2017 Fraser sockeye escapement options evaluations
OPTION 1- using adjusted 2013 TAMs

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
Early Stuart	10%	60%	108,000	270,000
Early Summer (w/o misc)	10%	60%	100,000	250,000
Summer (w/o misc)	10%	60%	1,250,000	3,125,000
Late (w/o misc)	20%-30%	60%	300,000	750,000

Management Unit		**Pre-season Forecast Return**				
		p10	p25	**p50**	p75	p90
Early Stuart	forecast	42,000	64,000	**99,000**	158,000	253,000
	TAM Rule (%)	0%	0%	**0%**	32%	57%
	Escapement Target	42,000	64,000	**99,000**	108,000	108,000
	pMA	0.64	0.64	**0.64**	0.64	0.64
	MA	26,900	41,000	**63,400**	69,100	69,100
	Esc. Target + MA	68,900	105,000	**162,400**	177,100	177,100
	LAER	10%	10%	**10%**	10%	10%
	ER at Return	0%	0%	**0%**	0%	30%
	Allowable ER	10%	10%	**10%**	10%	30%
	available harvest	4,200	6,400	**9,900**	15,800	75,900
	2016 Performance					
	Projected S (after MA	23,100	35,100	**54,400**	86,700	108,000
	BY Spawners	86,311	86,311	**86,311**	86,311	86,311
	Proj. S as % BY S	27%	41%	**63%**	100%	125%
	cycle avg S	210,606	210,606	**210,606**	210,606	210,606
	Proj. S as % cycle S	11%	17%	**26%**	41%	51%

Management Unit		**Pre-season Forecast Return**				
		p10	p25	**p50**	p75	p90
Early Summer (w/o RNT)	*lower ref. pt. (w misc)*	137,000	137,000	137,000	137,000	137,000
	upper ref. pt. (w misc)	342,500	342,500	342,500	342,500	342,500
	forecast (incl. misc)	95,100	166,300	342,500	791,900	1,971,000
	TAM Rule (%)	0%	18%	**60%**	60%	60%
	Escapement Target	95,100	137,000	**137,000**	316,760	788,400
	pMA	0.42	0.45	**0.49**	0.53	0.56
	MA	40,300	61,900	**67,400**	167,300	439,200
	Esc. Target + MA	135,400	198,900	**204,400**	484,060	1,227,600
	LAER	10%	10%	**10%**	10%	10%
	ER at Return	0%	0%	**40%**	39%	38%
	Allowable ER	10%	10%	**40%**	39%	38%
	available harvest	9,500	16,600	**138,100**	307,800	743,400
	2016 Performance					
	Projected S (after MA	60,100	103,100	**137,000**	316,800	788,400
	BY Spawners	210,690	210,690	**210,690**	210,690	210,690
	Proj. S as % BY S	29%	49%	**65%**	150%	374%
	cycle avg S	81,685	81,685	**81,685**	81,685	81,685
	Proj. S as % cycle S	74%	126%	**168%**	388%	965%

Management		Pre-season Forecast Return				
Unit		p10	p25	**p50**	p75	p90
Summer	*lower ref. pt. (w misc)*	1,375,100	1,375,100	**1,375,100**	1,375,100	1,375,100
(w. RNT & Har)	*upper ref. pt. (w misc)*	3,437,750	3,437,750	**3,437,750**	3,437,750	3,437,750
	forecast	1,065,000	1,861,000	**3,407,000**	6,631,000	12,560,000
	TAM Rule (%)	0%	26%	**60%**	60%	60%
	Escapement Target	1,065,000	1,375,100	**1,375,100**	2,652,400	5,024,000
	pMA	0.11	0.11	**0.12**	0.12	0.12
	MA	117,400	154,700	**159,600**	318,700	627,500
	Esc. Target + MA	1,182,400	1,529,800	**1,534,700**	2,971,100	5,651,500
	LAER	10%	10%	**10%**	10%	10%
	ER at Return	0%	18%	**55%**	55%	55%
	Allowable ER	10%	18%	**55%**	55%	55%
	available harvest	106,500	331,200	**1,872,300**	3,659,900	6,908,500
	2016 Performance					
	Projected S (after MA	863,300	1,375,100	1,375,100	2,652,400	5,024,000
	BY Spawners	1,928,582	1,928,582	**1,928,582**	1,928,582	1,928,582
	Proj. S as % BY S	45%	71%	**71%**	138%	261%
	cycle avg S	1,577,700	1,577,700	**1,577,700**	1,577,700	1,577,700
	Proj. S as % cycle S	55%	87%	**87%**	168%	318%

Management		Pre-season Forecast Return				
Unit		p10	p25	**p50**	p75	p90
Late	*lower ref. pt. (w misc)*	314,000	314,000	**314,000**	314,000	314,000
(w/o Har)	*upper ref. pt. (w misc)*	785,000	785,000	**785,000**	785,000	785,000
	forecast	113,000	247,000	**583,000**	1,292,000	2,849,000
	TAM Rule (%)	0%	0%	**46%**	60%	60%
	Escapement Target	113,000	247,000	**314,000**	516,800	1,139,600
	pMA	0.73	0.83	**0.89**	0.96	0.99
	MA	82,700	205,700	**280,100**	496,000	1,133,400
	Esc. Target + MA	195,700	452,700	**594,100**	1,012,800	2,273,000
	LAER	20%	20%	**20%**	30%	30%
	ER at Return	0%	0%	**0%**	22%	20%
	Allowable ER	20%	20%	**20%**	30%	30%
	available harvest	22,600	49,400	**116,600**	387,600	854,700
	2016 Performance					
	Projected S (after MA	52,200	107,800	**246,500**	461,500	999,900
	BY Spawners	321,018	321,018	**321,018**	321,018	321,018
	Proj. S as % BY S	16%	34%	**77%**	144%	311%
	cycle avg S	177,190	177,190	**177,190**	177,190	177,190
	Proj. S as % cycle S	29%	61%	**139%**	260%	564%

Available Harvest (TF, US, CDN)	142,800	403,600	**2,136,900**	4,371,100	8,582,500
Total projected spawners	998,700	1,621,100	**1,813,000**	3,517,400	6,920,300
total escapement goal	1,315,100	1,823,100	1,925,100	3,593,960	7,060,000
implied total mortality	0%	22%	57%	59%	60%

2017 Fraser sockeye escapement options evaluations

OPTION 1

Run timing group / Stocks	Total Escapement		Projected esc. across range of run size forecasts at specified TAM + MA					comparisons @p50	
	cycle yr	brood year	10%	25%	50%	75%	90%	to cycle	to BY
Early Stuart	**210,606**	**86,311**	**23,100**	**35,100**	**54,400**	**86,700**	**108,000**	26%	63%
Early Summer									
Bowron	5,613	3,306	1,100	2,300	2,600	4,600	8,200	46%	79%
Fennell (cycle avg since 1961)	3,050	3,513	2,800	4,500	5,300	9,600	16,900	174%	151%
Gates (cycle avg since 1945)	6,114	57,326	8,500	14,200	18,400	37,000	77,300	301%	32%
Nadina	21,652	13,493	10,800	19,800	25,200	49,700	91,000	116%	187%
Pitt	26,780	59,279	26,800	39,800	42,600	72,700	120,200	159%	72%
Scotch (cycle avg since 1983)	5,120	24,708	0	600	3,400	34,700	209,100	66%	14%
Seymour	6,287	23,429	1,100	4,000	7,500	27,300	74,900	119%	32%
misc (Chilliwack)	2,563	11,705	7,200	14,400	26,500	66,600	153,000	1034%	226%
Summer									
Chilko	244,789	1,235,234	543,000	873,700	878,000	1,667,600	3,107,000	359%	71%
Quesnel	839,358	184,038	36,900	68,100	78,700	190,000	389,400	9%	43%
Late Stuart	379,176	132,603	81,900	142,100	153,700	321,700	639,200	41%	116%
Stellako	57,183	110,196	142,500	184,800	145,500	205,100	300,500	254%	132%
Harrison	49,588	250,117	33,700	64,500	81,400	194,500	450,300	164%	33%
Raft	7,606	16,394	11,500	15,700	13,500	23,200	36,000	177%	82%
Late									
Cultus (high hatchery contribut	5,673	3,312	300	300	1,000	1,800	3,900	18%	30%
Late Shuswap	65,125	185,245	4,100	20,000	59,900	133,600	309,100	92%	32%
Portage	4,621	7,509	2,800	6,900	17,500	41,800	99,600	379%	233%
Weaver	31,336	36,077	14,800	28,900	64,000	119,800	264,900	204%	177%
Birkenhead	68,237	80,120	25,900	43,700	88,100	138,500	277,000	129%	110%

2017 Fraser sockeye escapement options evaluations
OPTION 2- Summer Run Alternative

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
Early Stuart	10%	60%	108,000	270,000
Early Summer (w/o misc)	10%	60%	100,000	250,000
Summer (w/o misc)	10%	60%	1,000,000	2,500,000
Late (w/o misc)	20%-30%	60%	300,000	750,000

Management Unit		Pre-season Forecast Return p10	p25	**p50**	p75	p90
Early Stuart	forecast	42,000	64,000	**99,000**	158,000	253,000
	TAM Rule (%)	0%	0%	**0%**	32%	57%
	Escapement Target	42,000	64,000	**99,000**	108,000	108,000
	pMA	0.64	0.64	**0.64**	0.64	0.64
	MA	26,900	41,000	**63,400**	69,100	69,100
	Esc. Target + MA	68,900	105,000	**162,400**	177,100	177,100
	LAER	10%	10%	**10%**	10%	10%
	ER at Return	0%	0%	**0%**	0%	30%
	Allowable ER	10%	10%	**10%**	10%	30%
	available harvest	4,200	6,400	**9,900**	15,800	75,900
	2016 Performance					
	Projected S (after MA	23,100	35,100	**54,400**	86,700	108,000
	BY Spawners	86,311	86,311	**86,311**	86,311	86,311
	Proj. S as % BY S	27%	41%	**63%**	100%	125%
	cycle avg S	210,606	210,606	**210,606**	210,606	210,606
	Proj. S as % cycle S	11%	17%	**26%**	41%	51%

Management Unit		Pre-season Forecast Return p10	p25	**p50**	p75	p90
Early Summer (w/o RNT)	*lower ref. pt. (w misc)*	137,000	137,000	137,000	137,000	137,000
	upper ref. pt. (w misc)	342,500	342,500	342,500	342,500	342,500
	forecast (incl. misc)	95,100	166,300	342,500	791,900	1,971,000
	TAM Rule (%)	0%	18%	**60%**	60%	60%
	Escapement Target	95,100	137,000	**137,000**	316,760	788,400
	pMA	0.42	0.45	**0.49**	0.53	0.56
	MA	40,300	61,900	**67,400**	167,300	439,200
	Esc. Target + MA	135,400	198,900	**204,400**	484,060	1,227,600
	LAER	10%	10%	**10%**	10%	10%
	ER at Return	0%	0%	**40%**	39%	38%
	Allowable ER	10%	10%	**40%**	39%	38%
	available harvest	9,500	16,600	**138,100**	307,800	743,400
	2016 Performance					
	Projected S (after MA	60,100	103,100	**137,000**	316,800	788,400
	BY Spawners	210,690	210,690	**210,690**	210,690	210,690
	Proj. S as % BY S	29%	49%	**65%**	150%	374%
	cycle avg S	81,685	81,685	**81,685**	81,685	81,685
	Proj. S as % cycle S	74%	126%	**168%**	388%	965%

Management		Pre-season Forecast Return				
Unit		p10	p25	**p50**	p75	p90
Summer	*lower ref. pt. (w misc)*	1,100,100	1,100,100	**1,100,100**	1,100,100	1,100,100
(w. RNT & Har)	*upper ref. pt. (w misc)*	2,750,250	2,750,250	**2,750,250**	2,750,250	2,750,250
	forecast	1,065,000	1,861,000	**3,407,000**	6,631,000	12,560,000
	TAM Rule (%)	0%	41%	**60%**	60%	60%
	Escapement Target	1,065,000	1,100,100	**1,362,800**	2,652,400	5,024,000
	pMA	0.11	0.11	**0.12**	0.12	0.12
	MA	117,400	123,800	**158,200**	318,700	627,500
	Esc. Target + MA	1,182,400	1,223,900	**1,521,000**	2,971,100	5,651,500
	LAER	10%	10%	**10%**	10%	10%
	ER at Return	0%	34%	**55%**	55%	55%
	Allowable ER	10%	34%	**55%**	55%	55%
	available harvest	106,500	637,100	**1,886,000**	3,659,900	6,908,500
	2016 Performance					
	Projected S (after MA	863,300	1,100,100	1,362,800	2,652,400	5,024,000
	BY Spawners	1,928,582	1,928,582	**1,928,582**	1,928,582	1,928,582
	Proj. S as % BY S	45%	57%	**71%**	138%	261%
	cycle avg S	1,577,700	1,577,700	**1,577,700**	1,577,700	1,577,700
	Proj. S as % cycle S	55%	70%	**86%**	168%	318%

Management		Pre-season Forecast Return				
Unit		p10	p25	**p50**	p75	p90
Late	*lower ref. pt. (w misc)*	314,000	314,000	**314,000**	314,000	314,000
(w/o Har)	*upper ref. pt. (w misc)*	785,000	785,000	**785,000**	785,000	785,000
	forecast	113,000	247,000	**583,000**	1,292,000	2,849,000
	TAM Rule (%)	0%	0%	**46%**	60%	60%
	Escapement Target	113,000	247,000	**314,000**	516,800	1,139,600
	pMA	0.73	0.83	**0.89**	0.96	0.99
	MA	82,700	205,700	**280,100**	496,000	1,133,400
	Esc. Target + MA	195,700	452,700	**594,100**	1,012,800	2,273,000
	LAER	20%	20%	**20%**	30%	30%
	ER at Return	0%	0%	**0%**	22%	20%
	Allowable ER	20%	20%	**20%**	30%	30%
	available harvest	22,600	49,400	**116,600**	387,600	854,700
	2016 Performance					
	Projected S (after MA	52,200	107,800	**246,500**	461,500	999,900
	BY Spawners	321,018	321,018	**321,018**	321,018	321,018
	Proj. S as % BY S	16%	34%	**77%**	144%	311%
	cycle avg S	177,190	177,190	**177,190**	177,190	177,190
	Proj. S as % cycle S	29%	61%	**139%**	260%	564%

Available Harvest (TF, US, CDN)	142,800	709,500	**2,150,600**	4,371,100	8,582,500
Total projected spawners	998,700	1,346,100	**1,800,700**	3,517,400	6,920,300
total escapement goal	1,315,100	1,548,100	1,912,800	3,593,960	7,060,000
implied total mortality	0%	34%	57%	59%	60%

2017 Fraser sockeye escapement options evaluations

OPTION 2

Run timing group / Stocks	Total Escapement		Projected esc. across range of run size forecasts at specified TAM + MA					comparisons @p50	
	cycle yr	brood year	10%	25%	50%	75%	90%	to cycle	to BY
Early Stuart	**210,606**	**86,311**	**23,100**	**35,100**	**54,400**	**86,700**	**108,000**	26%	63%
Early Summer									
Bowron	5,613	3,306	1,100	2,300	2,600	4,600	8,200	46%	79%
Fennell (cycle avg since 1961)	3,050	3,513	2,800	4,500	5,300	9,600	16,900	174%	151%
Gates (cycle avg since 1945)	6,114	57,326	8,500	14,200	18,400	37,000	77,300	301%	32%
Nadina	21,652	13,493	10,800	19,800	25,200	49,700	91,000	116%	187%
Pitt	26,780	59,279	26,800	39,800	42,600	72,700	120,200	159%	72%
Scotch (cycle avg since 1983)	5,120	24,708	0	600	3,400	34,700	209,100	66%	14%
Seymour	6,287	23,429	1,100	4,000	7,500	27,300	74,900	119%	32%
misc (Chilliwack)	2,563	11,705	7,200	14,400	26,500	66,600	153,000	1034%	226%
Summer									
Chilko	244,789	1,235,234	543,000	699,000	870,200	1,667,600	3,107,000	355%	70%
Quesnel	839,358	184,038	36,900	54,500	78,000	190,000	389,400	9%	42%
Late Stuart	379,176	132,603	81,900	113,700	152,300	321,700	639,200	40%	115%
Stellako	57,183	110,196	142,500	147,800	144,200	205,100	300,500	252%	131%
Harrison	49,588	250,117	33,700	51,600	80,700	194,500	450,300	163%	32%
Raft	7,606	16,394	11,500	12,600	13,400	23,200	36,000	176%	82%
Late									
Cultus (high hatchery contribut	5,673	3,312	300	300	1,000	1,800	3,900	18%	30%
Late Shuswap	65,125	185,245	4,100	20,000	59,900	133,600	309,100	92%	32%
Portage	4,621	7,509	2,800	6,900	17,500	41,800	99,600	379%	233%
Weaver	31,336	36,077	14,800	28,900	64,000	119,800	264,900	204%	177%
Birkenhead	68,237	80,120	25,900	43,700	88,100	138,500	277,000	129%	110%

Comparison of Forecast Abundance to TAM Rule Options

Early Stuart	forecast	p10 42,000	p25 64,000	p50 99,000	p75 158,000	p90 253,000
Option 1	Allowable ER	10%	10%	10%	10%	30%
	Projected S (after MA)	23,100	35,100	54,400	86,700	108,000
	Proj. S as % BY S	27%	41%	63%	100%	125%
	Proj. S as % cycle S	11%	17%	26%	41%	51%
Option 2	*same as option 1*					

Early Summer	forecast (incl. misc)	p10 95,100	p25 166,300	p50 342,500	p75 791,900	p90 1,971,000
Option 1	Allowable ER	10%	10%	40%	39%	38%
	Projected S (after MA)	60,100	103,100	137,000	316,800	788,400
	Proj. S as % BY S	29%	49%	65%	150%	374%
	Proj. S as % cycle S	74%	126%	168%	388%	965%
Option 2	*same as option 1*					

Summer	forecast (incl. misc)	p10 1,065,000	p25 1,861,000	p50 3,407,000	p75 6,631,000	p90 12,560,000
Option 1	Allowable ER	10%	18%	55%	55%	55%
	Projected S (after MA)	863,300	1,375,100	1,375,100	2,652,400	5,024,000
	Proj. S as % BY S	45%	71%	71%	138%	261%
	Proj. S as % cycle S	55%	87%	87%	168%	318%
Option 2	Allowable ER	10%	34%	55%	55%	55%
	Projected S (after MA)	863,300	1,100,100	1,362,800	2,652,400	5,024,000
	Proj. S as % BY S	45%	57%	71%	138%	261%
	Proj. S as % cycle S	55%	70%	86%	168%	318%

Lates	forecast (incl. misc)	p10 113,000	p25 247,000	p50 583,000	p75 1,292,000	p90 2,849,000
Option 1	Allowable ER	20%	20%	20%	30%	30%
	Projected S (after MA)	52,200	107,800	246,500	461,500	999,900
	Proj. S as % BY S	16%	34%	77%	144%	311%
	Proj. S as % cycle S	29%	61%	139%	260%	564%
Option 2	*same as option 1*					

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

2017 Fraser pink escapement option

IFMP OPTION

	Pre-season Forecast Return				
	p10	p25	**p50**	p75	p90
forecast	4,447,000	6,177,000	8,693,000	12,353,000	16,682,000
escapement target	4,027,000	5,366,000	6,000,000	6,000,000	6,000,000
allowable ER	9%	13%	31%	51%	64%
available harvest	420,000	811,000	2,693,000	6,353,000	10,682,000