<u>Shuswap-ES</u>									
Adams Channel		0	0	0	0	0	0.0%	0	
Adams River, lower	Sep. 6-13, 2018.	61	61	0	25	36	93.2%	34	Adams system composite sex ratio and percent spawn applied.
Adams River, upper	Sep. 3-10, 2018.	13,318	13,318	0	5,517	7,801	92.3%	7,198	Adams system composite sex ratio applied.
Anstey River	Sep. 5-14, 2018.	12,634	12,634	0	6,288	6,346	92.9%	5,895	
Blueberry Creek		0	0	0	0	0	0.0%	0	
Burton Creek	Sep. 3-10, 2018.	103	103	0	43	60	93.2%	56	Adams system composite sex ratio and percent spawn applied.
Cayenne Creek	Sep. 3-10, 2018.	698	698	0	294	404	94.6%	382	
Celista Creek	Sep. 7-13, 2018.	841	841	0	442	399	78.6%	314	
Craigellachie Creek	Sep. 6-15, 2018.	22	22	0	11	11	90.9%	10	Eagle system sex ratio and percent spawn applied.
Crazy Creek	Aug. 29-Sep. 4, 2018.	1,147	1,147	0	575	572	96.8%	554	Eagle system sex ratio applied.
Eagle River	Sep. 6-15, 2018.	242,603	242,603	0	123,213	119,390	90.7%	108,266	
Four Mile Creek		0	0	0	0	0	0.0%	0	
Hiuihill Creek	Sep. 1-8, 2018.	688	688	0	321	367	95.3%	350	
Hunakwa Creek	Sep. 4-10, 2018.	92	92	0	46	46	92.9%	43	Anstey R. sex ratio and percent spawn applied.
Leifur Creek	Aug. 21-Sep. 7, 2018.	1,125	1,125	0	551	551	91.6%	521	Eagle system sex ratio applied.

TABLE 1. 2018 PRELIMINARY EARLY SUMMER RUN SOCKEYE SALMON ESCAPEMENT SUMMARY

WATERSHED AREA / CONSERVATION UNIT	PEAK SPAWNING	TOTAL POPULATION	ADULTS	JACKS	MALES	FEMALES	% SPAWN	EFFECTIVE FEMALES*	REMARKS
Four Mile Creek		0	0	0	0	0	0.0%	0	
Hiuihill Creek	Sep. 1-8, 2018.	688	688	0	321	367	95.3%	350	
Hunakwa Creek	Sep. 4-10, 2018.	92	92	0	46	46	92.9%	43	Anstey R. sex ratio and percent spawn n applied.
Loftus Creek	Aug. 31-Sep. 7, 2018.	1,105	1,105	0	554	551	94.6%	521	Eagle system sex ratio applied.
McNomee Creek	Sep. 7-13, 2018.	22,538	22,535	3	10,723	11,812	82.2%	9,715	Seymour R. system comp. sex ratio and percent spawn n applied.
Momich River, lower	Sep. 3-10, 2018.	31	31	0	13	18	93.2%	17	Adams system composite sex ratio and percent spawn n applied.
Nikwikaia Creek	Sep. 1-8, 2018.	509	509	0	211	298	93.2%	278	Adams system composite sex ratio and percent spawn n applied.
Onyx Creek		2	2	0	1	1	100.0%	1	Sex ratio and percent spawn n assumed.
Perry River	Sep. 3-12, 2018.	3,496	3,496	0	1,754	1,742	90.9%	1,584	Eagle system sex ratio and percent spawn n applied.
Ross Creek		2	2	0	1	1	0.0%	0	Sex ratio and percent spawn n assumed.
Scotch Creek	Sep. 4-10, 2018.	82,192	82,192	0	43,693	38,499	76.2%	29,348	
Seymour River	Sep. 7-13, 2018.	108,490	108,475	15	51,619	56,856	82.2%	46,740	Seymour R. system comp. sex ratio and percent spawn n applied.
Sinmax Creek (Pass Creek)		131	131	0	54	77	93.2%	72	Adams system composite sex ratio and percent spawn n applied.
Yard Creek	Aug. 30-Sep. 5, 2018.	5,560	5,560	0	2,707	2,853	91.5%	2,611	
AREA TOTAL:		496,263	496,245	18	248,105	248,140	86.2%	213,989	
<u>NORTH THOMPSON</u>									
<u>North Barriere-ES</u>									
Barriere River, upper (Fennell Creek)	Aug. 29-Sep. 4, 2018.	2,416	2,416	0	915	1,501	93.8%	1,408	
Harper Creek	Aug. 29-Sep. 4, 2018.	14	14	0	5	9	93.8%	8	U. Barriere R. sex ratio and percent spawn n applied.
AREA TOTAL:		2,430	2,430	0	920	1,510	93.8%	1,416	
<u>CHILCOTIN</u>									
<u>Taseko-ES</u>									
Lastman Creek		0	0	0	0	0	0.0%	0	
Taseko Lake		70	70	0	35	35	100.0%	35	Sex ratio and percent spawn n assumed.
AREA TOTAL:		70	70	0	35	35	100.0%	35	
<u>NECHAKO</u>									
<u>Nadina-Francois-ES</u>									
Glacier Creek ²		54	54	0	25	29	66.7%	19	Nadina R. sex ratio and percent spawn n applied.
Nadina Channel	Sep. 21-27, 2018.	62,775	62,775	0	29,253	33,522	66.7%	22,347	Nadina R. sex ratio and percent spawn n applied.
Nadina River	Sep. 14-24, 2018.	193,966	193,966	0	90,388	103,578	66.7%	69,049	
AREA TOTAL:		256,795	256,795	0	119,666	137,129	66.7%	91,415	
<u>UPPER FRASER</u>									
<u>Bowron-ES</u>									
Bowron River, upper	Sep. 5-14, 2018.	8,190	8,190	0	3,408	4,782	98.7%	4,722	
Huckey Creek ³		216	216	0	90	126	98.7%	124	U. Bowron R. sex ratio and percent spawn n applied.
Sub Total:		8,406	8,406	0	3,498	4,908	98.7%	4,846	

TABLE 1. 2018 PRELIMINARY EARLY SUMMER RUN SOCKEYE SALMON ESCAPEMENT SUMMARY

WATERSHED AREA / CONSERVATION UNIT	PEAK SPAWNING	TOTAL POPULATION	ADULTS	JACKS	MALES	FEMALES	% SPAWN	EFFECTIVE FEMALES*	REMARKS
<u>Indian/Kruger-ES⁴</u>									
Indianpoint Creek	Sep. 5-12, 2018.	130	130	0	54	76	98.7%	75	U. Bowron R. sex ratio and percent spawn applied.
Sub Total:		130	130	0	54	76	98.7%	75	
<u>Upper Fraser (River-Type)⁴</u>									
Bowron River, lower		0	0	0	0	0	0.0%	0	
Sub Total:		0	0	0	0	0	0.0%	0	
AREA TOTAL:		8,536	8,536	0	3,552	4,984	98.7%	4,921	
TOTALS:									
		787,091	786,223	868	382,849	403,374	79.9%	322,288	

* Effective female totals do not include fish killed for biological samples.

¹ Historical escapements (pre-2010) included in the Upper Pitt River escapement.

² No previous historical Sockeye spawning population on record for this cycle year.

³ Historical escapements (pre-2004) included in the Bowron River escapement.

⁴ Unvalidated CU; further research is required to determine if a valid CU (Grant et. al 2011).

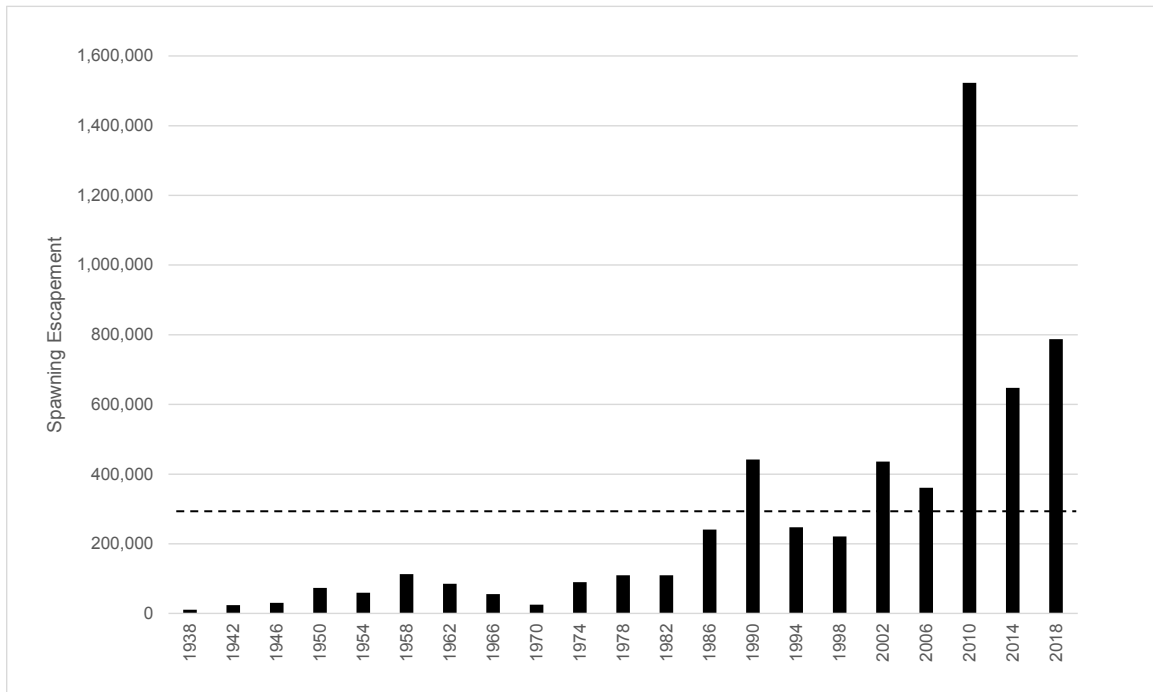
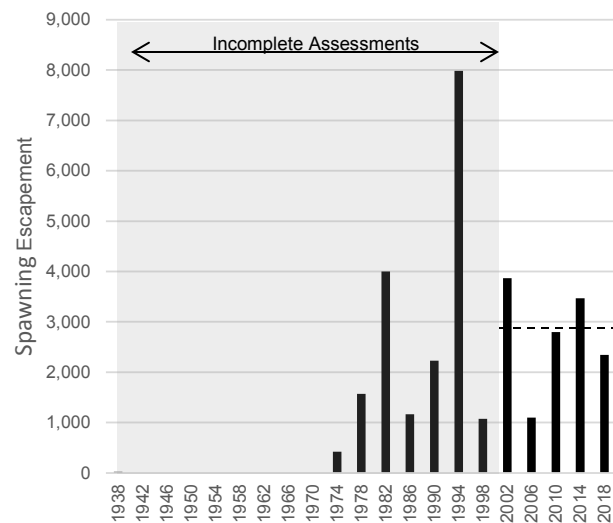
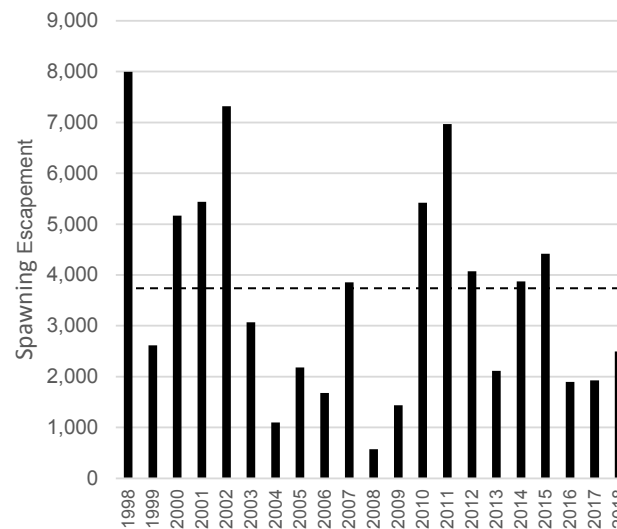


Figure 1. Historical Early Summer Run Sockeye spawning escapements on the 2018 cycle line. Dashed line indicates the cycle year average.

a. Chilliwack-ES



b. Nahatlatch-ES



c. Pitt-ES

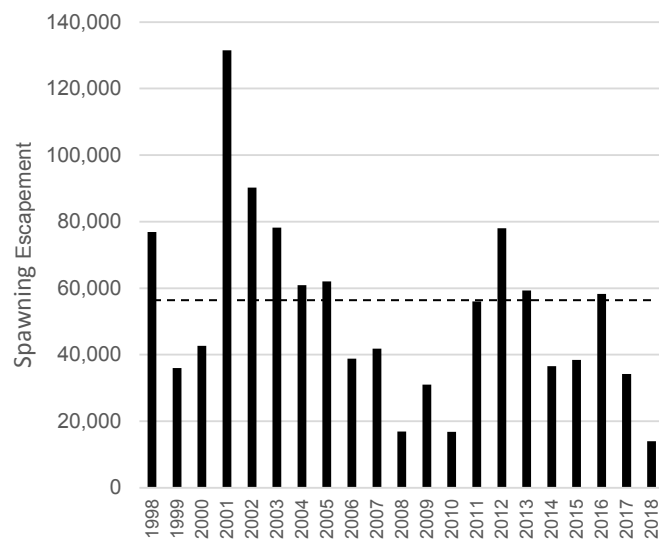
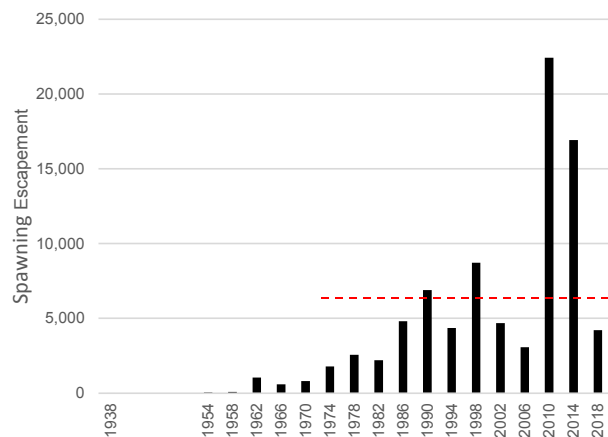
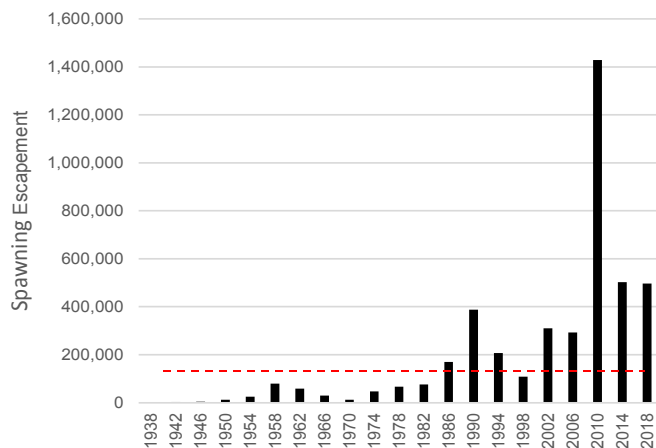


Figure 2 (a-c). Historical spawning escapements for the Lower Fraser area Early Summer Run Sockeye CUs (conservation units); Chilliwack-ES (a), Nahatlatch-ES (b) and Pitt-ES (c). Dashed line indicates the recent average (1998-2017) except for Chilliwack-ES which indicates the recent cycle year average (2002-2014).

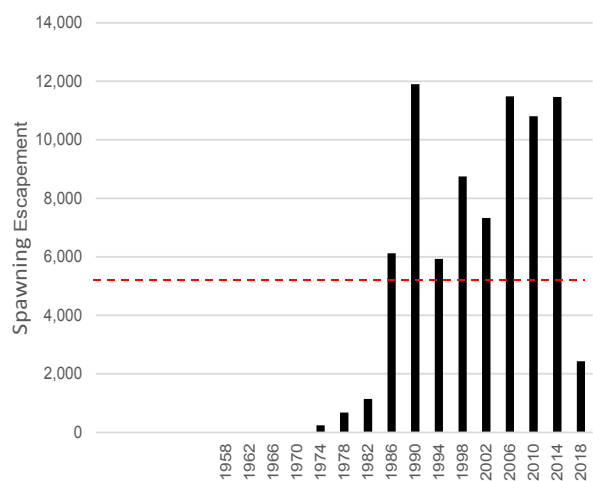
a. Anderson-Seton-ES



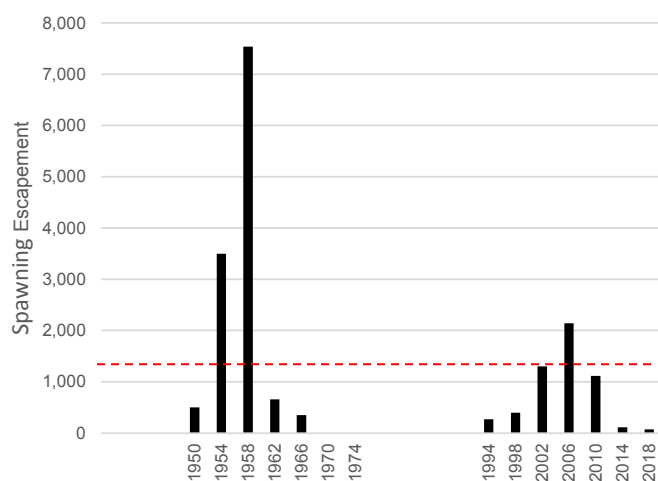
b. Shuswap-ES



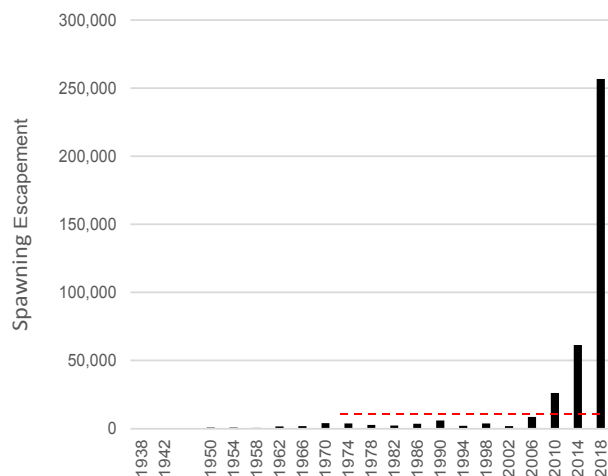
c. North Barriere-ES



d. Taseko-ES



e. Nadina-Francois-ES



f. Bowron-ES

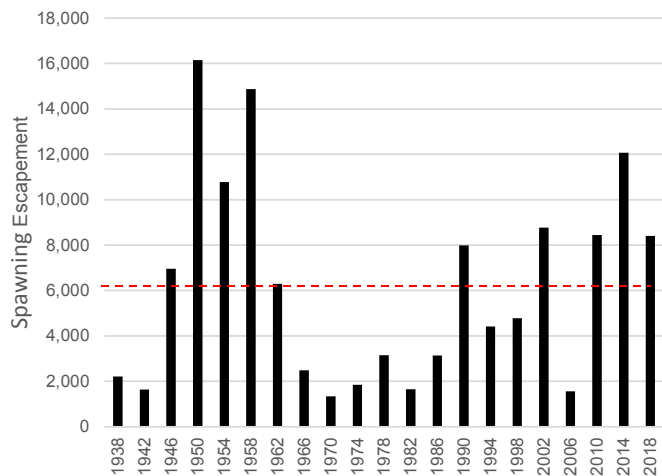


Figure 3 (a-f). Historical Early Summer Run Sockeye spawning escapements by CU on the 2018 cycle line; Anderson-Seton-ES (a), Shuswap-ES (b), North Barriere-ES (c), Taseko-ES (d) and Nadina-Francois-ES (e) and Bowron-ES (f). Dashed line indicates the cycle year average. Missing years indicate no assessments were conducted.

a. Upper Fraser (River-Type)



b. Indian/Kruger – ES

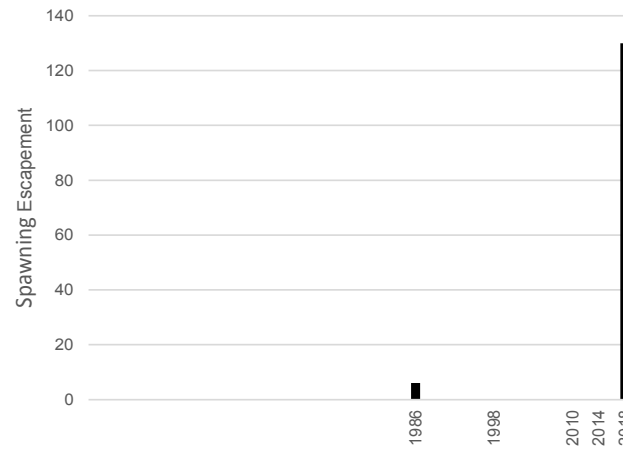


Figure 4 (a-b). Historical spawning escapements for the Upper Fraser area Early Summer Run Sockeye CUs requiring validation on the 2018 cycle line; Upper Fraser (River-Type) (a) and Indian/Kruger-ES (b). Missing years indicate no assessments were conducted.