

Population genetic structure of Alaskan Pacific ocean perch (*Sebastes alutus*)



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Implications

- Improved description POP life history
- POP as a model for other species of rockfish

POP life history ?

- **Fertilization in deep water in the winter**
 - Where does this take place?
 - When?
- **Larvae released in April-May**
 - Where?
 - Geographic location
 - Location in the water column
- **Movement of larvae and adults?**

Methods

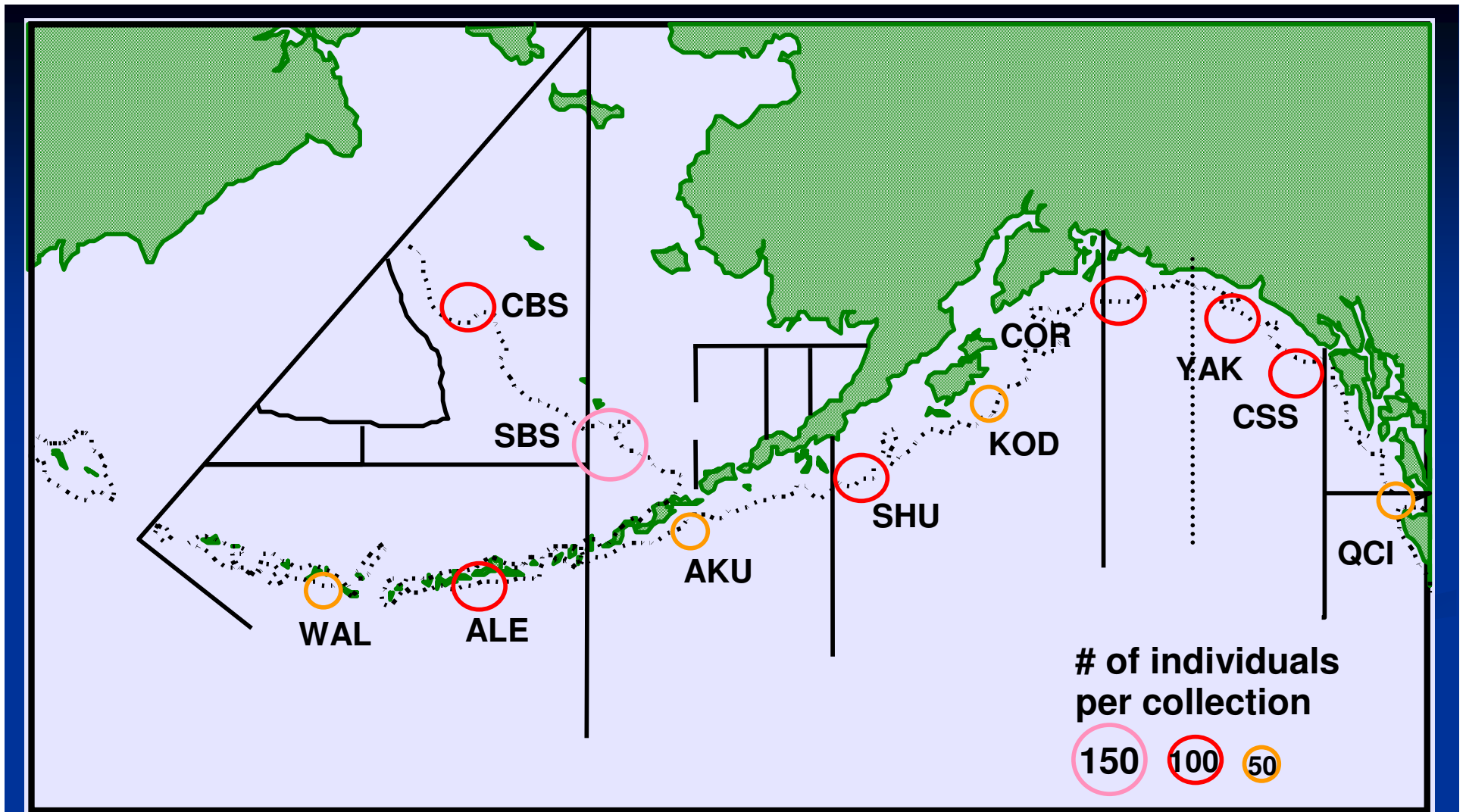
- Collect samples from Alaskan waters
- Quantify microsatellite variation within and among POP collections
- Use allele frequency distributions to characterize genetic structure



Photo taken by Nancy Roberson



Photo taken by Nancy Roberson



QCI - Queen Charlotte Islands

CSS – Cross Sound

YAK – Yakutat

COR – Cordova

KOD- Kodiak

SHU - Shumagins

AKU - Akutan

ALE – Aleutians

WAL – Western Aleutians

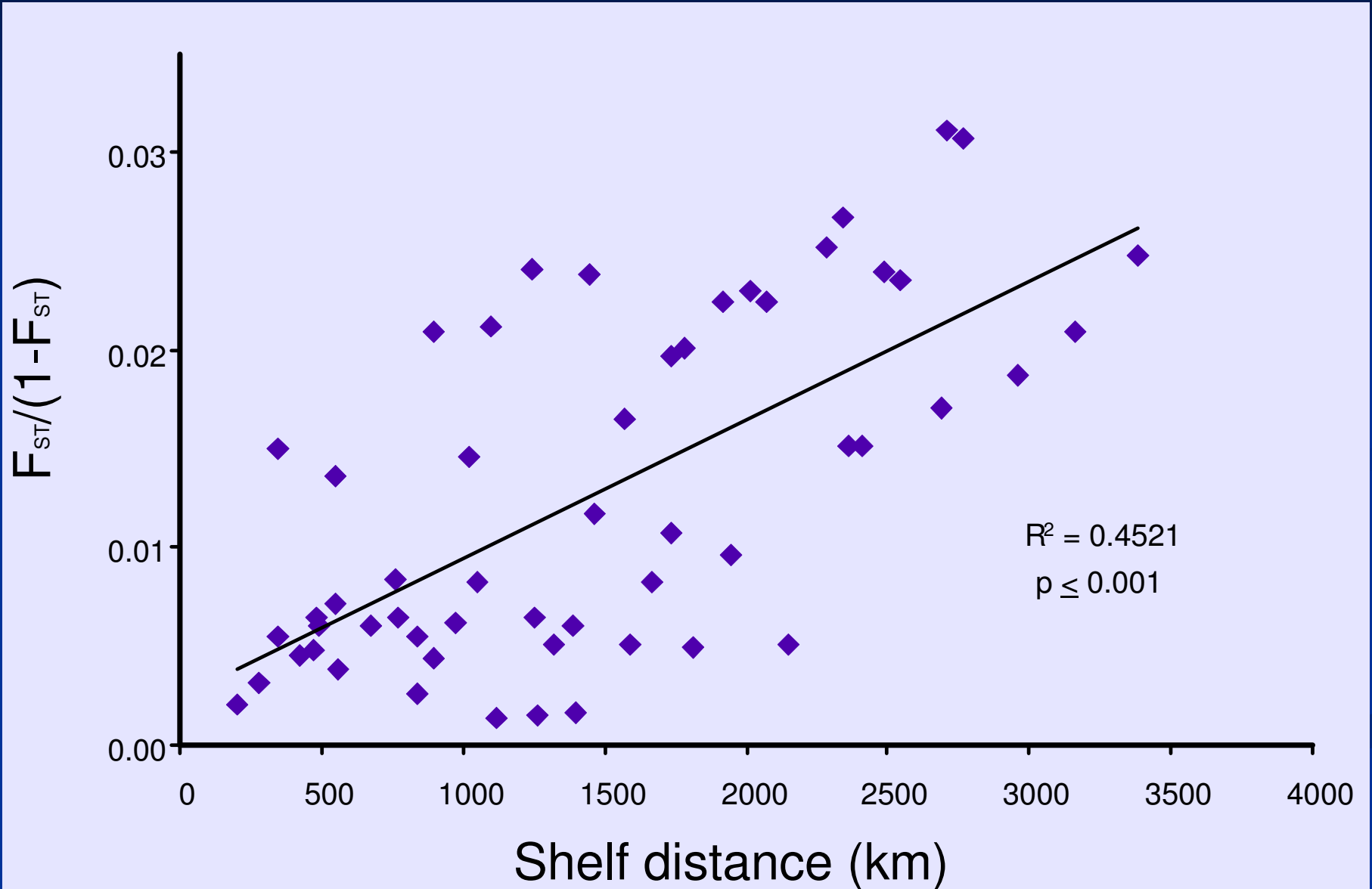
SBS – Southern Bering Sea

CBS – Central Bering Sea

Results

- Significant divergence between all collections, $F_{ST}=0.0123$ ($p < 10^{-5}$ for all loci)
- All pairwise tests of homogeneity were significant
- No evidence of genetic bottleneck
- Correlation between genetic divergence and geographic distance

Correlation of geographic and genetic distances



Results

- ✓ Significant divergence between all collections, $F_{ST}=0.0123$ ($p < 10^{-5}$ for all loci)
- ✓ No evidence of genetic bottleneck
- ✓ Correlation between genetic distance and geographic distance
- Break in geneflow in the central GOA

Program

Estimation of the # of clusters

BAPS

2

Cluster 1: {QCI,CSS,YAK}

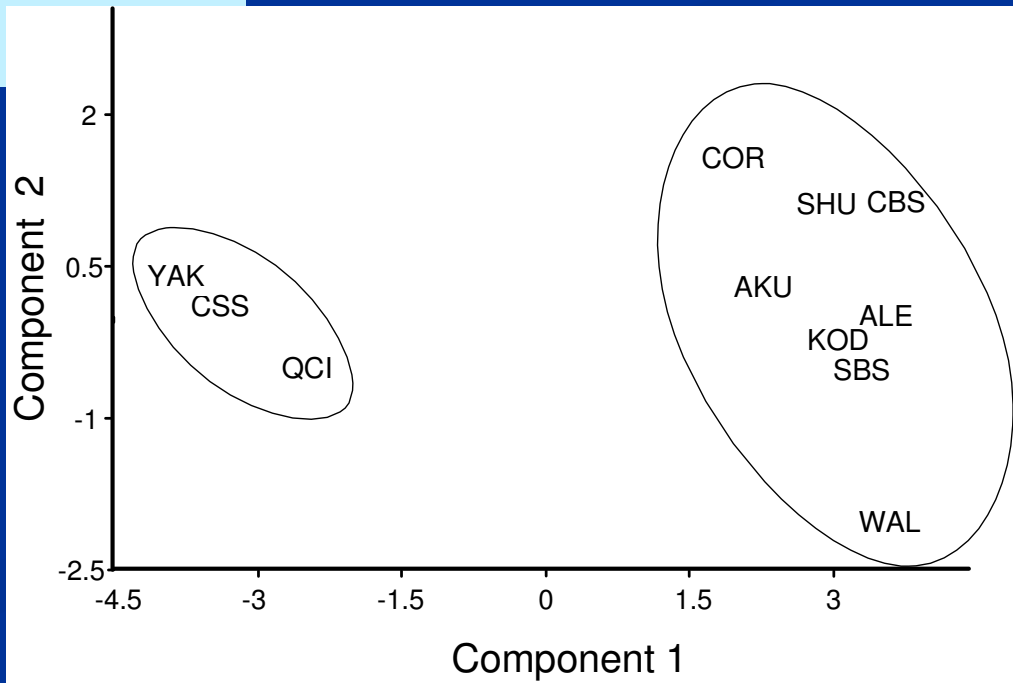
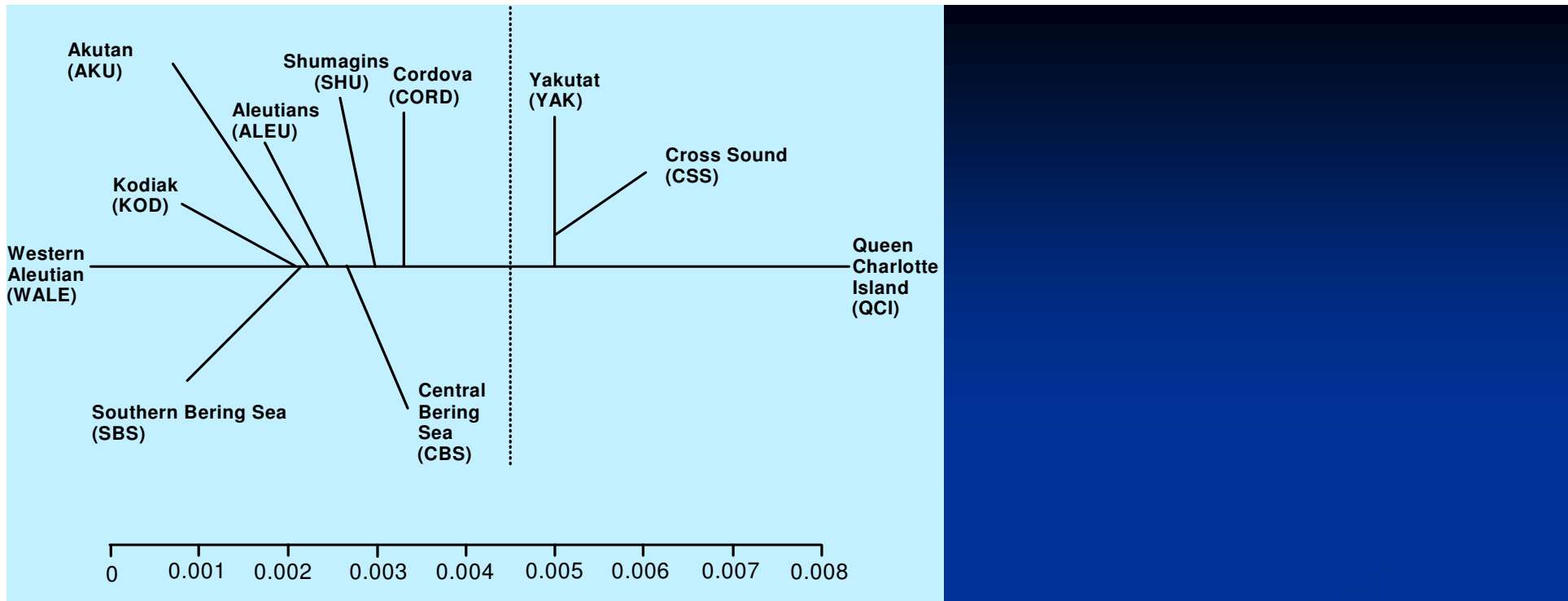
Cluster 2: {All others}

Structure

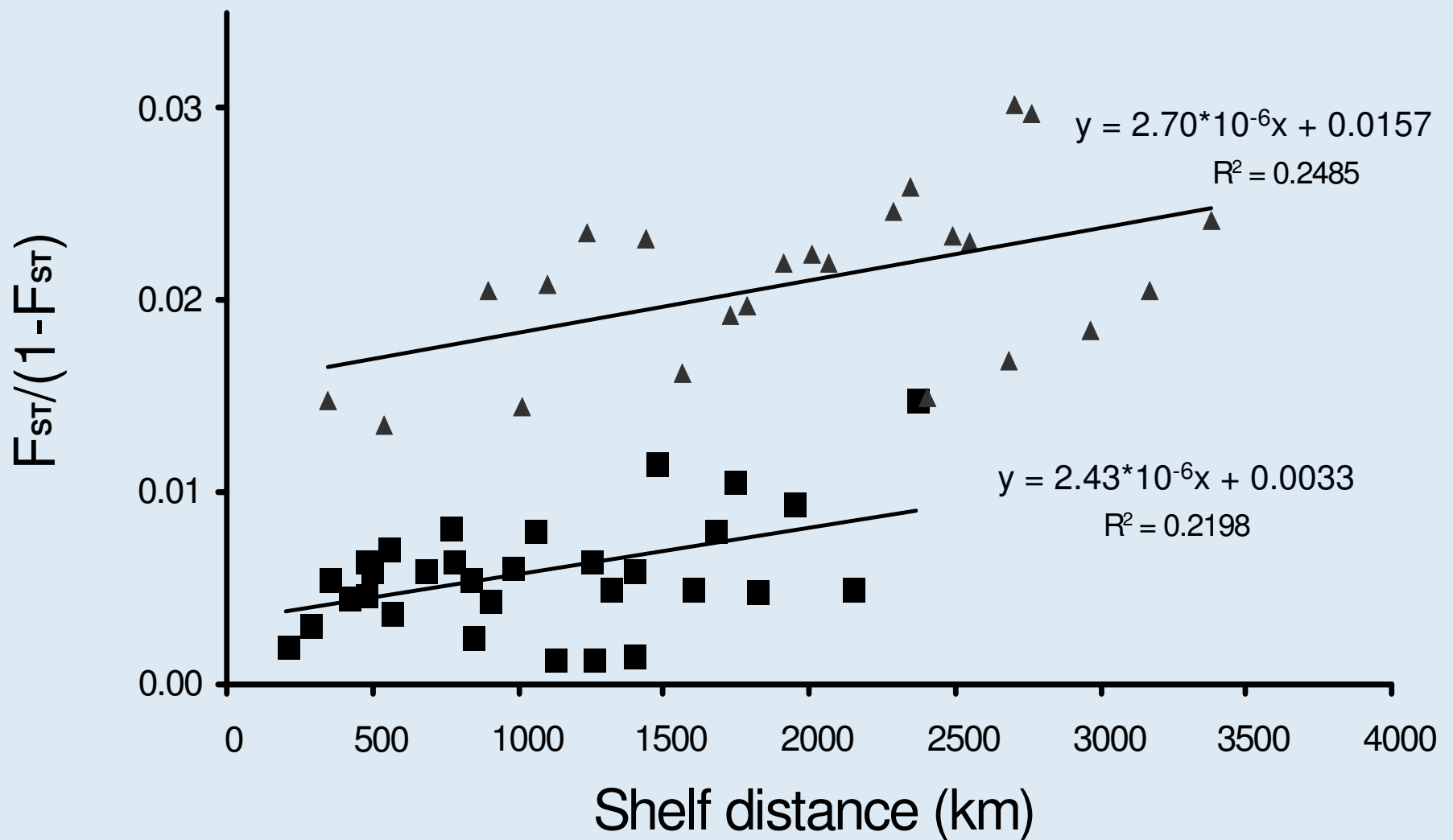
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HWLER

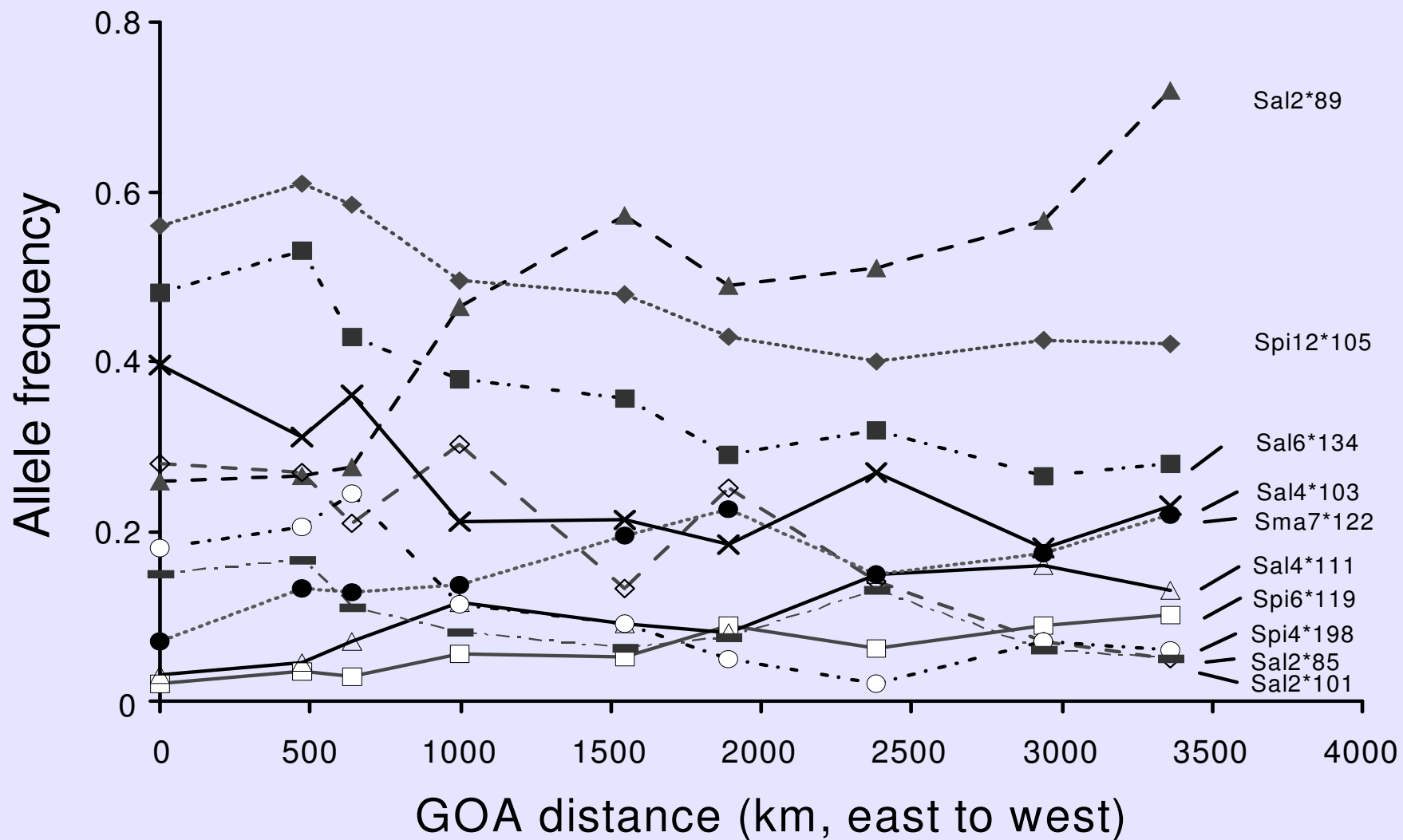
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Within and Between Groups



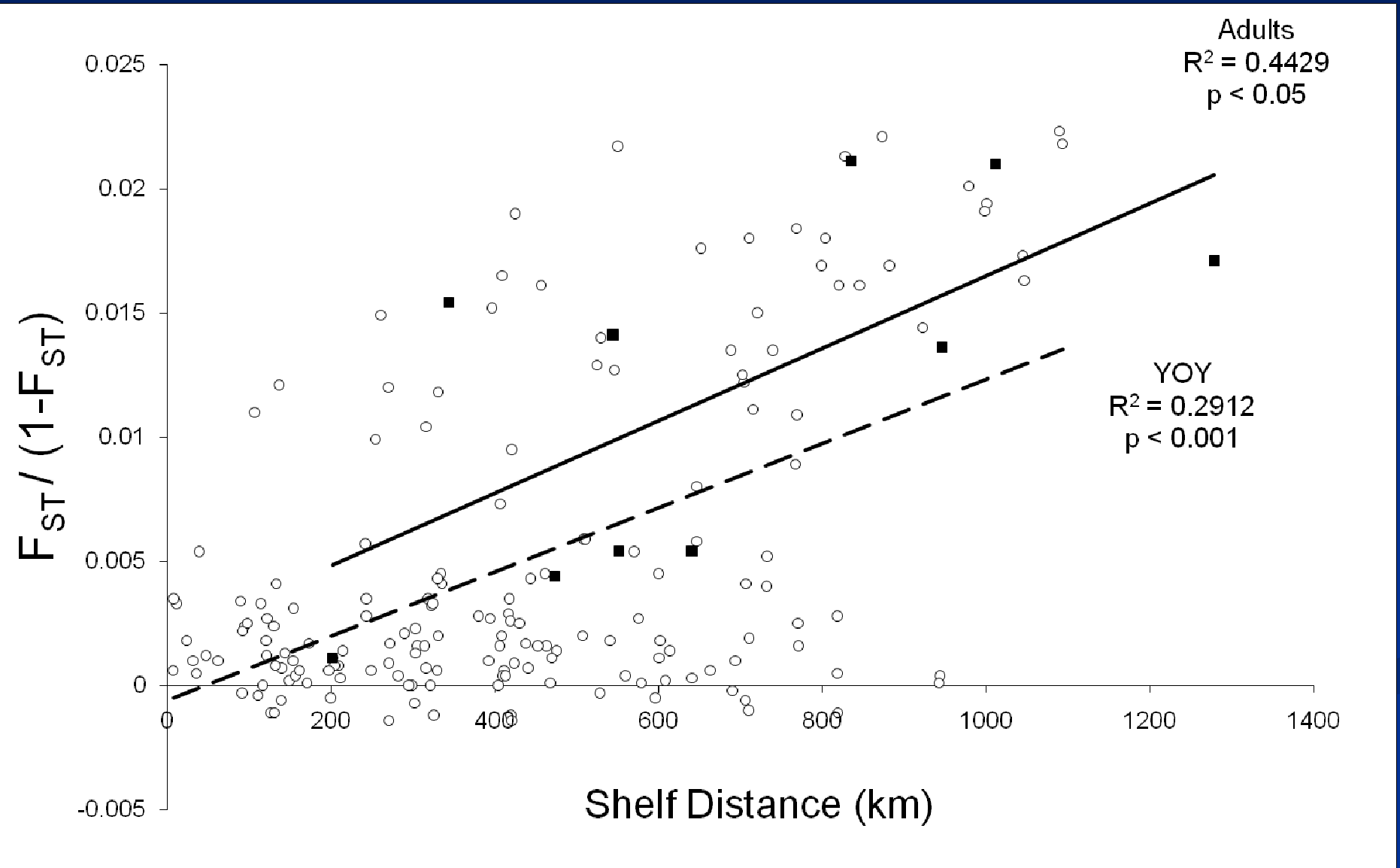
Allele frequency clines



Sweepstakes Effect?

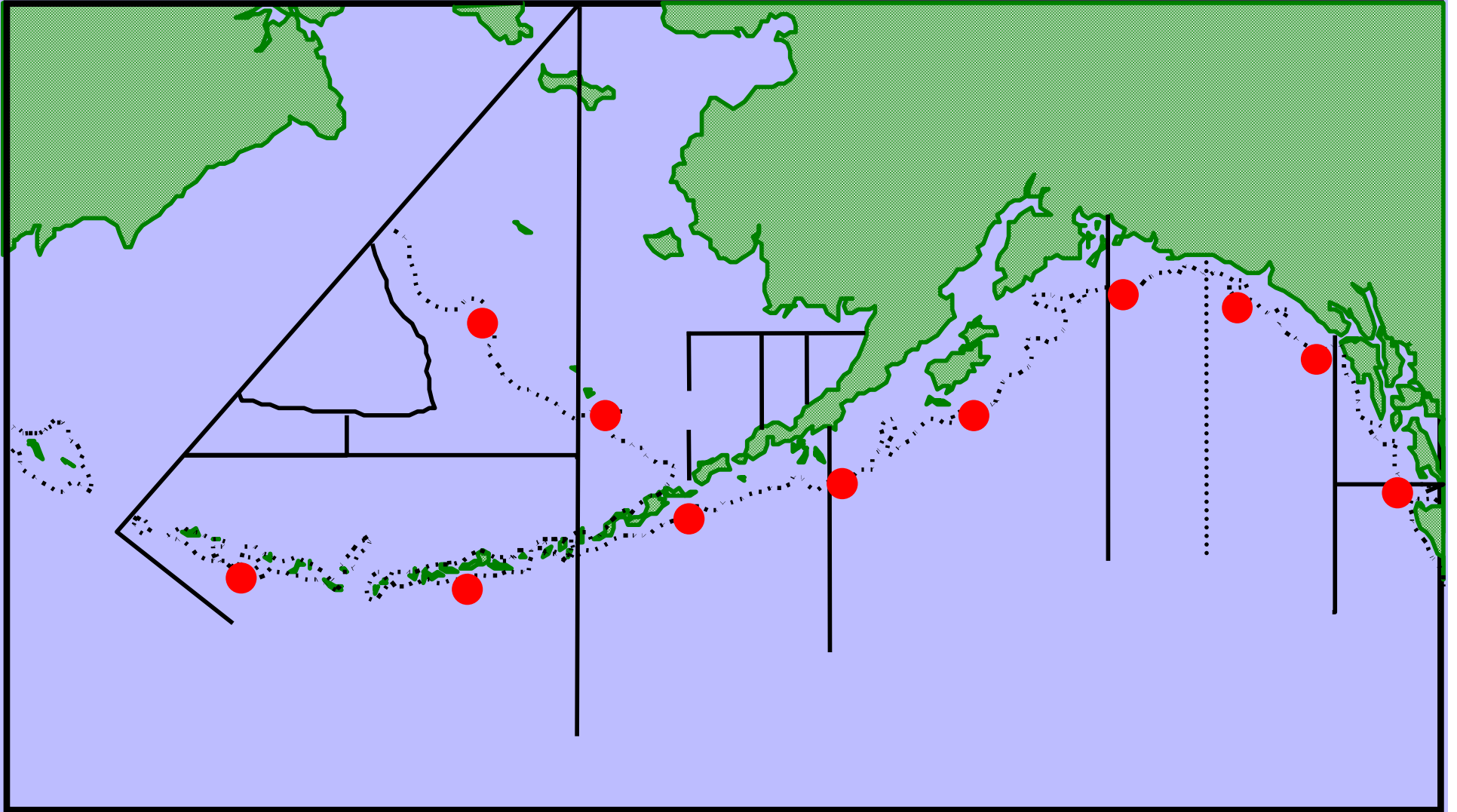
- Strong IBD signal in adults
- YOY preliminary results (L.Kamin)
 - Generally similar along a transect within and between years
 - Divergence among transects at different locations
 - YOY generally similar to nearby adult POP

IBD YOY and Adults



Conclusions

- Genetic divergence exists in Alaskan POP
- Probably limited movement
 - All life stages
 - Larvae
 - Adults
- Management scale > population structure



What's next?

- **Estimate local effective neighborhood size and dispersal distance**
- **Combine population genetics and population dynamics by developing models that consider the scale of population sub-division and the spatial scale of harvest**
- **Study of fine scale structure**
 - **NPRB proposal to intensively sample areas between Kodiak and Yakutat on a smaller scale**
 - **Summer 2007 – collected 2,500 individuals to start this study**

Acknowledgments

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- The individuals that collected the genetic samples



Photo taken by Nancy Roberson

Questions?

