Understanding pink salmon production trends in the Strait of Georgia

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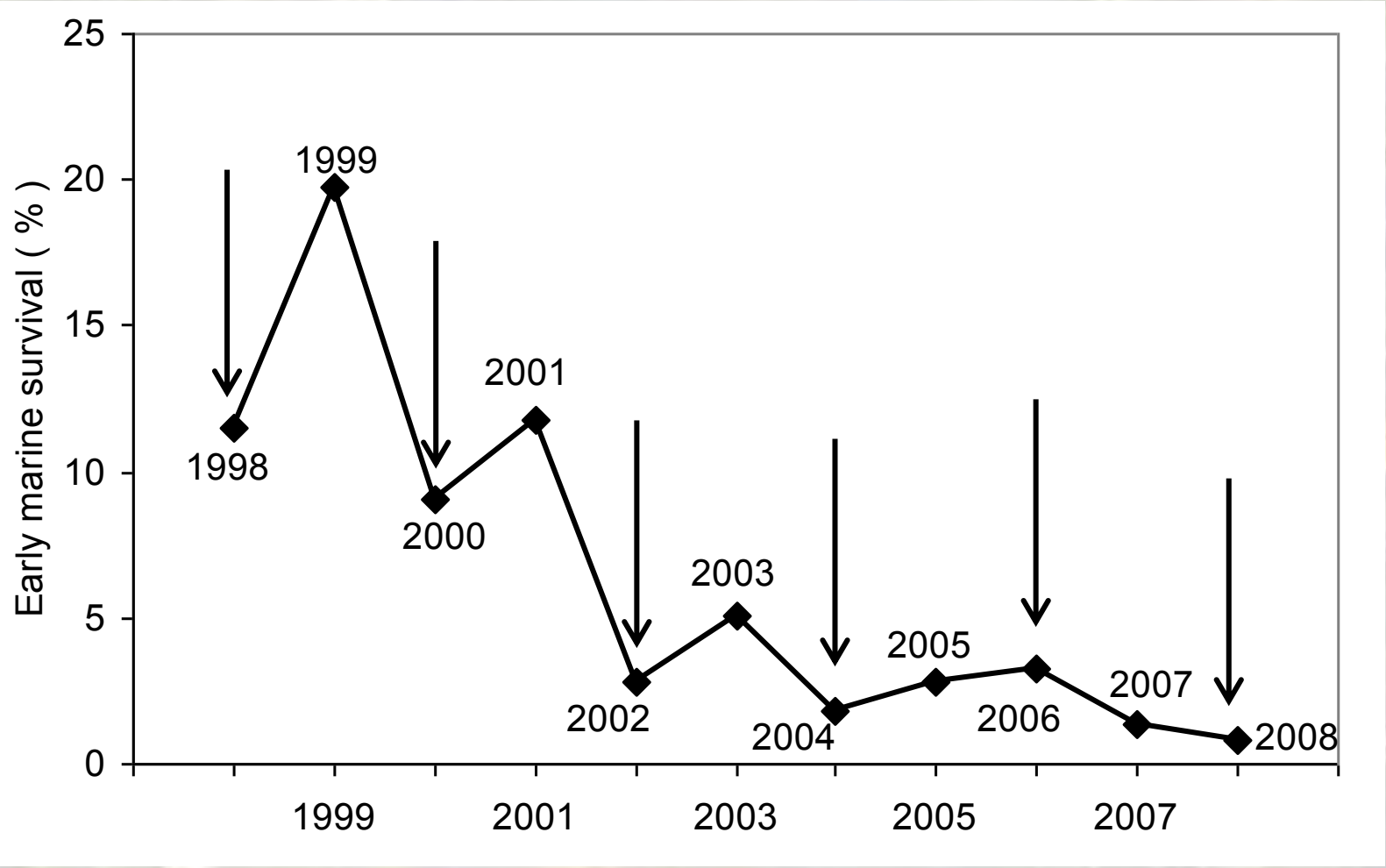
NPAFC Pink and Chum Workshop, Nanaimo October 2011

Satellite Image of the Strait of Georgia and Vancouver Island

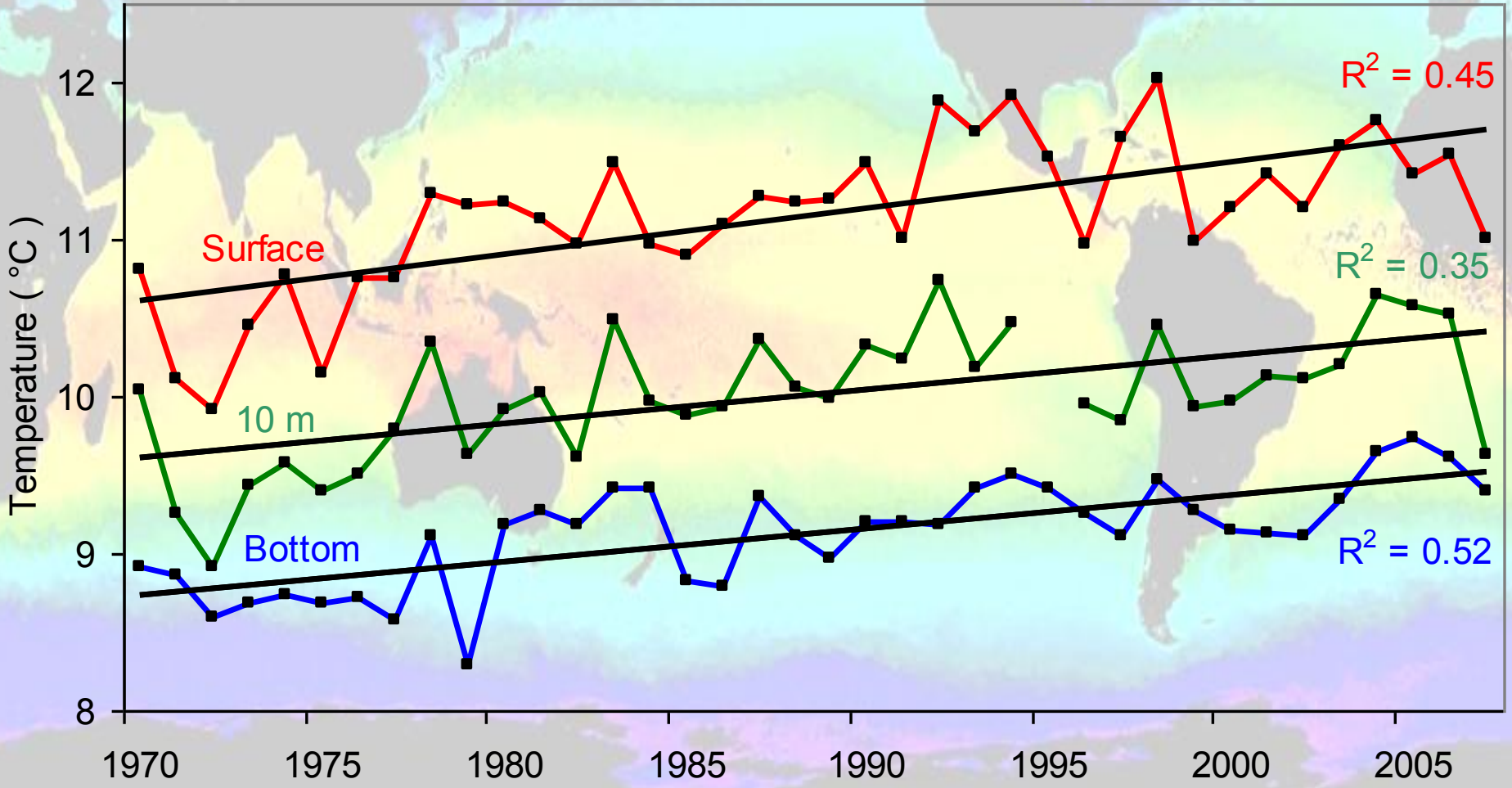
Bill Ricker: “I for one am ready to give up research for a unique cause of dominance and concentrate rather on identifying which cause or causes operate on each individual stock.”

Ricker, W.E. 1962. Regulation of the abundance of pink salmon populations. Pages 155-201 *in* Symposium on Pink Salmon. Vancouver, October 13-15, 1960. Edited by N.J. Wilimovsky, Institute of Fisheries, University of British Columbia, Vancouver, B.C.

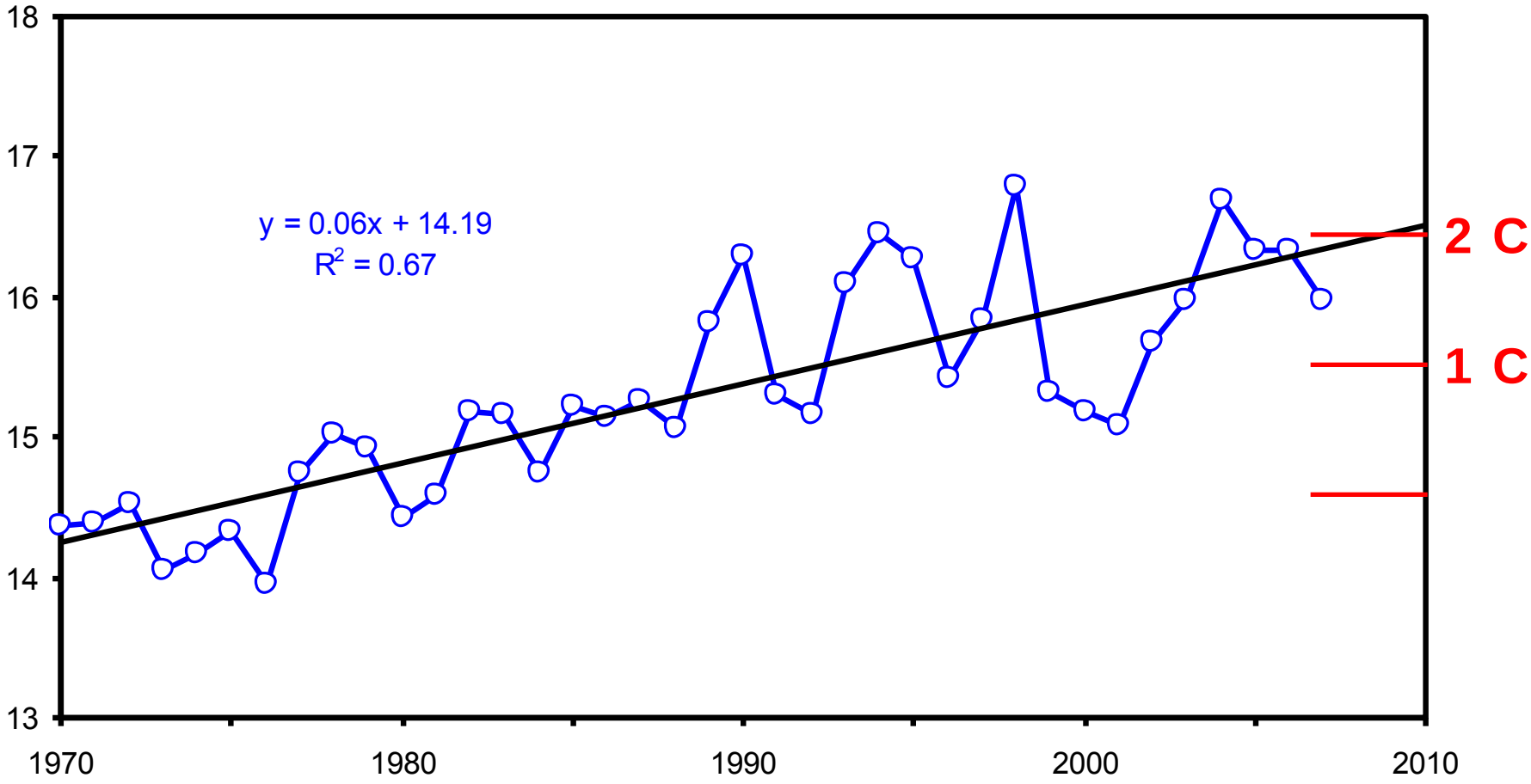


Marine survival from ocean entry until the September survey for coho salmon in the Strait of Georgia

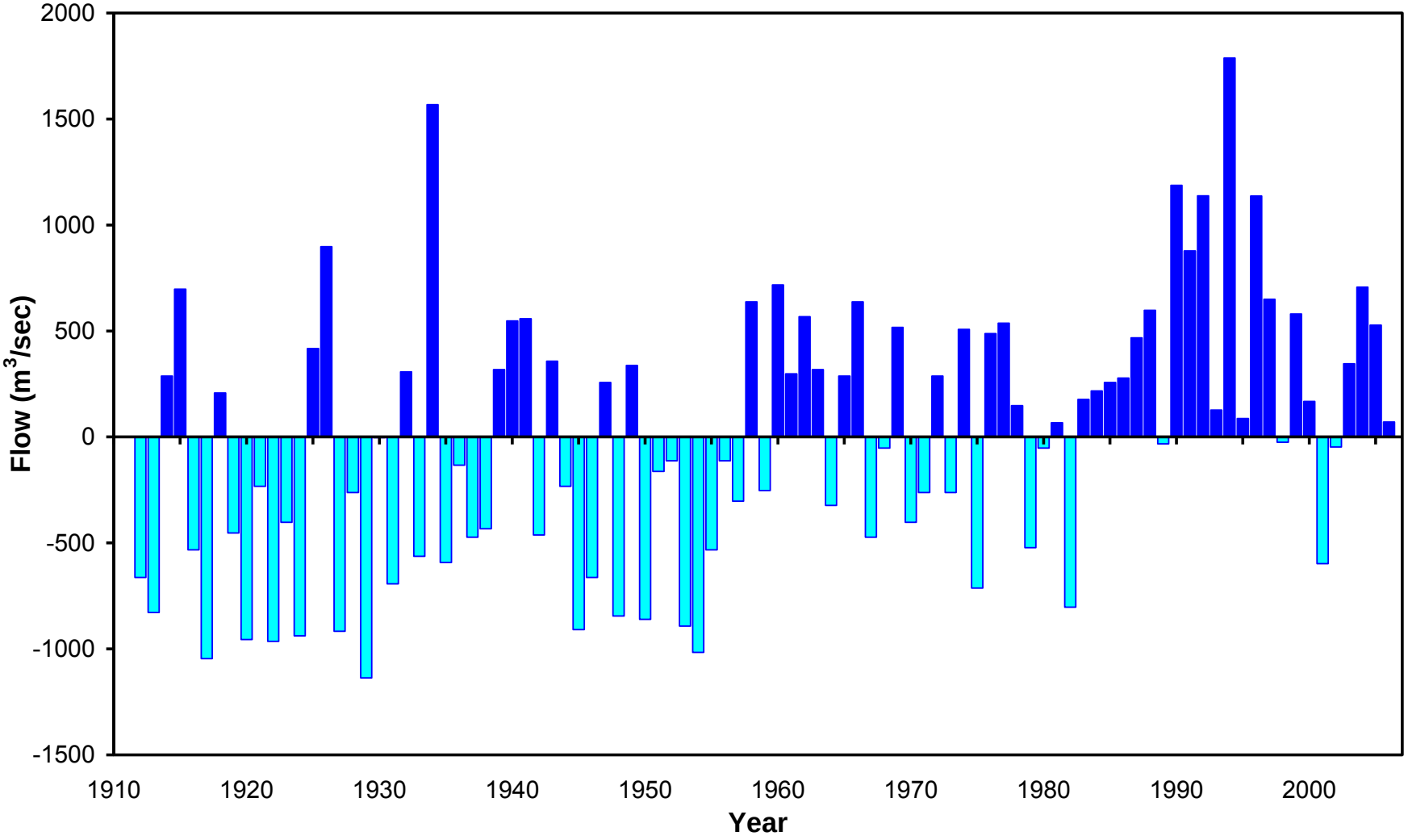
Average temperature at the Nanoose site in the Strait of Georgia



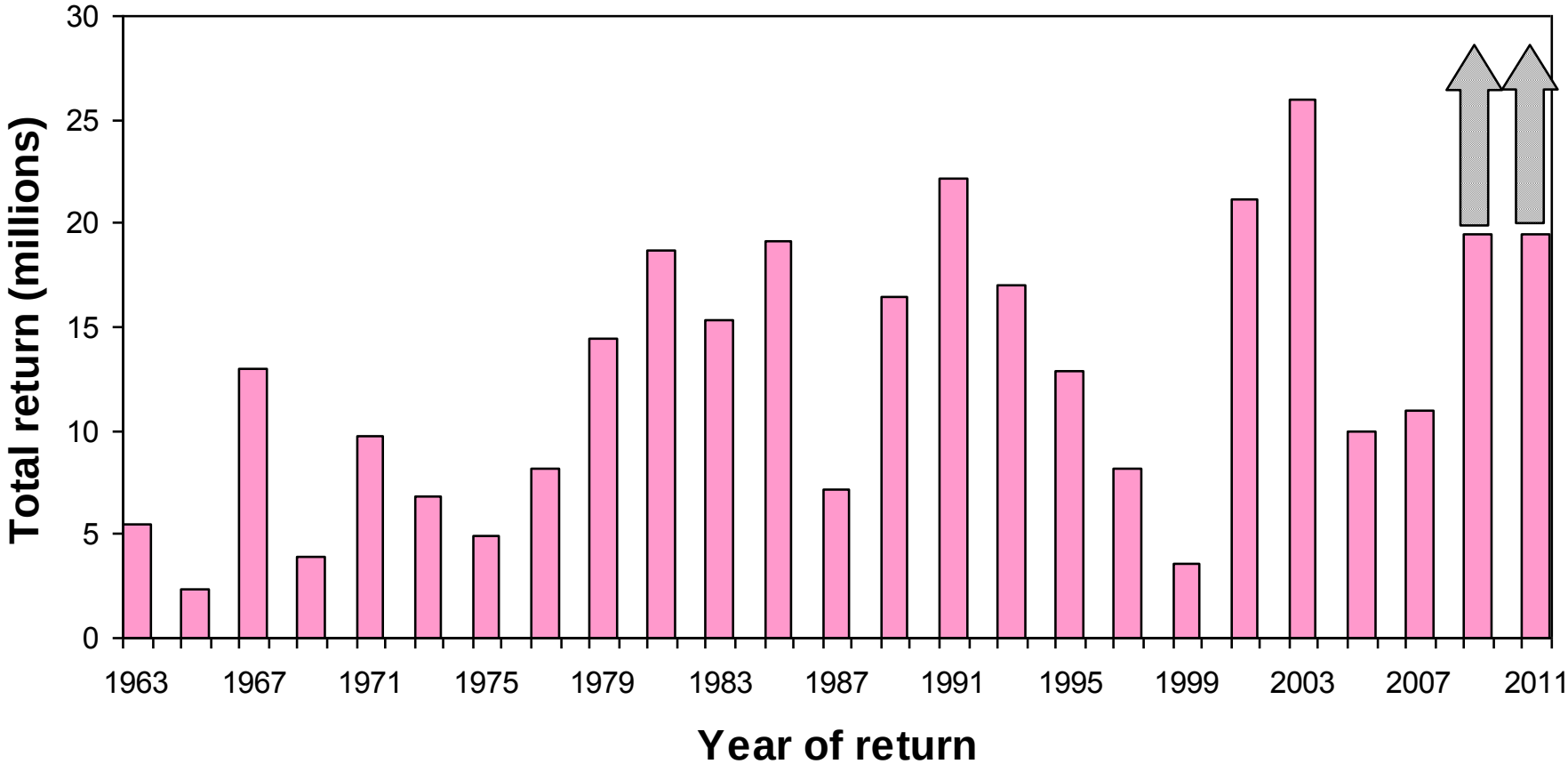
Average SST from May to September



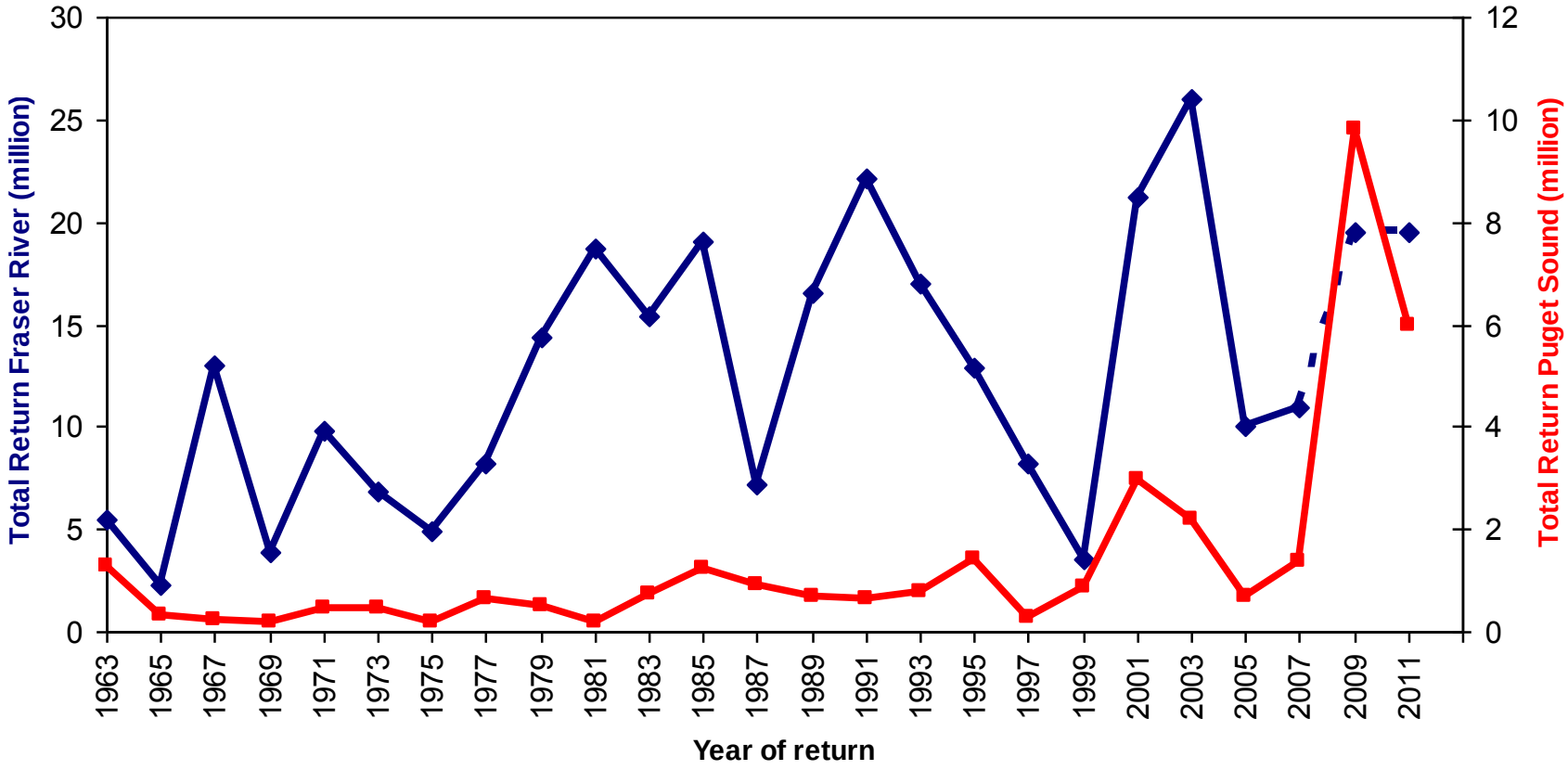
Fraser River April flow anomaly (1912-2005)



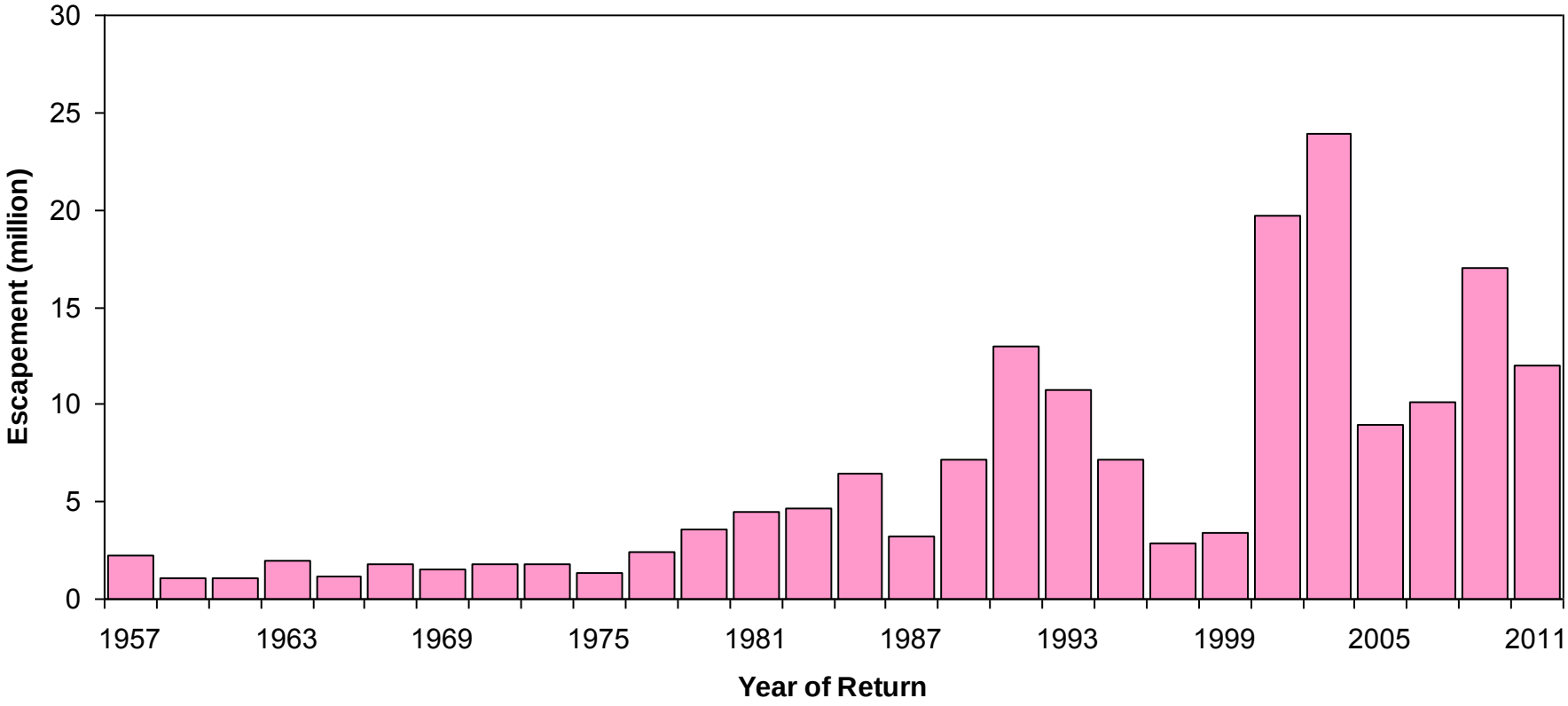
Total returns of Fraser River pink salmon



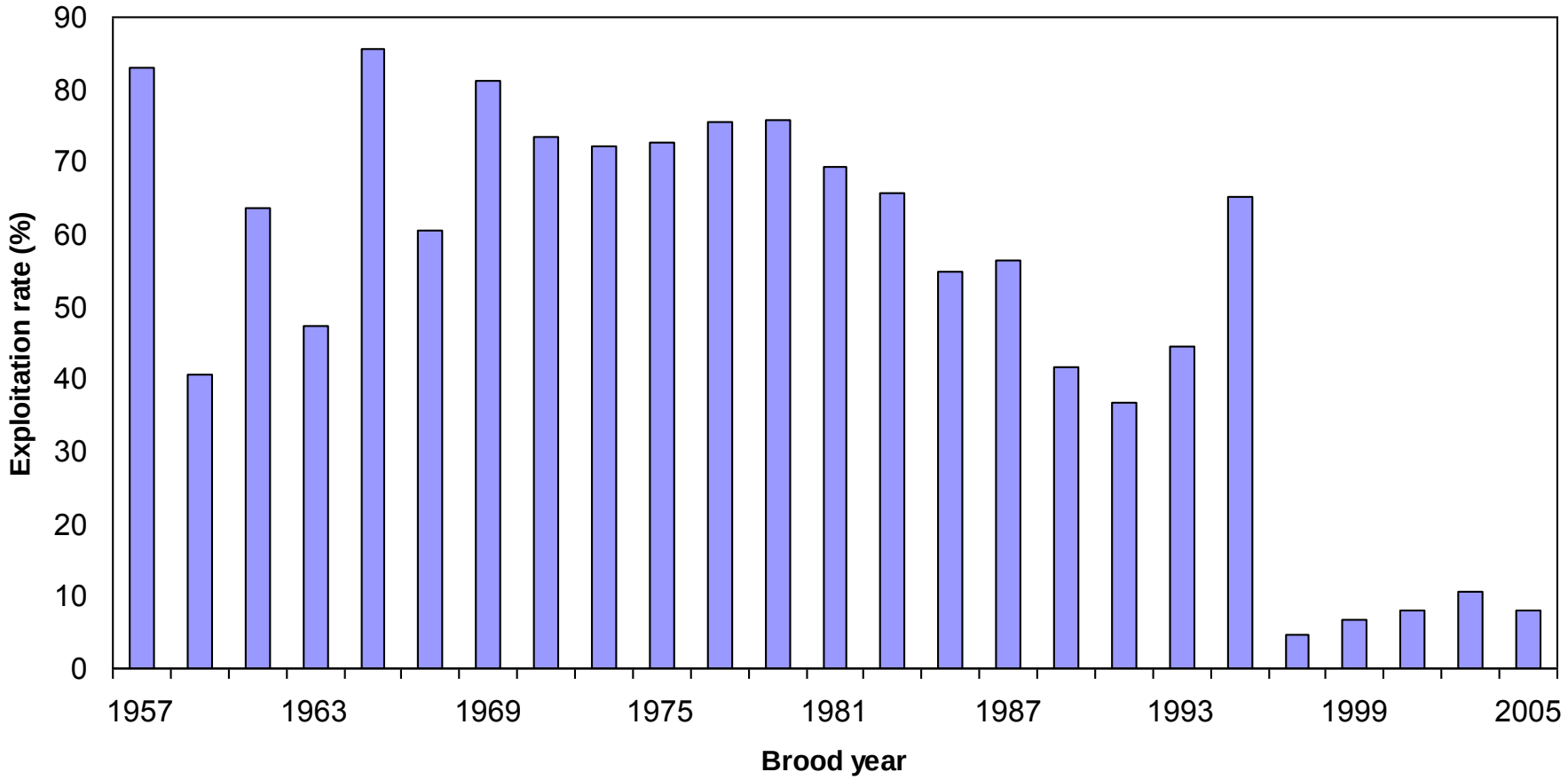
Comparison of Fraser River and Puget Sound pink salmon returns

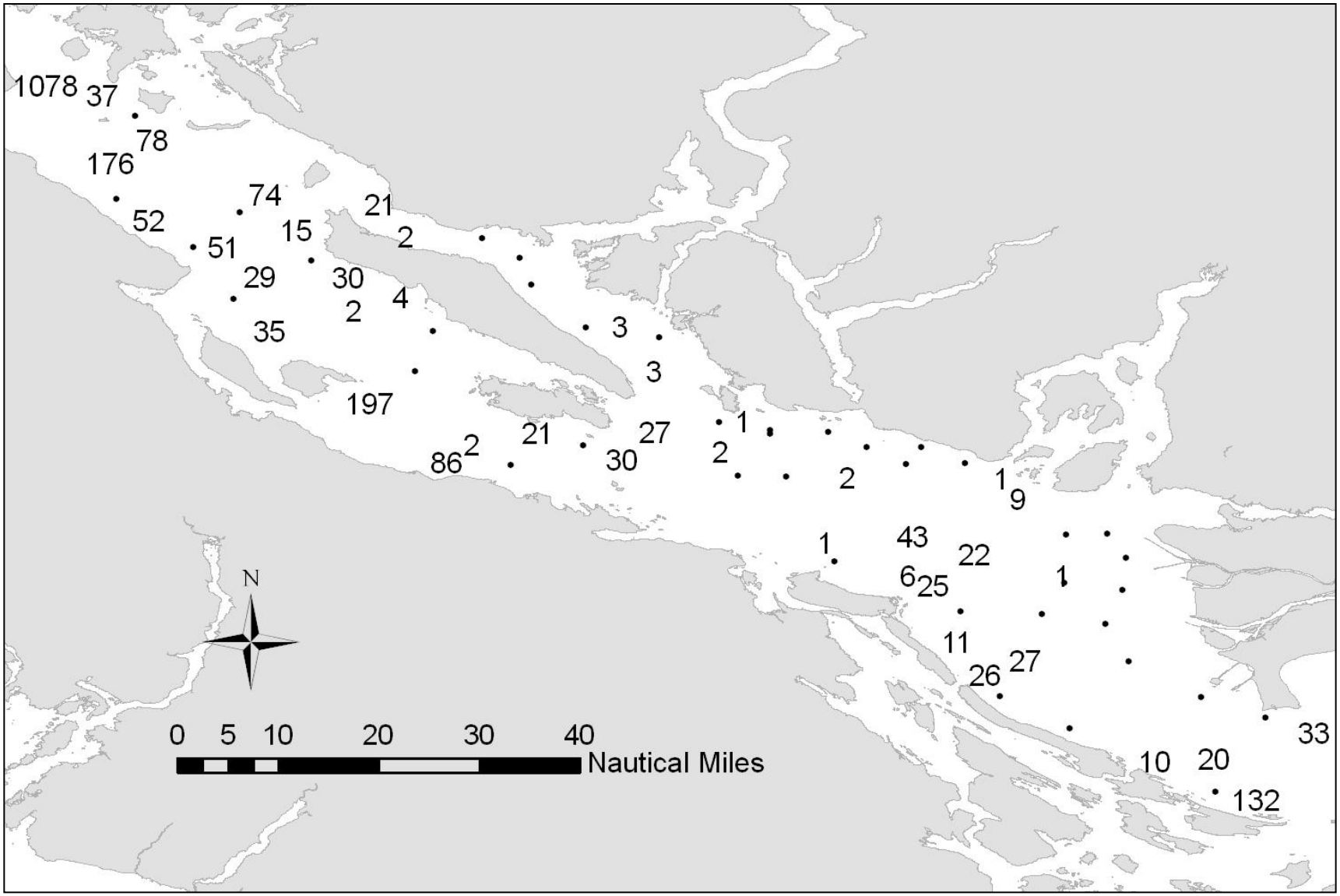


Escapement of pink salmon to the Fraser River

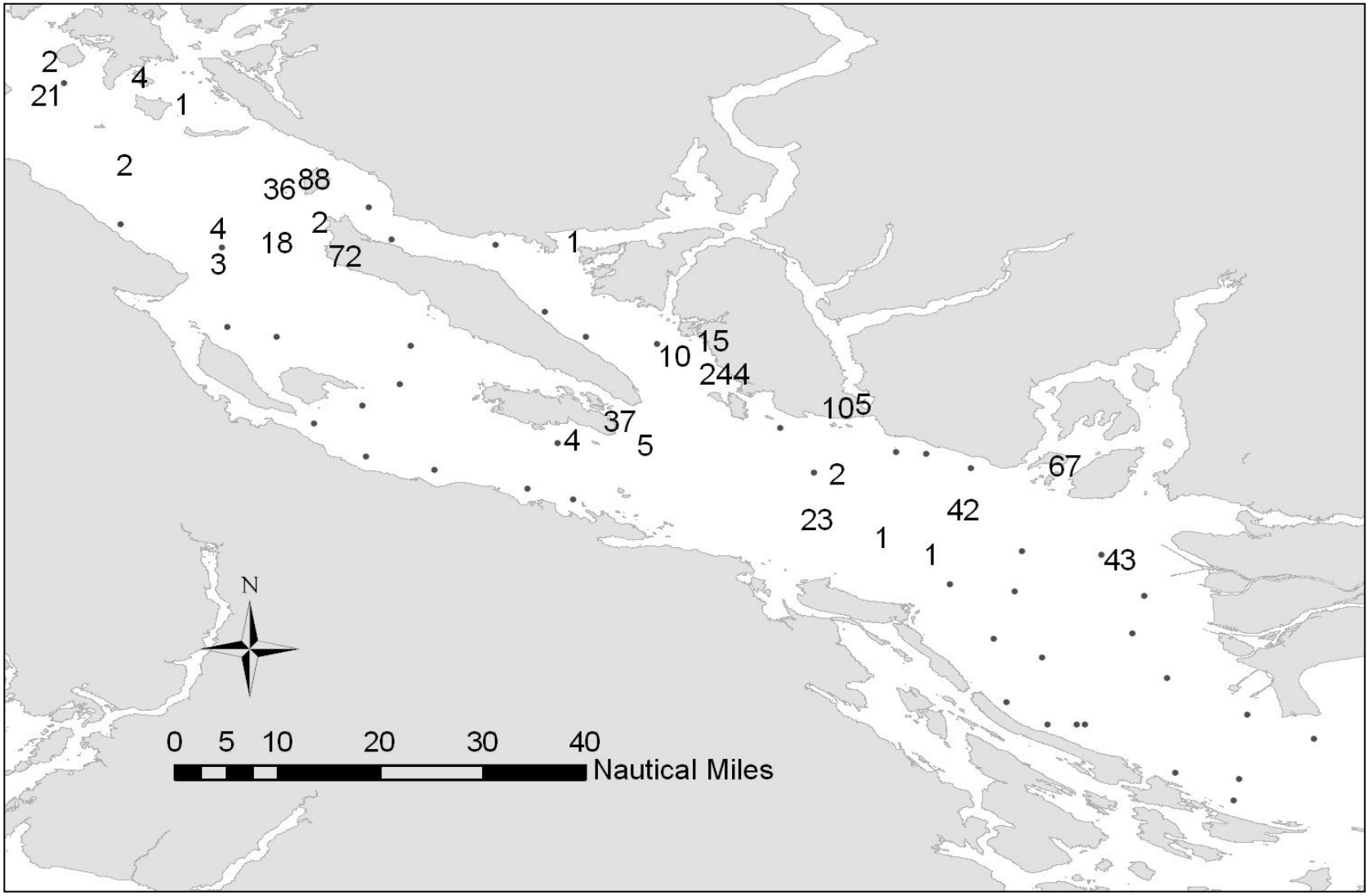


Exploitation rate of Fraser River pink salmon



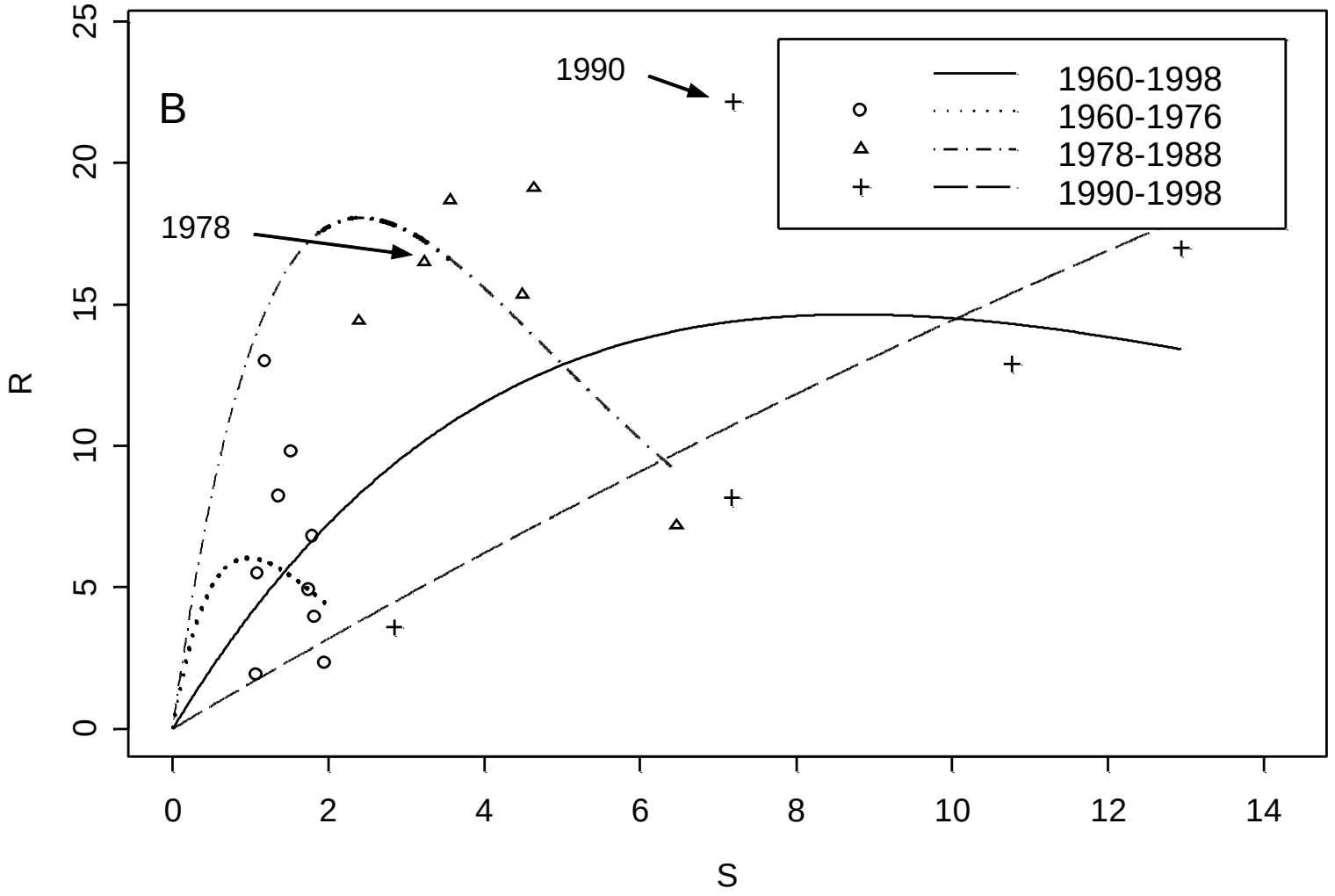


Number of juvenile pink salmon caught in 2008 in July

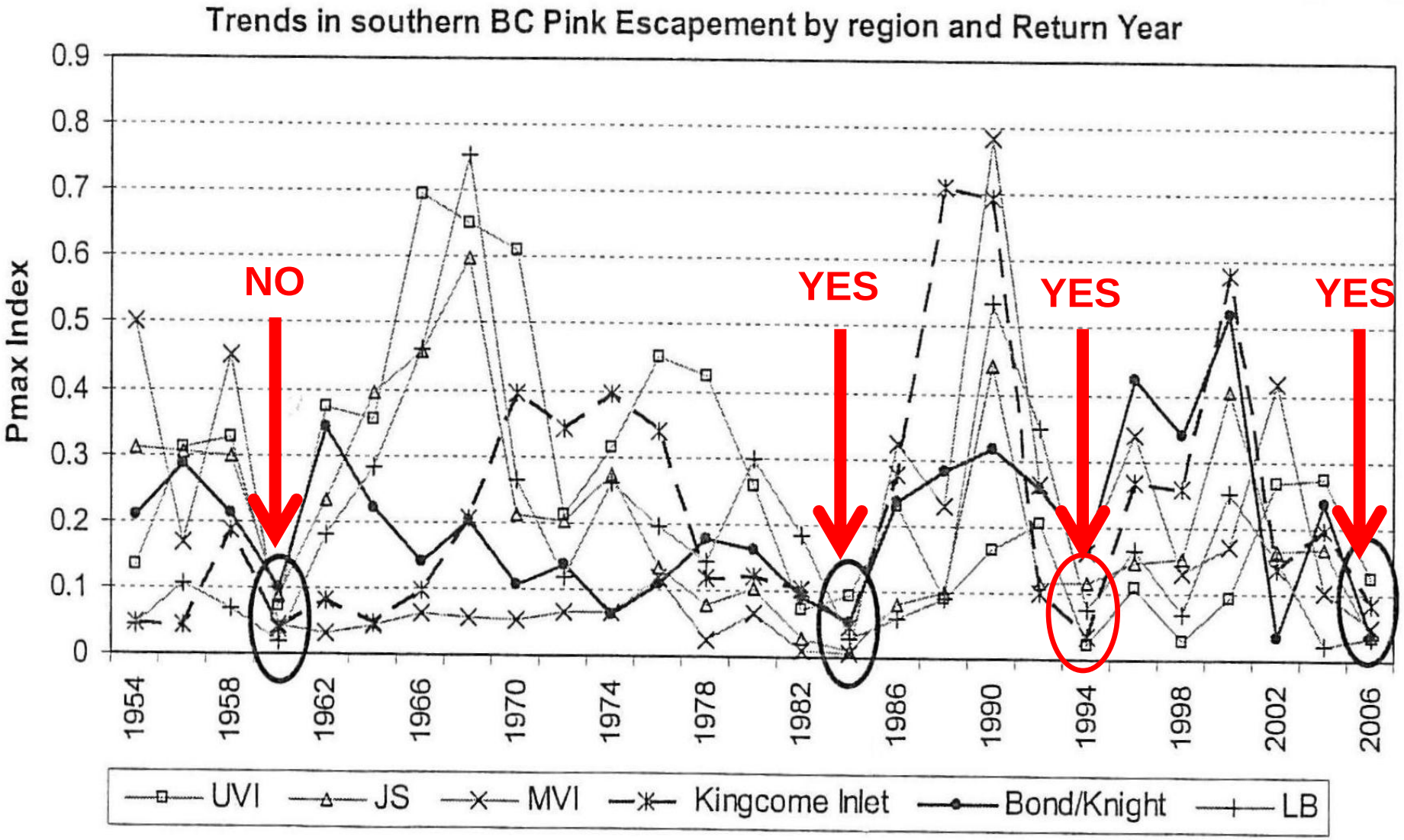


Number of juvenile pink salmon caught in 2008 in September

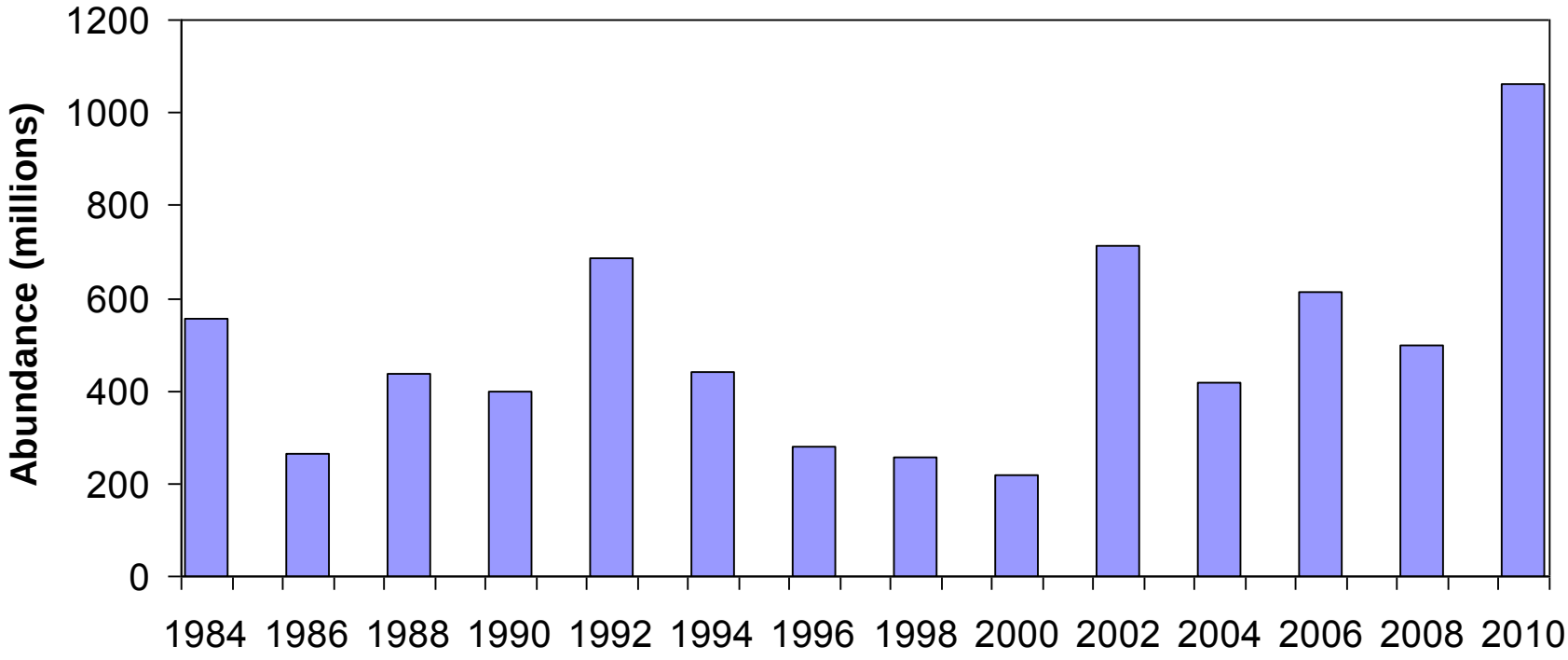
Overall and regime-dependent relationships between stock & recruitment for pink salmon



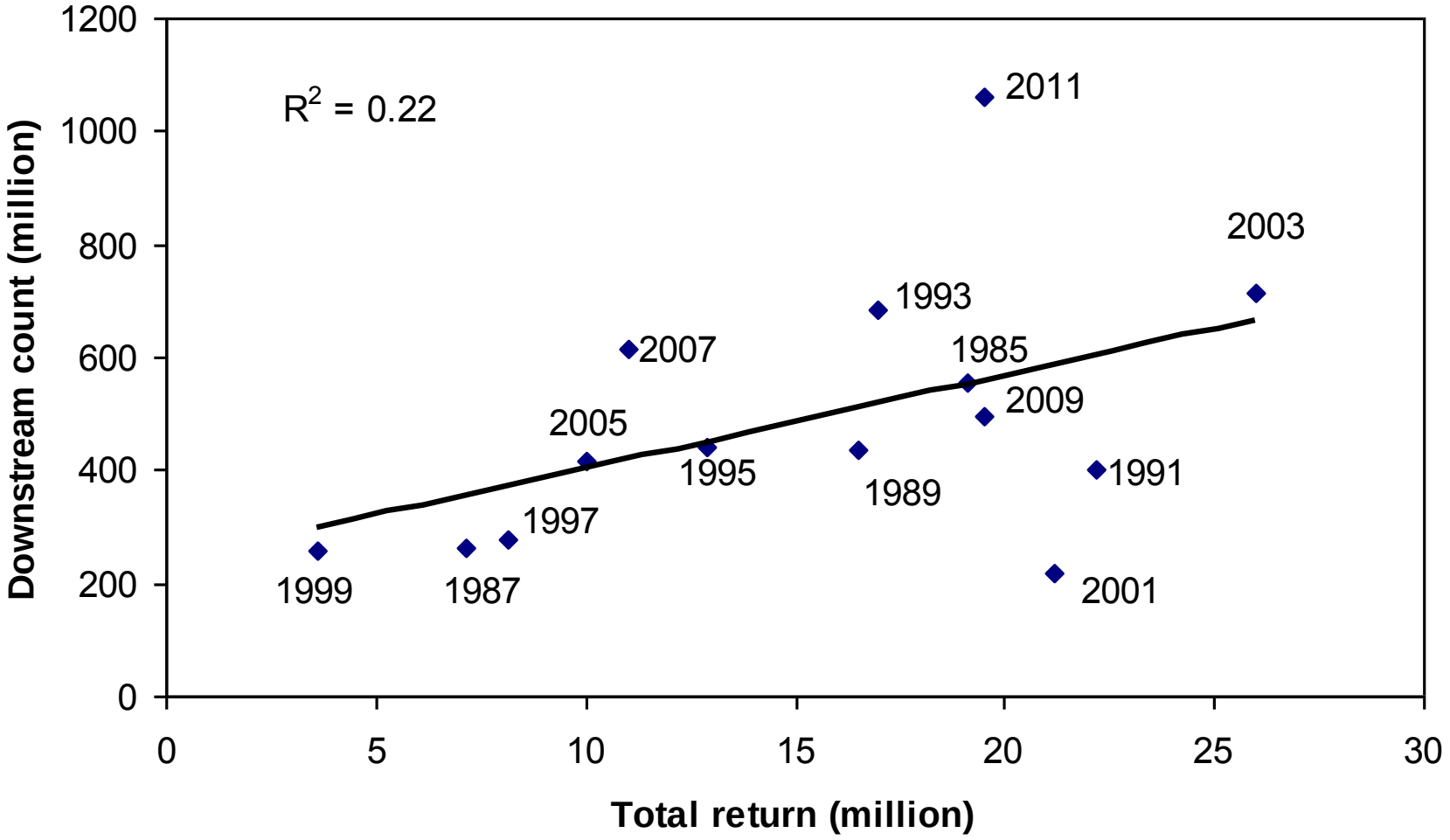
From Beamish, Schnute, Cass, Neville & Sweeting. 2004. TAFS 133:1396-1412.


Trends in southern BC Pink Escapement by region and Return Year
Pmax Index
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
NO
YES
YES
YES
1954
1958
1962
1966
1970
1974
1978
1982
1986
1990
1994
1998
2002
2006
UVI
JS
MVI
Kingcome Inlet
Bond/Knight
LB

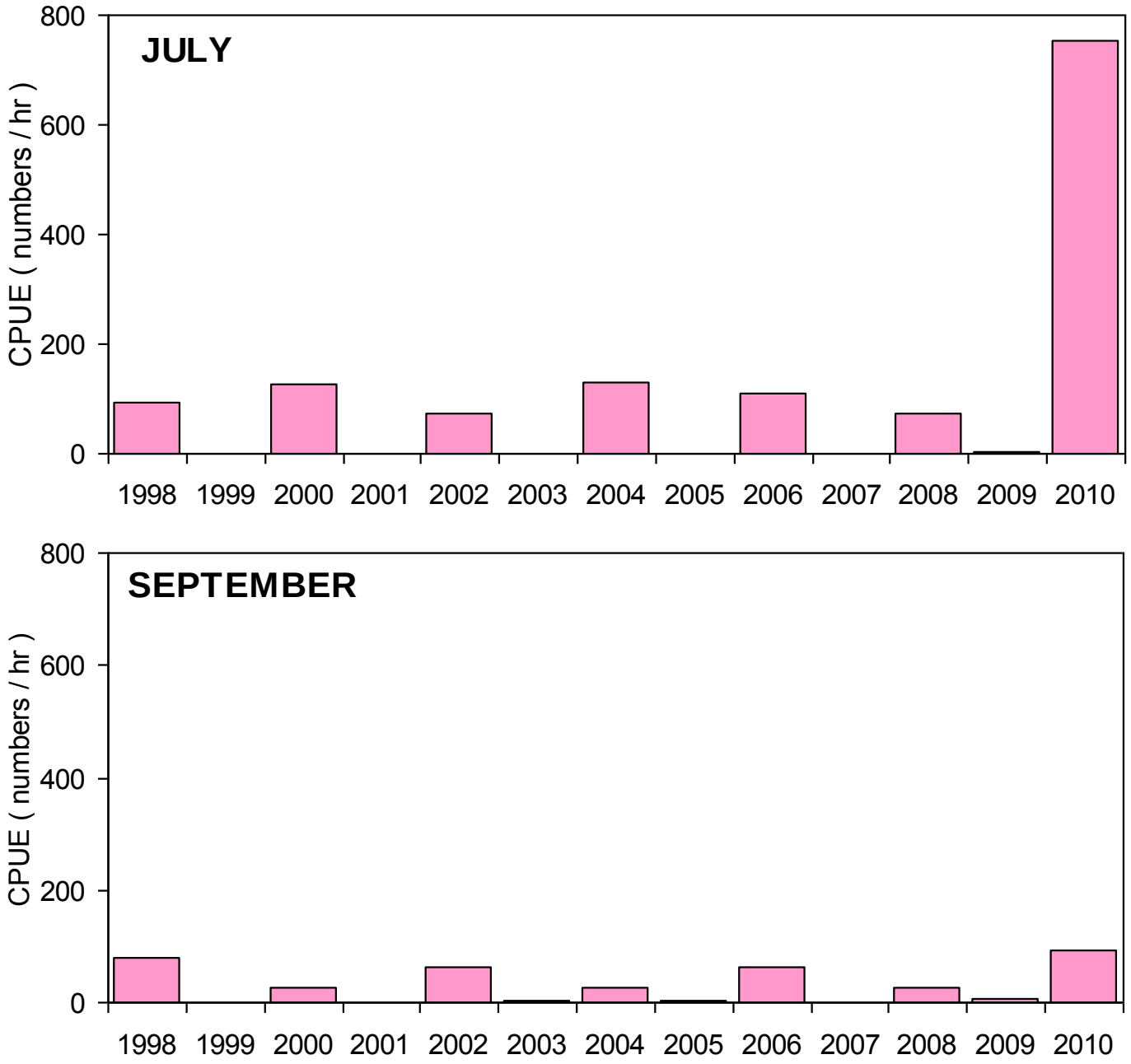
Estimate of abundance of pink salmon fry at Mission from Feb 20-Mar 16 to May 13-June 25



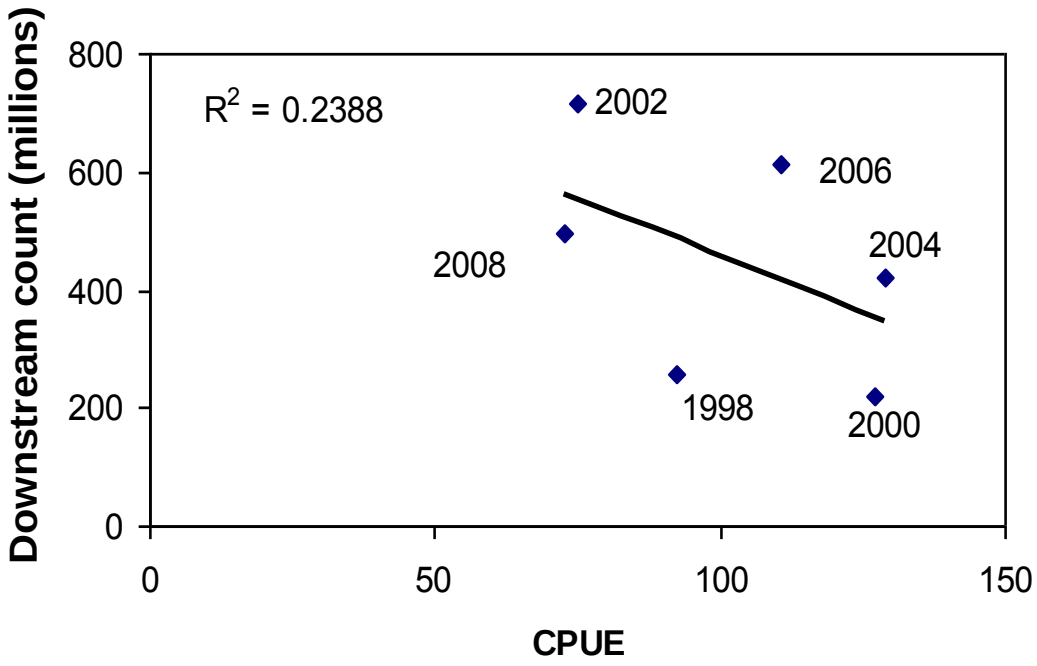
Downstream counts of pink salmon fry compared to the total return for the same brood year

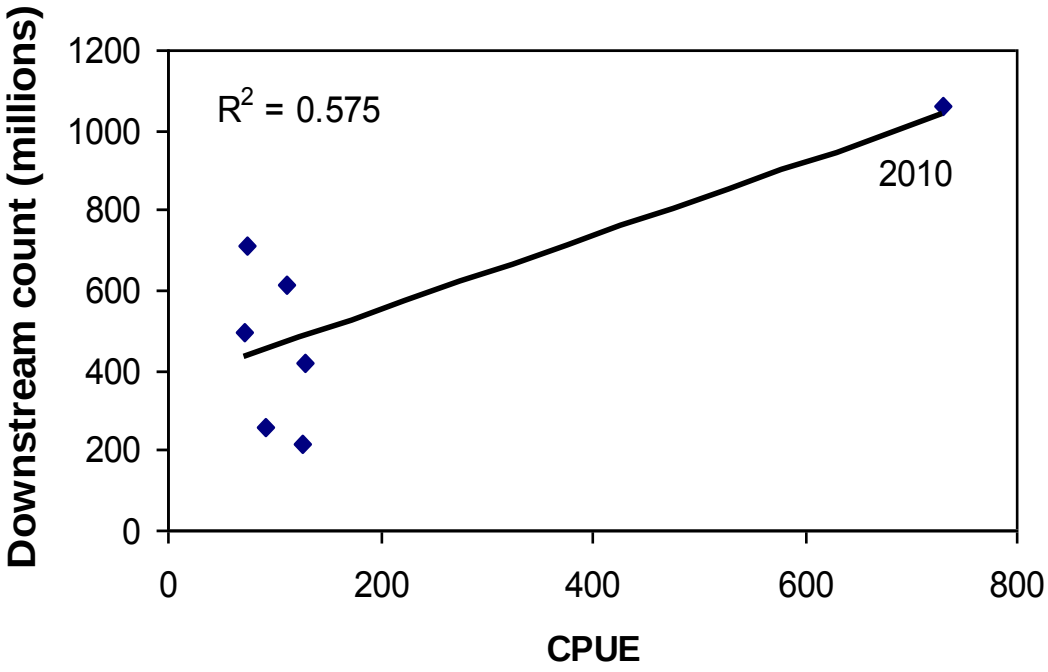


CPUE of pink salmon in the Strait of Georgia for July and September 1998-2010

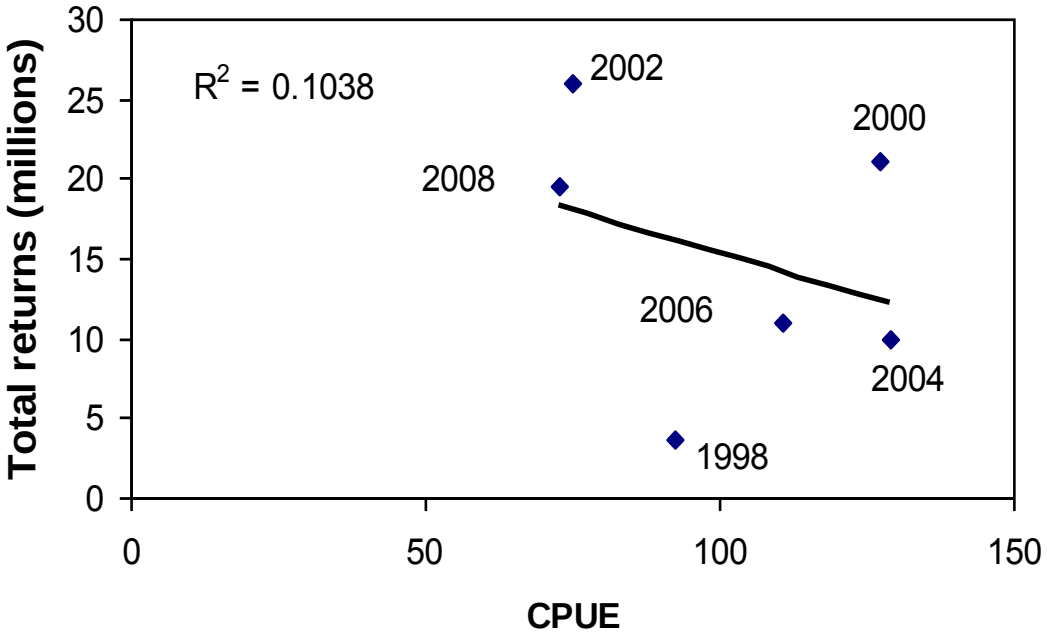


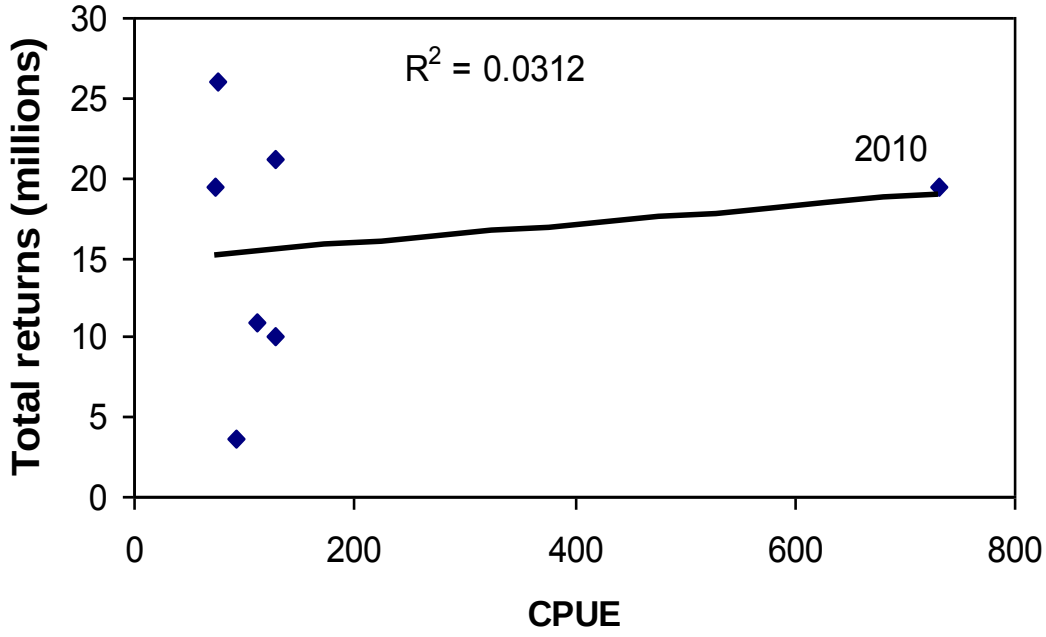
Number of pink salmon fry moving downstream compared to CPUE in the trawl survey





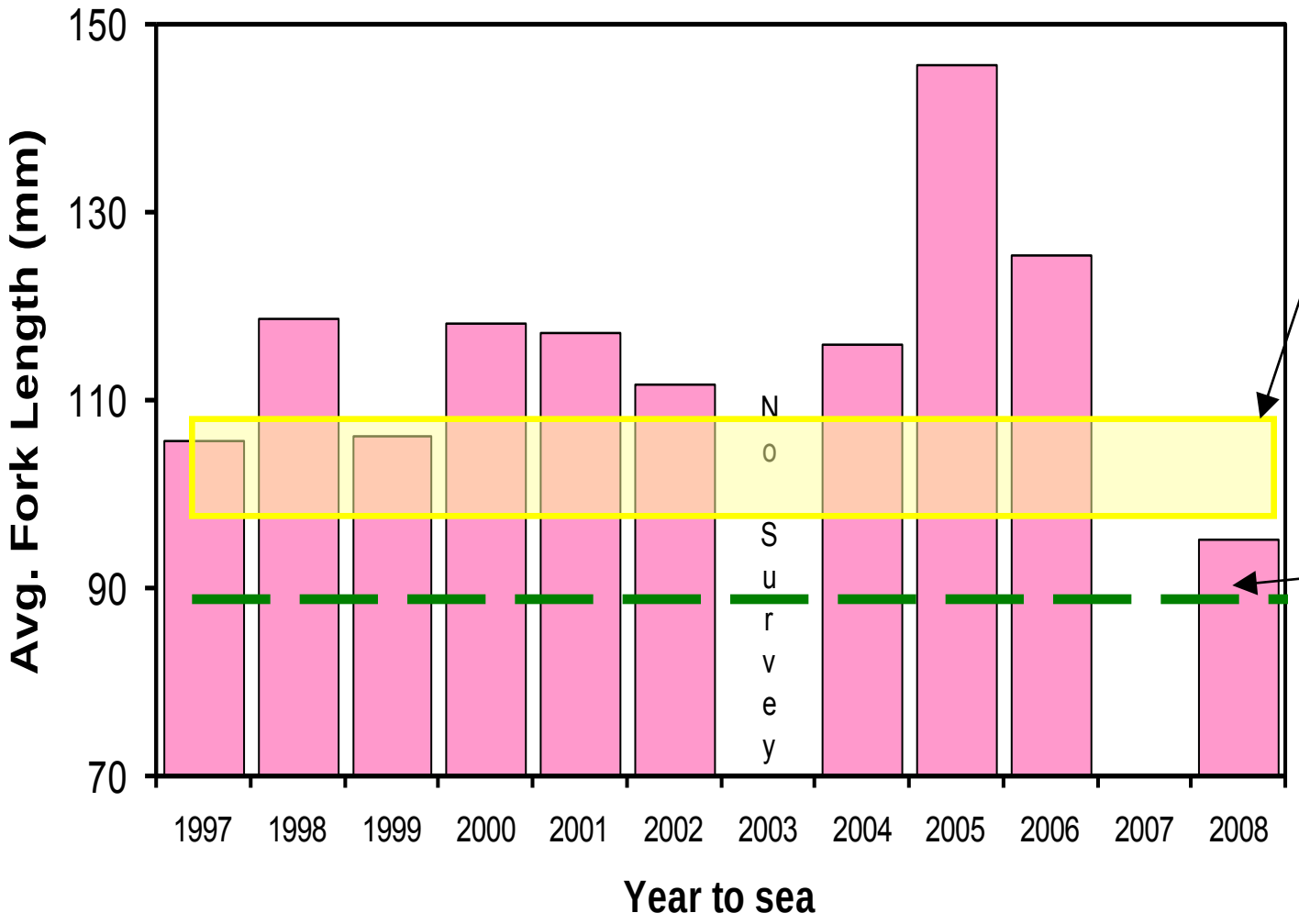
Total returns of pink salmon to the Fraser River compared to CPUE in the trawl survey





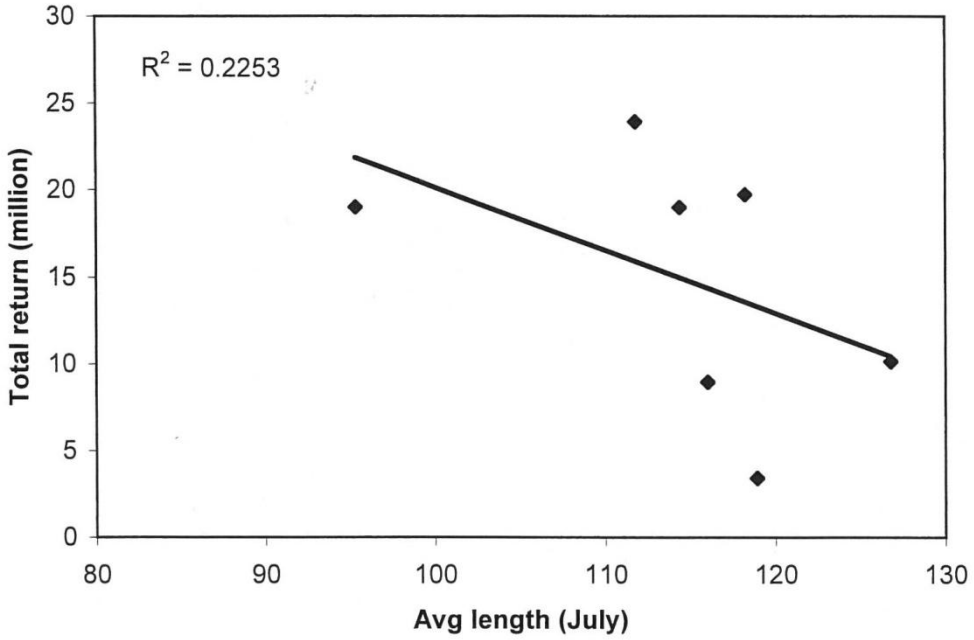
Year shown is year to sea

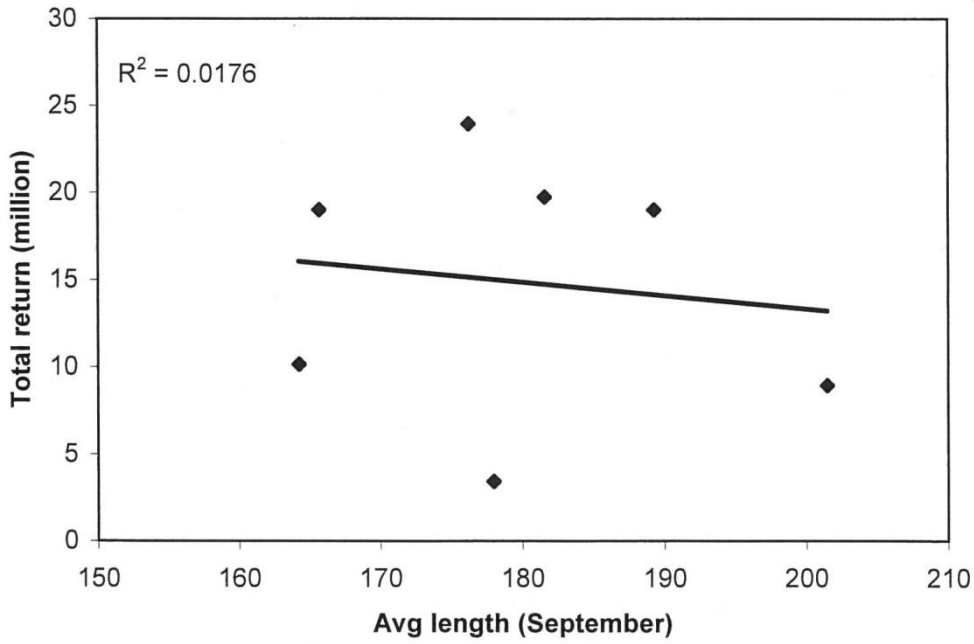
Average size of juvenile pink salmon in July (1997-2008)



Average size of pink salmon in July 1966-68 (Phillips and Barraclough, 1978 (N~250)

Average size of pink salmon in July 1976 (Healey)





Comparison of total pink salmon return to the Fraser River and the average length of the juveniles caught in the trawl surveys

Average of first 5 intercirculii spaces for pink salmon from the Broughton Island area

2002	2003	2004
Escapement 123,000	Enter ocean	Adult escapement 1,076,000
	0.034mm (n = 134)	0.032mm (n = 283)

GOOD WINTER SURVIVAL

2004	2005	2006
Escapement 1,076,000	Enter ocean	Adult escapement 337,000
	0.035mm (n = 66)	0.040mm (n = 288)

POOR WINTER SURVIVAL

Summary

- Faster growing fish survive better and larger fish survive better in stressful winters

- Large-scale atmospheric processes are producing warmer temperatures probably resulting in more food in the spring and winter more frequently

Summary

- Pink salmon are sensitive and resilient to ocean conditions
- Pink salmon may be more responsive to ocean conditions because they use more energy for growth in the early marine period and less is stored for the winter

Summary

- Pink salmon are strongly and equally influenced by growing conditions in the early marine period and in the winter

International Year of the Salmon