



2022 Fraser Sockeye

Pre-season Presentation

Presented to: Fraser and
Approach Forum

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Photo by Maxime Veilleux

Presentation Outline

For Discussion:

- 1) Draft Sockeye Escapement Options
- 2) Key Management Considerations
 - Early Stuart Window Closure
 - Cultus Lake Sockeye Management
- 3) Other Considerations



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Fraser Sockeye

2022 Draft Fraser Sockeye Escapement Plan Options

Escapement Plan Options

Option 1- Brood Year (2018) Escapement Plan

Management Unit	Harvest Rule Parameters			
	Low Abundance ER (LAER)	TAM Cap	Lower Fishery Reference Point	Upper Fishery Reference Point
Early Stuart	10%	60%	108,000	270,000
Early Summer (w/o misc)	20%	60%	180,000	450,000
Summer (w/o misc)	20%	60%	1,020,000	2,550,000
Late (w/o misc)	20-30%	60%	1,100,000	2,750,000

Option 2: Modified Brood Year (2018) Escapement Plan

Management Unit	Harvest Rule Parameters			
	Low Abundance ER (LAER)	TAM Cap	Lower Fishery Reference Point	Upper Fishery Reference Point
Early Stuart	10%	20%	108,000	135,000
Early Summer (w/o misc)	20%	50%	180,000	360,000
Summer (w/o misc)	20%	50%	1,250,000	2,500,000
Late (w/o misc)	20%	50%	1,100,000	2,200,000

Option 3: Conservative Escapement Plan

Management Unit	Harvest Rule Parameters			
	Low Abundance ER (LAER)	TAM Cap	Lower Fishery Reference Point	Upper Fishery Reference Point
Early Stuart	10%	20%	108,000	135,000
Early Summer (w/o misc)	10%	40%	180,000	300,000
Summer (w/o misc)	10%	40%	1,250,000	2,083,000
Late (w/o misc)	10%	40%	1,100,000	1,833,000

Note: blue cells indicate changes from the Option 1 Escapement Plan

Escapement Options - Summary

	p10	p25	p50	p75	p90
Option 1					
Max Allowable Harvest Rate	20%	36%	52%	52%	52%
Allowable Harvest (TF, US, CDN)	470,854	1,689,520	5,097,860	10,650,700	21,875,400
Total projected spawners	1,629,200	2,480,800	3,912,600	8,160,500	16,662,400
Option 2					
Max Allowable Harvest Rate	20%	31%	40%	40%	41%
Allowable Harvest (TF, US, CDN)	470,854	1,434,720	3,952,300	8,253,300	16,931,400
Total projected spawners	1,629,200	2,718,000	4,878,300	10,180,100	20,820,700
Option 3					
Max Allowable Harvest Rate	10%	25%	29%	29%	29%
Allowable Harvest (TF, US, CDN)	237,377	1,173,480	2,806,740	5,856,000	12,024,700
Total projected spawners	1,830,500	2,928,000	5,843,900	12,199,500	24,959,300



Photo by Maxime Veilleux

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2022 MANAGEMENT ISSUES AND KEY CONSIDERATIONS

Key Considerations- Early Stuart

- Early Stuart p50 forecast of 105,000.
- Early Stuart three-week window closure implemented to protect stock of concern.
 - Extension of window closure to four weeks aimed at protecting early timed Early Summer Stocks (e.g., Bowron, Taseko).
- Management actions include no fishing for Sockeye during specified window closure.
- Actual dates may be adjusted based on in-season run timing information.

Key Considerations- Early Stuart/Early Summers

Areas	Start Date	End Date ~3 Weeks	End Date ~4 weeks
Areas 11 to 17, 19 to 21, 121 and 123 to 127	June 19	July 15	July 22
Areas 18 and 29	June 28	July 21	July 27
Steveston to Mission	June 28	July 21	July 27
Mission to Sawmill	June 30	July 23	July 29
Sawmill to Deadman	July 3	July 25	Aug 1
Deadman-Hixon	July 8	July 30	Aug 6
Hixon to Prince George	July 11	Aug 2	Aug 9
Prince George to Stuart River	July 13	Aug 4	Aug 11

Key Considerations- Cultus Lake

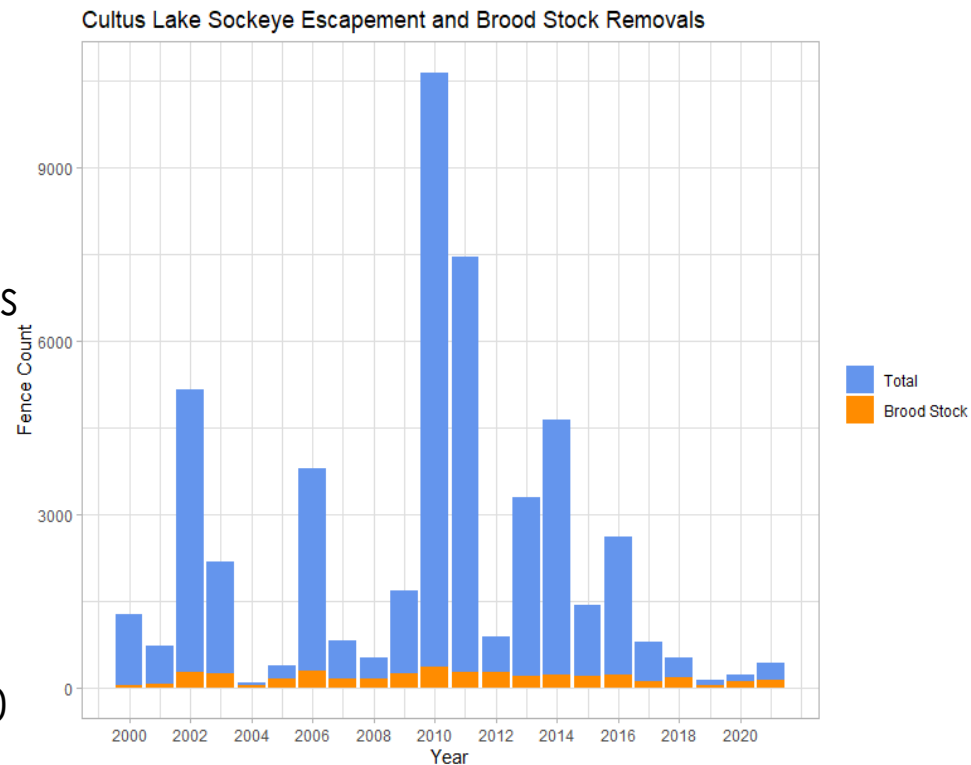
- Cultus Lake Sockeye assessed as Endangered by COSEWIC in 2003 and 2017.
 - Not listed under the *Species at Risk Act*.
- Recovery Objectives developed in 2005 through National Conservation Strategy and again in 2020 through SARA RPA process.
 - Overall, goal to halt population decline and return to status of self-sustaining and genetically robust wild population.
- Major threats include: **lake eutrophication**, mortality associated with migration timing, fisheries interceptions, and change in freshwater habitat conditions ([DFO 2020](#)).
- Stock is part of the larger aggregate MU of Late Run Sockeye.

Key Considerations- Cultus Lake: Background

- Based on low forecast and changes in environmental conditions, recovery objectives will not be achieved in 2022.
- Poor status of the population primarily attributed to very low rates of smolt production.
- In-season information available for Late run size only.
 - No in-season data specifically for Cultus Lake Sockeye.
- 2022 p50 forecast of 3.7 million for the Late Run, and 1,000 for Cultus Lake.

Key Considerations- Cultus Lake: Enhancement

- Hatchery enhancement activities began in 2000
- Release strategies involves smolt releases into Sweltzer Creek and some fry into Cultus lake.
- Hatchery production targets designed to reflect the achievement towards recovery objectives.
- Planned enhancement measures for 2022 will be consistent with recent years.
- In 2022, adult removals for brood stock set at the lower level of:
 - a) 200 fish or
 - b) 50% of the run (based on p50 pre-season forecast).

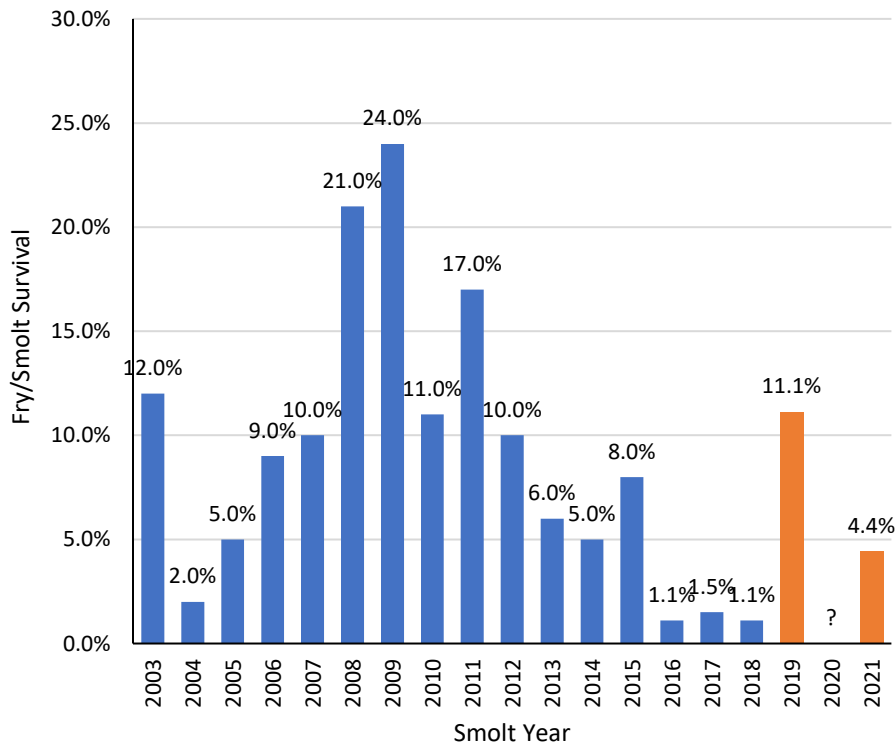


Key Considerations- Cultus Lake: Enhancement

Past Enhancement		Current Enhancement	
Approach	Year	Approach	Year
Captive Brood Program	2002 - 2013	Fry and smolt releases	2004 - Present
Lake Shore Fry Releases (exposing fish to predation at release)	2004 - 2005	Mid-Lake Fry Releases	2006 - Present
August-October Fry Releases	2004 - 2018	January Fry Releases (during optimal Oxygen levels to improve survival)	2019 - Present

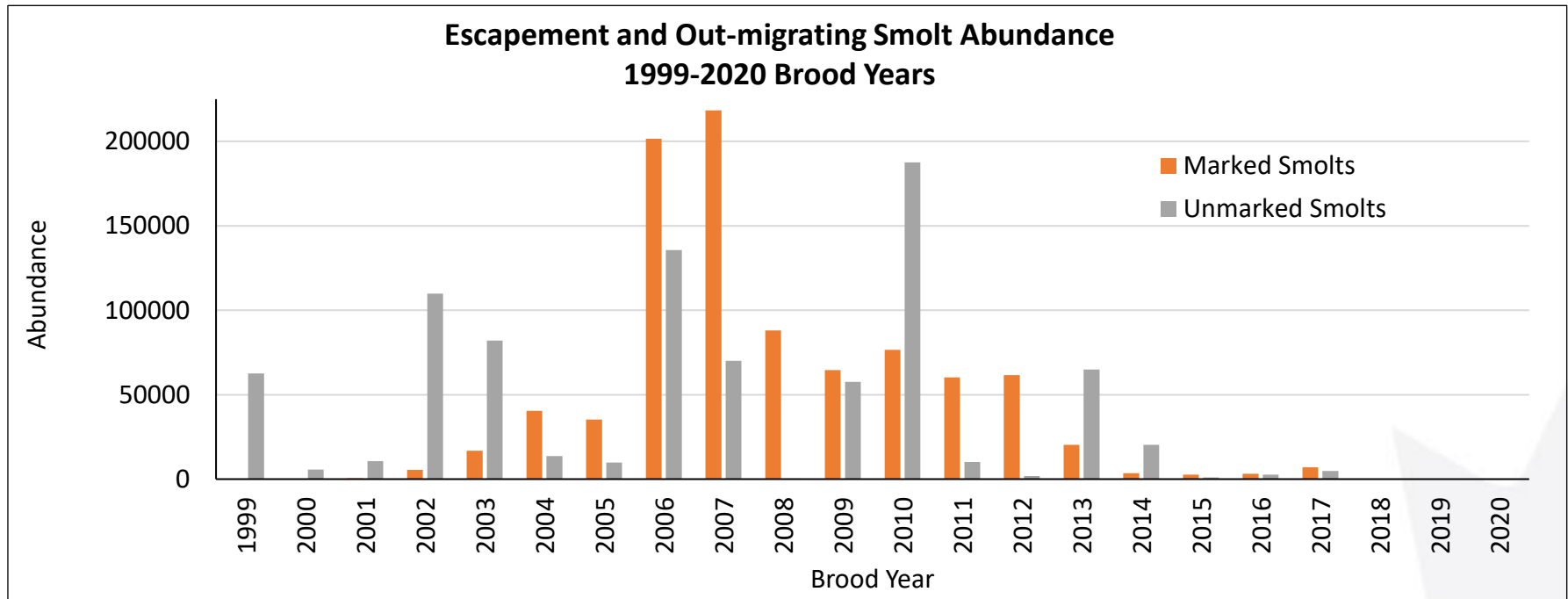
Key Considerations- Cultus Lake: Enhancement

Survival of Hatchery Origin
Sockeye Fry in Cultus Lake 2003-2021



- 2022 brood year (2018) escapement was low.
 - **504** individuals returning to the fence and **168** removed for hatchery brood stock.
- **186,445** fry were released into Cultus Lake, with additional smolts released into Sweltzer Creek.
- Normal smolt outmigration assessments did not occur in 2020 due to the COVID-19 pandemic.

Key Considerations- Cultus Lake: Enhancement



Brood Year	Smolt Year	Brood Stock Removals	Fry Releases into the Lake	Marked Out-migrating Smolts	Fry/Smolt Survival
2017	2019	111	62,825	7,001	11%
2018	2020	168	186,445	-	-
2019	2021	45	4,891	217	4%

Key Considerations- Cultus Lake: Threat Mitigation

- Invasive species mitigation:
 - Eurasian milfoil control (2006).
 - Eurasian milfoil removal experiments (2019).
 - Northern Pikeminnow removal program in the lake (ongoing).
 - Derby style fishery.
- Habitat monitoring:
 - Lake ecosystem monitoring (ongoing).
 - Limnological and juvenile salmon survival studies (ongoing).

Key Considerations- Cultus Lake

- Summer and Late Run fisheries may be constrained by Cultus Lake Sockeye.
- In recent years, Cultus Lake Sockeye have been managed in 2 ways:
 - Off-cycle years: max. allowable ER was the greater of:
 - a) LAER identified for Late Run Sockeye, or
 - b) ER that is consistent with continued rebuilding of population based on in-season information on returns and potential numbers of effective spawners.
 - 2018 (dominant year): Cultus ER to be managed in-line with the Late Run ER.



Photo by Maxime Veilleux

Fraser Sockeye

OTHER ISSUES

Other Issues-

Sharing Opportunities: Overview

- For FSC fisheries, a sharing plan may be required to distribute impacts between marine and Fraser River First Nations.
- When FSC fisheries are prosecuted using the LAER, the Department's current approach is to license amounts by area to guide low-impact fisheries.

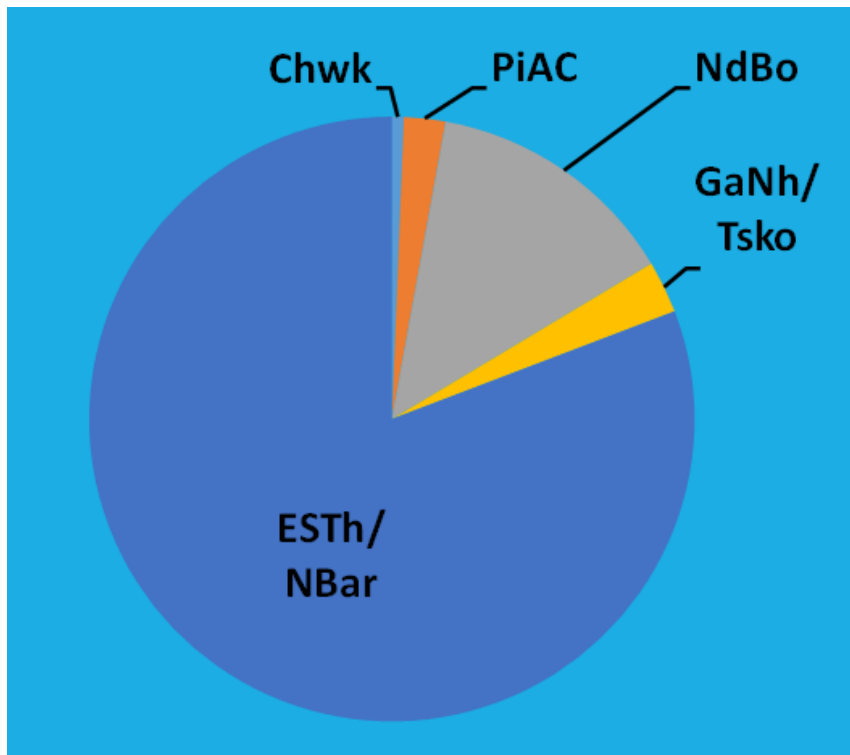
Area	% Total
South Coast	25.4%
Lower Fraser	41.3%
BC Interior	33.3%

Other Issues- Sharing Opportunities: 2022

- Stocks within an aggregate are not evenly distributed spatially
- Based on the pre-season forecast, sharing may be a possibility for the Early Summer run.

Other Issues- Stock Proportions: Early Summer

Early Summer



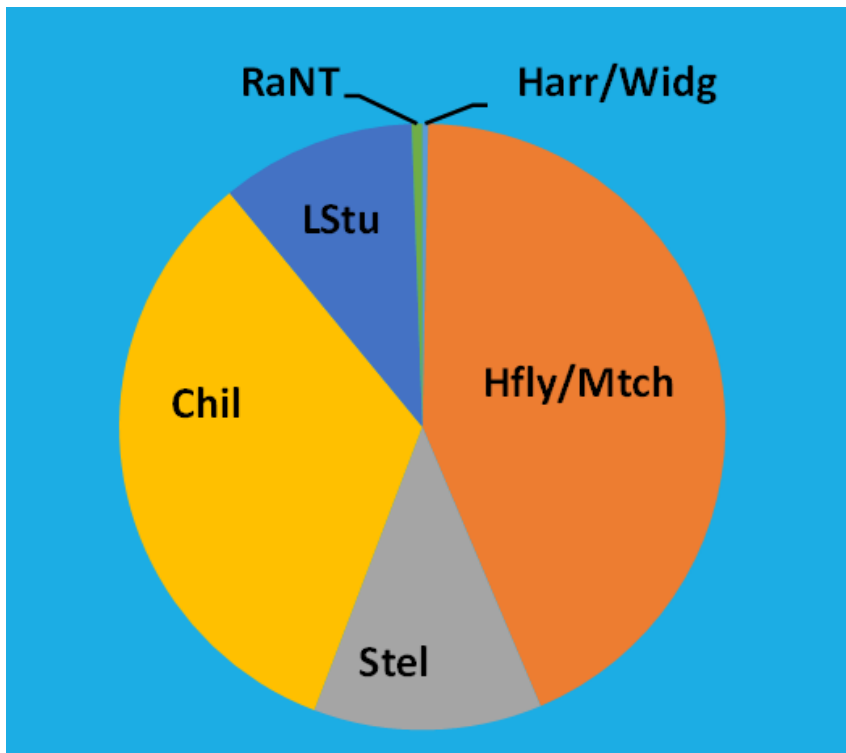
Provided by the PSC

Stock	Stock Name	Proportion of Aggregate
ESTh/NBar	Early South Thompson, North Barriere	80.8%
NdBo	Nadina, Bowron	13.6%
GaNh/Tsko	Gates, Nahatlach, Taseko	2.8%
PiAC	Pitt, Alouette, Coquitlam	2.2%
Chwk	Chilliwack	0.6%

Note: green cells indicate Lower Fraser stocks

Other Issues- Stock Proportions: Summer

Summer



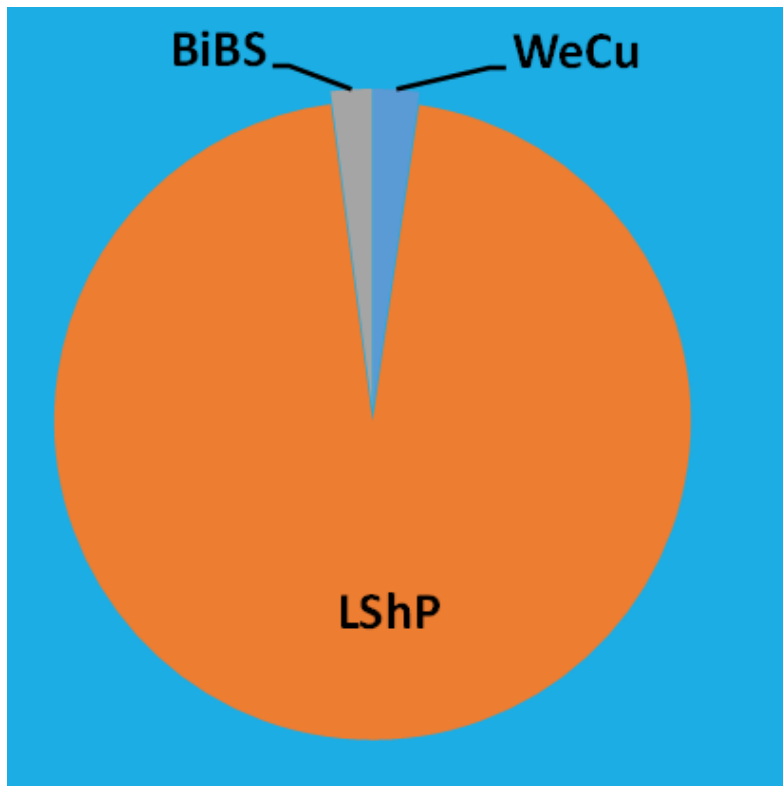
Stock	Stock Name	Proportion of Aggregate
Hfly/Mtch	Horsefly, Quesnel	43.3%
Chil	Chilko	33.2%
Stel	Stellako	12.2%
LStu	Late Stuart	10.4%
RaNT	Raft, North Thompson	0.6%
Harr/Widg	Harrison, Widgeon	0.3%

Provided by the PSC

Note: green cells indicate Lower Fraser stocks

Other Issues- Stock Proportions: Lates

Lates



Stock	Stock Name	Proportion of Aggregate
LShP	Late Shuswap, Portage	95.6%
WeCu	Weaver, Cultus	2.3%
BiBS	Birkenhead, Big Silver	2.0%

Note: green cells indicate Lower Fraser stocks

Provided by the PSC

Other Issues

- Alaskan Catch
 - Treaty negotiation issue
 - Catches are low but variable
 - Linked to Chapter 2
- 2022 FSC Allocations
- Low Abundance Exploitation Rate (LAER)
- Excess to Salmon Spawning Requirements (ESSR)
- Economic Opportunity/Demonstration Fisheries

ADDITIONAL SLIDES

2022 Fraser Sockeye Forecast Summary

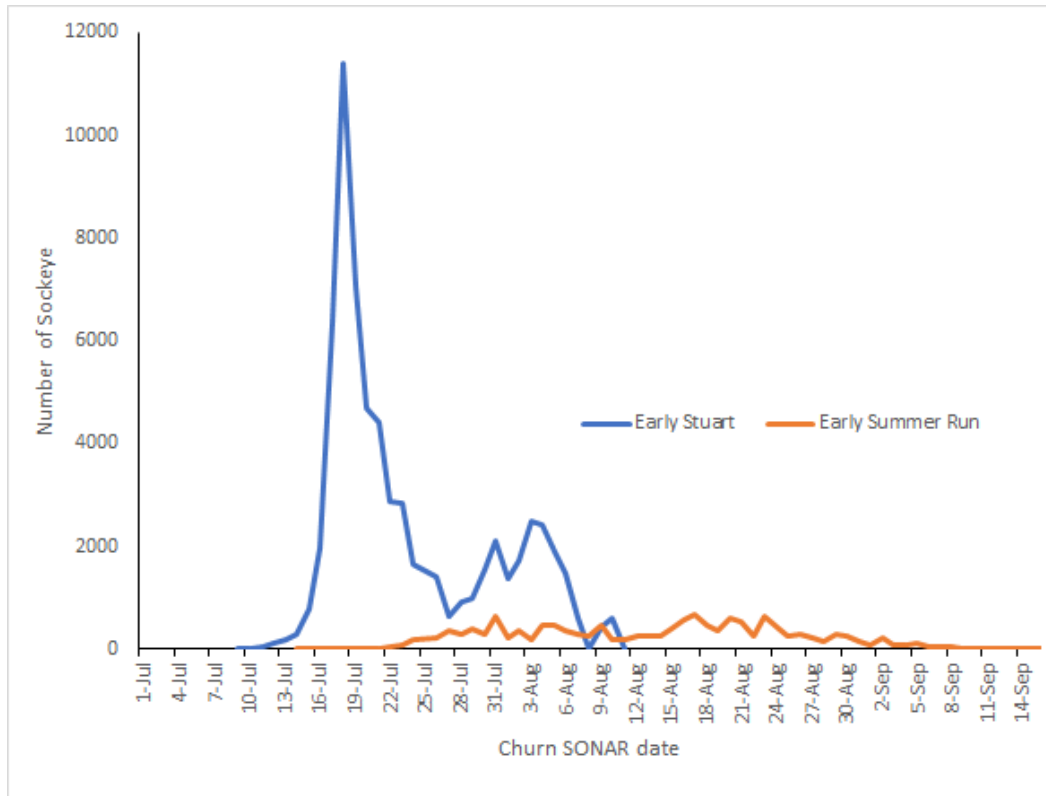
Group	Probability that return will be at/or Below Specified Run Size				
	10%	25%	50%	75%	90%
E. Stuart	39,000	63,000	105,000	172,000	268,000
E. Summer	384,000	767,000	1,579,000	3,159,000	5,686,000
Summer	1,239,000	2,231,000	4,403,000	8,904,000	17,468,000
Late	711,000	1,604,000	3,688,000	8,160,000	18,285,000
TOTAL	2,374,000	4,662,000	9,775,000	20,395,000	41,707,000

Escapement Options - Key Questions

- What Option do you prefer? Are there other Options we should consider?
- Given recent returns and uncertainty in the forecast, are there additional actions that should be considered to address returns at the lower end of the forecast?
- Are there additional measures that should be considered for specific stocks within the aggregates that are a concern (E.g., Cultus Lake Management)?
- Given the return forecast distribution and potential constraints to access allowable harvest, should additional harvest in terminal areas where surpluses are expected be considered?

Key Considerations- Early Stuart: Migration timing

Big Bar E. Stuart and Early Summer Migration (2021)



- E. Stuart have short migration timing.
- Overlap with early timed Early Summer stocks.
- 2022 Nadina return anticipated to be high abundance compared to 2021
 - High 2018 brood year abundance