

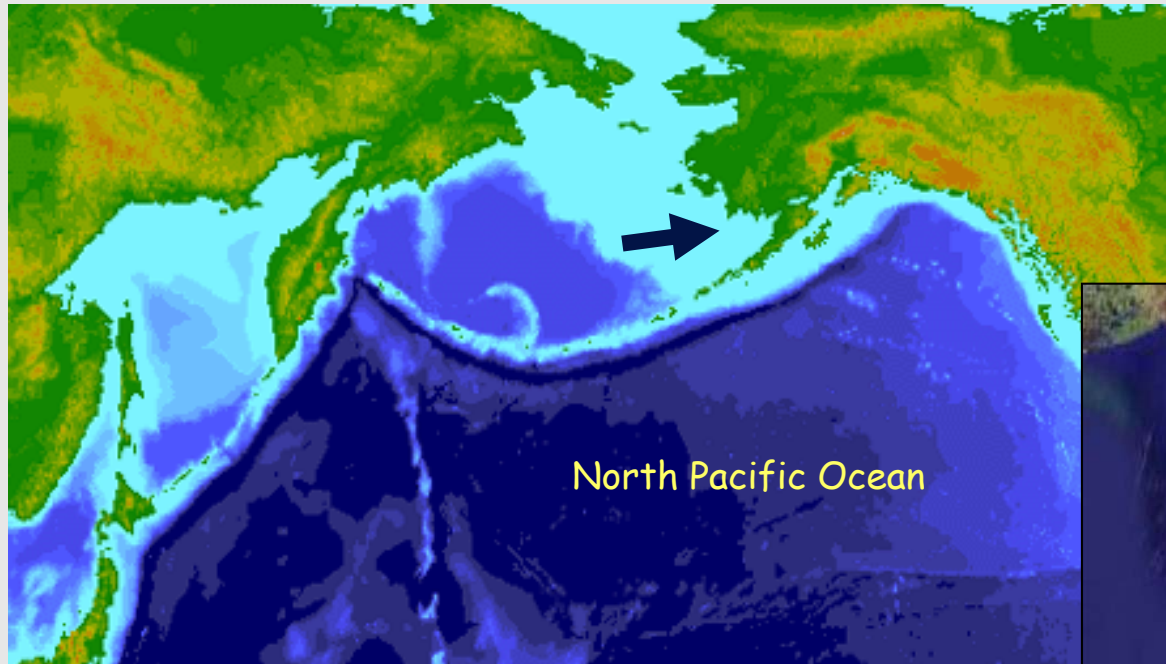
# The Ecological and Evolutionary Dynamics of Aquatic Landscapes that Support Pacific Salmon

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AFS, Oct 1 2019

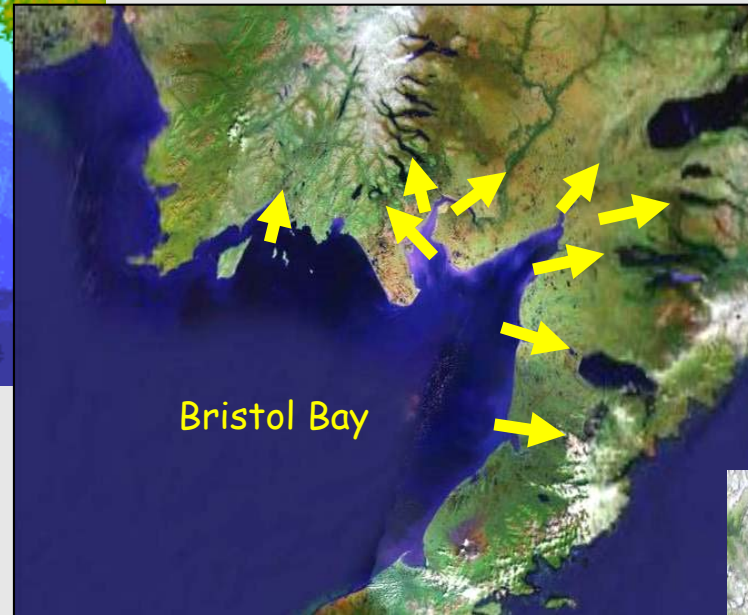




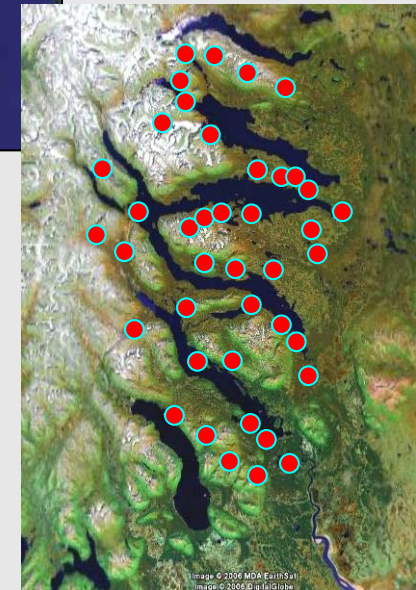
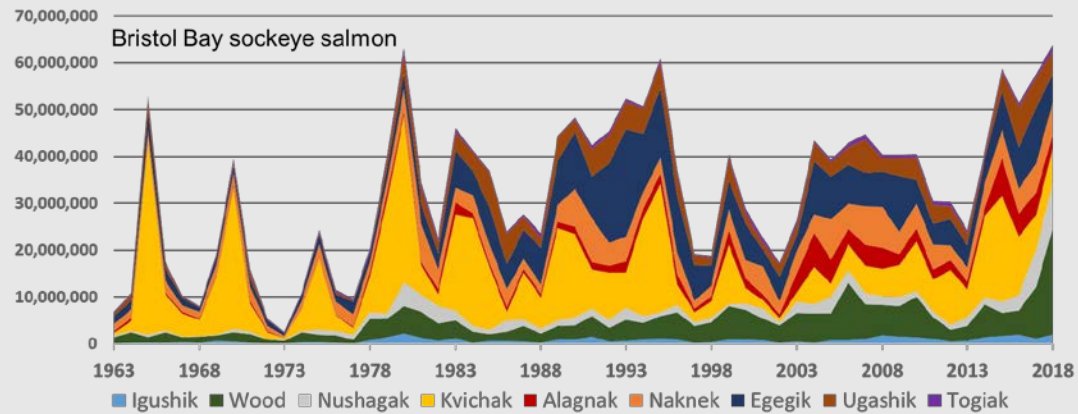
# The nested structure of salmon habitat



9 major rivers

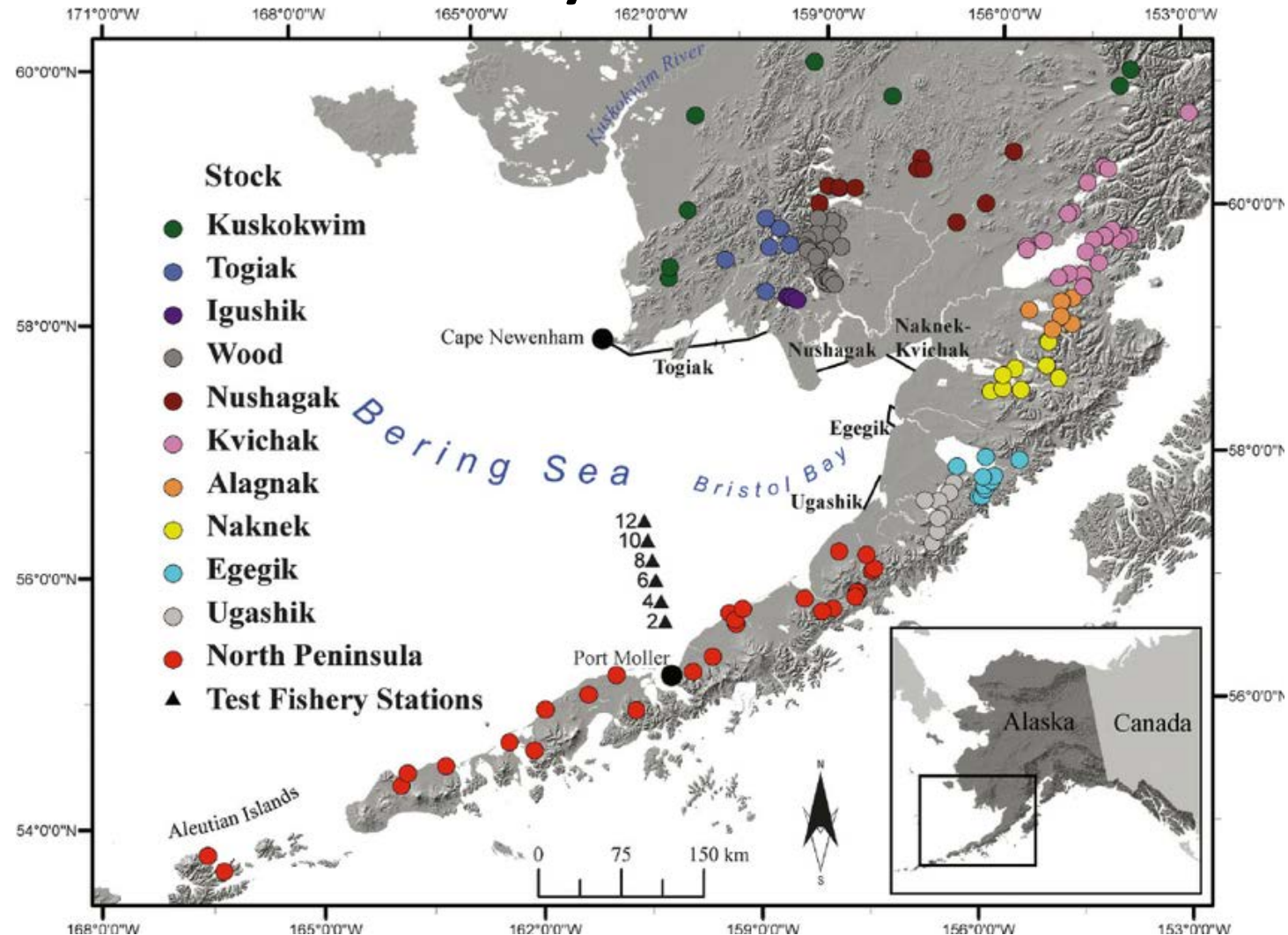


each with  
many  
populations





# Population diversity in Bristol Bay sockeye salmon



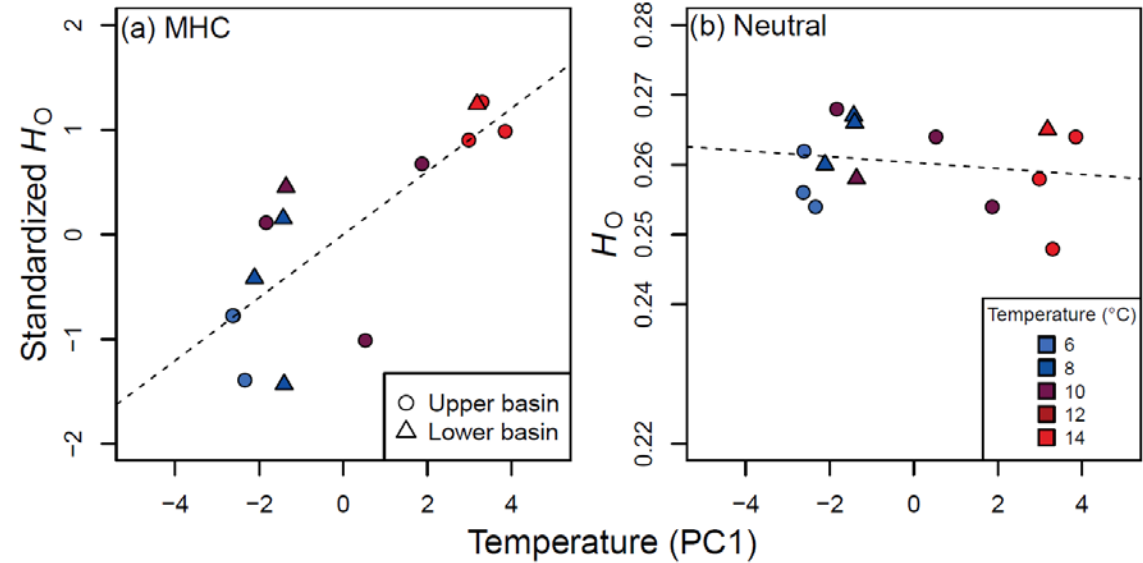
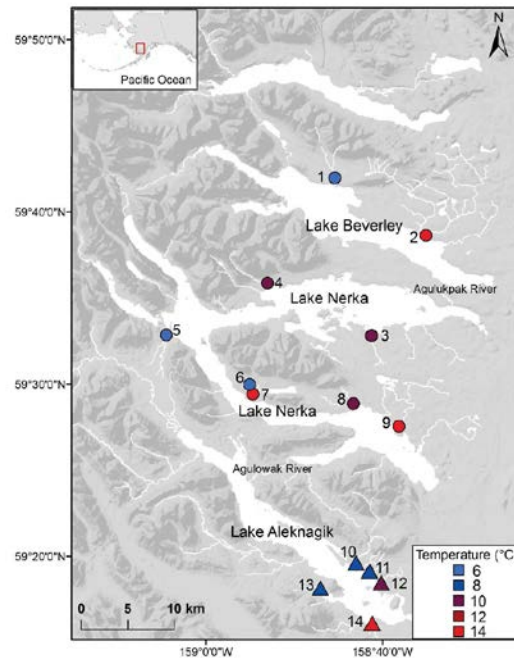
# Very fine-scale local adaptations in sockeye salmon

JOURNAL OF Evolutionary Biology

doi: 10.1111/jeb.22444

**Major histocompatibility complex diversity is positively associated with stream water temperatures in proximate populations of sockeye salmon**

W. A. LARSON<sup>1</sup>, P. J. LISI<sup>2</sup>, J. E. SEEB, L. W. SEEB & D. E. SCHINDLER  
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# Salmon landscapes are shifting mosaics of suitable habitat (*sensu* Stanford et al. 2005)

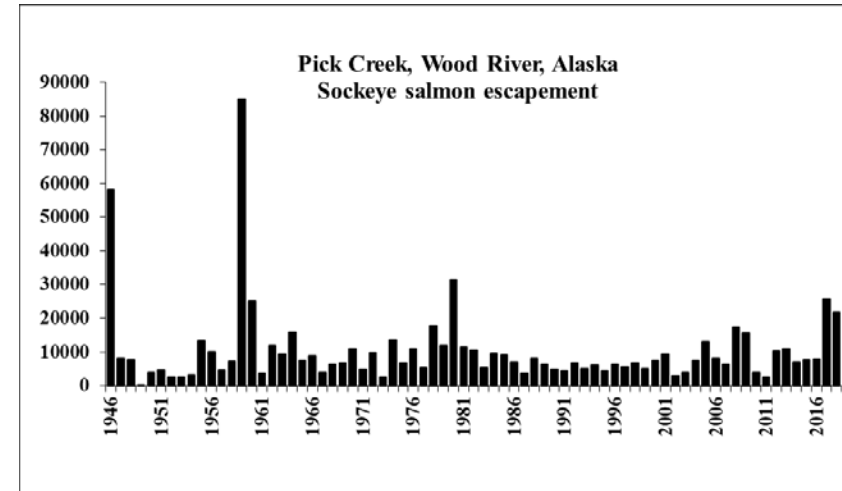
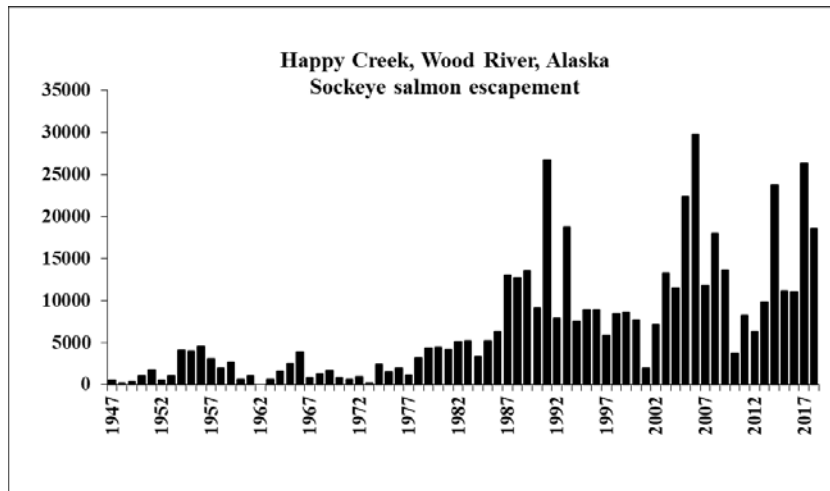




# Remarkable variation in abundance at population scales

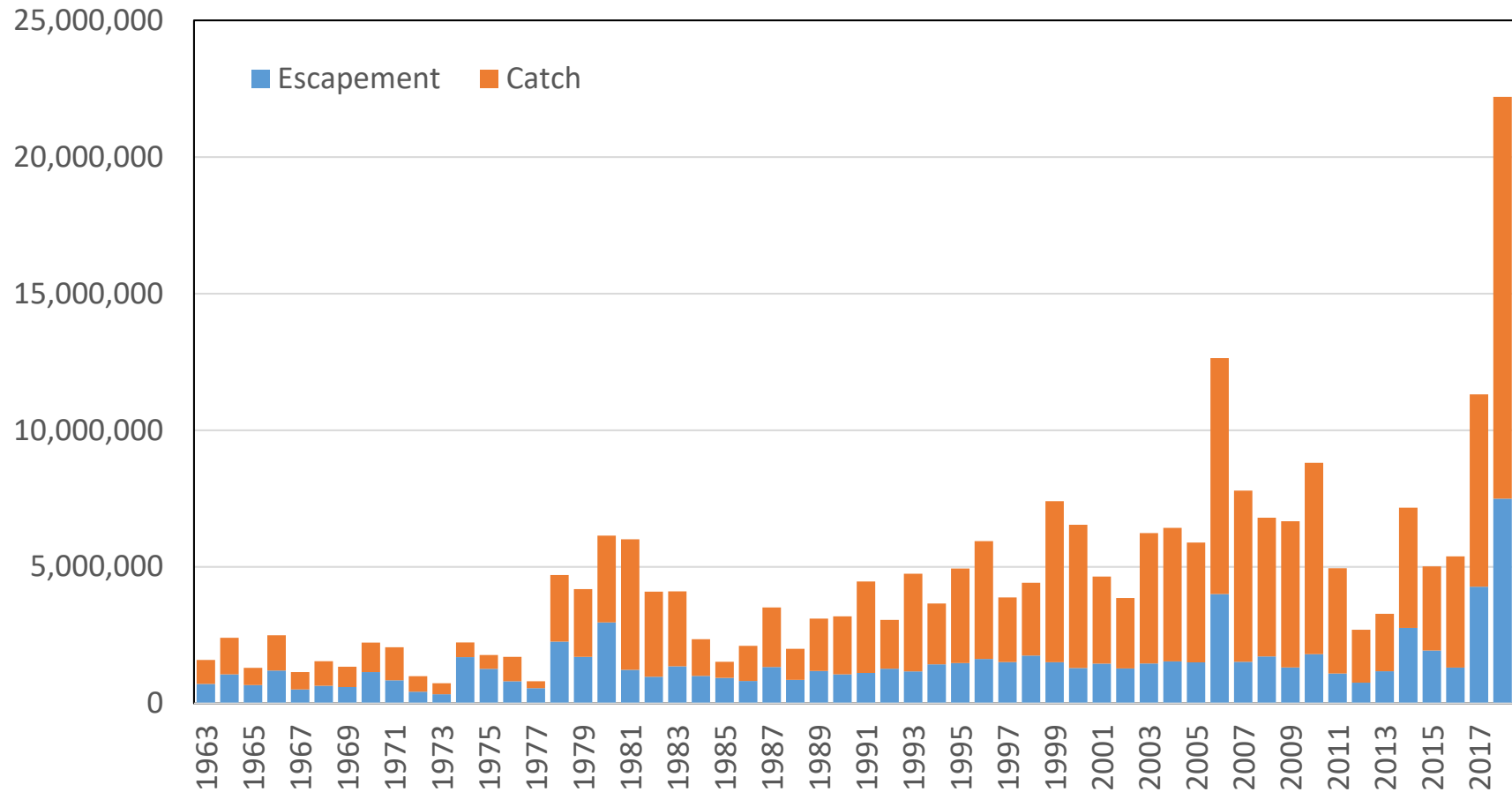
Short-term assessments mis-represent long-term potential of habitat.

Examples from Wood River:



data from UW – Alaska Salmon Program

## Sockeye salmon returns to Wood River, Alaska

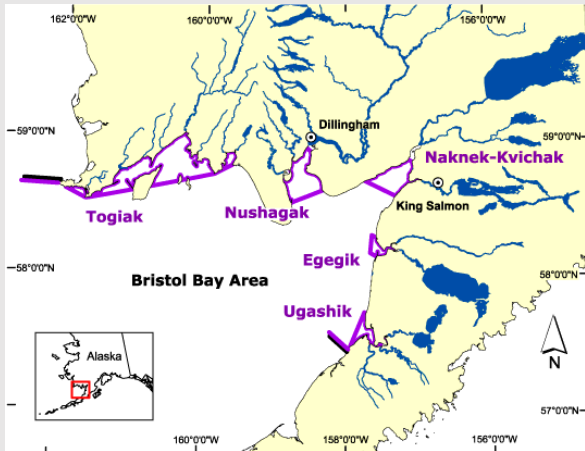
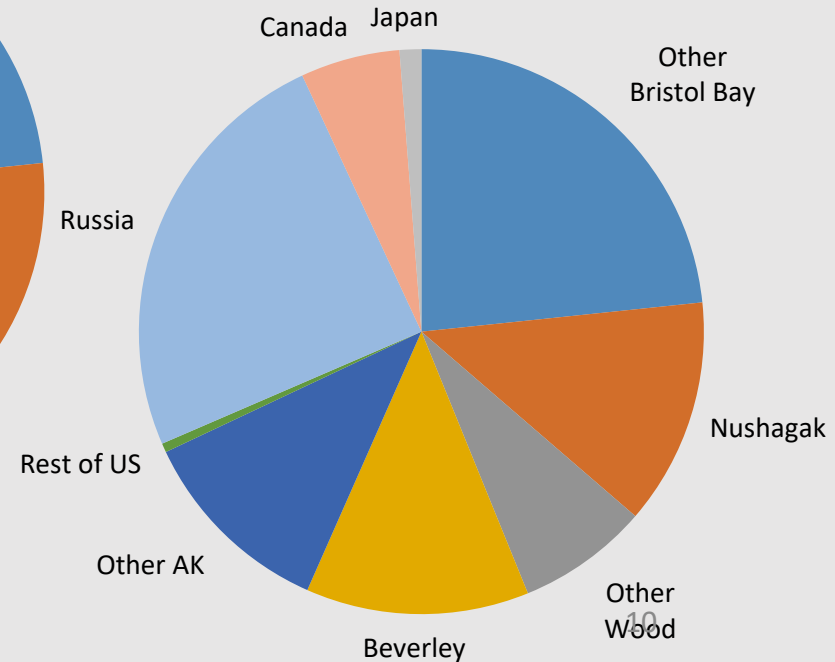
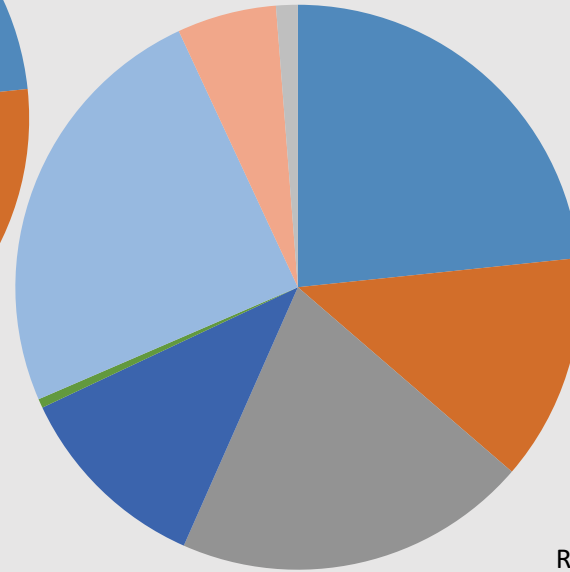
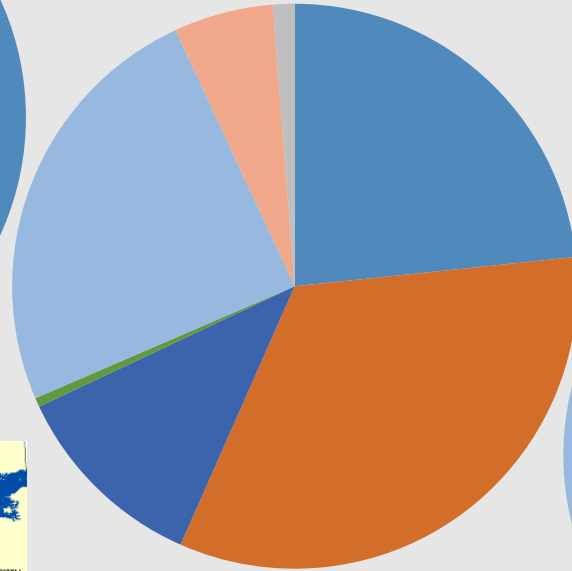
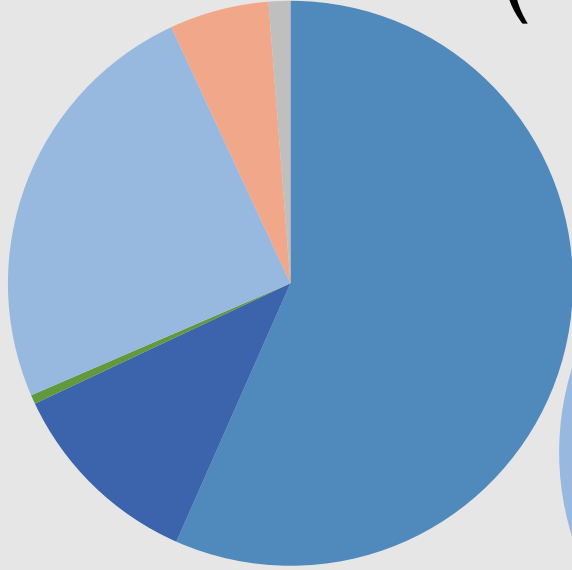








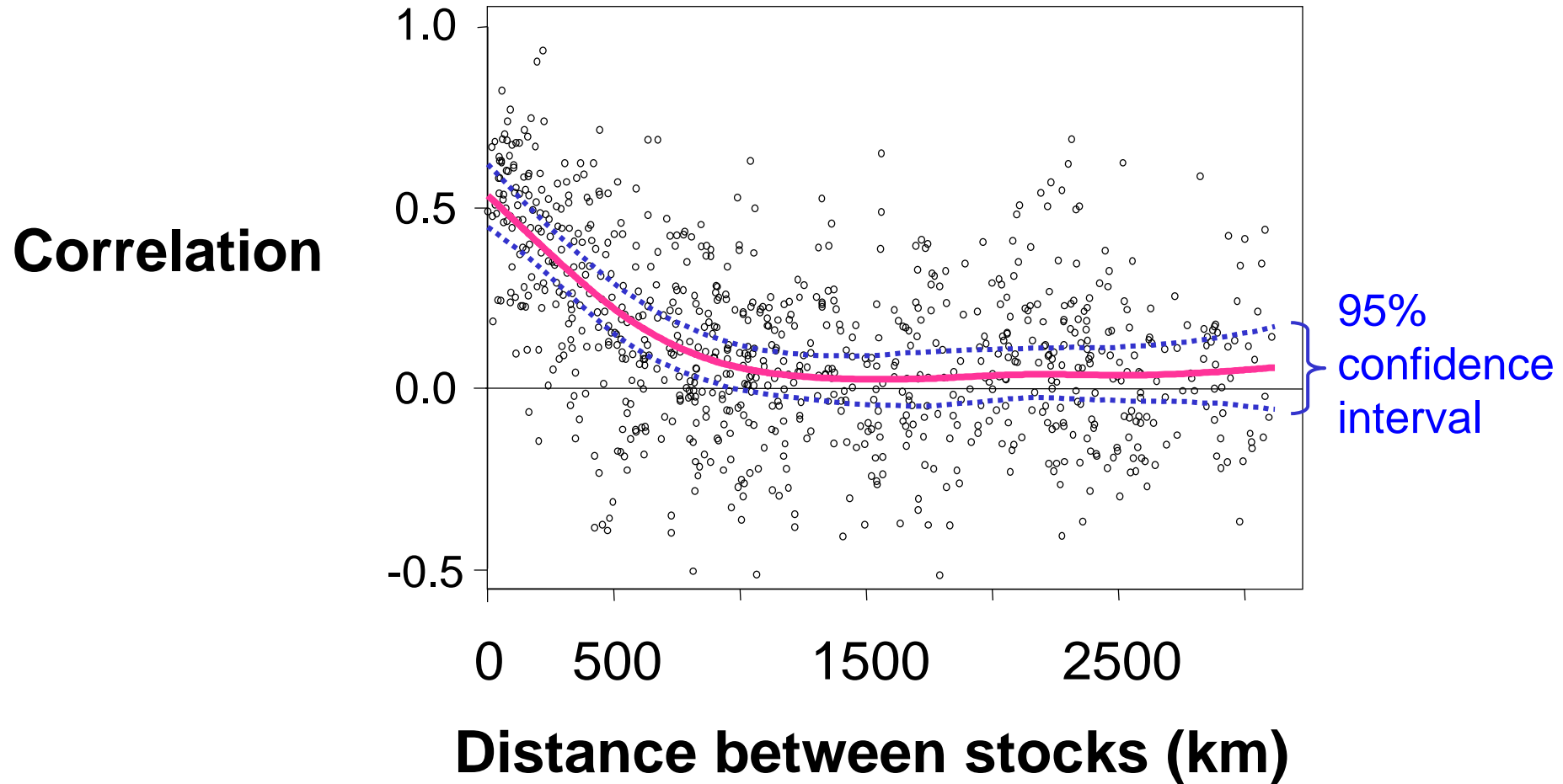
# Global sockeye catch 2018 (387M pounds) (Lake Beverley contribution = 13%) (<0.01% of global sockeye habitat)



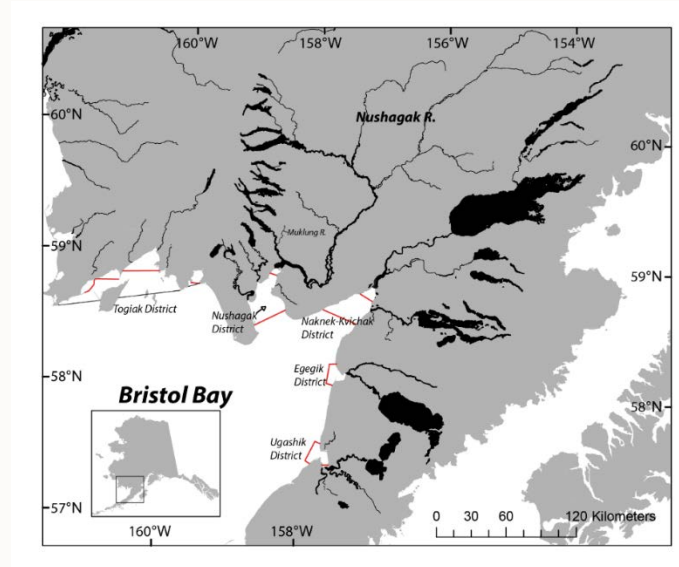
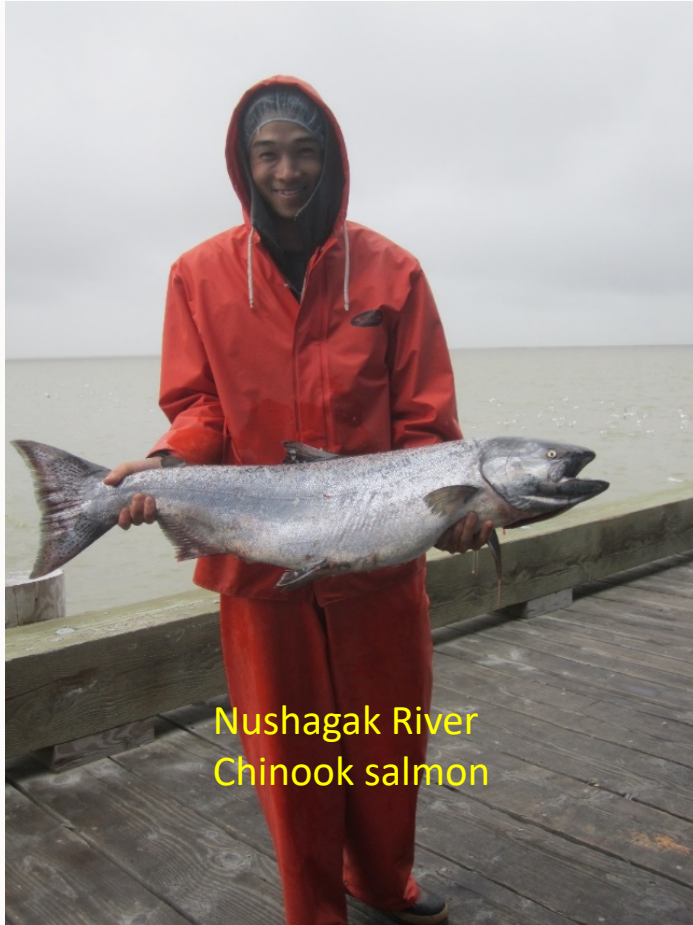




## Pairwise correlations in productivities among 43 **pink** salmon stocks



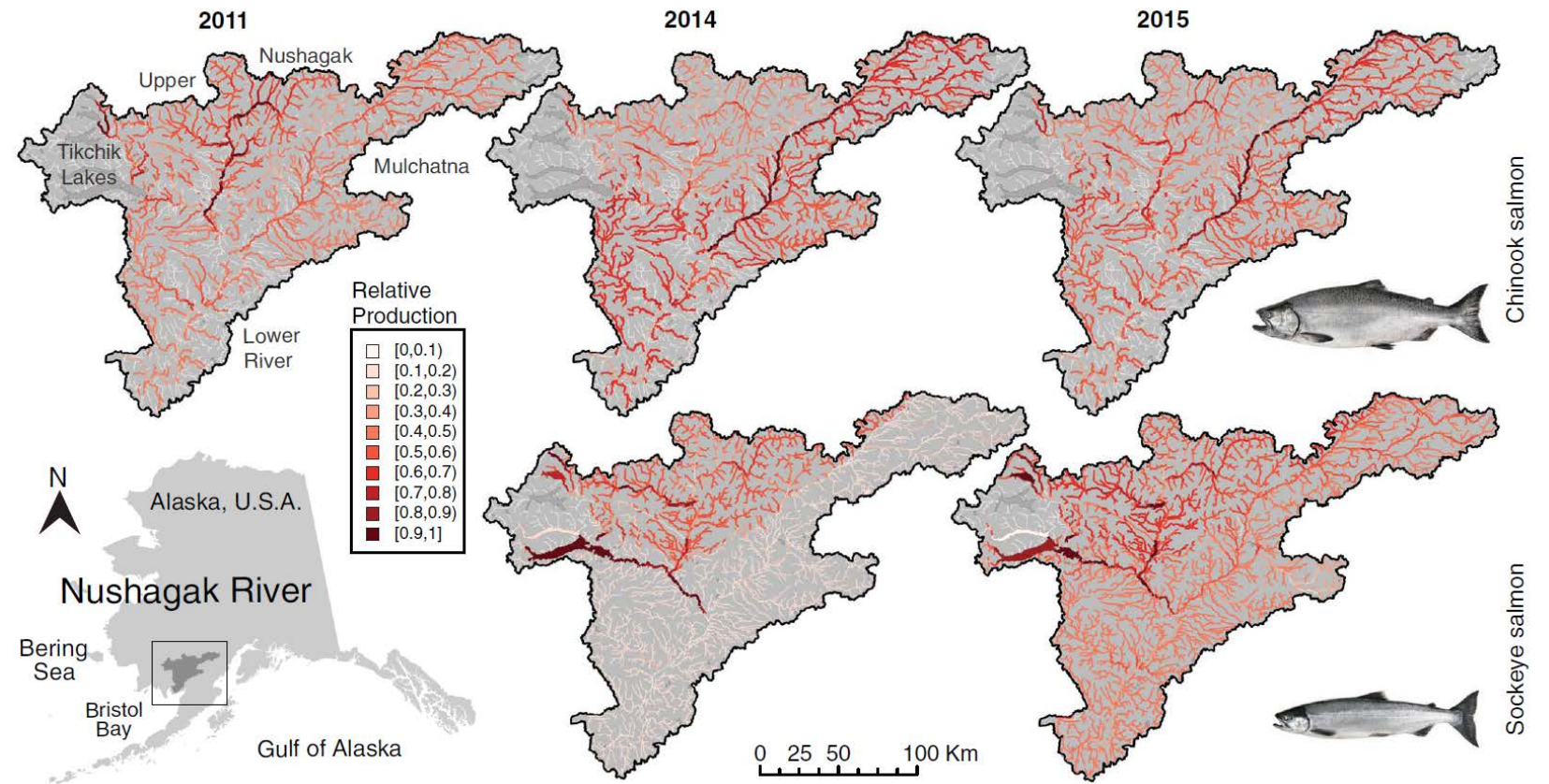
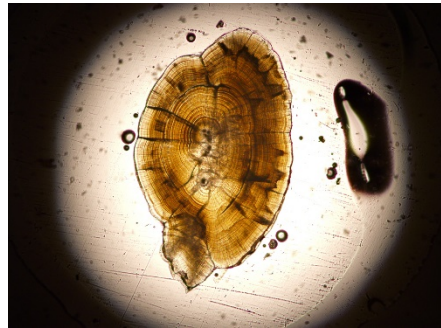
## Chinook salmon – habitat use within watersheds (how consistent is production within individual tributaries?)





# Shifting habitat mosaics and fish production across river basins

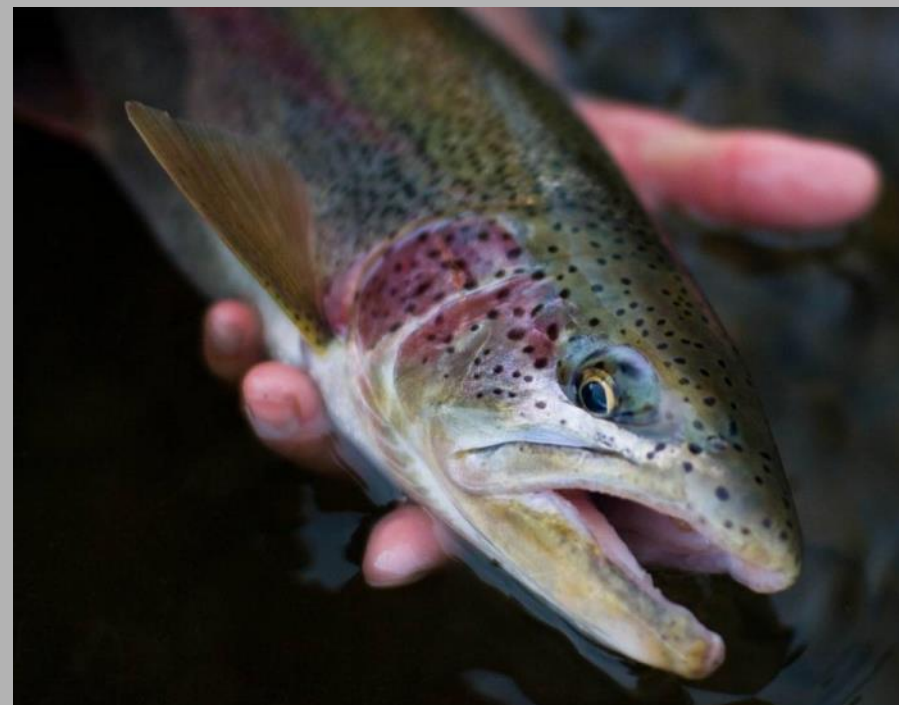
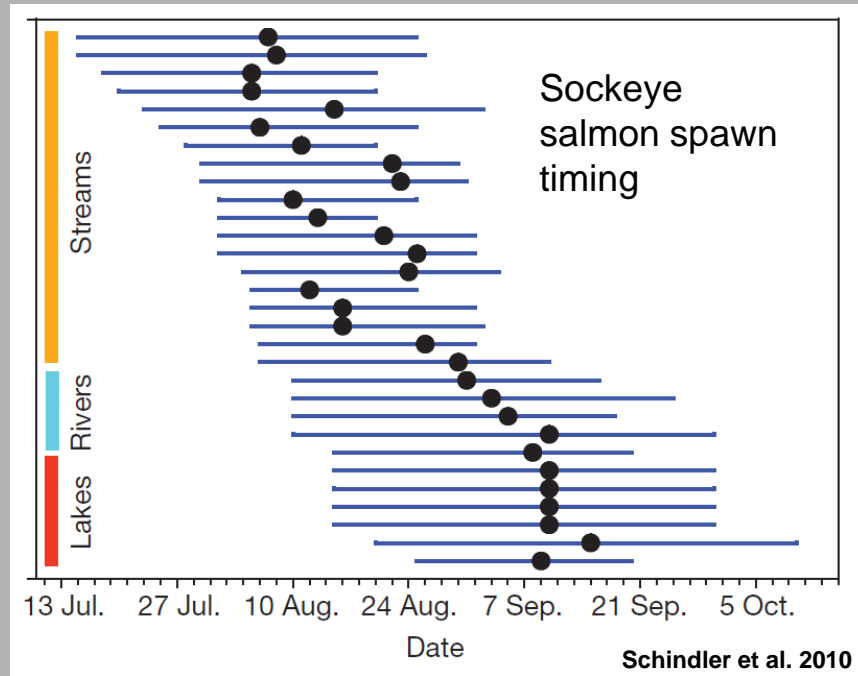
Sean R. Brennan<sup>1\*</sup>, Daniel E. Schindler<sup>1</sup>, Timothy J. Cline<sup>1</sup>, Timothy E. Walsworth<sup>1</sup>,  
Greg Buck<sup>2</sup>, Diego P. Fernandez<sup>3</sup>



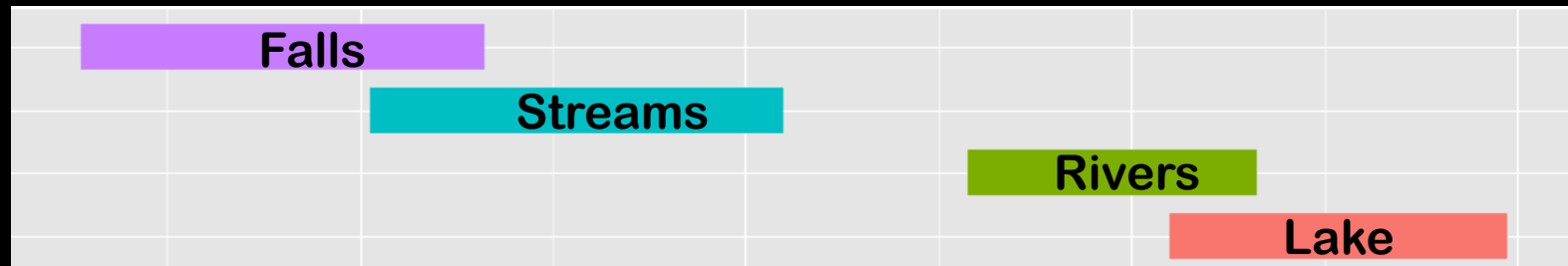
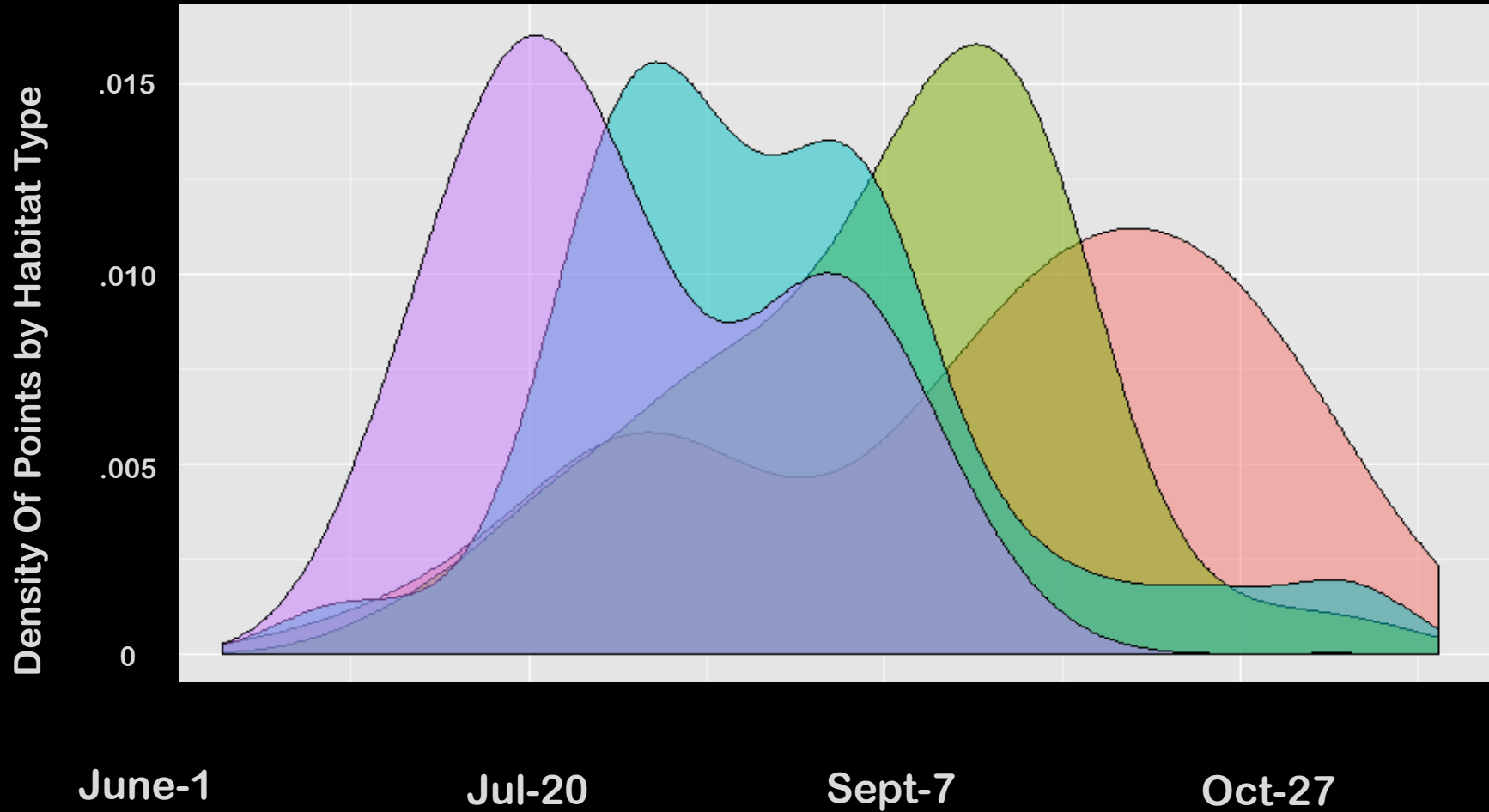
Do watershed predators benefit from geomorphic complexity and variation in salmon spawn timing?





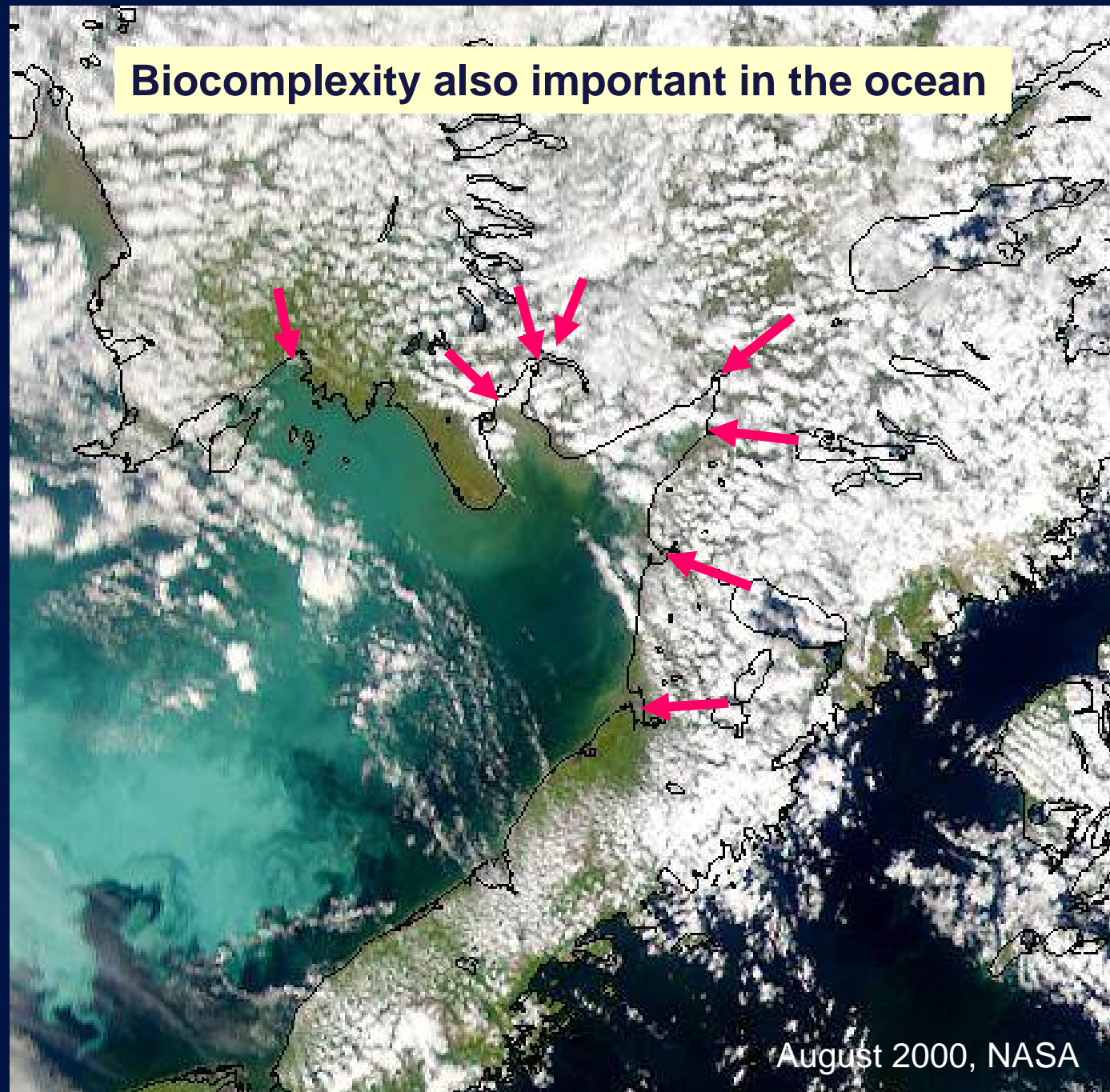


# Bears are “surfing” the salmon wave





**Biocomplexity also important in the ocean**



August 2000, NASA

# 'Coarsening' biocomplexity is a serious threat to the resilience of salmon ecosystems



## Chena River, Alaska

