



Fraser River Sockeye 2009

Differences between estimates

Mission escapement	1,303,000
- Catch upstream of Mission	52,000
- <u>En-route losses</u>	<u>??????</u>
= Potential Spawning escapement	1,251,000
Upstream spawning escapement	<u>1,056,000</u>

Difference Between Estimates (DBE)= 195,000

Sources of differences between estimates



- a. Mission escapement bias?**
- b. In-river catch estimation bias?**
- c. En-route loss?**
- d. Spawning escapement bias?**
- e. Imprecision of estimates (a-d).**

Reasons for DBEs are explored annually



- 1. Evidence of potential bias provides rationale for program improvements**
- 2. Determine whether DBE should be included as part of total run estimate**

Impacts of DBEs on management



1. DBE's are part of the management adjustment models

- Management adjustments – Addition of fish to pre-season or in-season escapement targets to increase likelihood of achieving spawning escapement targets.

Impacts of DBEs on management



2. DBE's may be added to the total return in some years (e.g. if upstream estimates are incomplete, or there is evidence of en-route losses)



How do Total run calculations differ?

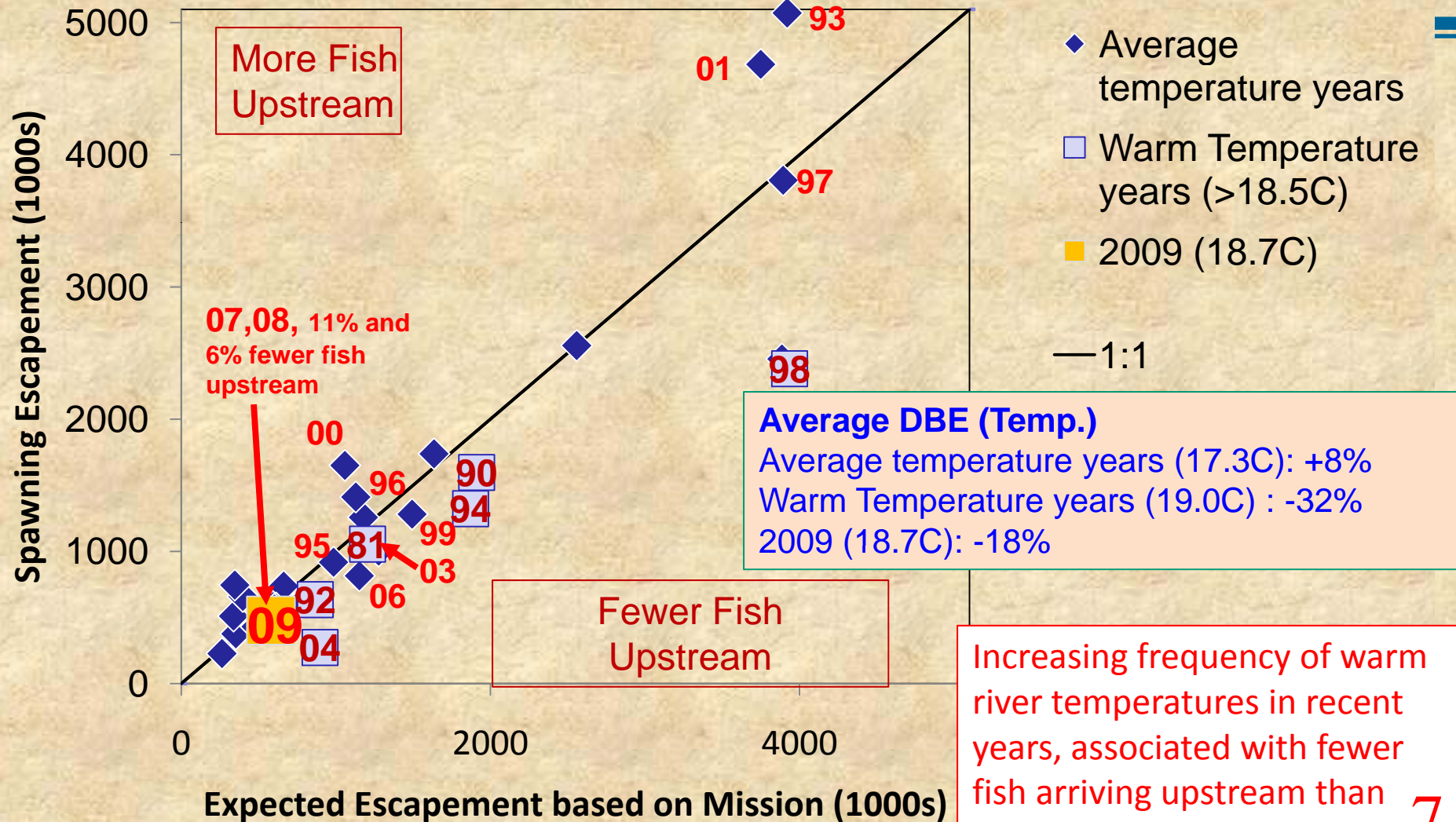
When DBE excluded:

Total run = Spawning escapement + all catches

When DBE included:

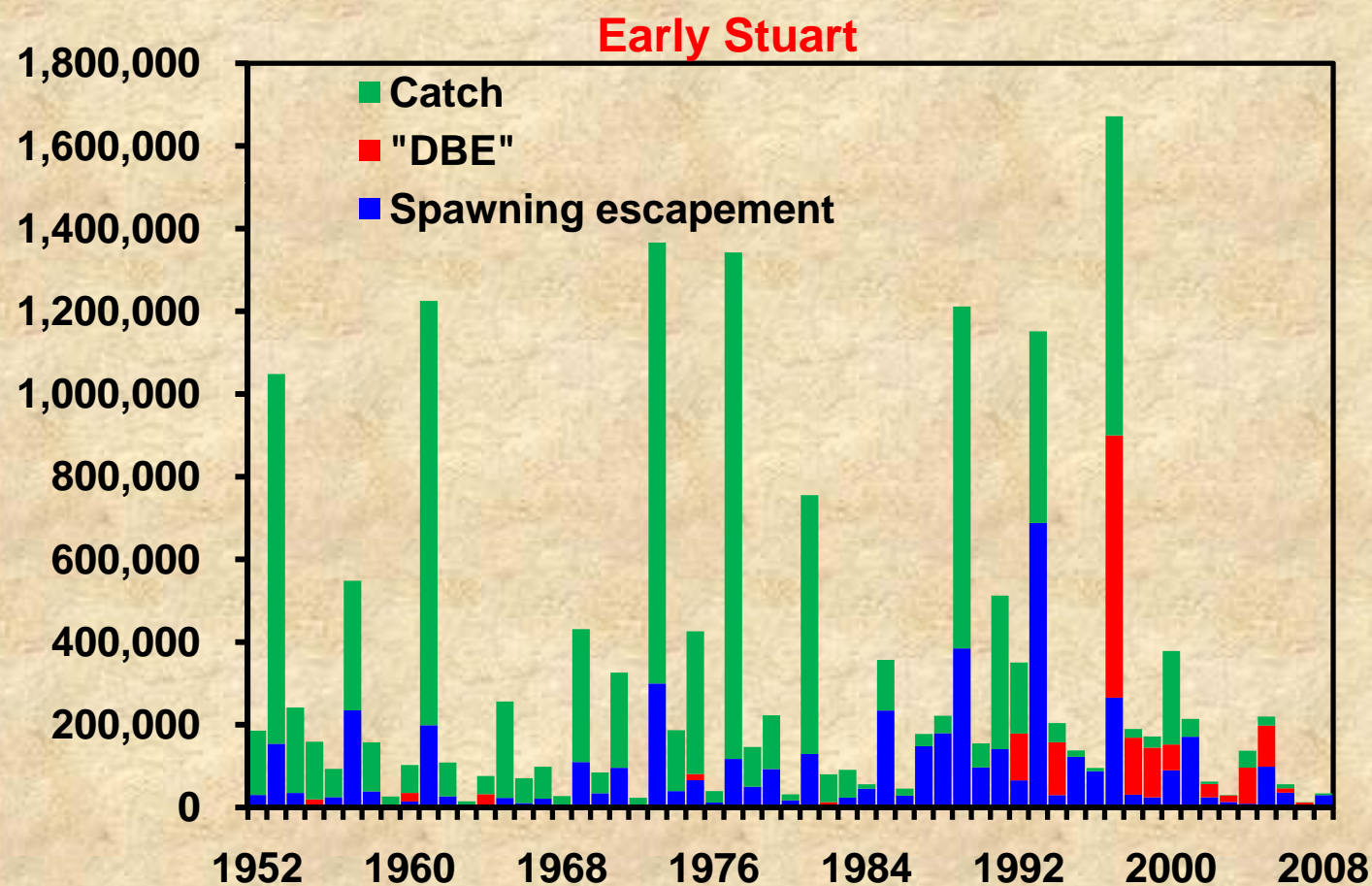
Total run = Spawning escapement + DBE + all catches (same as Mission escapement + catches downstream of Mission)

Pattern of Differences Between Estimates for Summer-run



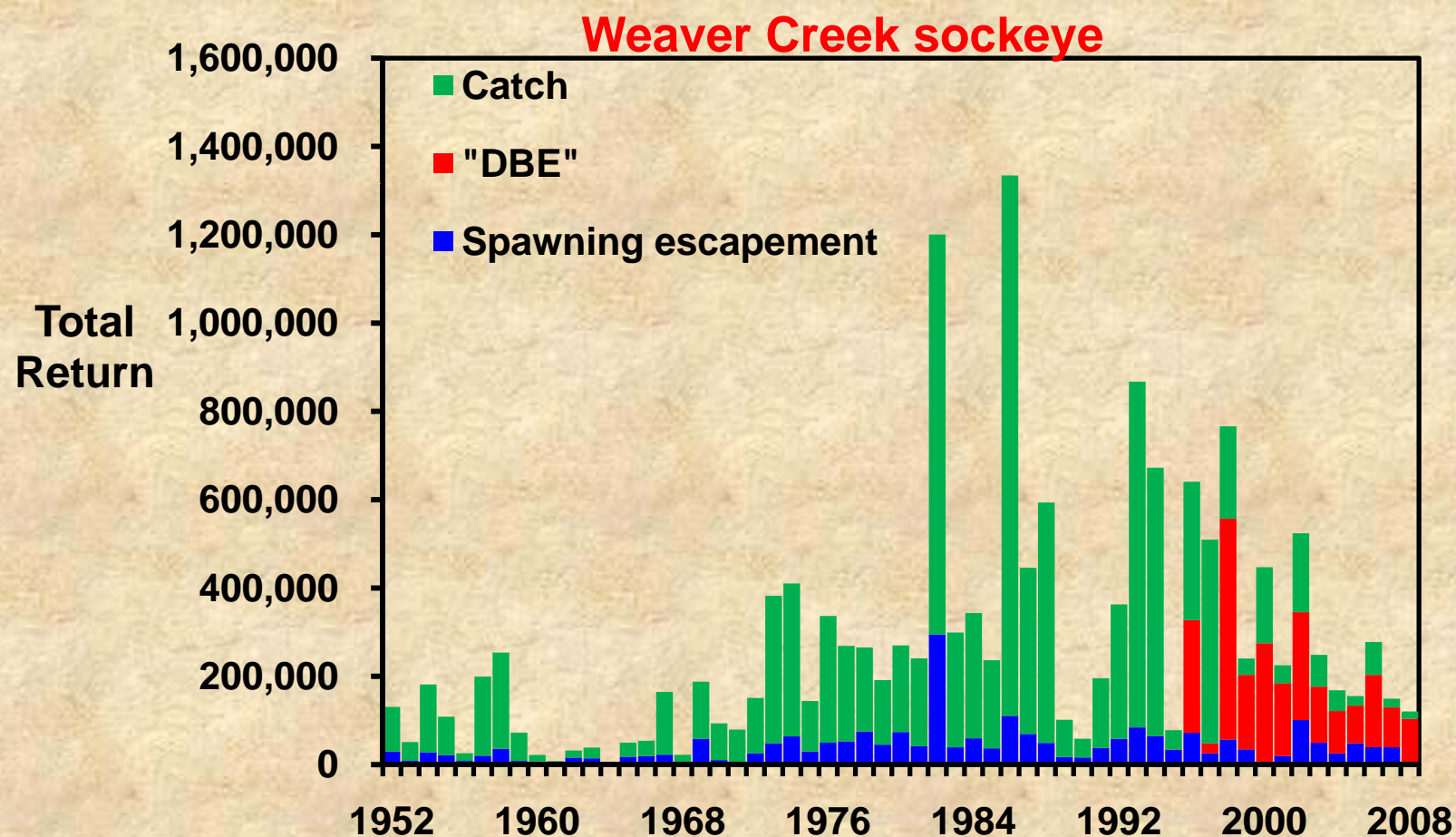


Impacts of DBEs on Total return



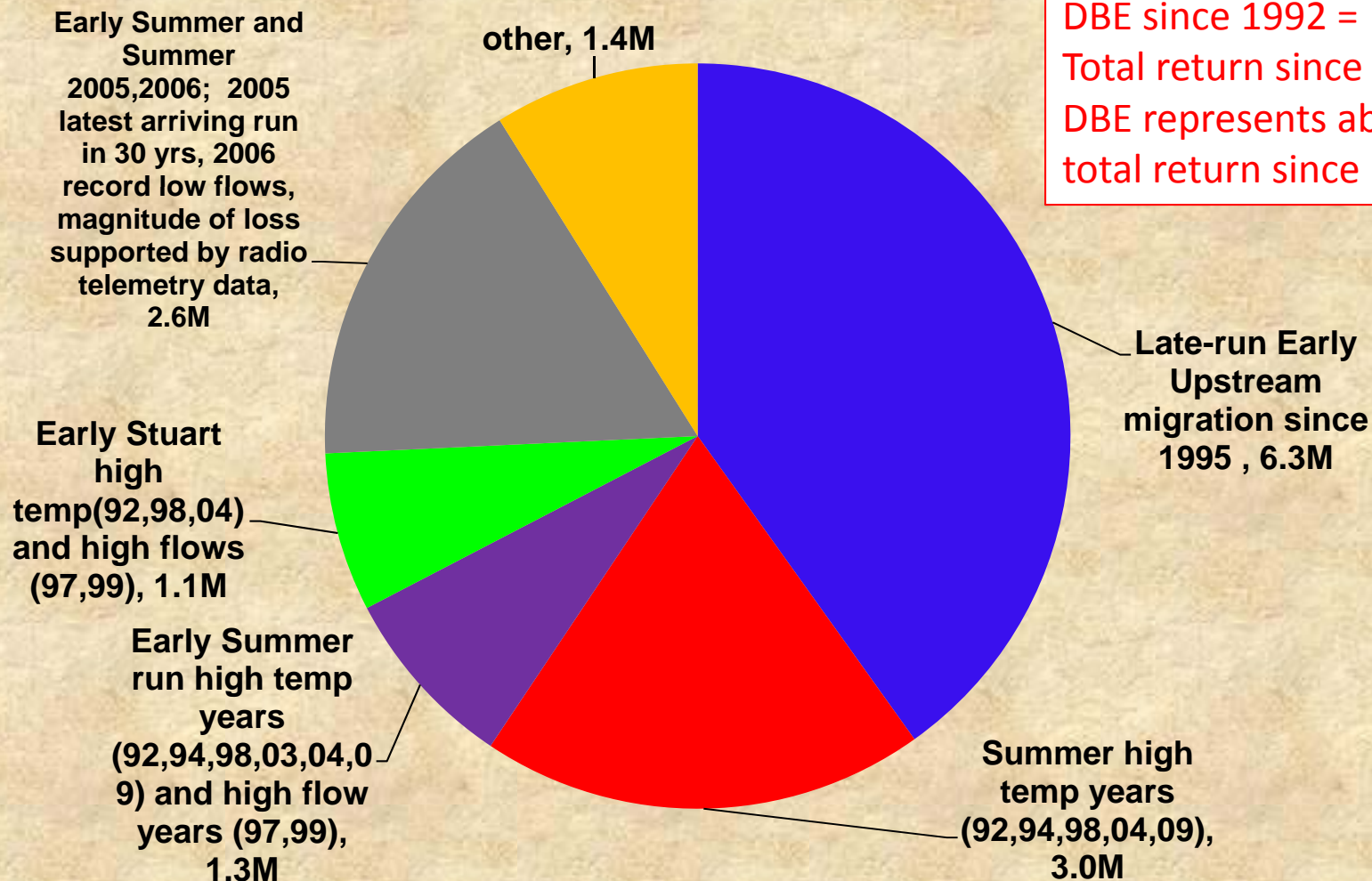


Impacts of DBEs on Total return



15.7M fish have been added to the Fraser sockeye total return since 1992

Events since associated with 15.7M fish DBE since 1992



DBE since 1992 = 15.7M
Total return since 92 = 147.7M
DBE represents about 11% of total return since 1992

Framework for determining when to include DBEs in total return estimates

Principles - **Include** DBEs when:

the magnitude of the DBE is consistent with the combination of losses resulting from natural factors (e.g. environmental conditions, disease, fishing) and/or stock assessment biases (e.g. incomplete or biased surveys)

Framework for determining when to include DBEs in total return estimates

Principles - **Exclude** DBEs when:

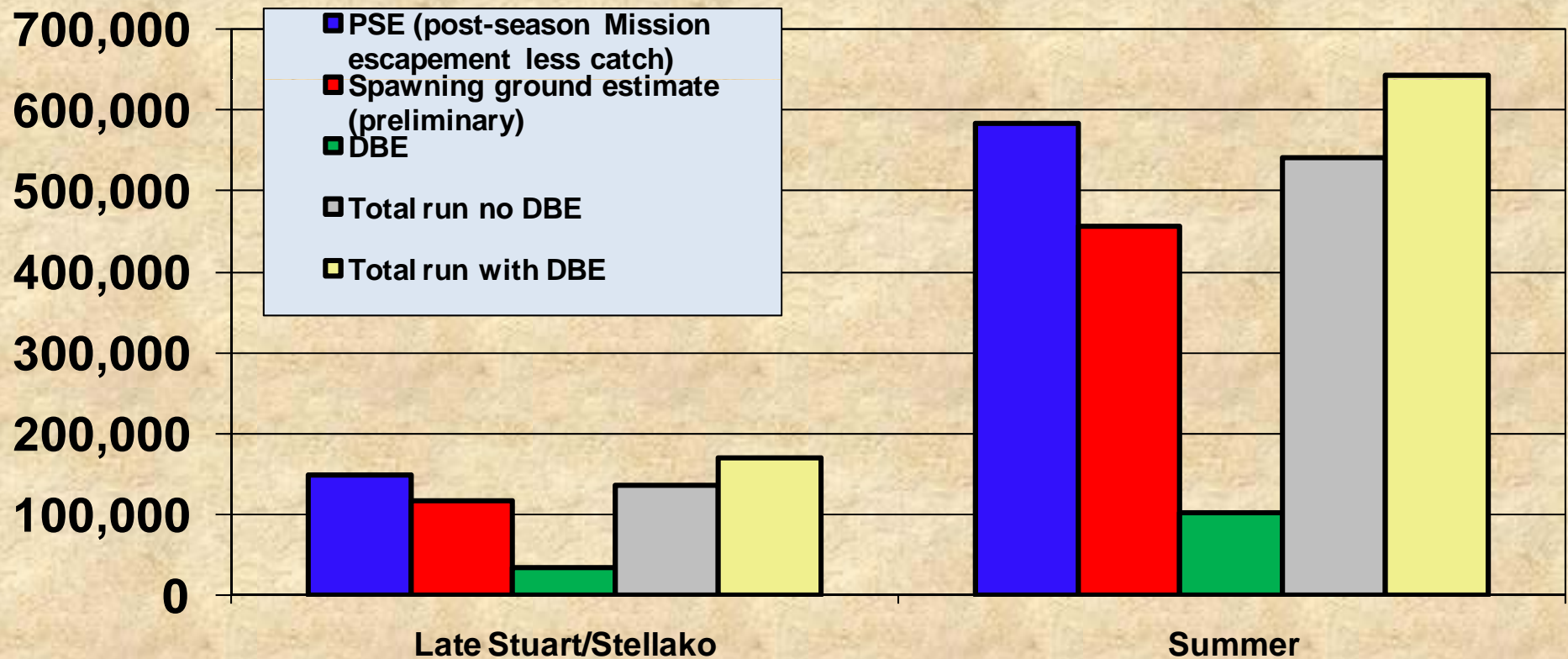
the magnitude of DBEs is consistent with some bias in lower river estimates, **or**

DBEs are of “negligible” magnitude, or there is insufficient evidence for losses and bias in either upper and lower river estimates.

This later circumstance might occur due to imprecision of estimates.

Refined Framework Examples:

Late Stuart/Stellako



Refined Framework Examples:

Late Stuart/Stellako

	L.Stuart/Stellako
a. Mission Escapement	161,821
b. Catch upstream of Mission	12,625
c. Potential Spawning escapement (A-B)	149,196
d. Upstream Spawning escapement	115,650
e. DBE (c-d)	33,546
f. Total Catch all areas	19,396
Total Run with DBE (d+e+f)	168,592
Total Run without DBE (d+f)	135,046

Framework for determining when to include DBEs in total return estimates:

Weight of evidence: Late Stuart/Stellako

Stock-group: Late Stuart / Stellako		Year of return: 2009	
Lower River Components	Total Salmon	Species composition	Stock composition
Evidence of bias? (Y/N) (if yes, specific source)	N or only small Y	N	N
Sources of bias	Matched Qualark except for short period when Mission exceeded Qualark warm water ?	Sockeye dominated the migration period	Late Stuart & Stellako combined are well-identified; stock proportions at Qualark are supported
Upper River components	Spawning escapement	In-river catch	Other losses/mortality
Evidence of bias? (Y/N) (if yes, specific source)	N or only small Y	N(input?)	Y
Sources of bias	Fence for Stellako and M-R for Tachie should be unbiased; visual estimate of Middle R has potential to be an underestimate	No evidence of poor upstream surveys	Warm water encountered; LGL tagging indicated poor survival for summer-run sockeye
Decision and summary of rationale:	33,000 fish DBE included in estimates of Total return; spawning ground underestimate and migration loss likely		