

A photograph of several coho salmon swimming in dark water. The fish are silvery with a hint of blue on their sides. They are arranged in a loose group, with some in the foreground and others in the background. The lighting is dramatic, highlighting the scales and fins of the fish against the dark background.

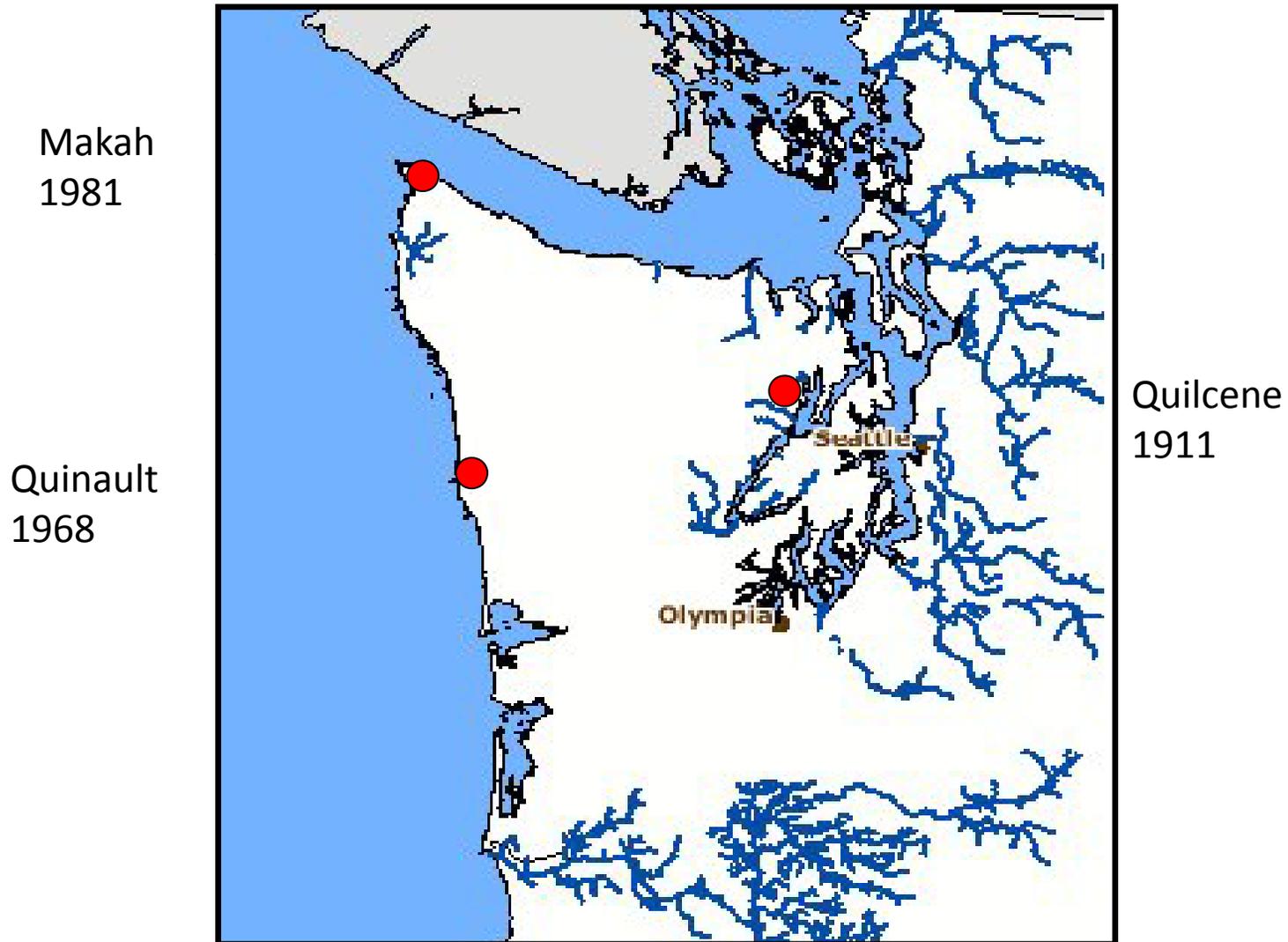
Precocious males and genetic resources in coho salmon: what if we remove the jacks?

Photo by Chris Huss

Background

- Most coho in WA spawn at 3 years.
 - Jacks spawn at 2 years, providing gene flow among years
- Divergence among geographic populations > divergence among years within sites
 - Populations can generally be described even without temporal sampling
- “...If hatcheries exclude jacks from spawning, they are effectively propagating three independent populations...”

USFWS hatcheries on the Olympic Peninsula



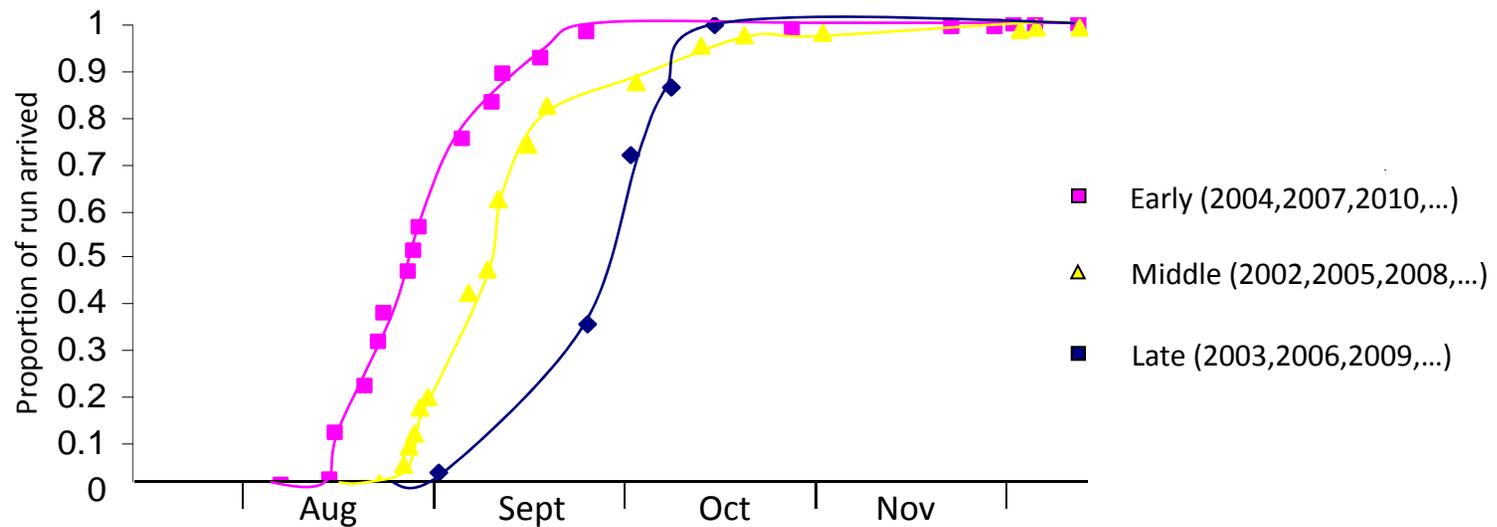
Quilcene NFH



- Propagating coho for ~100 years
- Earliest returning fish used for broodstock
- Jacks excluded from broodstock prior to 1992

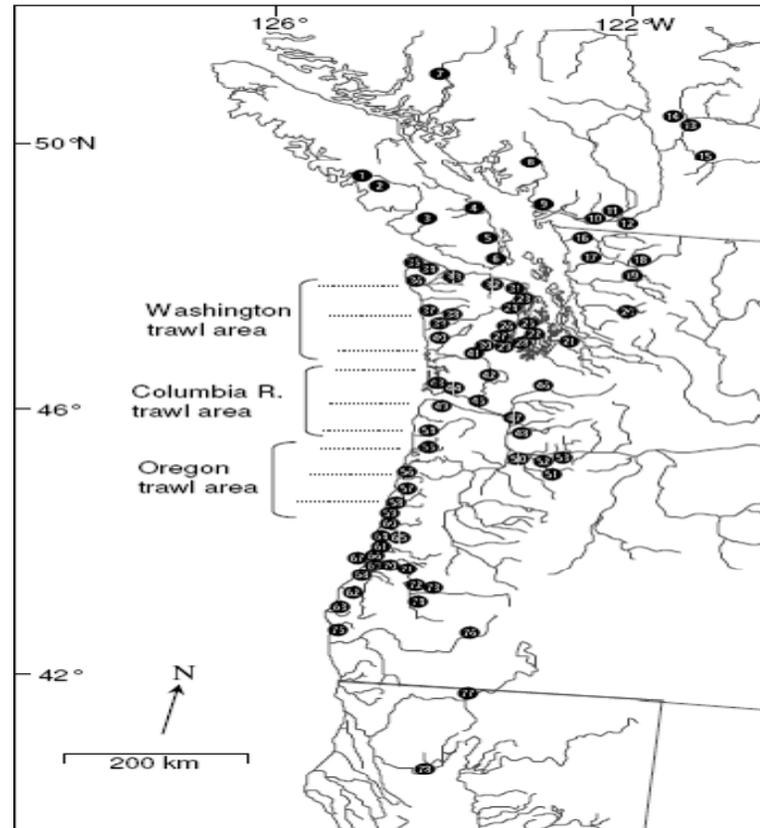
Photo credit: Ron Wong

Quilcene NFH



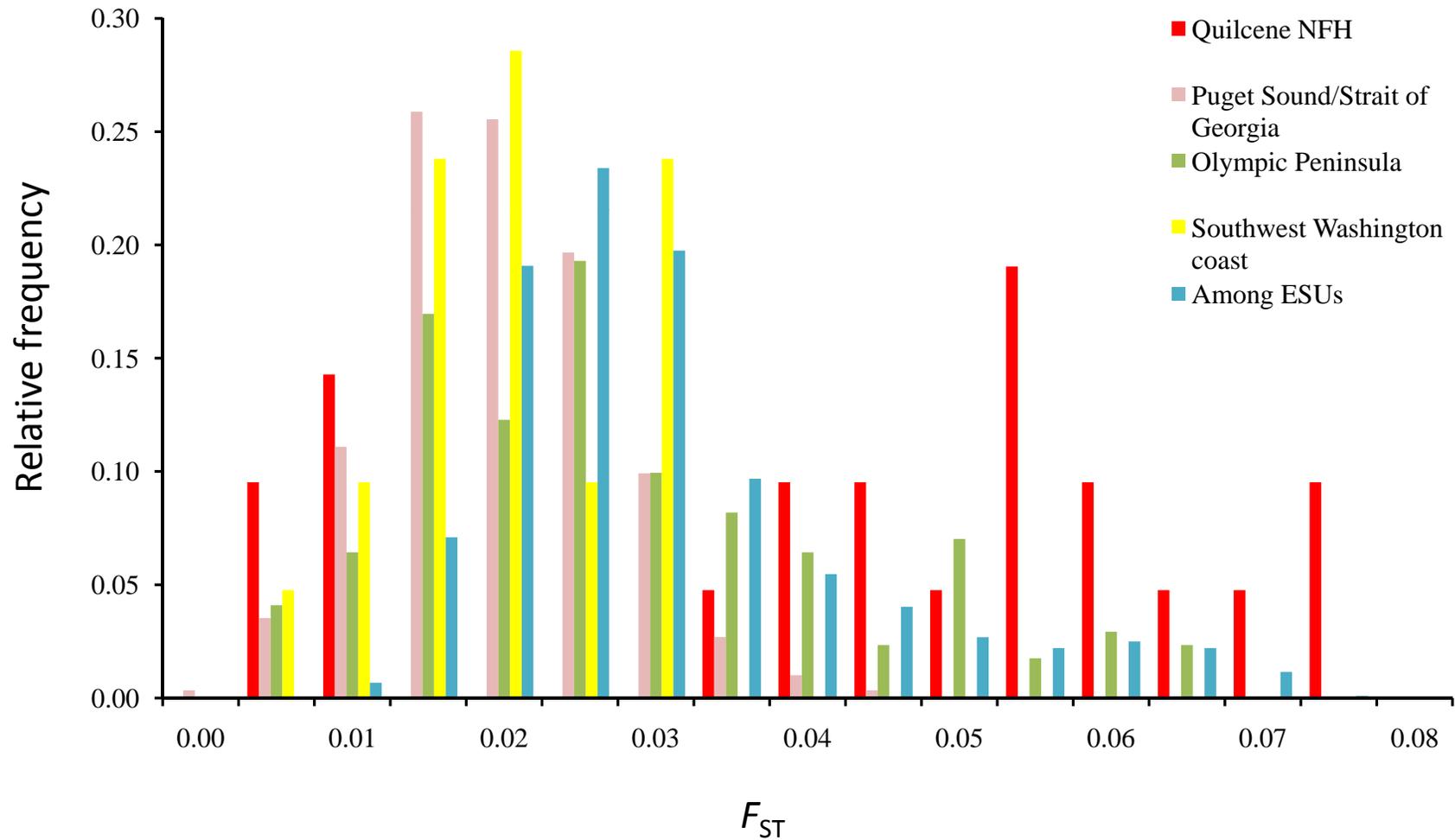
Three different run years have three different return times

Coho salmon microsatellite baseline

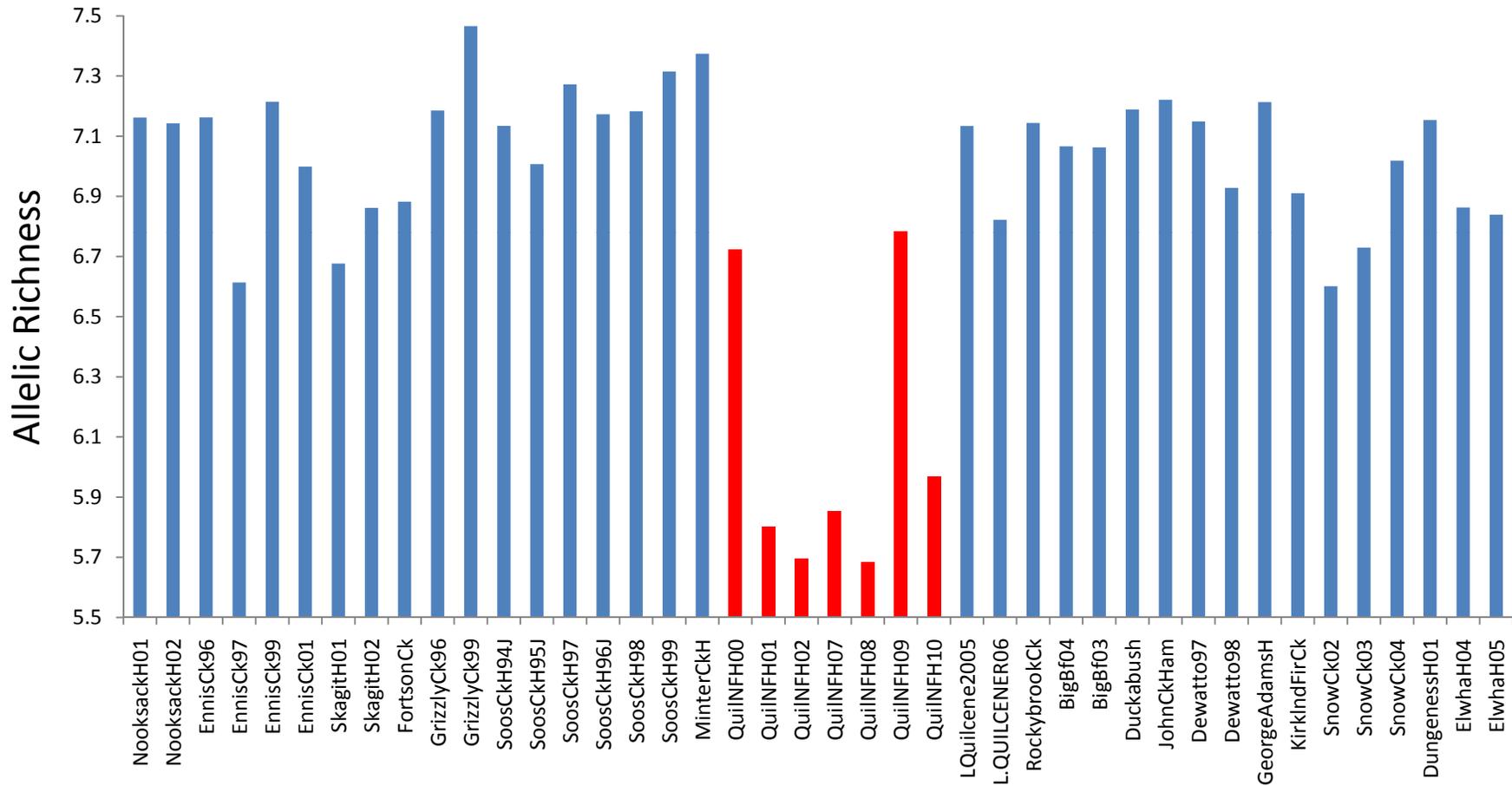


Van Doornik, D. M.; Teel, D. J.; Kuligowski, D. R.; Morgan, C. A., and Casillas, E. 2007. Genetic analyses provide insight into the early ocean stock distribution and survival of juvenile coho salmon (*Oncorhynchus kisutch*) off the coasts of Washington and Oregon. *North American Journal of Fisheries Management* 27:220-237.

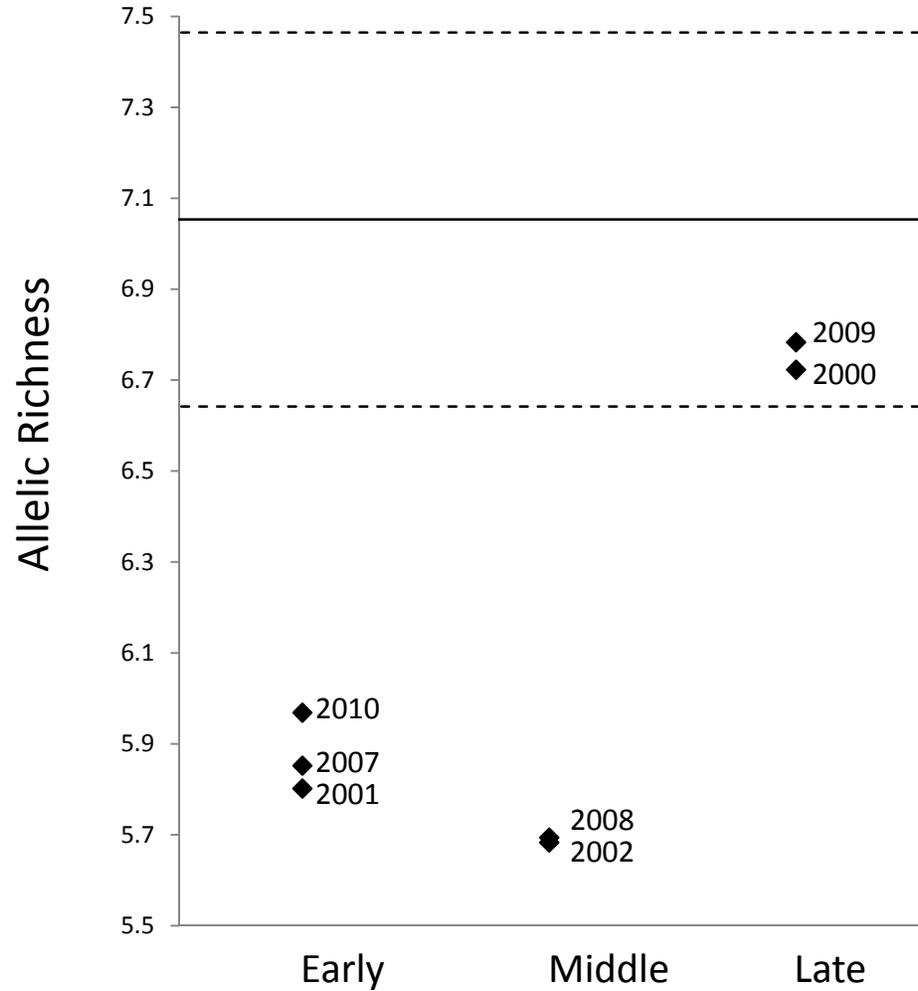
Divergence among broodlines at Quilcene NFH

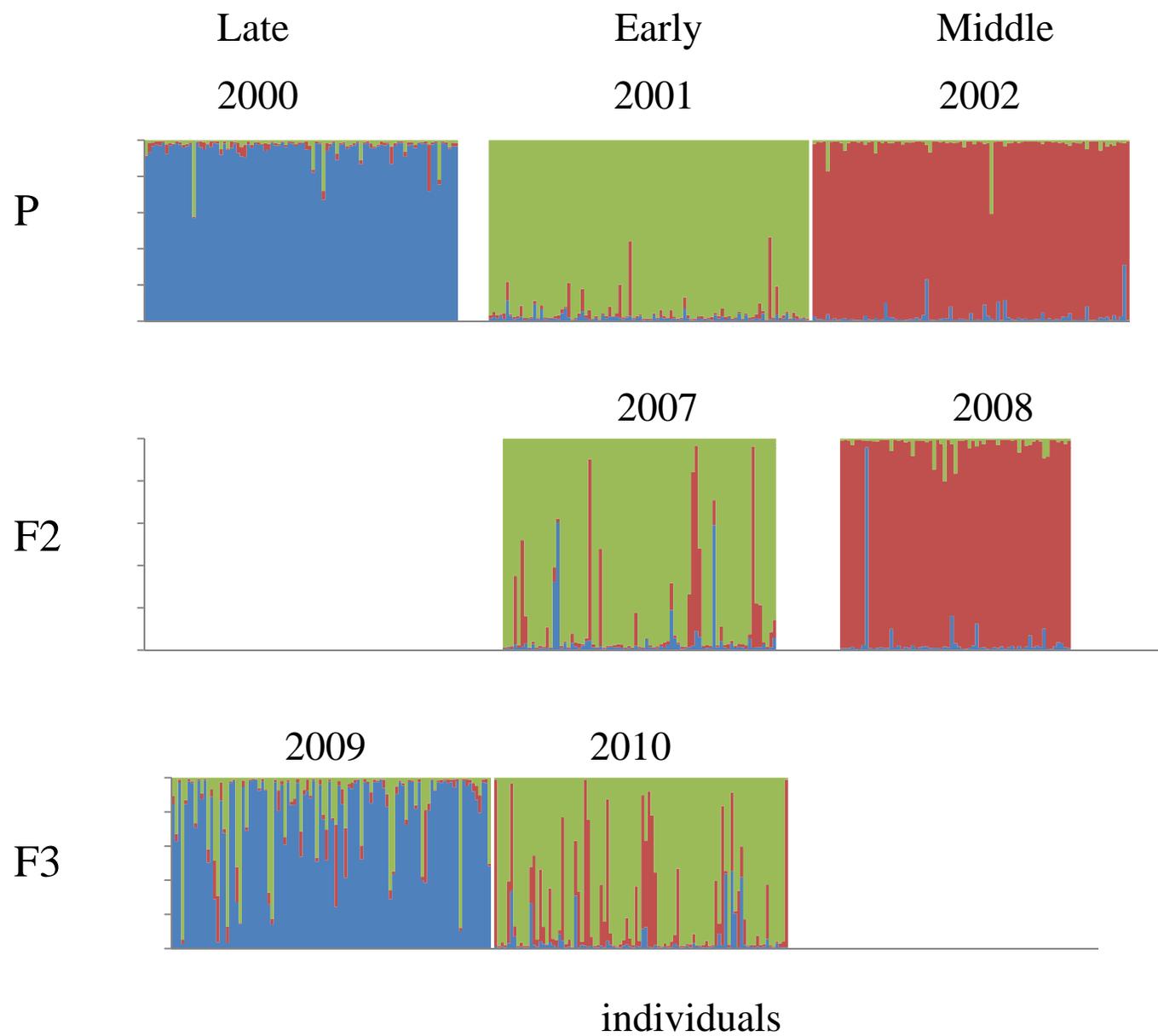


Genetic diversity in coho salmon from Puget Sound/Strait of Georgia ESU

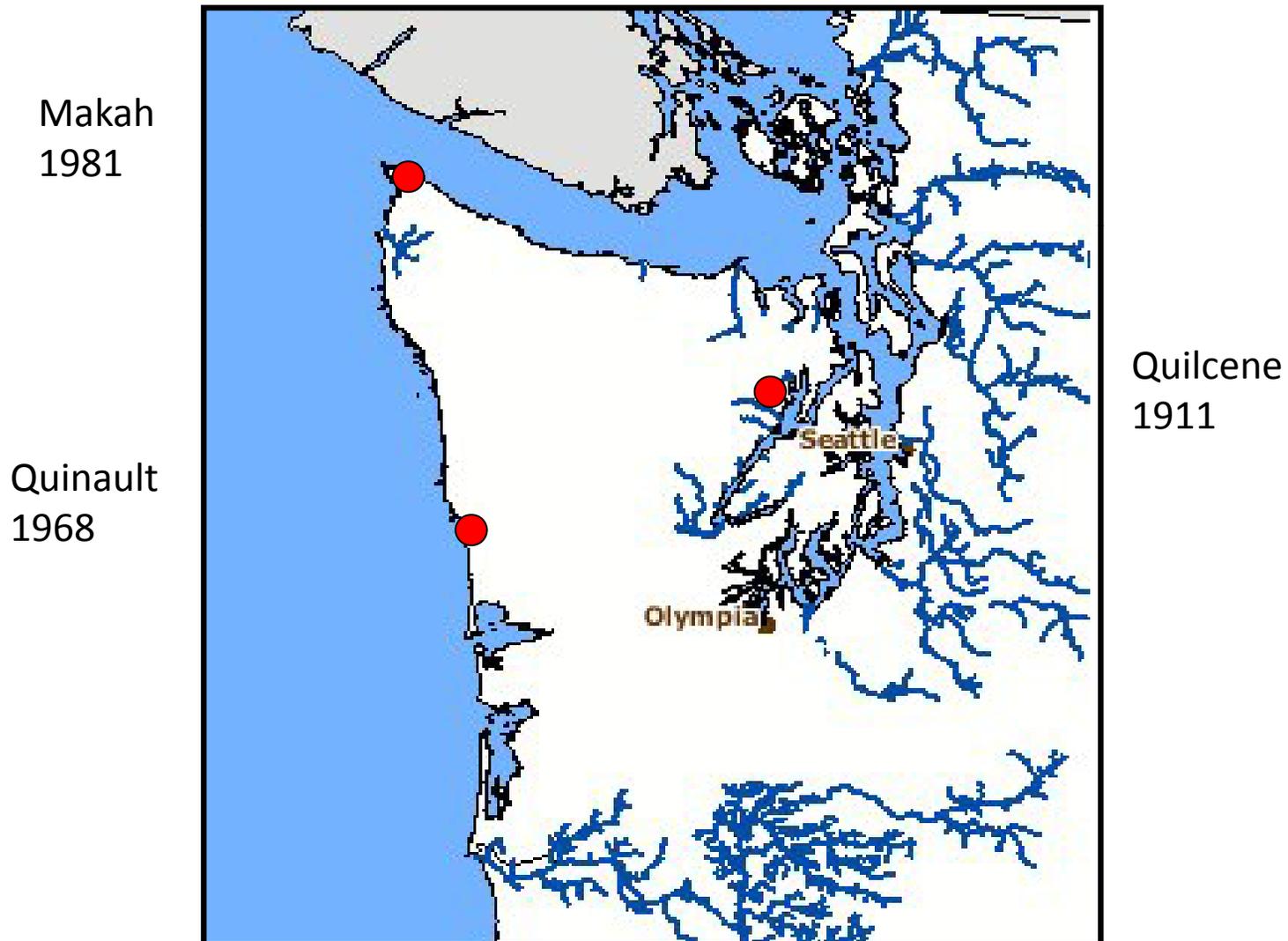


Genetic diversity in Quilcene NFH coho salmon

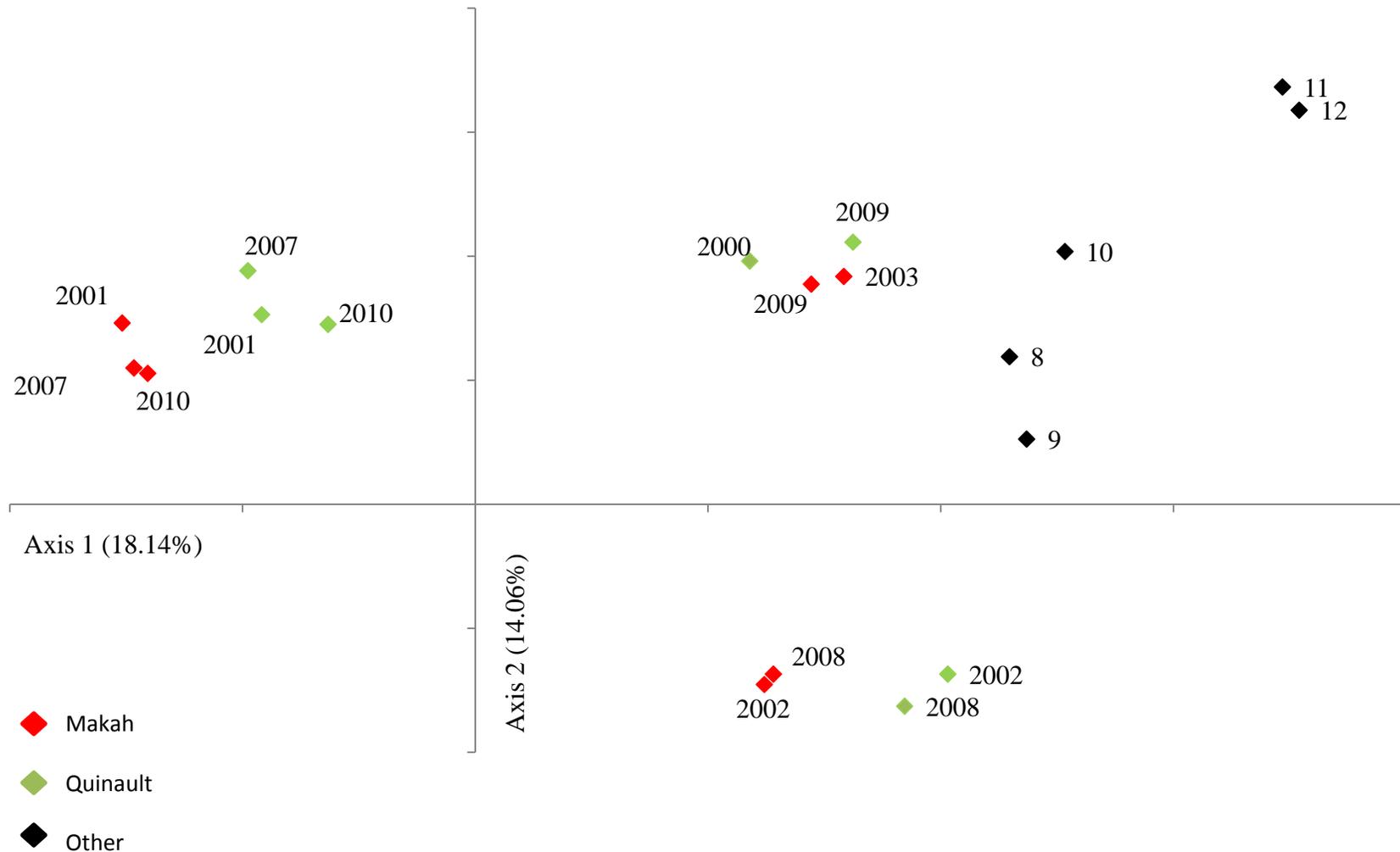




USFWS hatcheries on the Olympic Peninsula



Temporal structure > geographic structure for Quinault and Makah NFH



Summary

- Hatchery populations which excluded jacks exhibit
 - Temporal structure based on divergence among broodlines
 - Loss of genetic variation (lower N_e /increased genetic drift)
- Loss of variation is likely due to many interacting factors, but increased temporal structure is probably mostly due to exclusion of jacks.
- Precocious males provide a mechanism through which coho salmon populations can increase their standing genetic variation, and insure against the loss of genetic resources due to catastrophic habitat loss.

Acknowledgements

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Disclaimer

The findings and conclusions presented here are those of the author and do not necessarily represent the views of the United States Fish and Wildlife Service.