2016 Fraser sockeye escapement options evaluations
OPTION 1

Raft North Thompson & Harrison in Summer Run.

	Harvest Rule Parameters				
Management Unit	**Low Abundance ER (LAER)**	**TAM Cap**	**Lower Fishery Reference Point**	**Upper Fishery Reference Point**	**Pre-season pMA**
Early Stuart	10%	60%	108,000	270,000	0.69
Early Summer (w/o misc)	10%	60%	100,000	250,000	0.60
Summer (w/o misc)	10%	60%	640,000	1,600,000	0.12
Late (w/o misc)	20-30%	60%	300,000	750,000	4.68

Management Unit		**Pre-season Forecast Return**				
		p10	p25	**p50**	p75	p90
Early Stuart	forecast	13,000	22,000	**36,000**	59,000	89,000
	TAM Rule (%)	0%	0%	**0%**	0%	0%
	Escapement Target	13,000	22,000	**36,000**	59,000	89,000
	MA	9,000	15,200	**24,800**	40,700	61,400
	Esc. Target + MA	22,000	37,200	**60,800**	99,700	150,400
	LAER	10%	10%	**10%**	10%	10%
	ER at Return	0%	0%	**0%**	0%	0%
	Allowable ER	10%	10%	**10%**	10%	10%
	available harvest	1,300	2,200	**3,600**	5,900	8,900
	2016 Performance					
	Projected S (after MA)	7,000	12,000	**19,000**	31,000	47,000
	BY Spawners	26,233	26,233	**26,233**	26,233	26,233
	Proj. S as % BY S	27%	46%	**72%**	118%	179%
	cycle avg S	35,861	35,861	**35,861**	35,861	35,861
	Proj. S as % cycle S	20%	33%	**53%**	86%	131%

Management Unit		**Pre-season Forecast Return**				
		p10	p25	**p50**	p75	p90
Early Summer (w/o RNT)	*lower ref. pt. (w misc)*	156,000	156,000	156,000	156,000	156,000
	upper ref. pt. (w misc)	391,000	391,000	391,000	391,000	391,000
	forecast (incl. misc)	120,000	217,000	447,000	1,003,000	2,703,000
	TAM Rule (%)	0%	28%	**60%**	60%	60%
	Escapement Target	120,000	156,000	**178,800**	401,200	1,081,200
	MA	72,000	93,600	**107,300**	240,700	648,700
	Esc. Target + MA	192,000	249,600	**286,100**	641,900	1,729,900
	LAER	10%	10%	**10%**	10%	10%
	ER at Return	0%	0%	**36%**	36%	36%
	Allowable ER	10%	10%	**36%**	36%	36%
	available harvest	12,000	21,700	**160,900**	361,100	973,100
	2016 Performance					
	Projected S (after MA)	68,000	122,000	**179,000**	401,000	1,081,000
	BY Spawners	276,018	276,018	**276,018**	276,018	276,018
	Proj. S as % BY S	25%	44%	**65%**	145%	392%
	cycle avg S	132,183	132,183	**132,183**	132,183	132,183
	Proj. S as % cycle S	51%	92%	**135%**	303%	818%

Management		Pre-season Forecast Return				
Unit		p10	p25	**p50**	p75	p90
Summer	*lower ref. pt. (w misc)*	730,000	730,000	**730,000**	730,000	730,000
(w. RNT & Har)	*upper ref. pt. (w misc)*	1,824,000	1,824,000	**1,824,000**	1,824,000	1,824,000
	forecast	647,000	1,004,000	**1,695,000**	2,984,000	5,031,000
	TAM Rule (%)	0%	27%	**57%**	60%	60%
	Escapement Target	647,000	730,000	**730,000**	1,193,600	2,012,400
	MA	77,600	87,600	**87,600**	143,200	241,500
	Esc. Target + MA	724,600	817,600	**817,600**	1,336,800	2,253,900
	LAER	10%	10%	**10%**	10%	10%
	ER at Return	0%	19%	**52%**	55%	55%
	Allowable ER	10%	19%	**52%**	55%	55%
	available harvest	64,700	186,400	**877,400**	1,647,200	2,777,100
	2016 Performance					
	Projected S (after MA)	520,000	730,000	**730,000**	1,194,000	2,012,000
	BY Spawners	559,387	559,387	559,387	559,387	559,387
	Proj. S as % BY S	93%	130%	**130%**	213%	360%
	cycle avg S	656,591	656,591	**656,591**	656,591	656,591
	Proj. S as % cycle S	79%	111%	**111%**	182%	306%

Management		Pre-season Forecast Return				
Unit		p10	p25	**p50**	p75	p90
Late	*lower ref. pt. (w misc)*	396,000	396,000	**396,000**	396,000	396,000
(w/o Har)	*upper ref. pt. (w misc)*	991,000	991,000	**991,000**	991,000	991,000
	forecast	41,000	65,000	**111,000**	205,000	368,000
	TAM Rule (%)	0%	0%	**0%**	0%	0%
	Escapement Target	41,000	65,000	**111,000**	205,000	368,000
	MA	191,900	304,200	**519,500**	959,400	1,722,200
	Esc. Target + MA	232,900	369,200	**630,500**	1,164,400	2,090,200
	LAER	20%	20%	**20%**	30%	30%
	ER at Return	0%	0%	**0%**	0%	0%
	Allowable ER	20%	20%	**20%**	30%	30%
	available harvest	8,200	13,000	**22,200**	61,500	110,400
	2016 Performance					
	Projected S (after MA)	6,000	9,000	**16,000**	25,000	45,000
	BY Spawners	61,209	61,209	61,209	61,209	61,209
	Proj. S as % BY S	10%	15%	**26%**	41%	74%
	cycle avg S	134,046	134,046	**134,046**	134,046	134,046
	Proj. S as % cycle S	4%	7%	**12%**	19%	34%

Available Harvest (TF, US, CDN)	86,200	223,300	**1,064,100**	2,075,700	3,869,500
Total projected spawners	601,000	873,000	**944,000**	1,651,000	3,185,000
total escapement goal	821,000	973,000	1,055,800	1,858,800	3,550,600

2016 Fraser sockeye escapement options evaluations

OPTION 1

Run timing group / Stocks	Total Escapement cycle yr	Total Escapement brood year	Projected esc. across range of run size forecasts at specified TAM + MA 10%	25%	50%	75%	90%	comparisons @p50 to cycle	to BY
Early Stuart	**35,861**	**26,233**	**7,000**	**12,000**	**19,000**	**31,000**	**47,000**	53%	72%
Early Summer			68,000	122,000	179,000	401,000	1,081,000		
(total excluding miscellaneou	**97,883**	**145,016**	**55,000**	**88,800**	**114,500**	**233,900**	**610,700**		
Bowron	7,265	59	600	1,100	1,600	3,200	5,200	22%	2712%
Fennell (cycle avg since 1959)	8,565	1,967	3,400	5,100	5,600	9,200	15,600	65%	285%
Gates	24,662	31,179	13,600	22,500	30,400	55,200	92,400	123%	98%
Nadina	19,995	30,942	13,600	25,300	36,000	71,600	132,400	180%	116%
Pitt	28,024	78,038	23,800	33,700	36,000	58,800	84,800	128%	46%
Scotch (cycle avg since 1983)	2,096	2,007	200	1,100	4,800	35,600	279,200	229%	239%
Seymour	7,276	824	0	100	200	400	1,200	3%	24%
Summer			520,000	730,000	730,000	1,194,000	2,012,000		
(tl excl. NThmisc, incl. Har)	**656,591**	**559,387**	**517,600**	**725,600**	**725,700**	**1,186,000**	**1,996,000**		
Chilko	469,096	246,602	368,900	478,400	431,500	629,400	913,000	92%	175%
Quesnel	11,619	624	4,800	6,500	6,500	10,000	16,000	56%	1042%
Late Stuart	44,993	93,159	33,800	62,500	82,700	170,900	351,900	184%	89%
Stellako	108,204	137,992	69,100	104,700	110,300	181,700	304,300	102%	80%
Harrison	7,504	71,002	32,100	61,800	83,600	178,900	385,900	1114%	118%
Raft	15,175	10,008	8,800	11,600	11,200	15,200	24,800	74%	112%
Late			6,000	9,000	16,000	25,000	45,000		
(total excluding miscellaneo	**128,672**	**57,395**	**4,800**	**7,100**	**12,100**	**19,100**	**34,700**		
Cultus (high hatchery contributic	11,822	892	100	300	600	1,100	2,100	5%	67%
Late Shuswap	5,733	12	0	0	600	3,000	9,300	10%	5000%
Portage	1,382	25	0	0	100	100	200	7%	400%
Weaver	29,941	924	300	600	1,200	2,100	3,800	4%	130%
Birkenhead	79,794	55,542	4,400	6,300	9,800	12,800	19,300	12%	18%

2016 Fraser sockeye escapement options evaluations
OPTION 2

Raft North Thompson & Harrison in Summer Run.

Management Unit	Harvest Rule Parameters: Low Abundance ER (LAER)	TAM Cap	Lower Fishery Reference Point	Upper Fishery Reference Point	Pre-season pMA
Early Stuart	10%	60%	108,000	270,000	0.69
Early Summer (w/o misc)	10%	60%	150,000	375,000	0.60
Summer (w/o misc)	10%	60%	800,000	2,000,000	0.12
Late (w/o misc)	20%	60%	300,000	750,000	4.68

Management Unit		Pre-season Forecast Return p10	p25	**p50**	p75	p90
Early Stuart	forecast	13,000	22,000	**36,000**	59,000	89,000
	TAM Rule (%)	0%	0%	**0%**	0%	0%
	Escapement Target	13,000	22,000	**36,000**	59,000	89,000
	MA	9,000	15,200	**24,800**	40,700	61,400
	Esc. Target + MA	22,000	37,200	**60,800**	99,700	150,400
	LAER	10%	10%	**10%**	10%	10%
	ER at Return	0%	0%	**0%**	0%	0%
	Allowable ER	10%	10%	**10%**	10%	10%
	available harvest	1,300	2,200	**3,600**	5,900	8,900
	2016 Performance					
	Projected S (after MA)	7,000	12,000	**19,000**	31,000	47,000
	BY Spawners	26,233	26,233	**26,233**	26,233	26,233
	Proj. S as % BY S	27%	46%	**72%**	118%	179%
	cycle avg S	35,861	35,861	**35,861**	35,861	35,861
	Proj. S as % cycle S	20%	33%	**53%**	86%	131%

Management Unit		Pre-season Forecast Return p10	p25	**p50**	p75	p90
Early Summer (w/o RNT)	*lower ref. pt. (w misc)*	234,000	234,000	234,000	234,000	234,000
	upper ref. pt. (w misc)	586,000	586,000	586,000	586,000	586,000
	forecast (incl. misc)	120,000	217,000	447,000	1,003,000	2,703,000
	TAM Rule (%)	0%	0%	**48%**	60%	60%
	Escapement Target	120,000	217,000	**234,000**	401,200	1,081,200
	MA	72,000	130,200	**140,400**	240,700	648,700
	Esc. Target + MA	192,000	347,200	**374,400**	641,900	1,729,900
	LAER	10%	10%	**10%**	10%	10%
	ER at Return	0%	0%	**16%**	36%	36%
	Allowable ER	10%	10%	**16%**	36%	36%
	available harvest	12,000	21,700	**72,600**	361,100	973,100
	2016 Performance					
	Projected S (after MA)	68,000	122,000	**234,000**	401,000	1,081,000
	BY Spawners	276,018	276,018	**276,018**	276,018	276,018
	Proj. S as % BY S	25%	44%	**85%**	145%	392%
	cycle avg S	132,183	132,183	**132,183**	132,183	132,183
	Proj. S as % cycle S	51%	92%	**177%**	303%	818%

Management Unit	Pre-season Forecast Return p10	p25	**p50**	p75	p90

Summer	*lower ref. pt. (w misc)*	912,000	912,000	**912,000**	912,000	912,000
(w. RNT & Har)	*upper ref. pt. (w misc)*	2,280,000	2,280,000	**2,280,000**	2,280,000	2,280,000
	forecast	647,000	1,004,000	**1,695,000**	2,984,000	5,031,000
	TAM Rule (%)	0%	9%	**46%**	60%	60%
	Escapement Target	647,000	912,000	**912,000**	1,193,600	2,012,400
	MA	77,600	109,400	**109,400**	143,200	241,500
	Esc. Target + MA	724,600	1,021,400	**1,021,400**	1,336,800	2,253,900
	LAER	10%	10%	**10%**	10%	10%
	ER at Return	0%	0%	**40%**	55%	55%
	Allowable ER	10%	10%	**40%**	55%	55%
	available harvest	64,700	100,400	**673,600**	1,647,200	2,777,100
	2016 Performance					
	Projected S (after MA)	520,000	807,000	**912,000**	1,194,000	2,012,000
	BY Spawners	559,387	559,387	559,387	559,387	559,387
	Proj. S as % BY S	93%	144%	**163%**	213%	360%
	cycle avg S	656,591	656,591	**656,591**	656,591	656,591
	Proj. S as % cycle S	79%	123%	**139%**	182%	306%

Management		**Pre-season Forecast Return**				
Unit		p10	p25	**p50**	p75	p90
Late	*lower ref. pt. (w misc)*	396,000	396,000	**396,000**	396,000	396,000
(w/o Har)	*upper ref. pt. (w misc)*	991,000	991,000	**991,000**	991,000	991,000
	forecast	41,000	65,000	**111,000**	205,000	368,000
	TAM Rule (%)	0%	0%	**0%**	0%	0%
	Escapement Target	41,000	65,000	**111,000**	205,000	368,000
	MA	191,900	304,200	**519,500**	959,400	1,722,200
	Esc. Target + MA	232,900	369,200	**630,500**	1,164,400	2,090,200
	LAER	20%	20%	**20%**	20%	20%
	ER at Return	0%	0%	**0%**	0%	0%
	Allowable ER	20%	20%	**20%**	20%	20%
	available harvest	8,200	13,000	**22,200**	41,000	73,600
	2016 Performance					
	Projected S (after MA)	6,000	9,000	**16,000**	29,000	52,000
	BY Spawners	61,209	61,209	61,209	61,209	61,209
	Proj. S as % BY S	10%	15%	**26%**	47%	85%
	cycle avg S	134,046	134,046	**134,046**	134,046	134,046
	Proj. S as % cycle S	4%	7%	**12%**	22%	39%

Available Harvest (TF, US, CDN)	86,200	137,300	**772,000**	2,055,200	3,832,700
Total projected spawners	601,000	950,000	**1,181,000**	1,655,000	3,192,000
total escapement goal	821,000	1,216,000	1,293,000	1,858,800	3,550,600

2016 Fraser sockeye escapement options evaluations

OPTION 2

Run timing group / Stocks	Total Escapement cycle yr	Total Escapement brood year	Projected esc. across range of run size forecasts at specified TAM + MA 10%	25%	50%	75%	90%	comparisons @p50 to cycle	to BY
Early Stuart	**35,861**	**26,233**	**7,000**	**12,000**	**19,000**	**31,000**	**47,000**	53%	72%
Early Summer			68,000	122,000	234,000	401,000	1,081,000		
(total excluding miscellaneou	**97,883**	**145,016**	**55,000**	**88,800**	**149,700**	**233,900**	**610,700**		
Bowron	7,265	59	600	1,100	2,100	3,200	5,200	29%	3559%
Fennell (cycle avg since 1959)	8,565	1,967	3,400	5,100	7,300	9,200	15,600	85%	371%
Gates	24,662	31,179	13,600	22,500	39,800	55,200	92,400	161%	128%
Nadina	19,995	30,942	13,600	25,300	47,100	71,600	132,400	236%	152%
Pitt	28,024	78,038	23,800	33,700	47,100	58,800	84,800	168%	60%
Scotch (cycle avg since 1983)	2,096	2,007	200	1,100	6,300	35,600	279,200	301%	314%
Seymour	7,276	824	0	100	200	400	1,200	3%	24%
Summer			520,000	807,000	912,000	1,194,000	2,012,000		
(tl excl. NThmisc, incl. Har)	**656,591**	**559,387**	**517,600**	**802,200**	**906,600**	**1,186,000**	**1,996,000**		
Chilko	469,096	246,602	368,900	528,900	539,100	629,400	913,000	115%	219%
Quesnel	11,619	624	4,800	7,200	8,100	10,000	16,000	70%	1298%
Late Stuart	44,993	93,159	33,800	69,100	103,300	170,900	351,900	230%	111%
Stellako	108,204	137,992	69,100	115,700	137,700	181,700	304,300	127%	100%
Harrison	7,504	71,002	32,100	68,300	104,400	178,900	385,900	1391%	147%
Raft	15,175	10,008	8,800	12,900	14,000	15,200	24,800	92%	140%
Late			6,000	9,000	16,000	29,000	52,000		
(total excluding miscellaneo	**128,672**	**57,395**	**4,800**	**7,100**	**12,100**	**22,200**	**40,100**		
Cultus (high hatchery contributic	11,822	892	100	300	600	1,300	2,400	5%	67%
Late Shuswap	5,733	12	0	0	600	3,500	10,700	10%	5000%
Portage	1,382	25	0	0	100	100	300	7%	400%
Weaver	29,941	924	300	600	1,200	2,400	4,400	4%	130%
Birkenhead	79,794	55,542	4,400	6,300	9,800	14,800	22,300	12%	18%

Comparison of Forecast Abundance 80% Range to TAM rule Options

Early Stuart	forecast	p10 13,000	p25 22,000	p50 36,000	p75 59,000	p90 89,000
Option 1	Allowable ER	10%	10%	10%	10%	10%
	Projected S (after MA)	7,000	12,000	19,000	31,000	47,000
	Proj. S as % BY S	27%	46%	72%	118%	179%
	Proj. S as % cycle S	20%	33%	53%	86%	131%
Option 2	*same as option 1*					

Early Summer	forecast (incl. misc)	p10 120,000	p25 217,000	p50 447,000	p75 1,003,000	p90 2,703,000
Option 1	Allowable ER	10%	10%	36%	36%	36%
	Projected S (after MA)	68,000	122,000	179,000	401,000	1,081,000
	Proj. S as % BY S	25%	44%	65%	145%	392%
	Proj. S as % cycle S	51%	92%	135%	303%	818%
Option 2	Allowable ER	10%	10%	16%	36%	36%
	Projected S (after MA)	68,000	122,000	234,000	401,000	1,081,000
	Proj. S as % BY S	25%	44%	85%	145%	392%
	Proj. S as % cycle S	51%	92%	177%	303%	818%

Summer	forecast (incl. misc)	p10 647,000	p25 1,004,000	p50 1,695,000	p75 2,984,000	p90 5,031,000
Option 1	Allowable ER	10%	19%	52%	55%	55%
	Projected S (after MA)	520,000	730,000	730,000	1,194,000	2,012,000
	Proj. S as % BY S	93%	130%	130%	213%	360%
	Proj. S as % cycle S	79%	111%	111%	182%	306%
Option 2	Allowable ER	10%	10%	40%	55%	55%
	Projected S (after MA)	520,000	807,000	912,000	1,194,000	2,012,000
	Proj. S as % BY S	93%	144%	163%	213%	360%
	Proj. S as % cycle S	79%	123%	139%	182%	306%

Lates	forecast (incl. misc)	p10 41,000	p25 65,000	p50 111,000	p75 205,000	p90 368,000
Option 1	Allowable ER	20%	20%	20%	30%	30%
	Projected S (after MA)	6,000	9,000	16,000	25,000	45,000
	Proj. S as % BY S	10%	15%	26%	41%	74%
	Proj. S as % cycle S	4%	7%	12%	19%	34%
Option 2	Allowable ER	20%	20%	20%	20%	20%
	Projected S (after MA)	6,000	9,000	16,000	29,000	52,000
	Proj. S as % BY S	10%	15%	26%	47%	85%
	Proj. S as % cycle S	4%	7%	12%	22%	39%

forecast p-level is below lower fisheries reference point
forecast p-level is between lower & upper fisheries reference point
forecast p-level is above upper fisheries reference point