Fraser Sockeye Planning WS 2014

Options For 2014

Presented to: Fraser Sockeye Planning Workshop
Meeting Details: 17 Mar 2014, Richmond Executive Inn
Presented by: Gottfried Pestal

Outline

Expectations
- Forecasts
- Expected challenges

Context for 2014 Planning
- Recent spawner abundances
- Recent productivity
- Integrated biological status (WSP)

Options for 2014
- 2 Options
- Expected outcomes by mgmt group
- Expected outcomes by stock

Additional Considerations
- Potential ESSR
- Mgmt adjustment handling
- Cultus recovery objectives

Expectations

Big Picture Expectation

- forecast is for a large total run size
- based on the very large total spawner abundance in the 2010 brood year for all stocks
- Also have indications of better survival to adult since the 2009 return year
- BUT: stock-specific differences

Challenges - 1

Uncertainty in forecasts

- Higher than usual, because for several stocks the brood year abd exceeds previous obs range
- Scotch, Seymour, Harrison, Late Shu and Portage (Not Chilko -> smolt count large but not outside range)

Uncertain en-route mortality

- Tends to be small for Summer (except 1998,2006 and 2013)
- Much larger for other mgmt groups (e.g. 20-30% out of 60% Total Allowable Mortality
- Need to re-estimate regularly in-season (water temp, discharge)

Challenges - 2

Availability of In-season Info

- Abundance est for mgmt groups and larger stocks with current stock ID methodology
- Weekly updates after peak through Area 20

Aggregate harvest of mutiple stocks

- Stocks in a mgmt group can have very different productivities
- Aggregate plan has been constrained to 60% Total Allowable Mortality to protect less productiv stocks

Challenges – 3

Uncertain capacity

- Likely that spawner abundances in 2014 will be large to very large for several of the stocks.
- This raises concerns regarding potential capacity limits of the nursery lakes, but it is difficult to estimate optimal levels of spawner abundance, either as a long-term average or for a specific year.
- Alternative estimates can differ widely, and this uncertainty needs to be taken into account (e.g. when planning ESSR-type fisheries).

Context for 2014 Planning

Recent Spawner Abundances - 1

Table 1

- Wide range of average spawner abd
- Strong fluctuation over time (& cycles)
- WSP lower BM vs. FRSSI BM

Table 2 (Gen Avg)

- 14 of 19 have recent Gen Avg at or above Avg (Gen Avg). Exceptions = Early Stuart, Bowron, Late Stuart, Quesnel, Cultus

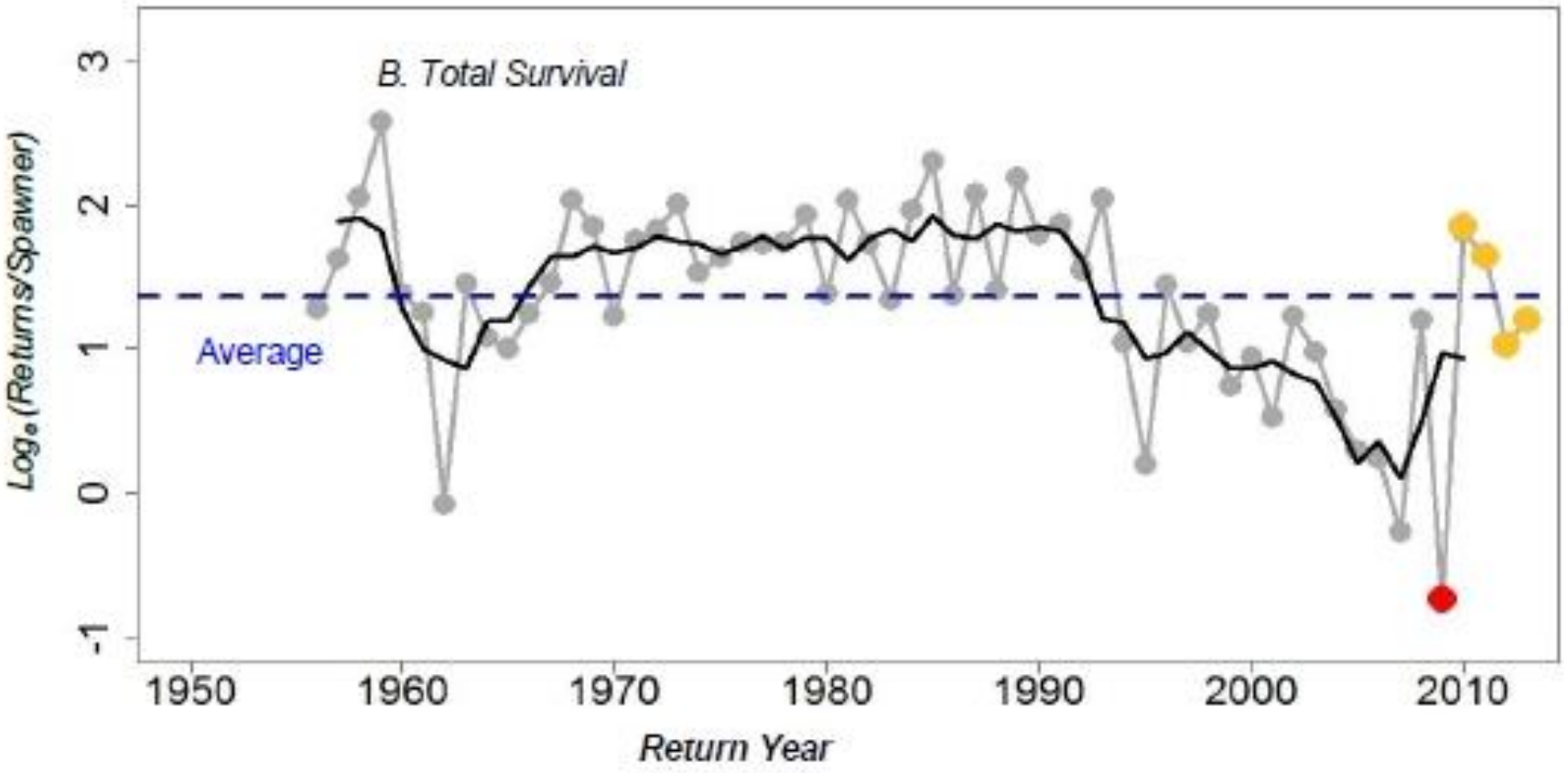
- Most stocks at/above FRSSI BM 2 and Above WSP Lower BM

Recent Spawner Abundances - 2

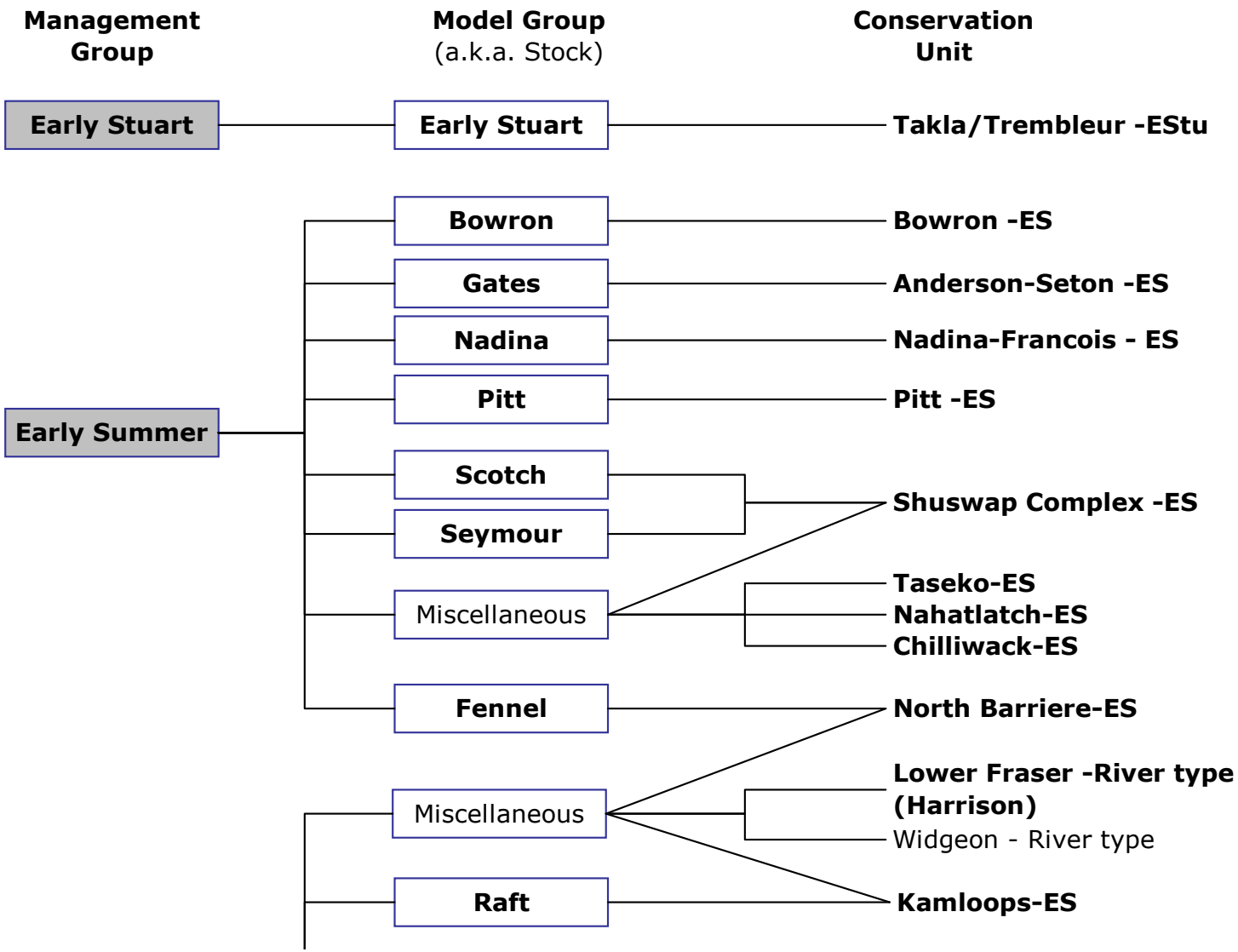
Table 3

- 12 of 19 stocks have recent Gen Avg less than max(Gen Avg), despite 2010 abd
- 5 stocks: recent Gen Avg is highest obs (Scotch, Seymour, Chilko, Harrison, and Late Shuswap)
- 6 of 11 non-cyclic stocks: recent Gen Avg much smaller than the upper end of range for WSP Upper BM.

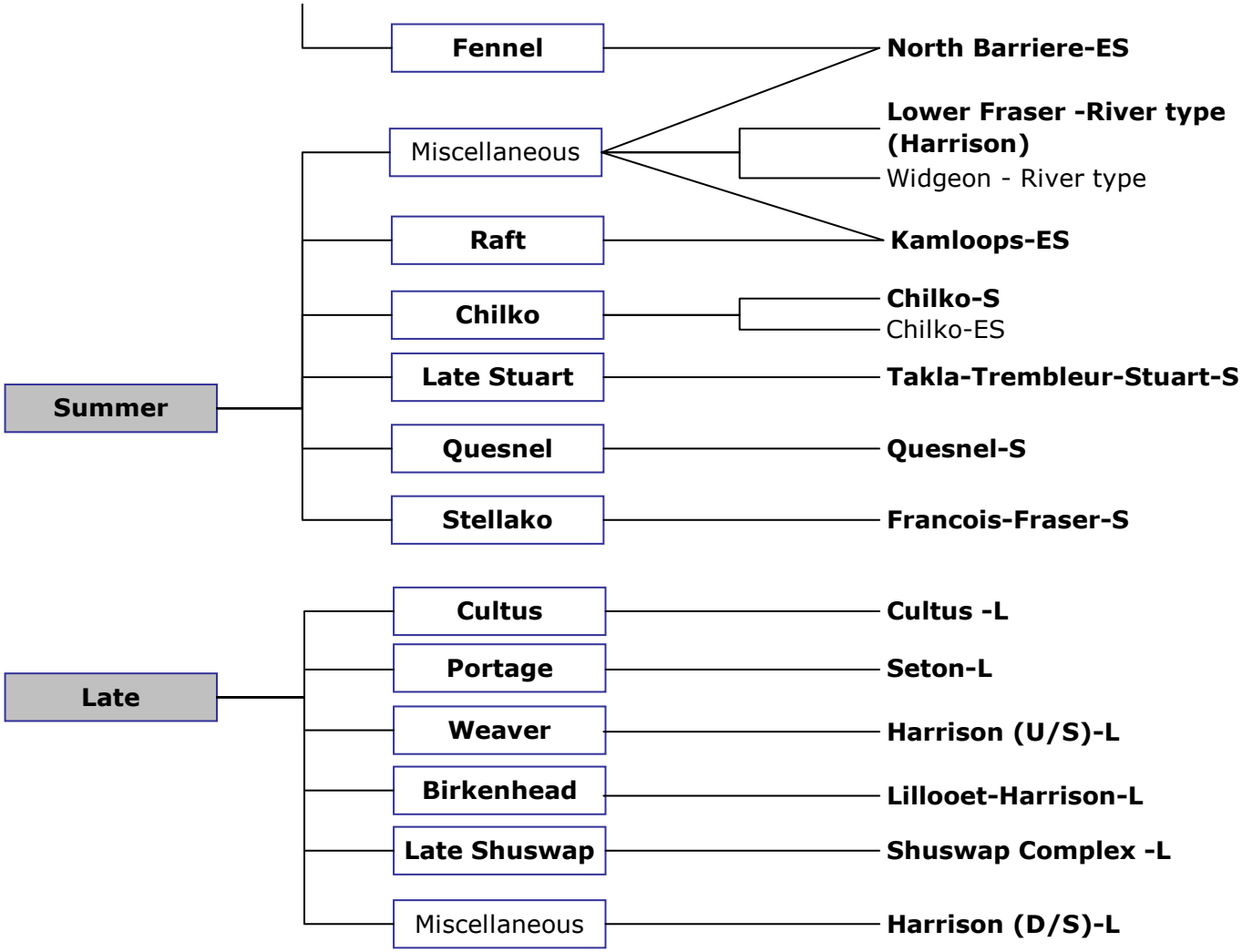
Productivity



Biological Status (WSP) - 1



Biological Status (WSP) - 2



bold = Used in the FRSSI Model

bold = "major contributor of diversity or abundance within a model group"

Biological Status (WSP) - 3

Integrated Status Evaluation

- Combine multiple metrics (relative abundance, long-term trend, short-term trend) with other information
- Expert workshop with combination of break-out groups and plenary discussions
- Each CU evaluated by multiple groups, then all participants developed a consensus status designation and **commentary**

=> Details in Res Doc: Grant & Pestal (2011)

Biological Status (WSP) - 4

Status	Conservation Unit	Cyclic	Stock
Red	Takla-Trembleur-EStu	cyclic	Early Stuart
Red	Nadina-Francois-ES		Nadina
Red*	Taseko-ES		Miscellaneous Early Summers
Red	Nahatlatch-ES		Miscellaneous Early Summers
Red	Bowron-ES		Bowron
Red	Cultus-L		Cultus
Red	Widgeon – River		Miscellaneous Lates
R/A	Chilliwack-ES		Miscellaneous Early Summers
R/A	Francois-Fraser-S		Stellako
R/A	Quesnel-S	cyclic	Quesnel
R/A	Takla-Trembleur-Stuart-S	cyclic	Late Stuart
Amber	North Barriere-ES		Fennel & Miscellaneous Early Summer
Amber	Anderson-Seton-ES	cyclic	Gates
Amber	Kamloops-ES		Raft & Miscellaneous Early Summers
Amber	Harrison (U/S)-L		Weaver
A/G	Pitt-ES		Pitt
A/G	Shuswap-ES	cyclic	Scotch, Seymour, Misc.E.Sum.
Green*	Chilko-S & Chilko-ES agg.		Chilko
Green*	Lillooet-Harrison-L		Birkenhead
Green	Shuswap Complex-L	cyclic	Late Shuswap
Green	Harrison – River		Harrison
Green	Harrison (D/S)-L		Miscellaneous Lates

?	DD	Chilko-ES		Chilko

?	Undet.	Seton-L	cyclic	Seton

Break for Discussion

Options for 2014

Description

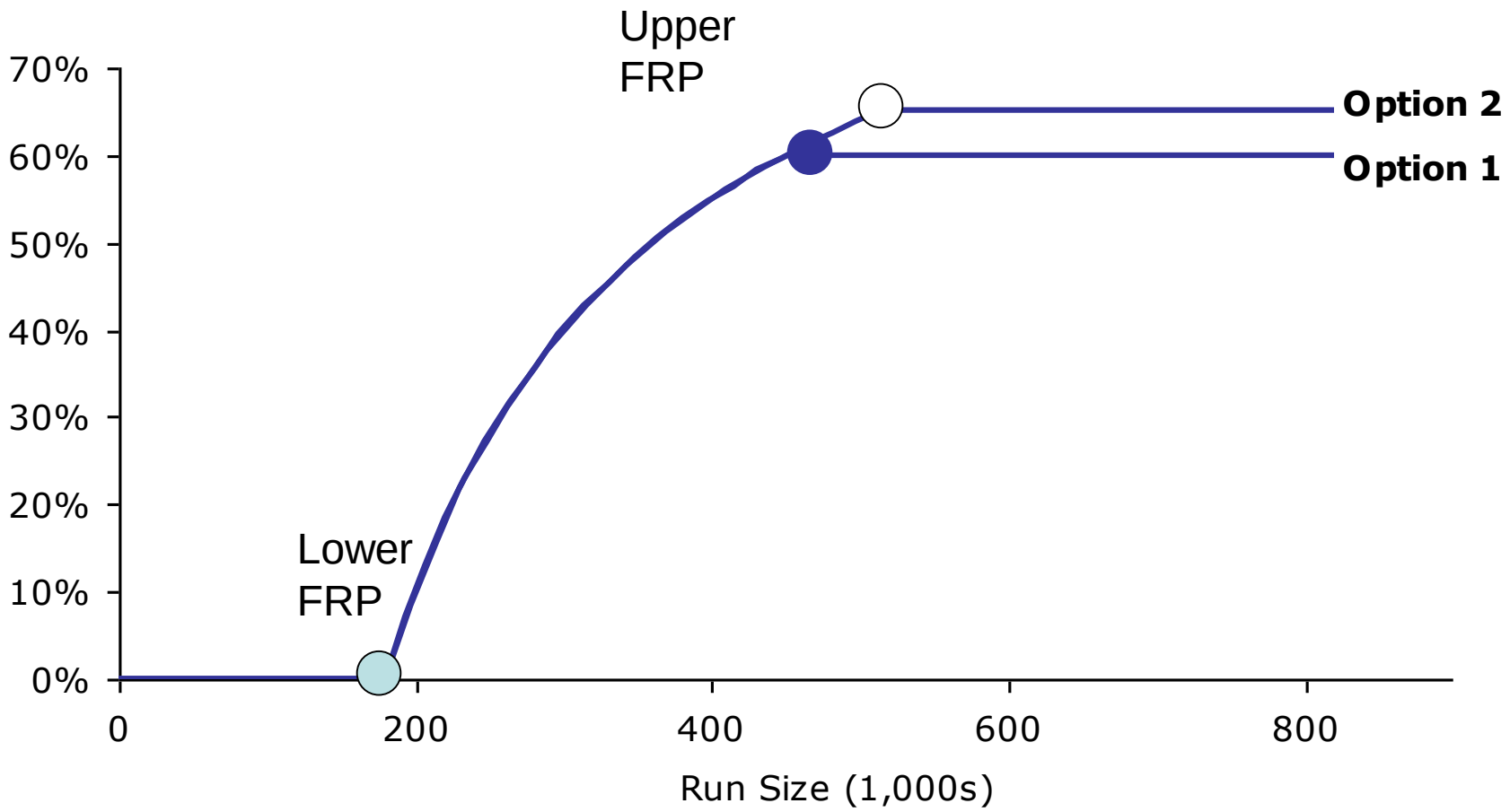
Option 1 – Like Cycle Year

- Same TAM rules as in 2010, except that the Fishery Reference Points were adjusted (Raft, Harrison, and North Thompson now part of Summer)

Option 2 – Increase TAM Cap

- Increase TAM cap to 65% due to large expected run size for Early Summer, Summers and Lates.
- Lower FRP stay the same, but Upper FRP increase due to the gradual increase in TAM until it reaches the cap.

Illustration of 2 Options



Option Details

Option 1 – Like Cycle Year

	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	0.67
Early Summer (w/o misc)	10%	60%	180,000	450,000	0.43
Summer (w/o misc)	10%	60%	1,020,000	2,550,000	0.10
Late (w/o misc)	20-30%	60%	1,100,000	2,750,000	0.61

Option 2 – Increase TAM Cap

	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	0.67
Early Summer (w/o misc)	10%	65%	180,000	514,286	0.43
Summer (w/o misc)	10%	65%	1,020,000	2,914,286	0.10
Late (w/o misc)	20-30%	65%	1,100,000	3,142,857	0.61

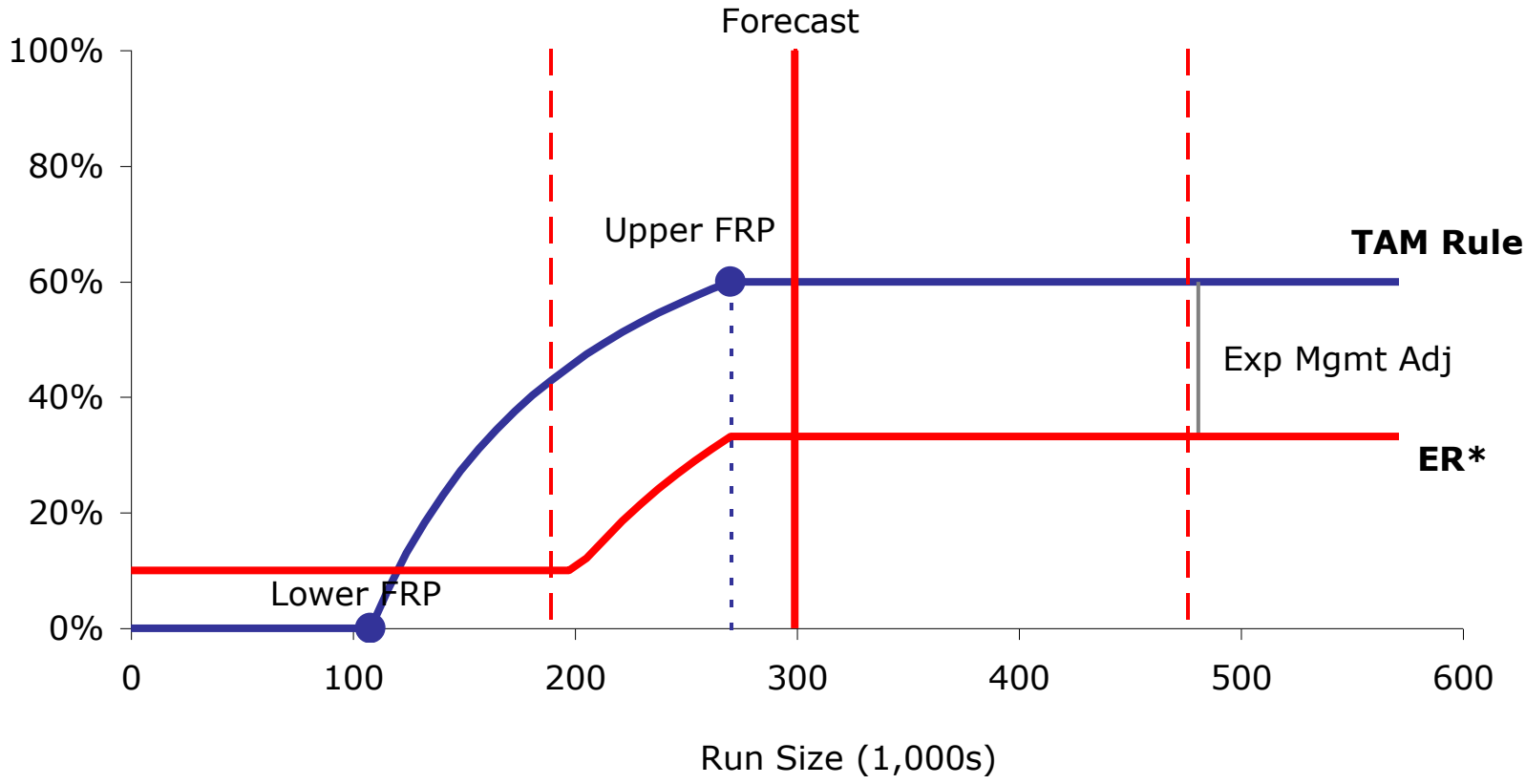
Changes since 2010

For both options

- Early Stuart TAM rule changed based on FN feedback
- Harrison -> Summer -> Miscellaneous
- Raft & North Thompson -> Summer

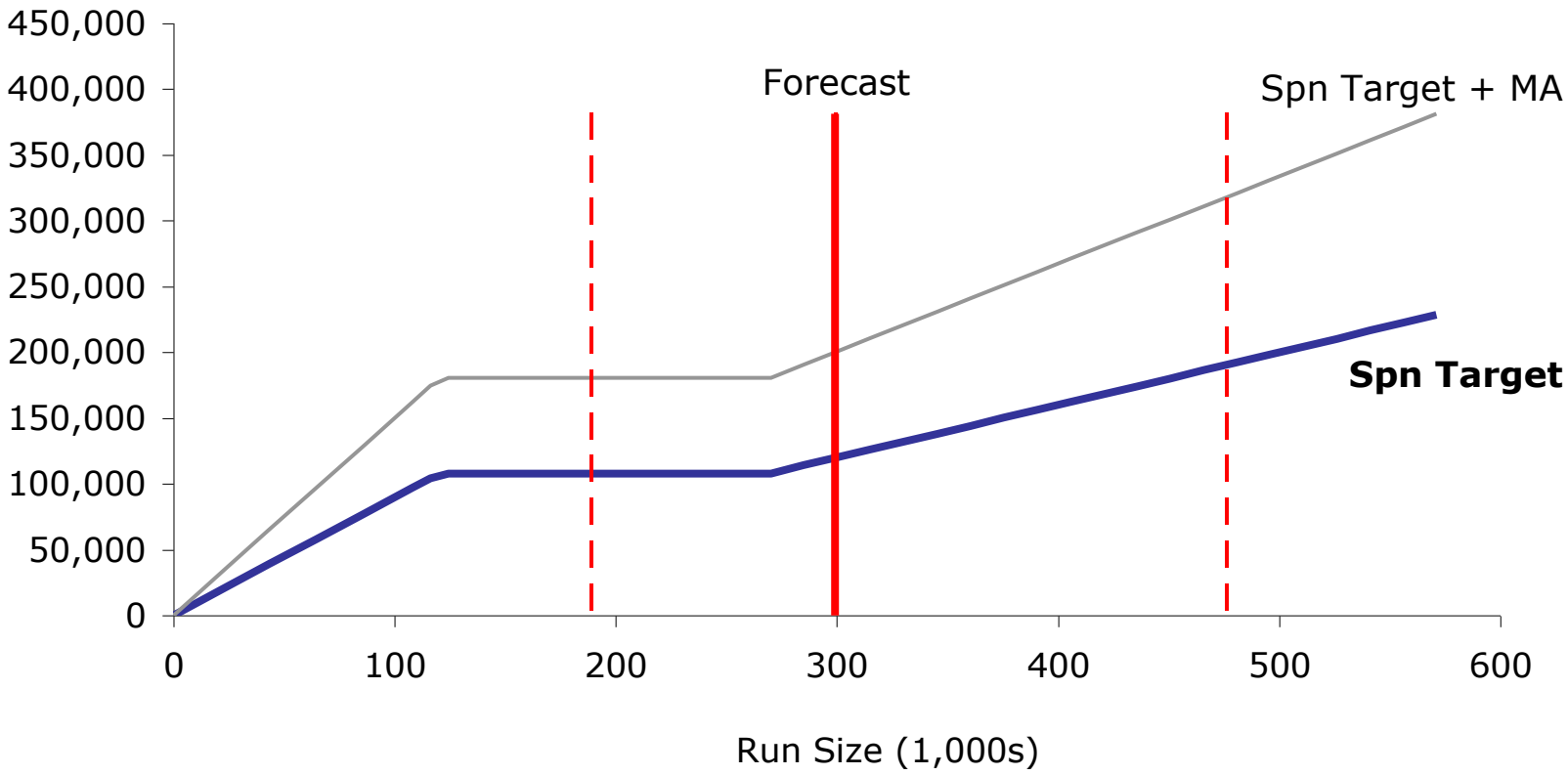
Expected Outcomes
By Management Group

Early Stuart - 1

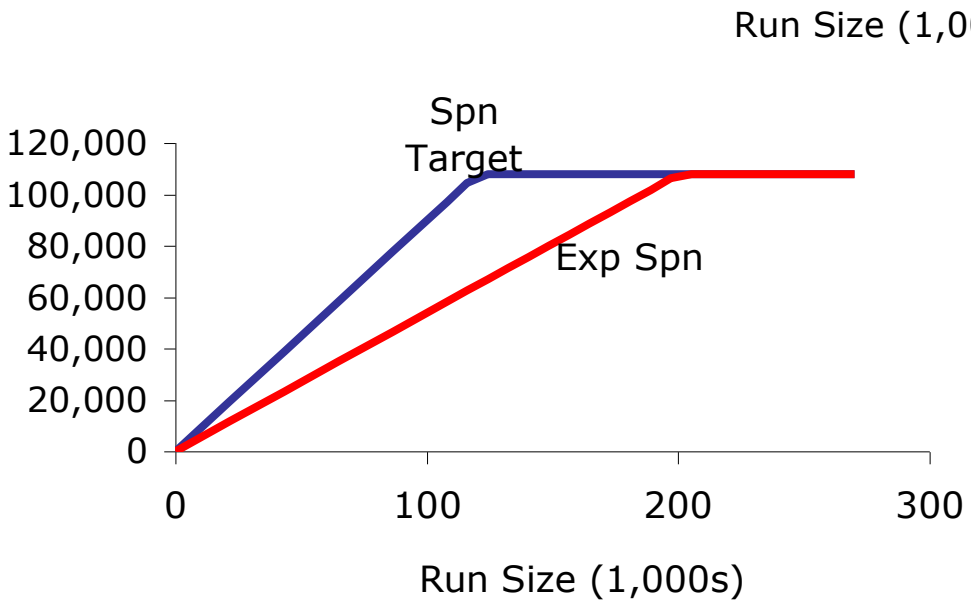


* ER = expected ER based on TAM, expected Mgmt Adj, and applying Low Abd ER

Early Stuart - 2



Early Stuart - 3



At low run size, expected spawners is less than the spawner target resulting from the TAM rule, because of en-route mortality and the Low Abd ER. At larger run sizes, all of the en-route mortality can be absorbed in the Total Allowable Mortality, and the spawner target can be achieved.

Early Stuart - 4

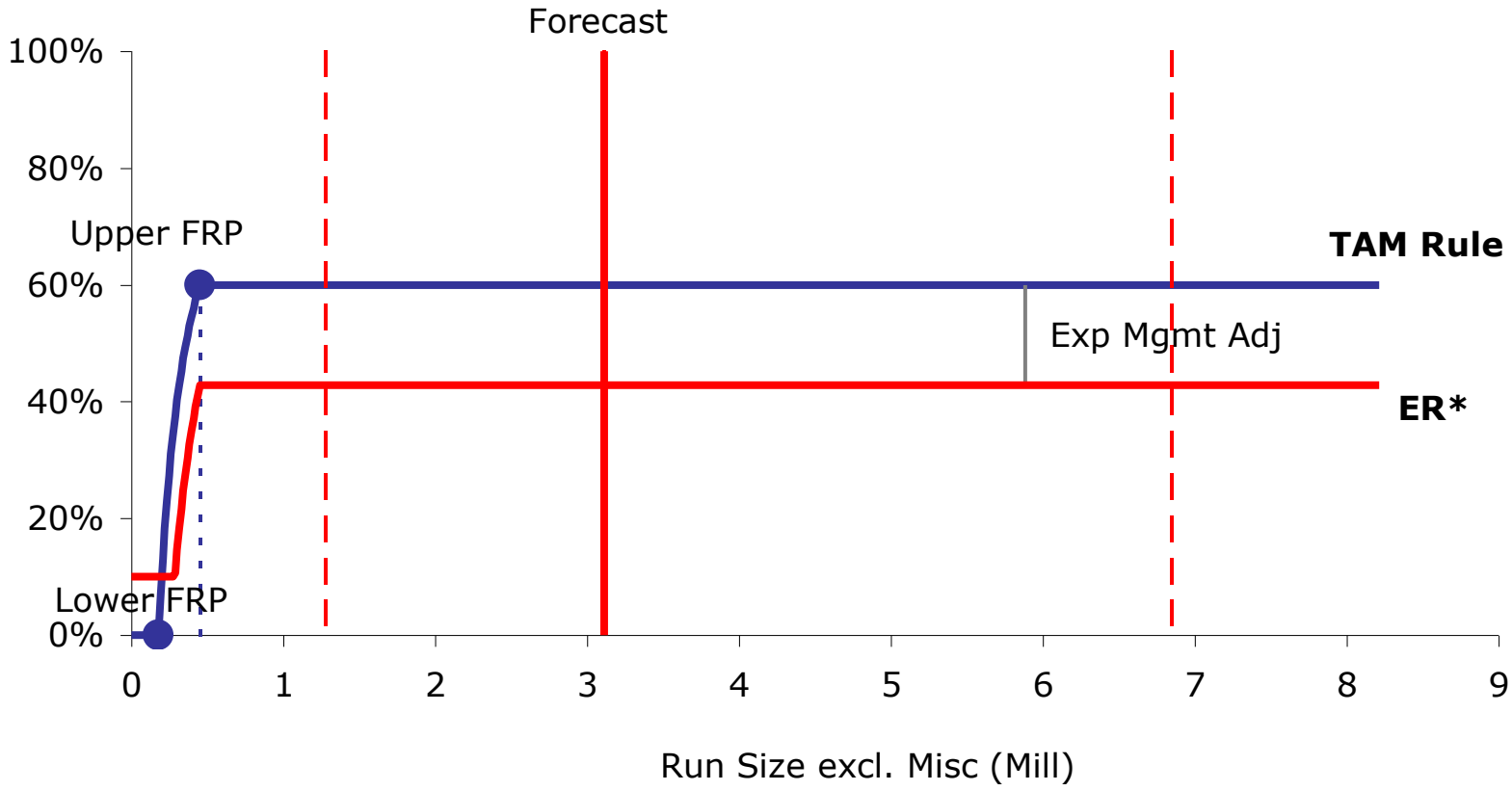
Same TAM rule under Option 1 and 2

	Pre-season Forecast Return				
	p10	p25	**p50**	p75	p90
forecast	132,000	189,000	**299,000**	476,000	709,000
TAM Rule (%)	18%	43%	**60%**	60%	60%
Escapement Target	108,000	108,000	**119,600**	190,400	283,600
MA	72,400	72,400	**80,100**	127,600	190,000
Esc. Target + MA	180,400	180,400	**199,700**	318,000	473,600
LAER	10%	10%	**10%**	10%	10%
ER at Return	0%	5%	**33%**	33%	33%
Allowable ER	10%	10%	**33%**	33%	33%
available harvest	13,200	18,900	**99,300**	158,000	235,400
2014 Performance					
Projected S (after MA)	71,000	102,000	**120,000**	190,000	284,000
BY Spawners	60,300	60,300	**60,300**	60,300	60,300
Proj. S as % BY S	118%	169%	**199%**	315%	471%
cycle avg S	36,500	36,500	**36,500**	36,500	36,500
Proj. S as % cycle S	195%	279%	**329%**	521%	778%

Early Stuart - Table

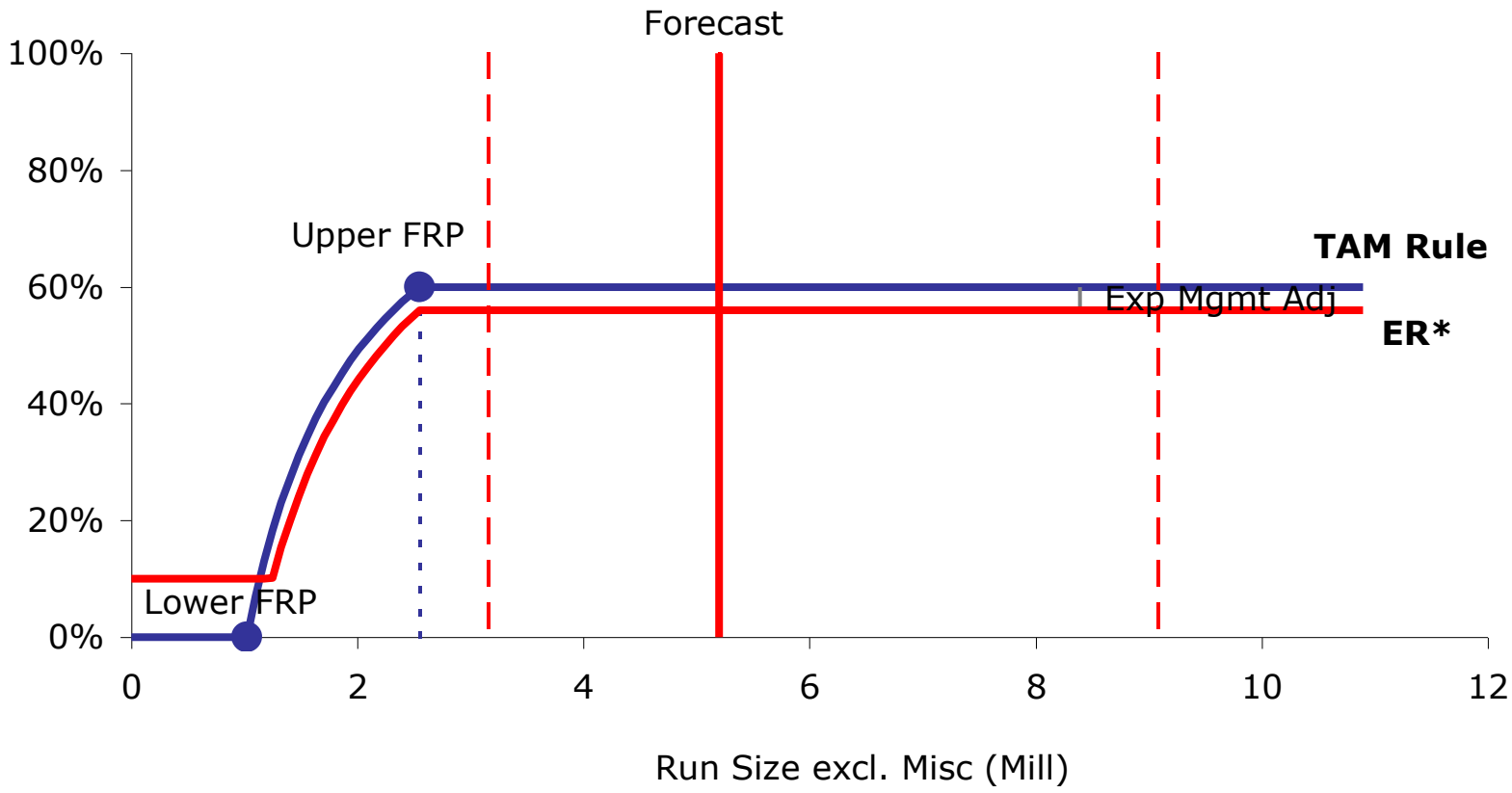
	Pre-season Forecast Return		
	p10	p25	**p50**
forecast	132,000	189,000	**299,000**
TAM Rule (%)	18%	43%	**60%**
Escapement Target	108,000	108,000	**119,600**
MA	72,400	72,400	**80,100**
Esc. Target + MA	180,400	180,400	**199,700**
LAER	10%	10%	**10%**
ER at Return	0%	5%	**33%**
Allowable ER	10%	10%	**33%**
available harvest	13,200	18,900	**99,300**
2014 Performance			
Projected S (after MA)	71,000	102,000	**120,000**
BY Spawners	60,300	60,300	**60,300**
Proj. S as % BY S	118%	169%	**199%**
cycle avg S	36,500	36,500	**36,500**
Proj. S as % cycle S	195%	279%	**329%**

Early Summer – Option 1



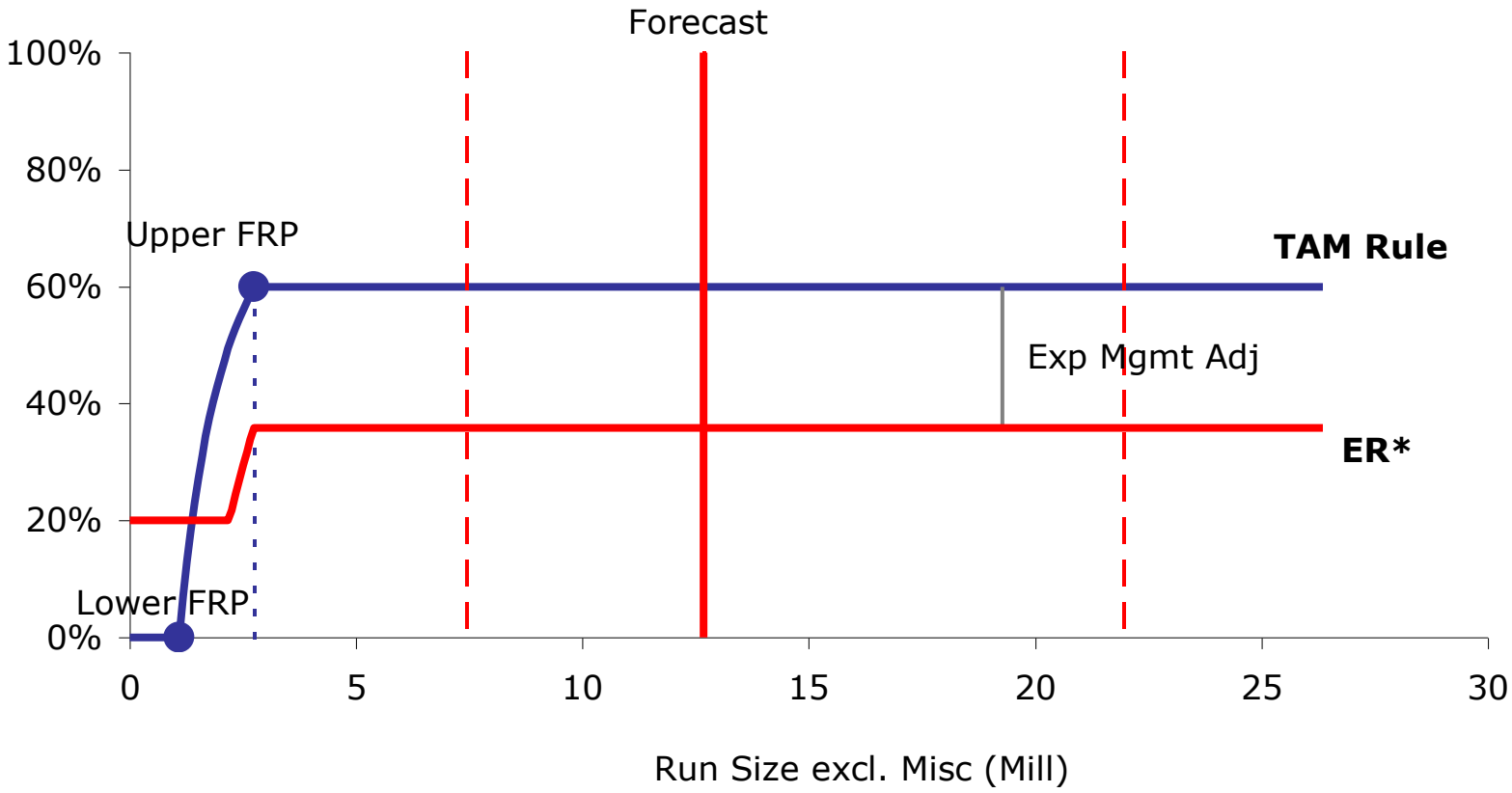
* ER = expected ER based on TAM, expected Mgmt Adj, and applying Low Abd ER

Summer – Option 1



* ER = expected ER based on TAM, expected Mgmt Adj, and applying Low Abd ER

Late – Option 1



* ER = expected ER based on TAM, expected Mgmt Adj, and applying Low Abd ER

Summary - Early Stuart

- Forecast well over Upper FRP
- Exp Spn well over brood year and cycle line avg, even after large expected en-route mortality (absorbed in TAM)

Summary - Early Summer

- At low end of forecast, exp spn well below brood year but around or above cycle line avg (under both options
- At mid-point of forecast, exp spn about ½ of brood year (but 5 times cycle line avg)
- Forecast clearly about Upper FRP (even at p10)
- Substantial share of TAM is taken up by en-route mortality, resulting in lower target ER

Summary - Summer

- At low end of forecast, exp spn well below brood year but around or above cycle line avg (under both options
- At mid-point of forecast, exp spn about ½ of brood year (but 2 times cycle line avg)
- Forecast range mostly above Upper FRP (p25)
- Usually low en-route mortality, so target ER is close to TAM

Summary - Late

- At lower half of forecast range, exp spn well below brood year
- But: exp spn at or above cycle line average for most of the forecast range (p25 and up), for both options
- Forecast clearly about Upper FRP (even at p10)
- Substantial share of TAM is taken up by en-route mortality, resulting in lower target ER

Expected Outcomes By Stock

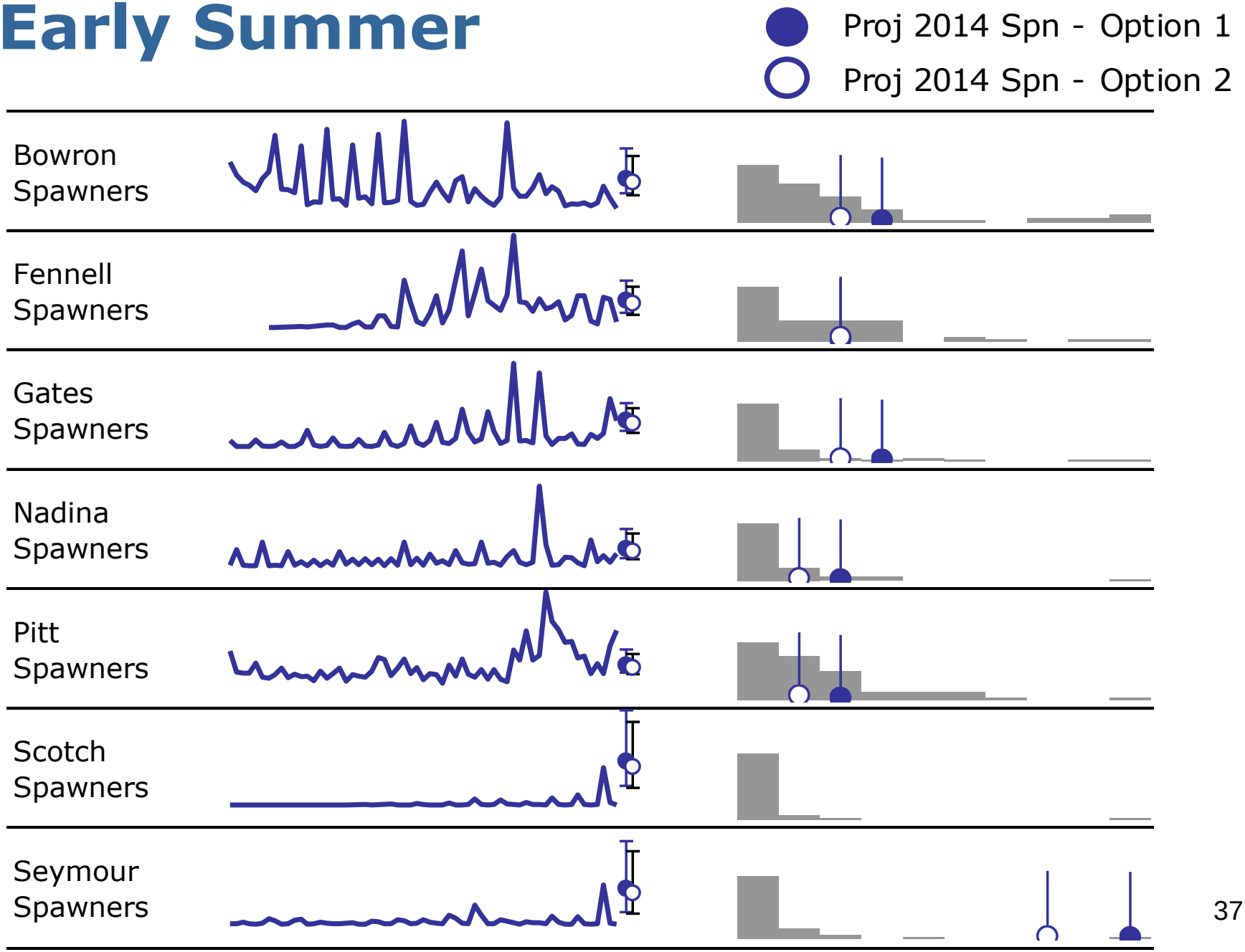
Early Stuart

Proj 2014 Spn - Option 1

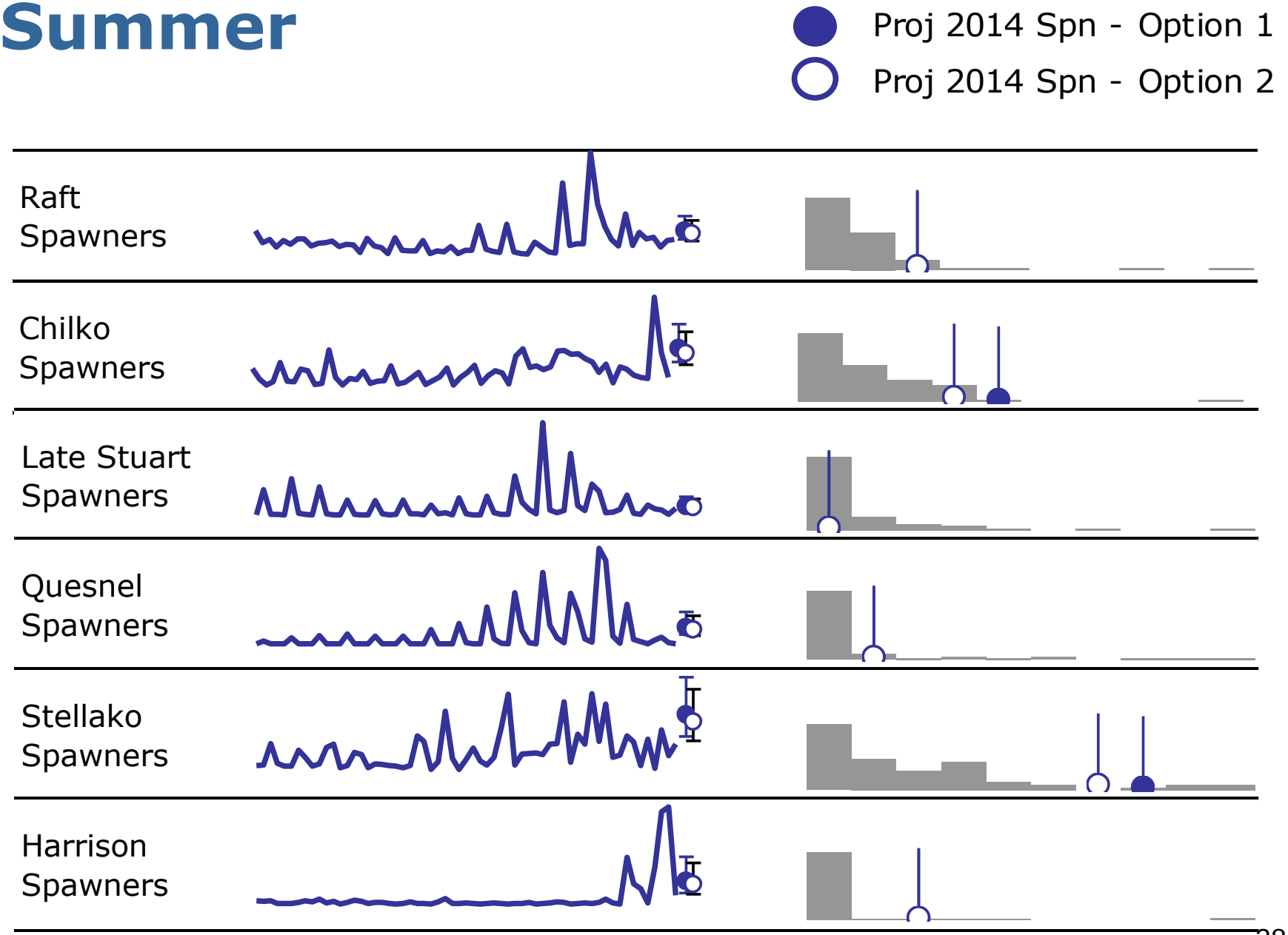
Proj 2014 Spn - Option 2

E. Stuart Spawners

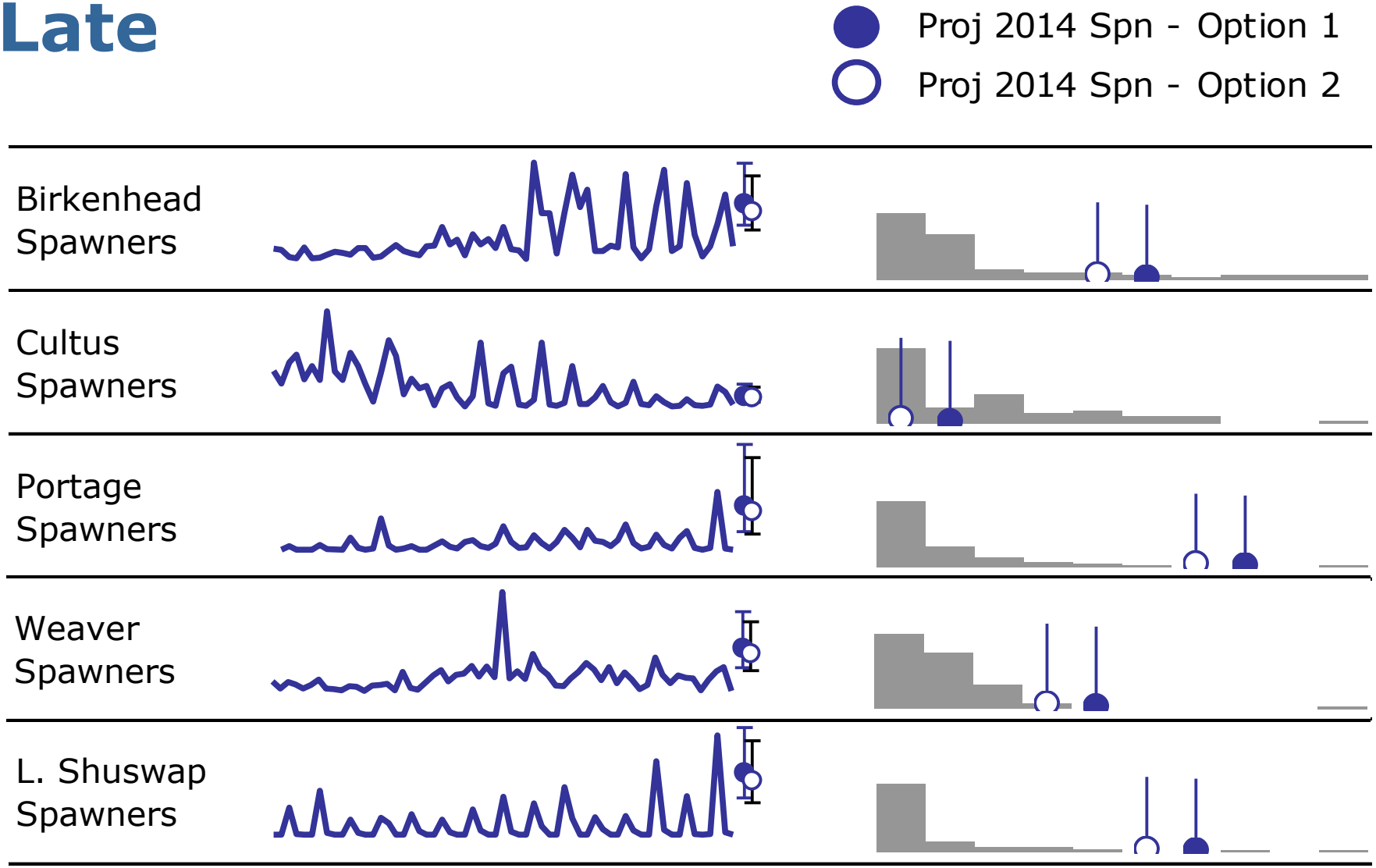
Early Summer



Summer


Proj 2014 Spn - Option 1
Proj 2014 Spn - Option 2
Raft Spawners
Chilko Spawners
Late Stuart Spawners
Quesnel Spawners
Stellako Spawners
Harrison Spawners

Late


Proj 2014 Spn - Option 1
Proj 2014 Spn - Option 2
Birkenhead Spawners
Cultus Spawners
Portage Spawners
Weaver Spawners
L. Shuswap Spawners

Summary – Stock Specific

- 18 of 19 stocks with exp spn near or above long-term median and cycle line average (except Cultus)
- Several stocks with exp spn much larger than long-term median (up to 400 times larger) and clearly larger than cyce average (5-10 times) These are Scotch, Seymour, Quesnel, Harrison, and Late Shuswap
- 12 of 19 stocks below max(obs spn)
- 7 stocks with exp spn larger than any previous observed. These are Scotch, Seymour, Stellako, Birkenhead, Portage, Weaver, Late Shuswap

Break for Discussion

Additional Considerations

Potential ESSR Fisheries

Considerations

- Limiting factor (spawning hab or rearing lake?)
- Capacity estimate for limiting factor
- Buffer above capacity estimate (uncertainty)
- Implementation

Handling Management Adjustments

Options to consider?

Cultus Recovery Objectives

Inputs

- Forecasted abundance
- En-route mortality level
- Pre-spawn mortality level

Challenge

- Identify maximum ER that would meet formal recovery objectives, assuming a pre-spawn mortality of about 40%

Cultus Recovery Objectives

	Cultus run size (in-season, will use Lates as a proxy)									
pMA	7,000	8,000	9,000	10,000	11,000	12,000	13,000	14,000	15,000	16,000
0.43	20%	20%	20%	22%	29%	35%	40%	44%	44%	44%
0.47	20%	20%	20%	20%	27%	33%	38%	43%	44%	44%
0.52	20%	20%	20%	20%	25%	31%	36%	41%	44%	44%
0.56	20%	20%	20%	20%	23%	29%	34%	39%	43%	44%
0.61	20%	20%	20%	20%	20%	27%	32%	37%	41%	44%
0.67	20%	20%	20%	20%	20%	24%	30%	35%	39%	43%
0.72	20%	20%	20%	20%	20%	22%	28%	33%	37%	41%
0.79	20%	20%	20%	20%	20%	20%	25%	30%	35%	39%
0.85	20%	20%	20%	20%	20%	20%	22%	28%	33%	37%
0.92	20%	20%	20%	20%	20%	20%	20%	25%	30%	34%

pMA = Percent Managament Adjustment

Feedback from Tier 3 meeting (March 17, 2014)

Ideas Raised on March 17

- At larger run sizes would like to have seen larger increases in TAM rule to 70% ER or higher.
- Should consider capping the escapement target for the aggregates at some level so they do not increase to levels well above those seen in the past.
- May want to implement the MA differently at very large run sizes especially when the MA results in little or no TAC.