

Genetic Stock Composition of Chinook Salmon Harvested in Northern Cook Inlet Marine Commercial and Subsistence Fisheries, 2014–2016



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Overview of presentation

- Purpose of study
- Fishery description
- Collection locations
- Collection results
- Genetic methods
- Results
- Future work

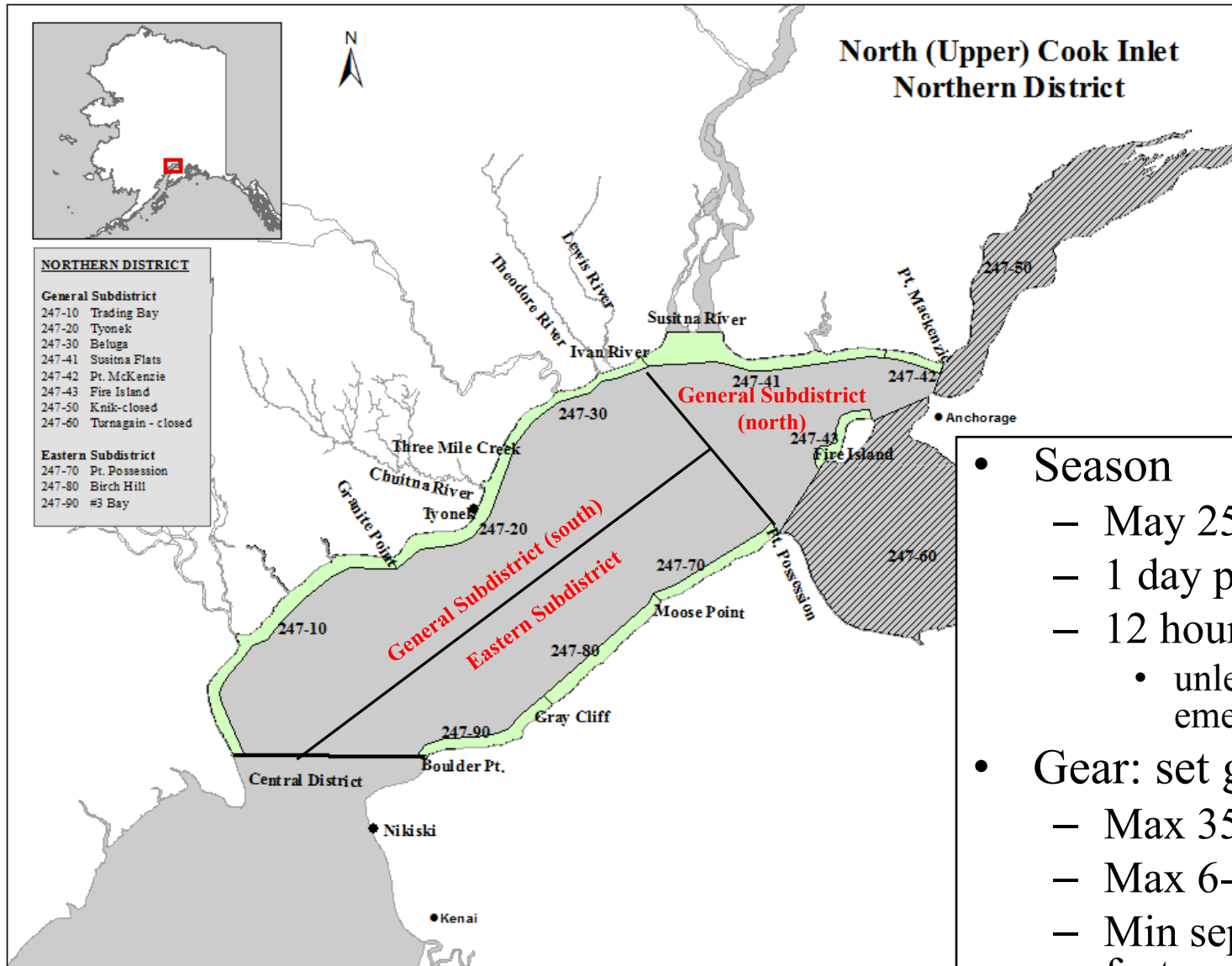


Alaska Sustainable Salmon Fund

- Purpose: Determine stock composition of Chinook salmon marine harvests in NCI
 - Northern District commercial
 - Tyonek subsistence
- NCI Stocks of Concern
 - Chuitna, Theodore, and Lewis rivers, and Alexander, Willow, Goose, and Sheep creeks



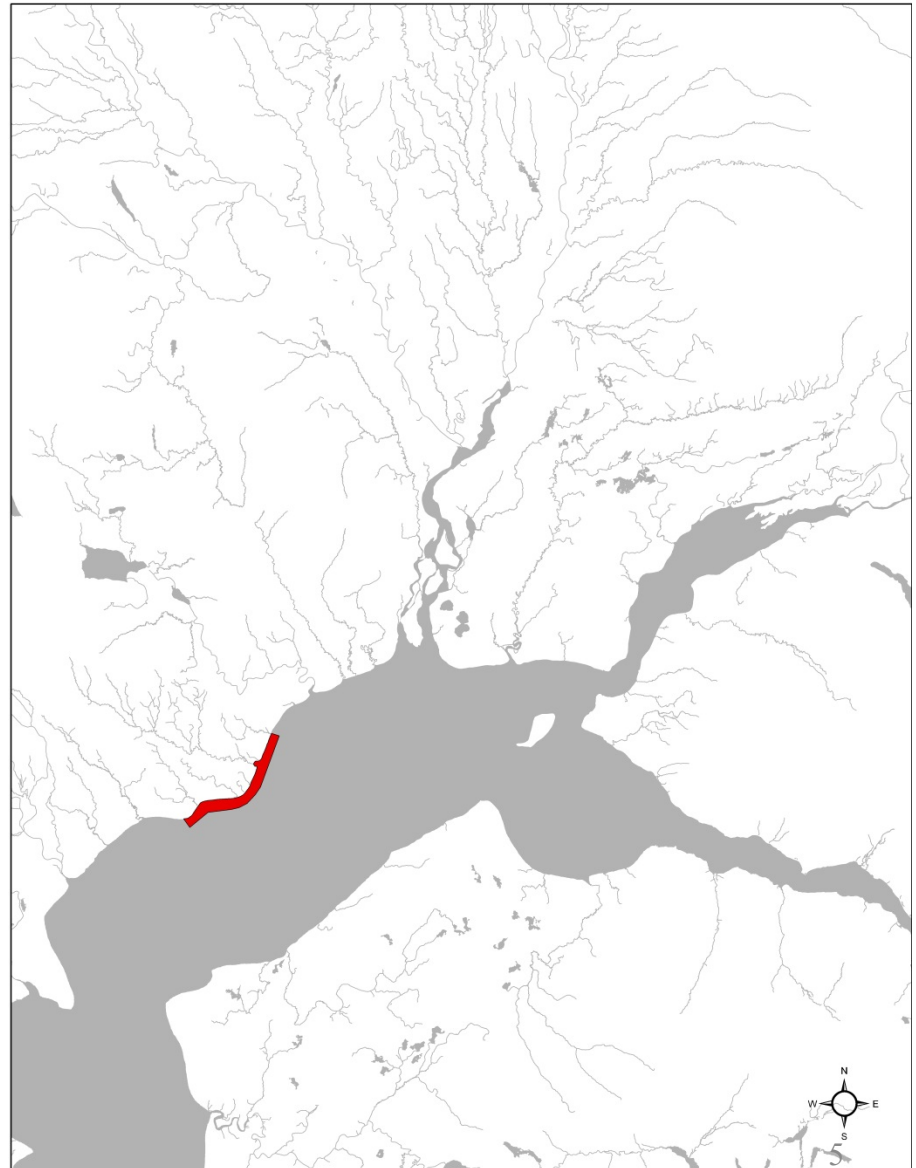
Description of commercial fisheries



- **Season**
 - May 25 - June 24
 - 1 day per week
 - 12 hours per day
 - unless altered by emergency order
- **Gear: set gillnet**
 - Max 35 fathoms long
 - Max 6-inch mesh
 - Min separation 1,200 feet

Description of subsistence fishery

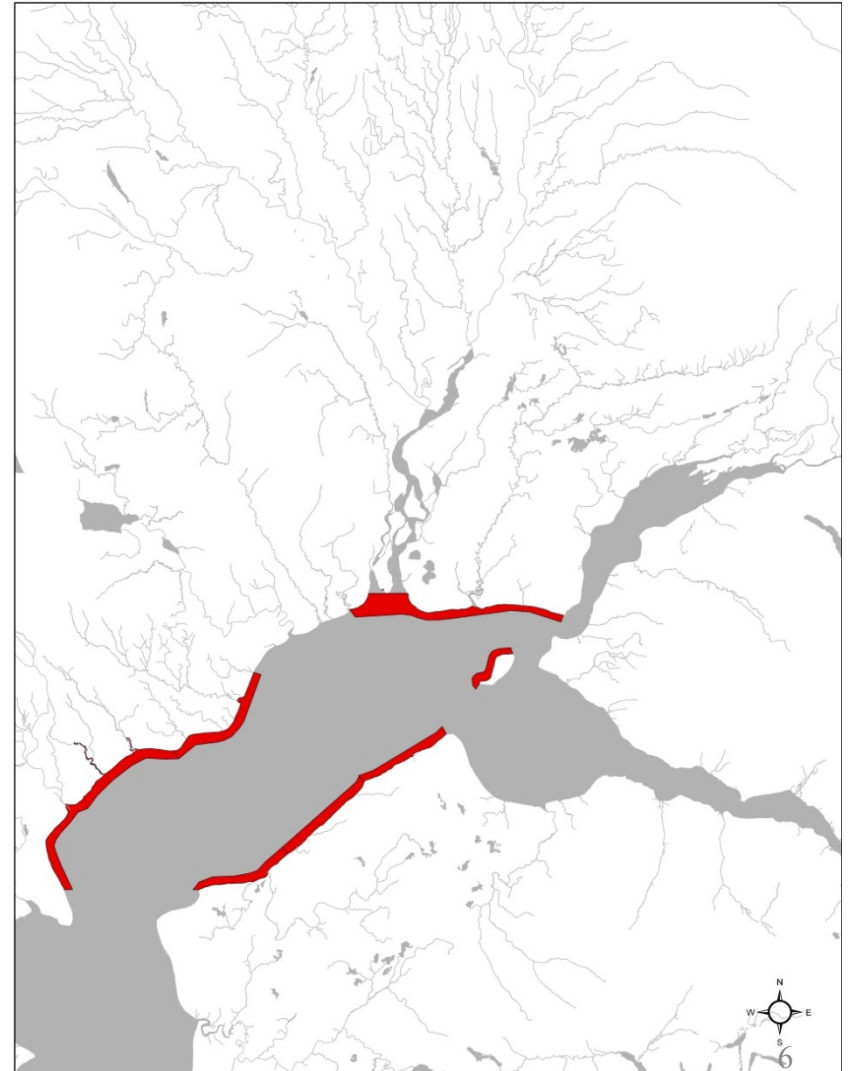
- Early season
 - May 15 - June 15
 - 3 days per week
 - 16 hours per day
- Late season
 - June 16 - October 15
 - 1 day per week
 - 12 hours per day
- Gear: set gillnet
 - Max 10 fathoms long
 - Max 6-inch mesh
 - Max 45 meshes deep
 - Min separation 600 feet



Northern Cook Inlet Chinook salmon **commercial** harvest

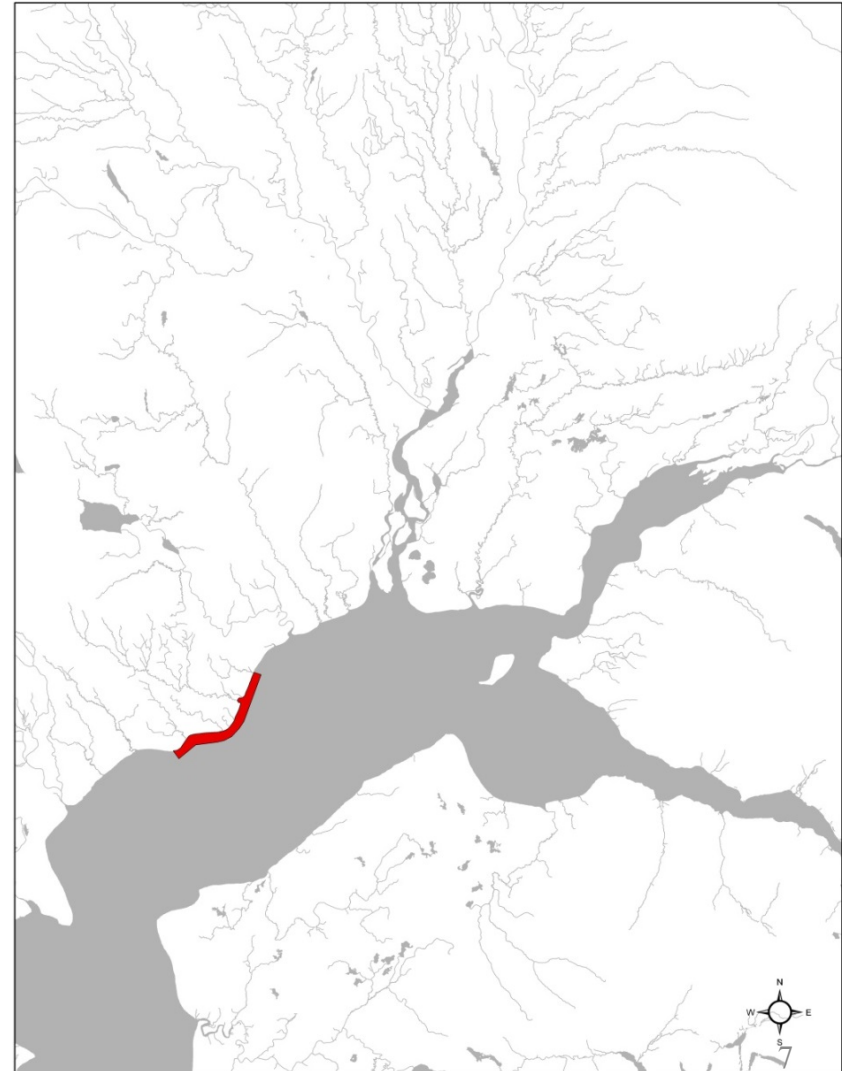
Northern District All

Year	Harvest
2014	1,538
2015	1,784
2016	2,137
2017	2,048

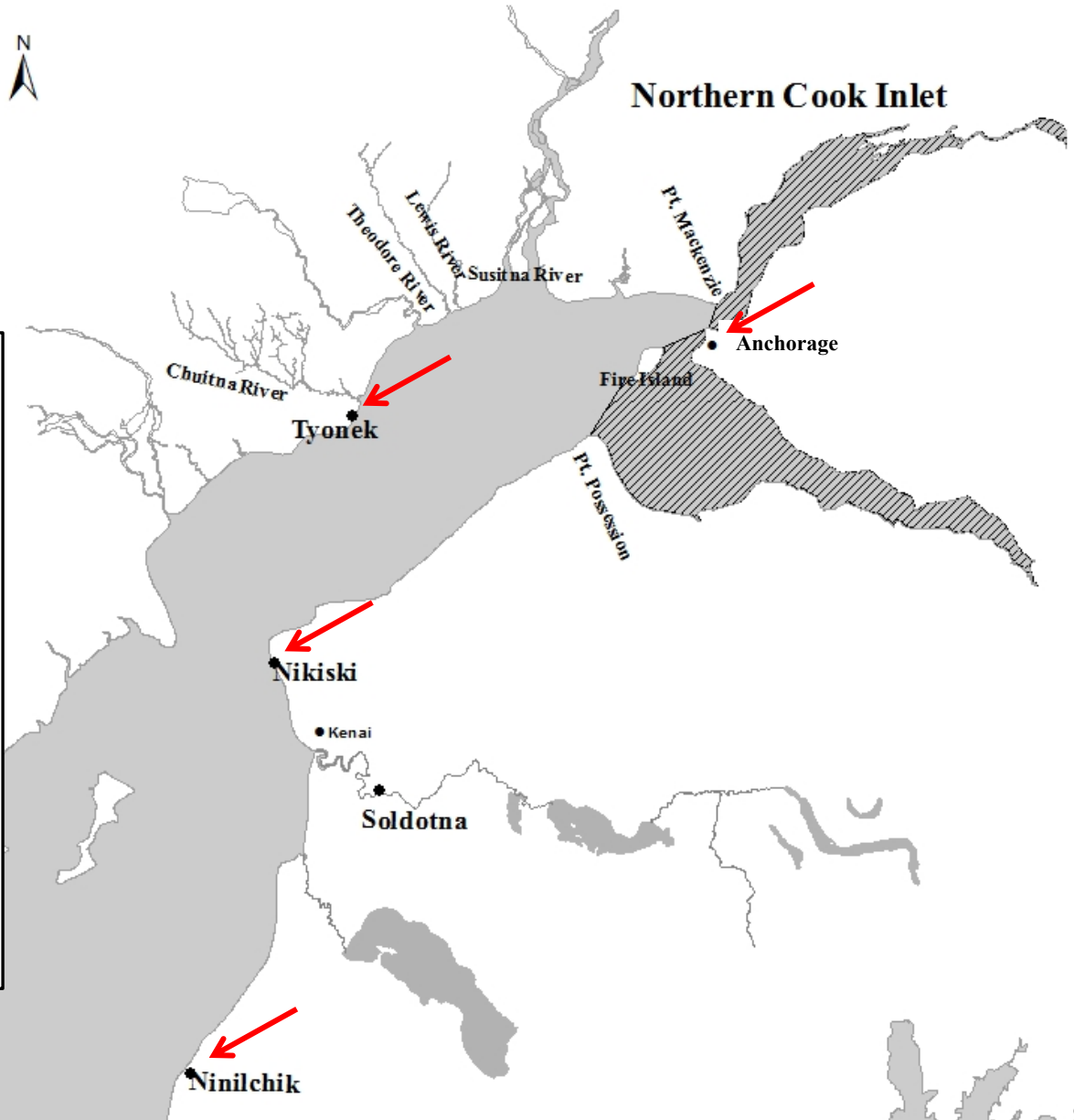


Tyonek Chinook salmon reported subsistence harvest

Subsistence	
Year	Harvest
2014	712
2015	929
2016	805
2017	877



Collection locations



Anchorage

- Ship Creek launch
- 2 processors

Kenai Peninsula (Ninilchik to Nikiski)

- 2 buying stations
- 5 processors

Tyonek

- Setnet sites
- Residences

Genetic tissue collection



Collections summary

Commercial

Year	Samples	% of Harvest
2014	747	49%
2015	1,169	66%
2016	1,458	68%
2017	1,788	87%

Subsistence

Year	Samples	% of Harvest
2014	196	27%
2015	327	35%
2016	289	36%
2017	252	29%



Subsampling for genetic analysis



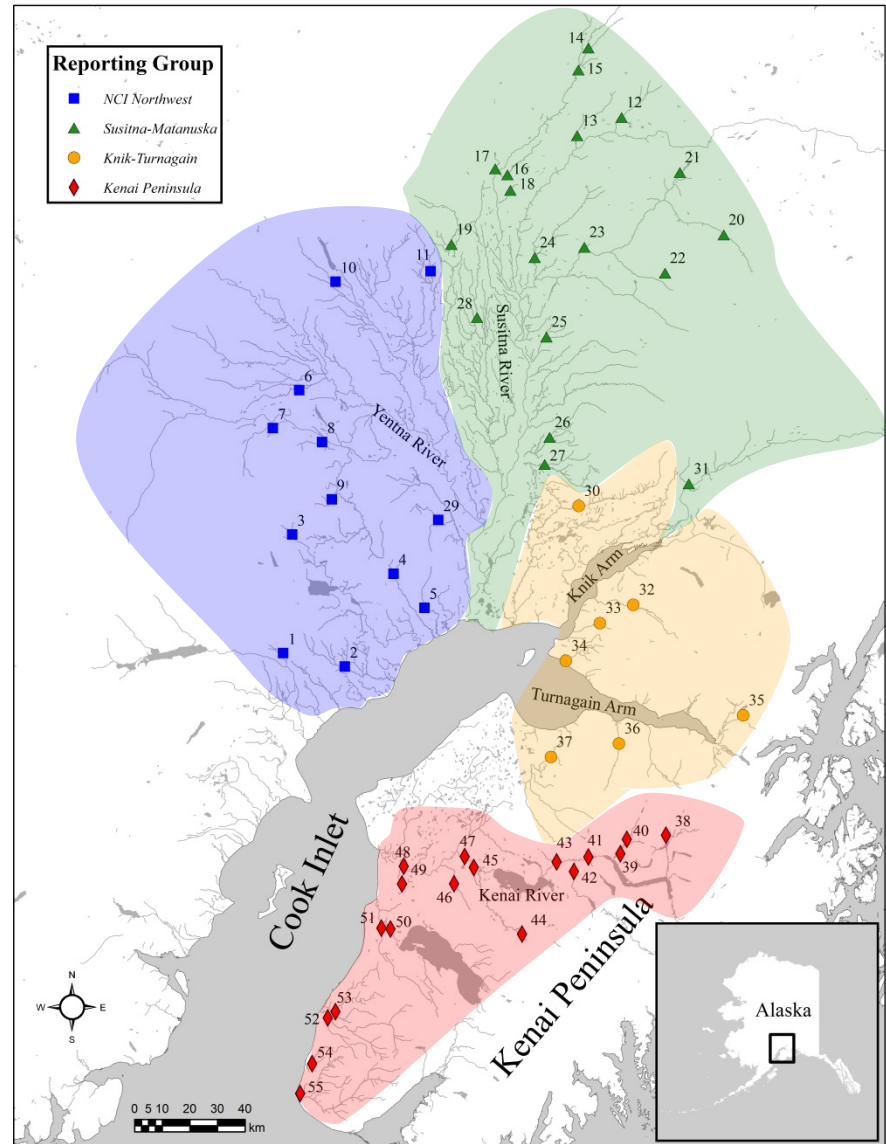
- In proportion to harvest
- Mixture is a collection of samples from several populations
- Min = 100 per mixture

Mixture summary

- **By area – commercial**
 - General Subdistrict (south)
 - General Subdistrict (north)
 - Eastern Subdistrict
- **By time – commercial**
 - May 29 – June 12 (early)
 - June 13 – June 30 (late)
- **By time – subsistence**
 - May 16 – May 31 (early)
 - June 1 – June 30 (late)

Genetic baseline

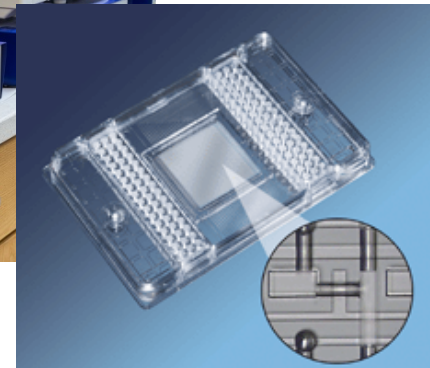
- 55 populations
- Reporting groups tested
 - Groups of populations that can be genetically distinguished
- 4 reporting groups identified
 - *NCI Northwest*
 - *Susitna-Matanuska*
 - *Knik-Turnagain*
 - *Kenai Peninsula*



Harvest sample analysis



- DNA extracted from samples
- Genotyped

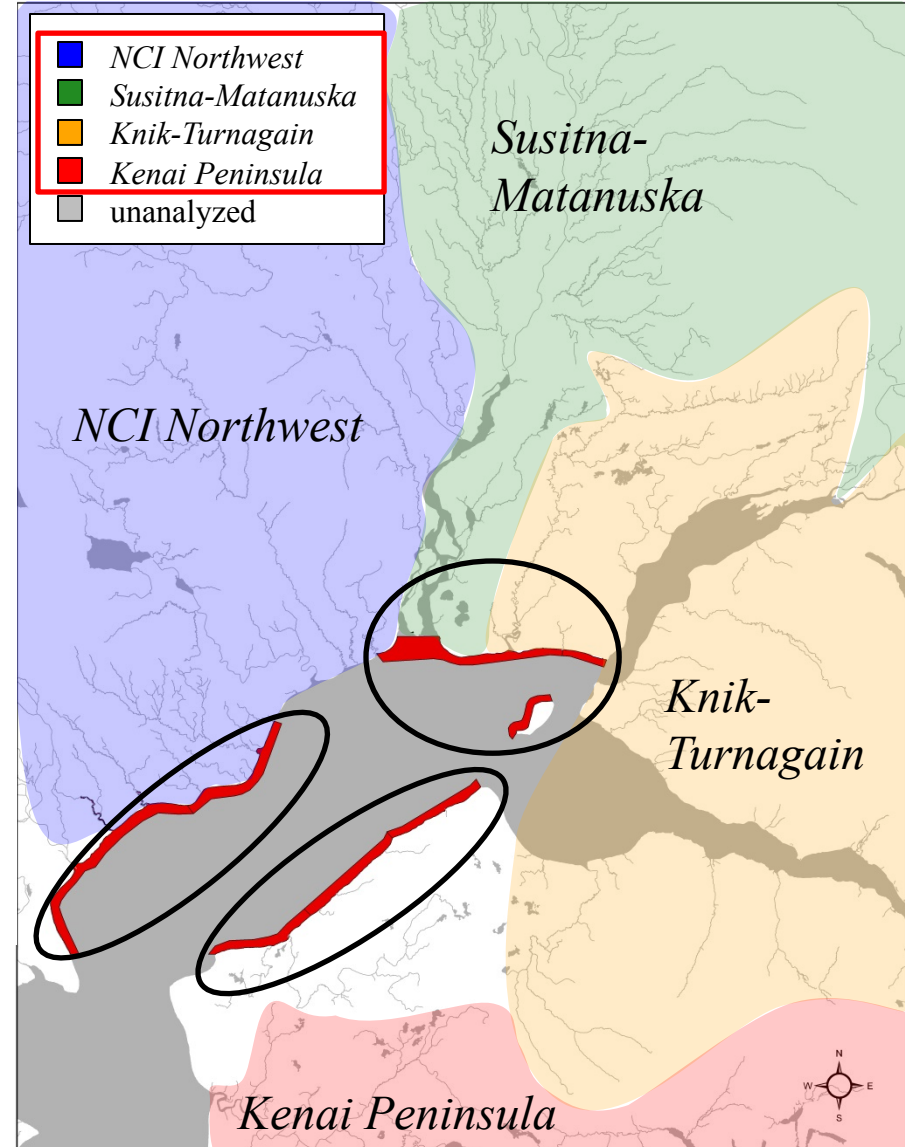
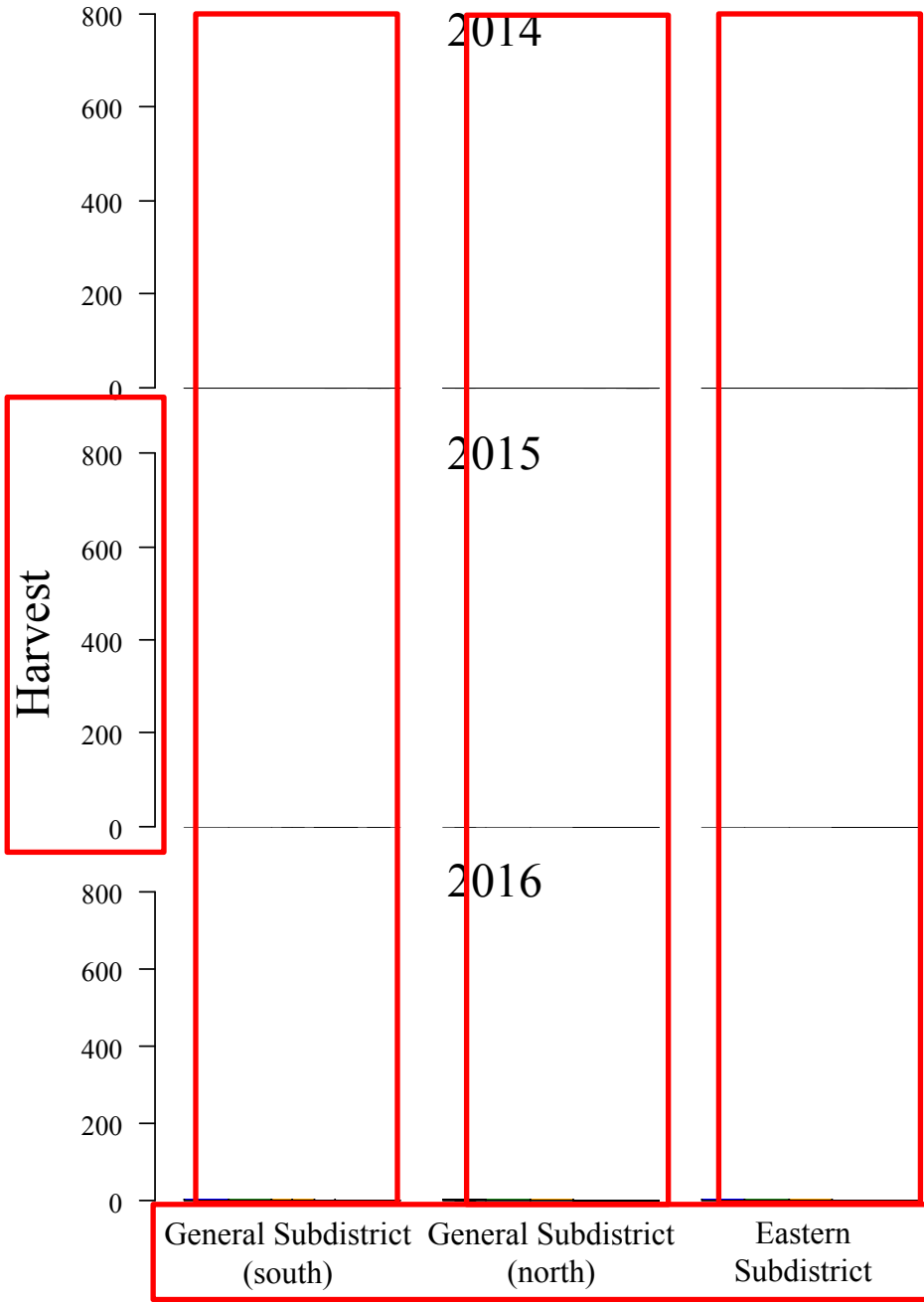


Mixed Stock Analysis (MSA)



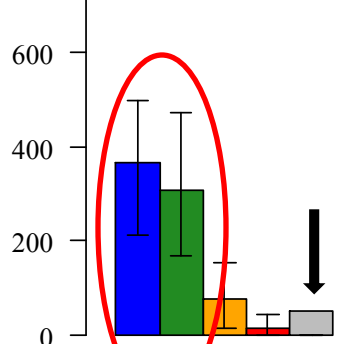
Uses a Bayesian algorithm to estimate the most probable contribution of the baseline populations to explain the combination of genotypes in the mixture sample.

Northern District commercial by area

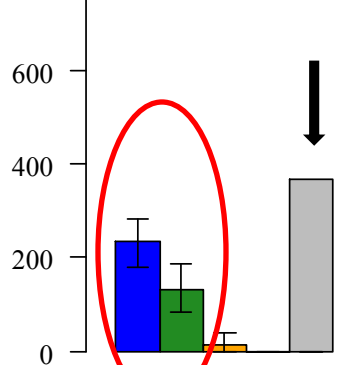


Northern District commercial by area

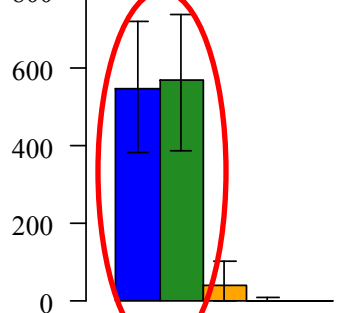
2014



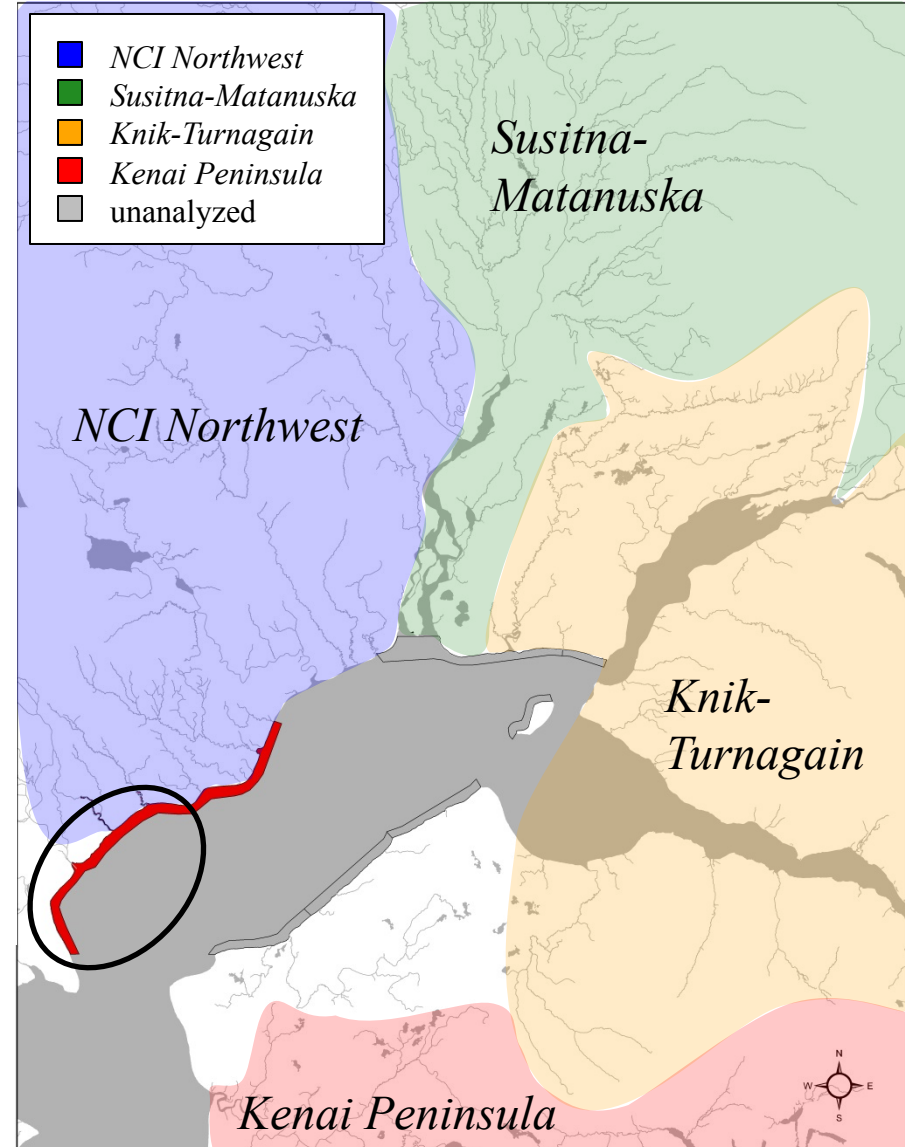
2015



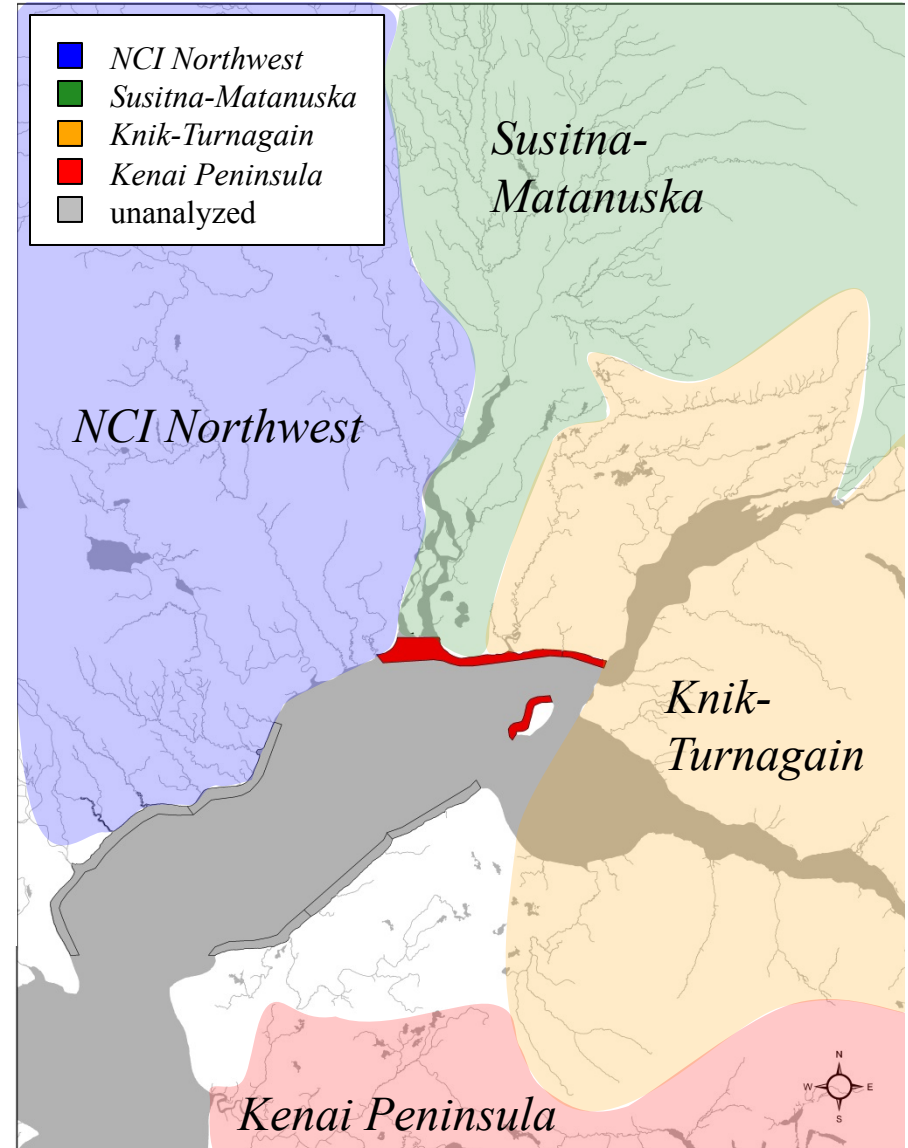
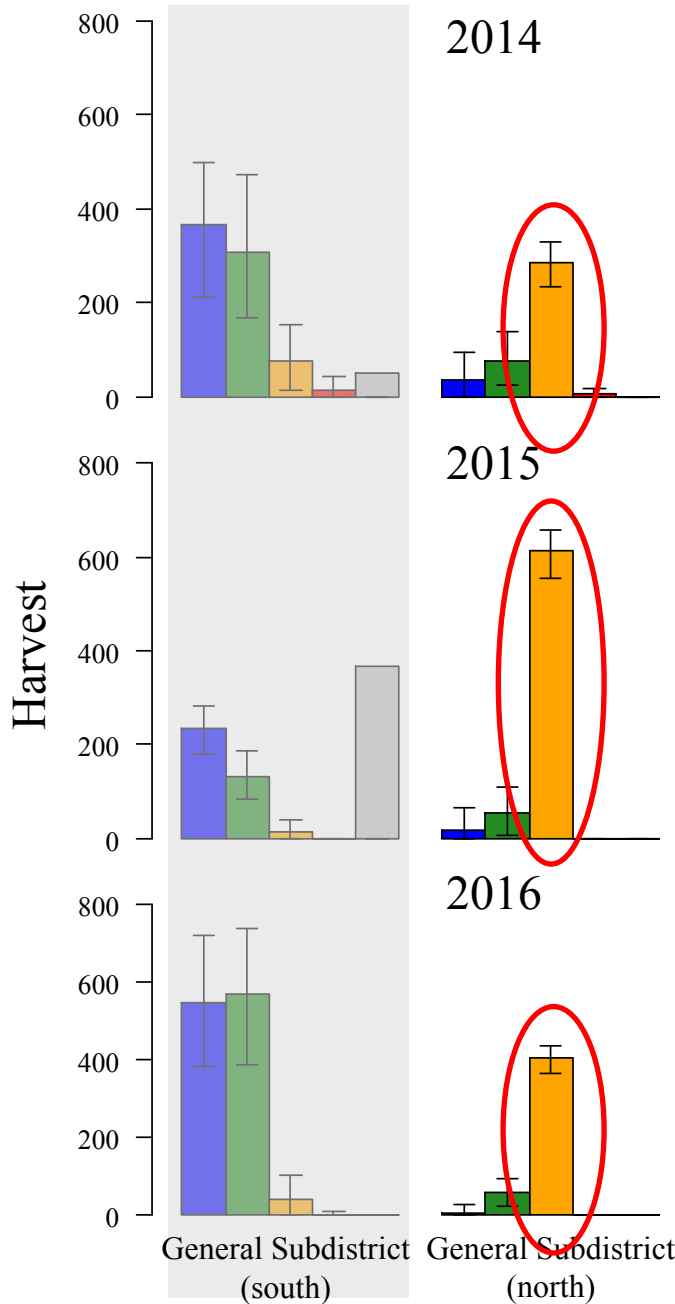
2016



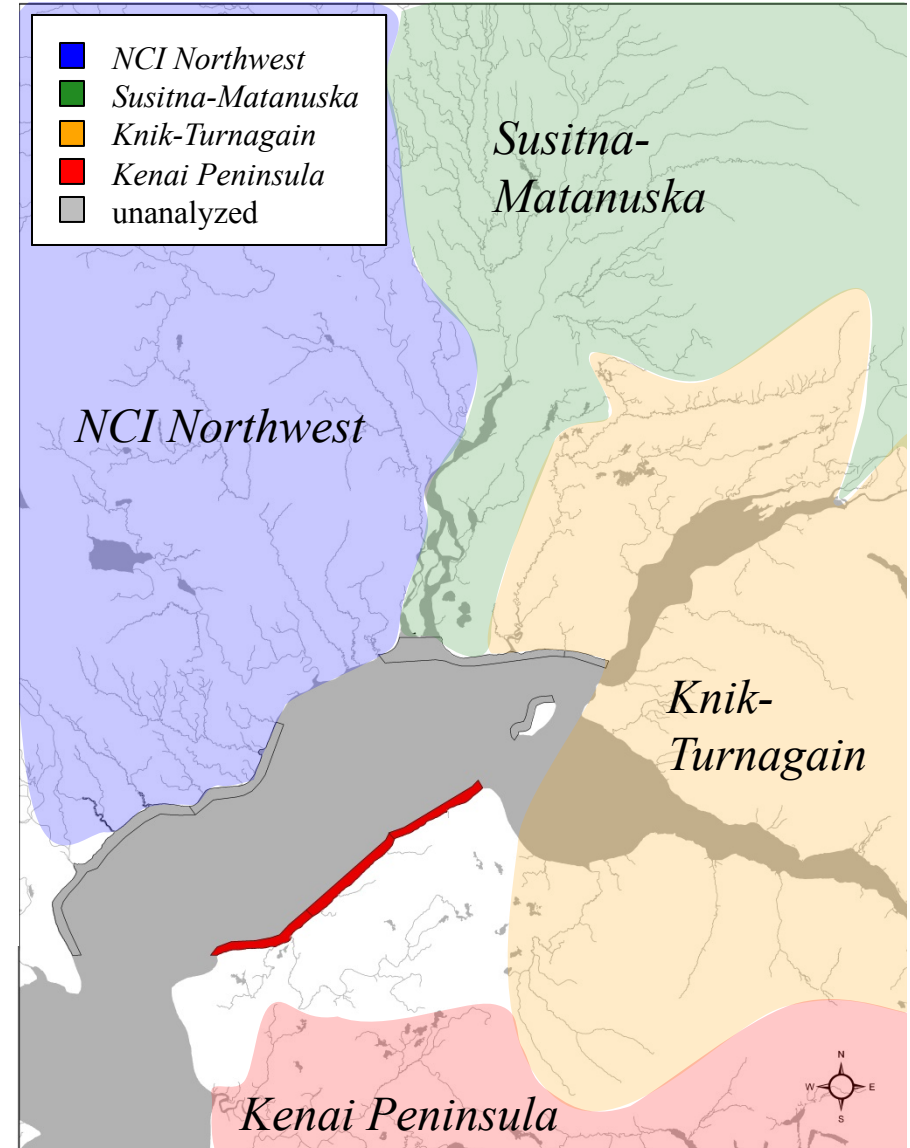
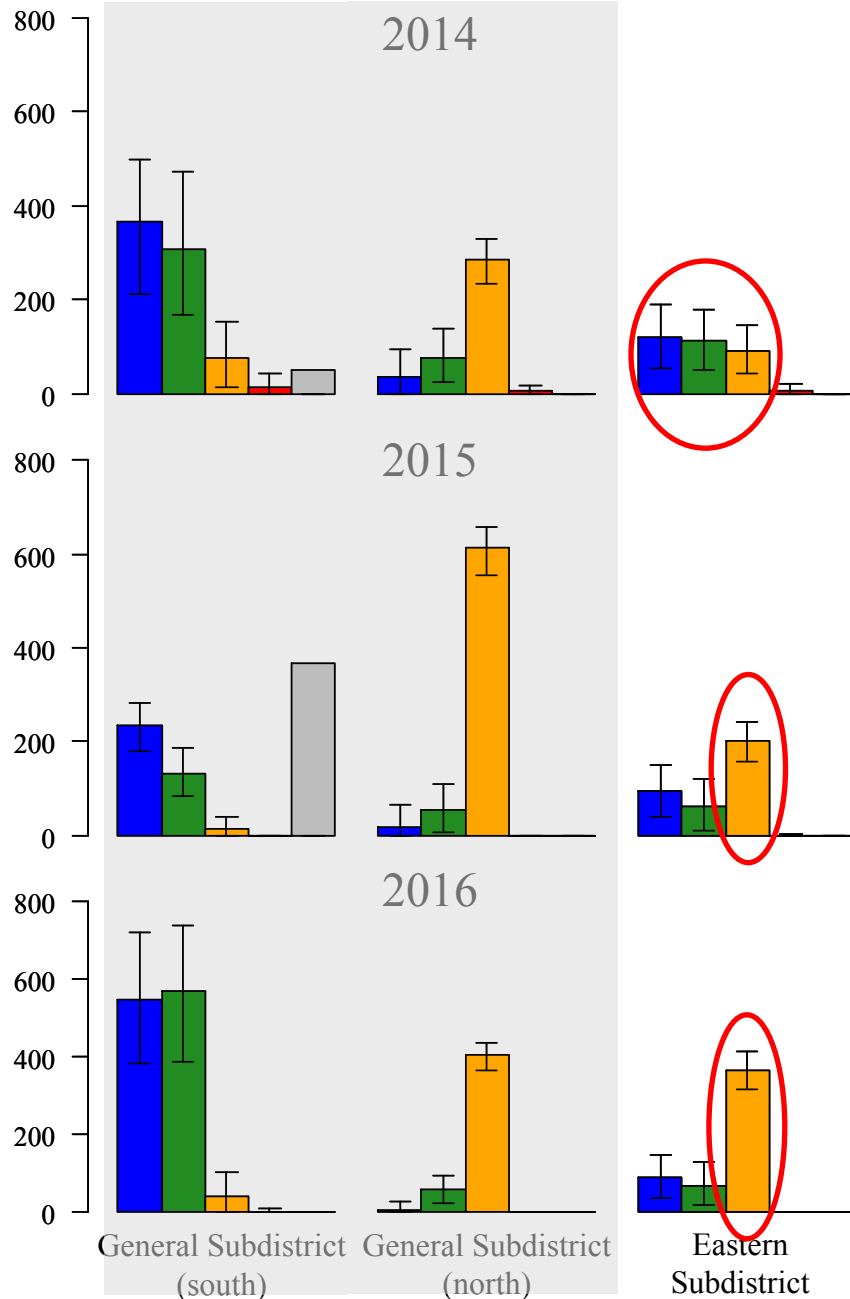
General Subdistrict
(south)



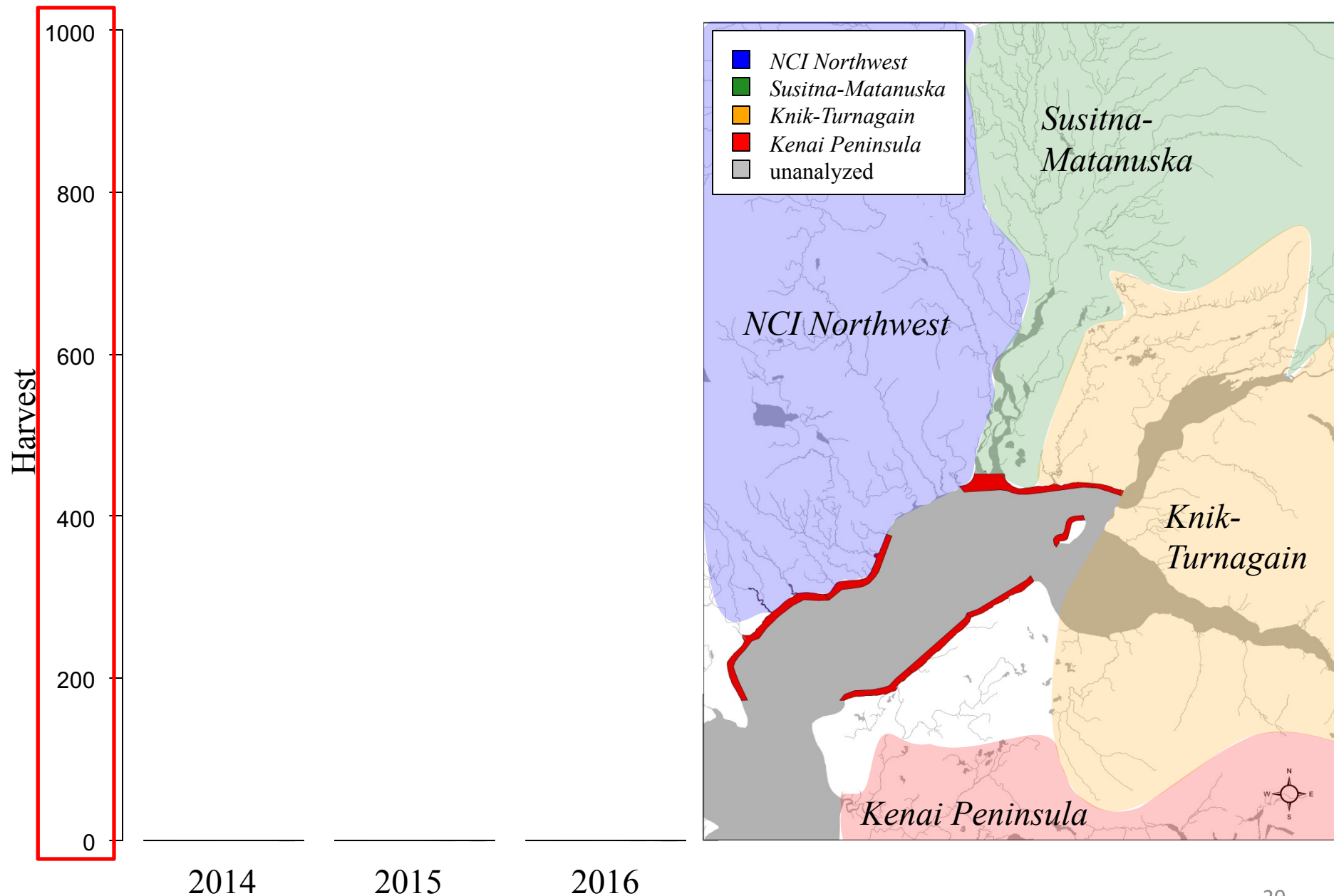
Northern District commercial by area



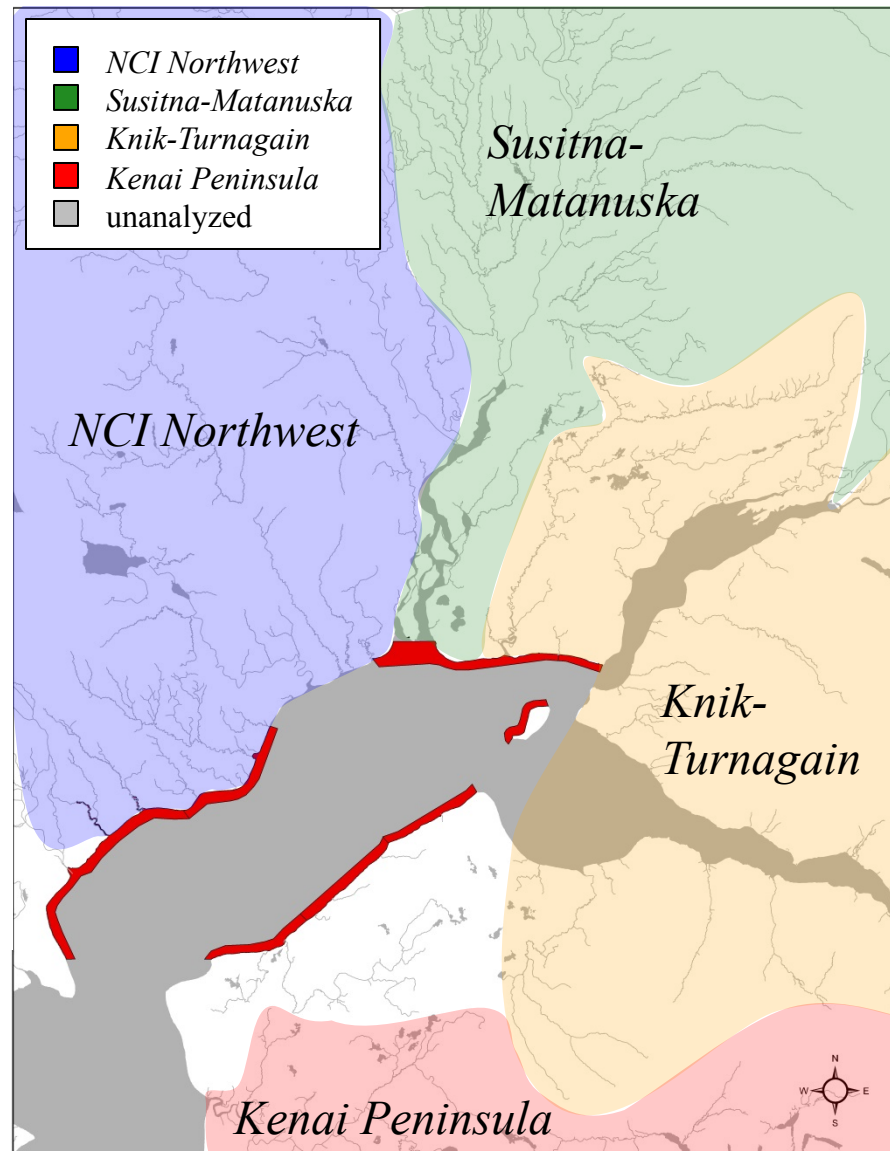
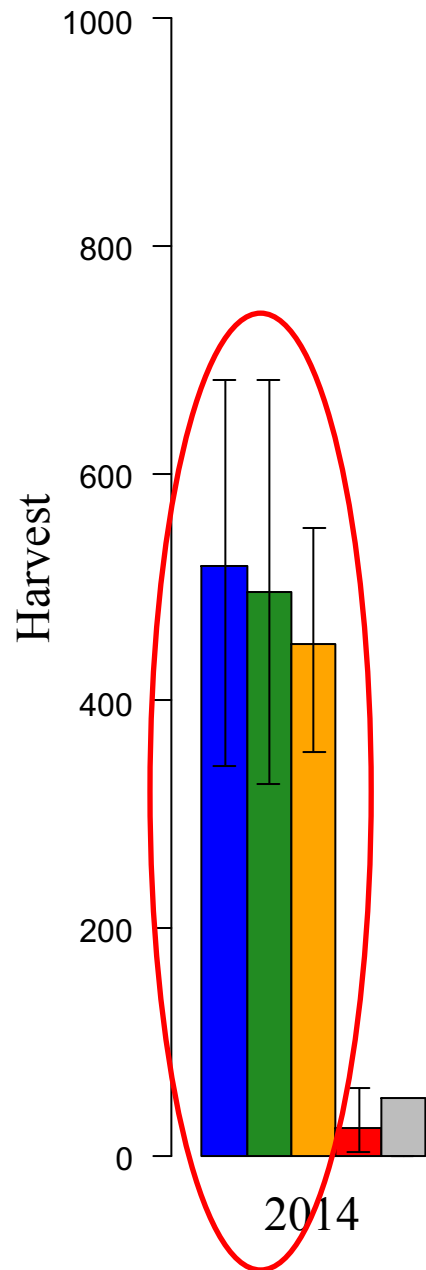
Northern District commercial by area



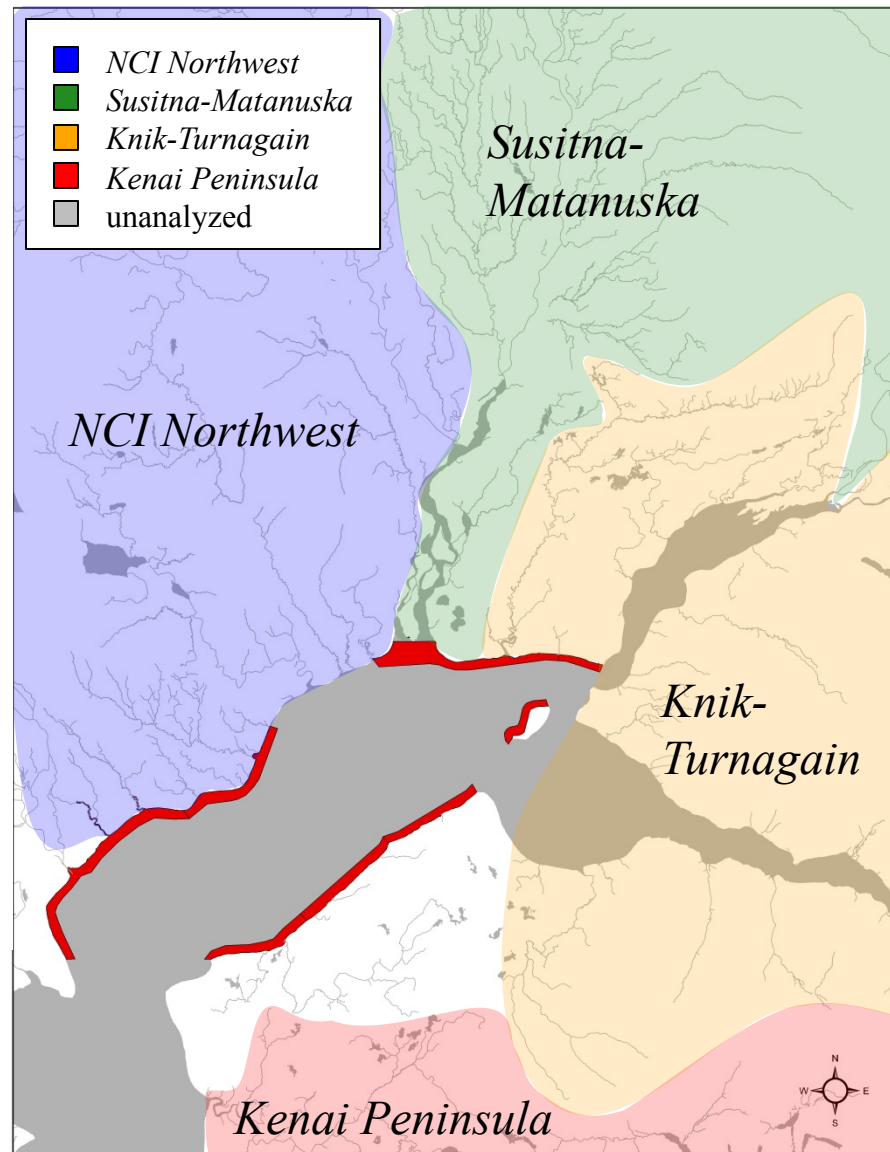
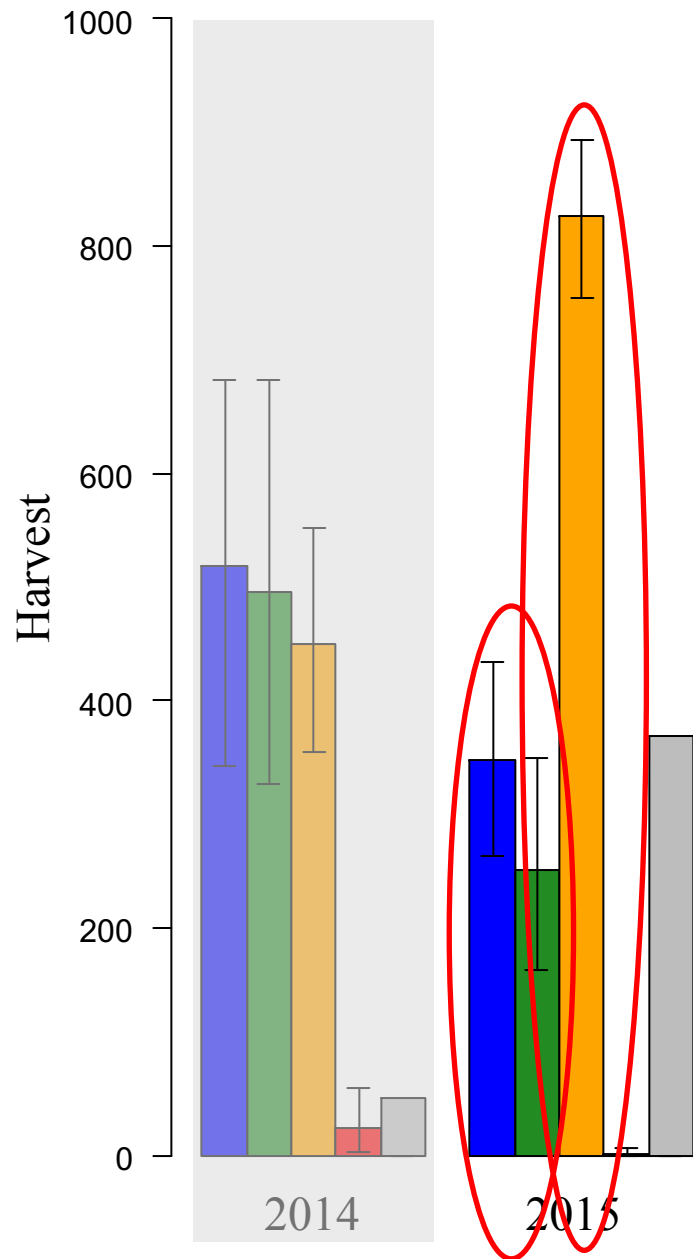
Overall Northern District commercial



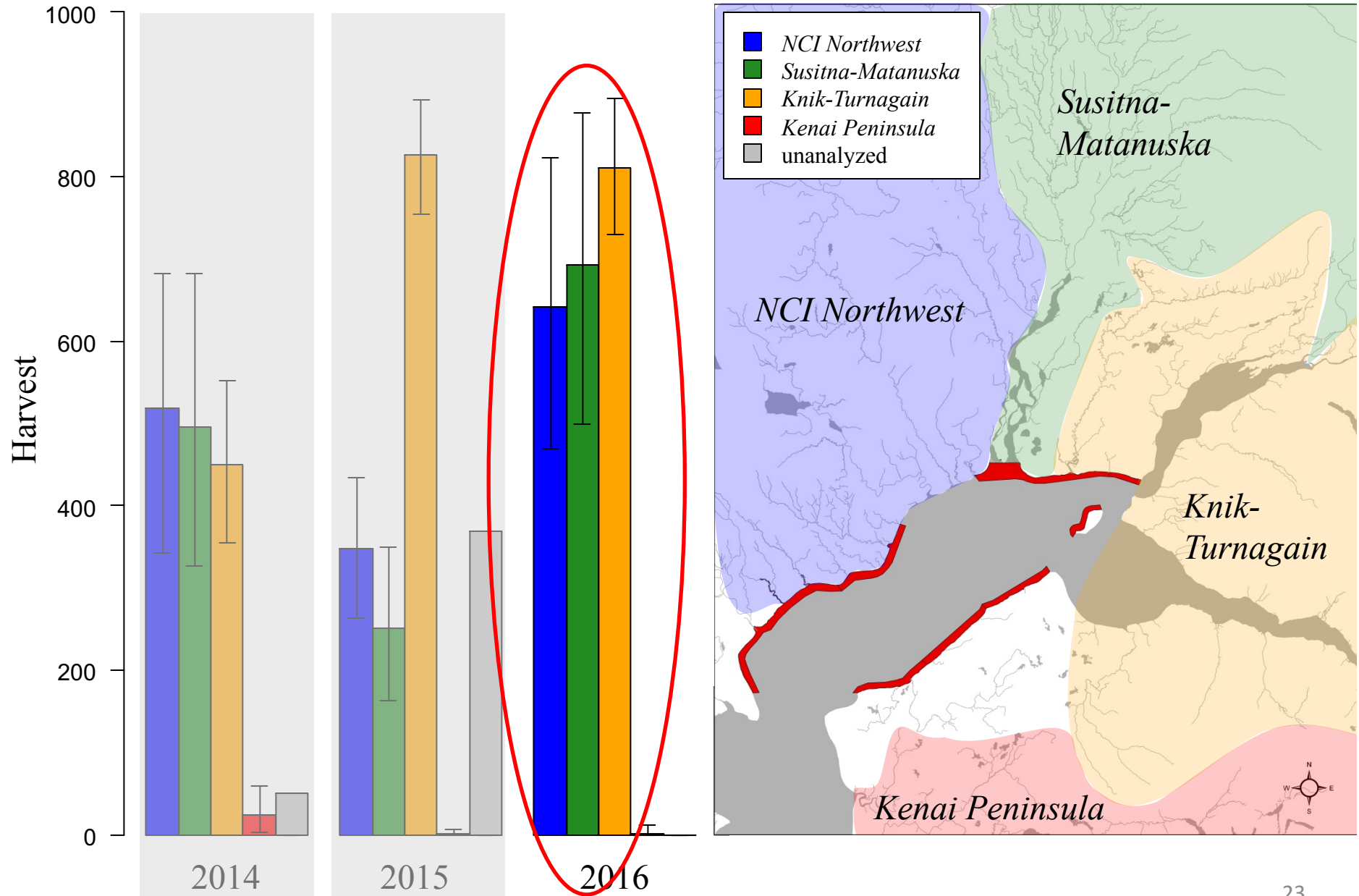
Overall Northern District commercial



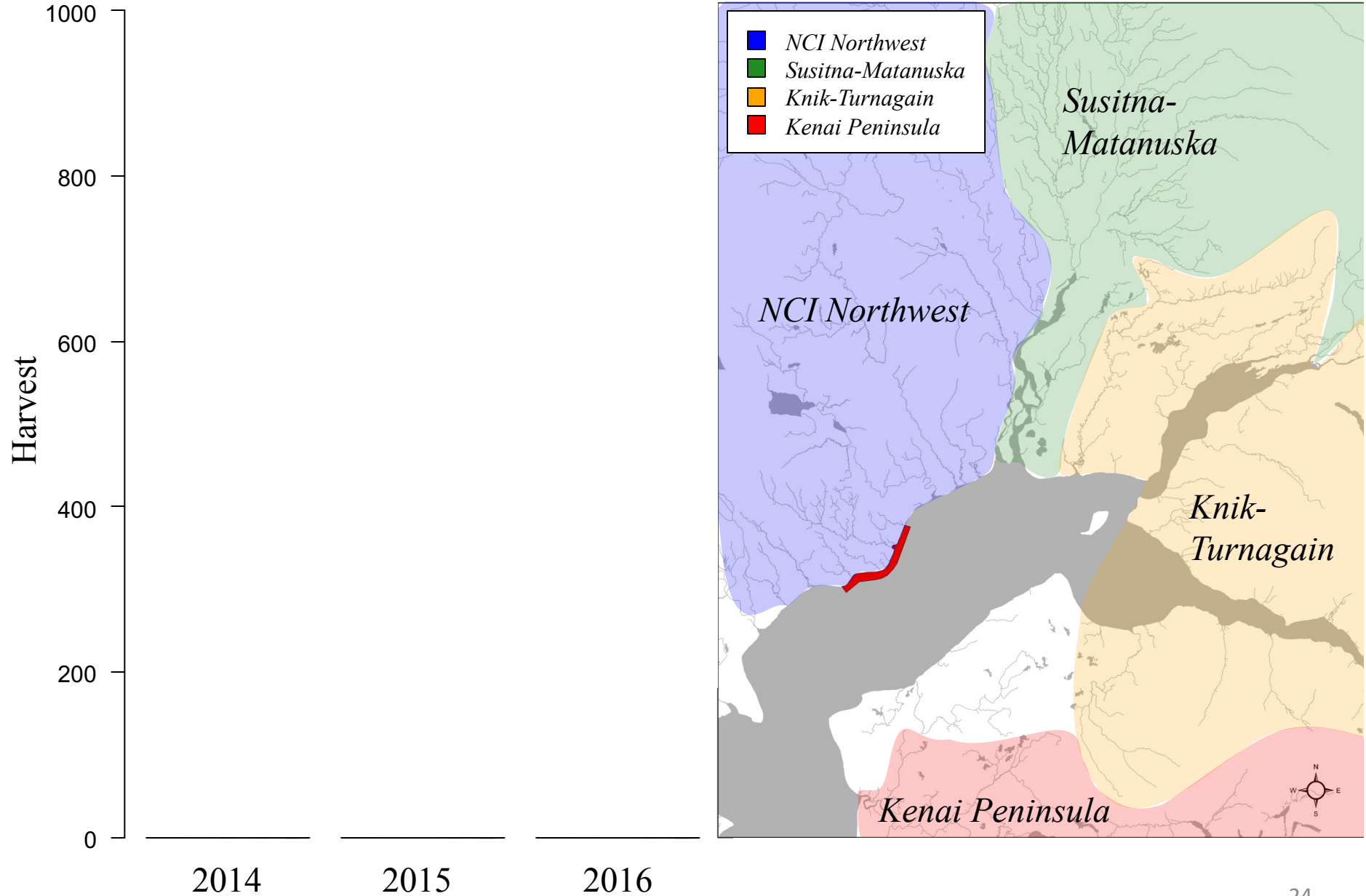
Overall Northern District commercial



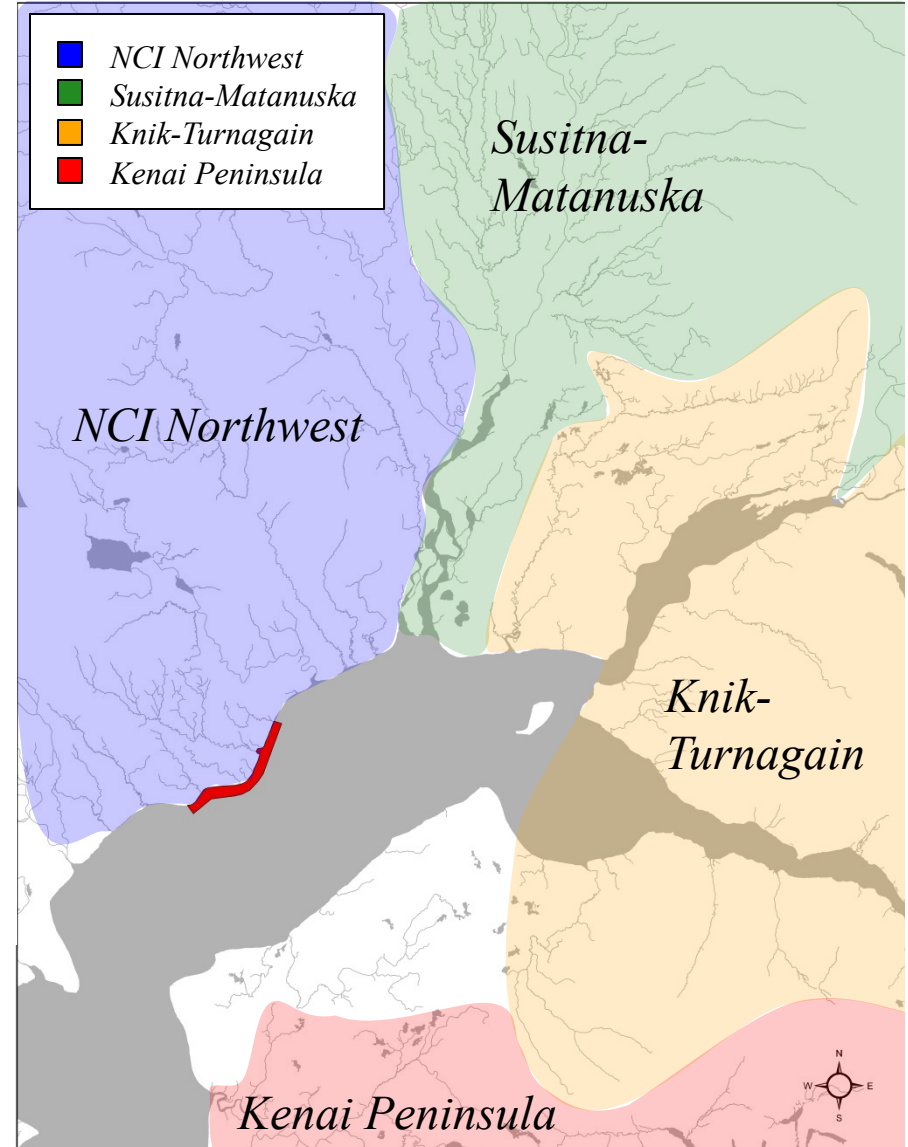
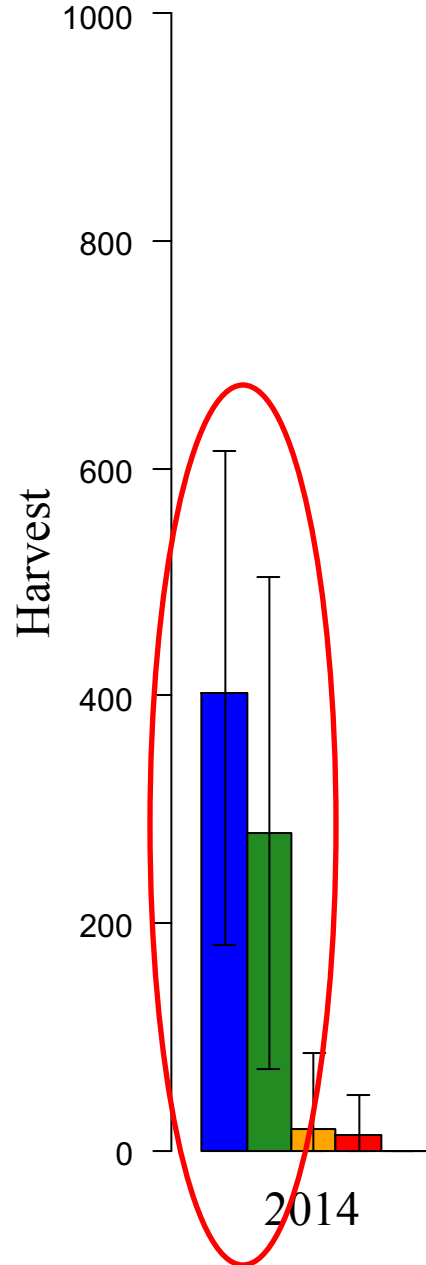
Overall Northern District commercial



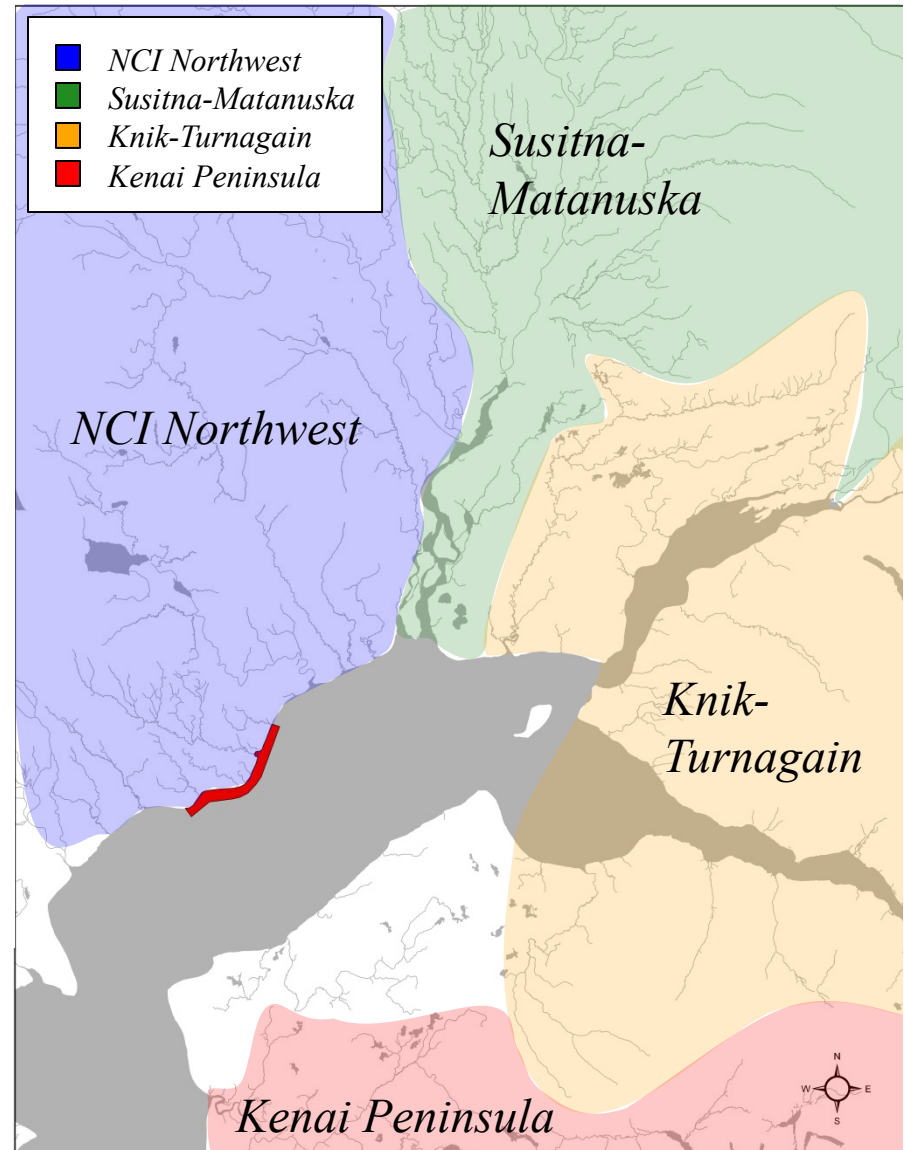
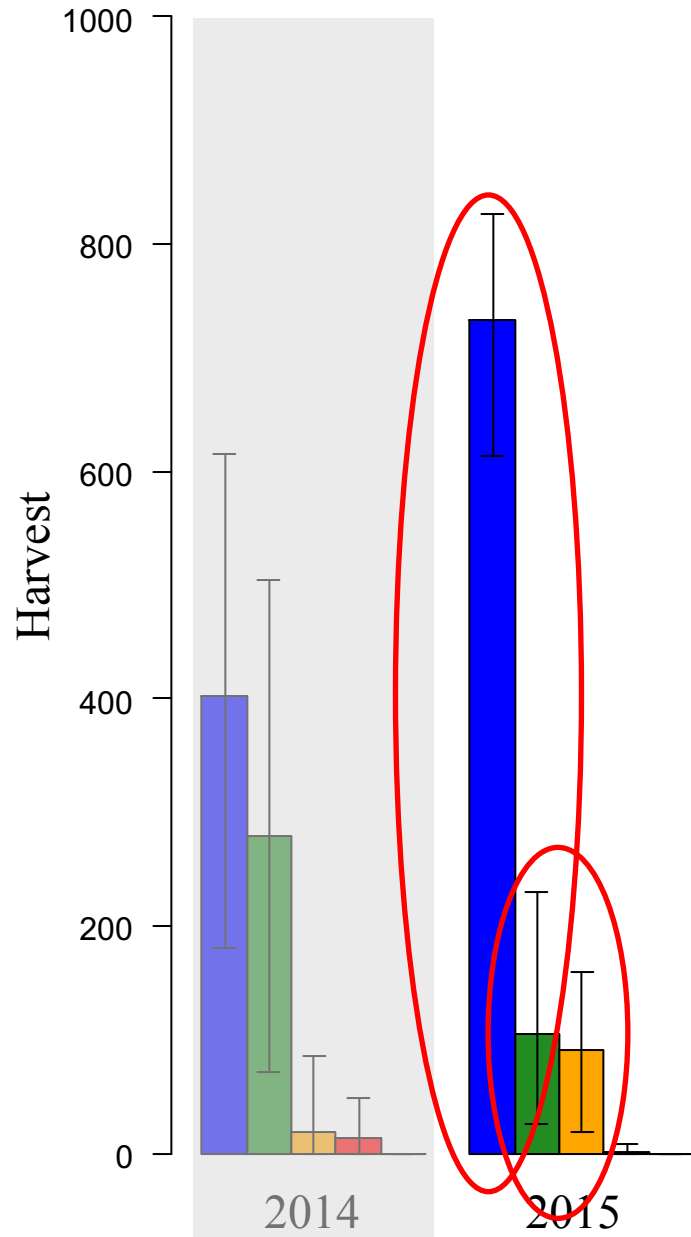
Tyonek subsistence



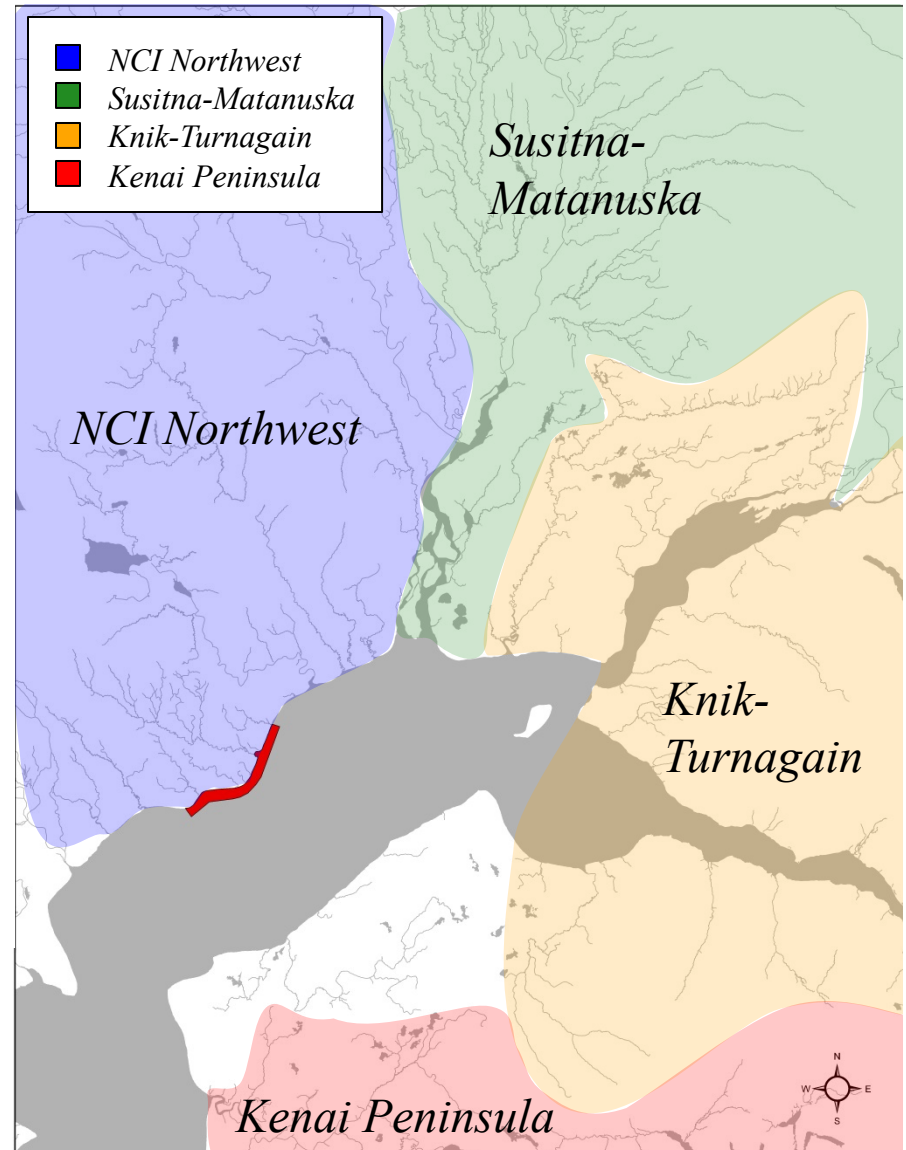
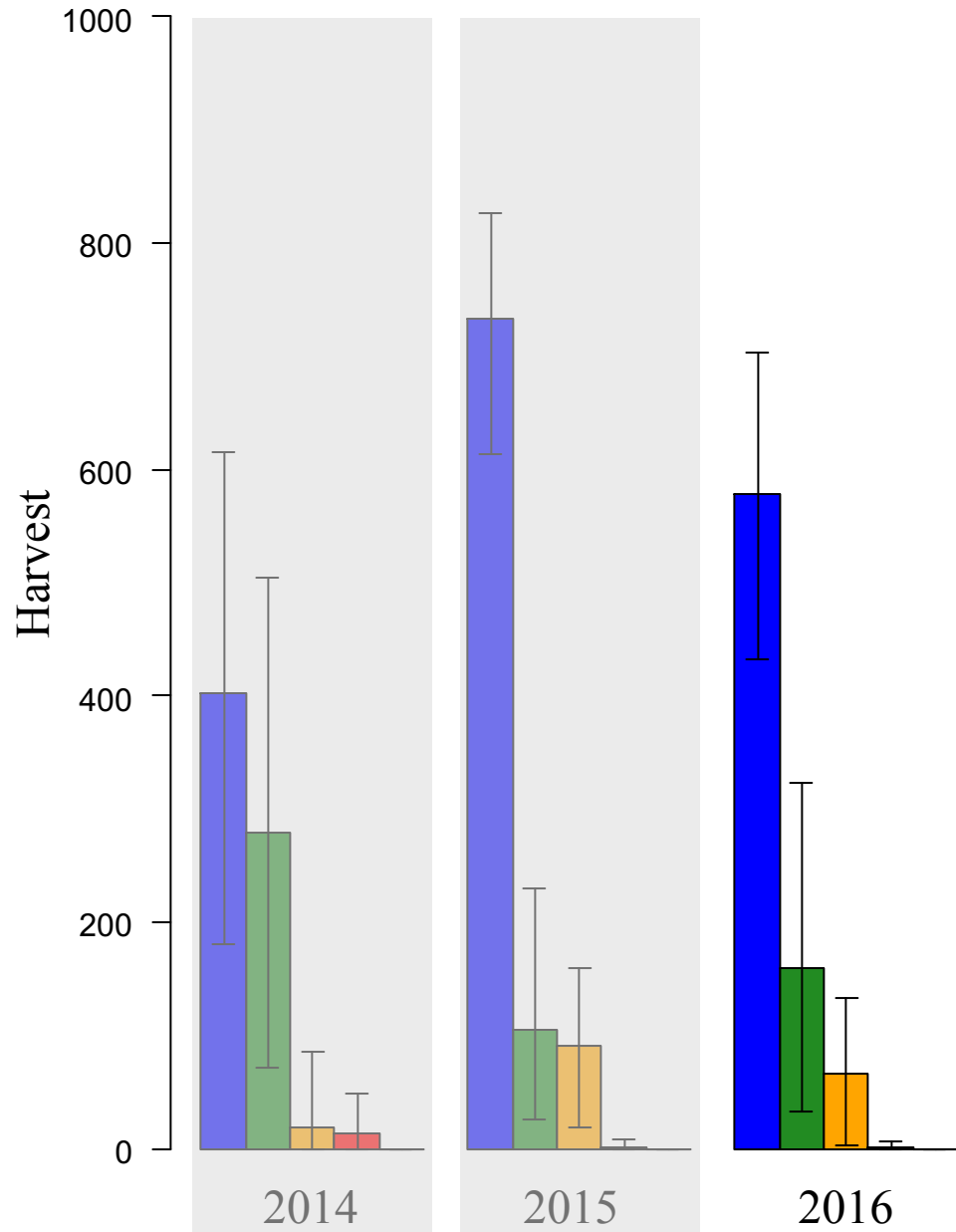
Tyonek subsistence



Tyonek subsistence

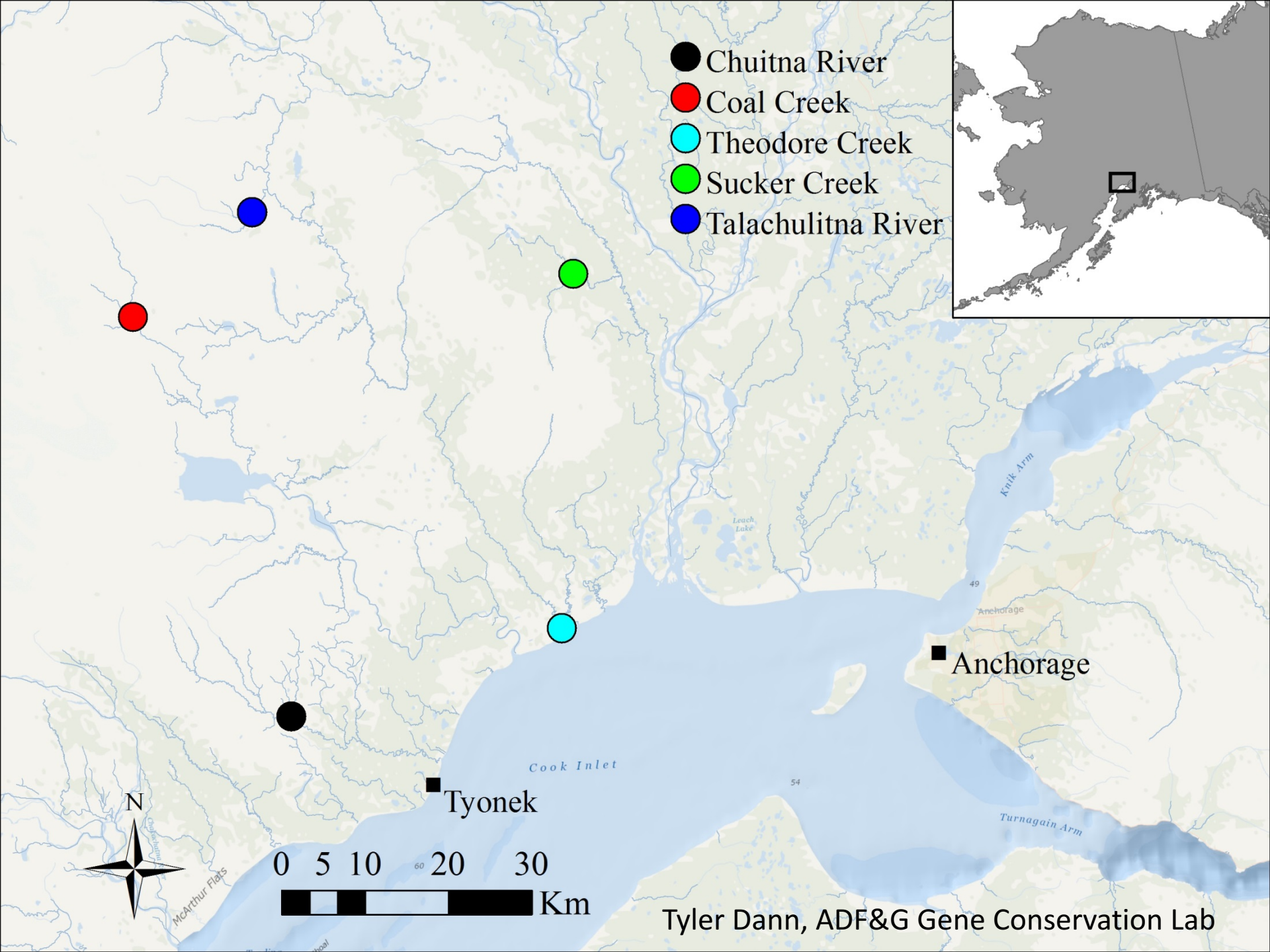


Tyonek subsistence

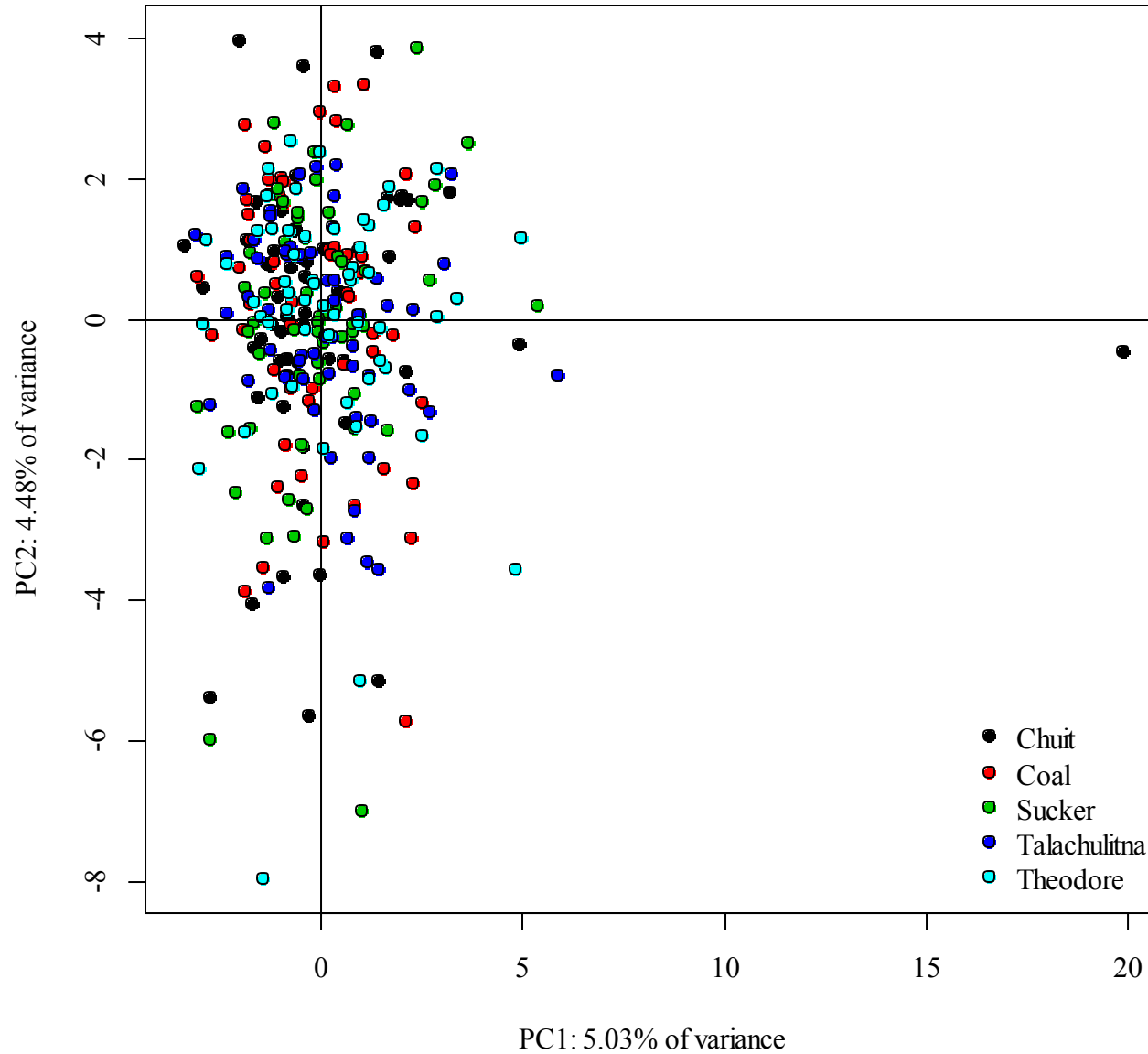


Future work

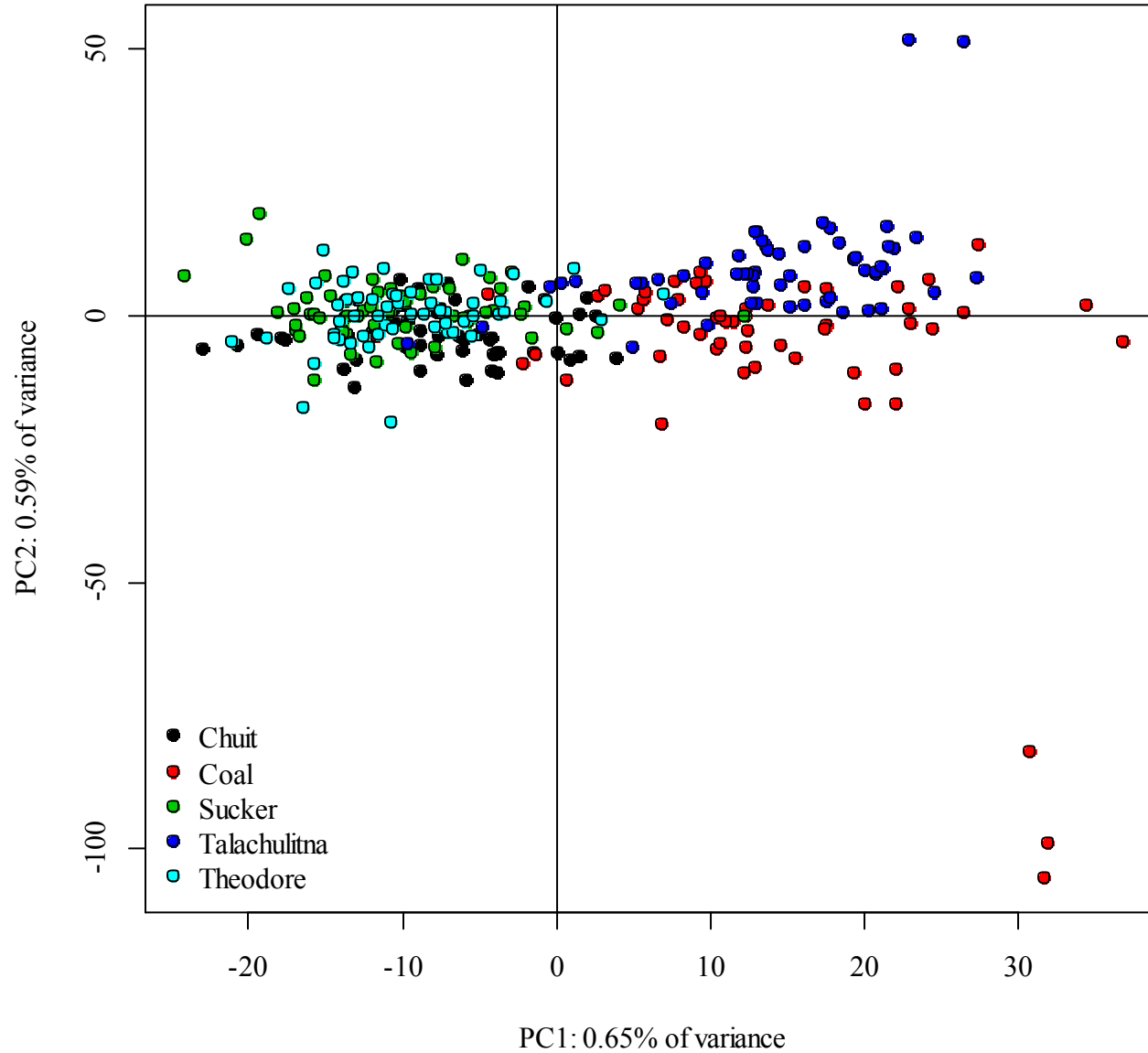
- Analyses
 - Extension: add more genetic markers
 - Pacific States Marine Fishery Commission (PSMFC) project (2017)



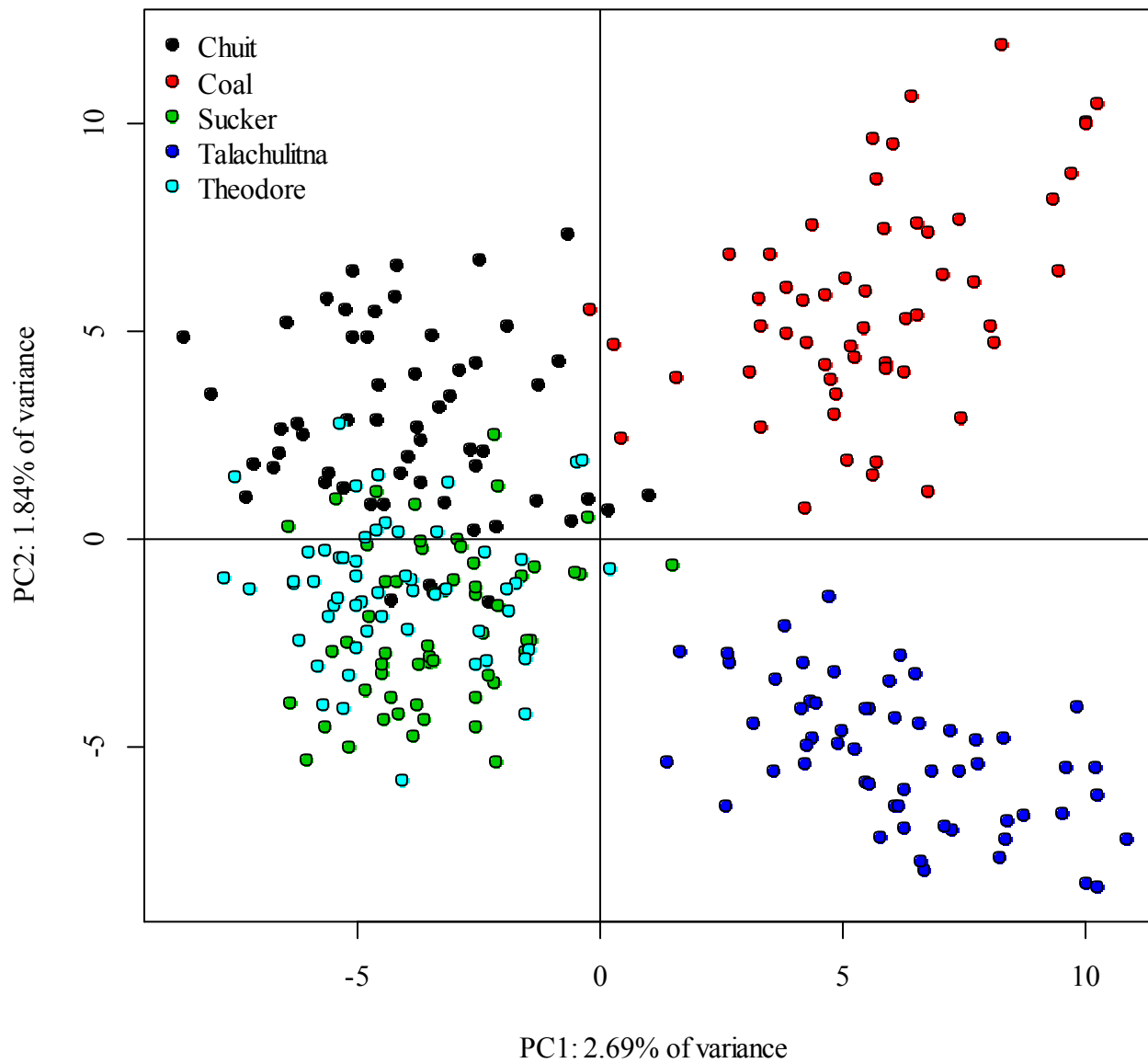
NW CI Chinook: 5 Populations; 282 Fish; 39 current SNPs



NW CI Chinook: 5 Populations; 282 Fish; 13.8K RAD SNPs



NW CI Chinook: 5 Populations; 282 Fish; Top 500 Overall Fst SNPs



Acknowledgements

- Field sampling
 - Department staff
 - Commercial fishermen
 - Subsistence fishers
- Genetic analysis
 - Gene Conservation Lab staff
- Funding
 - AKSSF
 - PSMFC



Questions?

