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Salish Sea Ecosystem Conference

2018 Salish Sea Ecosystem Conference
(Seattle, Wash.)

Apr 6th, 10:30 AM - 10:45 AM

Pacific Salmon in Puget Sound: abundance, survival and body size (1970-2015)

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Pacific Salmon in Puget Sound: Size, Abundance and Survival

James Losee, Aaron Dufault, Neala Kendall

Washington Department of Fish and Wildlife



Puget Sound-Background

Chinook



Coho



Chum



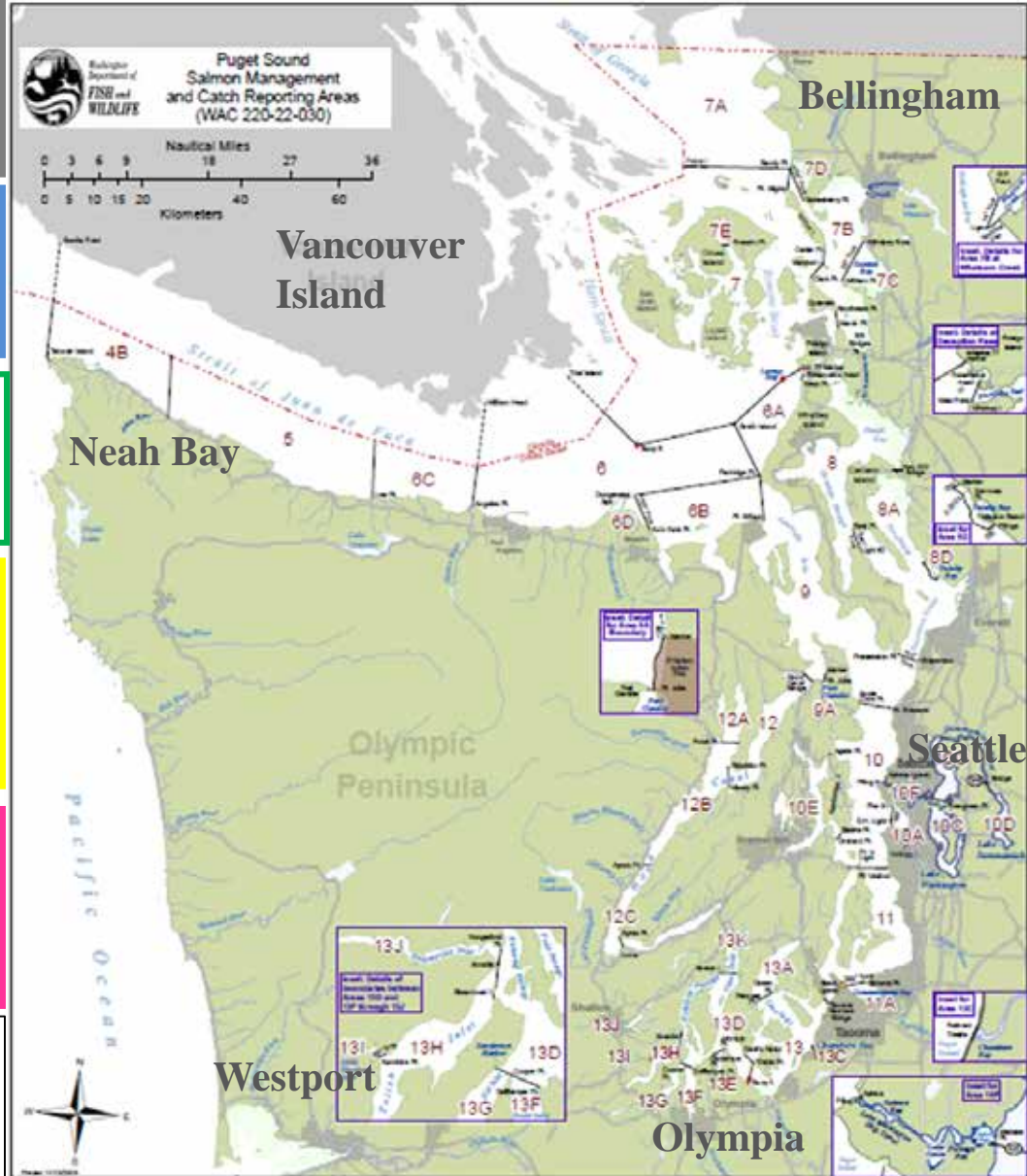
Sockeye



Pink



Steelhead



Study Objectives

- Compare trends in size, abundance and survival across all five species of Pacific Salmon and Steelhead (1970-2015)
 - How has the size of Puget Sound salmon changed?
 - How has abundance and species composition of Puget Sound salmon changed?
 - Are patterns of abundance and survival consistent across hatchery vs. naturally produced fish, life history type, region?

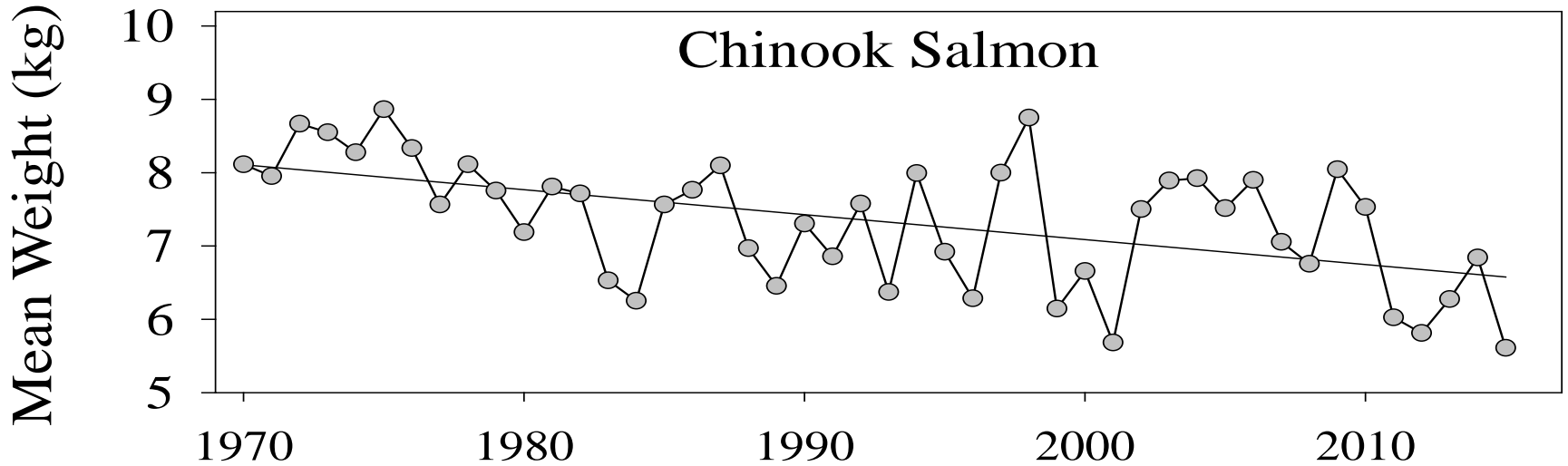


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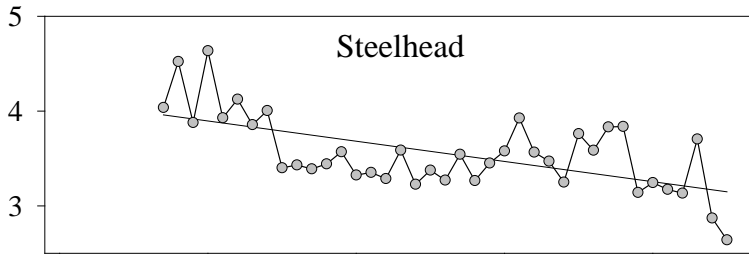
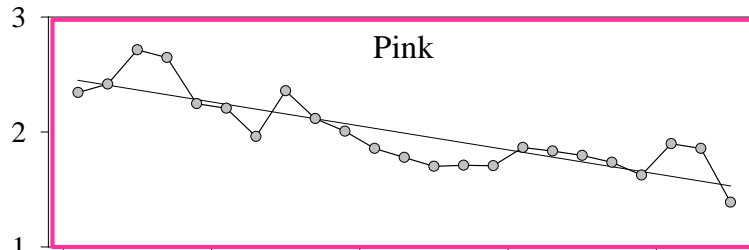
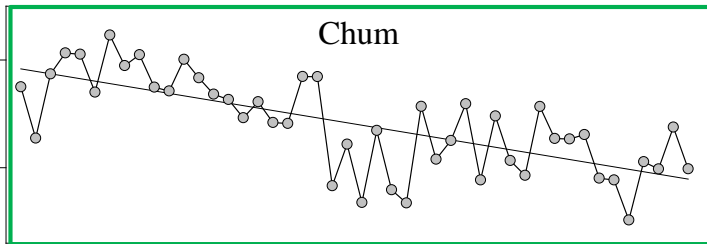
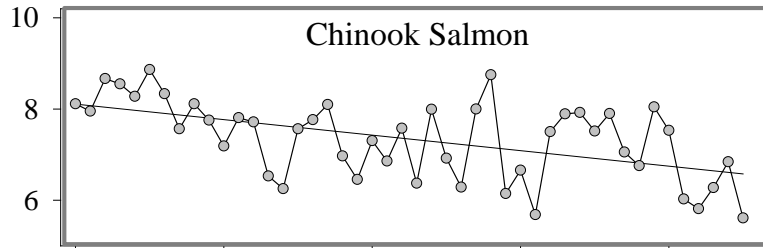


Salmon Size-Mass (kg)



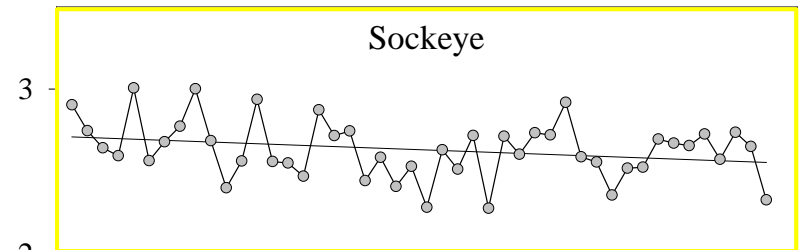
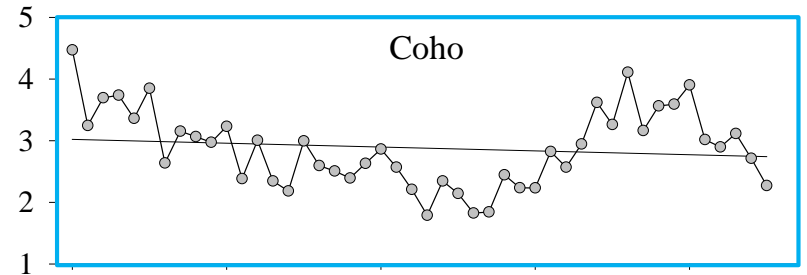
Generalized least squares w/ autocorrelation function $P < 0.05$

Salmon Size



1970 1980 1990 2000 2010

Return Year



1970 1980 1990 2000 2010

Return Year

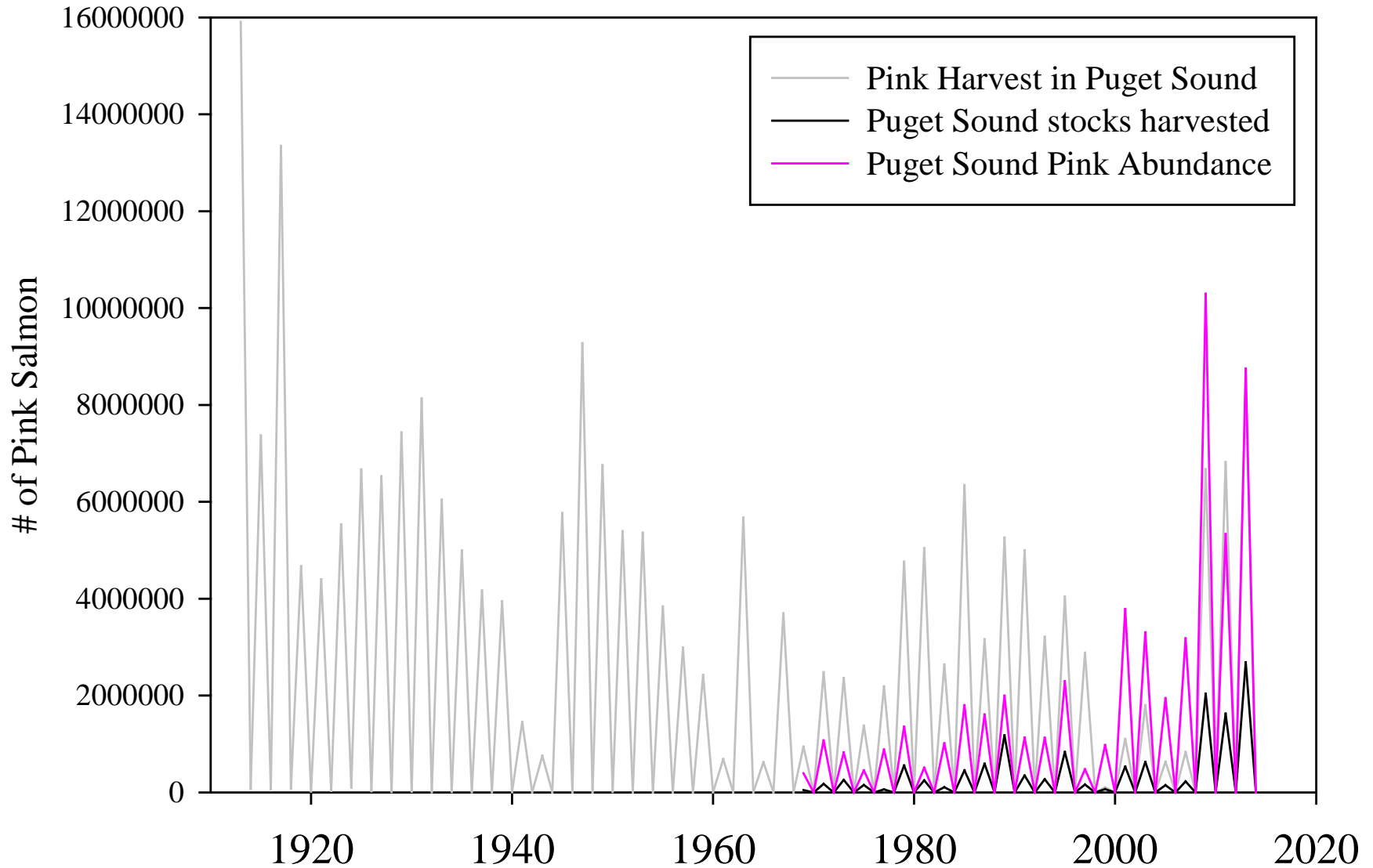
Generalized least squares w/ autocorrelation function

Study Objectives

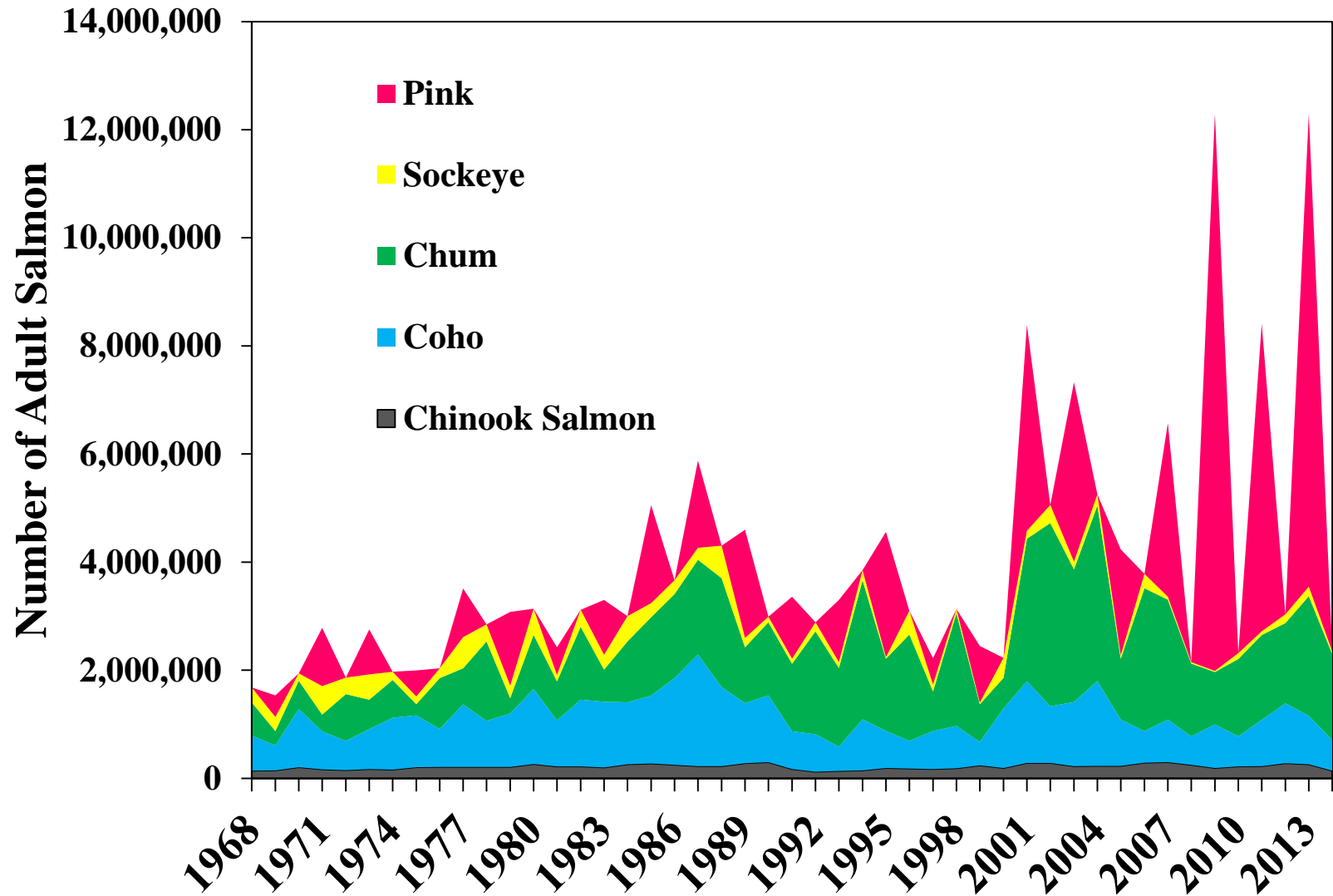
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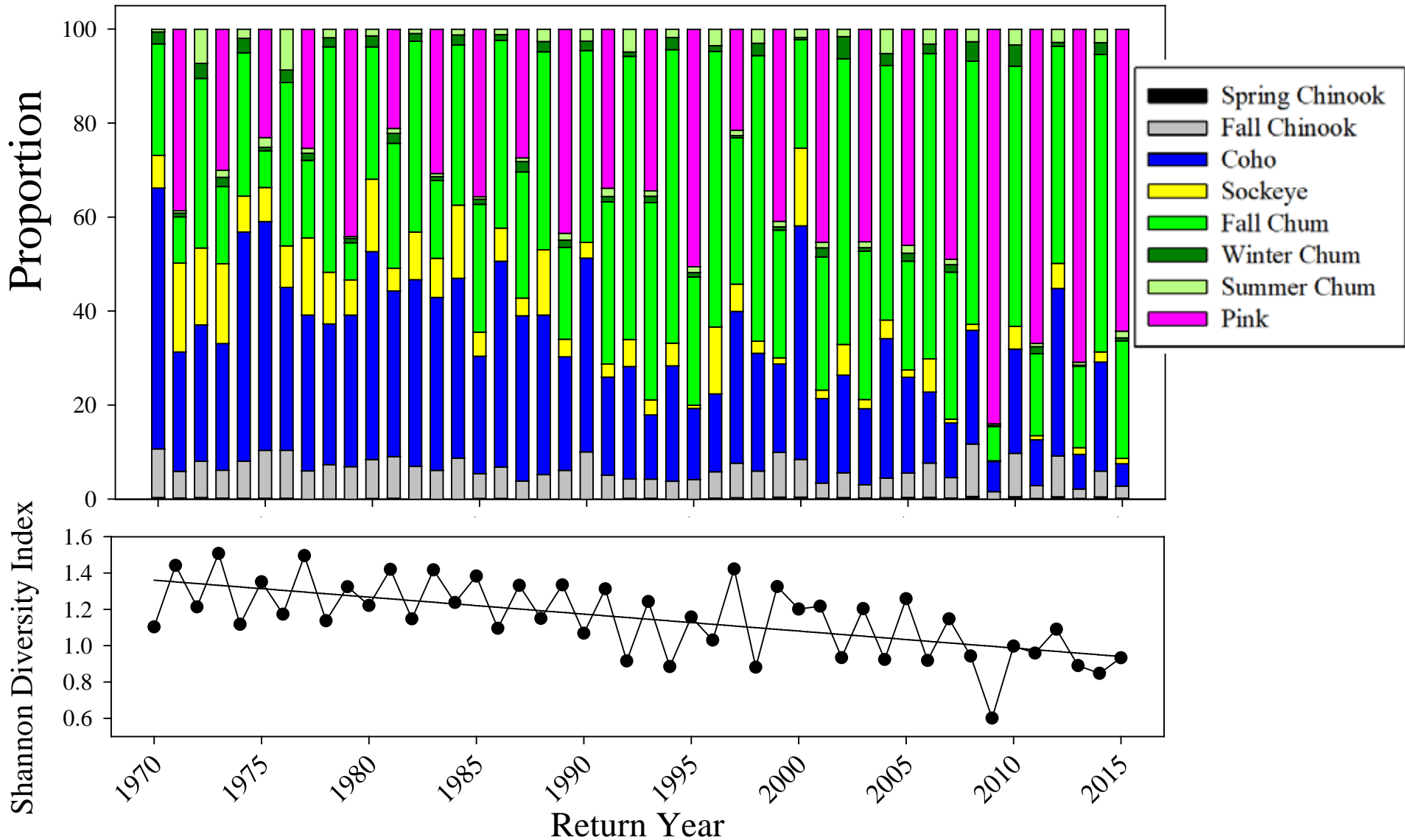
Salmon Abundance-Methods



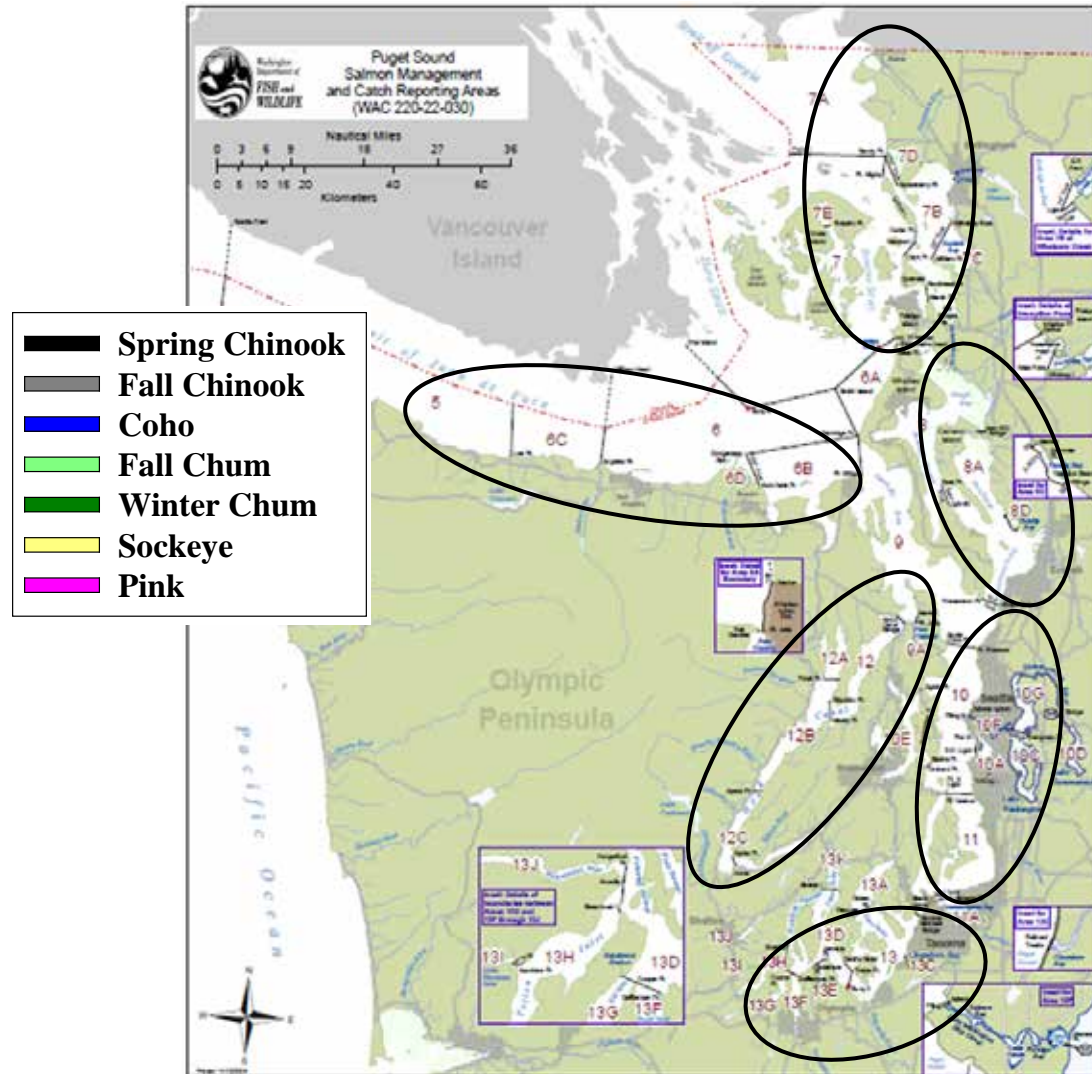
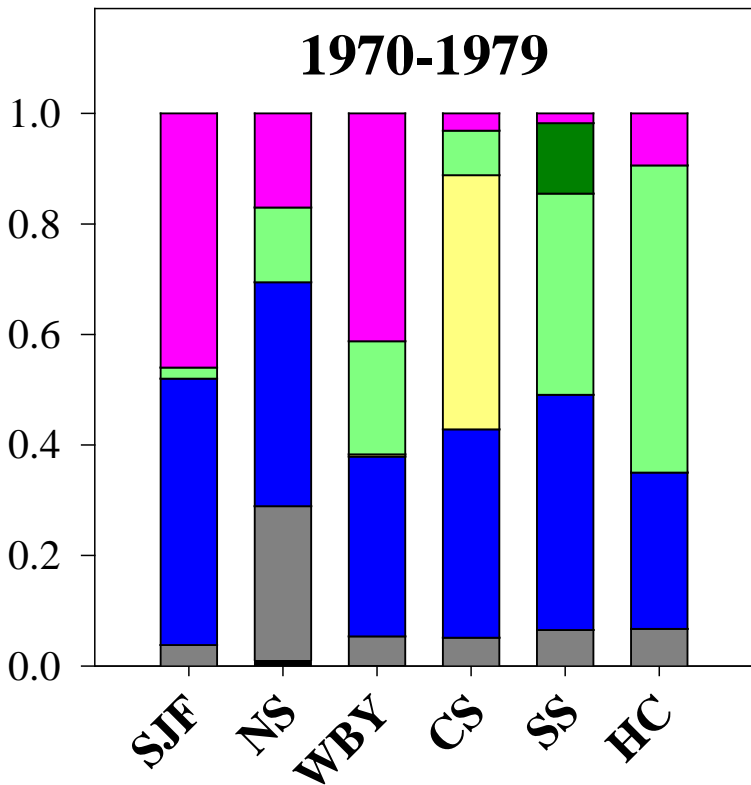
Salmon Abundance 1970-2015



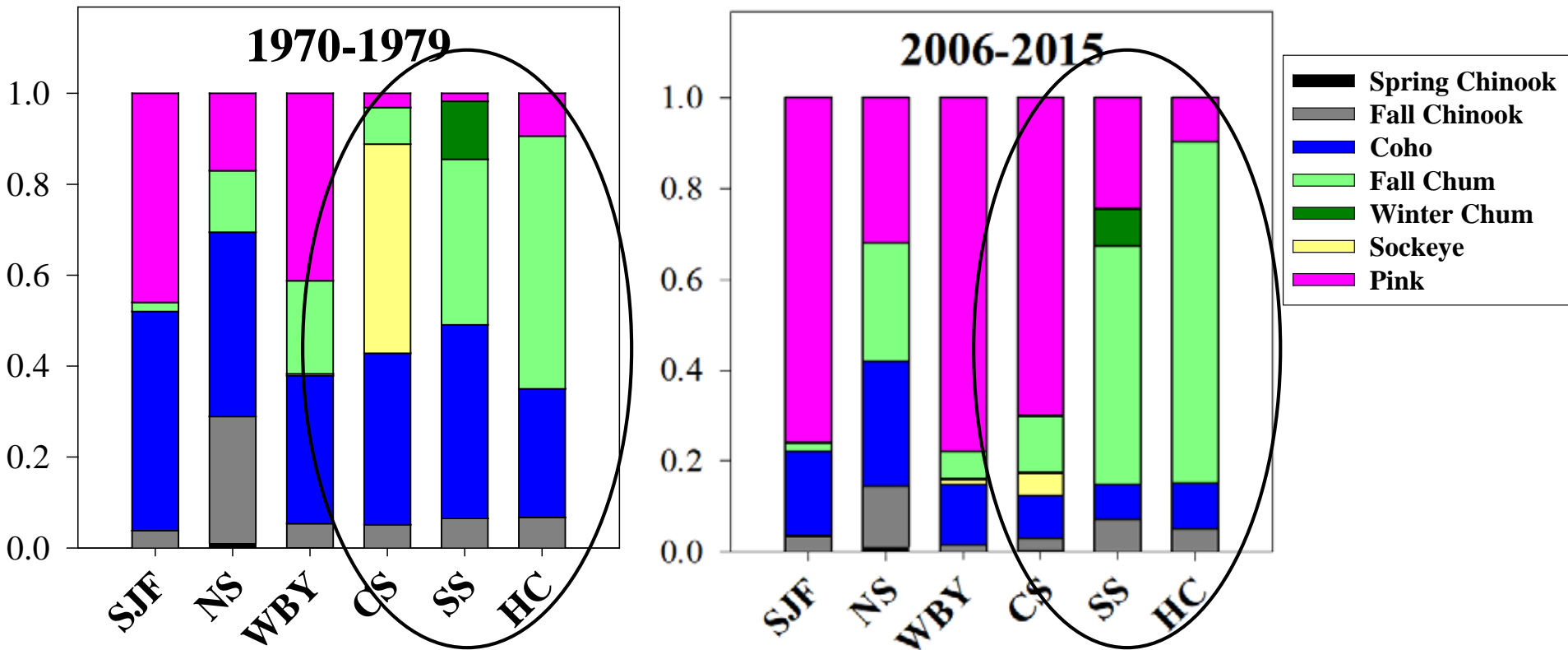
Salmon Species Diversity



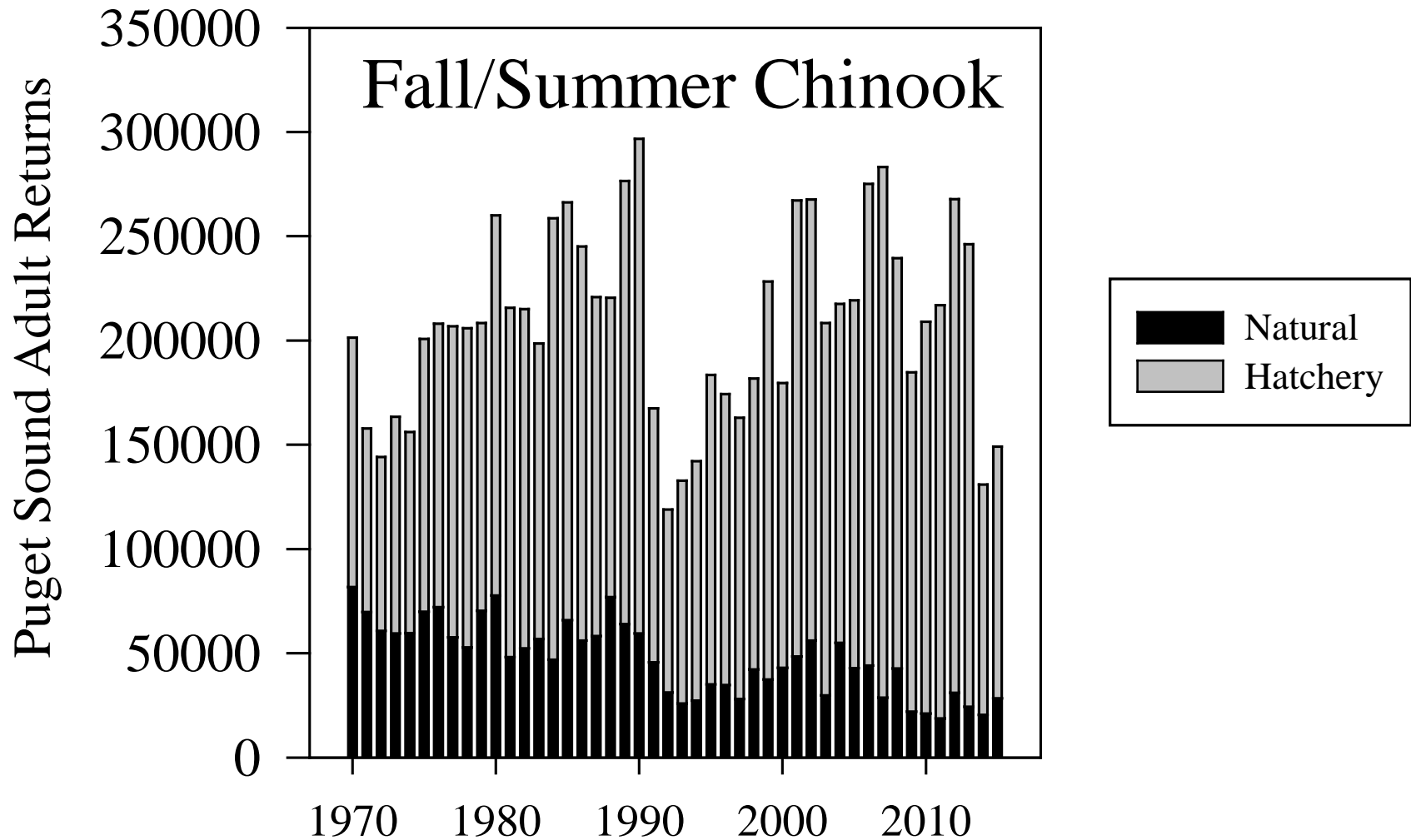
Salmon Abundance-Regional



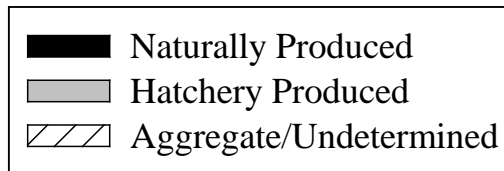
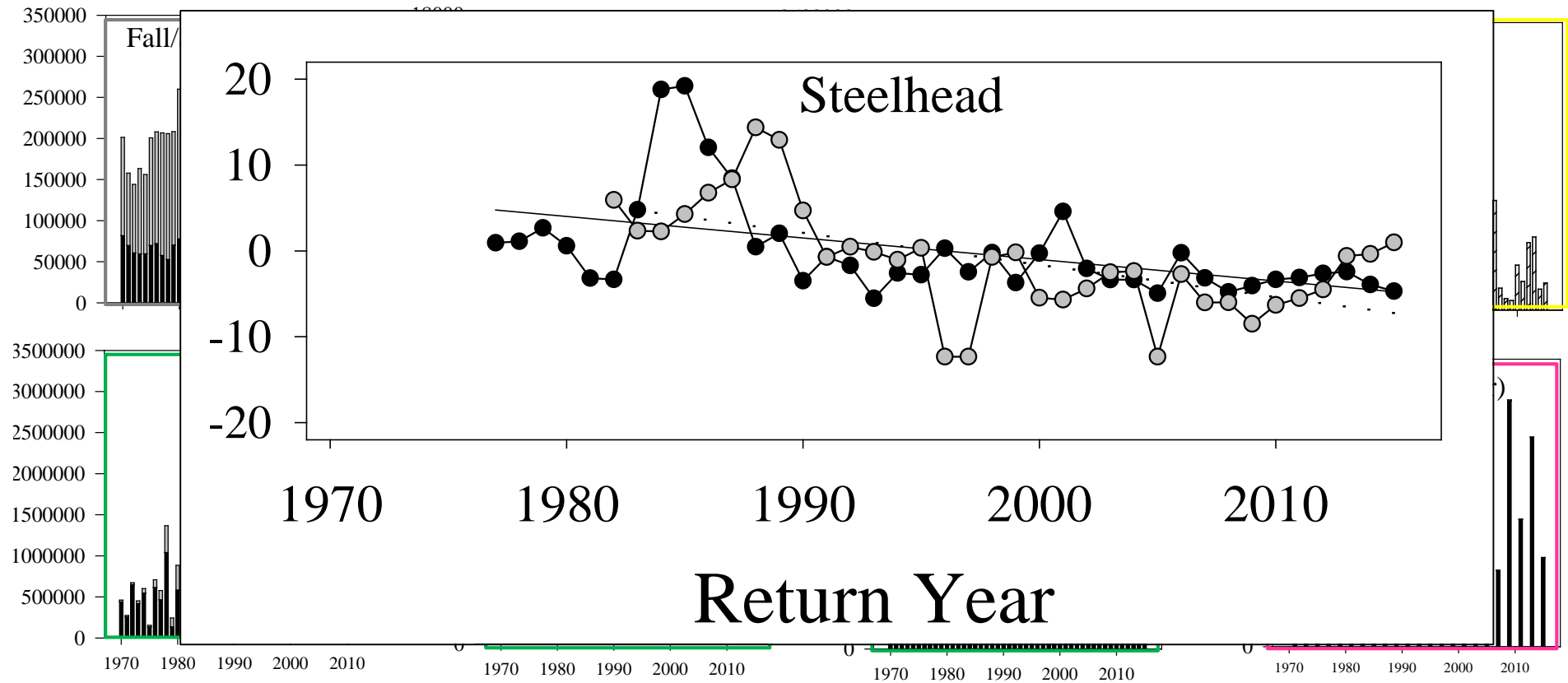
Salmon Abundance-Regional



Salmon Abundance-Hatchery vs. Natural



Salmon Abundance-Hatchery vs. Natural



Conclusion

- Decrease in size of Pacific Salmon with the exception of coho and sockeye
- Decrease in abundance of naturally produced “smolt” life history types particularly in South and Central Sound.
- Decrease in species diversity of Pacific Salmon in Puget Sound

Acknowledgements

- Northwest Indian Fish Commission and WDFW-Anderson, Jon Carey, Mara Zimmerman, Angelika Hagen-Braux, Kirt Hughes, Kyle Addicks Ryan Lothrop, Mara Zimmerman, Salish Sea Marine Survival Project

Questions

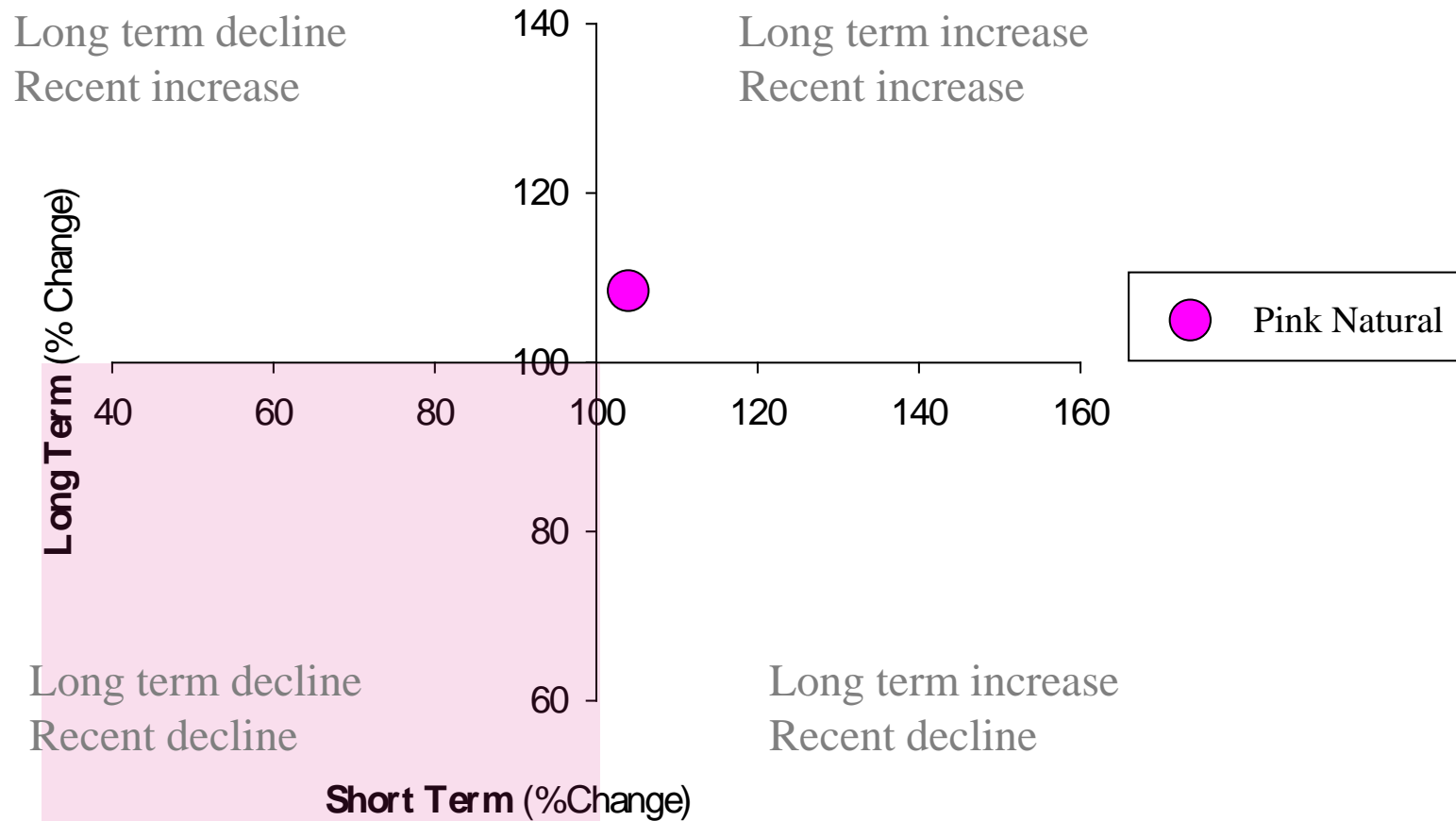


Study Objectives

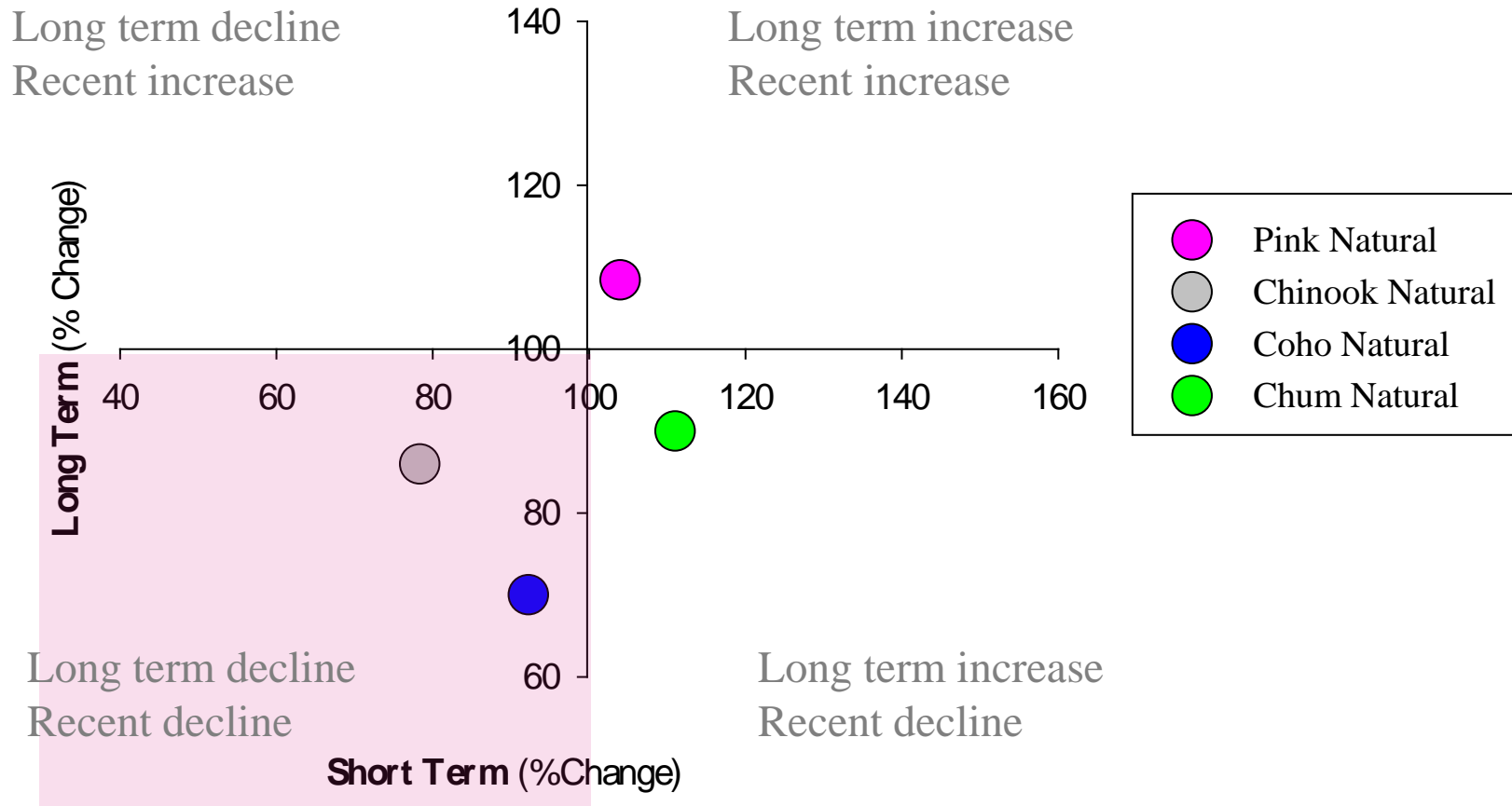
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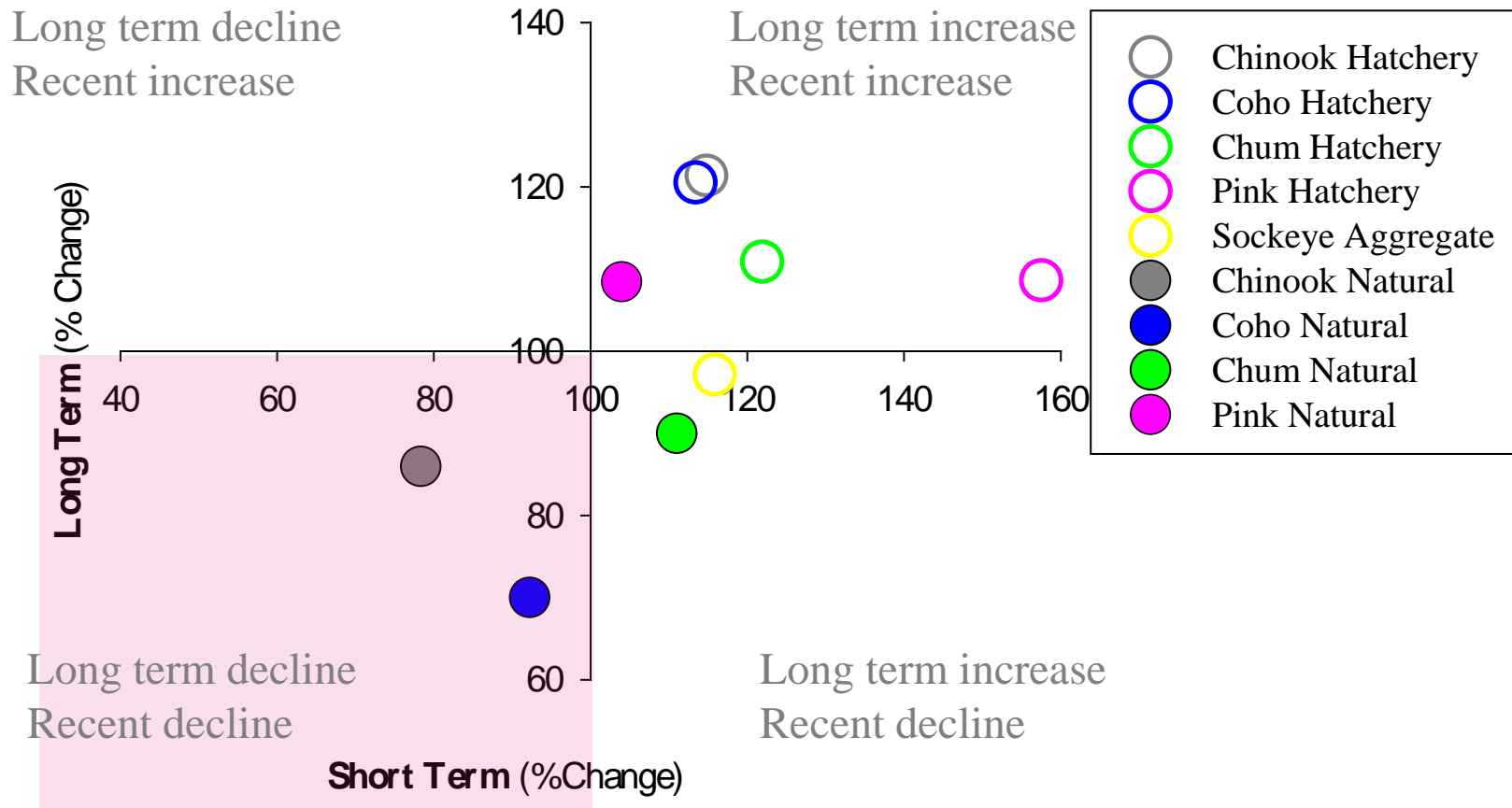
Salmon Survival Hatchery vs. Wild



Salmon Survival Hatchery vs. Wild



Salmon Survival Hatchery vs. Wild



Species are different from two time periods due to differences.

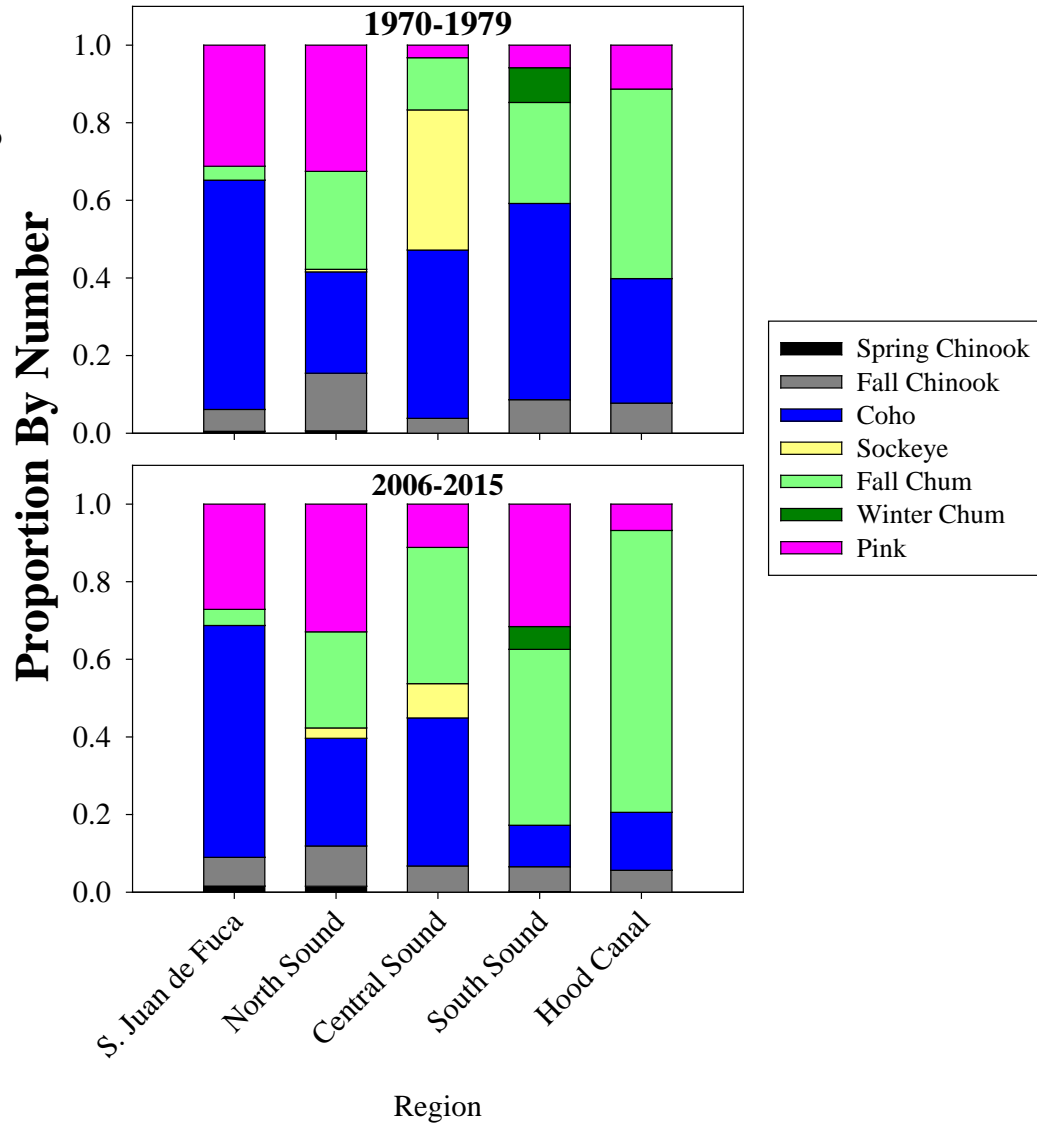


Figure X. Species Composition of Pacific Salmon, *Ocorhynchus* in Puget Sound, WA in years 1970-1979 vs. 2006-2015.

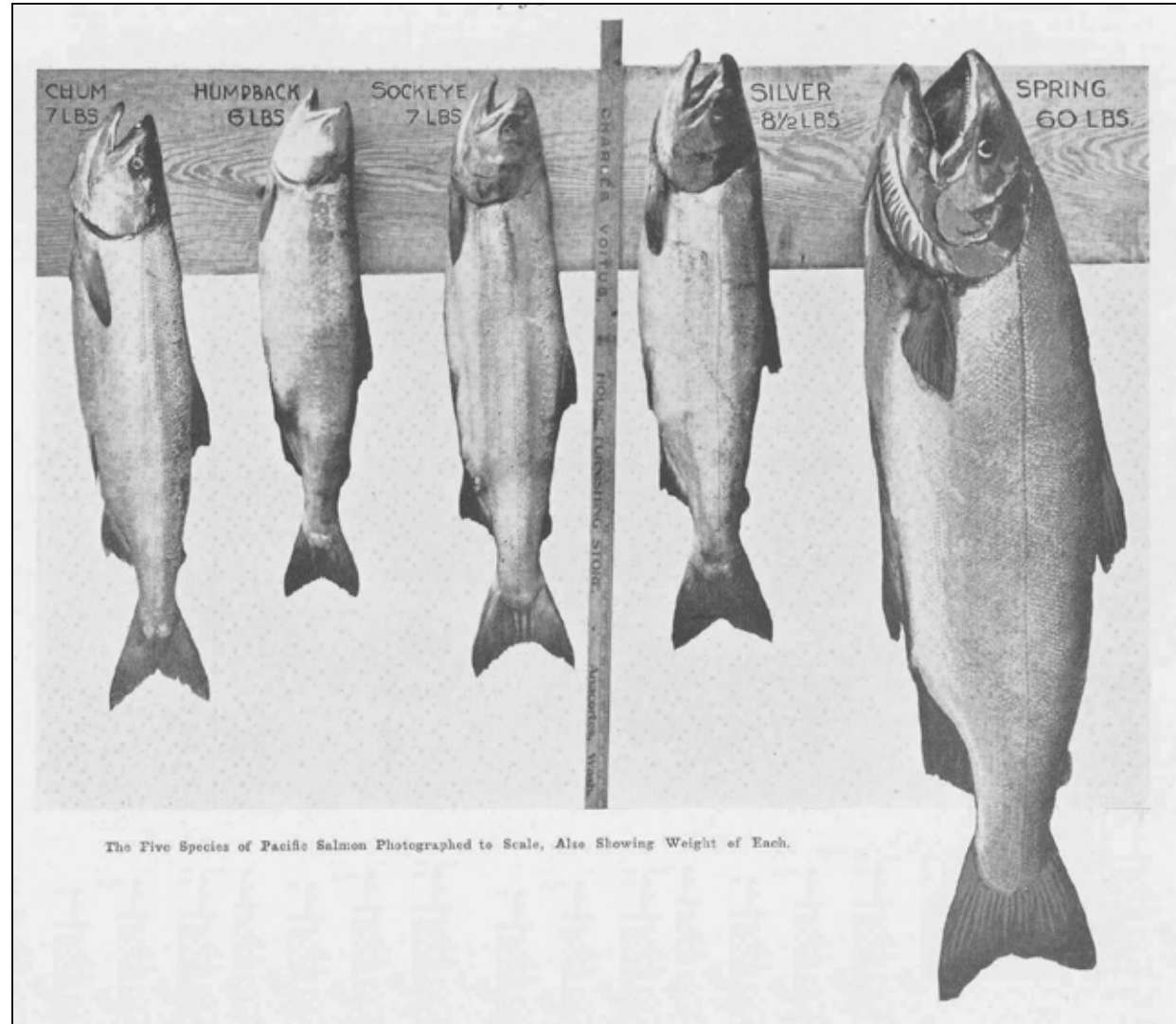
Salmon Size-Mass (kg)

Purse Seine Catch
1970-2015

caught/landed
weight

N=>500 landing
reports per species
per year

Average ~4523



Puget Sound-Background

Chinook



Coho



Chum



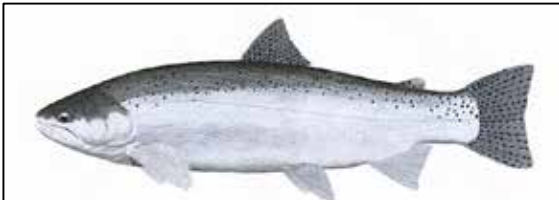
Sockeye



Pink



Steelhead



Salmon Survival-Methods

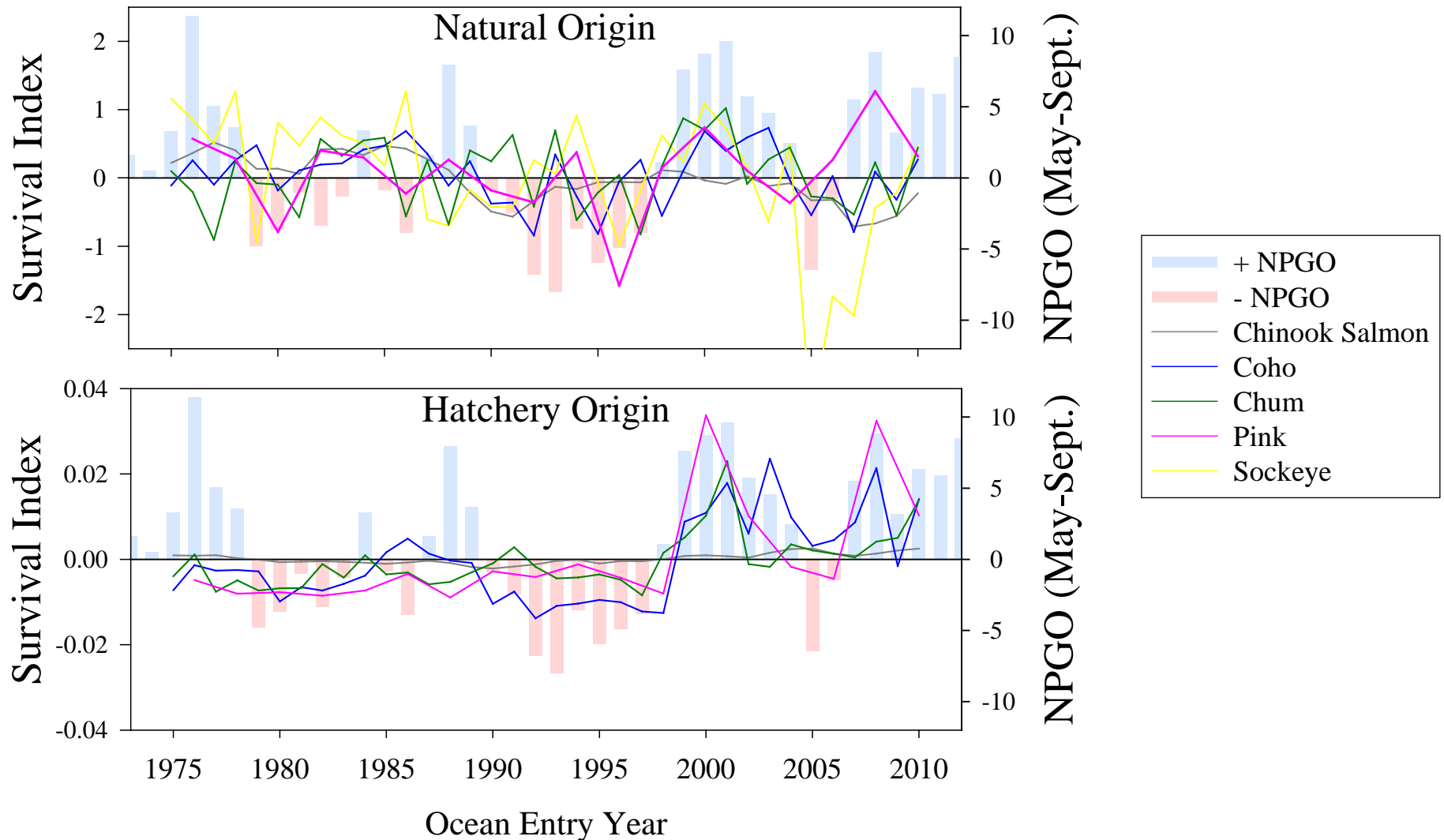
Hatchery origin survival
= recruit per release (SAR)



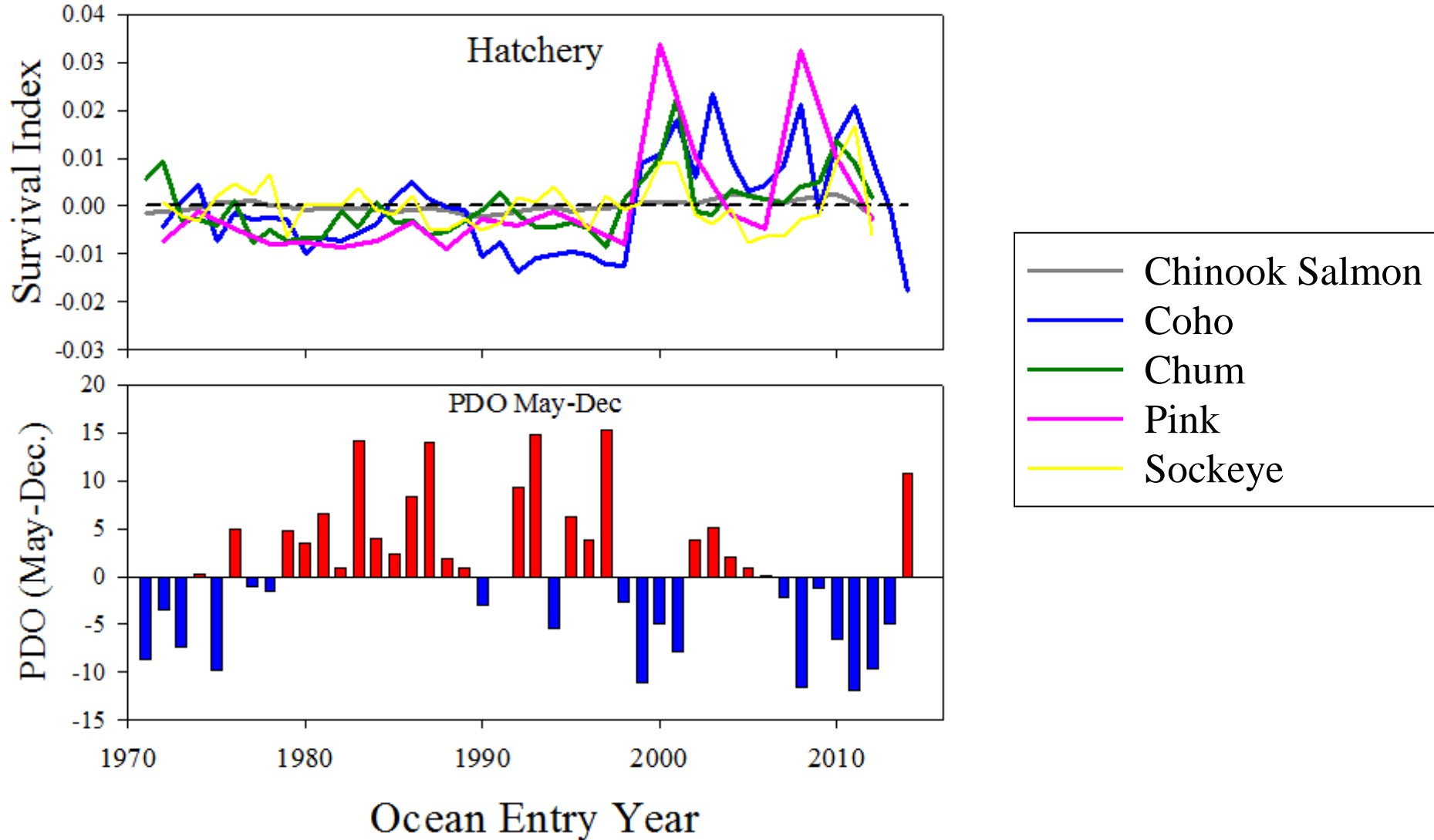
Natural origin survival =
recruit per spawner



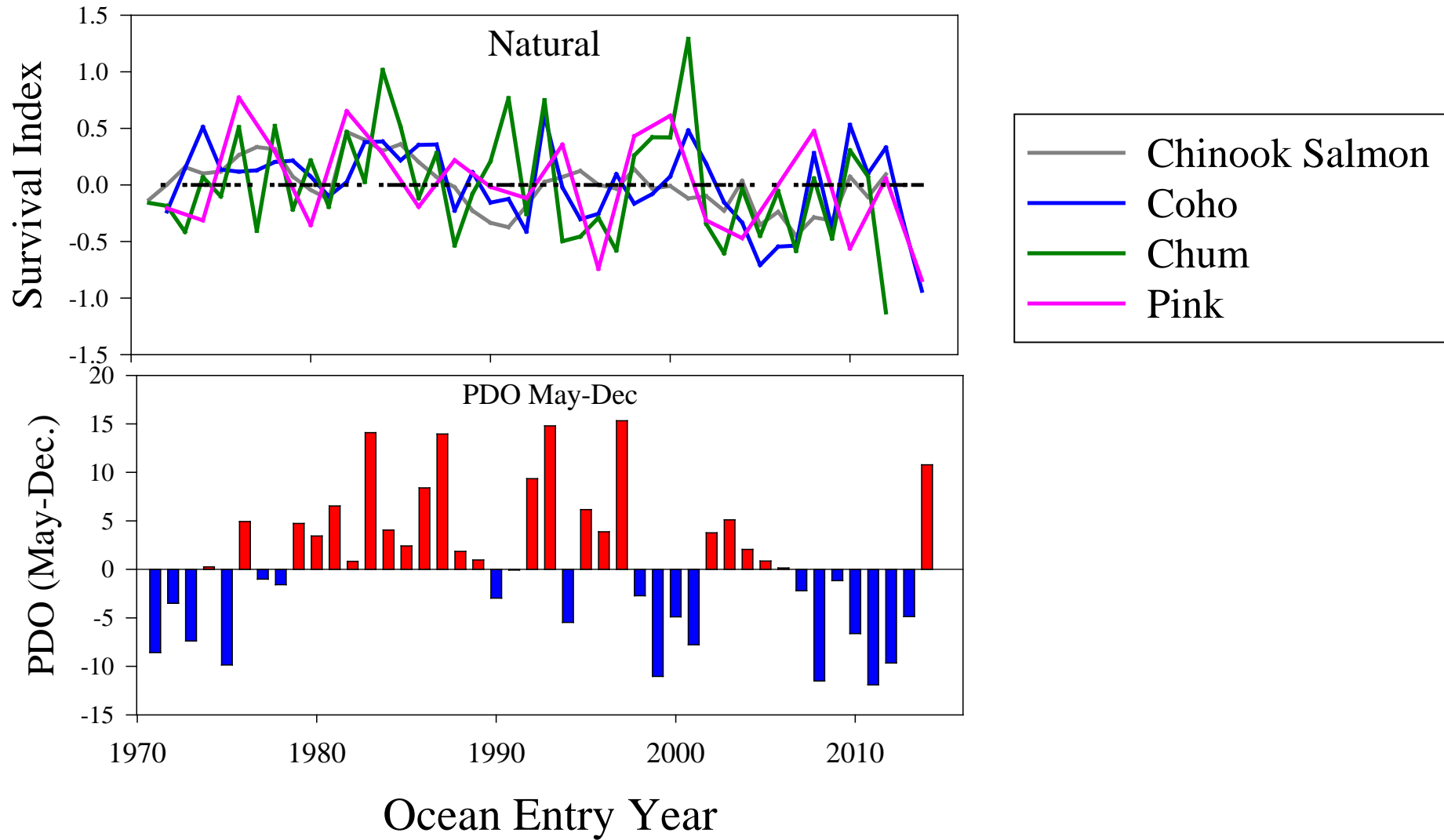
Salmon Survival and Climate



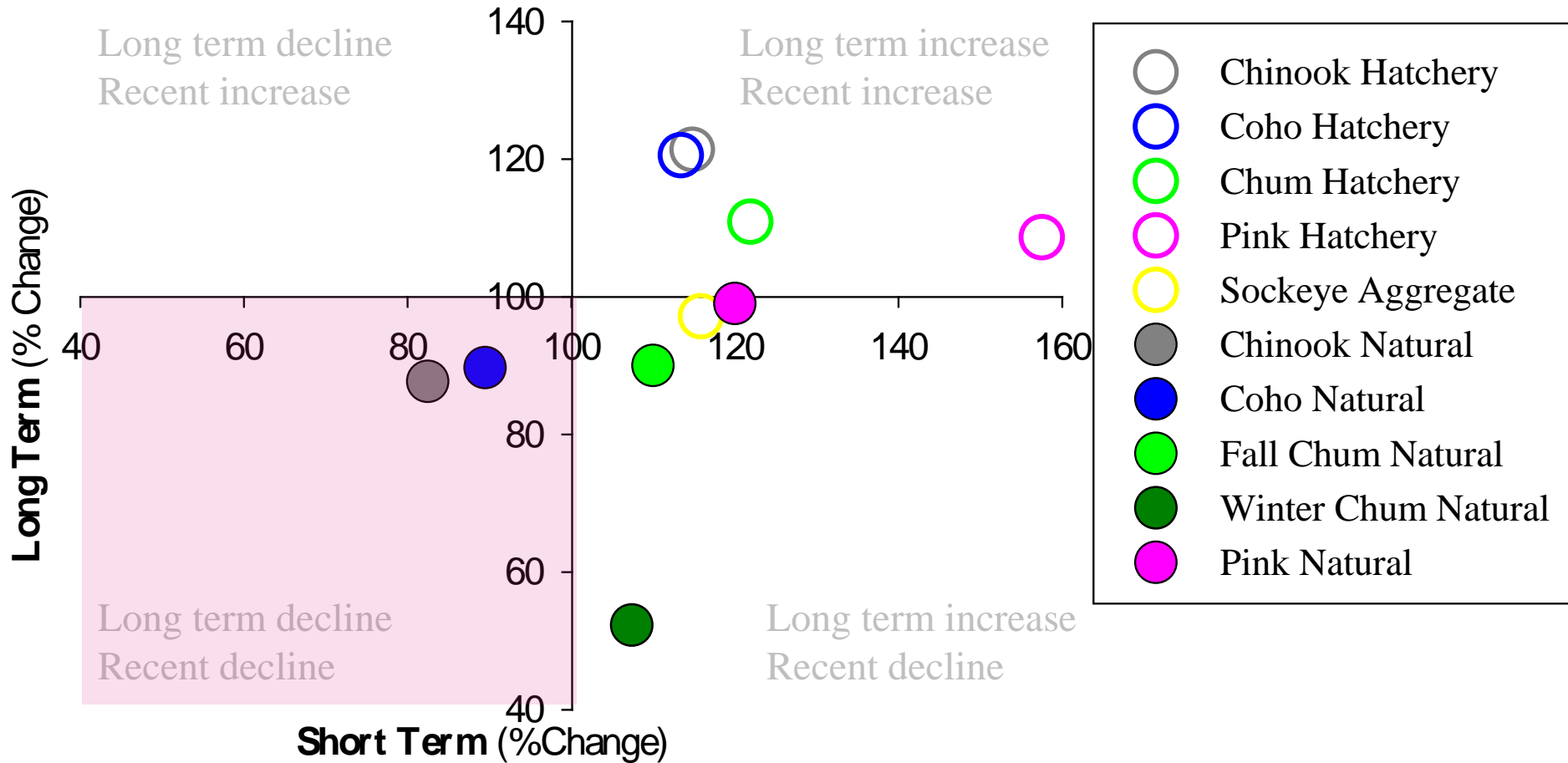
Salmon Survival and Climate



Salmon Survival and Climate



Salmon Survival Hatchery vs. Wild



Pink Effect?

Survival Recruit/Spawner

