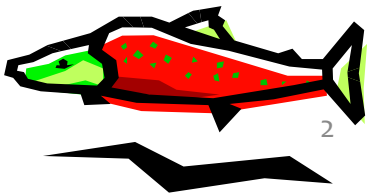
2015 Post-season Review

Fraser Sockeye & Pink

presented to: Forum on Harvest and Conservation
by: J. Nener
date: 16-Jan-2016

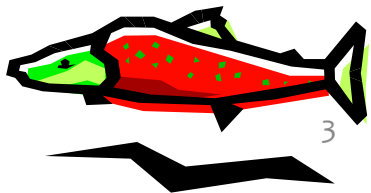
Overview

- Background
- Pre-season
- In-season
- Post-season
- Next steps/Timelines



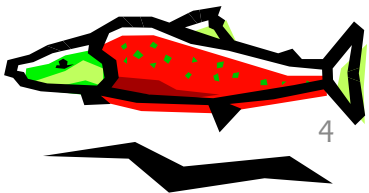
Fraser Sockeye & Pink

BACKGROUND



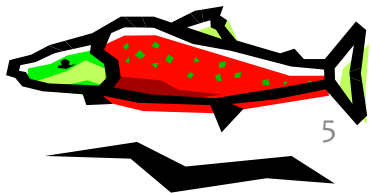
Fraser Sockeye Life History

- Currently there are 24 WSP Conservation Units identified for Fraser Sockeye
- Generally Fraser Sockeye that rear in lakes return predominantly as 4 year olds spending two years in freshwater and two years in the marine environment (4_2). Some stocks can exhibit strong 5 year old components (5_2) (i.e. Pitt River).
- Some Fraser sockeye stocks that rear temporarily in the estuary of the Fraser River return predominantly as three year olds (3_1) or four year olds (4_1) where less time is spent in freshwater (Harrison).



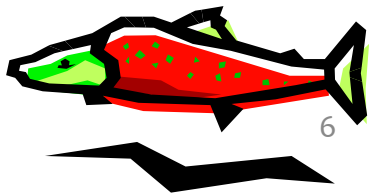
Fraser Pink Life History

- All Fraser Pinks are considered part of the same WSP CU
- Fraser pinks migrate out to sea in the spring immediately following the adult return and return as 2 year old adults
- As with all South Coast pinks, Fraser Pinks mainly return on odd calendar years, however, there are small numbers of pinks that return to the Fraser on even years.



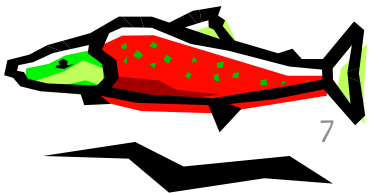
Harvest Management: FR Sockeye

- The four Fraser sockeye aggregates managed under the PST Annex generally contain stocks with similar return timing in the marine area.
  - The stocks within the 4 aggregates was adjusted in 2012 so that Harrison, Raft, and North Thompson stocks are now considered Summer run.
- Canada's escapement plan specifies escapement requirements that vary with run size for each run timing aggregate and includes an abundance below which there are very limited directed harvests allowed and a total mortality cap.
- At low sockeye aggregate abundances, low abundance exploitation rates (LAERs) are implemented to protect the majority of the run timing aggregate while allowing for fisheries on more abundant co-migrating run timing groups and/or species
- In-season assessments of run size, timing and environmental conditions and concerns for other sockeye stocks and species directly influence harvest opportunities



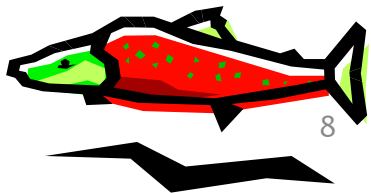
Harvest Management: FR Pinks

- Fraser Pinks are managed as one aggregate
- Similar to Fraser Sockeye, the Fraser Pink escapement plan is abundance based. Unlike the FR SK escapement plan, however:
  - directed exploitation rate is allowed at all run sizes (i.e., no LAER)
  - there is no management adjustment applied
- In-season assessments of run size, timing and concerns for stocks and species of concern directly influence harvest opportunities



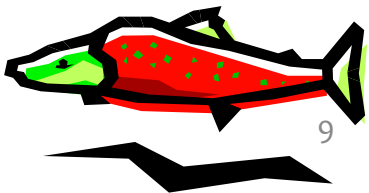
Fraser Sockeye & Pink

2015 PRE-SEASON



Run size forecasts

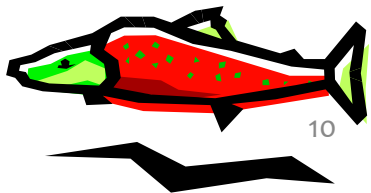
- run size forecasts are expressed as a range of values that largely reflect the density-independent survival (such as environmental and biological conditions) stocks have historically experienced.
- the forecasts for Chilko and Harrison were flagged in 2015
  - sibling models (jack-to-four year olds) for Chilko indicated a much smaller forecast than best performing model (i.e., higher chance returns would fall at lower p-levels)
  - new higher productivity Harrison regime (post-2000 brood year) and very little SR data in this period (poorly understood population dynamics and extremely variable age proportions); the forecast range was wide and where returns would fall was highly uncertain.
  - Chilko + Harrison = >80% of the Summer run p50 forecast



2015 FR SK & PK run size forecast

	p10	p25	p50	p75	p90
Early Stuart	8,000	16,000	30,000	58,000	108,000
Early Summer	236,000	424,000	837,000	1,603,000	2,963,000
Summer	1,701,000	2,681,000	4,675,000	8,764,000	16,511,000
Late	419,000	703,000	1,236,000	2,210,000	3,998,000
TL Sockeye	2,364,000	3,824,000	6,778,000	12,635,000	23,580,000
TL PINK	7,661,000	10,385,000	14,455,000	20,450,000	27,776,000

The Fraser Panel started the season at p50 forecast for pink & all sockeye run timing groups except Early Stuart, which started at p25.

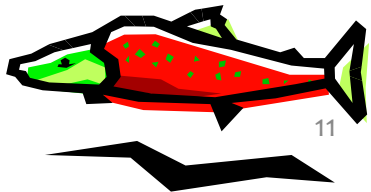


2015 FR SK Escapement Plan

Management Unit	Harvest Rule Parameters: Low Abundance ER (LAER)	TAM Cap	Lower Fishery Reference Point	Upper Fishery Reference Point	Pre-season pMA	esc. goal @p50 forecast	ER @p50 forecast
Early Stuart	10%	60%	108,000	270,000	0.68	30,000	0%
Early Summer (w/o misc)	10%	60%	100,000	250,000	1	334,800	20%
Summer (w/o misc)	10%	65%	1,000,000	2,857,000	0.17	1,636,250	59%
Late (w/o misc)	20-30%	60%	300,000	750,000	0.95	494,400	22%

notes:

- TAM cap on Summers = 65% due to forecast range
- starting EStu run size at p25 doesn't change the esc. plan
- pMAs are as of the start of July in-season meetings
- Late run 20% LAER would change to 30% allowable ER if >p75



Pink Escapement Plan

2015 IFMP:

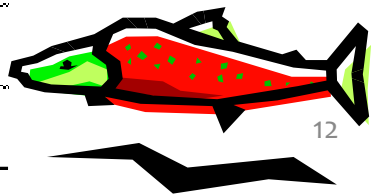
Table 7-24: Fraser River Pink Salmon Escapement Plan for 2015.

7,059,000	Lower Fishery Reference Point
20,000,000	Upper Fishery Reference Point
70%	Maximum Exploitation Rate

	Pre-season Forecast Return				
	p10	p25	**p50**	p75	p90
forecast	7,661,000	10,385,000	14,455,000	20,450,000	27,776,000
escapement target	6,000,000	6,000,000	6,000,000	6,135,000	8,333,000
allowable ER	22%	42%	58%	70%	70%

translation:

run size	**escapement plan**
less than 7.059M	ER linearly increases from 0% at run size =0 to 15% at run size = 7.059M
between 7.059M & 20M	esc goal = 6M
greater than 20M	ER = 70%

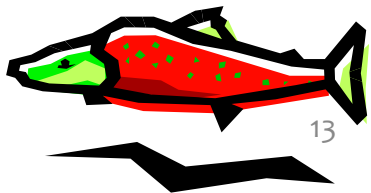


Projected Catch & Escapement at p50 forecast

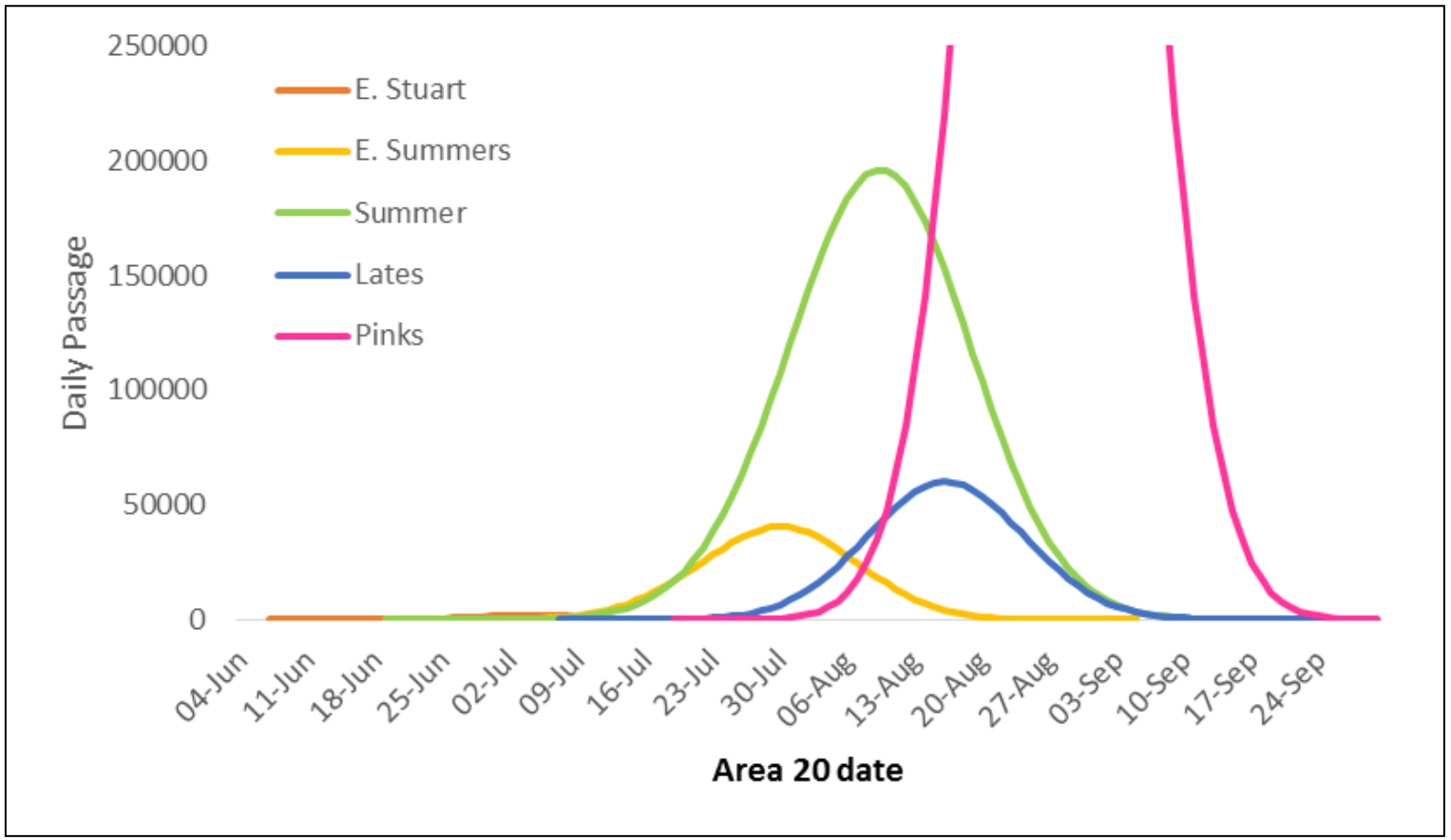
Run timing group	historical escapement cycle yr	historical escapement brood year	PSE* @p50	p50 PSE comparisons to cycle	p50 PSE comparisons to BY	potential catch@p50
Early Stuart	51,000	1,000	16,000	31%	1600%	3,000 **
Early Summer	150,000	219,000	335,000	223%	153%	167,400
Summer	778,000	1,866,000	1,636,000	210%	88%	2,760,550
Lates	519,000	494,000	494,000	95%	100%	270,000
Pinks	6,500,000	9,361,564	6,000,000	n/a	n/a	8,455,000

* PSE = potential spawning escapement (after catch & pMA taken into account)

** catch projected using LAER



2015 Run Timing Curves



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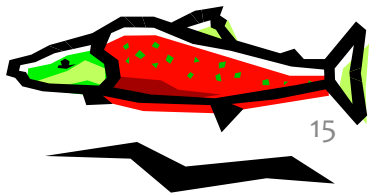
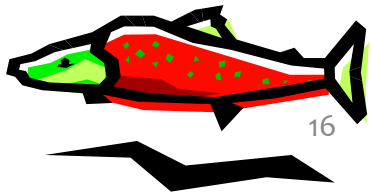
2015 IN-SEASON



run size

	p10	p25	p50	p75	p90	post-season*
Early Stuart	8,000	16,000	30,000	58,000	108,000	32,100
Early Summer	236,000	424,000	837,000	1,603,000	2,963,000	373,000
Summer	1,701,000	2,681,000	4,675,000	8,764,000	16,511,000	1,549,200
Late	419,000	703,000	1,236,000	2,210,000	3,998,000	165,800
TL Sockeye	**2,364,000**	**3,824,000**	**6,778,000**	**12,635,000**	**23,580,000**	**2,120,100**
TL PINK	7,661,000	**10,385,000**	**14,455,000**	**20,450,000**	**27,776,000**	**5,781,300**

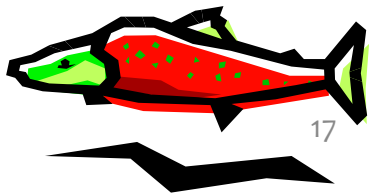
* preliminary post-season estimates October 2015



A20 Timing

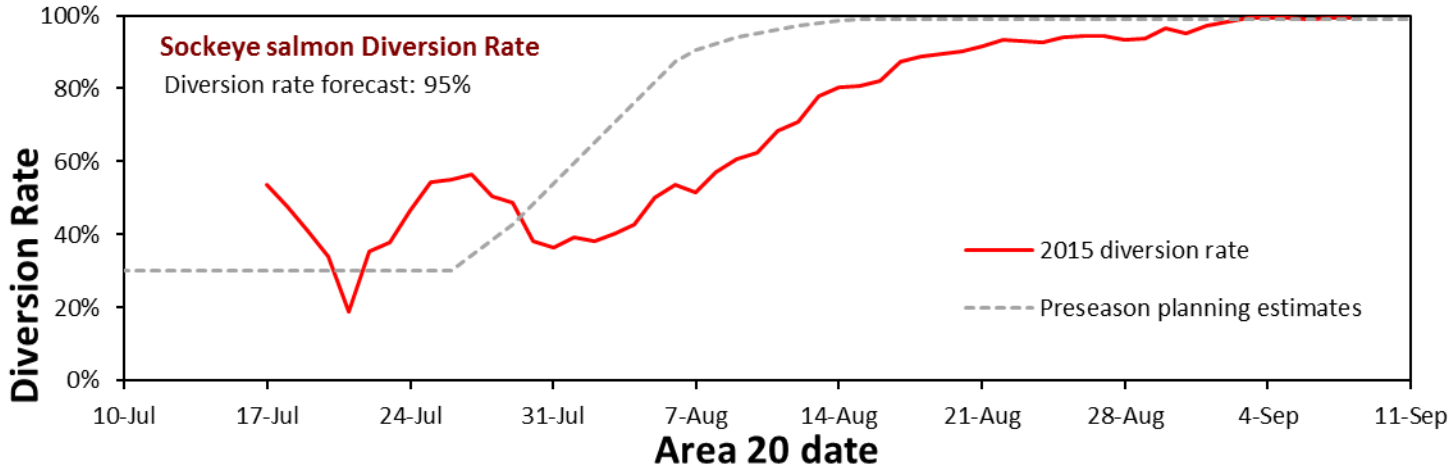
	long term medians	pre-season (June)	post-season (October)
Early Stuart	04-Jul	08-Jul	06-Jul
Early Summer	30-Jul	01-Aug	30-Jul
Summer	08-Aug	07-Aug	11-Aug
Lates	16-Aug	17-Aug	21-Aug
Pinks	28-Aug	28-Aug	22-Aug

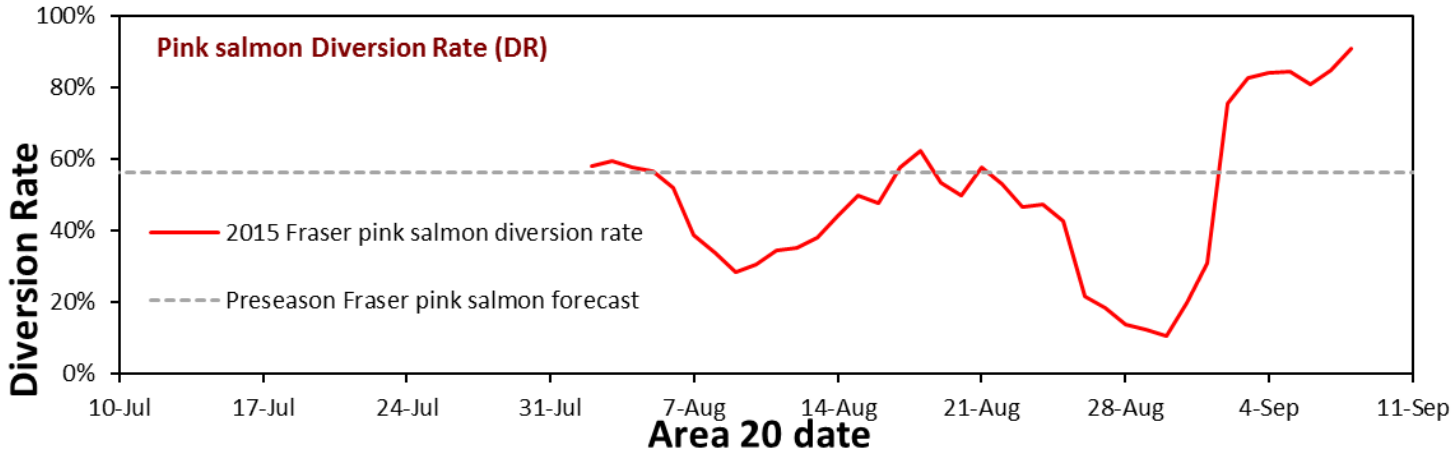
pre-season ESum, Sum, & Late dates are regressions based on EStu (forecast) & Chilko (long term median)



Diversion Rate

	Pre-season	post-season
Sockeye	95%	69%
Pink	56%	38%



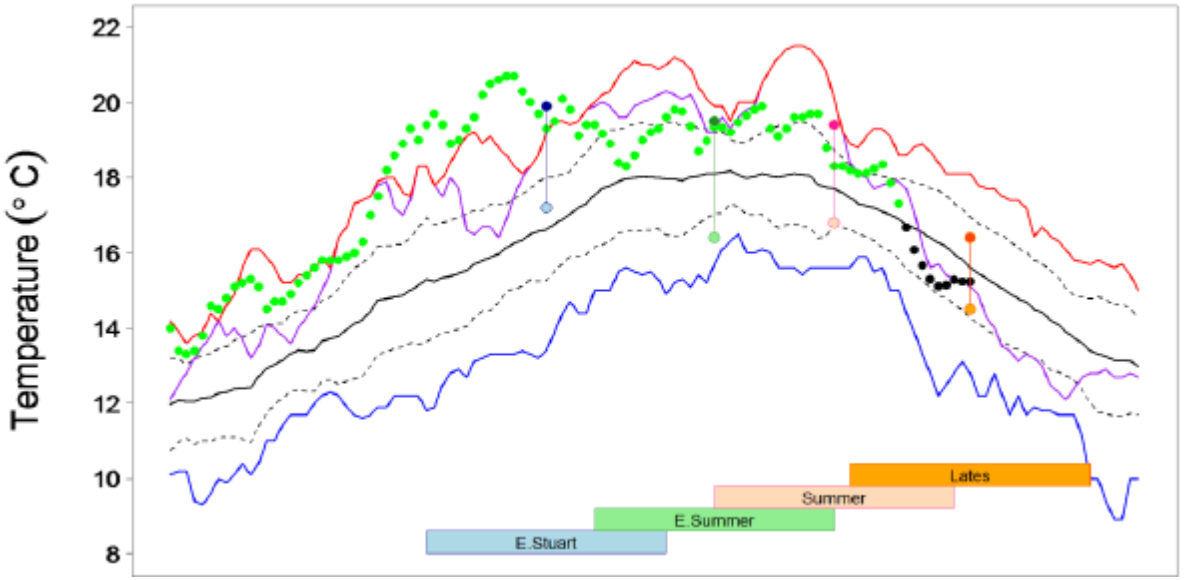


graphs courtesy of PSC

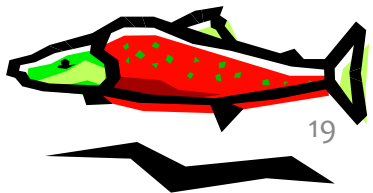
environmental conditions & pMA

	adopted pMAs		in-season
	pre-season	in-season*	DBE (fr. pMA)
Early Stuart	0.68	4.18	-81%
Early Summer	1	1	-50%
Summer	0.17	0.17	-15%
Lates	0.95	0.95	-49%

** final in-season adopted pMA*



graph courtesy of PSC

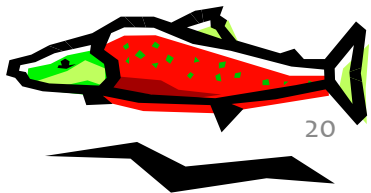


Fraser Sockeye & Pink

2015 POST-SEASON*

* relative to fisheries management season

…it's still in-season for Stock Assessment!



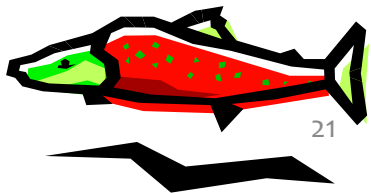
TAC, Catch, & Preliminary Exploitation Rates

	EStu	ESum	Summer	Late	tl Sockeye	Pinks
run size	**32,100**	**373,000**	**1,549,200**	**165,800**	**2,120,100**	**5,781,300**
TAC*	**1,000**	**80,000**	**157,400**	**37,500**	**275,900**	**710,200**
*TF deduction**	*200*	*6,500*	*29,000*	*2,300*	*38,000*	*48,000*
catch	**800**	**44,900**	**212,200**	**9,400**	**267,300**	**413,700**
US	*-*	*5,700*	*37,800*	*2,600*	*46,100*	*334,700*
CDN	*600*	*32,700*	*145,400*	*4,600*	*183,300*	*29,800*
ER	**2%**	**12%**	**14%**	**6%**	**13%**	**7%**

** TAC is not broken into US & CDN - majority of US catch was taken prior to in-season decrease* in run size. ~2k of US catch was taken in C&S fisheries after International TAC = 0.

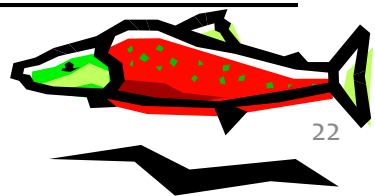
*** TF deduction = catch*

preliminary post-season numbers (20-Nov-2015)



Preliminary Catch by Group

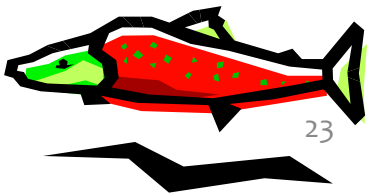
	Sockeye		Pink	
	Total	**Fraser**	Total	**Fraser**
Canada	*184,800*	***183,300***	*42,000*	***29,800***
Commercial	-	-	-	-
FSC	183,900	182,800	41,400	29,300
mrne	41,000	39,800	15,600	3,500
LFrA	61,500	61,500	24,600	24,600
BCI	81,400	81,400	1,200	1,200
FN Demo (BCI)	-	-	500	500
Recreational (JuFu)	300	-	-	-
Charter (Albion TF)	500	500	-	-
United States	*47,300*	***46,100***	*672,600*	***334,700***
FRP Test Fisheries	*41,700*	***37,900***	*122,600*	***49,200***
Total	*273,800*	***267,300***	*837,200*	***413,700***



Escapement Overview

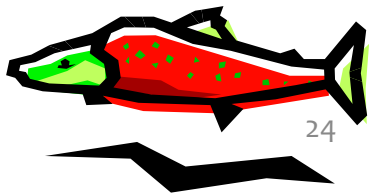
	Escapement			spawning success	
	2015	brood yr	%BY	2015	average
Early Stuart	10,084	758	1330%	75.1%	88.6%
Early Summer	139,833	216,337	65%	94.3%	89.5%
Summer	966,515	1,876,751	51%	98.3%	90.1%
Lates	*estimates expected to be available in January*				
Pinks*	5,369,000	9,361,564	57%		

* Mission hydroacoustics estimates



Preliminary Escapement & potential spawning escapement (PSE)

	esc goal	Run size - catch	DBE %	DBE #fish	PSE after DBE	escapement (#fish)	esc vs esc goal	esc vs PSE
EStu	32,100	31,300	-81%	-25,300	6,000	10,084	-22,016	4,084
ESum	149,200	328,100	-50%	-164,100	164,000	139,833	-9,367	-24,167
Sum	1,448,000	*1,337,000*	-15%	-194,300	1,142,700	966,515	-481,485	-176,185
Lates	165,800	*156,400*	-49%	-76,200	80,200	TBD		



pre&post season comparisons

pre-season

Mgmt group	run size @p50	SpnEsc target	pMA	MA	avail. harvest (incl TF)	allowable ER
Early Stuart	30,000	30,000	0.68	0	0	0%
Early Summer	837,000	334,800	1	334,800	167,400	20%
Summer	4,675,000	1,636,250	0.17	278,200	2,760,550	59%
Late	1,236,000	494,400	0.95	471,400	270,200	22%
Sockeye	**6,778,000**	**2,495,450**		**1,084,400**	**3,198,150**	**47%**

run sizes shown are at p50 forecast, for 2015, FRP chose to start the season with EStu @p25

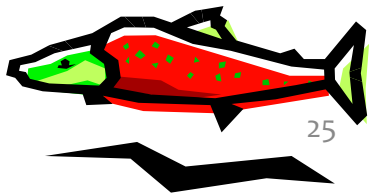
*** Estimates adopted by the Fraser River Panel for pre-season planning purposes June 2015*

post-season

Mgmt group	run size @p50	SpnEsc target	pMA	MA	avail. harvest (incl TF)	allowable ER	prelim ER	near final SpnEsc	prelim post-season catch
Early Stuart	32,100	32,100	4.18	134,200	0	10%	*2%*	10,084	800
Early Summer	373,000	149,200	1	149,200	74,600	20%	*12%*	139,833	44,900
Summer	1,549,200	1,448,000	0.17	246,200	0	10%	*14%*	*966,515*	212,200
Late	165,800	165,800	0.95	157,500	0	20%	*6%*	*TBD*	9,400
Sockeye	**2,120,100**	**1,795,100**		**687,100**	**74,600**				

[a] *Lower abundance exploitation rate (LAER) permitted as incidental harvest in the event there is no available harvest. The LAER is not shown in "available harvest" column.*

[b] *final run size estimates pending RSA work*



Next Steps & Timelines

- Summer & Late Run escapement
  - preliminaries: Lates (Jan)
  - near finals: Feb
- 2016 FR SK forecasts
  - Jan
- FR SK escapement plan
  - options in draft IFMP
- Draft IFMP
  - early March release date
  - comments due: 18-Apr