



# 2018 Post-season Review

## Fraser Sockeye

presented to: FORUM on Conservation and Harvest Planning  
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Fraser Sockeye

# **2018 PRE-SEASON**

# 2018 Run Size Forecasts

- Fraser Sockeye forecasts are expressed as a range of values and are associated with relatively high uncertainty in large part due to wide variability in annual salmon survival and observation error in the stock-recruitment data.
- The effects of extremely warm water temperatures on survival have been incorporated quantitatively into the forecasts for eight stocks where temperature covariate models historically perform well (Early Stuart, Bowron, Chilko, Quesnel, Raft, Cultus, Weaver, Birkenhead). Together these eight stocks account for 24% to 32% of the total 2018 forecast (depending on the probability level).
- Based on broad scale observations of warm temperatures and ecosystem responses between the 2013 and 2014 brood years, and the recent poor Fraser Sockeye survival, the 2018 Fraser Sockeye total return is expected to be at the lower probability level (10%-25%), below the median (50% probability level) of the forecast range.
  - DFO. 2018. Pre-season run size forecasts for Fraser River Sockeye (*Oncorhynchus nerka*) salmon in 2018.

# 2018 Fraser Sockeye Forecast Summary

Probability that Return will be at/or Below Specified Run Size					
Run timing group	10%	25%	50%	75%	90%
Early Stuart	37,000	54,000	84,000	133,000	199,000
Early Summer	584,000	1,102,000	2,155,000	3,765,000	6,587,000
Summer	1,470,000	2,473,000	4,344,000	7,669,000	13,173,000
Late	3,174,000	4,794,000	7,398,000	11,370,000	16,943,000
<b>TOTAL SOCKEYE</b>	<b>5,265,000</b>	<b>8,423,000</b>	<b>13,981,000</b>	<b>22,937,000</b>	<b>36,893,000</b>

- Given return uncertainty pre-season planning considered the range of forecast values.
- Given pre-season assumptions it was expected that there would be some international TAC at the p10 forecast.
- The final pre-season plan adopted by the Fraser Panel- p50 forecast.

# 2018 Fishery Planning Considerations

- Poor marine survival conditions leading to consideration of fishery planning at lower p-levels (p10 and p25)
- Fishery planning objectives for other stocks and species (Early Stuart, Early-timed Early Summers, Nimpkish, Sakinaw, Cultus, IFR steelhead and coho, SBC chinook)
- Escapement Plan with higher low abundance exploitation rate (LAER) limits (20%) if returns were very low and lower total allowable mortality rate caps (60%)
- Terminal fishery considerations (ESSR type) for stocks that may return in larger numbers than spawning requirements
- Harvest opportunities expected on Early Summer, Summer, and Late run sockeye even at the low end of the forecast

# 2018 Pre-season TAC

- Given pre-season assumptions it was expected that there would be significant harvest opportunities in Canada and the United States at the p50 forecast
- Actual harvest opportunities would be dependent on in-season information
- In Canada it was expected that Cultus sockeye would be a key constraint in being able to access available TAC

	<b>E.STU.</b>	<b>E.SUMM.</b>	<b>SUMM.</b>	<b>LATE</b>	<b>TOTAL</b>
<b>TOTAL RUN:</b>	84,000	2,155,000	4,344,000	7,398,000	13,981,000
<b>DEDUCTIONS</b>					
<b>NET ESC.</b>	84,000	862,000	1,737,500	2,959,200	5,642,700
<b>AFE:</b>	7,500	74,900	153,300	164,400	400,100
<b>TEST FISH:</b>	800	19,700	37,800	45,700	104,000
<b>MANAGEMENT ADJUSTMENT</b>	58,000	198,300	173,800	1,272,500	1,702,600
<b>pMA</b>	0.69	0.23	0.10	0.43	
<b>TOTAL DEDUCTIONS</b>	150,300	1,154,900	2,102,400	4,441,800	7,849,400
<b>TAC FOR INTERNATIONAL SHARING:</b>	-	1,000,100	2,241,600	2,956,200	6,197,900
<b>U.S. SHARE OF TAC. + PAYBACK:</b>	-	164,600	369,000	486,600	1,020,200
<b>BALANCE TO CANADA:</b>	7,500	910,400	2,025,900	2,634,000	5,577,800

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# **2018 IN-SEASON INFORMATION**

# Final In-season Stock Status

## 2018 Run status of Fraser sockeye salmon

Date: Oct. 31, 2018

Week of: Oct. 28 - Nov. 3, 2018	Sockeye				Total Fraser
	Management Group				
	E.Stuart	E.Summer	Summer	Late	
Mission passage (inclds Pitt, Alouette, Coquitlam)	121,400	1,128,300	2,067,900	2,316,900	5,634,500
Catch downstream of Mission	1,800	651,800	2,007,300	2,320,300	4,981,200
Accounted Run To Date	123,200	1,780,100	4,075,200	4,637,200	10,615,700
<b>Run size adopted in-season <sup>1</sup></b>	<b>125,000</b>	<b>1,800,000</b>	<b>4,100,000</b>	<b>4,700,000</b>	<b>10,725,000</b>
Run size forecasted pre-season	84,000	2,155,000	4,344,000	7,398,000	13,981,000
<b>Area 20 timing adopted in-season</b>	<b>4/Jul</b>	<b>6/Aug</b>	<b>10/Aug</b>	<b>17/Aug</b>	<b>13/Aug</b>
Area 20 timing expected pre-season	2/Jul	8/Aug	11/Aug	17/Aug	14/Aug
<b>Johnstone Str. Diversion Rate</b>	Annual average to date				33%
	Preseason forecast of annual rate:				63%

*1 Run sizes are usually not adopted until after the peak of the run has passed through marine test fishery areas in Juan de Fuca and Johnstone Straits.*

table courtesy of PSC

- Overall a good return but less than the p50 forecast. Most of the deviation was in the Late Run.
- Run timing was very close to expectations while diversion rate through the North was much lower than anticipated pre-season
- Although Late Run timing though Area 20 was close to expectations the delay off the mouth of the river was one of the longest observed since pre 1995 (~23 days)

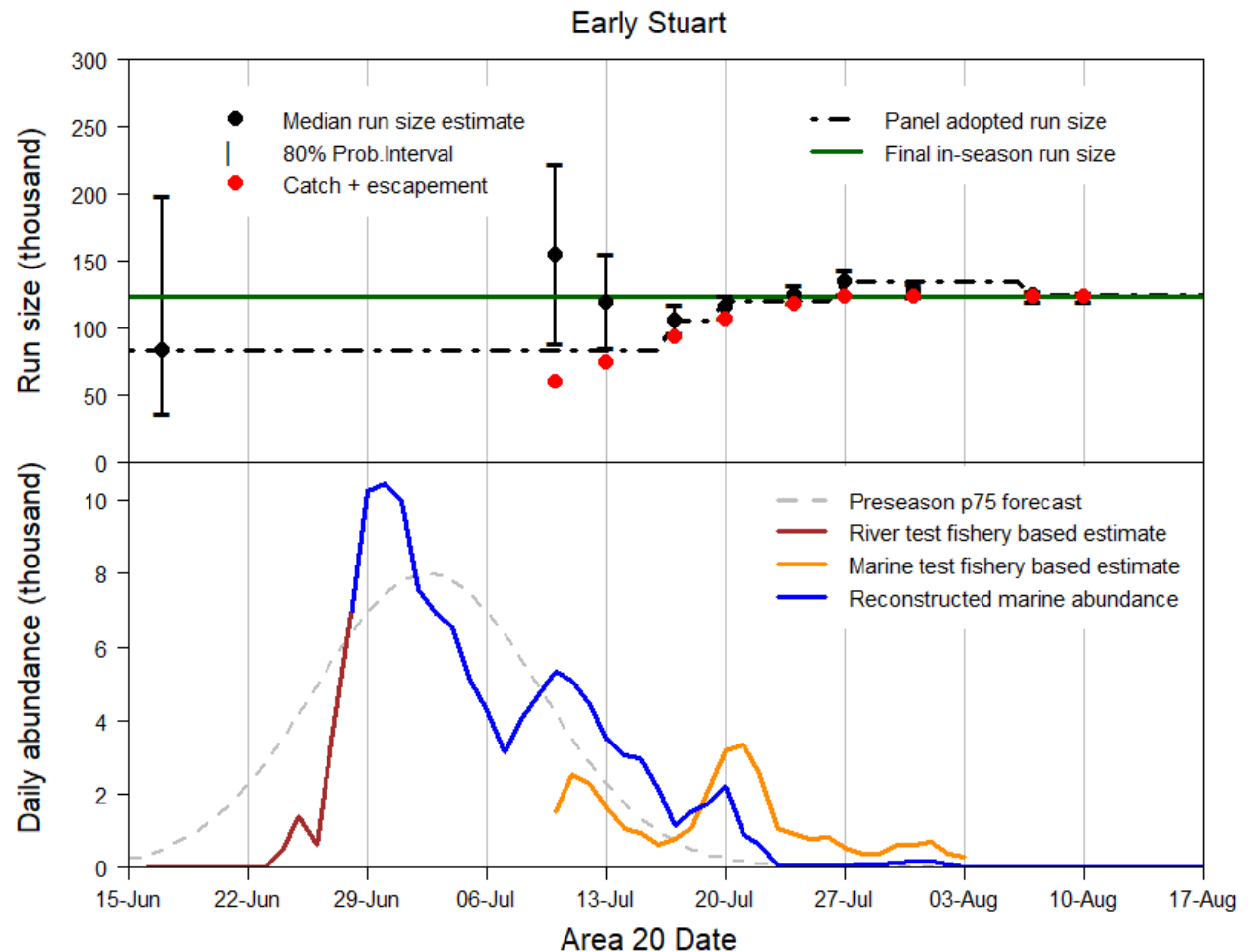


# 2018 Run size: Early Stuart

End-of-season estimate: 47% higher than p50 forecast, similar to the p75 forecast

Date	Adopted Run Size
p50 Forecast	84,000
17-Jul	106,000
20-Jul	120,000
27-Jul	135,000
07-Aug	125,000
End of season*	123,200

\*catch+escapement as of October 31



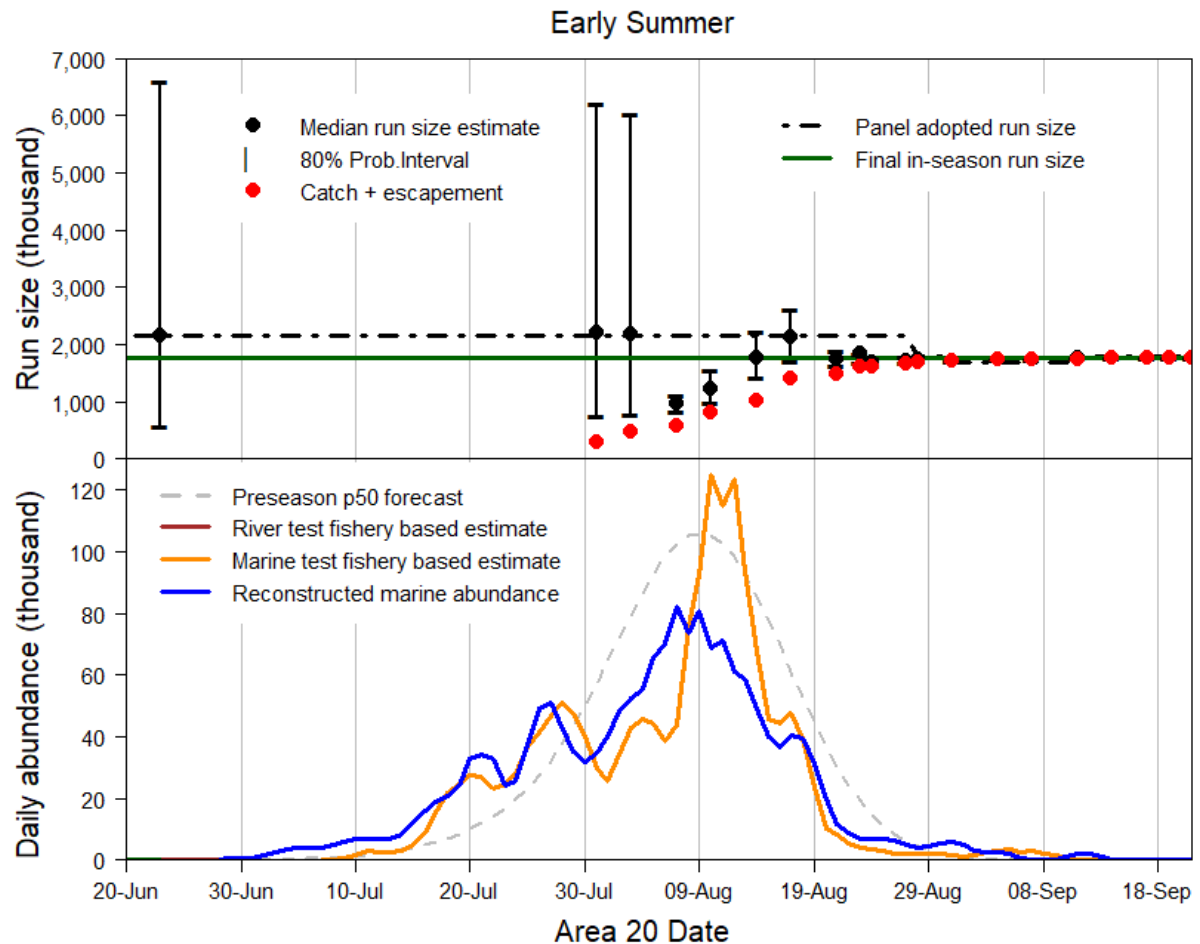
Slide courtesy of PSC

# 2018 Run size: Early Summer Run

End-of-season estimate: 17% lower than p50 forecast;

Date	Adopted Run Size
p50 Forecast	2,155,000
28-Aug	1,800,000
31-Aug	1,700,000
11-Sep	<b>1,800,000</b>
End of season*	1,780,100

\*catch+escapement as of October 31



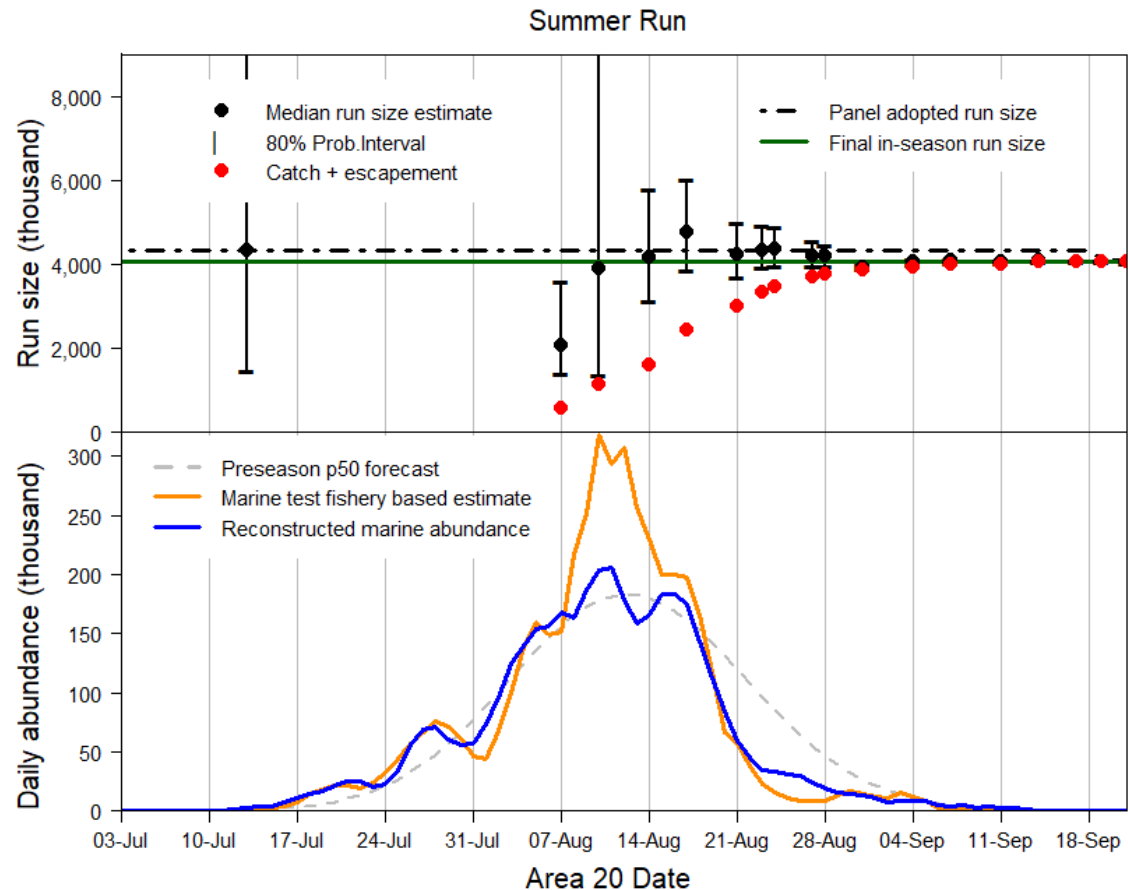
Slide courtesy of PSC

# 2018 Run size: Summer Run

End-of-season estimate: 6% lower than p50 forecast,  
 Quesnel was 79% above

Date	Adopted Run Size
p50 Forecast	4,344,000
28-Aug	4,344,000
19-Sep	<b>4,100,000</b>
End of season*	4,075,200

\*catch+escapement  
 as of October 31



Slide courtesy of PSC

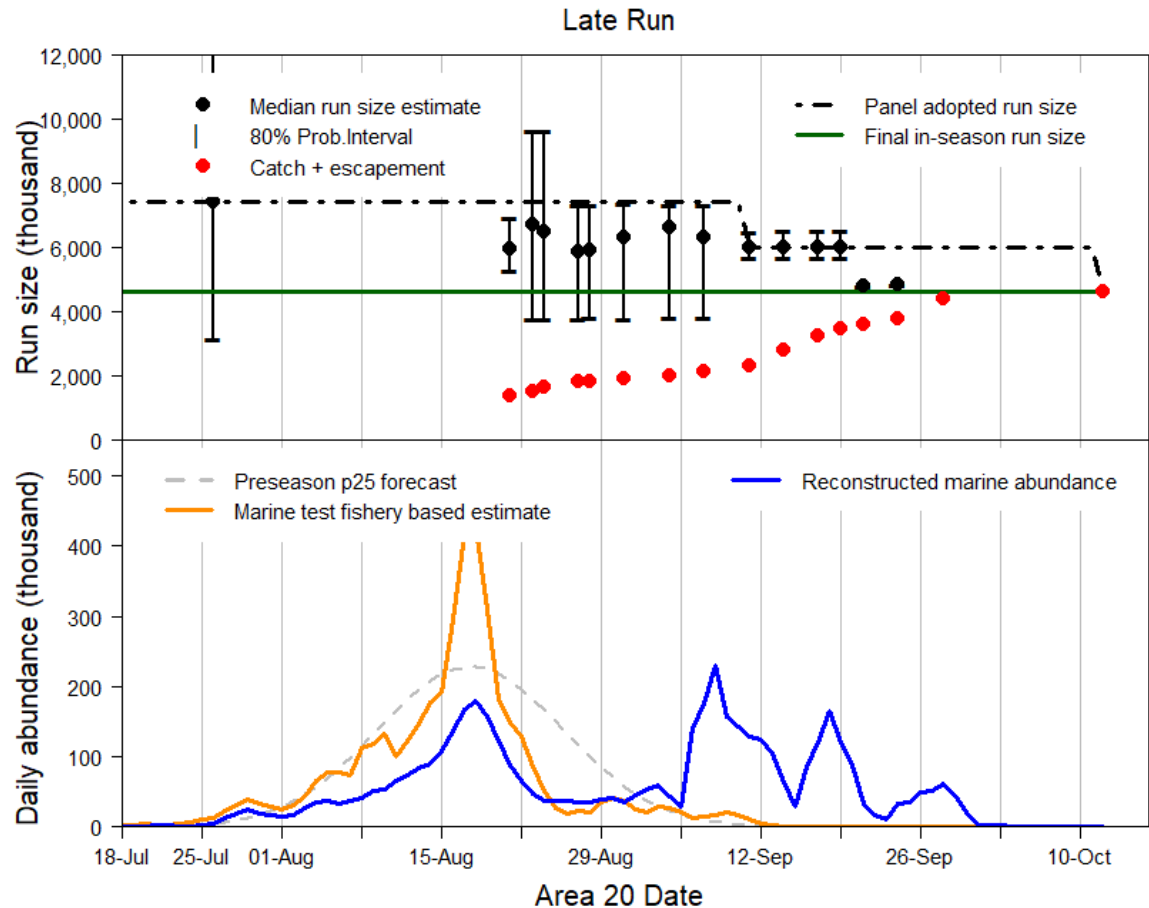
# 2018 Run size: Late Run

End-of-season estimate: 37% lower than p50 forecast, similar to the p25

Date	Adopted Run Size
p50 Forecast	7,398,000
11-Sep	6,000,000
19-Sep*	5,000,000
12-Oct	<b>4,700,000</b>
End of season**	4,637,200

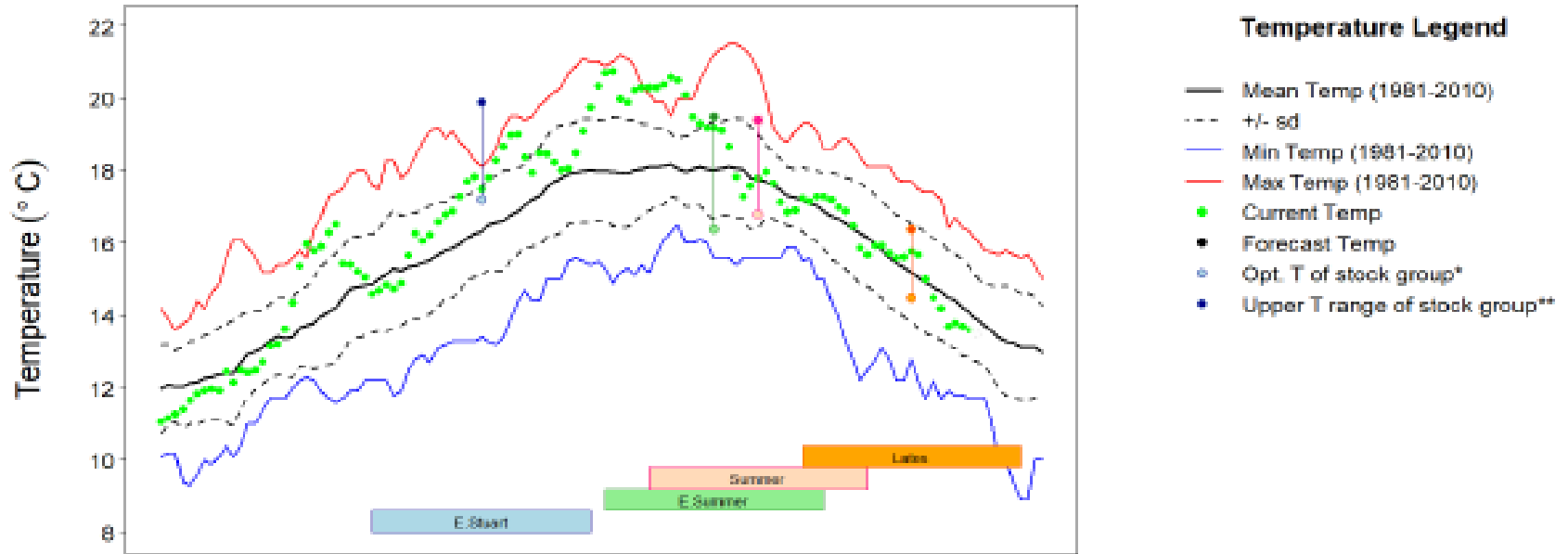
\*Provisionally used for management purposes

\*\*catch+escapement as of October 31



Slide courtesy of PSC

# Environmental Conditions & Differences Between Estimates (DBE)



	Adopted DBEs	
	pre-season	in-season*
Early Stuart	-0.41	NA
Early Summer	-0.19	NA
Summer	-0.09	NA
Lates	-0.30	-0.04

\* NA-No adjustments from pre-season

Note: Late Run value was provisional for management purposes

Graph courtesy of PSC

# Sockeye Fisheries

- Food Social Ceremonial
  - Marine Area: First Gn, Tr Jul 19; PSn Jul 25
  - Fraser River: First Gn Jul 25
- Commercial
  - US: First Jul 27 (low impact Gn)- ending Aug 24 (net)
  - Canada: Various fisheries beginning Aug 1 (Area D Gn) and ending Oct 12 (Kamloops Lake PSn)
- Recreational
  - Marine: Aug 1- Dec 31
  - Fraser River:
    - Mainstem LFA: Aug 7- Sep 5 (below Sawmill)
    - Terminal: various beginning Aug 15- Sep 30 (above Sawmill)

Fraser Sockeye

# **2018 POST-SEASON\***

\* relative to fisheries management season  
... it's still in-season for Stock Assessment!

# Projected Spawners Relative to Escapement Goals

- Projected Escapement (PSC) is based on Mission estimates, catches upstream and FRP adopted DBEs. The table below provides estimates of where we may end up relative to escapement goals for each MU.
- Based on spawning ground updates (preliminary Early Stuart and Early Summer are shown here) it is likely that we will be near escapement objectives for Summer Run sockeye but may be under for Late Runs

**Table: Projected and actual escapement relative to goals expressed as a percent under or over.**

	Lates		Summer		Early Summer		Early Stuarts		Total	
	% Esc. Target		% Esc. Target		% Esc. Target		% Esc. Target		% Esc. Target	
Projected Escapement (PSC)	<b>1,937,800</b>	3%	<b>1,615,200</b>	(2%)	<b>813,700</b>	13%	<b>68,900</b>	(36%)	<b>4,435,600</b>	2%
Escapement Target	<b>1,880,000</b>		<b>1,640,000</b>		<b>720,000</b>		<b>108,000</b>		<b>4,348,000</b>	
Actual Escapement	NA		NA		<b>787,100</b>	9%	<b>48,489</b>	(55%)	NA	
Escapement Target	<b>1,880,000</b>		<b>1,640,000</b>		<b>720,000</b>		<b>108,000</b>		<b>4,348,000</b>	

Note: The Projected Escapements are not preliminary spawning ground estimates. StAD will be providing spawning ground estimates later in the fall and winter.



# Preliminary Post-season Exploitation Rates Relative to Goals

- Catch estimates are preliminary
- Run Sizes may change in January or in May of next year which may affect the escapement goal and exploitation rate estimates

	Early Stuart	Early Summer	Summer	Late	Total
<b>Run Size</b>	125,000	1,800,000	4,100,000	4,700,000	10,725,000
<b>Catch</b>	<b>8,525</b>	<b>799,123</b>	<b>2,323,291</b>	<b>2,684,697</b>	<b>5,815,636</b>
<b>Projections</b>	-	-	<b>4,000</b>	<b>10,000</b>	<b>14,000</b>
<b>Catch and Projections</b>	<b>8,525</b>	<b>799,123</b>	<b>2,327,291</b>	<b>2,694,697</b>	<b>5,829,636</b>
<b>Allowable Impacts (All Fisheries)</b>	<b>12,500</b>	<b>914,400</b>	<b>2,296,000</b>	<b>2,744,800</b>	<b>5,967,700</b>
<b>BALANCE of TAC</b>	<b>3,975</b>	<b>115,277</b>	<b>- 31,291</b>	<b>50,103</b>	<b>138,064</b>
<b>Current Exploitation Rate</b>	6.8%	44.4%	56.7%	57.1%	54.2%
<b>Projected Exploitation Rate</b>	6.8%	44.4%	56.8%	57.3%	54.4%
<b>Allowable Exploitation Rate</b>	<b>10.0%</b>	<b>50.8%</b>	<b>56.0%</b>	<b>58.4%</b>	<b>55.6%</b>

# Preliminary Catch and Allocation

Preliminary percent catch of share relative to in-season catch targets.

Group	Share <sup>a</sup>	Catch <sup>b</sup>	Percent Share <sup>c</sup>
<b>US (Washington) TAC</b>	<b>897,105</b>	<b>989,459</b>	<b>110%</b>
<b>Canada TAC</b>	<b>4,955,045</b>	<b>4,724,754</b>	<b>95%</b>
Marine First Nations FSC	299,023	280,392	94%
Fraser River FN FSC (LFr)	409,226	365,547	89%
Fraser River FN FSC (BCI)	350,000	227,429	65%
<b>FSC Total</b>	<b>1,058,249</b>	<b>873,369</b>	<b>83%</b>
<b>Economic Opportunity and Treaty</b>	<b>226,443</b>	<b>253,368</b>	<b>107%</b>
<b>Demonstration</b>	<b>505,466</b>	<b>258,422</b>	<b>49%</b>
AREA B	1,476,026	1,899,277	117%
AREA D	706,915	475,443	67%
AREA E	734,280	601,827	82%
AREA G	31,429	29,906	95%
AREA H	128,787	181,690	129%
<b>Fleet Total</b>	<b>3,077,437</b>	<b>3,188,143</b>	<b>99%</b>
<b>Recreational</b>	NA	<b>151,452</b>	NA
<b>Test Fisheries</b>	NA	<b>115,423</b>	NA

<sup>a</sup> In-season catch targets based on Treaty and allocation guidelines outlined in the IFMP. Recreational and test fisheries contribute to catch however discrete shares are not calculated in-season.

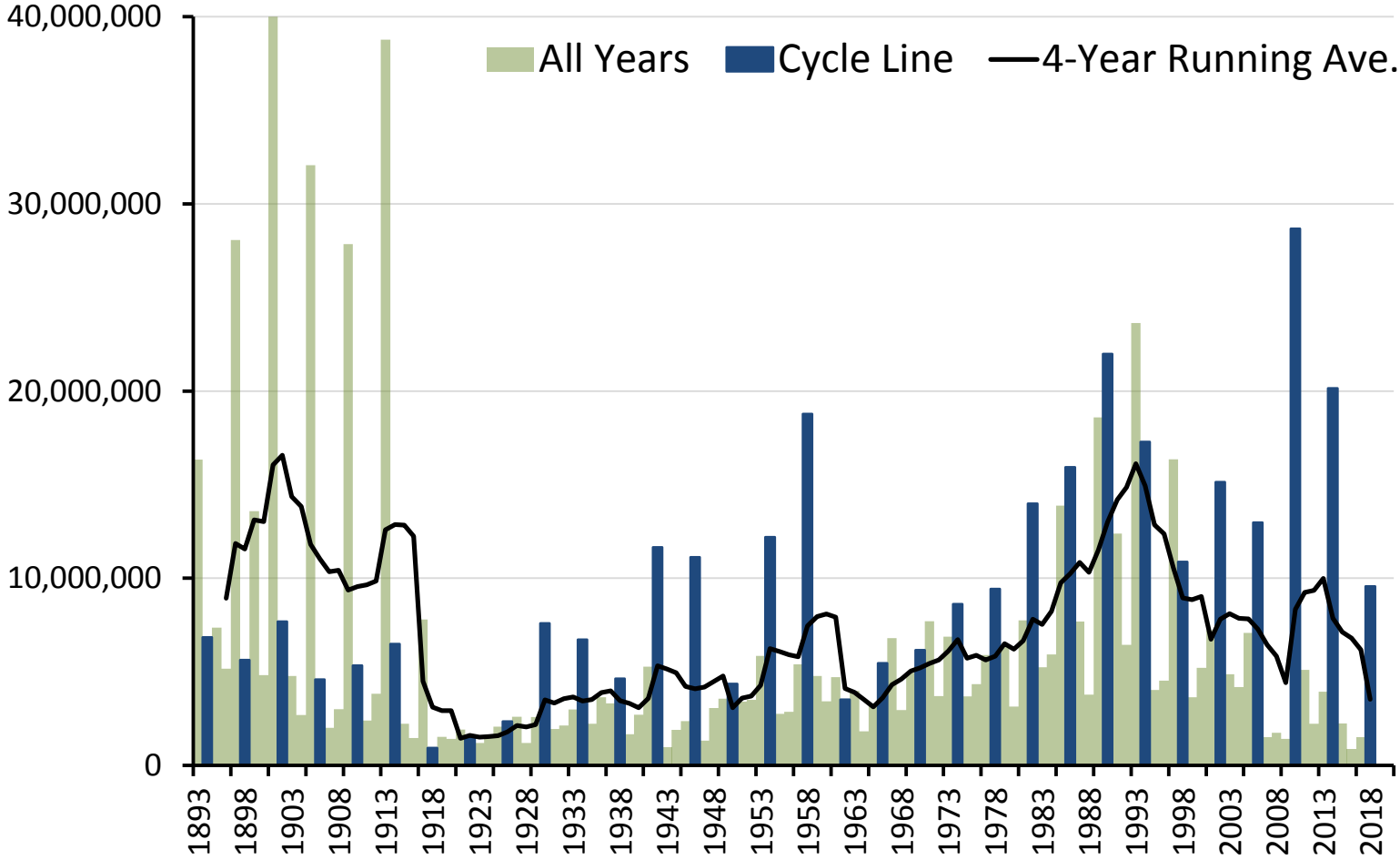
<sup>b</sup> Final in-season catch estimates as of October 31st. Catch includes additional harvest by Area B and H, EO and Demonstration fisheries that were permitted to target uncaught fish from the US, and other Area gear groups.

<sup>c</sup> Percent catch of share relative to targets. Share includes the additional uncaught release (186,233 Sept 21). Note: There were share transfers between Area B and H during the season which would result in an uneven catch per share between the two groups.

# Cultus Brood Stock and Exploitation Rate Objectives

- The Cultus exploitation rate objective was conditional on expecting DFO to reach brood targets. If the return was large enough for brood targets to be achieved Cultus could be managed up to the Late Run allowable exploitation rate.
- Pre-season, given assumptions, it was expected that a brood target of 200 sockeye could be achieved if the in-season Late Run run size reached the p25 forecast.
- The actual brood targets were defined by Science and SEP and were achieved. SEP took advice from Science on the number of fish required to meet genetic integrity requirements and also thought it was beneficial if some sockeye reached the lake to spawn.
- As of November 21<sup>st</sup> 332 Cultus sockeye have passed the fence and 169 have been retained for brood stock (last day of brood retention was Oct 12).
- The brood year escapement was 4,631
- The preliminary Cultus exploitation rate estimate is ~50%
- The Cultus return is similar to the p50 forecast

# 2018 Sockeye Run-size Summary



graph courtesy of PSC

# Next Steps & Timelines

- Early Summer, Summer & Late Run escapement
  - preliminaries: Early Summer & Summer (Dec), Lates (Jan)
  - near finals: Feb
- 2019 FR SK and PK forecasts
  - Feb
- FR SK and PK escapement plan
  - options in draft IFMP