

Pink Salmon in the North American Arctic

IYS Synthesis Symposium, Day 1, October 4th

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Pink Salmon and Arctic Expansions

- Pink salmon native range is throughout the North Pacific
- 2-year life history leading to distinct genetic lineages
- Expansion into Arctic ecosystems

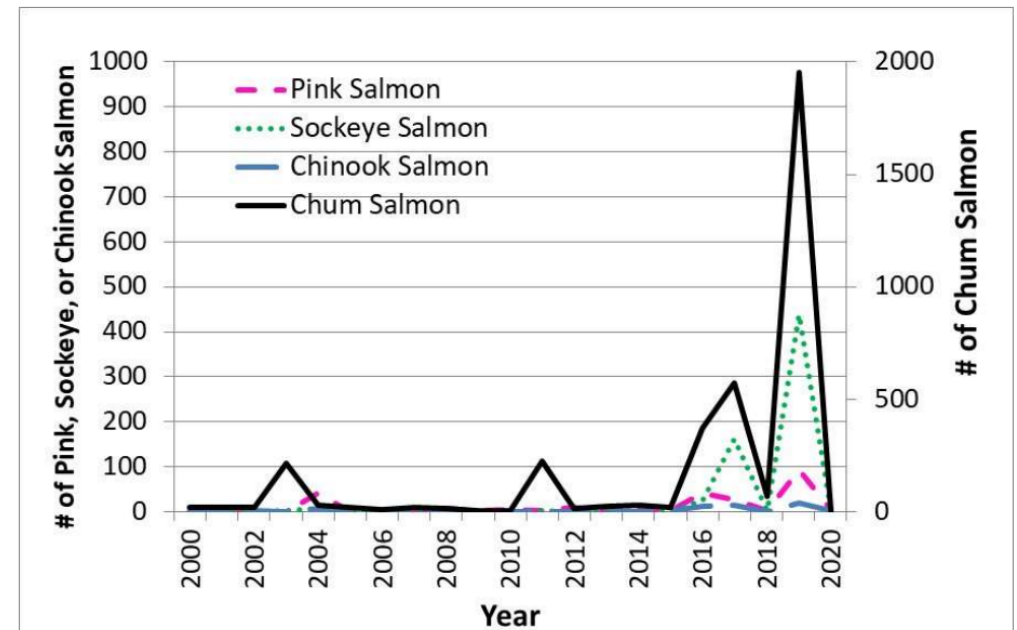


Fig 1. The number of each species of Pacific salmon reported to the Arctic Salmon community-based monitoring program from harvesters across the Canadian Arctic from 2000–2020. Only two coho salmon were reported during this period (in 2011 and 2019), thus they are not included.

North American Arctic Expansions: Where are they from?



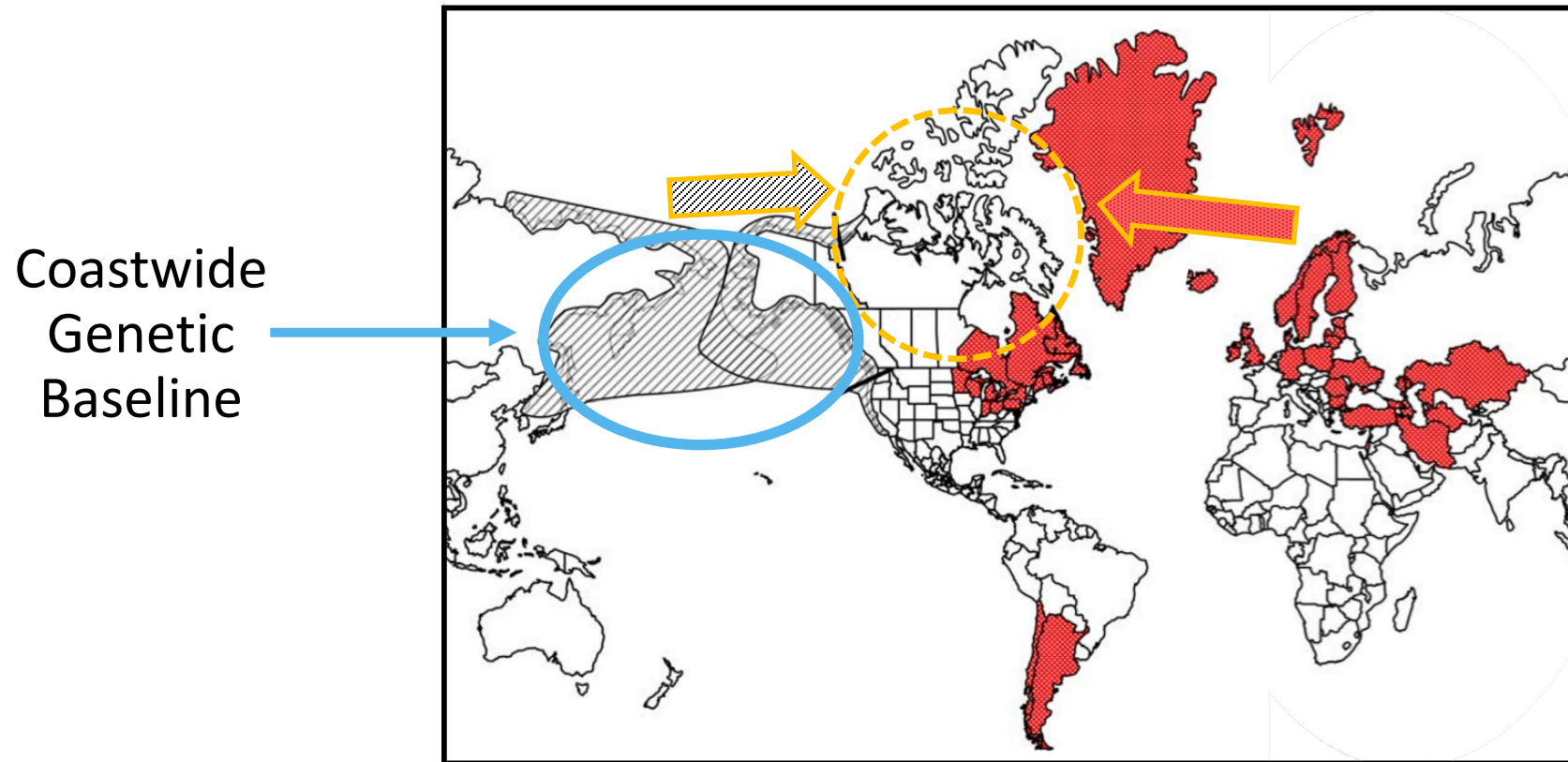
North American Arctic Expansions: Where are they from?

Expansions
from the
Pacific native
range?



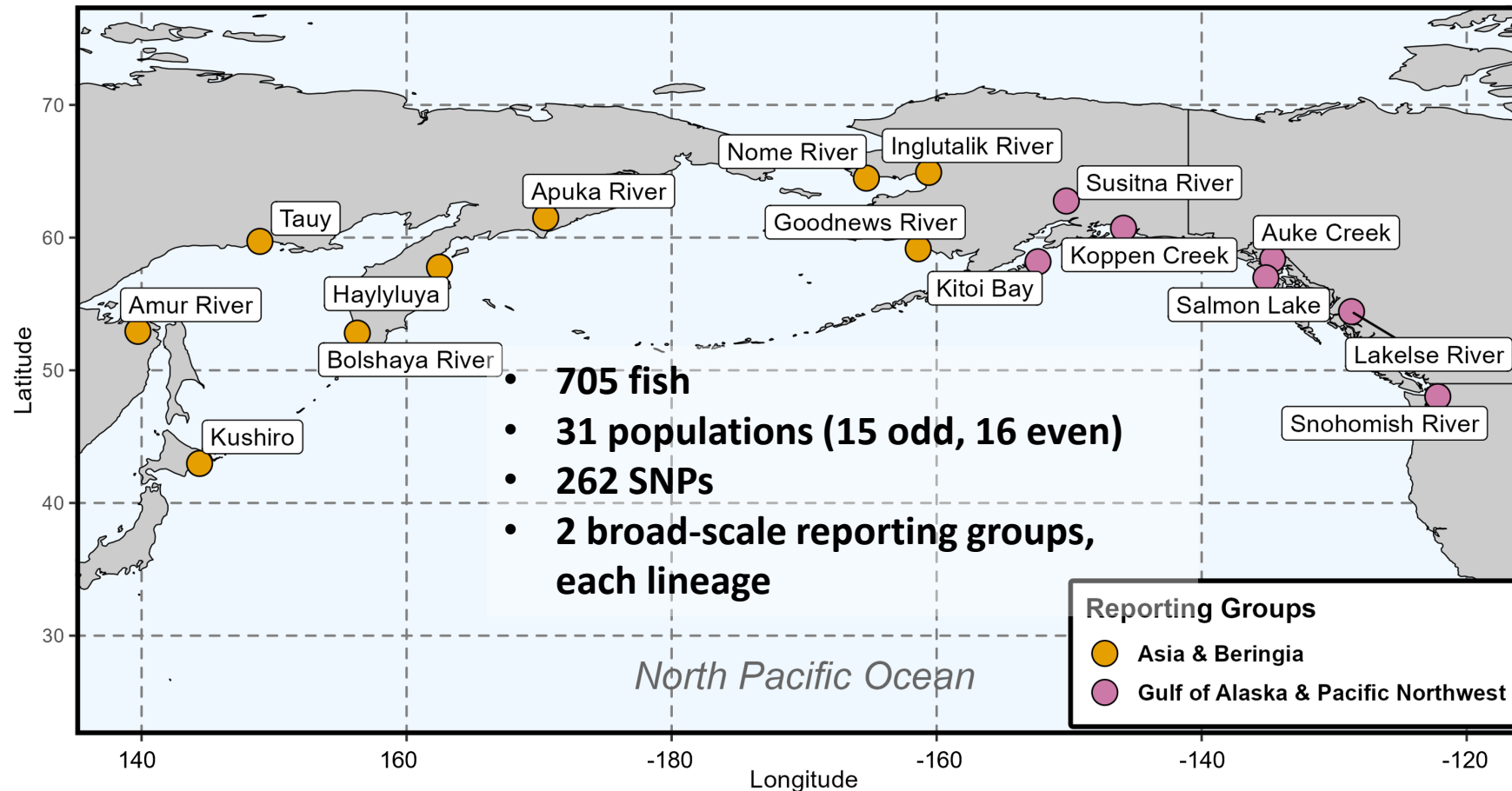
Expansions from
introduced
populations in
the Atlantic?

North American Arctic Expansions: Where are they from?

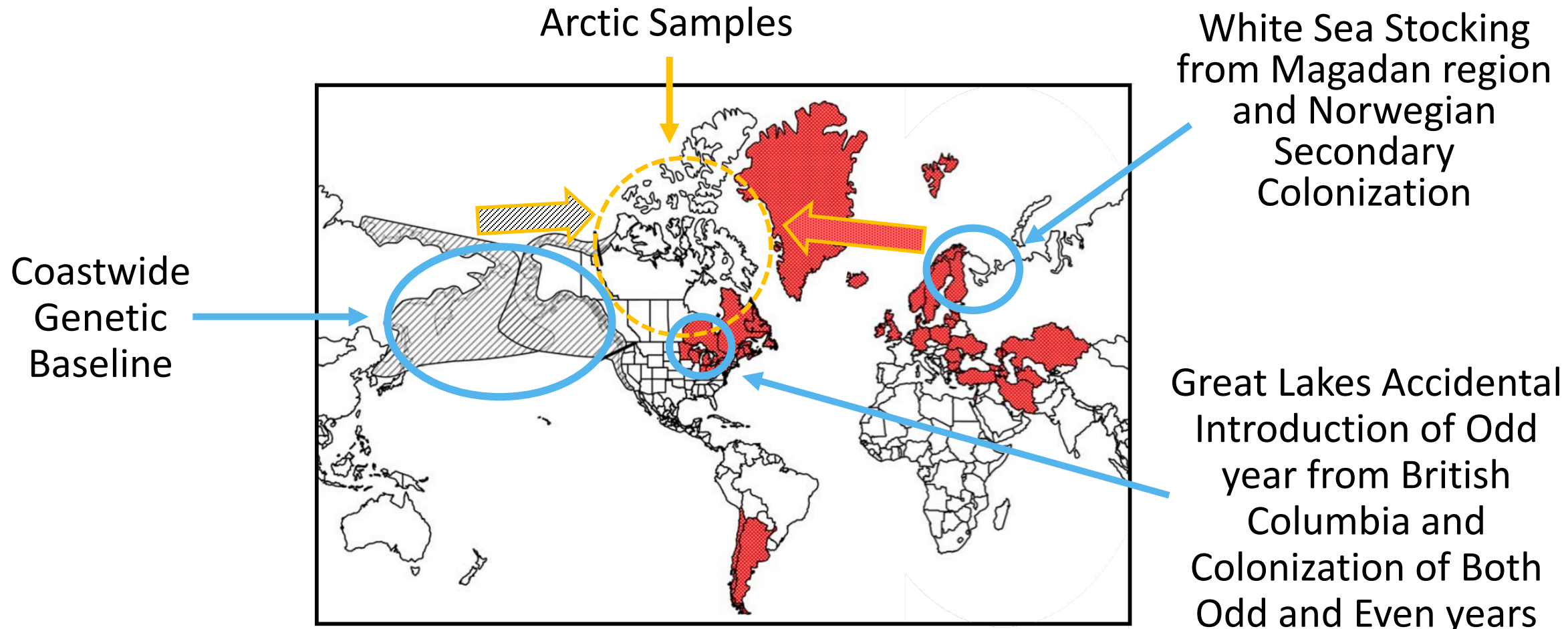


North Pacific Coastwide Genetic Baseline

Baseline of 16 locations (x2 lineages) from the North Pacific (native range)



North American Arctic Expansions: Where are they from?



North American Arctic Expansions: Deviation from 2-year life history?

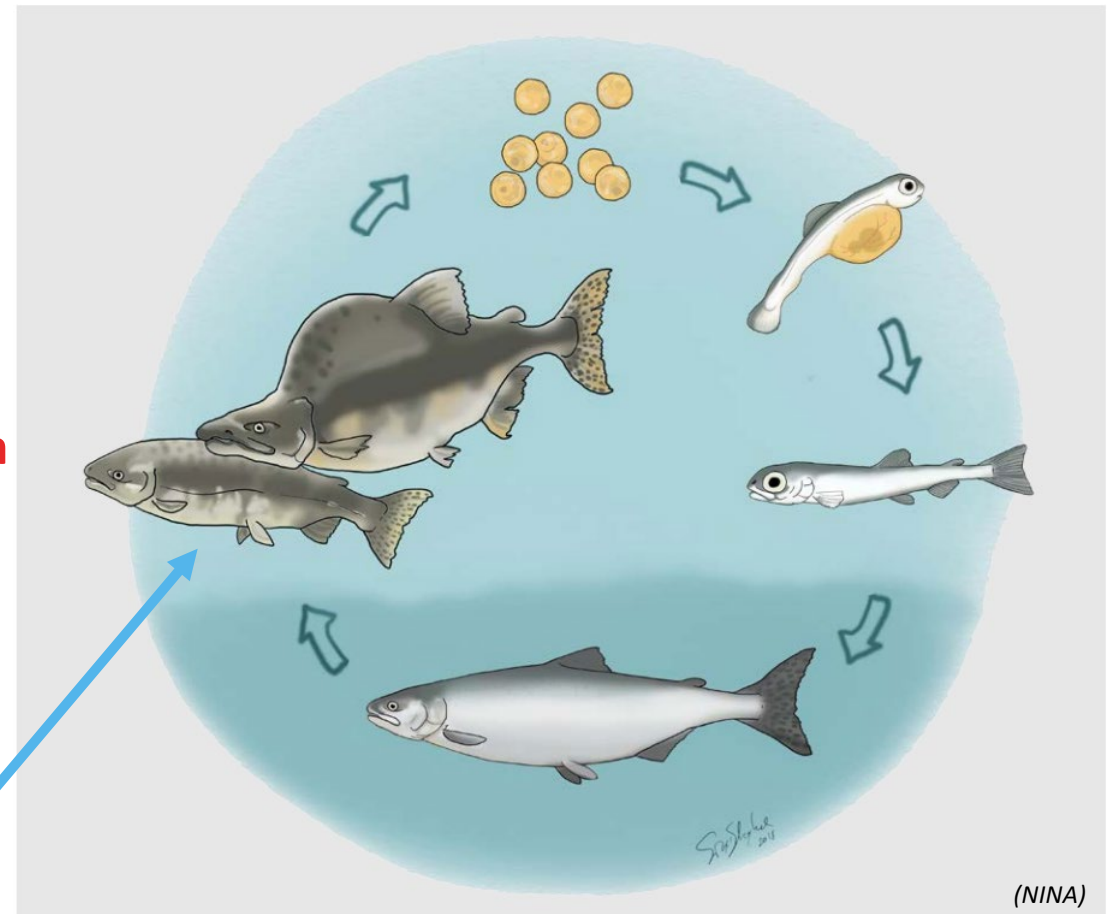
Mixing of
Even and Odd
genetic lineages?

Year 2
Return as adults to spawn

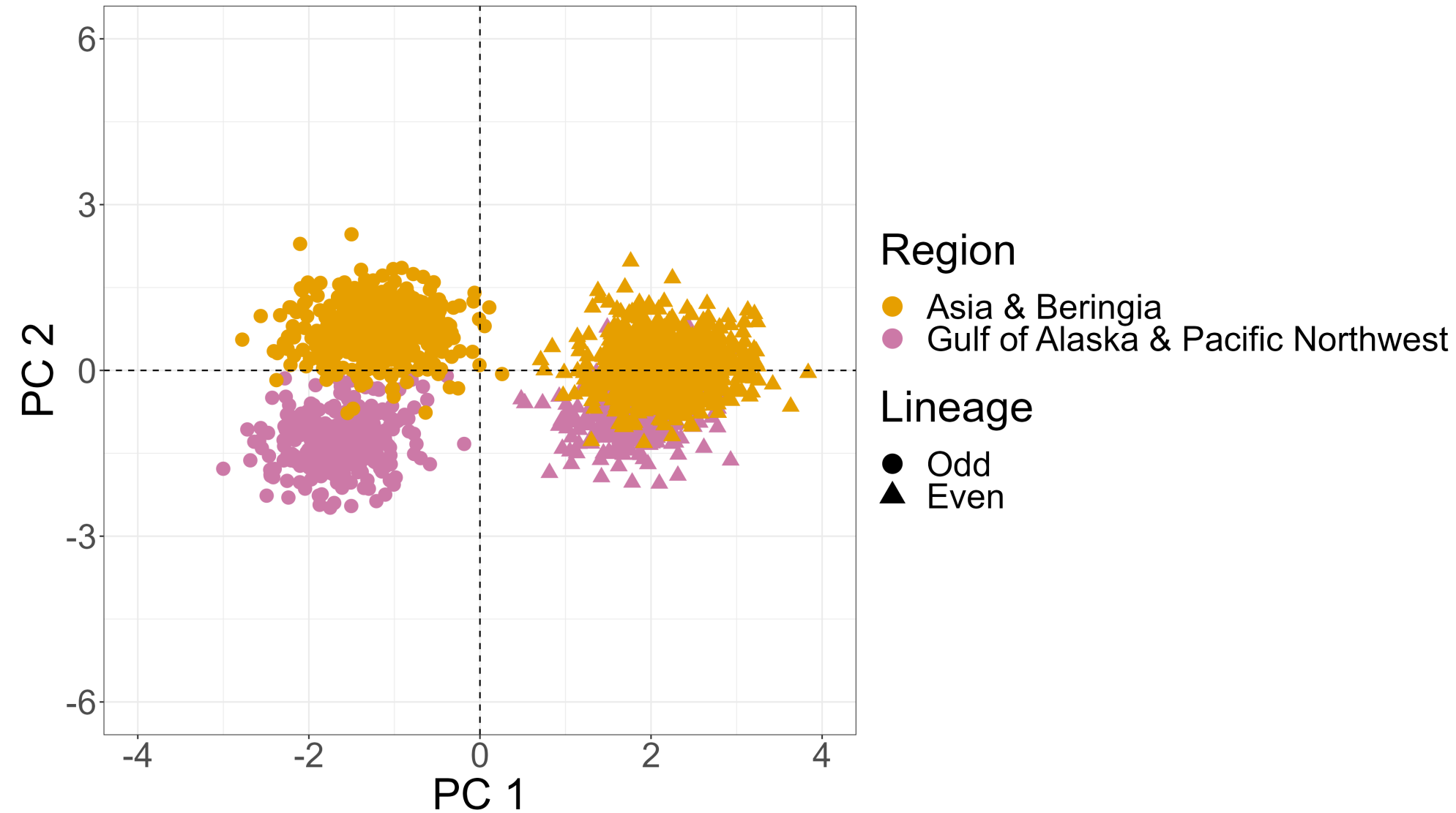
Year 3
Return as adults to spawn

Coastwide Genetic Baseline
with Odd and Even Lineages

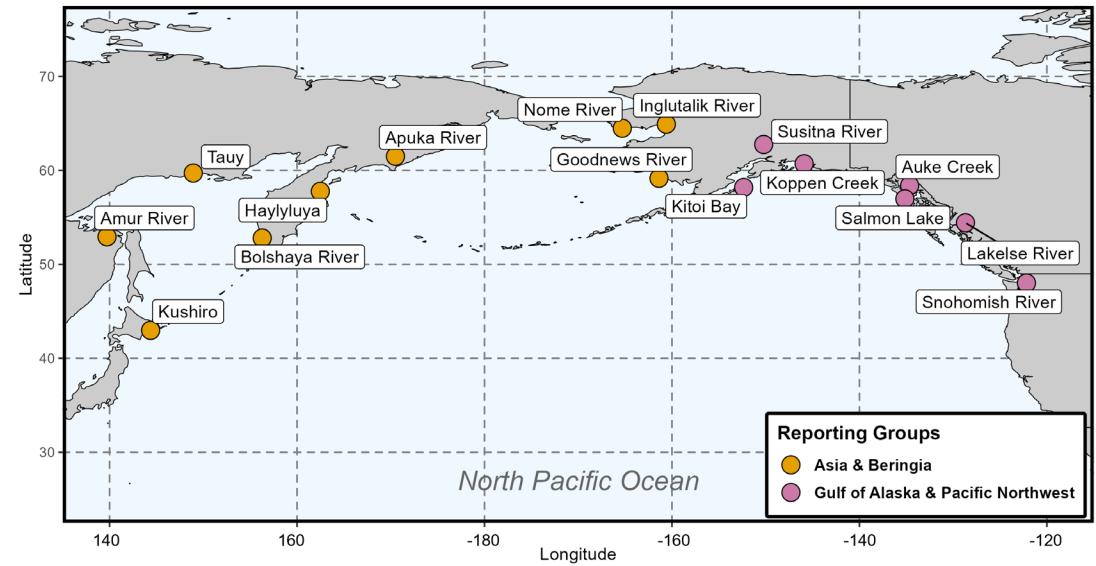
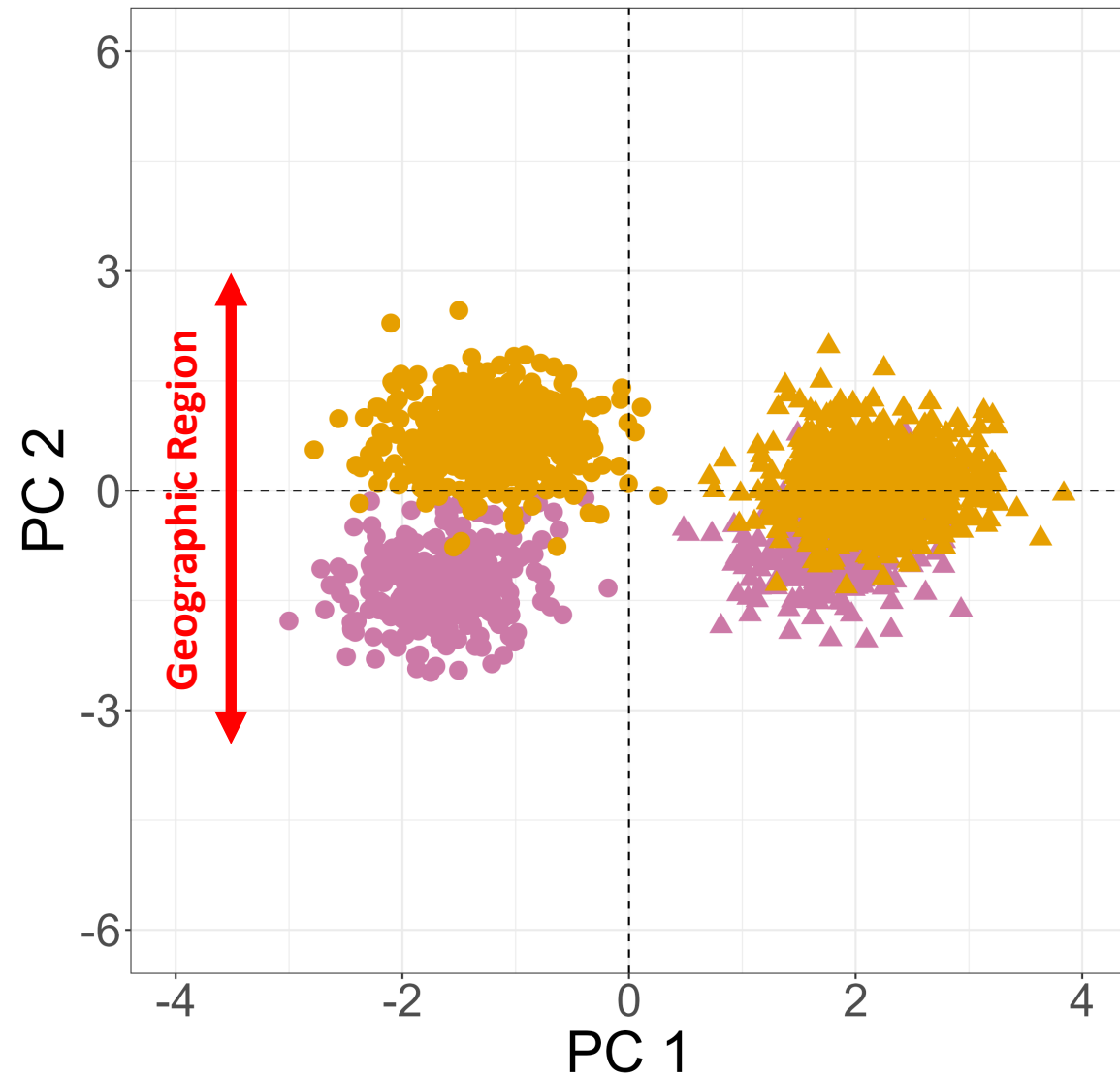
Year 0
Eggs laid and offspring hatch



Baseline Populations



Baseline Populations



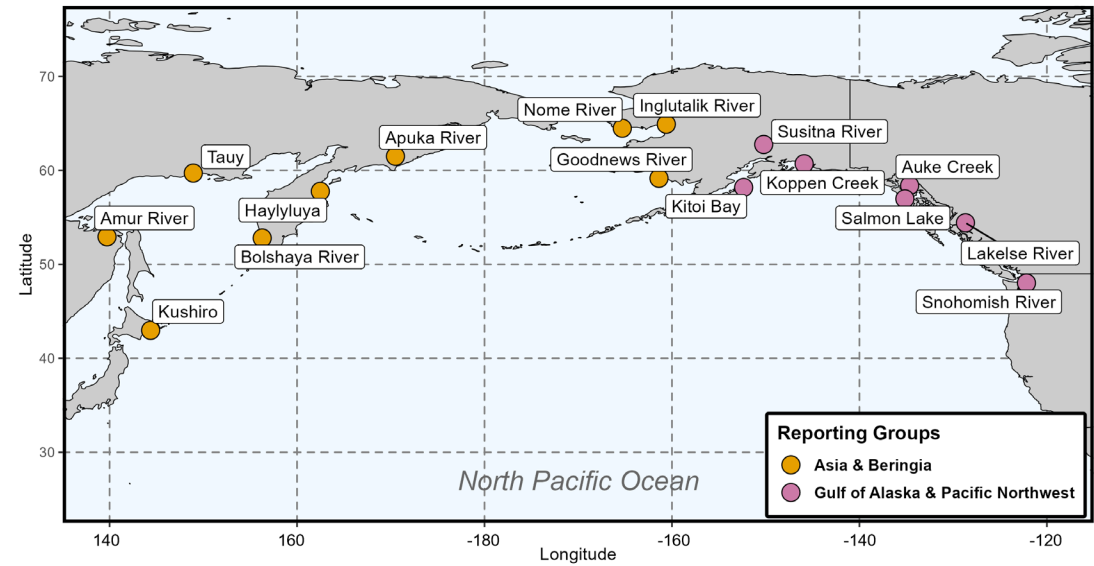
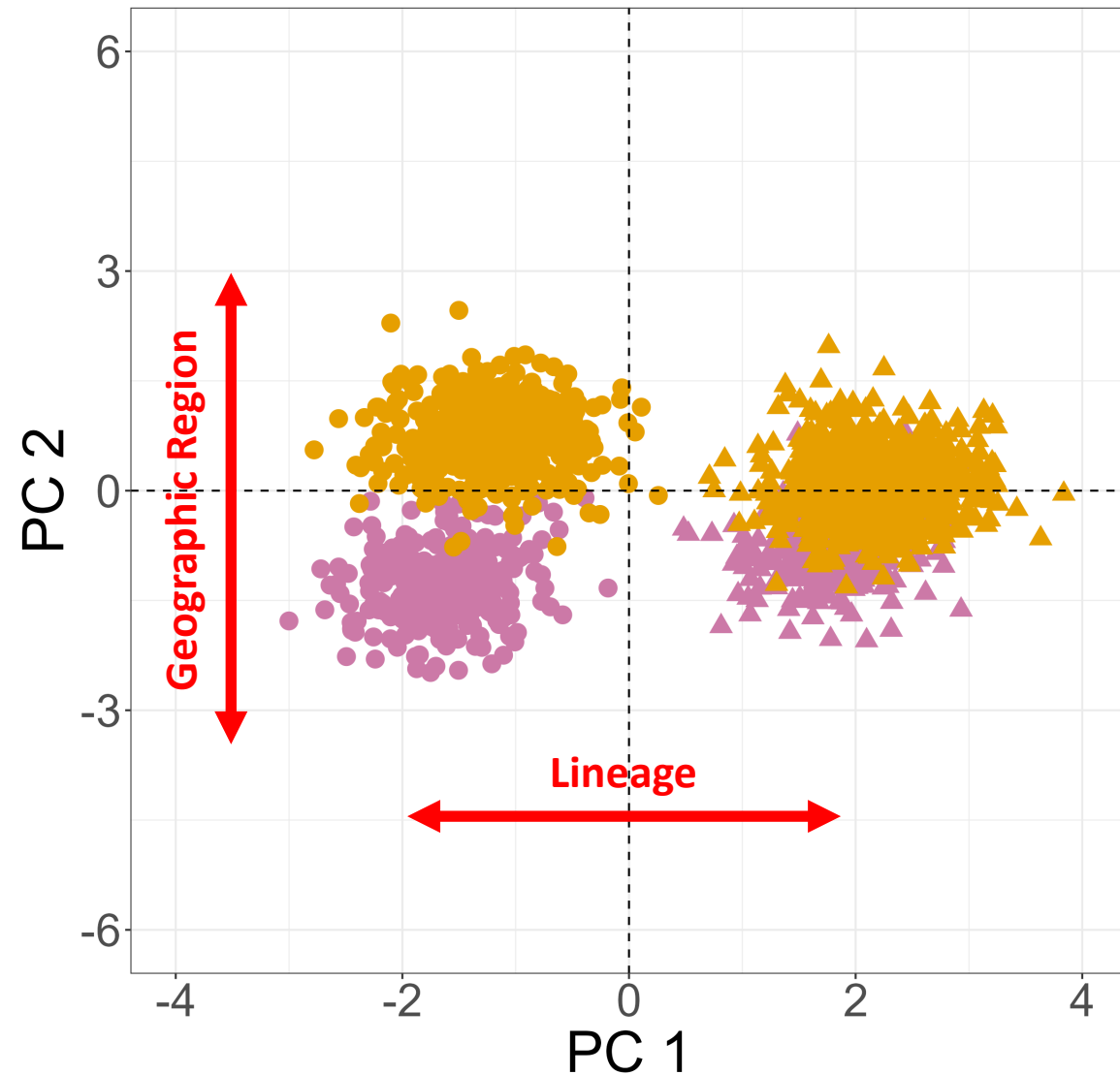
Region

- Asia & Beringia
- Gulf of Alaska & Pacific Northwest

Lineage

- Odd
- ▲ Even

Baseline Populations

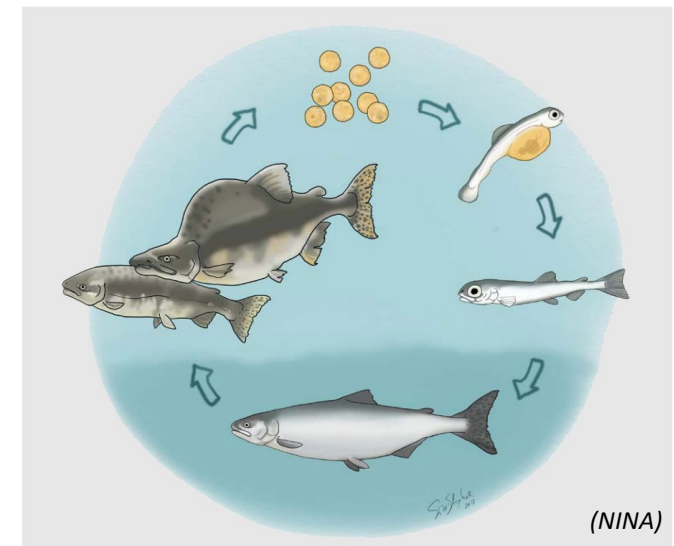


Region

- Asia & Beringia
- Gulf of Alaska & Pacific Northwest

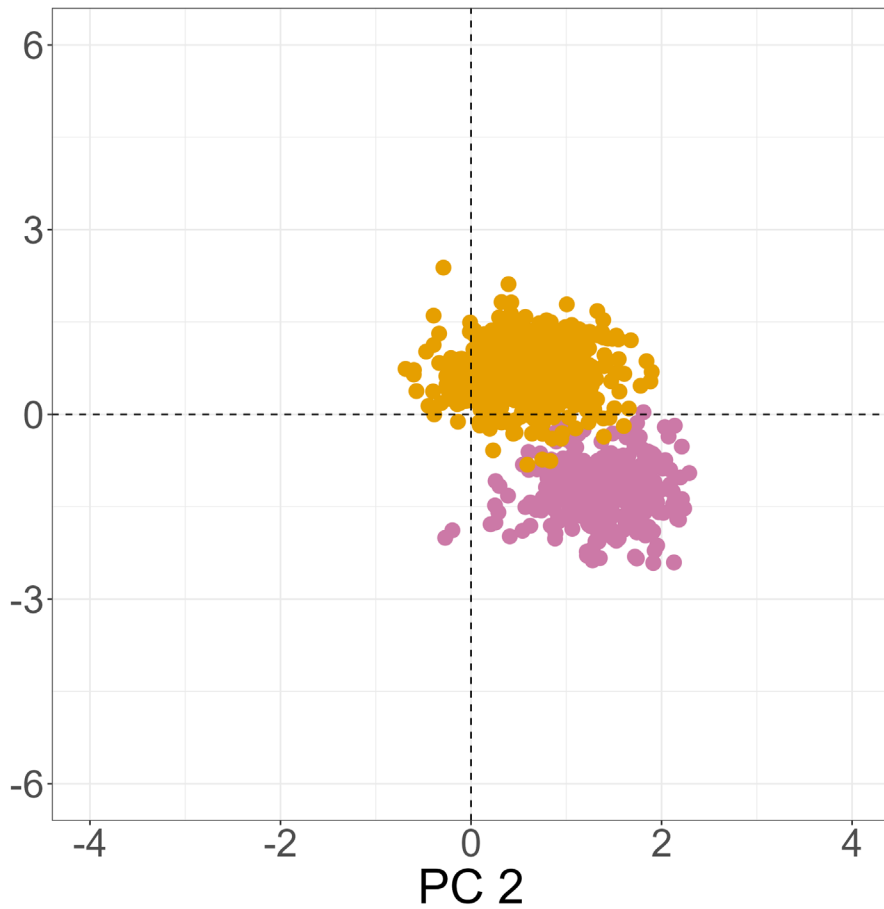
Lineage

- Odd
- ▲ Even

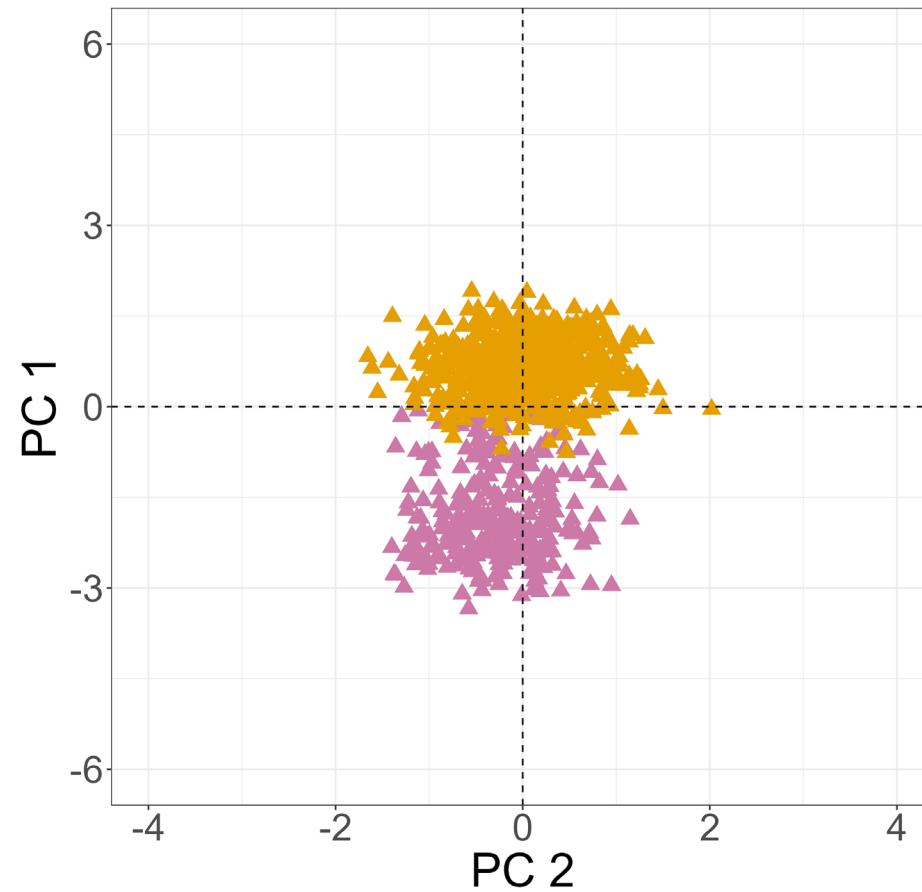


Baseline Populations: Odd and Even

Odd



Even



Region

● Asia & Beringia

● Gulf of Alaska & Pacific Northwest

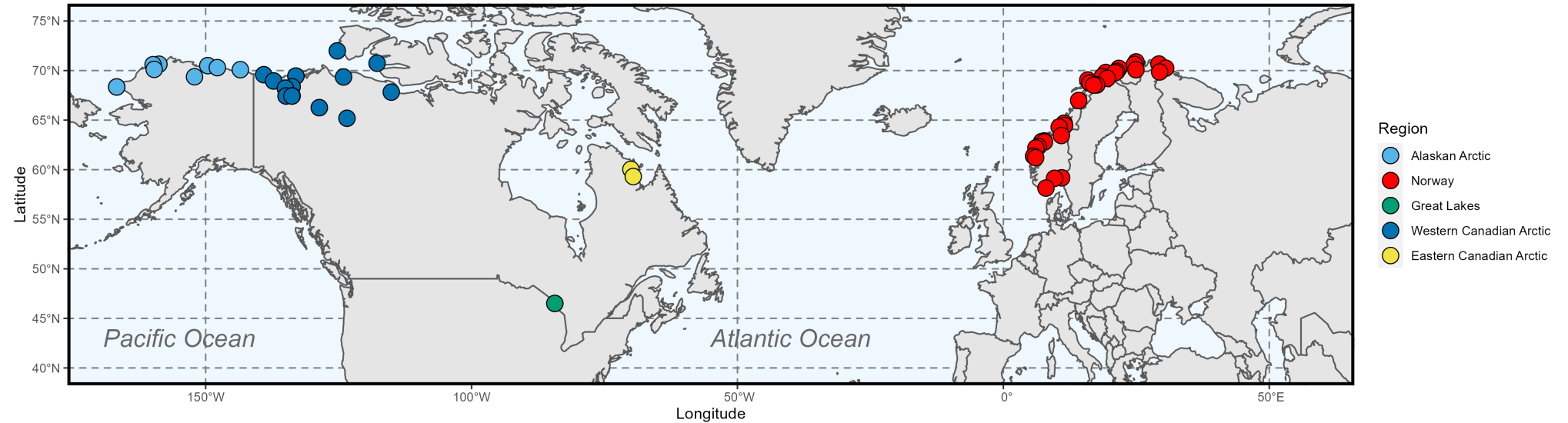
Lineage

● Odd

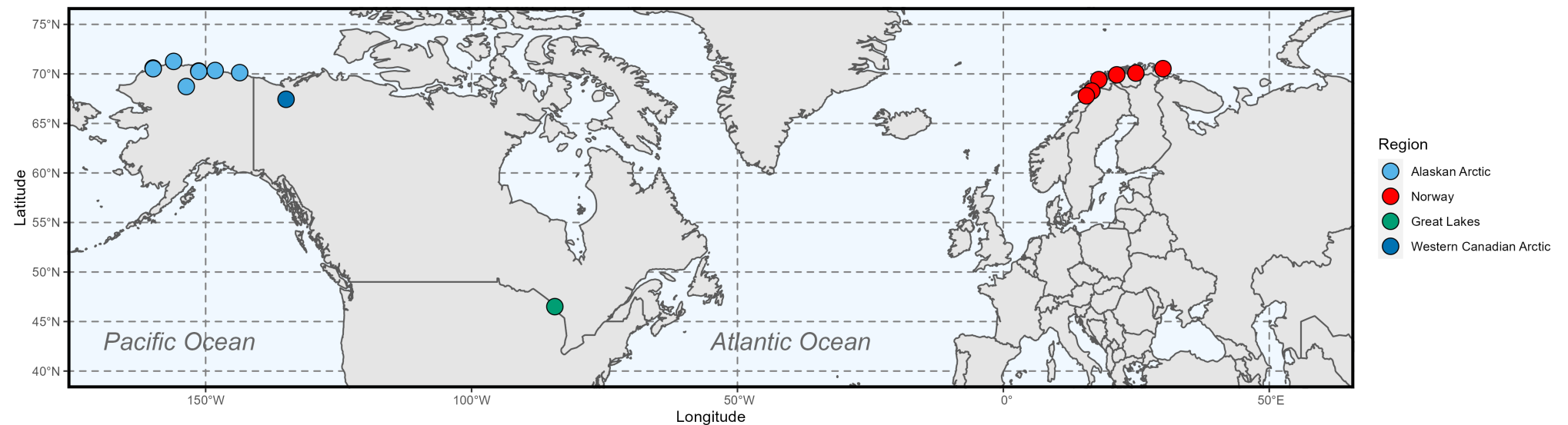
▲ Even

Arctic Samples Genotyped for Analysis

Odd years

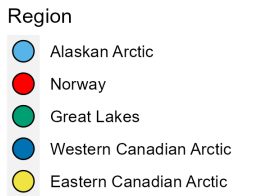
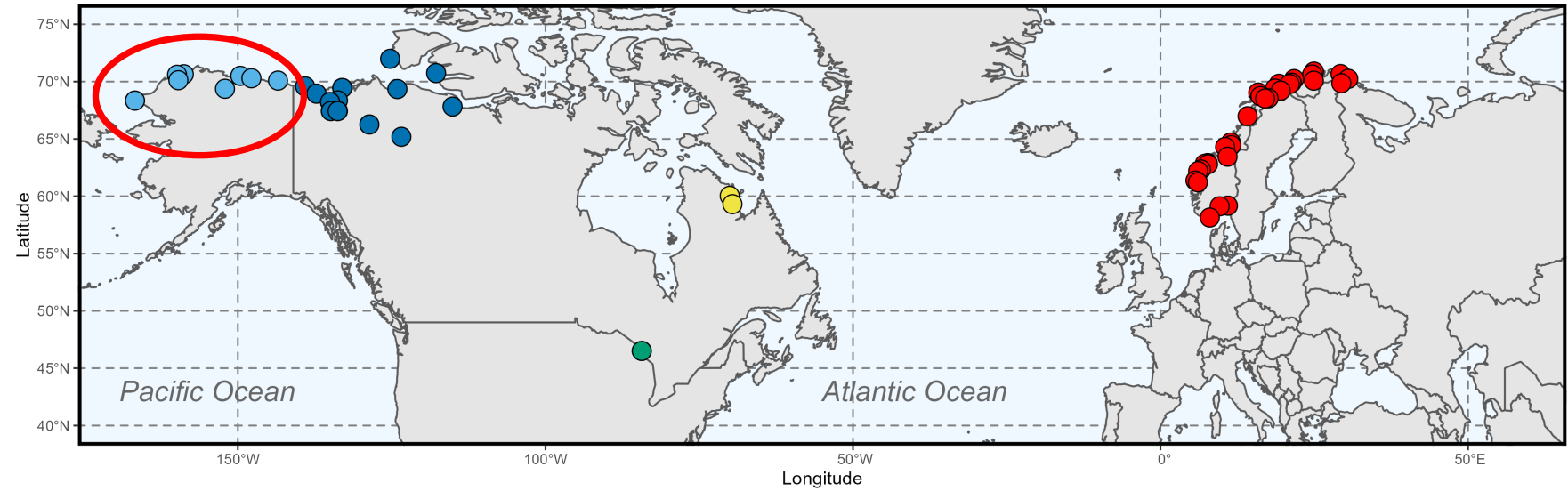


Even years

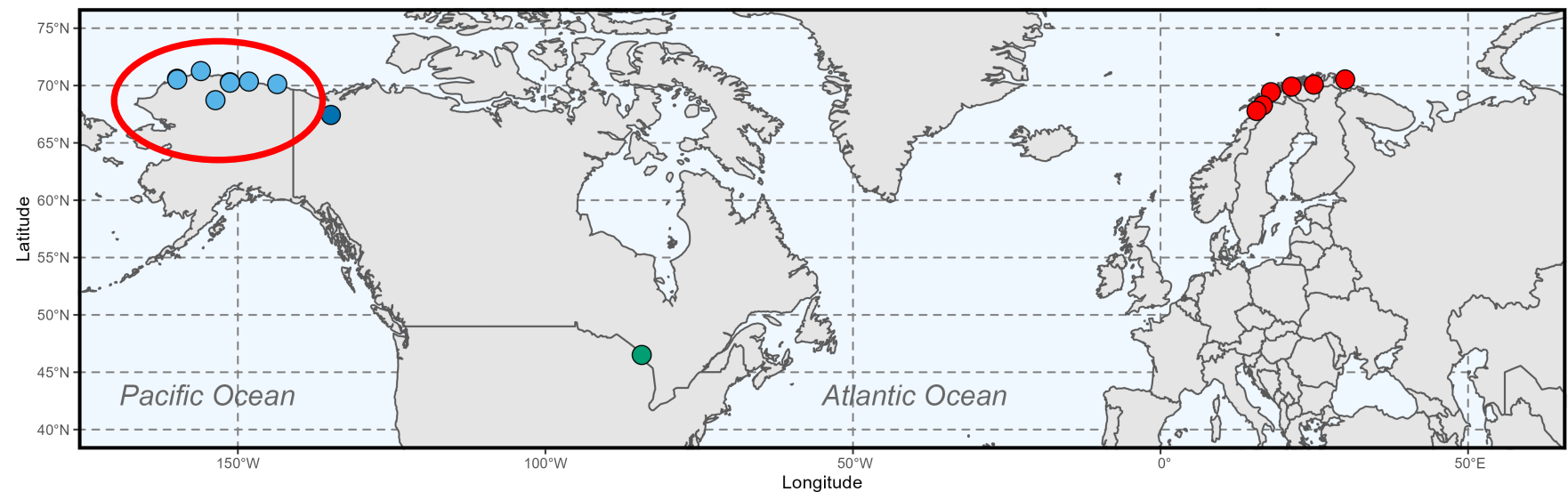


Samples: Alaskan Arctic

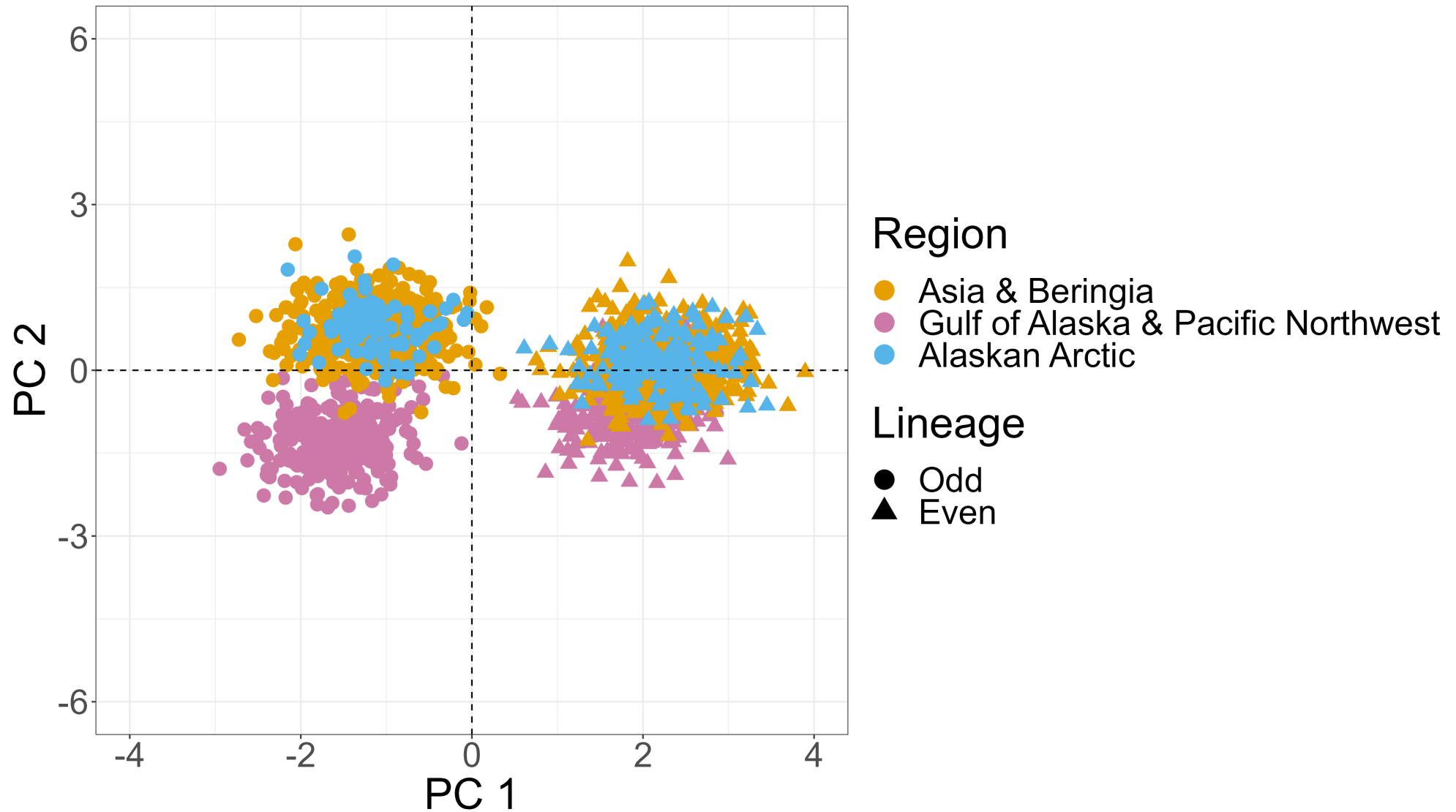
Odd years



Even years



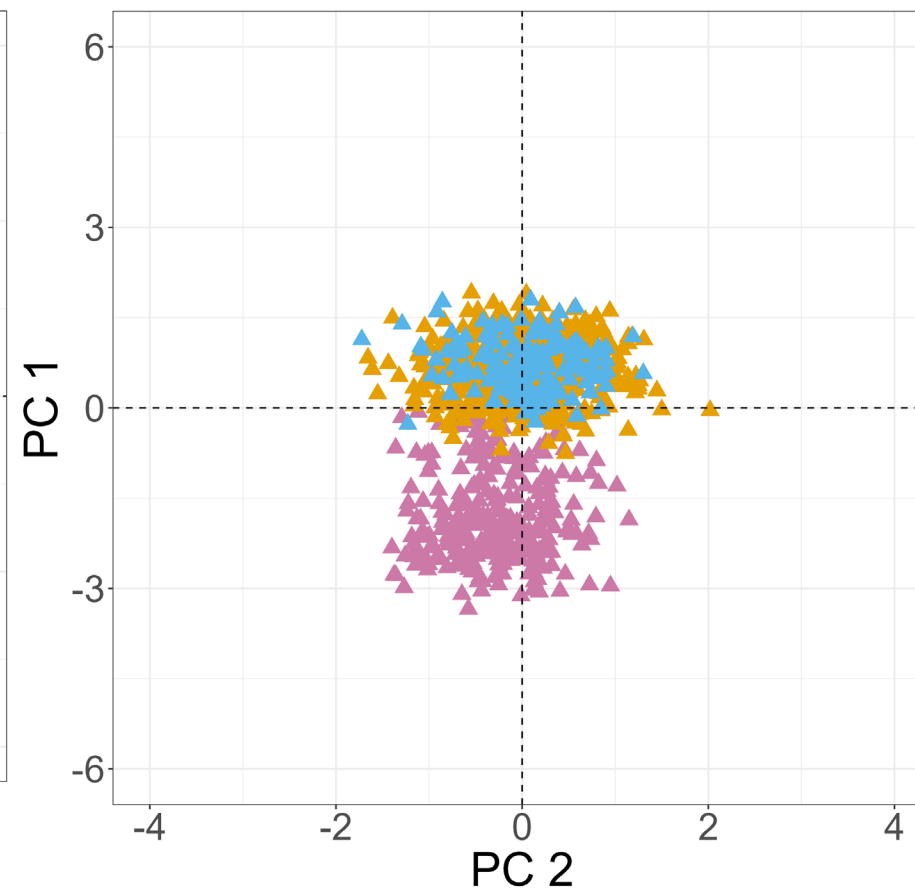
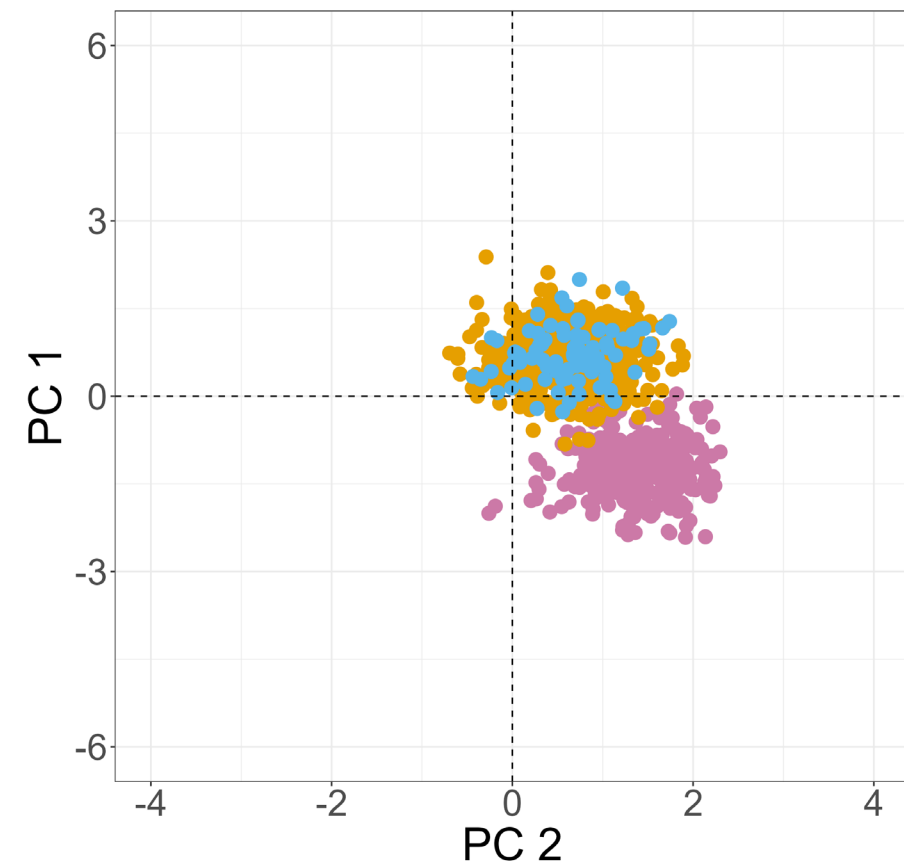
Samples: Alaskan Arctic



Samples: Alaskan Arctic

Odd

Even



Region

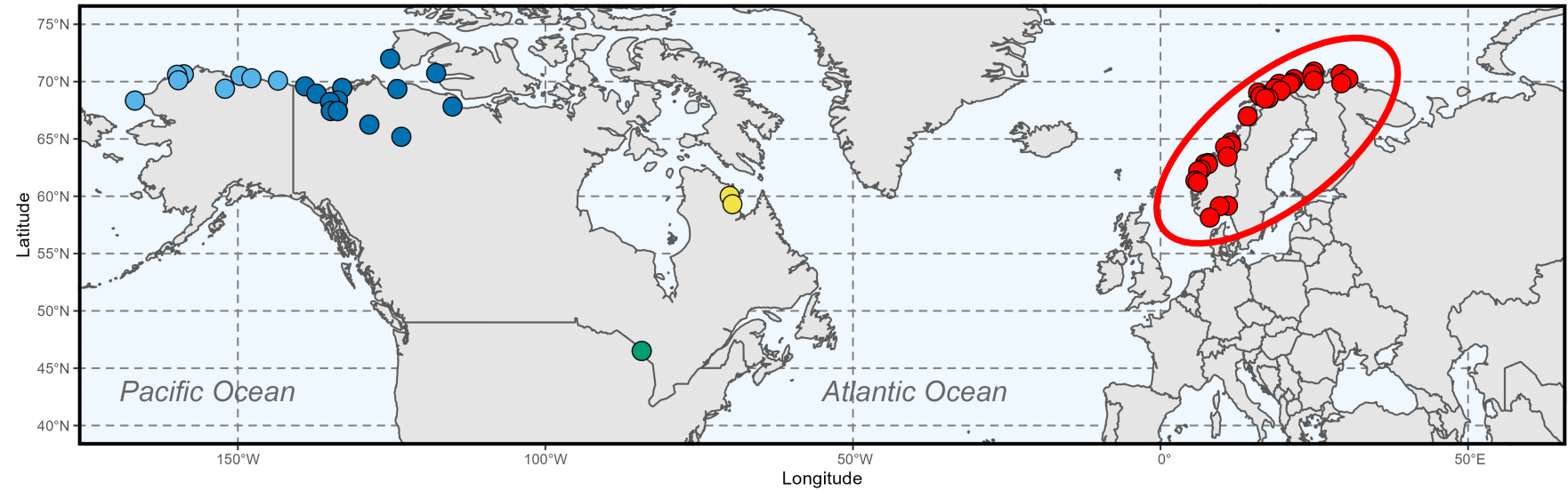
- Asia & Beringia
- Gulf of Alaska & Pacific Northwest
- Alaskan Arctic

Lineage

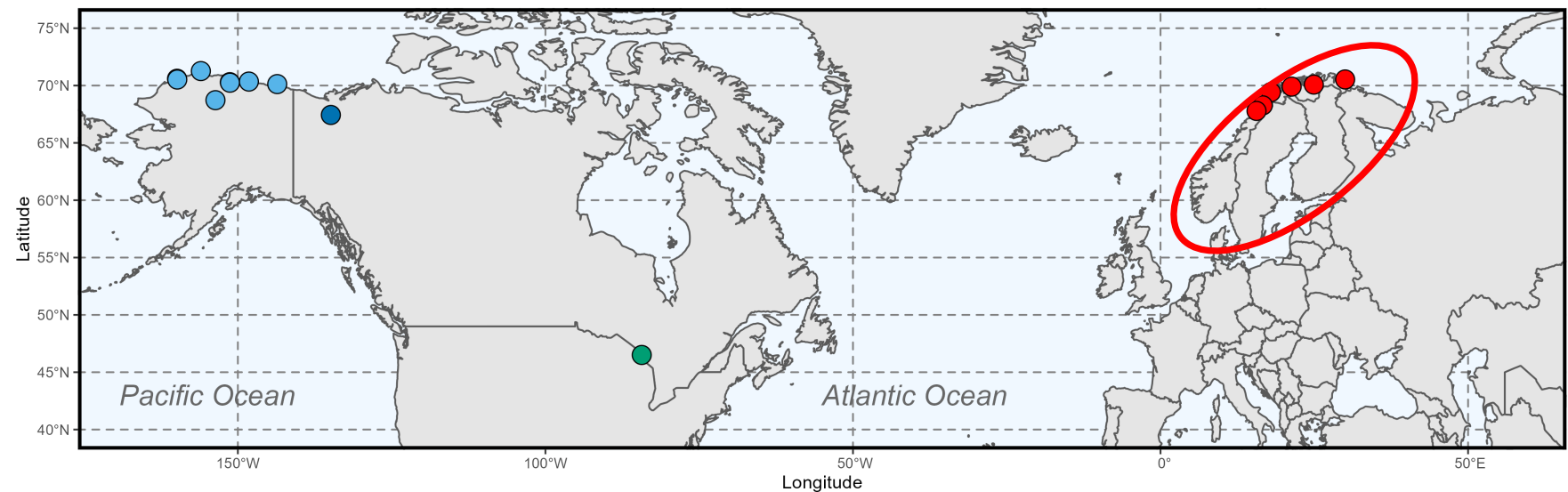
- Odd
- ▲ Even

Samples: Norway

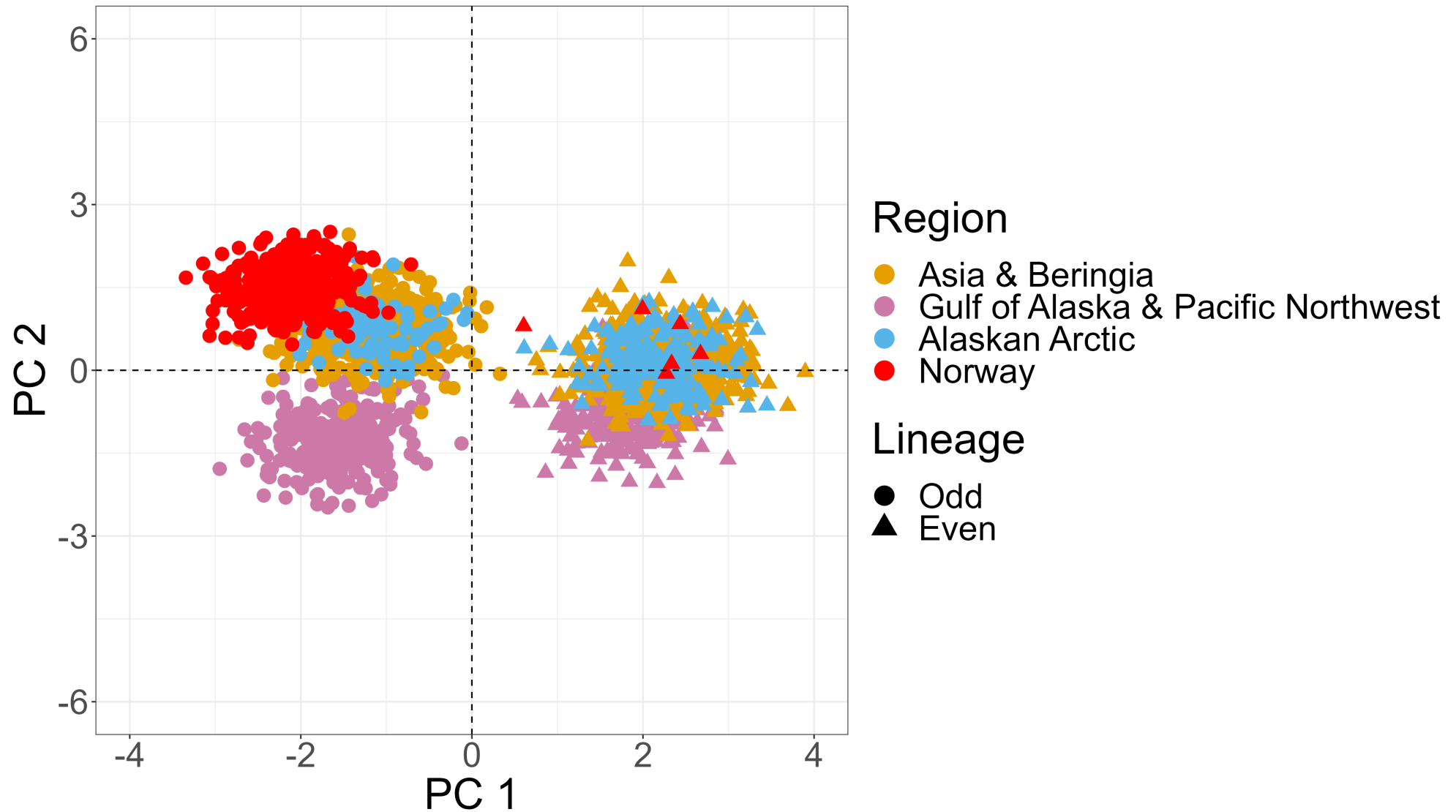
Odd years



Even years

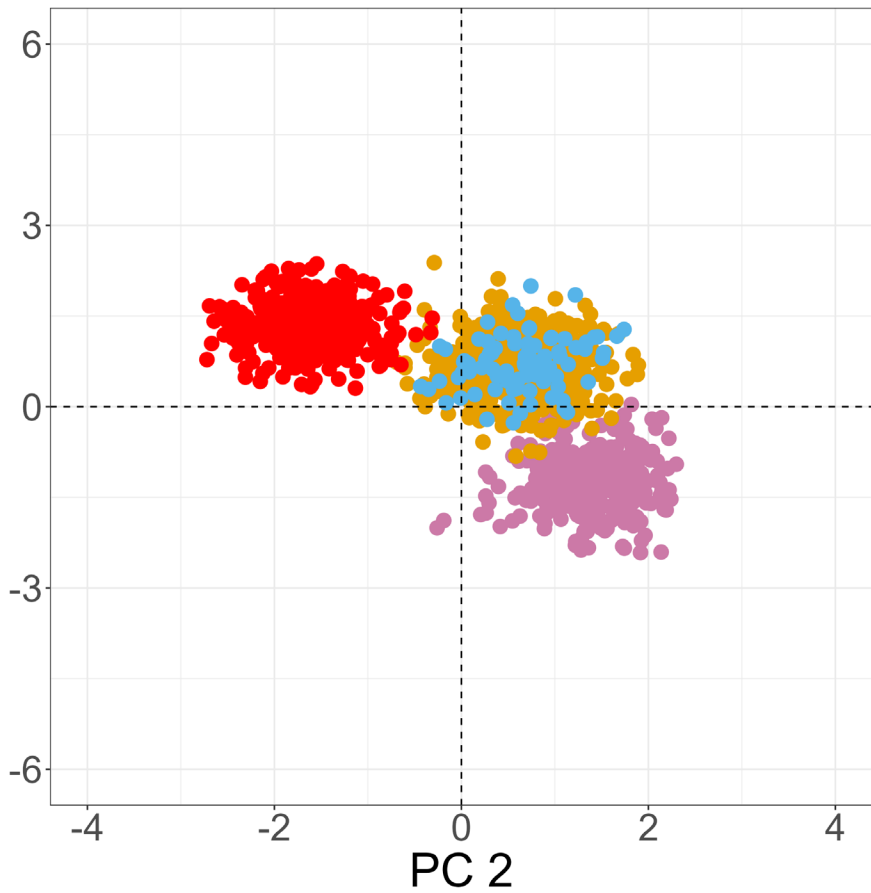


Samples: Norway

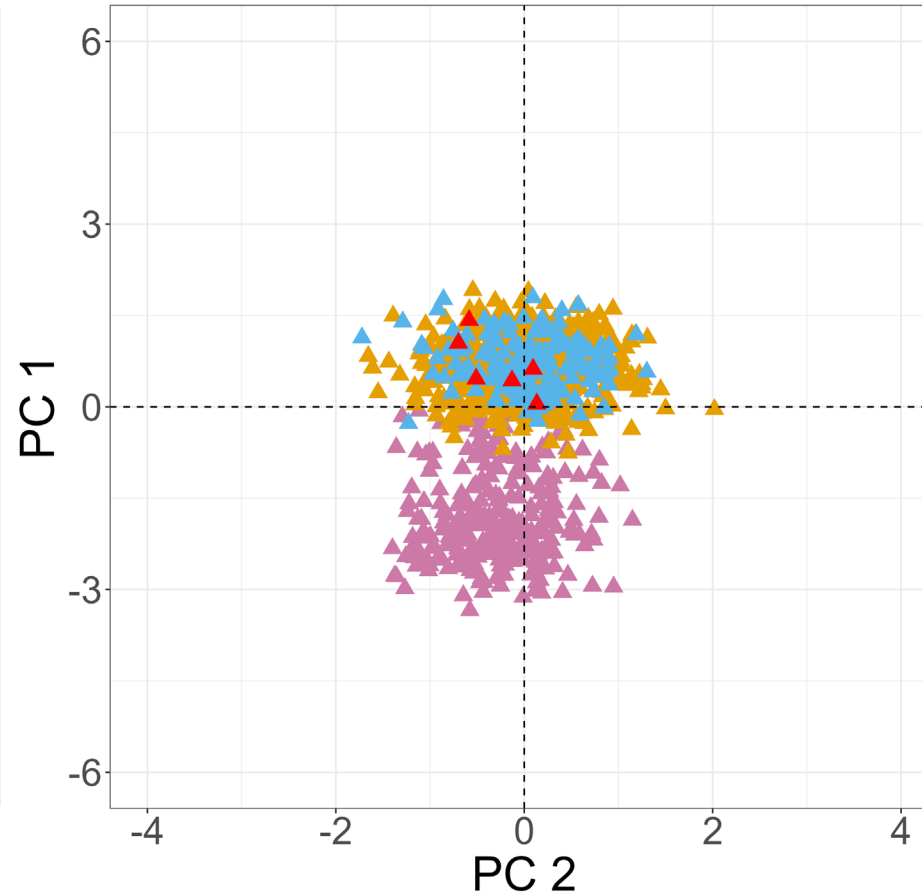


Samples: Norway

Odd



Even



Region

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- Gulf of Alaska & Pacific Northwest
- Alaskan Arctic
- Norway

Lineage

- Odd
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Samples: Norway

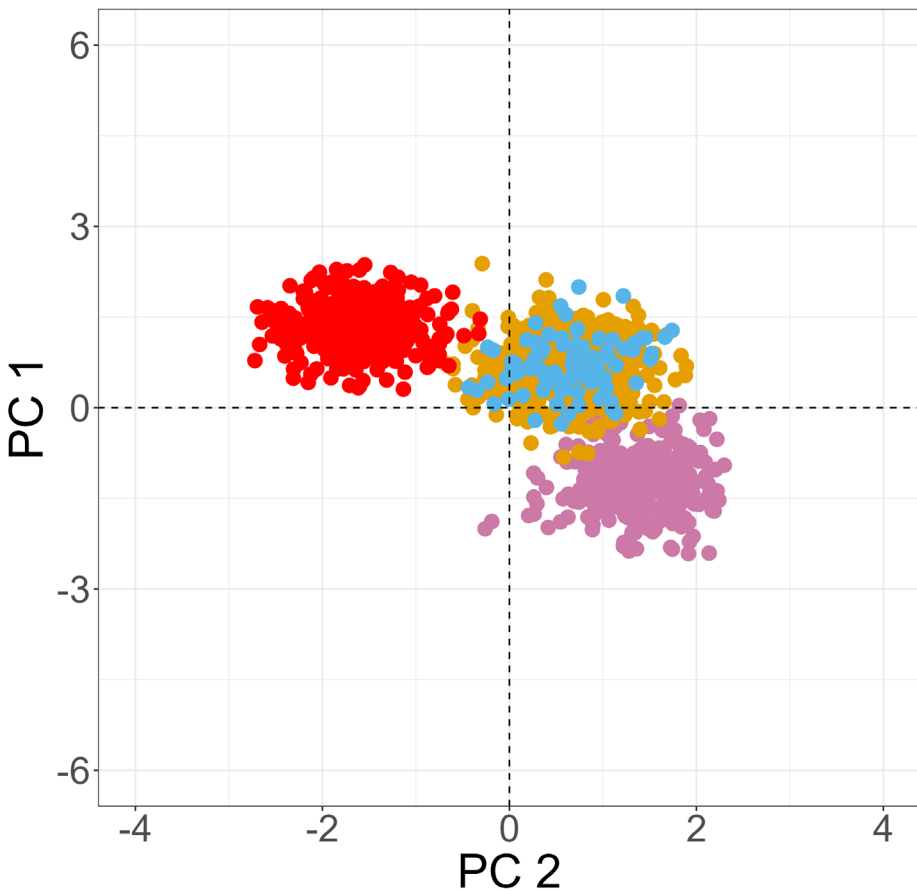
Variability of Biological and Population Genetic Indices in Pink Salmon, *Oncorhynchus gorbuscha* Transplanted into the White Sea Basin

N. V. Gordeeva^a, E. A. Salmenkova^a, and S. V. Prusov^b

^a Vavilov Institute of General Genetics, Russian Academy of Sciences, Moscow, Russia

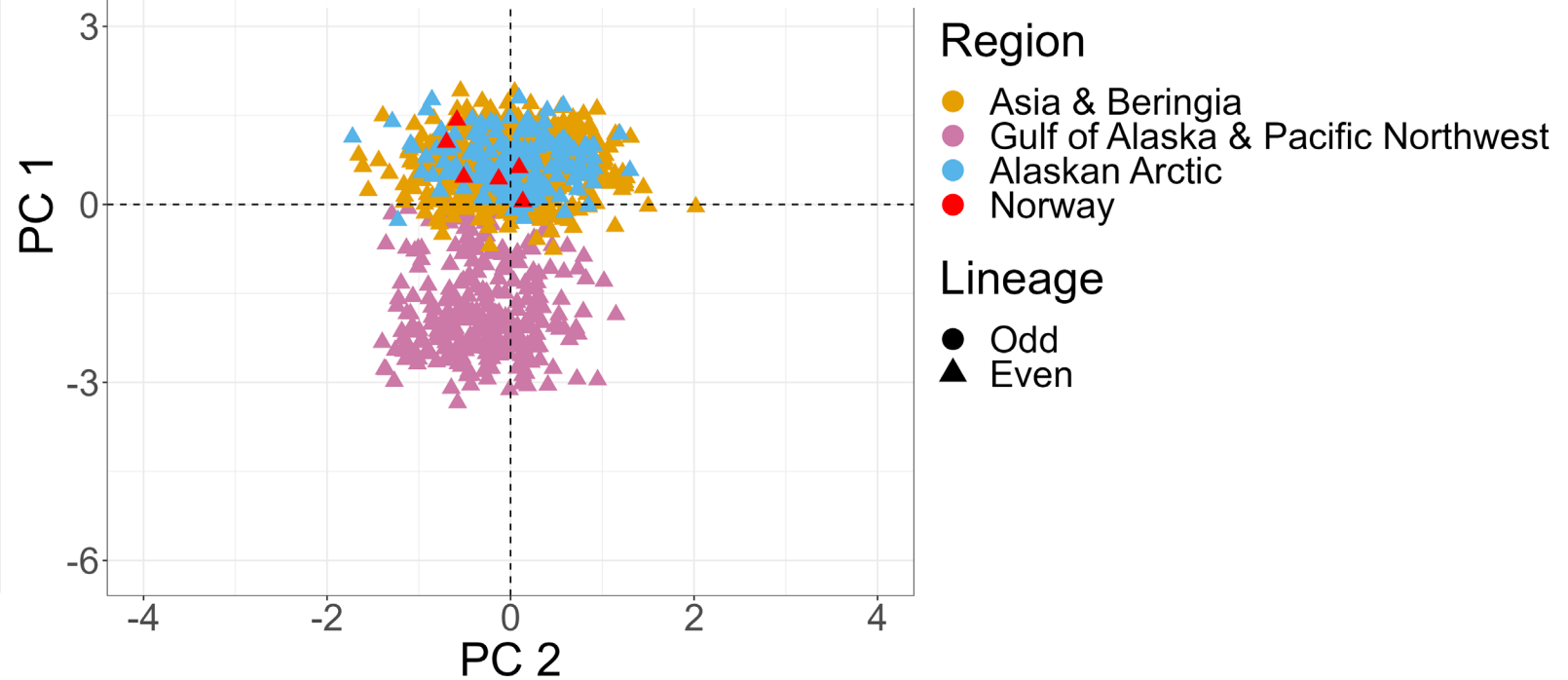
^b Knipovich Polar Research Institute of Marine Fisheries and Oceanography, Murmansk, Russia

Odd



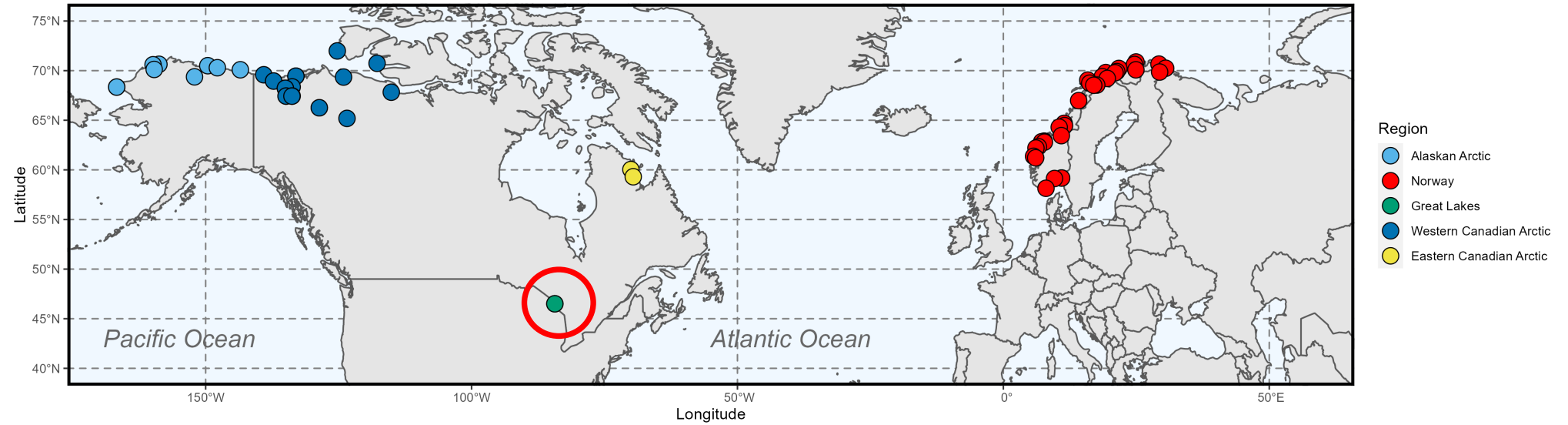
Comparative genetic variability of pink salmon from different parts of their range: native Pacific, artificially introduced White Sea and naturally invasive Atlantic Scottish rivers

John Gilbey¹ | Valeriia A. Soshnina^{2,3} | Alexander A. Volkov² | Daria A. Zelenina²



Samples: Great Lakes

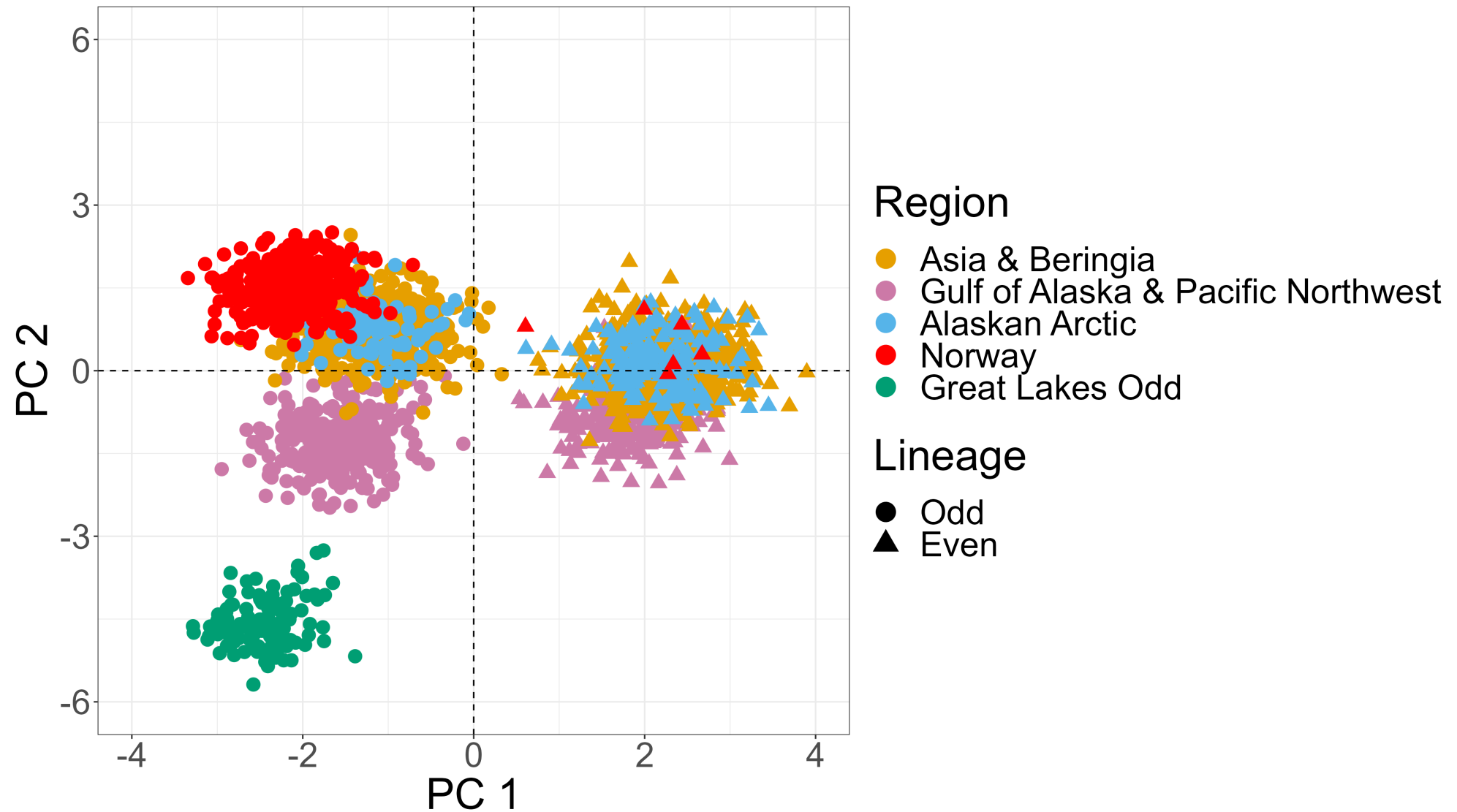
Odd years



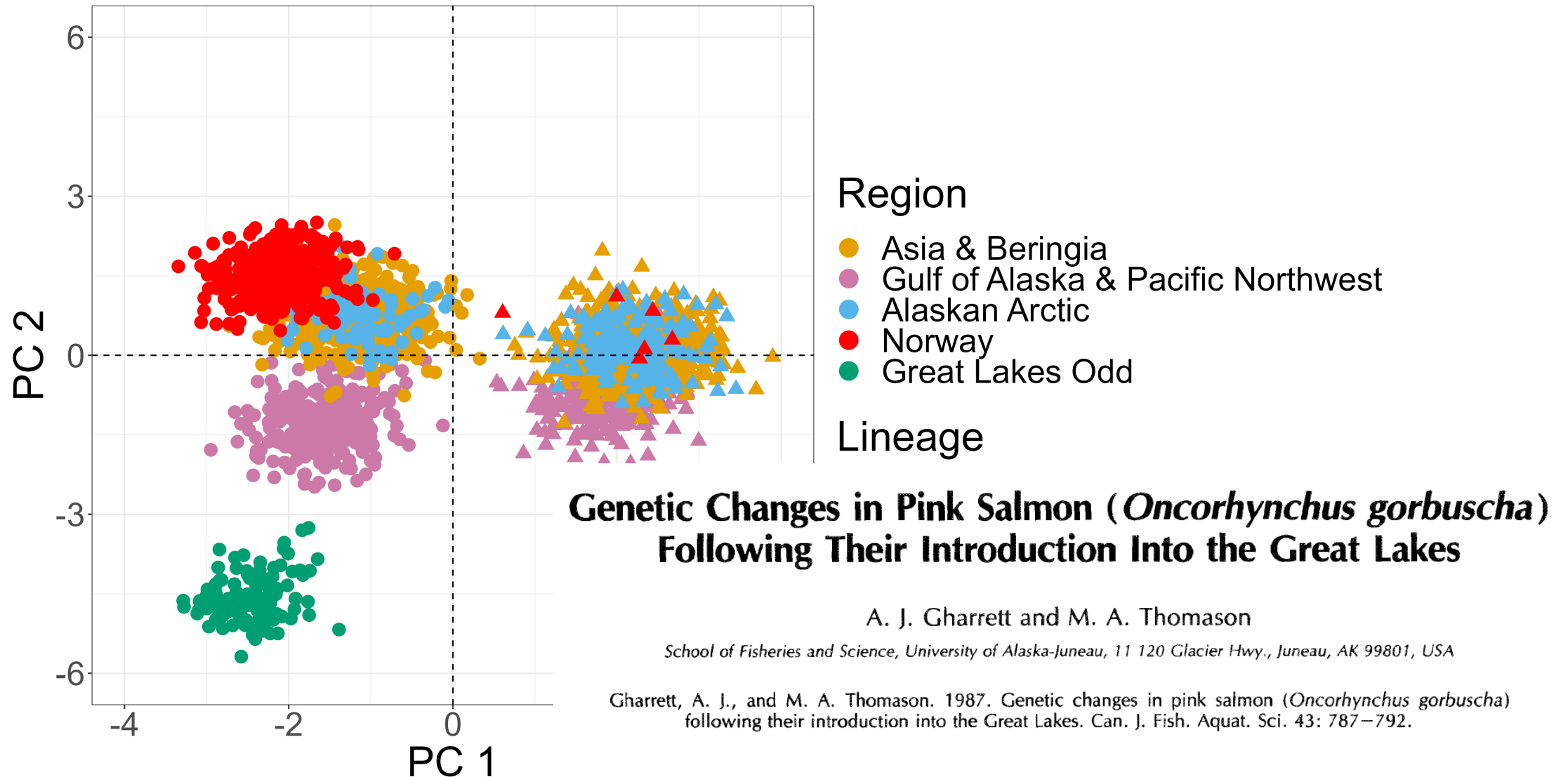
Even years



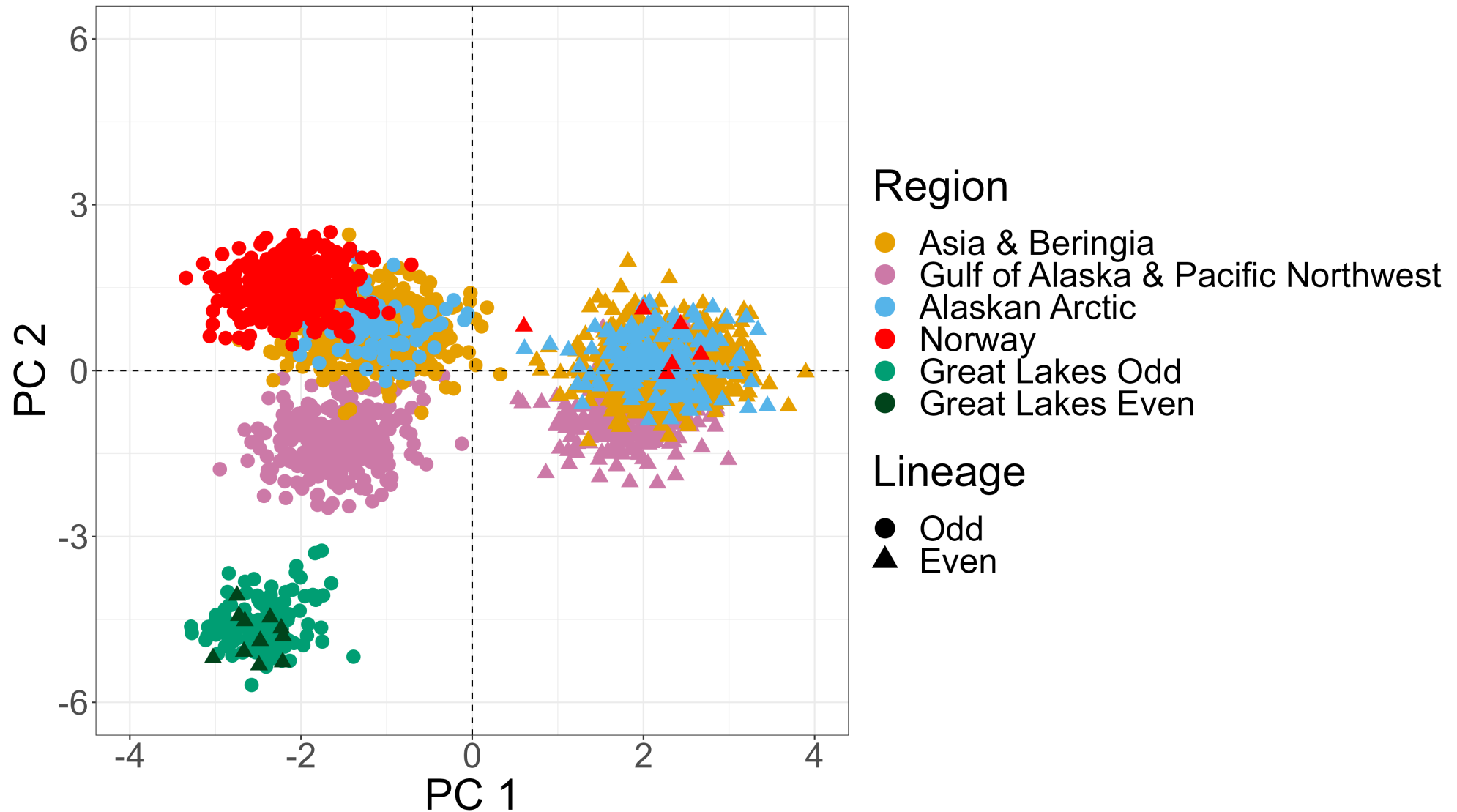
Samples: Great Lakes - Odd years



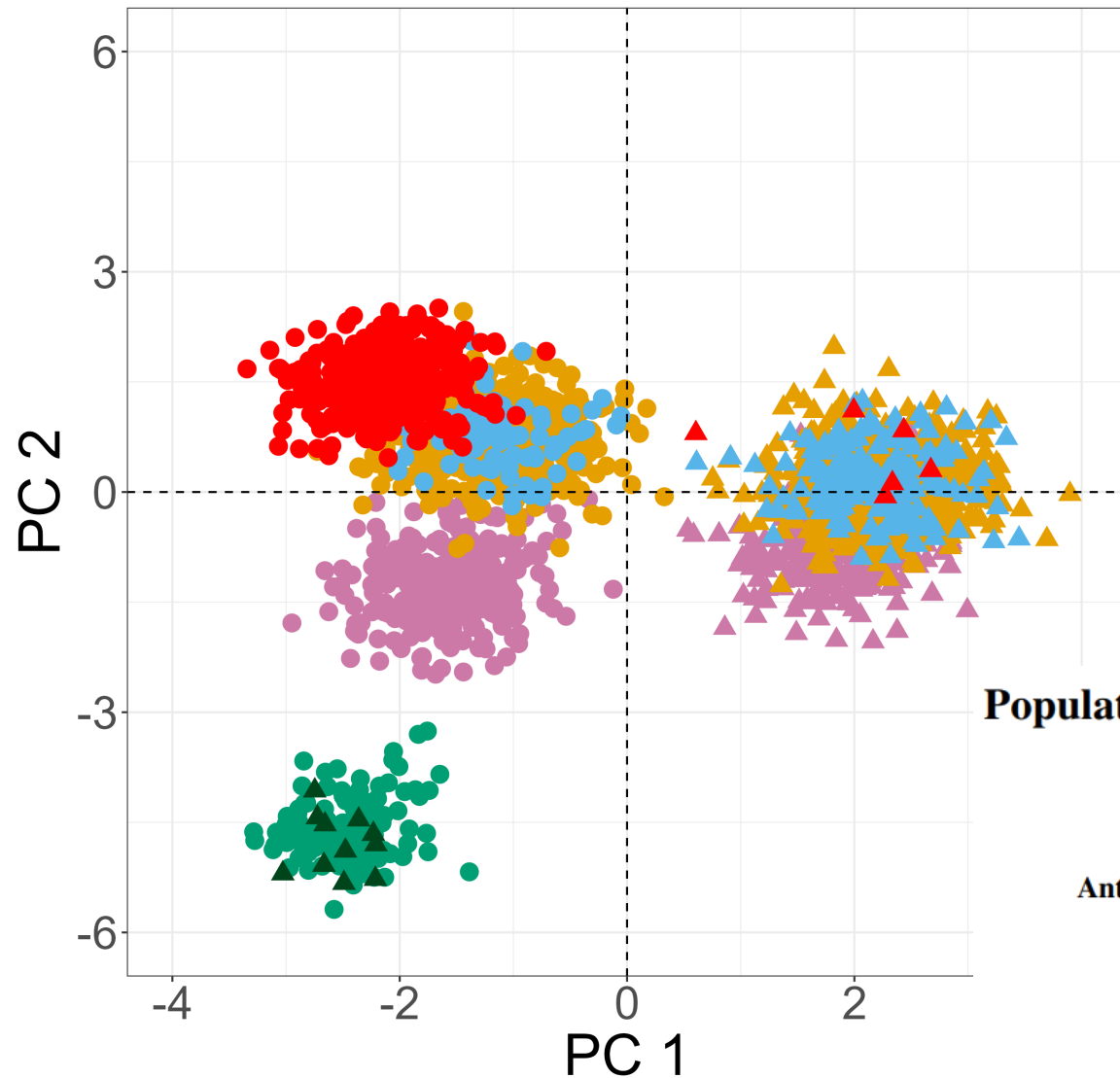
Samples: Great Lakes - Odd years



Samples: Great Lakes - Even years



Samples: Great Lakes - Even years



Region

- Asia & Beringia
- Gulf of Alaska & Pacific Northwest
- Alaskan Arctic
- Norway
- Great Lakes Odd
- Great Lakes Even

Lineage

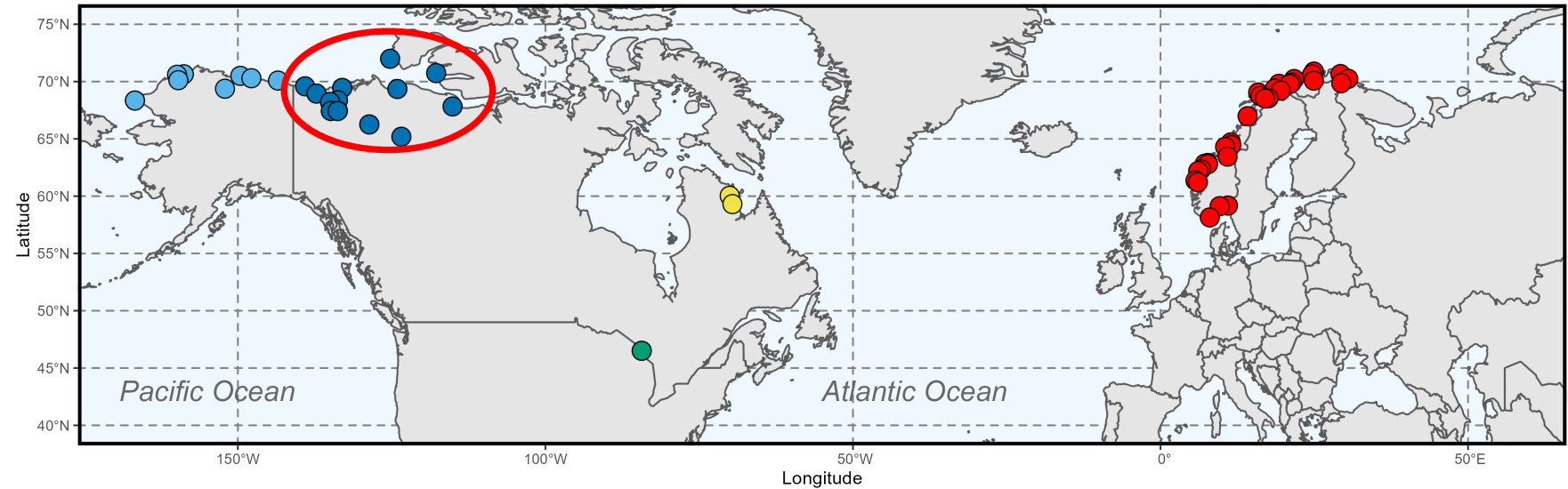
Population Characteristics and Spawning Migration Dynamics of Pink Salmon in U.S. Waters of the St. Marys River

Anthony J. Kennedy¹, Roger W. Greil, Richard C. Back², and Trent M. Sutton^{*1}

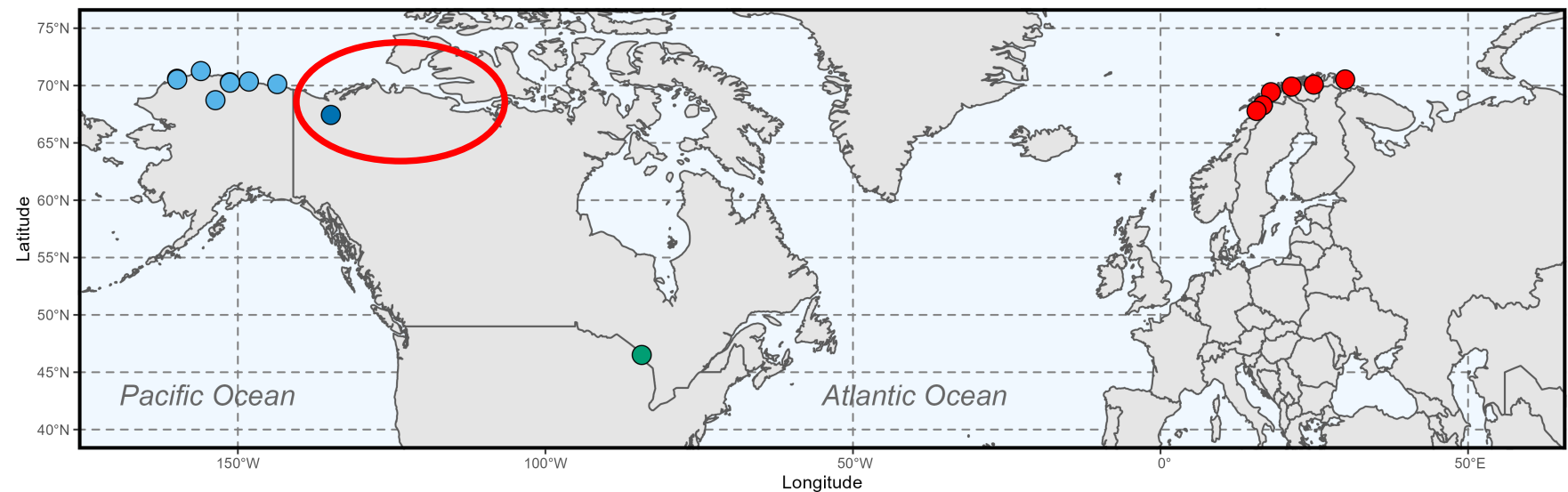
Lake Superior State University
Aquatic Research Laboratory
650 West Easterday Avenue
Sault Sainte Marie, Michigan 49783

Samples: Western Canadian Arctic

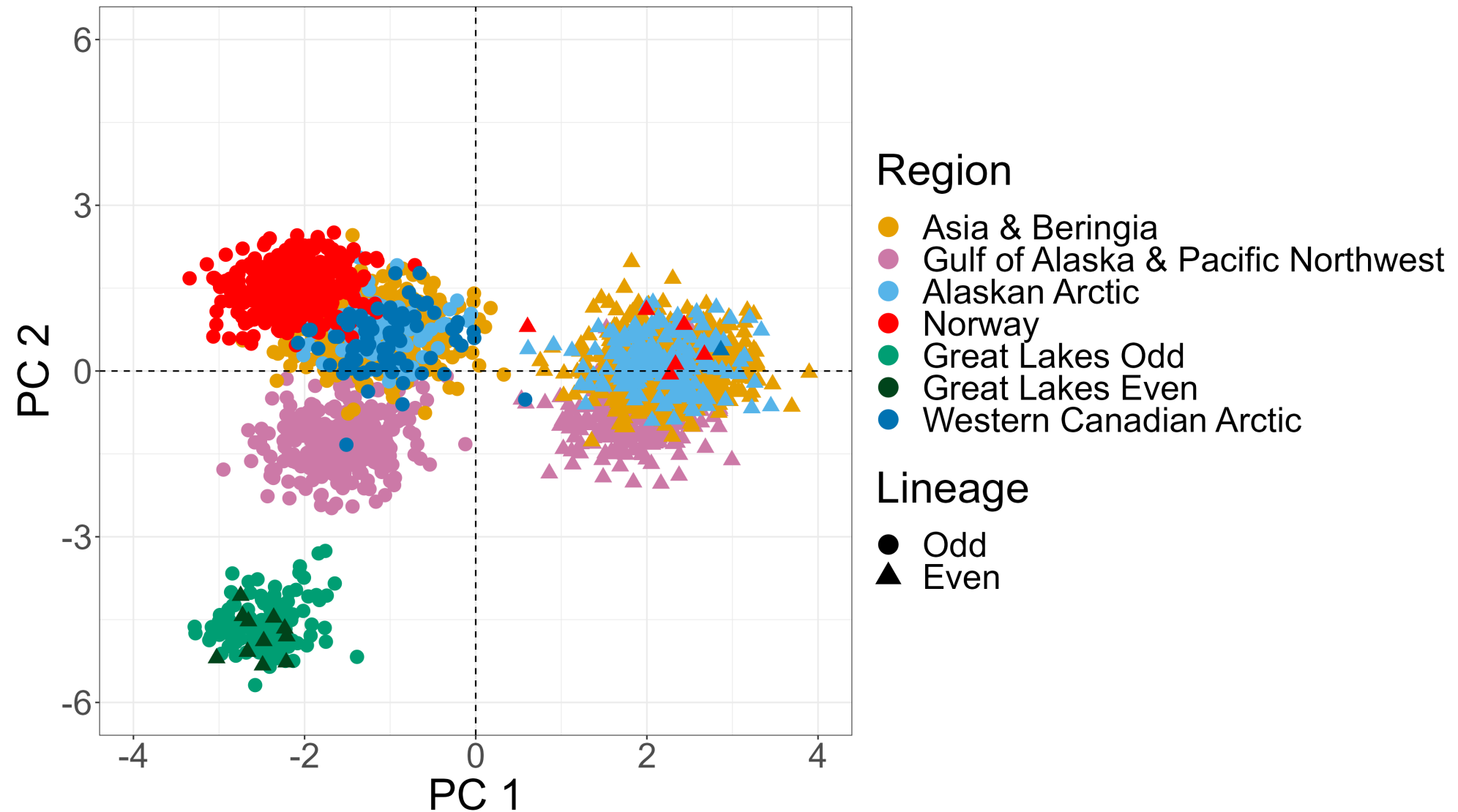
Odd years



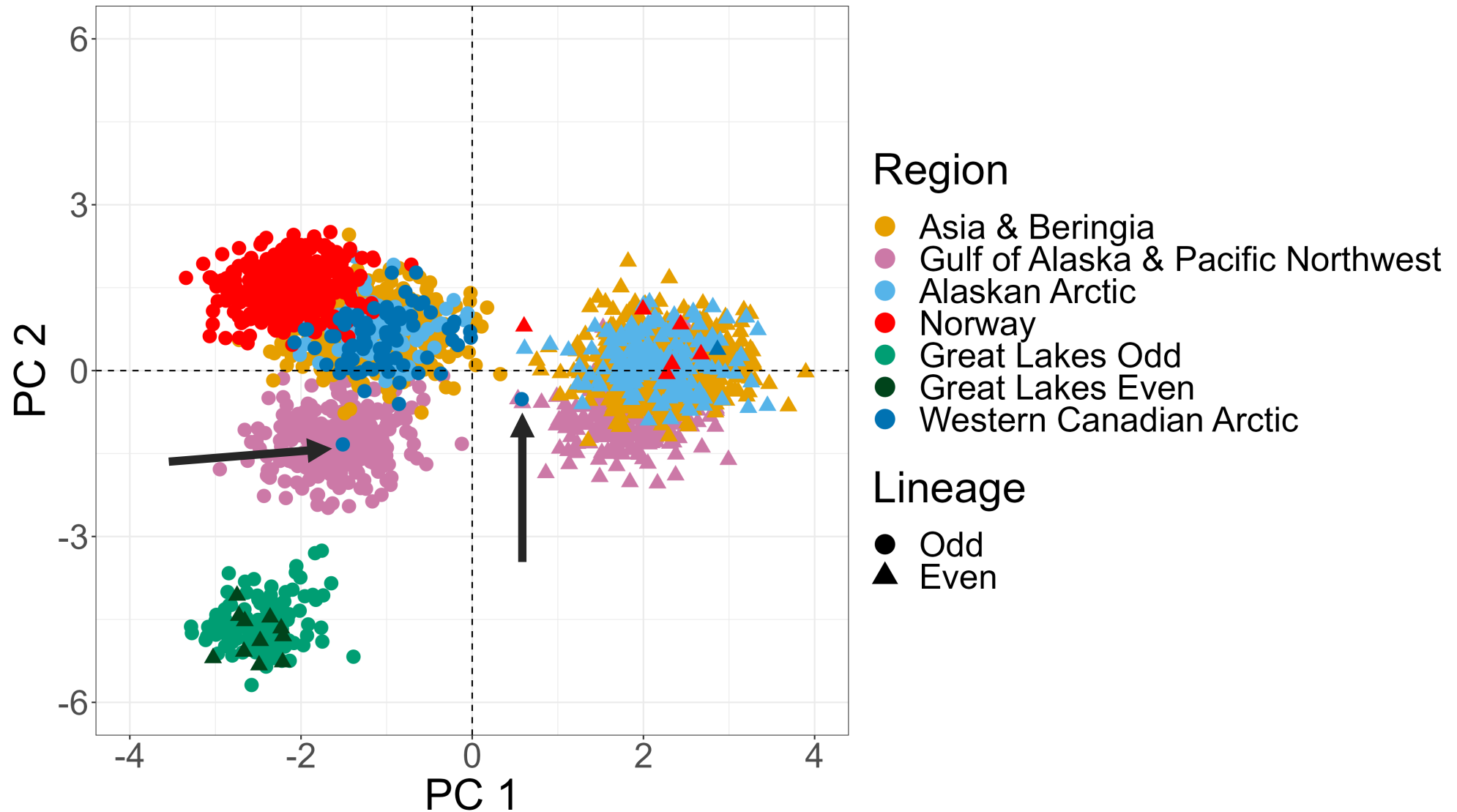
Even years



Genetic Findings: Western Canadian Arctic

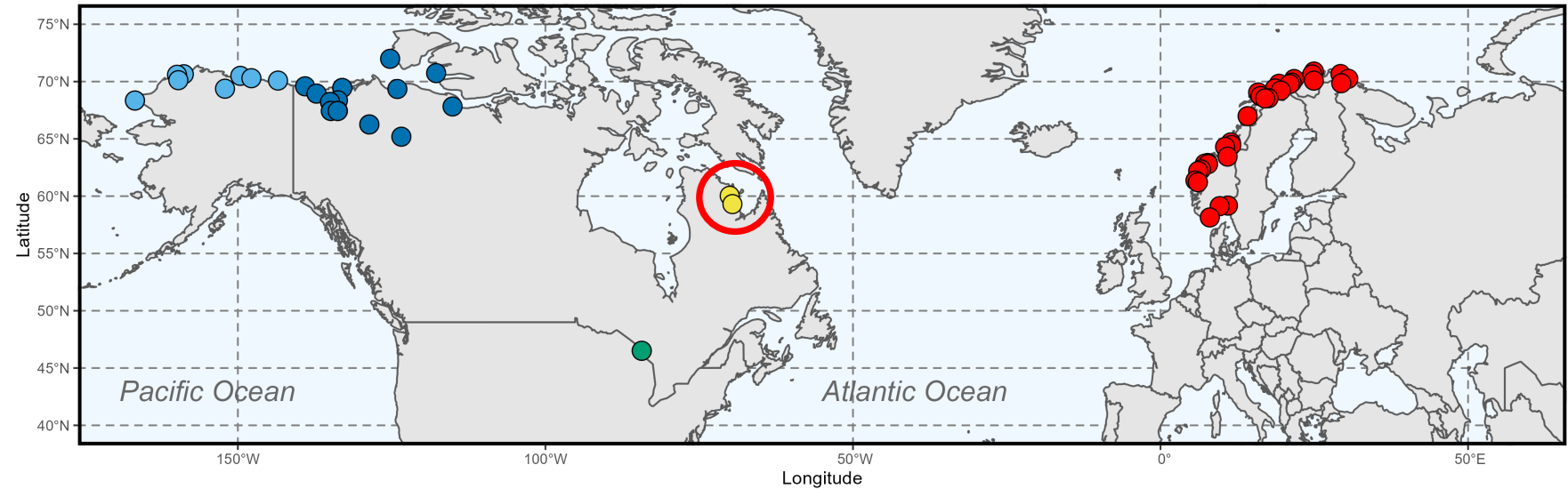


Genetic Findings: Western Canadian Arctic

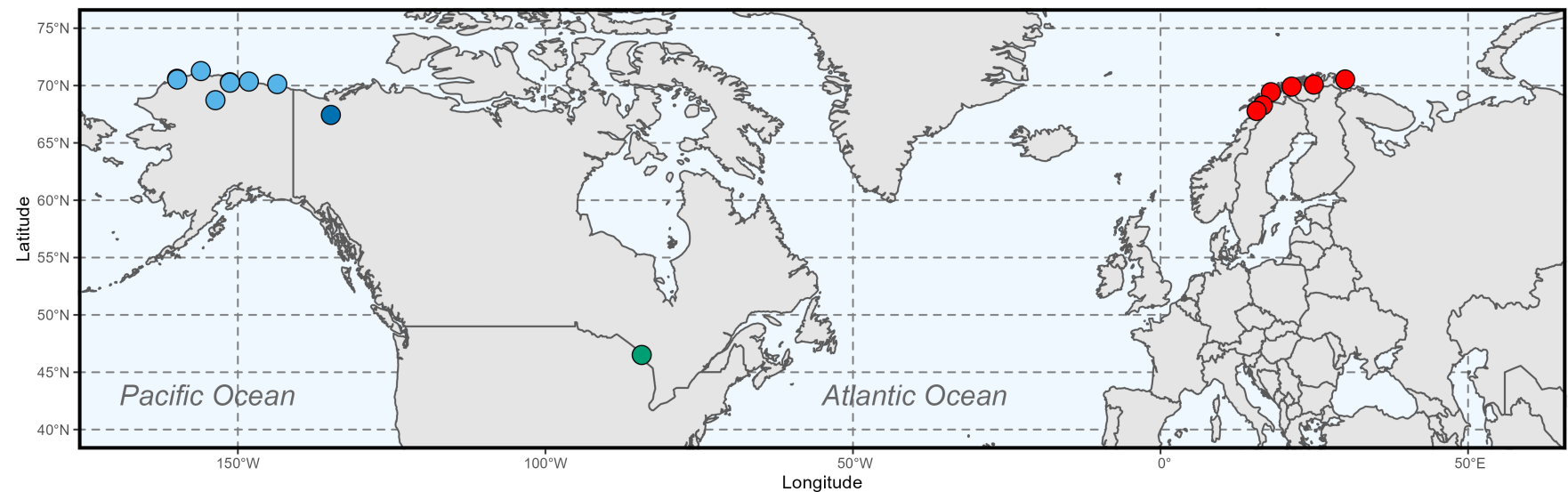


Samples: Eastern Canadian Arctic

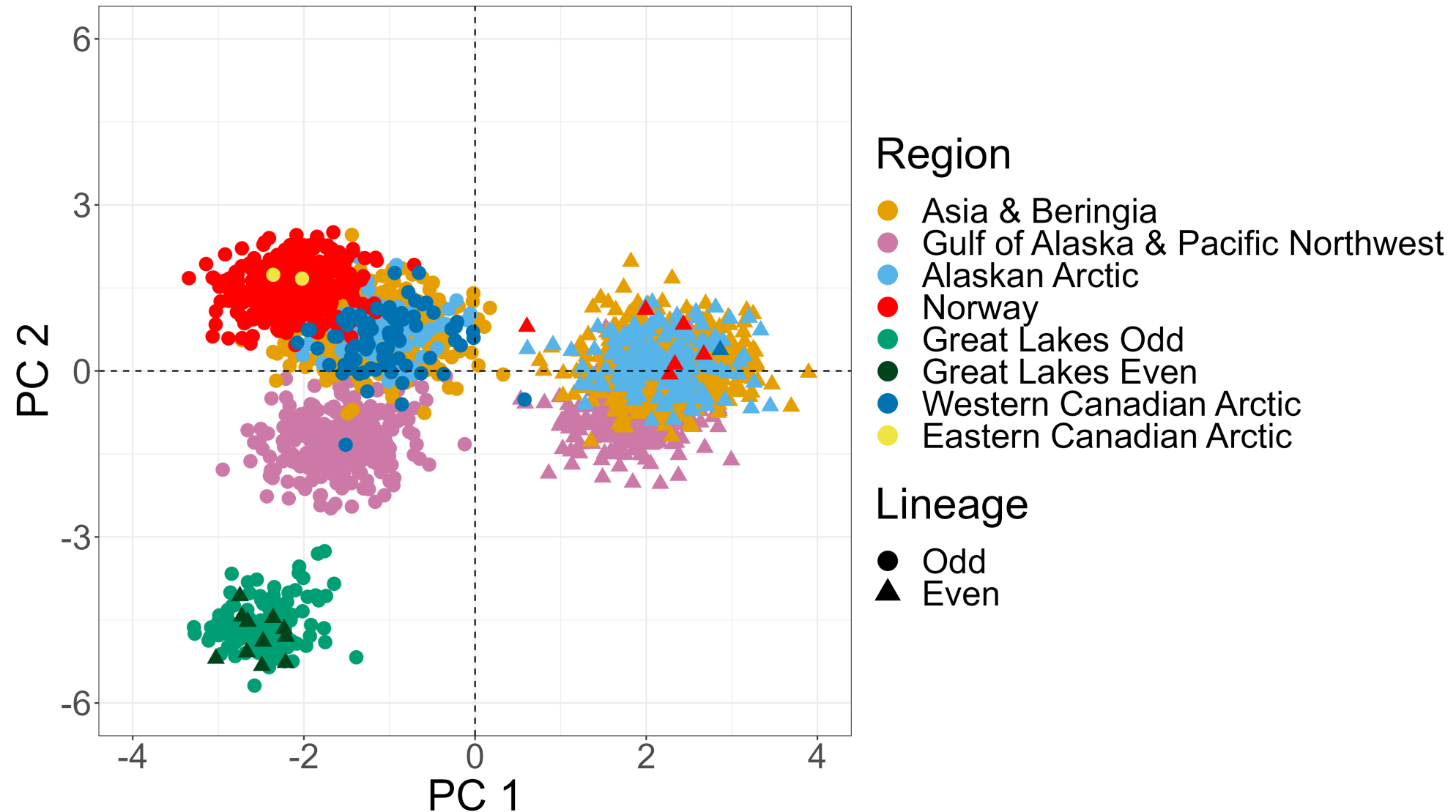
Odd years



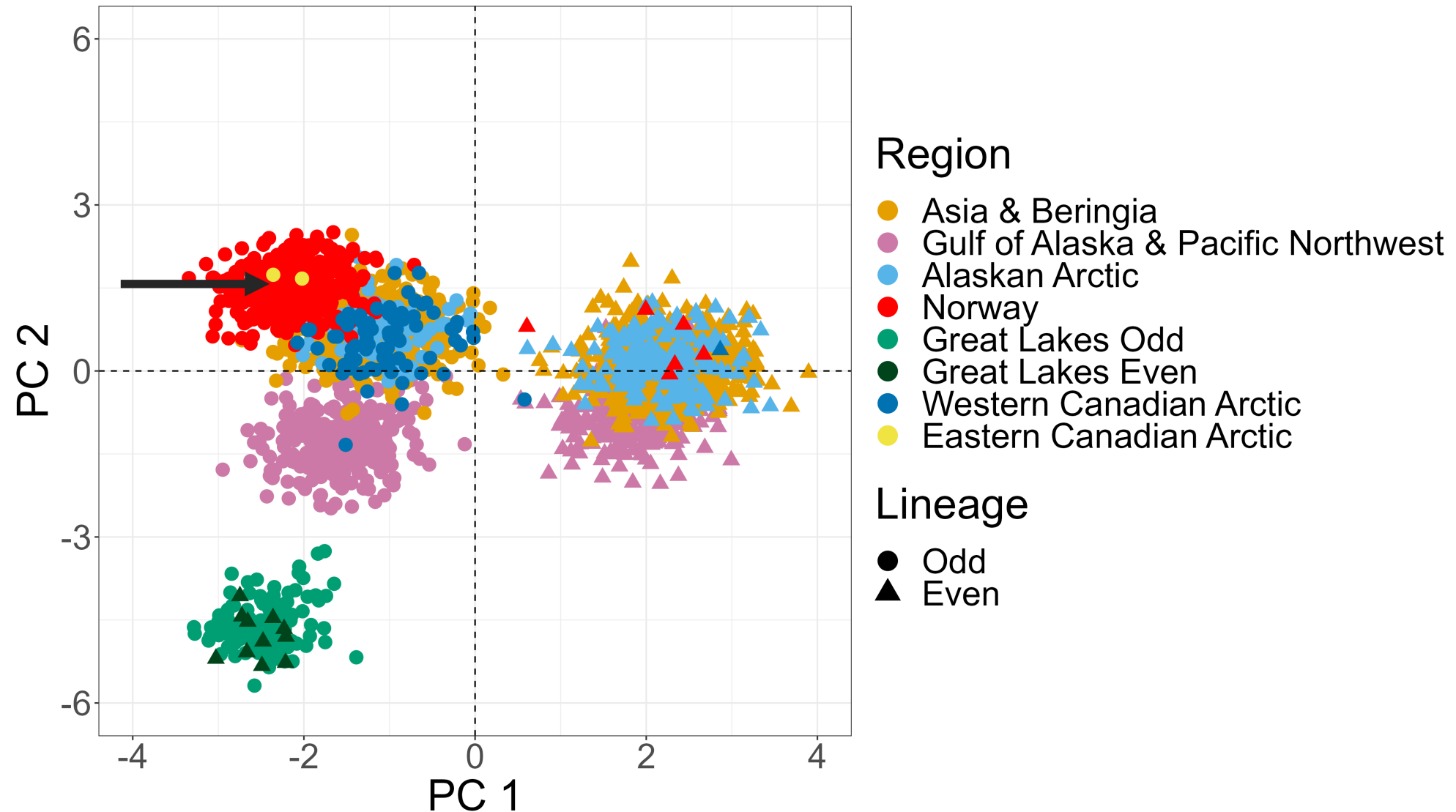
Even years



Genetic Findings: Eastern Canadian Arctic

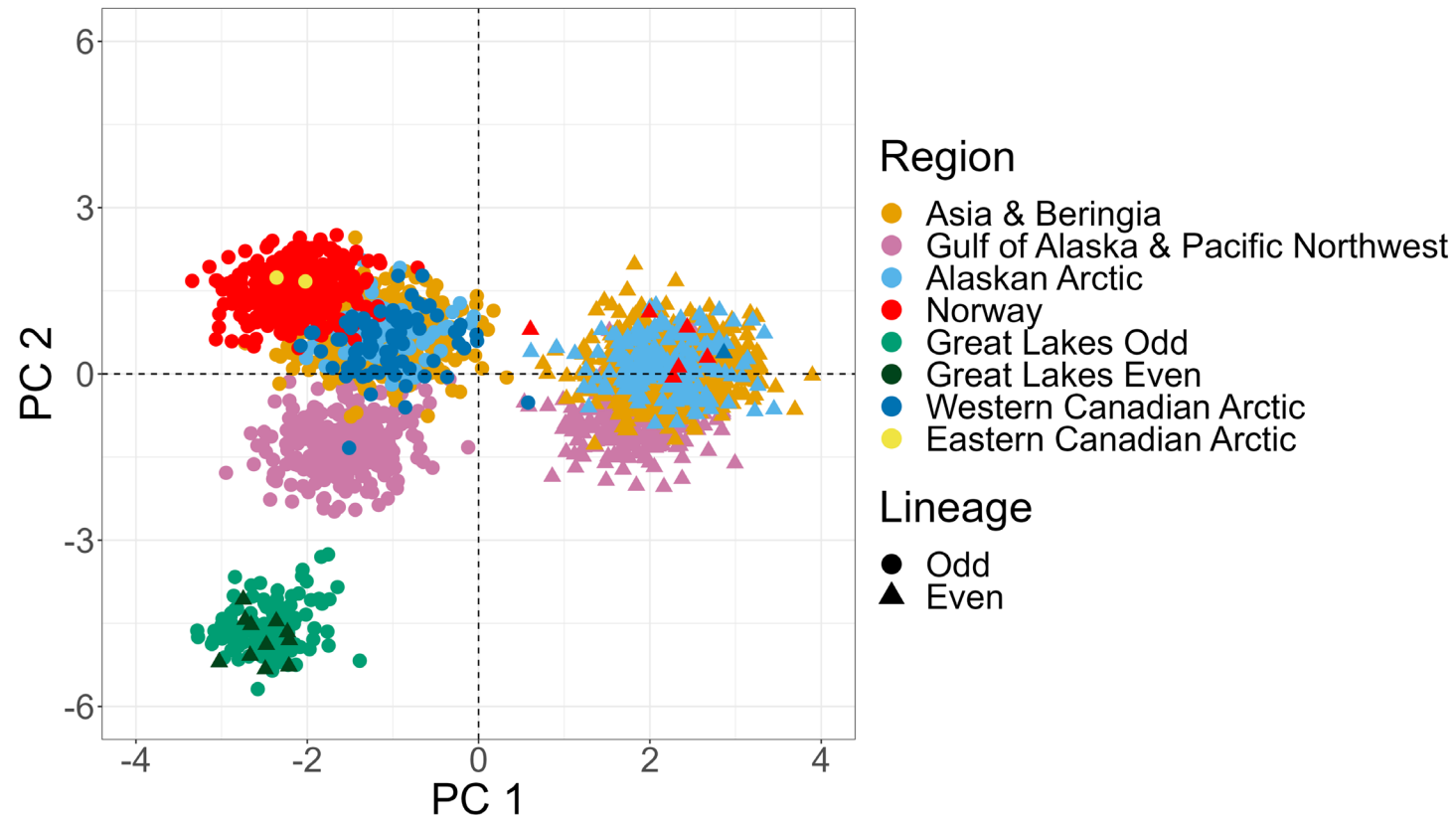


Genetic Findings: Eastern Canadian Arctic



Summary of New Genetic Findings

- Western Canadian Arctic expansions from the Pacific
 - Native range
 - Mostly Asia and Beringia stocks
 - One from further south?
 - One deviation from 2-year life history?
- Eastern Canadian Arctic expansions from the Atlantic
 - White Sea stocking and Norwegian colonization



A large salmon is captured mid-leap from the water, its body arched and its tail fluke visible. The water is splashing around the fish, and the background shows a blurred view of the water's surface. The text is overlaid on the left side of the image.

Thank you!

- Community harvesters, community organizations, and all those that support Arctic Salmon from across the Canadian Arctic
- Anthony Gharrett, Trent Sutton, University of Alaska Fairbanks
- Todd Sformo, North Slope Borough Wildlife Management
- Bonnie Borba, Rich Driscoll, Alaska Department of Fish and Game
- Pacific Coastal Salmon Recovery Fund
- Alaska Hatchery Research Program