



# 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?

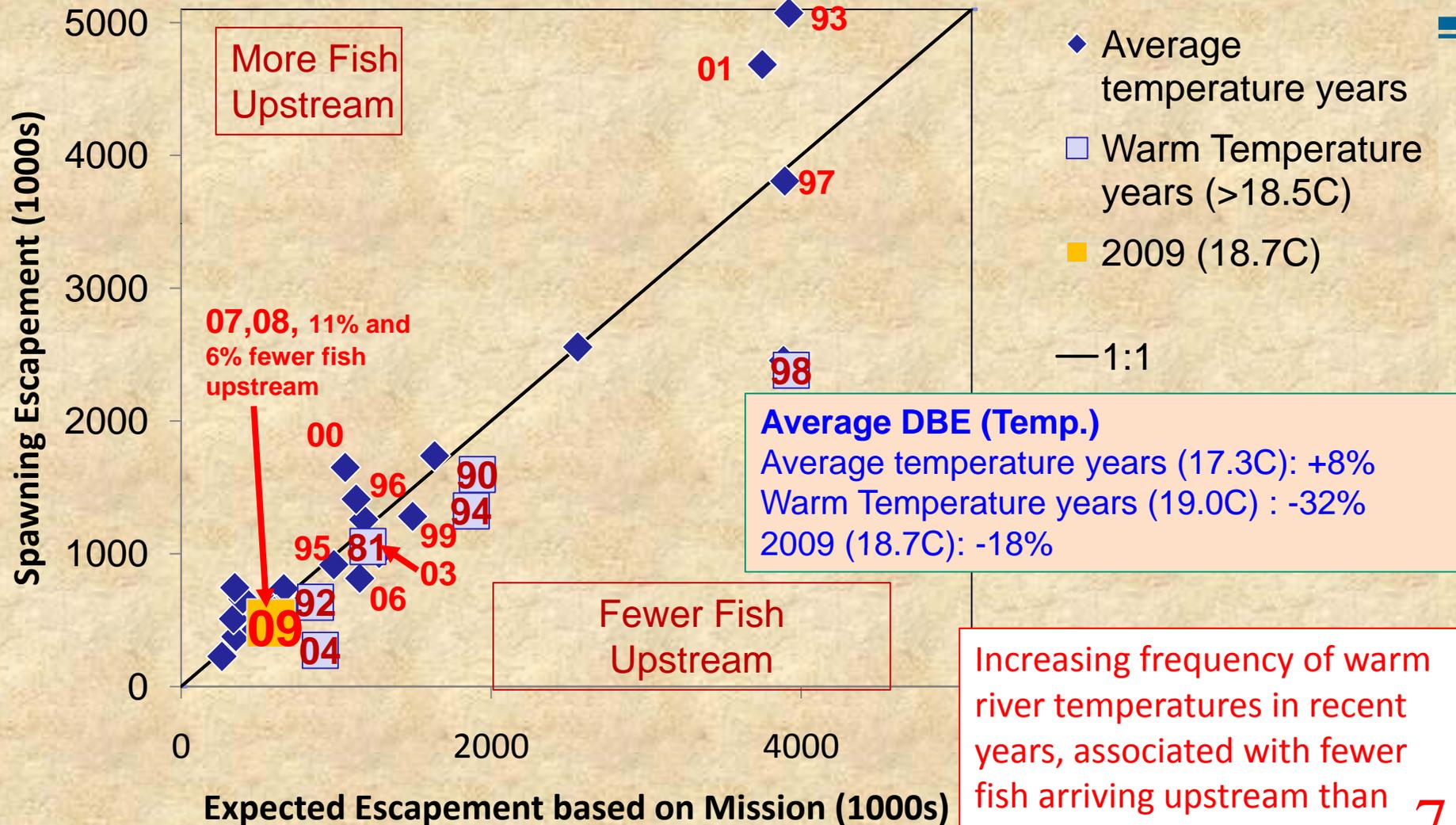
**When DBE excluded:**

**Total run = Spawning escapement + all catches**

**When DBE included:**

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

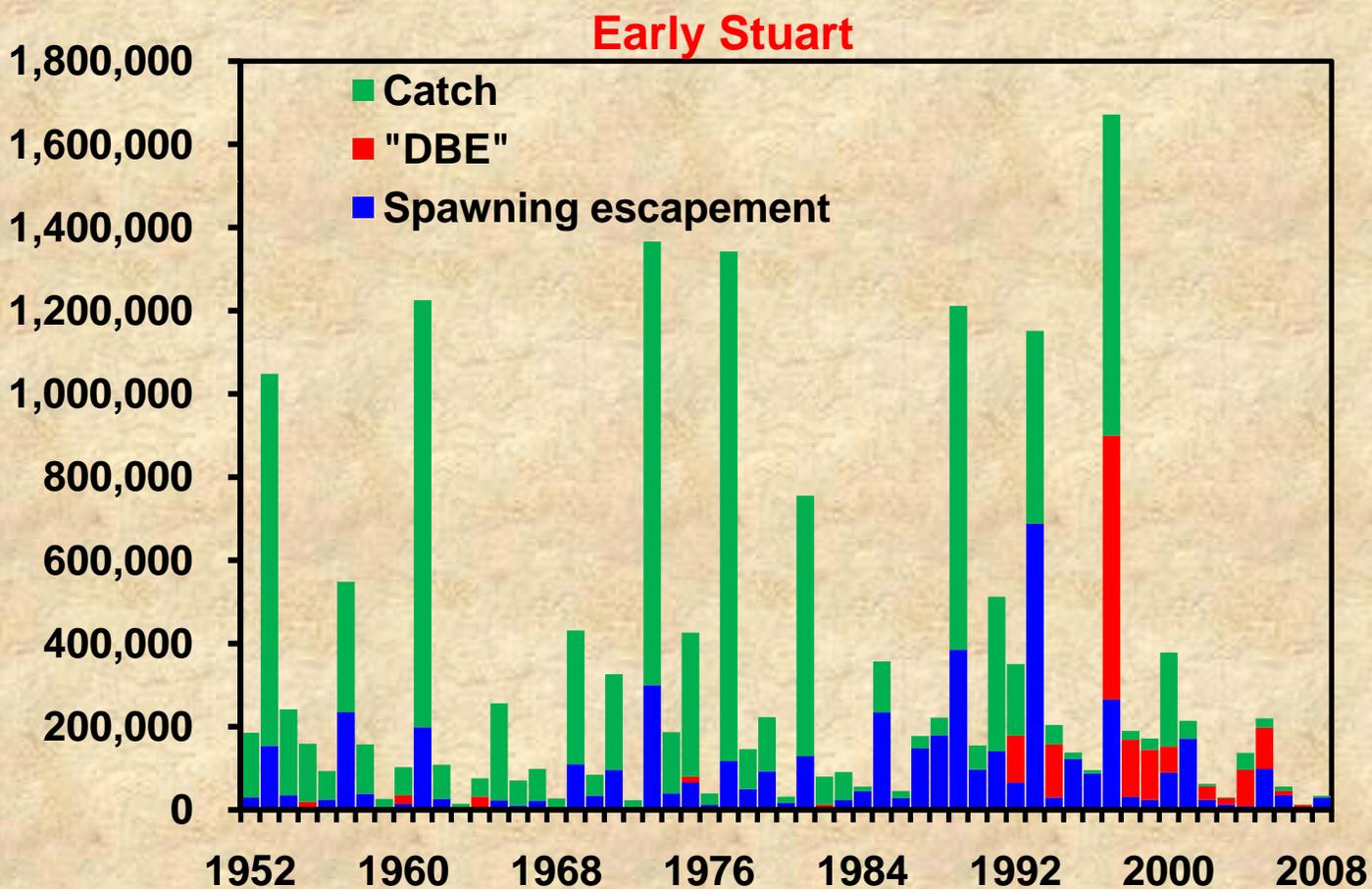
# Pattern of Differences Between Estimates for Summer-run



Increasing frequency of warm river temperatures in recent years, associated with fewer fish arriving upstream than expected.

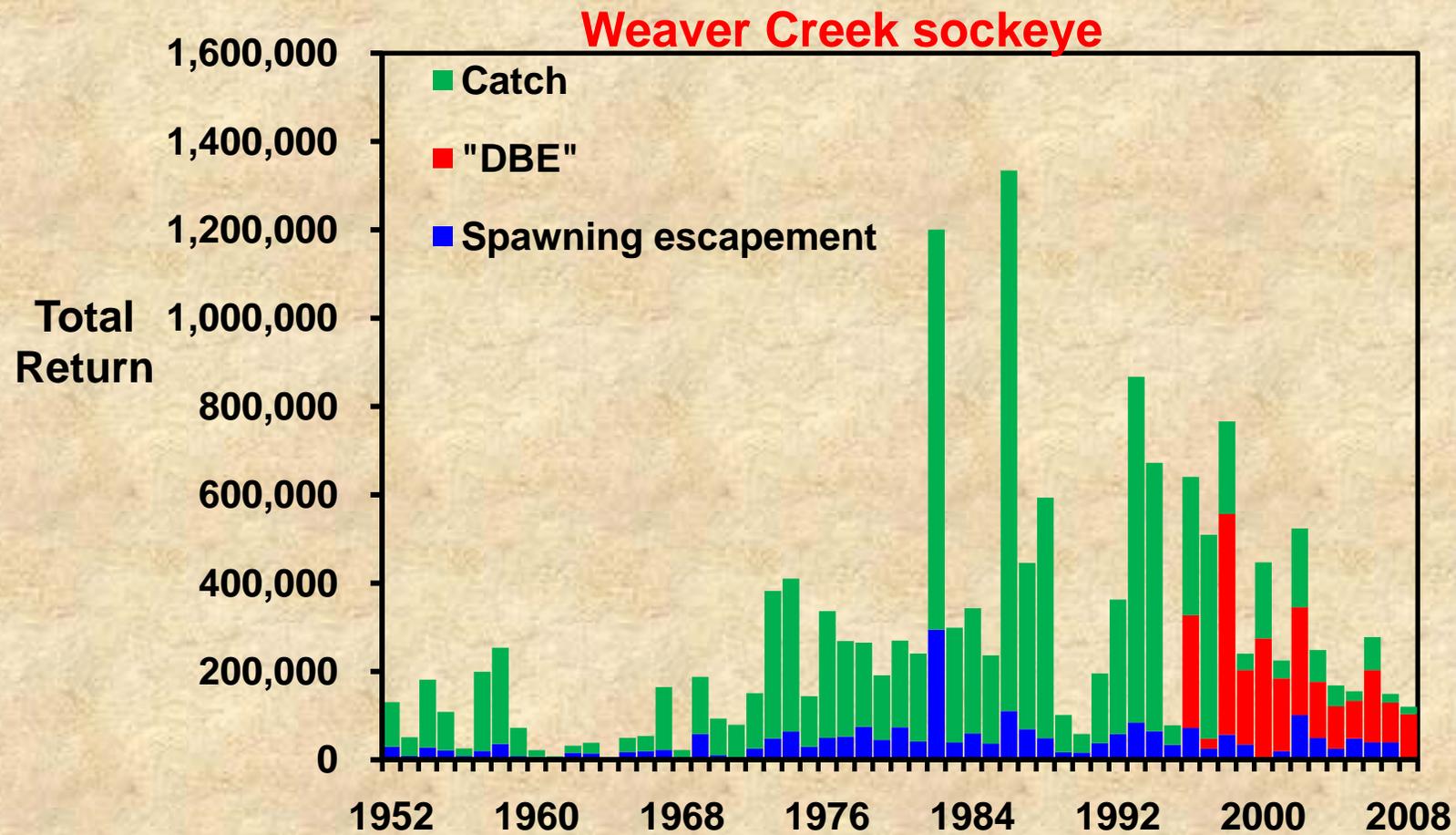


# Impacts of DBEs on Total return



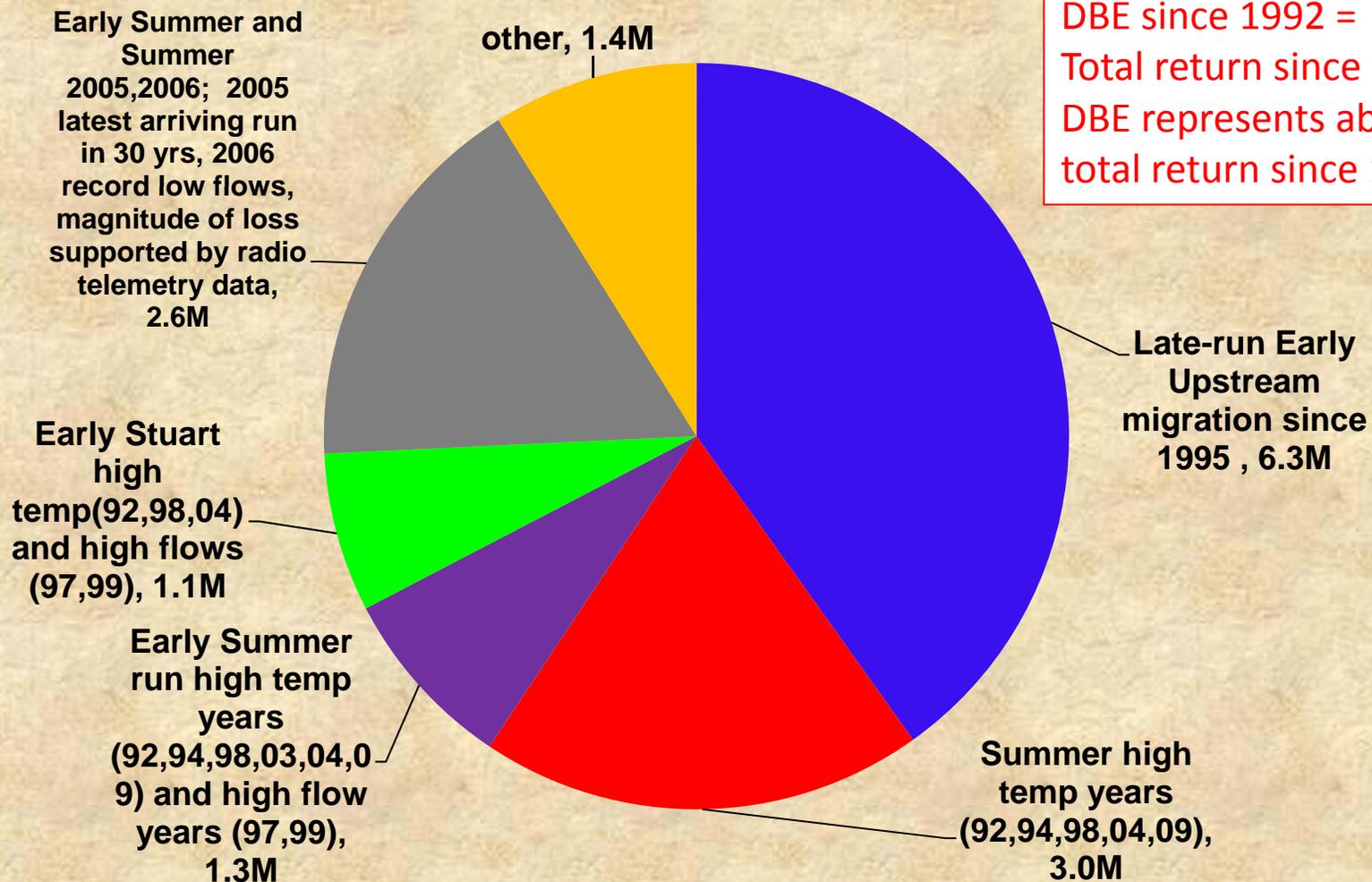


# Impacts of DBEs on Total return



# 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

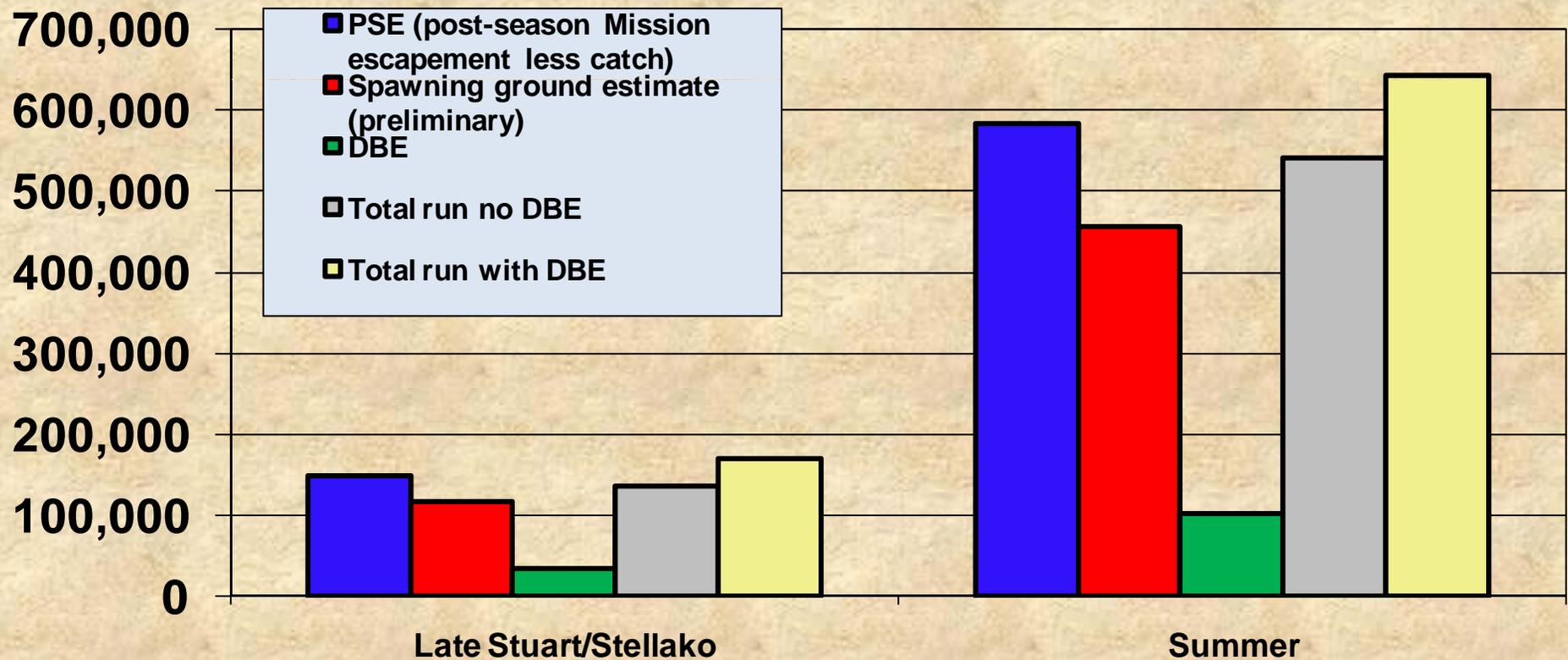
Principles - **Exclude** DBEs when:

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	
<b>Lower River Components</b>	<b>Total Salmon</b>	<b>Species composition</b>	<b>Stock composition</b>
<b>Evidence of bias? (Y/N) (if yes, specific source)</b>	N or only small Y	N	N
<b>Sources of bias</b>	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
<b>Upper River components</b>	<b>Spawning escapement</b>	<b>In-river catch</b>	<b>Other losses/mortality</b>
<b>Evidence of bias? (Y/N) (if yes, specific source)</b>	N or only small Y	N( input?)	Y
<b>Sources of bias</b>	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
<b>Decision and summary of rationale:</b>	<b>33,000 fish DBE included in estimates of Total return; spawning ground underestimate and migration loss likely</b>		