

nearly all stocks will meet escapement goals; although, some central Puget Sound fall Chum stocks appear to be below escapement again this year.

REFERENCES

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

IV. PRELIMINARY REVIEW OF 2017 UNITED STATES FRASER RIVER SOCKEYE AND PINK SALMON

INTRODUCTION

The 2017 Fraser River Panel fishing season was implemented under Annex IV of the Pacific Salmon Treaty (PST) 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 (*Oncorhynchus nerka*) and pink (*O. gorbuscha*) 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 2017 U.S. Fraser River salmon fisheries as authorized by the Panel. Catch and abundance information presented are considered preliminary.

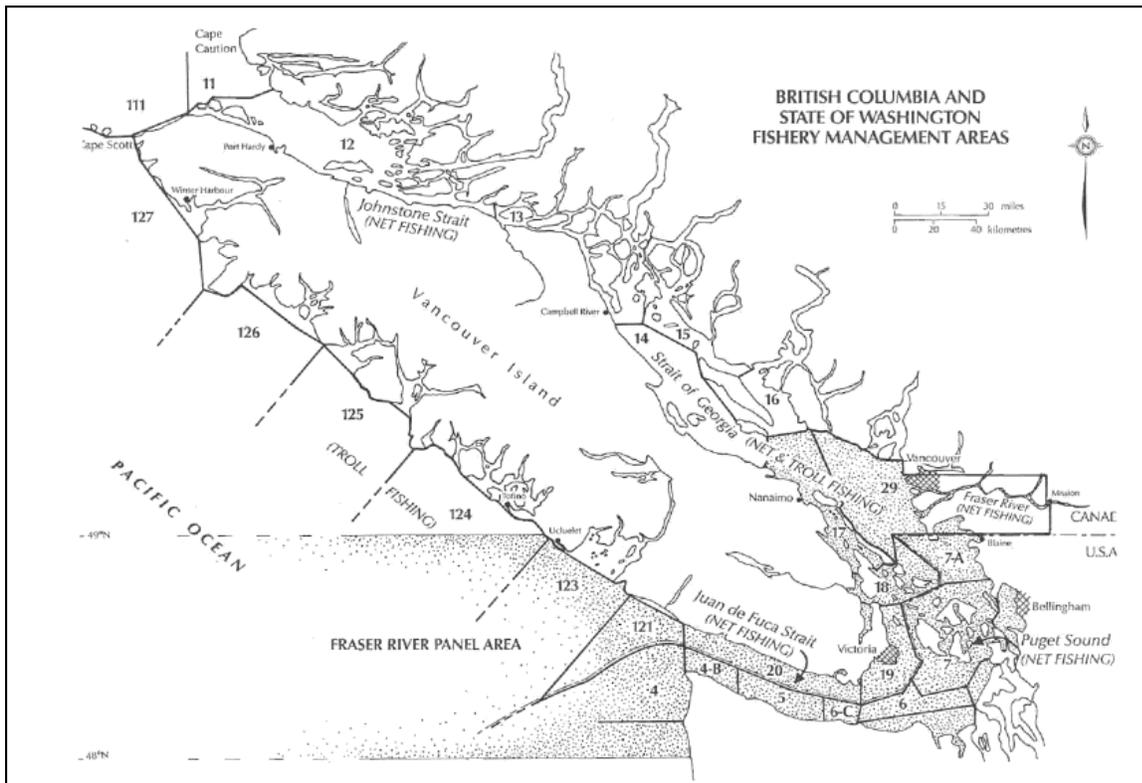


Figure 40. British Columbia and State of Washington Fishery Management Areas, 2017. The shaded area in the figure represents the marine waters managed by the Fraser River Panel.

PRESEASON 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 21 shows the 2017 pre-season sockeye forecasts based on the 50 percent probability level (p50), which represent the mid-point of the range of possible run sizes for all runs. Table 1 also provides the escapement goals for the sockeye run timing groups based on the pre-season abundance forecasts. 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 8,693,000 fish, with an escapement goal of 6 million fish.

Table 21. 2017 pre-season Fraser River sockeye forecasts and escapement goals by run timing group.

	Early Stuart	Early Summer	Summer	Lates	Total
Forecast of Abundance	99,000	343,000	3,407,000	583,000	4,432,000
Escapement Goal	99,000	137,000	1,375,000	314,000	1,925,000

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 preseason forecast for diversion was 51%, which was below the 1990-2016 median diversion rate of 62%. For pink salmon, a preseason northern diversion rate of 50% was adopted based on the correlation between sockeye and pink diversion rates.

Management Adjustments (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. The MAs are modeled using forecasts of environmental conditions and return timing or median historical differences between estimates. Table 22 provides the pre-season projected MAs that were used for planning fisheries in 2017. In-season adjustments use MA models that are based on both measured and forecasted temperatures and discharges or, for Late-run sockeye, upstream migration timing.

Table 22. 2017 pre-season proportional management adjustment (pMA) and corresponding proportional difference between estimates (pDBE) for each run timing group.

Early Stuart		Early Summer		Summer		Lates	
pMA	pDBE	pMA	pDBE	pMA	pDBE	pMA	pDBE
0.89	-47%	0.39	-28%	0.06	-6%	0.92	-48%

Run Timing

Run timing is temporal information about the presence of a salmon stock in an area during a specific time period. Run timing is an important variable when planning fisheries and predicting run size in-season. Area 20 50% dates (the dates when 50% of the run is predicted to have passed through Area 20) were forecast pre-season for the major Fraser River sockeye run groups and shown in Table 23. Because the forecast dates were extremely early relative to historical medians, the Panel adopted adjusted dates that were 2 to 5 days later than the forecast dates.

Table 23. 2017 Area 20 historic 50% run timing dates and updated pre-season timing forecasts in June.

Run Timing Group	Historic Median Date	June Forecast	Panel Adopted
Early Stuart	July 4	June 29	July 1
Early Summer	July 24	July 17	July 20
Summer	August 10	August 2	August 6
Lates	August 18	August 9	August 14
Pink salmon	August 28	August 28	August 28

U.S. Total Allowable Catch (TAC)

Based on the pre-season forecasts, the U.S. Total Allowable Catch (TAC) was established at 279,300 sockeye across all run groups, and 672,000 pink salmon. The TAC available by sockeye run timing group is shown in Table 24.

Table 24. 2017 total U.S. total allowable catch (TAC) by run timing group¹.

Run Timing Group	Pre-season U.S. TAC
Early Stuart	0
Early Summer	20,300
Summer	259,000
Lates	0
Total	279,300

¹ Based on Panel-approved final pre-season model run on July 7, 2017.

Preseason Management Plans

During the pre-season planning process the Panel evaluates and adopts management approaches for Fraser sockeye and pink salmon that address conservation and harvest objectives for each major run timing group. Using the Pacific Salmon Commission (PSC) fisheries planning model, the Panel develops pre-season 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 and meeting escapement objectives for less abundant runs.

In 2017, the pre-season forecast of ~4.4 million Fraser sockeye resulted in available U.S. TAC in the Early Summer and Summer run timing groups (Table 24), with the majority of TAC (~93%) in the Summer run group. While planning pre-season fishing schedules, the lack of TAC in Early Stuart and Late run sockeye left a narrow window for the U.S. to prosecute fisheries and minimize impacts to Early Stuart and Late run sockeye. U.S. fisheries were planned to commence in mid-July right before the peak of Summer run sockeye and prior to Late run sockeye showing up in abundance. The lack of TAC for the Late run group also delayed the start time modeled for pink-directed fisheries until September.

IN-SEASON MANAGEMENT

In-season, the PSC staff analyzes a variety of information to produce best estimates of northern diversion, management adjustments (MAs), 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 these in-season estimates that are critical to Fraser Panel management.

Run Assessment

The final in-season total abundance estimate for sockeye in 2017 (Table 25) was 1,482,000, which was 33% of the pre-season forecast. This represents the second smallest sockeye return to the Fraser River in the last 70 years. Across the four run timing groups, all groups returned well below their preseason forecasts. Early Stuart and Early Summer run sockeye performed similarly with respective in-season run size estimates at 47% and 48% of their pre-season forecasts. The return of Summer-run sockeye was only 31% of the preseason forecast, while Late-run sockeye only returned at 36% of forecast. The return of pink salmon, at 3,616,000 fish, represented 42% of the pre-season forecast. The pink salmon run in 2017 was the second lowest since 1965. Annual average Johnstone Strait diversion rates were 71% for sockeye and 57% for pink salmon.

The timing of 50% of the Fraser sockeye run through Area 20 in 2017 was later than expected across all run timing groups (Table 26). The Early Stuart run arrived 3 days later than expected pre-season (July 4), the Early Summer run arrived 14 days later than expected (August 3), the Summer run arrived 6 days later than expected (August 12), and the Late run arrived 3 days later than expected (August 17). By contrast, timing of Fraser River pink salmon through Area 20 was 10 days earlier than expected based on the pre-season forecast (August 18). Pink salmon timing in 2017 was the earliest on record.

Table 25. Comparison of 2017 pre-season vs. in-season abundance estimates for Fraser River sockeye salmon by run timing group¹.

Run Timing Group	Pre-Season 50% Probability Forecast	In-Season Run Size Estimate	Comparison: In-Season / Pre-Season Forecast
Early Stuart	99,000	47,000	47%
Early Summer	343,000	163,000	48%
Summer	3,407,000	1,062,000	31%
Lates	583,000	210,000	36%
Total Sockeye	4,432,000	1,482,000	33%
Pink salmon	8,693,000	3,616,000	42%

¹ As of October 2, 2017.

Table 26. Comparison of 2017 preliminary 50% run timing dates through Area 20 to in-season estimates.

Run Timing Group	Panel Adopted Run Timing Date	In-season 50% Run Timing Date
Early Stuart	July 1	July 4
Early Summer	July 20	August 3
Summer	August 6	August 12
Lates	August 14	August 17
Pink salmon	August 28	August 18

Season Description

The Fraser Panel met twice a week (usually on Tuesdays and Fridays) between July 14 and September 8, 2017 to receive updates on the abundance and timing of the sockeye and pink salmon returns from PSC staff and to review migration conditions in the Fraser River watershed. In-season abundance estimates were considerably lower than pre-season expectations, so U.S. fisheries were limited. In-river environmental conditions were not a major factor affecting management decisions in 2017. The following summarizes the major decisions related to Fraser sockeye and pink salmon in-season abundance assessments and U.S. fishing during the 2017 season.

July 14, 2017

In-season assessments of the abundance of Early Stuart sockeye indicated that the return was below the p50 forecast, therefore the run size was reduced from 99,000 to 50,000 with a revised Area 20 peak run timing of July 3 (two days later than modeled pre-season). Panel waters closed to commercial salmon fishing.

July 25, 2017

The Fraser River Panel adopted a run size of 166,000 for the Early Summer run (the p25 forecast level), down from 343,000 sockeye modeled pre-season. This eliminated any international TAC available for this group. Panel waters remained closed to commercial salmon fishing.

August 8, 2017

The Panel adopted an Early Stuart estimate of 46,000 sockeye with estimated marine timing of July 4, an Early Summer-run estimate of 125,000 sockeye with median timing of July 31 (11 days later than modeled), and a provisional Summer-run estimate of 1,250,000 sockeye for management purposes. There was no international TAC for the Summer-run at this lower abundance level. Panel waters remained closed to commercial salmon fishing.

August 11, 2017

The Panel officially adopted a Summer-run size of 1,250,000 with median timing of August 14 (8 days later than modeled). Panel waters remained closed to commercial salmon fishing.

August 18, 2017

The Panel adopted a slightly higher Early Summer run size of 150,000 with a peak timing in Area 20 of August 2, and a Late-run run size of 247,000 (the p25 forecast level) with a peak timing estimate of August 18 (four days later than modeled). Panel waters remained closed to commercial salmon fishing.

August 22, 2017

Although there was no international TAC available for Fraser River sockeye, fisheries directed at Fraser River pink salmon were approved by the Panel. The first Panel-approved U.S. commercial fishery for pink salmon was scheduled for August 23 to August 26 for Treaty Indian fishers in Areas 4B, 5, and 6C. A Treaty Indian pink-directed reef net fishery in Areas 7 and 7A was also approved for August 23, 24, and 25. Retention of sockeye was permitted for ceremonial and subsistence (C&S) purposes only.

August 25, 2017

The Panel decreased the Summer-run run size from 1,250,000 to 1,000,000 sockeye with an updated 50% marine timing of August 11.

The Panel approved U.S. Treaty Indian pink-directed net fisheries in Areas 6, 7, and 7A from August 25 to August 26. Also, a Treaty Indian pink-directed reef net fishery in Areas 7 and 7A was approved for August 26. Retention of sockeye was permitted for C&S purposes only.

An All Citizens' pink-directed fishery with non-retention of sockeye was also approved for reef nets in Areas 7 and 7A from August 25 and August 26.

August 28, 2017

The Panel adopted an interim pink salmon run size for management purposes of 4,800,000 (down from 8,693,000) with a 50% peak migration timing date through Area 20 of August 24 (four days earlier than forecast). U.S. TAC at this lower run size was 97,000 pink salmon.

The Panel approved the following pink-directed fisheries:

Treaty Indian fisheries in Areas 4B, 5, and 6C from August 29 to September 1; Treaty Indian net fishing in Areas 6, 7, and 7A from August 30 to August 31; and Treaty Indian reef net fishing in Areas 7 and 7A on August 29 and 30. Retention of sockeye was permitted for C&S purposes only

All Citizens' fisheries with non-retention of sockeye were approved for purse seines and gillnets in Areas 7 and 7A for August 29; and for reef nets on August 29 and 30.

August 31, 2017

The Panel approved additional U.S. fisheries directed at Fraser pink salmon in Panel waters.

Treaty Indian fisheries in Areas 4B, 5, and 6C, and Areas 6, 7, and 7A were approved from September 1 to September 5, with retention of sockeye for C&S purposes only.

All Citizens' fisheries in Areas 7 and 7A were also approved from September 1 to September 5. Retention of sockeye salmon was prohibited.

When it was determined that the U.S. fleet had exceeded available pink salmon TAC on September 3, all Panel-approved U.S. fisheries were closed by emergency order.

September 5, 2017

The U.S. informed Canada for concurrence prior to opening small portions of Areas 7 and 7A for both Treaty Indian and All Citizens' fisheries from September 6 to September 12. These fisheries were opened to facilitate removal of Atlantic salmon (*Salmo salar*), a non-native species that escaped from net pens operated by Cooke Aquaculture in Deepwater Bay, Cypress Island. Retention of sockeye and pink salmon were prohibited.

September 8, 2017

The Panel adopted final in-season run-size estimates for all sockeye management groups and pink salmon: Early Stuart – 47,000 sockeye with July 4 timing; Early Summer – 165,000 sockeye with August 4 timing; Summer – 1,044,000 sockeye with August 11 timing; and Late – 231,000 sockeye with August 16 timing. The Panel also adopted a pink salmon run size of 3,700,000 with 50% marine timing through Area 20 of August 19.

Table 27 summarizes changes to sockeye and pink salmon run sizes made by the Fraser Panel during the 2017 season.

Table 27. Summary of changes to Fraser River sockeye and pink run size estimates made by the Fraser Panel during the 2017 season.

Meeting Date	Group	Change Made
July 14, 2017	Early Stuart	decreased to 50,000
July 25, 2017	Early Summer	decreased to 166,000
August 8, 2017	Early Stuart	decreased to 46,000
	Early Summer	decreased to 125,000
August 11, 2017	Summer	decreased to 1,250,000*
August 18, 2017	Early Summer	increased to 150,000
	Late	decreased to 247,000
August 25, 2017	Summer	decreased to 1,000,000
August 28, 2017	Pink	decreased to 4,800,000*
September 5, 2017	Pink	decreased to 4,500,000*
September 8, 2017	Early Stuart	increased to 47,000
	Early Summer	increased to 165,000
	Summer	increased to 1,044,000
	Late	decreased to 231,000
	Pink	decreased to 3,700,000

*Provisional adjustment for management purposes.

HARVEST

U.S. harvest opportunities for sockeye salmon in 2017 were expected to be limited going into the season and in-season abundances estimates were continually downgraded from pre-season expectations throughout the season with no sockeye available for U.S. TAC after the decreases to the run sizes that the Panel adopted at the July 25 and August 11 meetings. The limited sockeye harvest that occurred was in Treaty Indian C&S fisheries (Table 28). There were no All Citizens' fishery openings directed at Fraser sockeye in 2017.

Between August 23 and September 5, the U.S. caught a total of 1,421 Fraser sockeye and 105,956 Fraser pink salmon (Table 29). During this period, Treaty Indian commercial fisheries were open for a total of 10 days in Areas 4B, 5, and 6C, seven days for net fisheries in Areas 6, 7, and 7A, and 9 days for reef nets in Areas 7 and 7A. All Citizens' commercial fisheries in Areas 7 and 7A were open for gillnet and purse seine fisheries for four days and seven days for reef nets.

U.S. Treaty Indian and All Citizen fisheries re-opened September 6 through September 12 in small portions of areas 7 and 7A to facilitate the removal of Atlantic salmon but did not retain any sockeye or pink salmon. No other fisheries were authorized in Panel waters prior to relinquishment by the Panel.

Table 28. Preliminary estimate of 2017 U.S. catches of Fraser River sockeye salmon in Panel area waters.

	Treaty Indian	All Citizens'
Ceremonial and Subsistence (all areas)	1,421	0
Commercial Catch in Areas 4B/5/6C	0	0
Commercial Catch in Areas 6/7/7A	0	0
Total Catch	1,421	0
% of U.S. Catch	100.0%	0

Table 29. Preliminary estimate of 2017 U.S. catches of Fraser River pink salmon in Panel area waters.

	Treaty Indian	All Citizens'
Ceremonial and Subsistence (all areas)	26	0
Commercial Catch in Areas 4B/5/6C	0	0
Commercial Catch in Areas 6/7/7A	94,989	10,941
Total Catch	95,015	10,941
% of U.S. Catch	89.7%	10.3%