

# **Genetic Stock Composition of the Commercial and Sport Harvest of King Salmon in Westward Region, 2014–2016**

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**A Report to the Alaska Board  
of Fisheries**

**January 2017**

**Divisions of Commercial  
Fisheries and Sport Fish**

**Oral Report: RC 3; Tab 6**

**Written Report: RC 3; Tab 10**

# Topics to be covered:

1. Background
2. Sampling Methods and Results
  - Kodiak Management Area Comm., 2014-2016
  - Kodiak Regulatory Area Sport, 2014-2016
3. Genetic Baseline
  - Reporting Groups
  - Genetic Diversity
4. Mixed Stock Analysis Methods & Results
  - Kodiak Management Area Comm., 2014-2016
  - Kodiak Regulatory Area Sport, 2014-2016
5. Interpretation

# Background

- Chinook Salmon Research Initiative (CSRI)
- Alaska stocks depressed
- 12 indicator stocks selected
  - 1 stock on Kodiak : Karluk River
  - 1 stock on Alaska Peninsula: Chignik River



# Background

- CSRI Information gaps identified
  - Adult spawning abundance
  - Juvenile abundance
  - Stock of origin of marine catches
- Project proposed for 2014–2016 to identify stock of origin in marine commercial and sport fisheries in Kodiak

# Background

- No directed king salmon commercial fishery
- Directed sockeye, pink, chum, and coho fisheries
- Escapement-based management
- Directed king salmon sport fishery



*Ayakulik River*

# Sampling Methods

(Commercial Fishery)

- Objective: sample king salmon commercial harvest in marine waters
- Sample at 3 ports:  
Kodiak, Larsen Bay, Alitak
- Collect and analyze 250–380 samples per spatio-temporal stratum (4 areas, 2 temporal strata)  
Early: June 1 – July 5
  - Non retention of Kings (>28") Seine gear only, KMA wideLate: July 6 – Aug 5
  - Non retention of Kings (>28") Southwest Kodiak District to Cape Kuliuk



# Sampling Methods

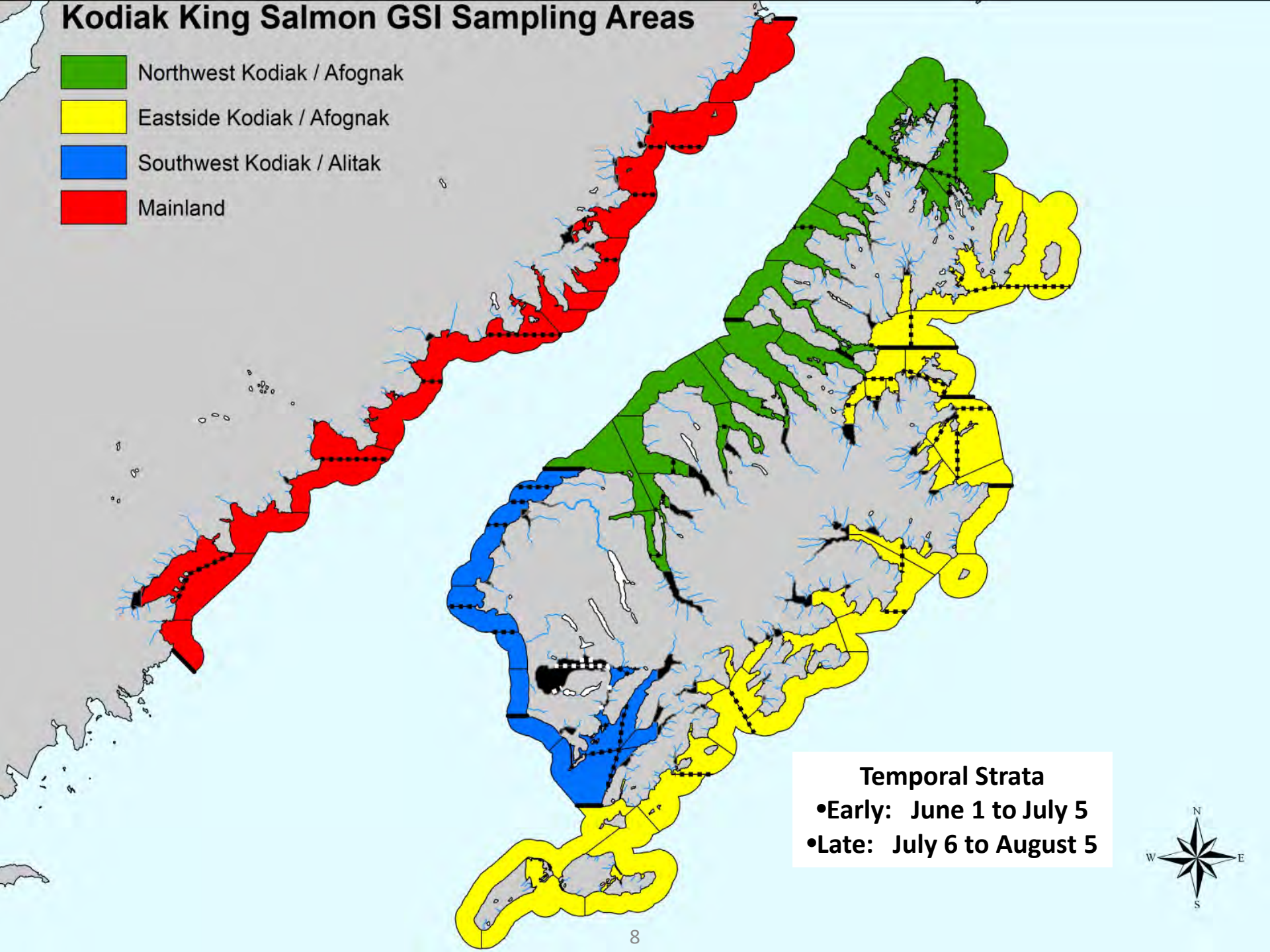
(Commercial and Sport)

- Collect genetic tissue (axillary process)
- Paired with age (scale), sex, and length
- Retain head for CWT analysis if adipose fin is clipped



# Kodiak King Salmon GSI Sampling Areas

- Northwest Kodiak / Afognak
- Eastside Kodiak / Afognak
- Southwest Kodiak / Alitak
- Mainland



## Temporal Strata

- Early: June 1 to July 5
- Late: July 6 to August 5





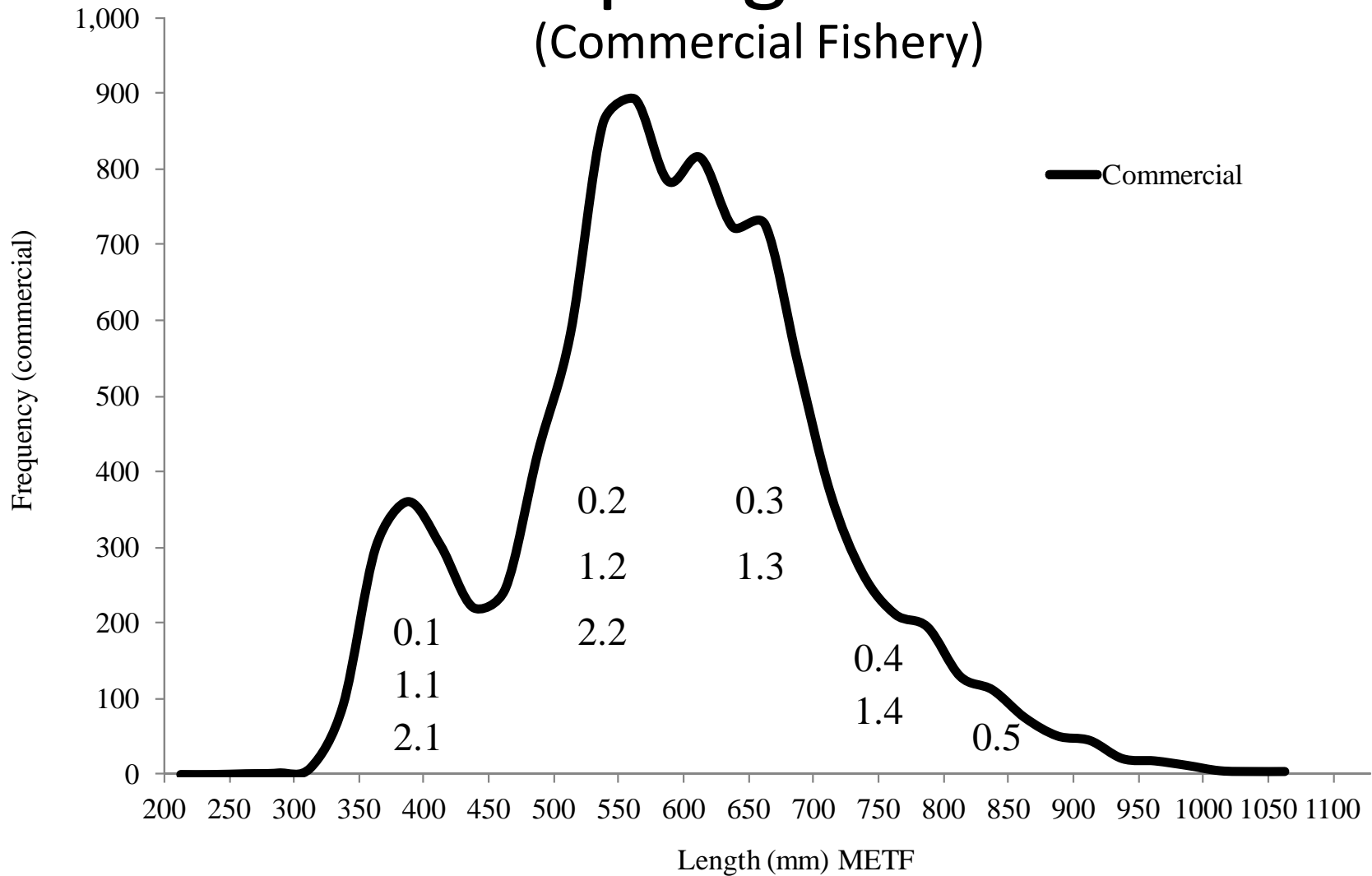
# Sampling Results

## (Commercial Fishery)

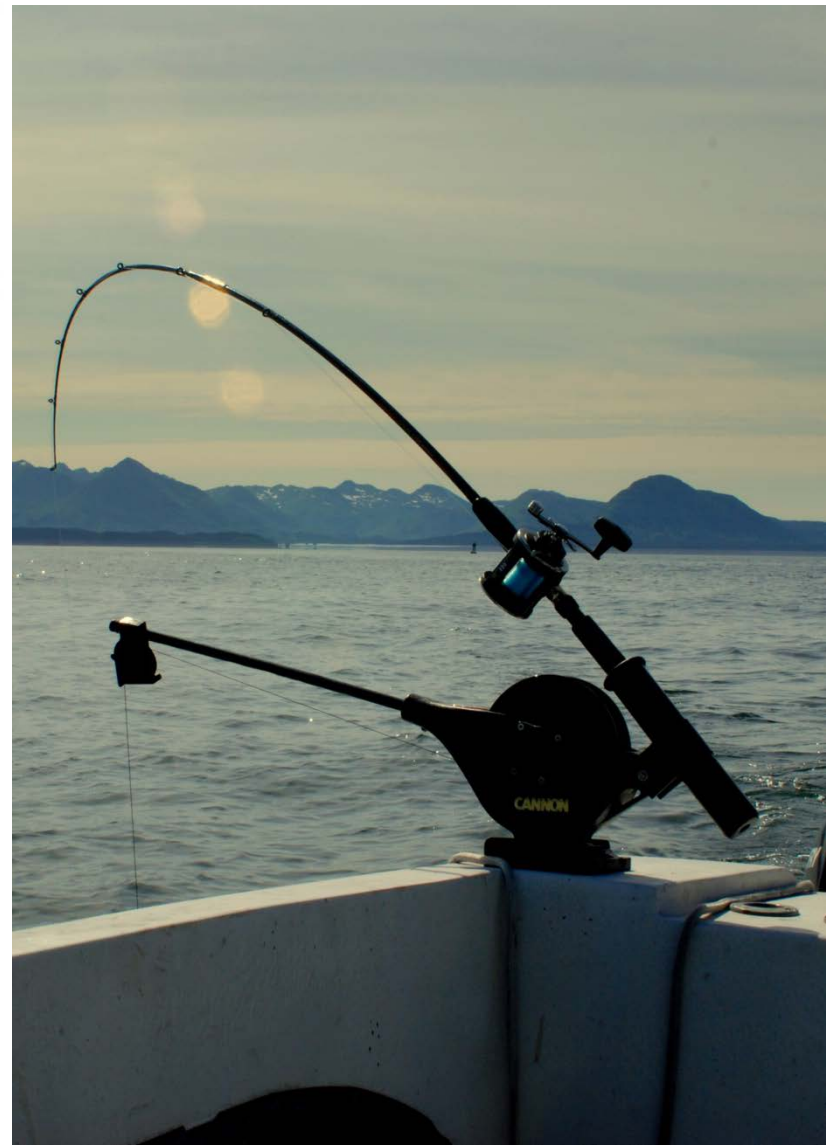
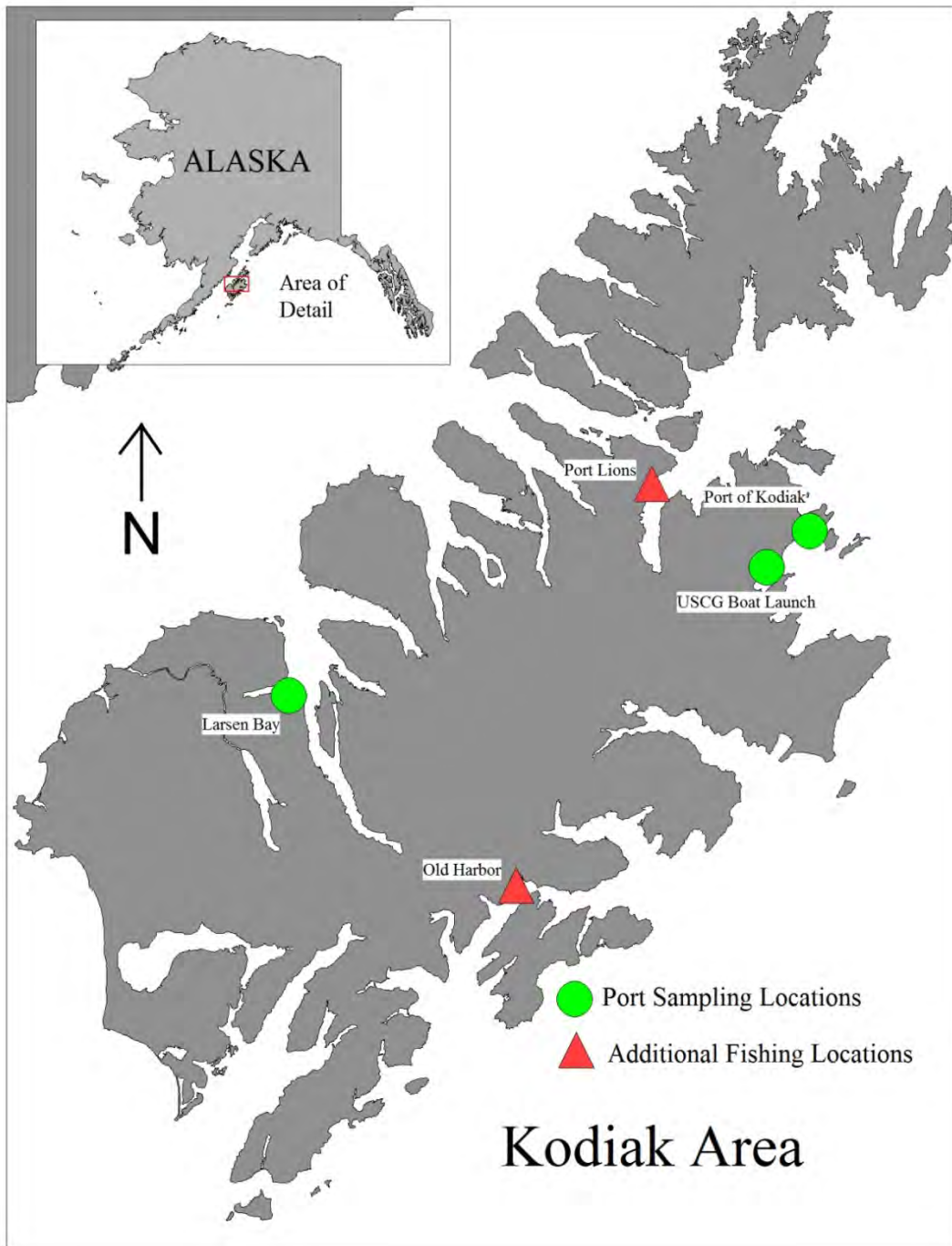
Geographic Area	Temporal		2014	2015	2016
	Stratum	Dates	Samples Collected		
NW Kodiak/Afognak	Early	6/1–7/5	657	567	583
	Late	7/6–8/5	406	404	453
SW Kodiak/Alitak	Early	6/1–7/5	287	307	310
	Late	7/6–8/5	426	496	291
Eastside Kodiak/Afognak	Early	6/1–7/5	294	434	316
	Late	7/6–8/5	505	285	322
Mainland	Early	6/1–7/5	Closed	Closed	461
	Late	7/6–8/5	475	282	453
Mixed Areas			231	70	90
Total			3,281	2,845	3,279

# Sampling Results

(Commercial Fishery)



Length frequency plot of the size (METF mm) of king salmon sampled as part of the Kodiak commercial fishery genetics project, 2014 to 2016.



# Sampling Methods

(Sport Fishery)

- Sample 3 locations near the City of Kodiak
  - Saint Paul Harbor (small boat harbor)
  - Saint Herman Harbor (Dog Bay boat harbor)
  - Coast Guard recreational boating launch
- Sample opportunistically at other Kodiak Island locations
  - Processing plant
  - Larsen Bay
- Sample as many fish as possible with one sampler
- Mid-May through mid-September
- Collect Age, Sex, and Length
- Retain head for CWT analysis if adipose fin is clipped

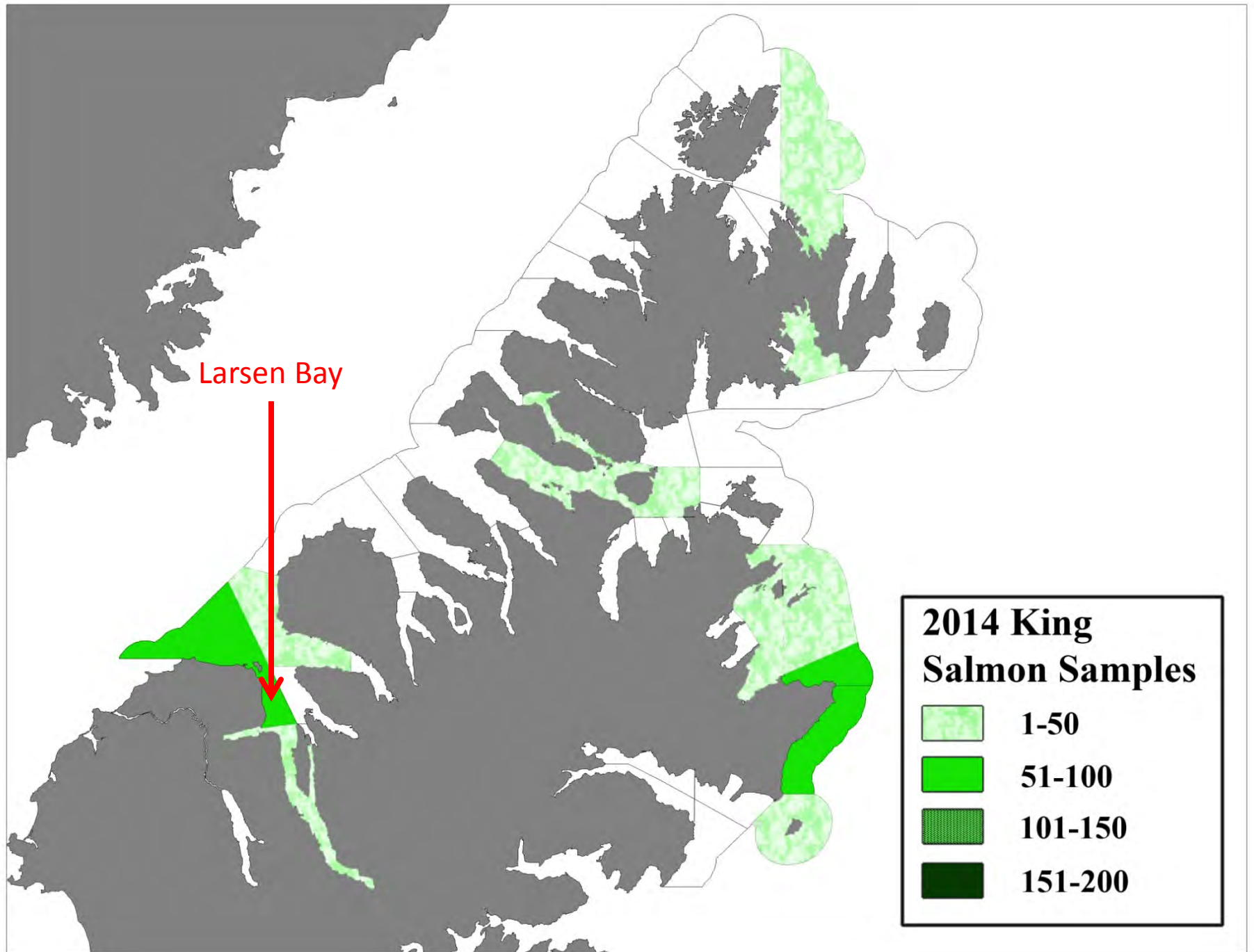


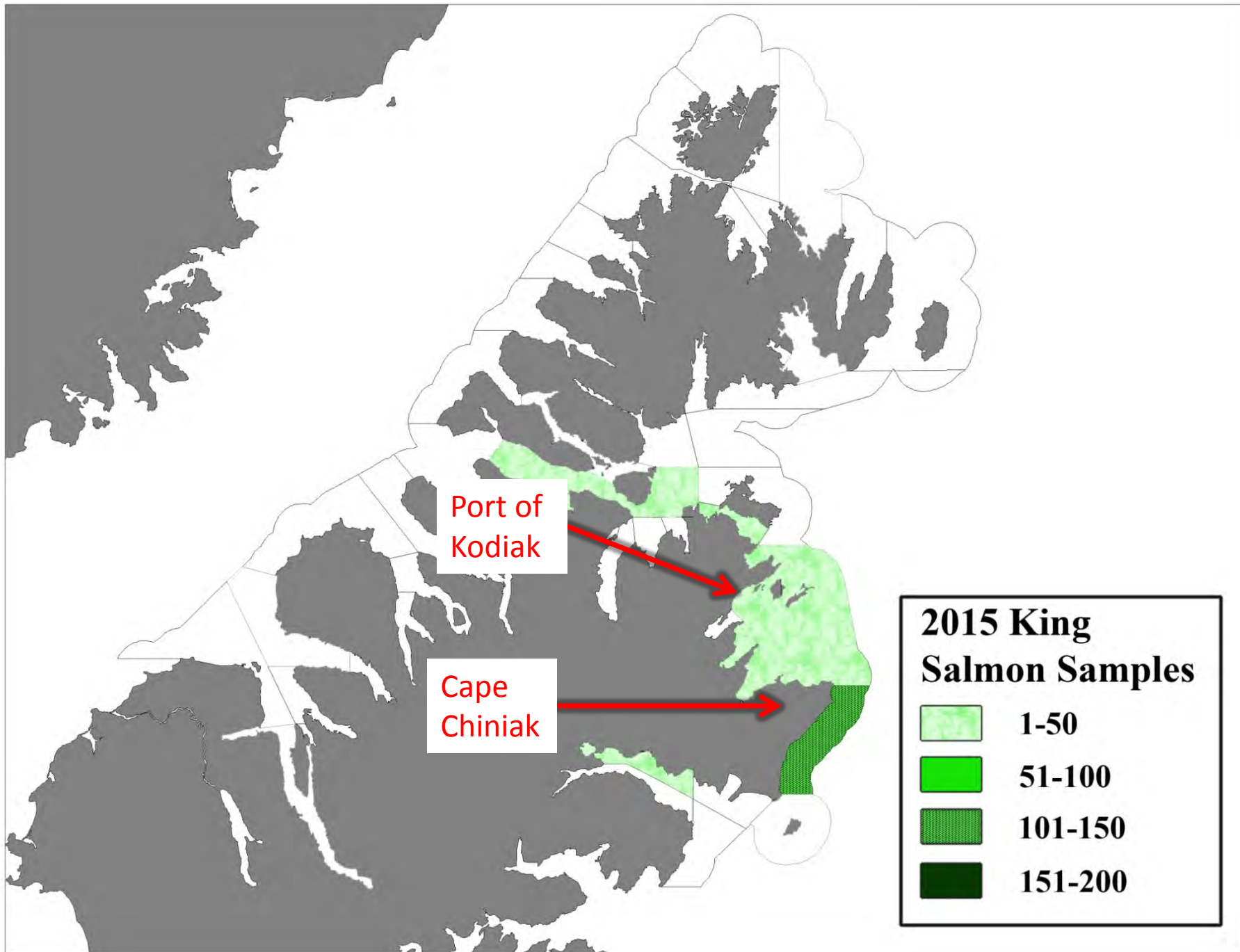
# Sampling Results

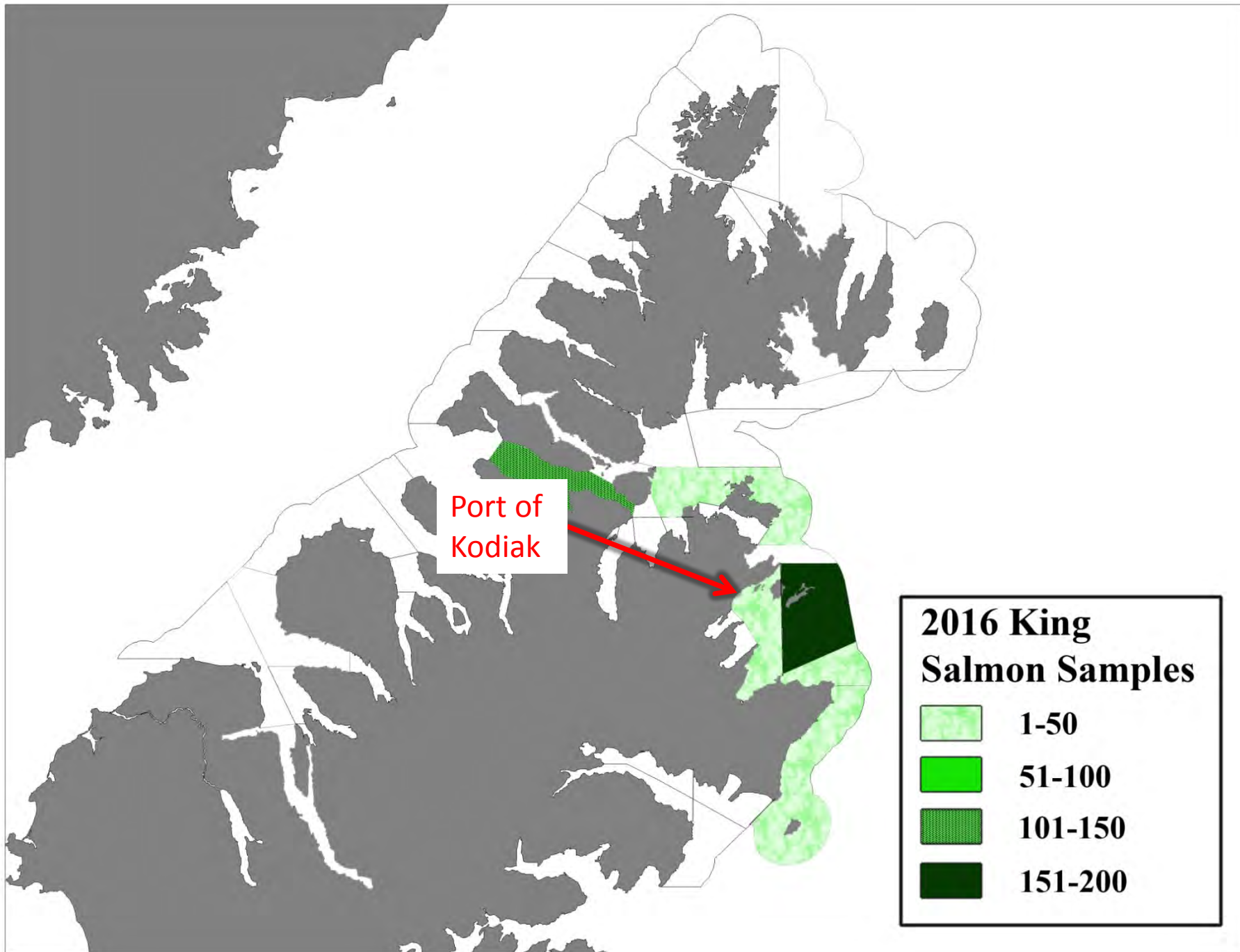
(Sport Fishery)

<u>Year</u>	<u>Samples Collected</u>	<u>Harvest</u>
2014	417	8,049
2015	282	6,709
2016	441	N/A



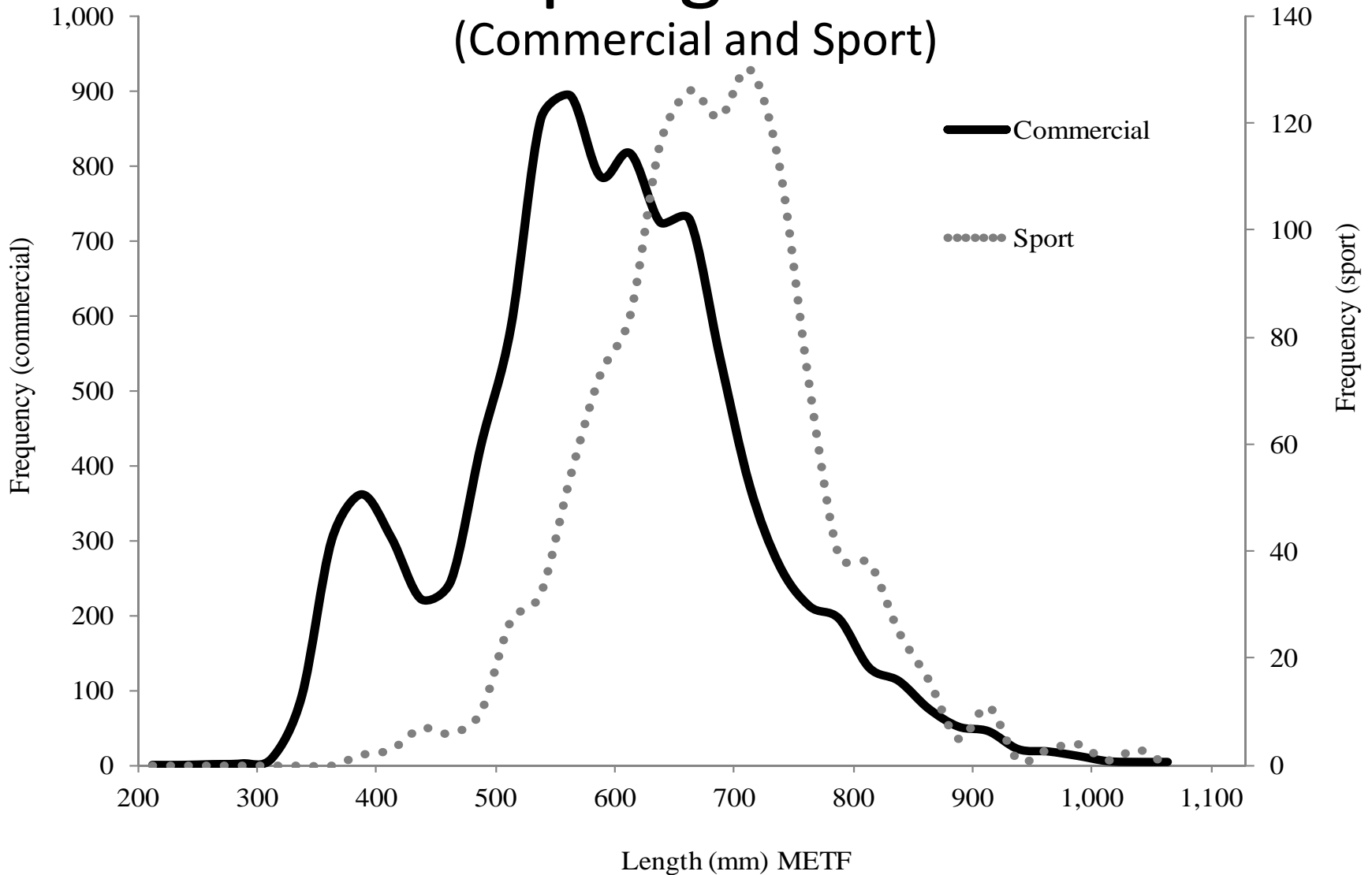






# Sampling Results

(Commercial and Sport)



Length frequency plot of the size (METF mm) of king salmon sampled as part of the Kodiak commercial and sport fishery genetics project, 2014 to 2016.



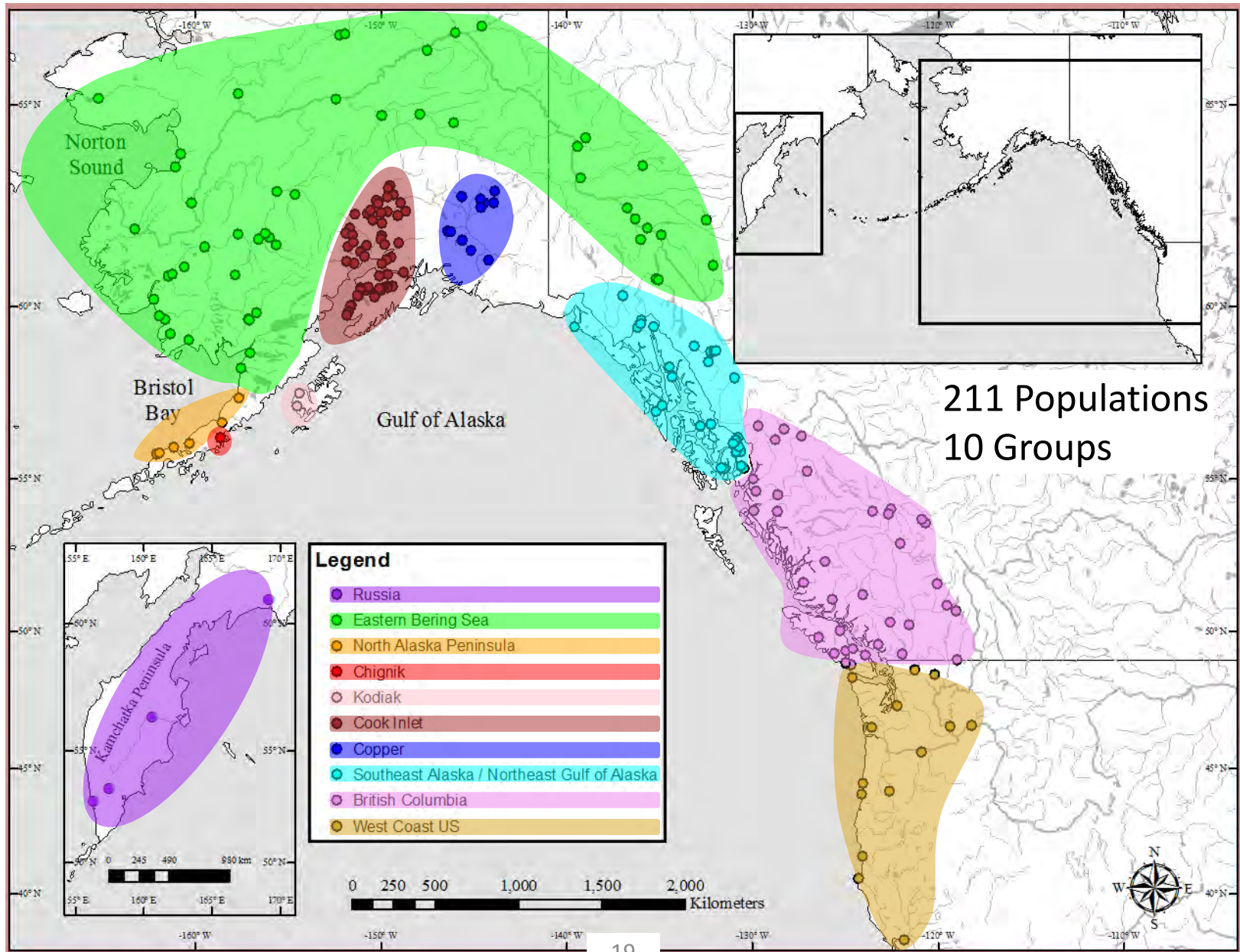
# Genetic Baseline

- Sampled populations
  - All potential stocks represented
- Populations genetically characterized
- Reporting groups tested
  - Groups of populations that can be genetically distinguished
- Mixed-stock analysis
  - Used to estimate stock contributions

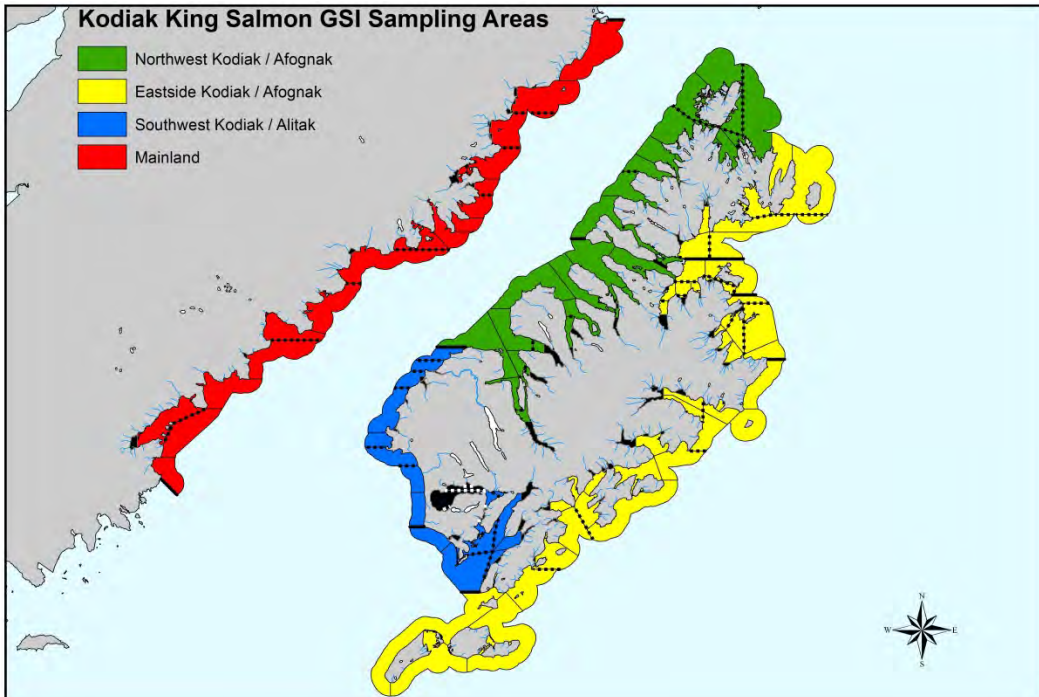




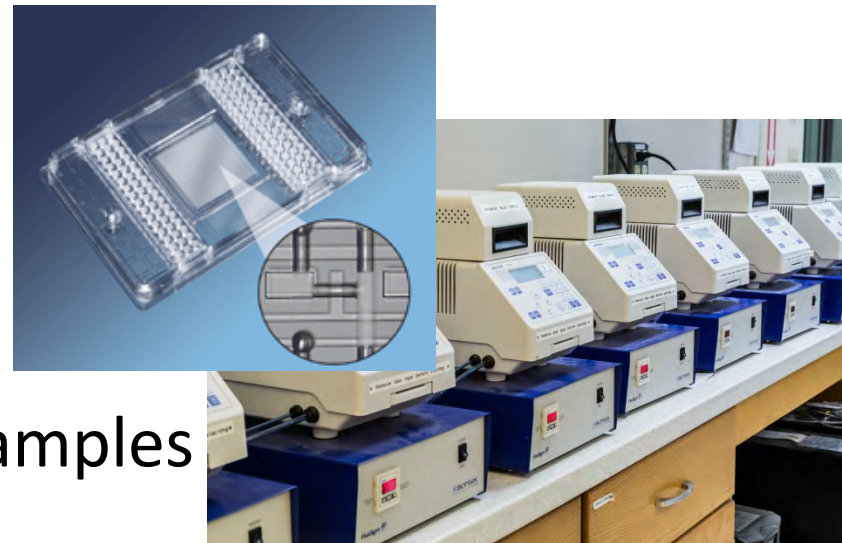
# Genetic Baseline



# Kodiak Comm. Harvest Sample Analysis



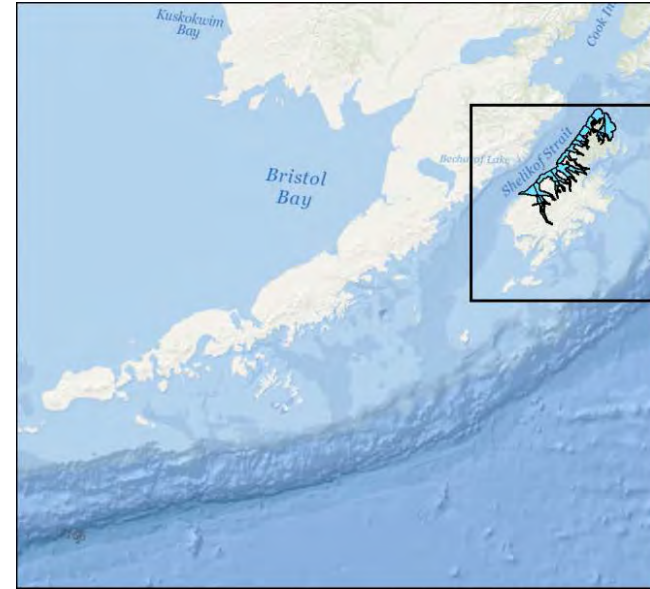
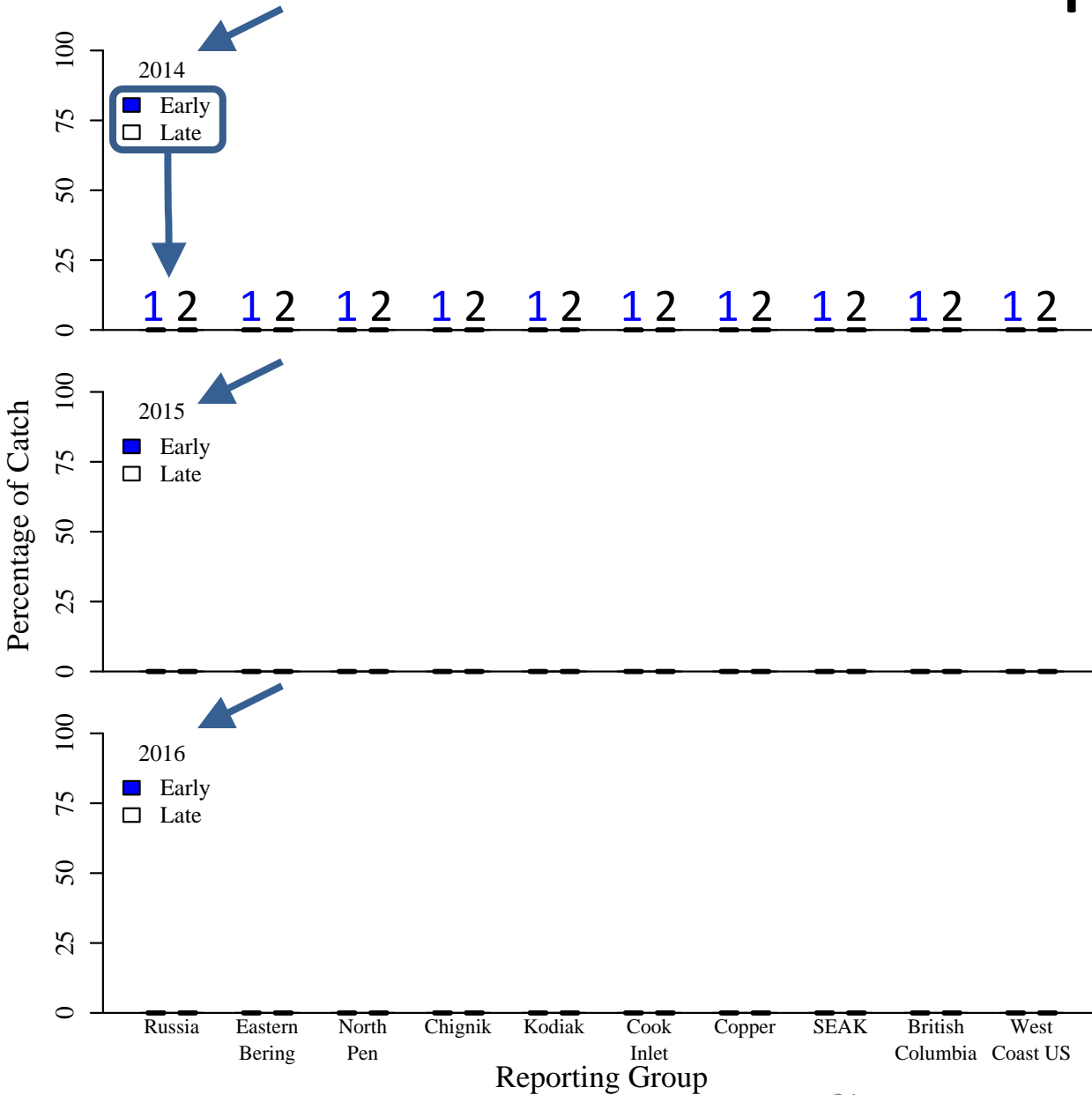
- Selected harvest samples



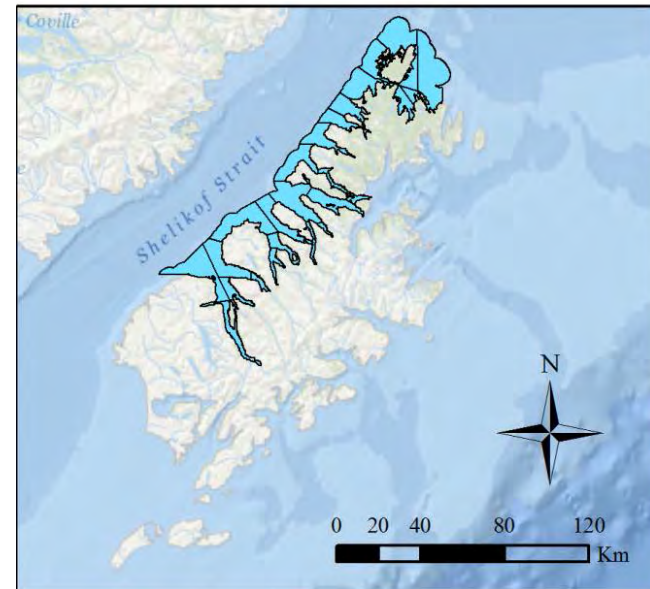
- Analyzed genetic samples



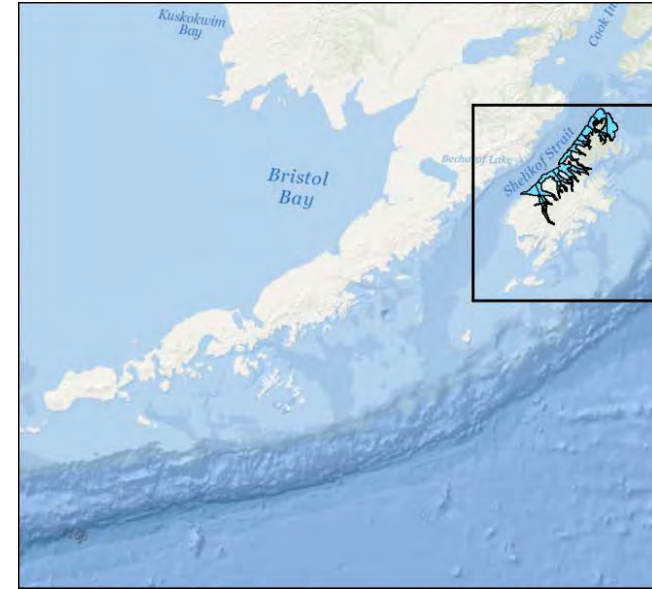
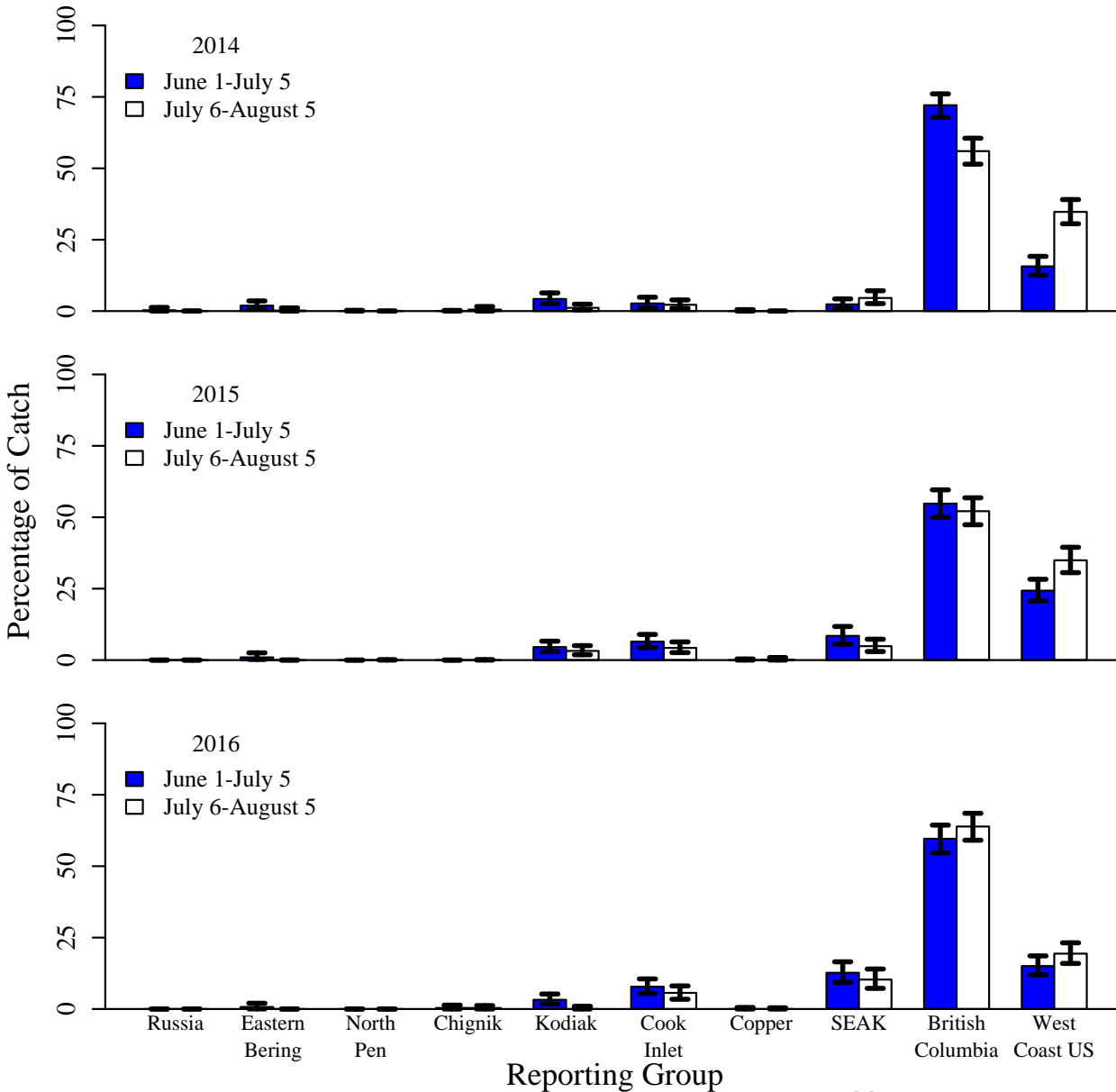
# Results-Example



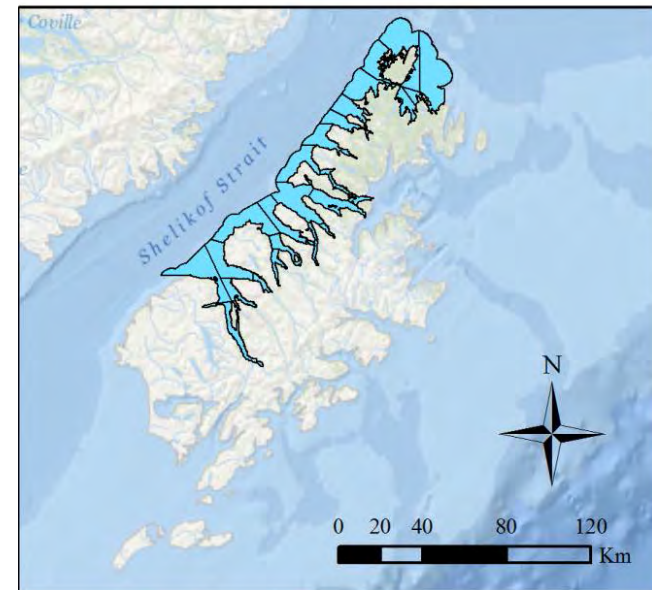
Northwest Kodiak / Afognak District



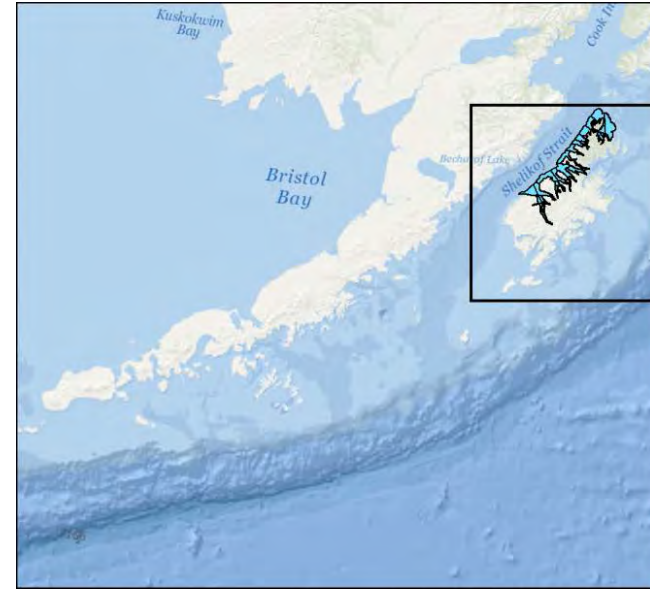
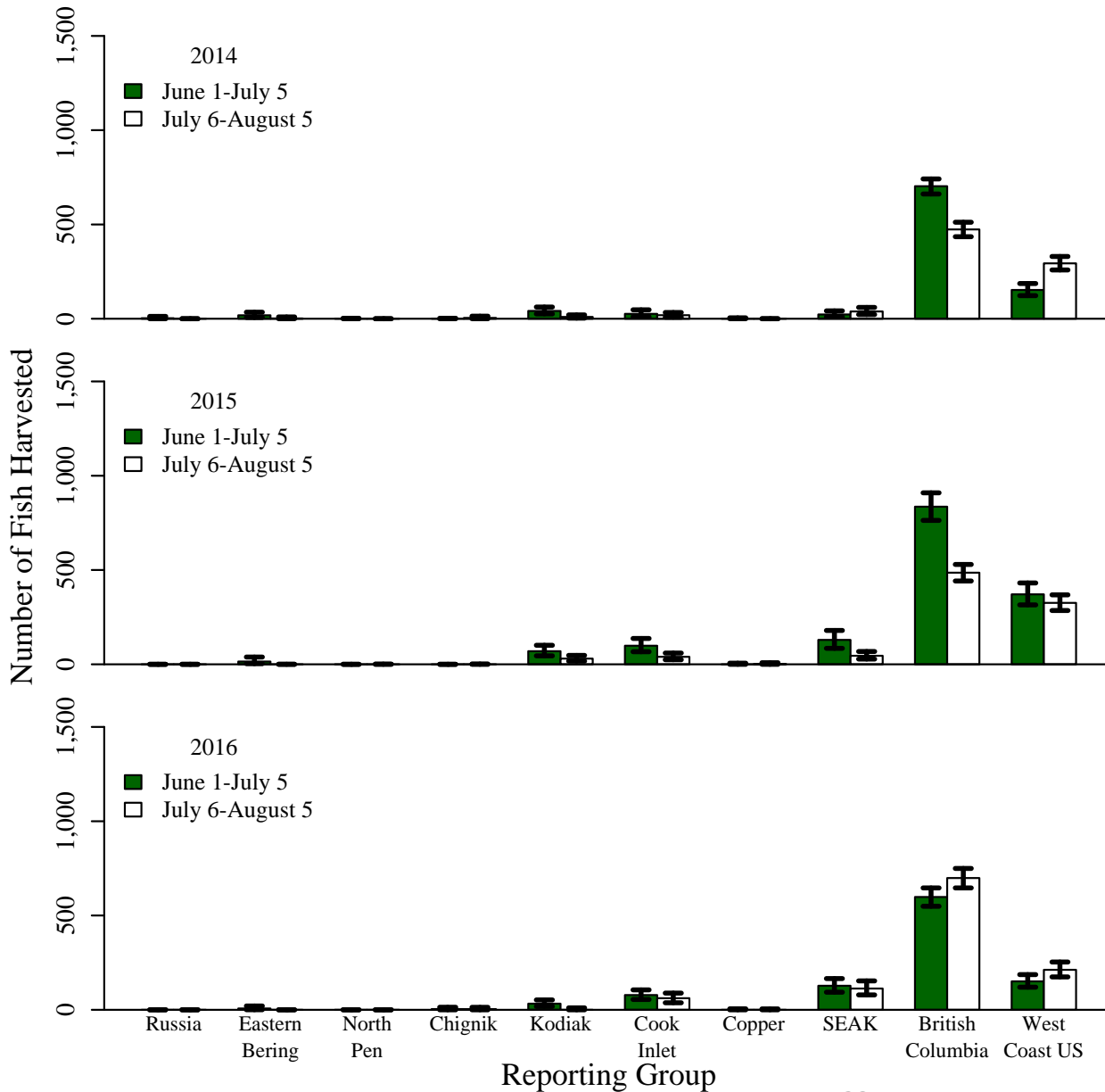
# NW Kodiak/Afognak Stock Composition



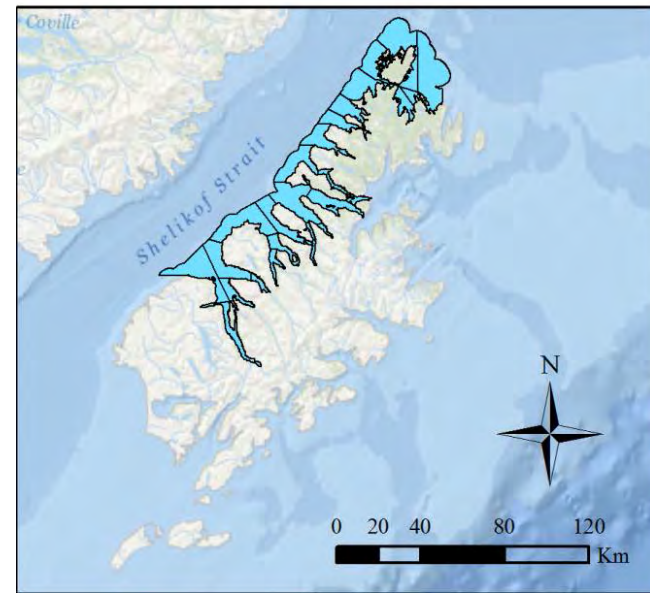
Northwest Kodiak / Afognak District



# NW Kodiak/Afognak Stock-Specific Harvest

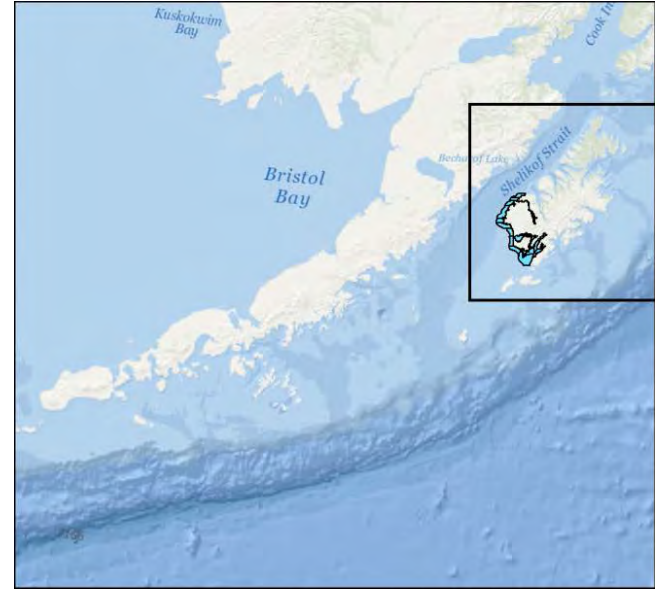
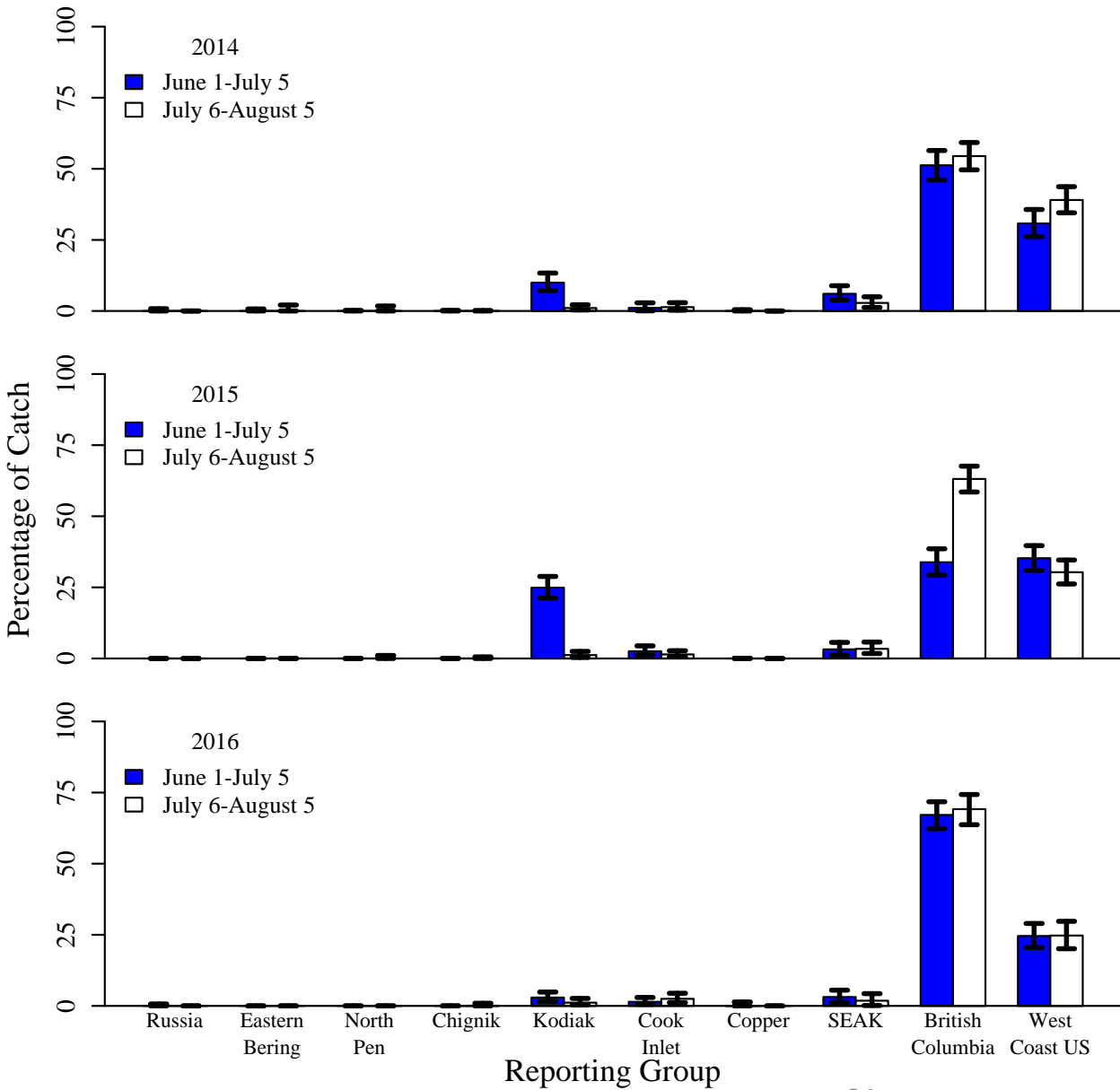


Northwest Kodiak / Afognak District

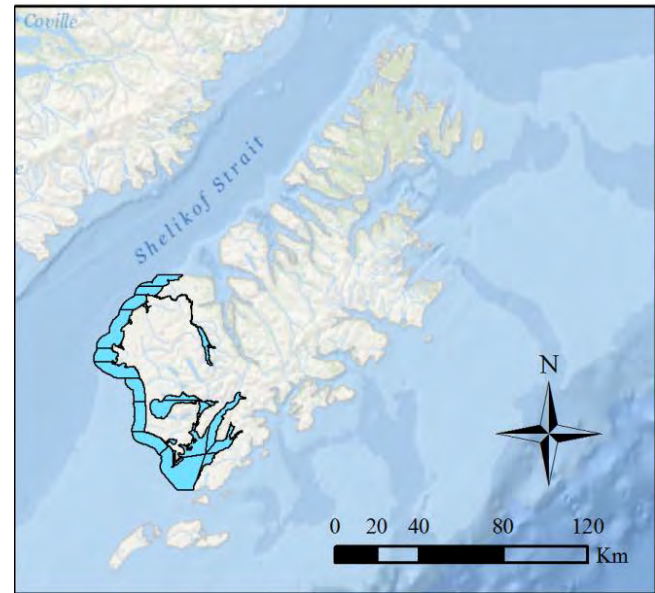




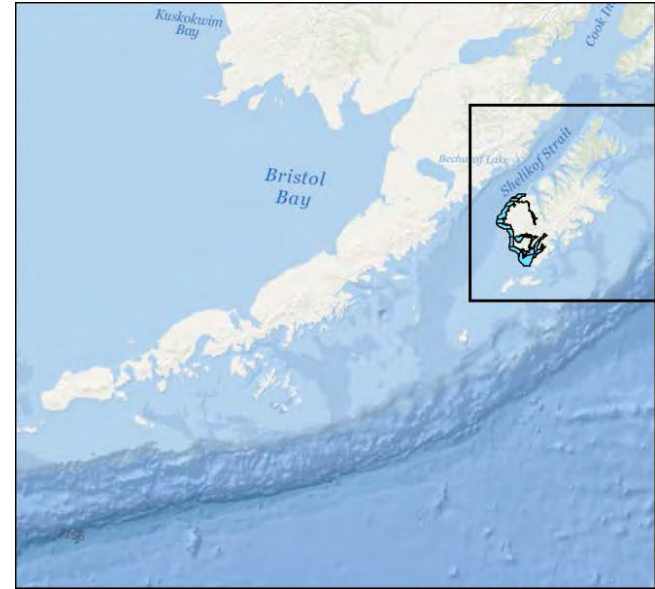
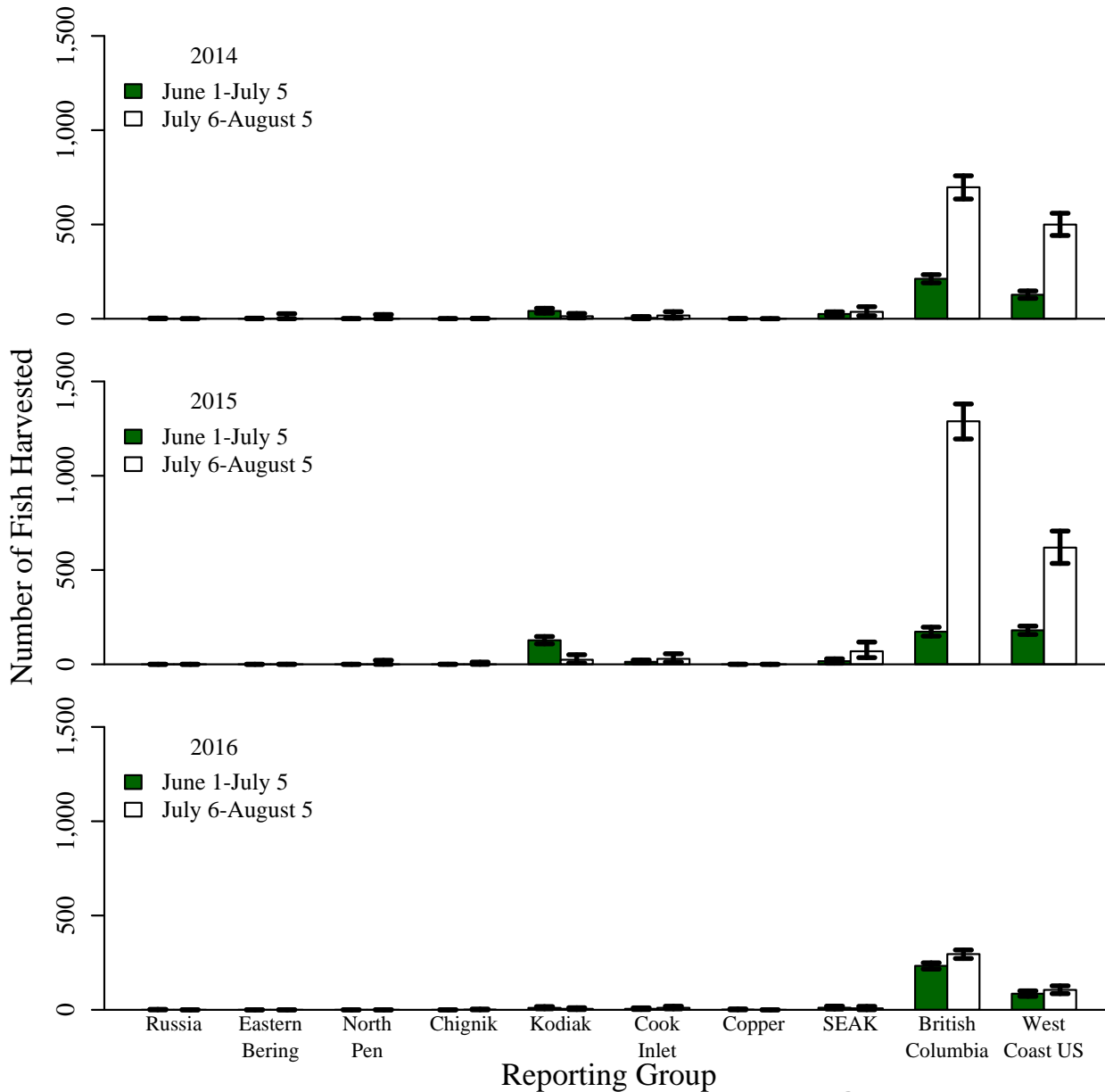
# SW Kodiak/Alitak Stock Composition



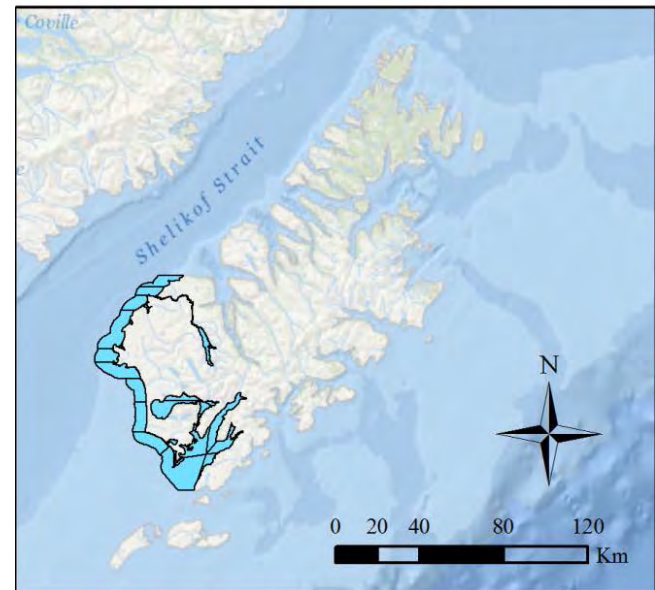
Southwest Kodiak / Alitak District



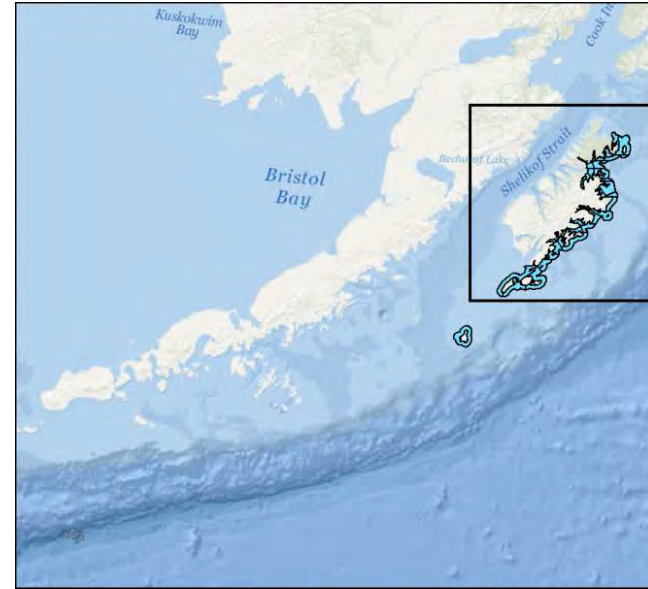
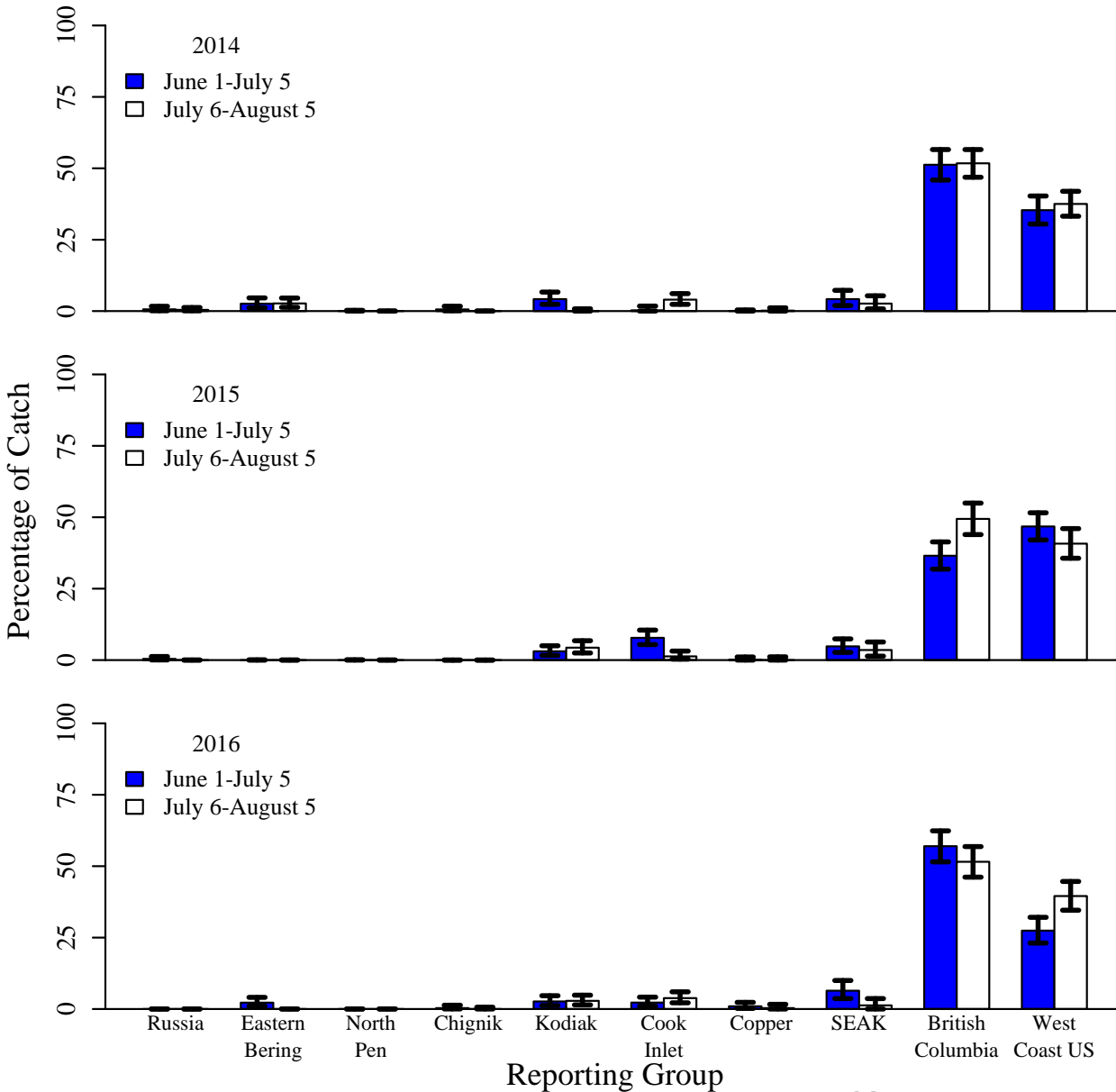
# SW Kodiak/Alitak Stock-Specific Harvest



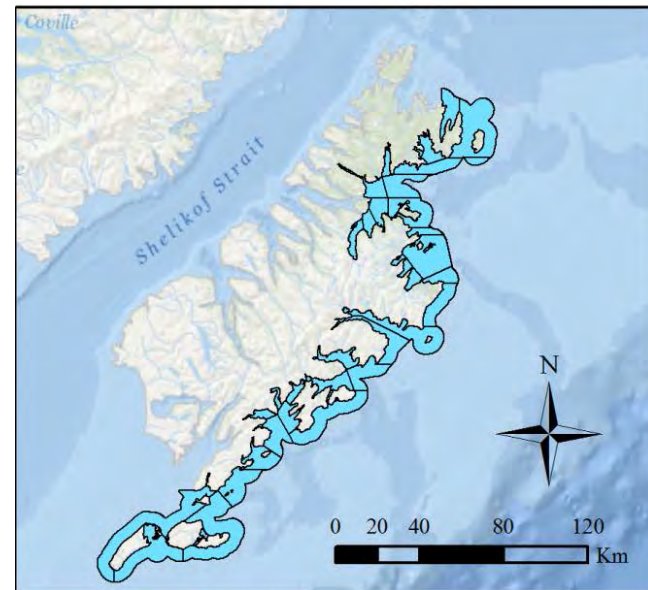
Southwest Kodiak / Alitak District



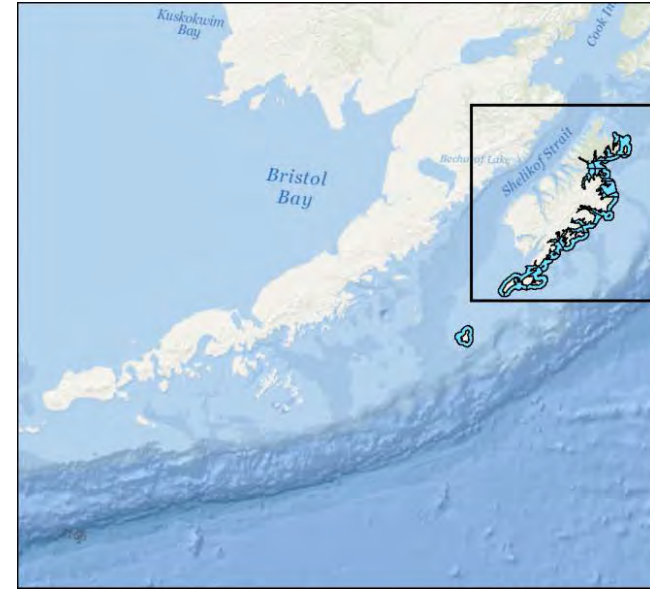
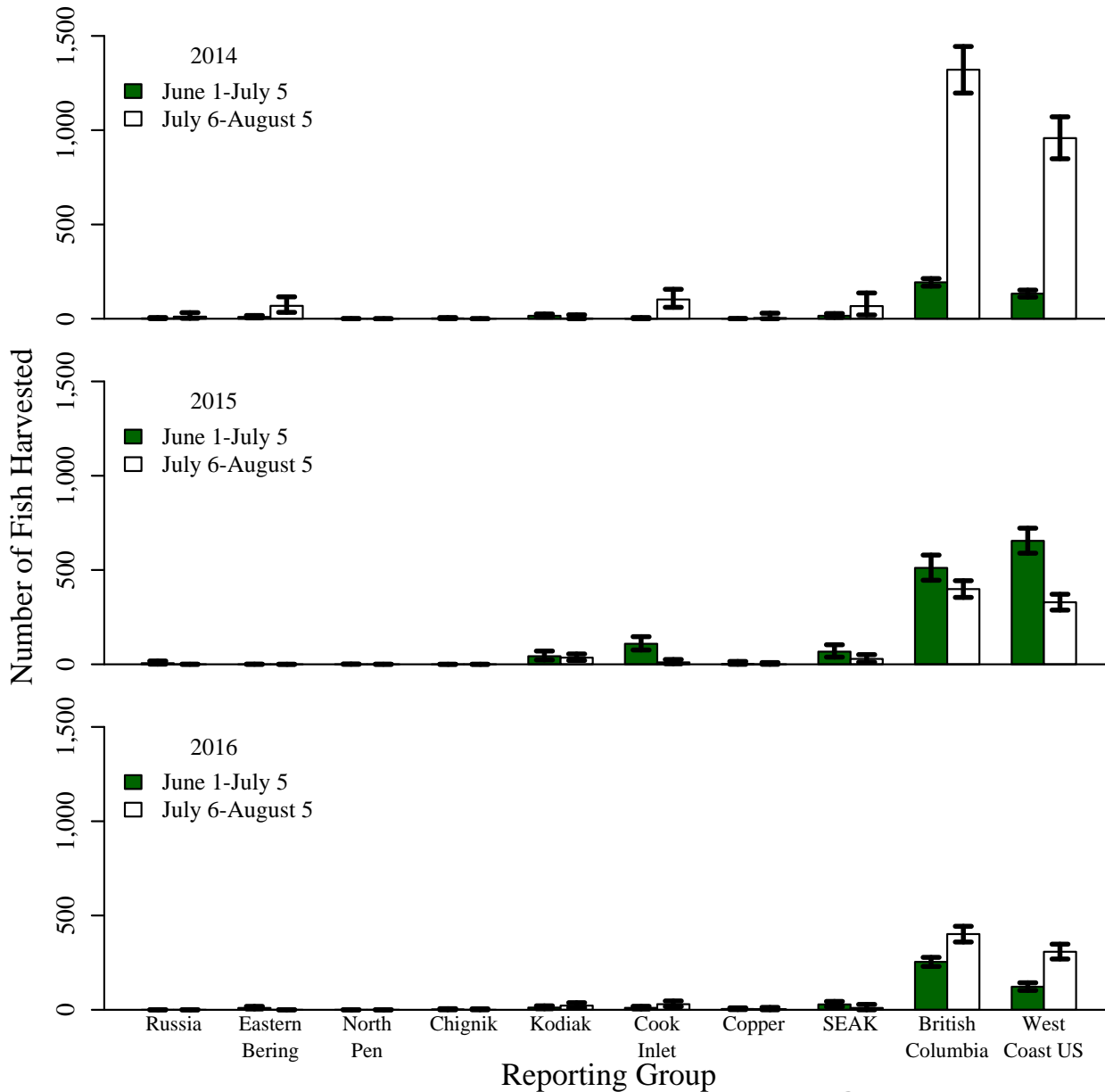
# Eastside Kodiak/Afognak Stock Composition



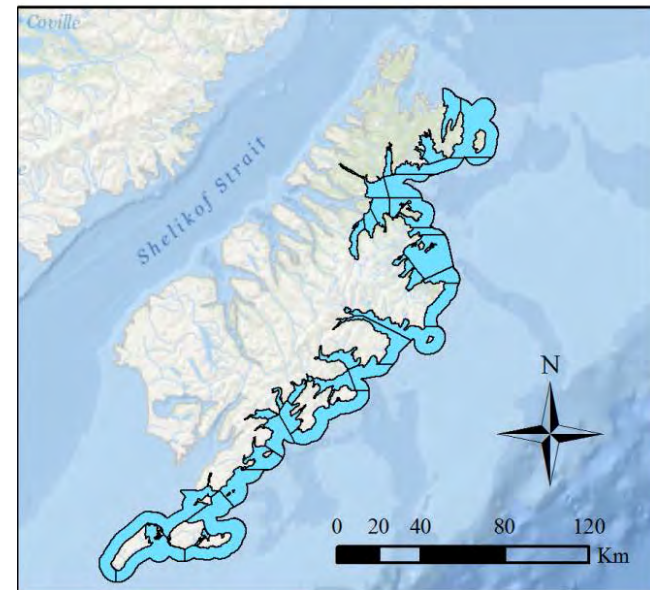
Eastside Kodiak / Afognak District



# Eastside Kodiak/Afognak Stock-Specific Harvest

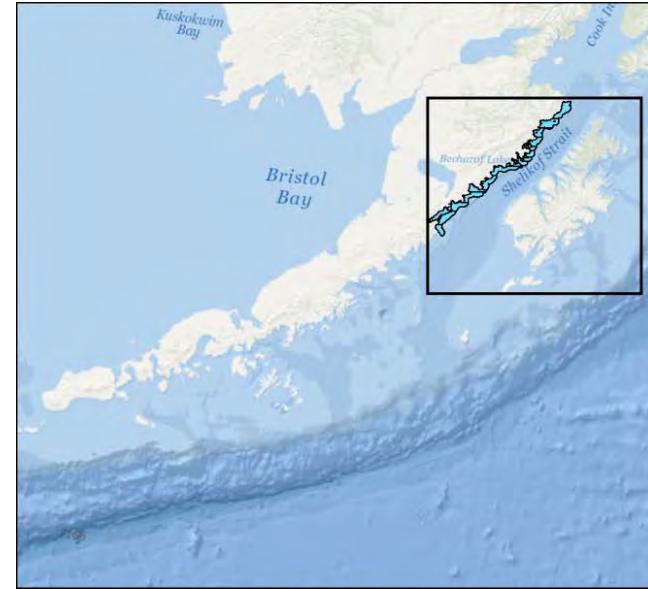
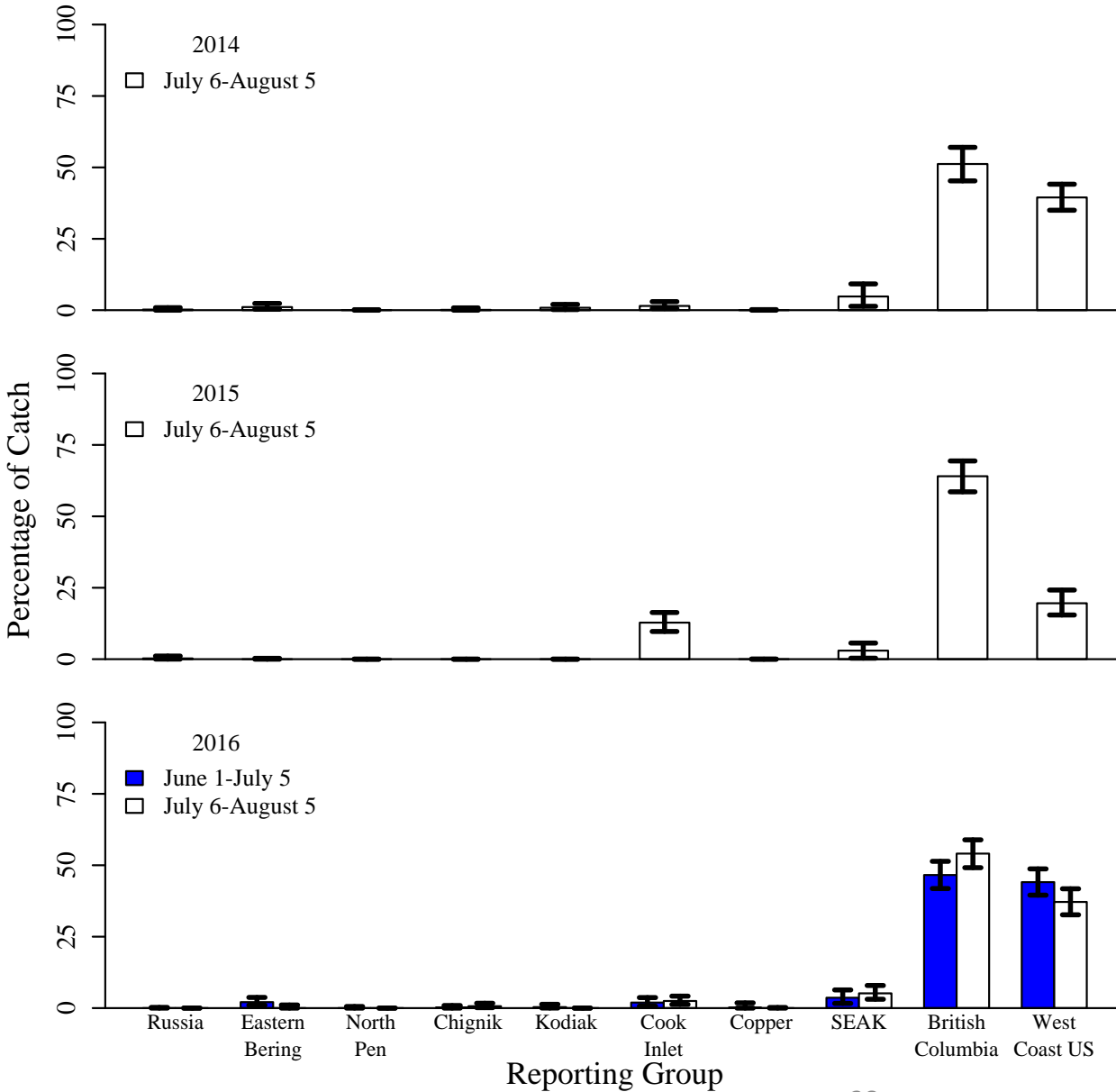


Eastside Kodiak / Afognak District

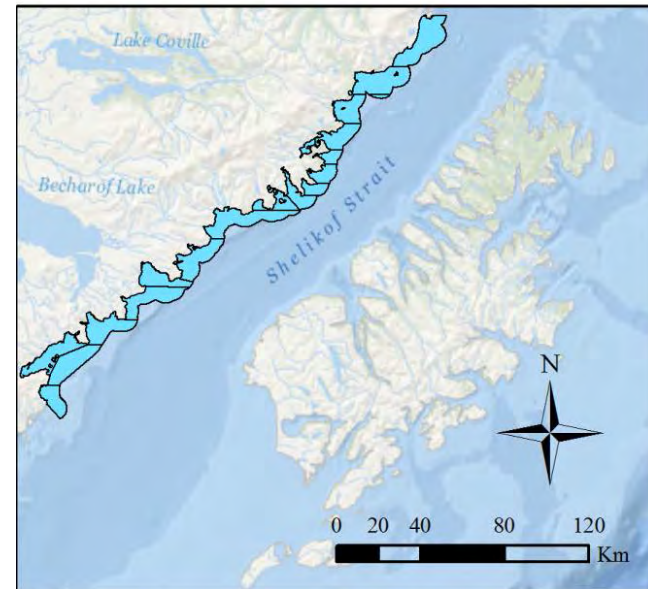




# Mainland Stock Composition

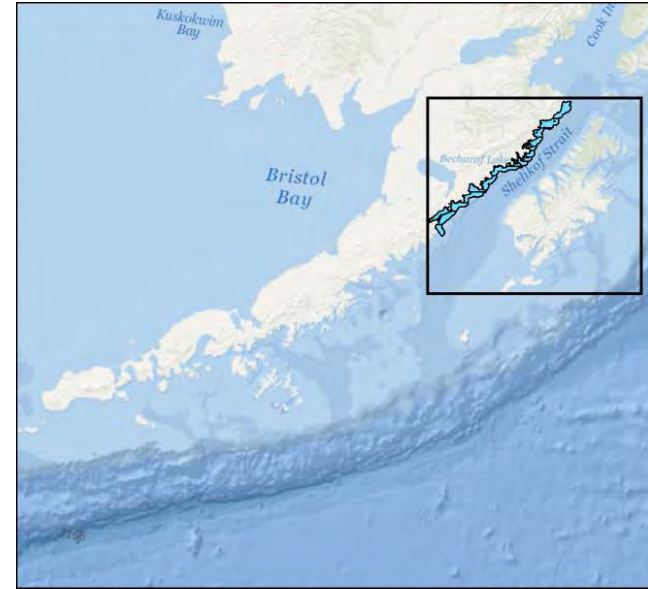
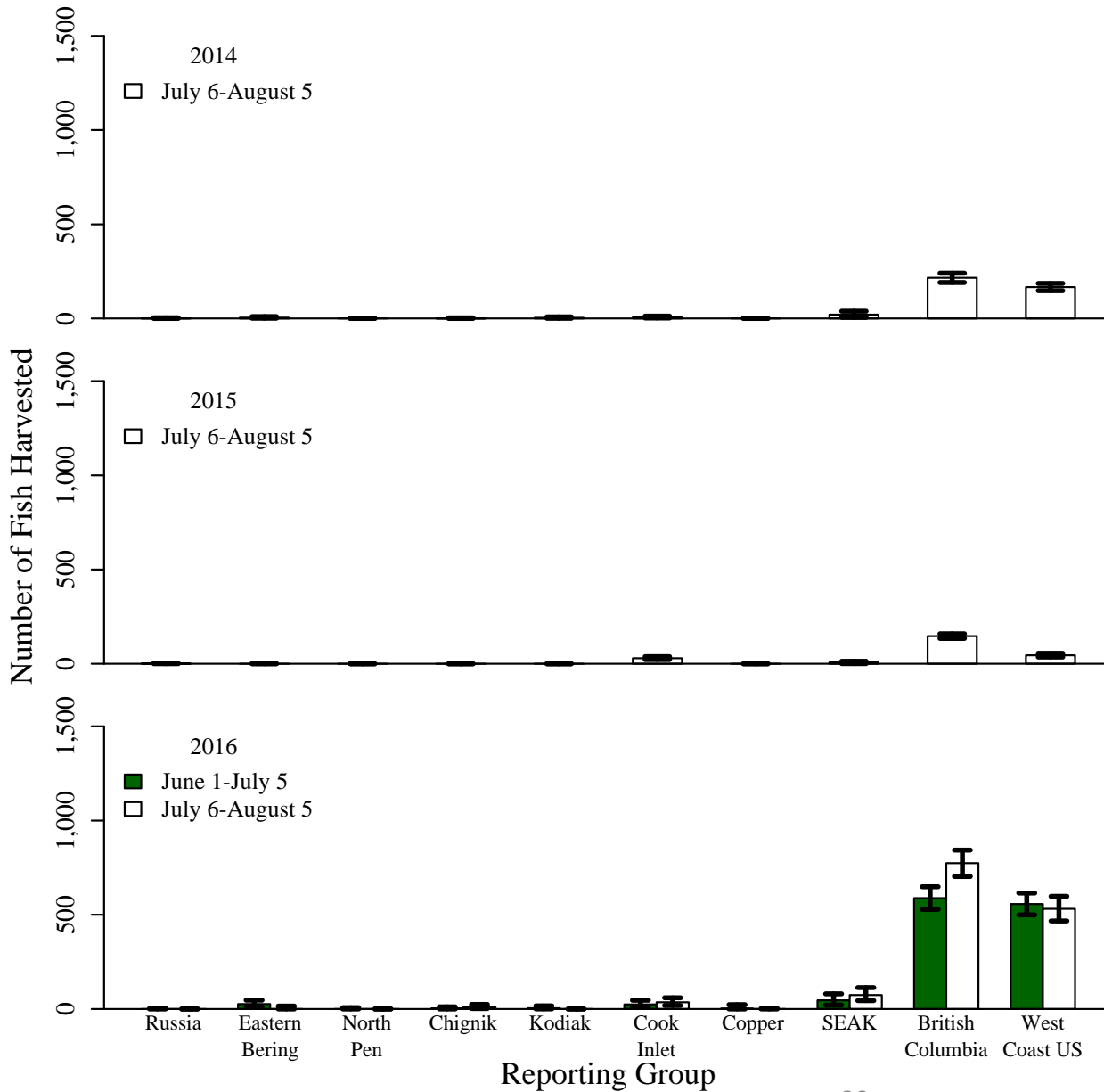


Mainland District

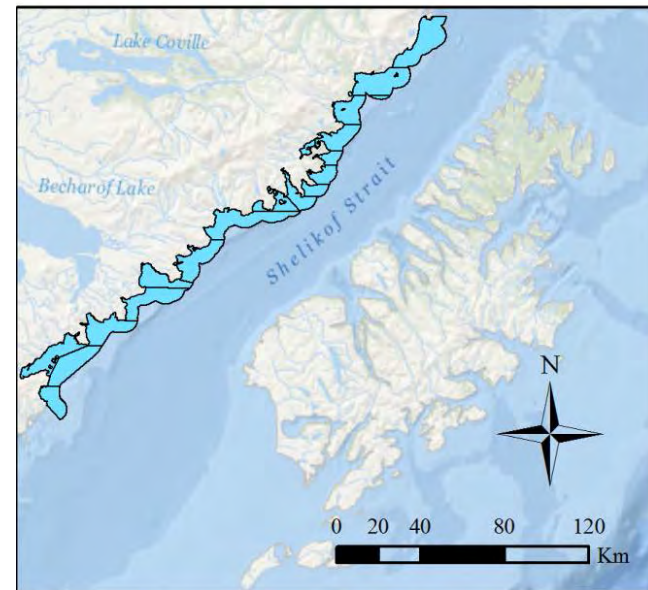




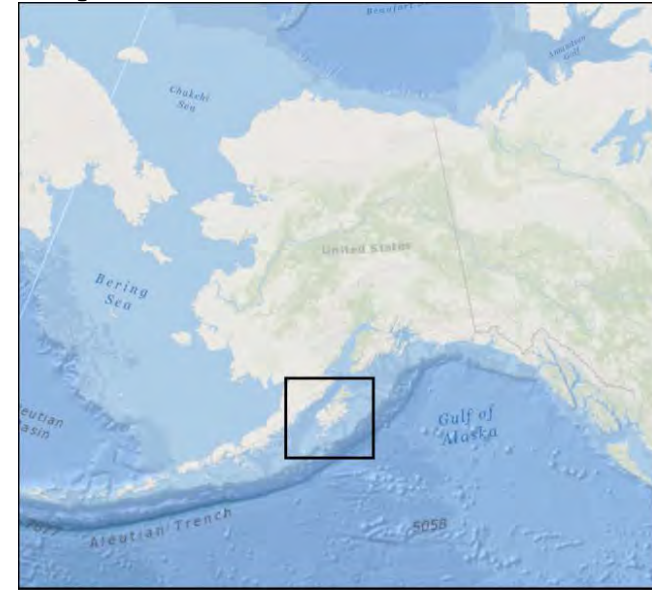
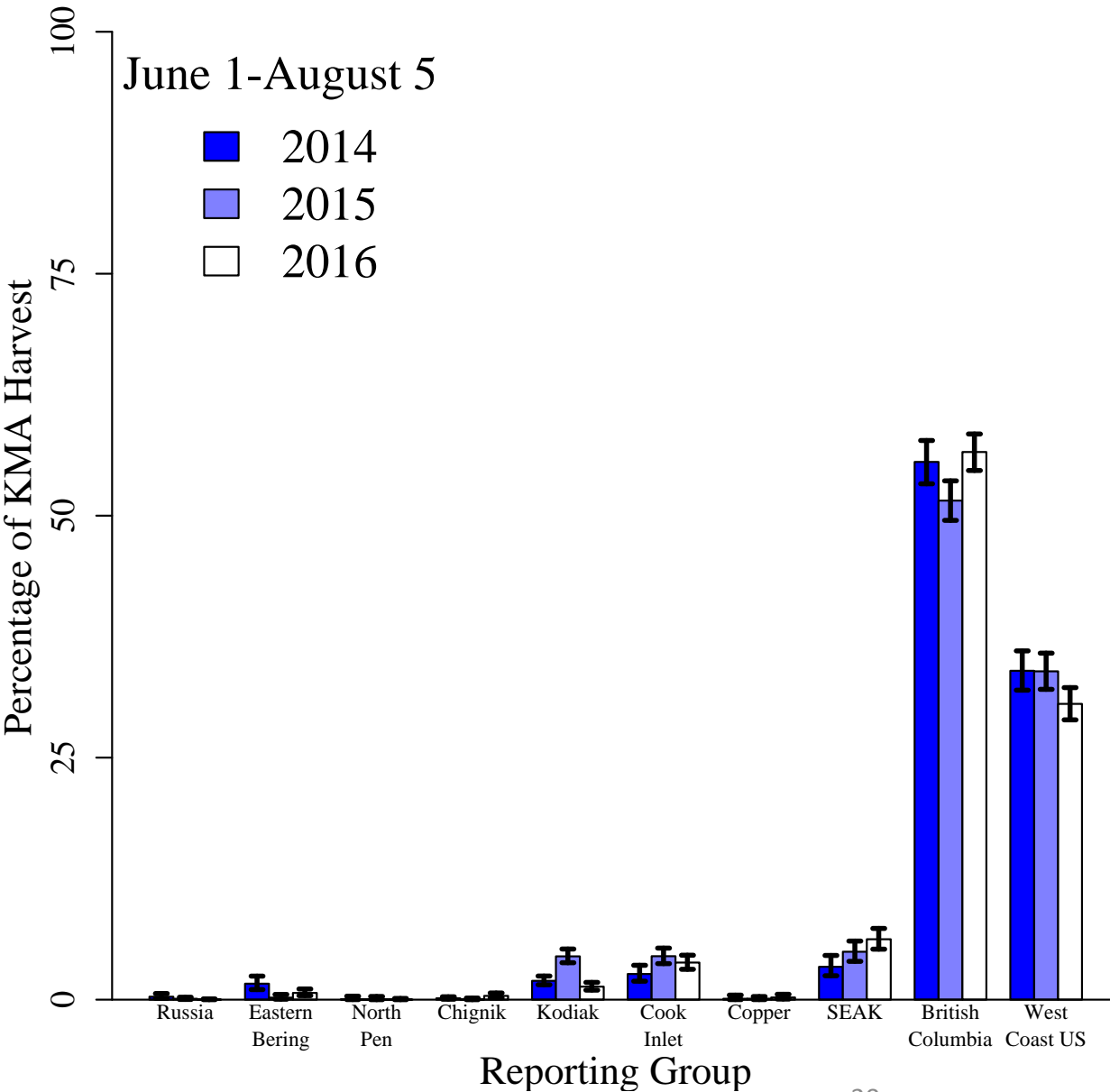
# Mainland Stock-Specific Harvest



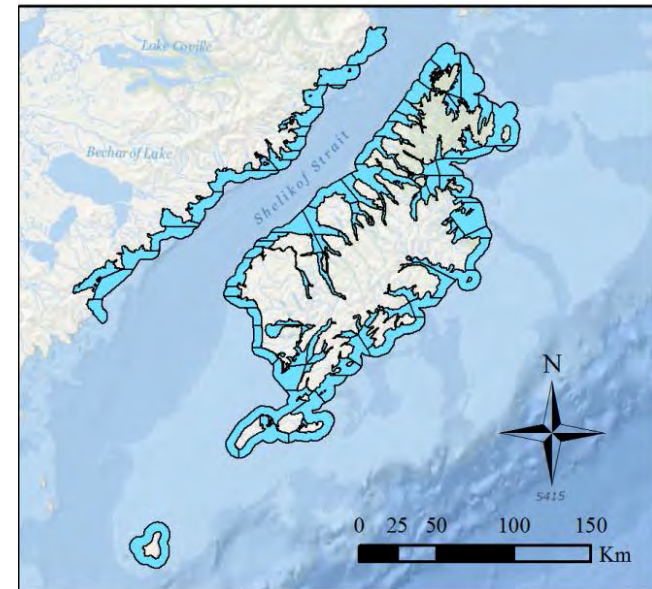
Mainland District



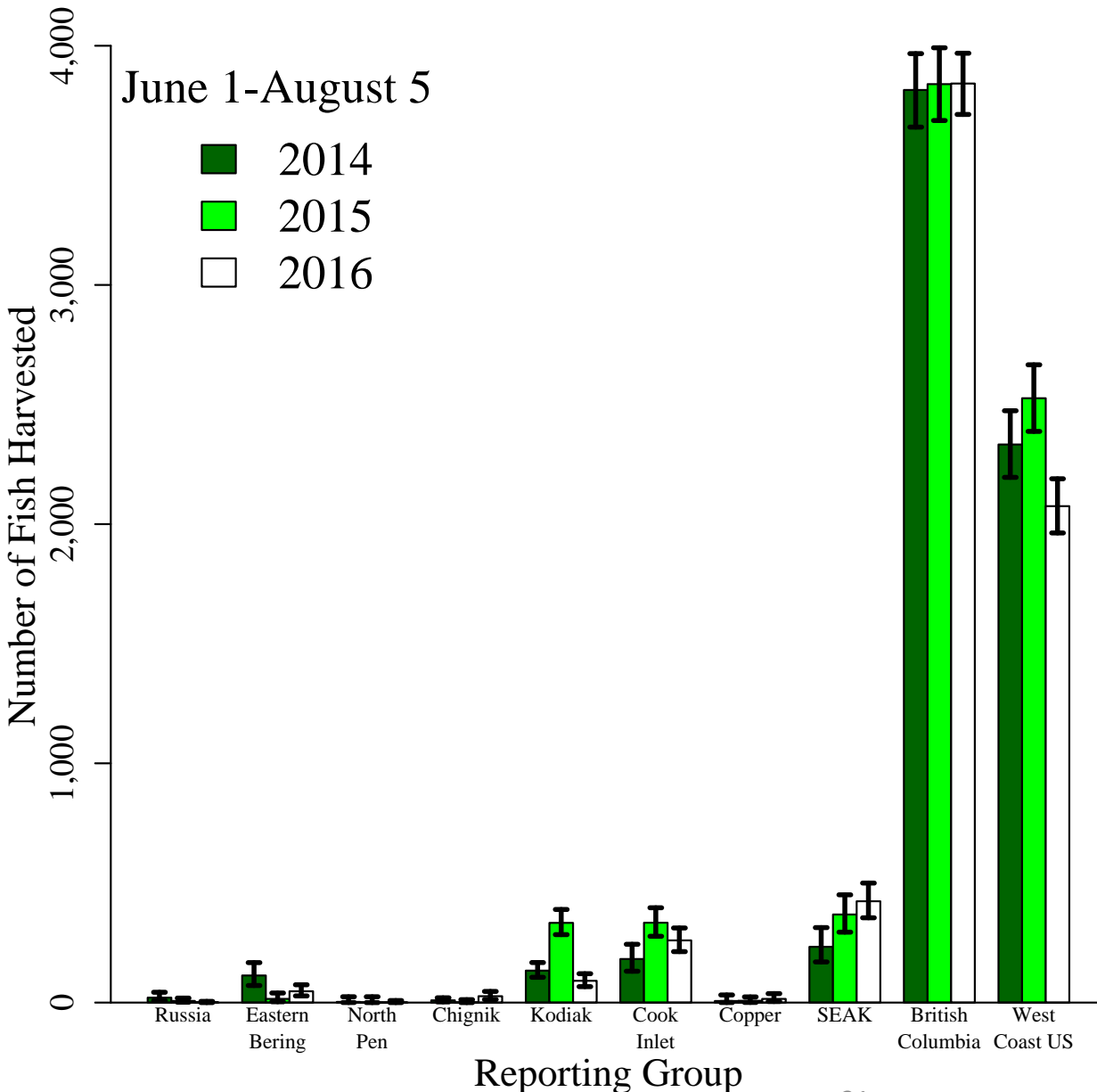
# KMA Comm. Stock Composition



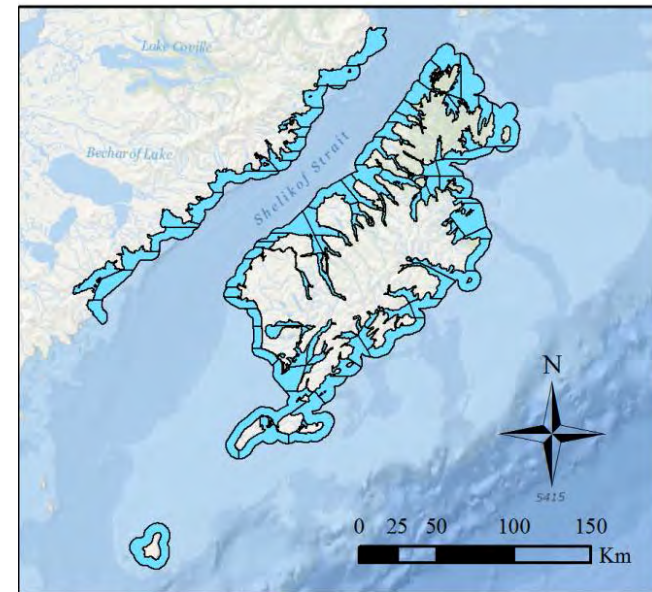
Kodiak Management Area



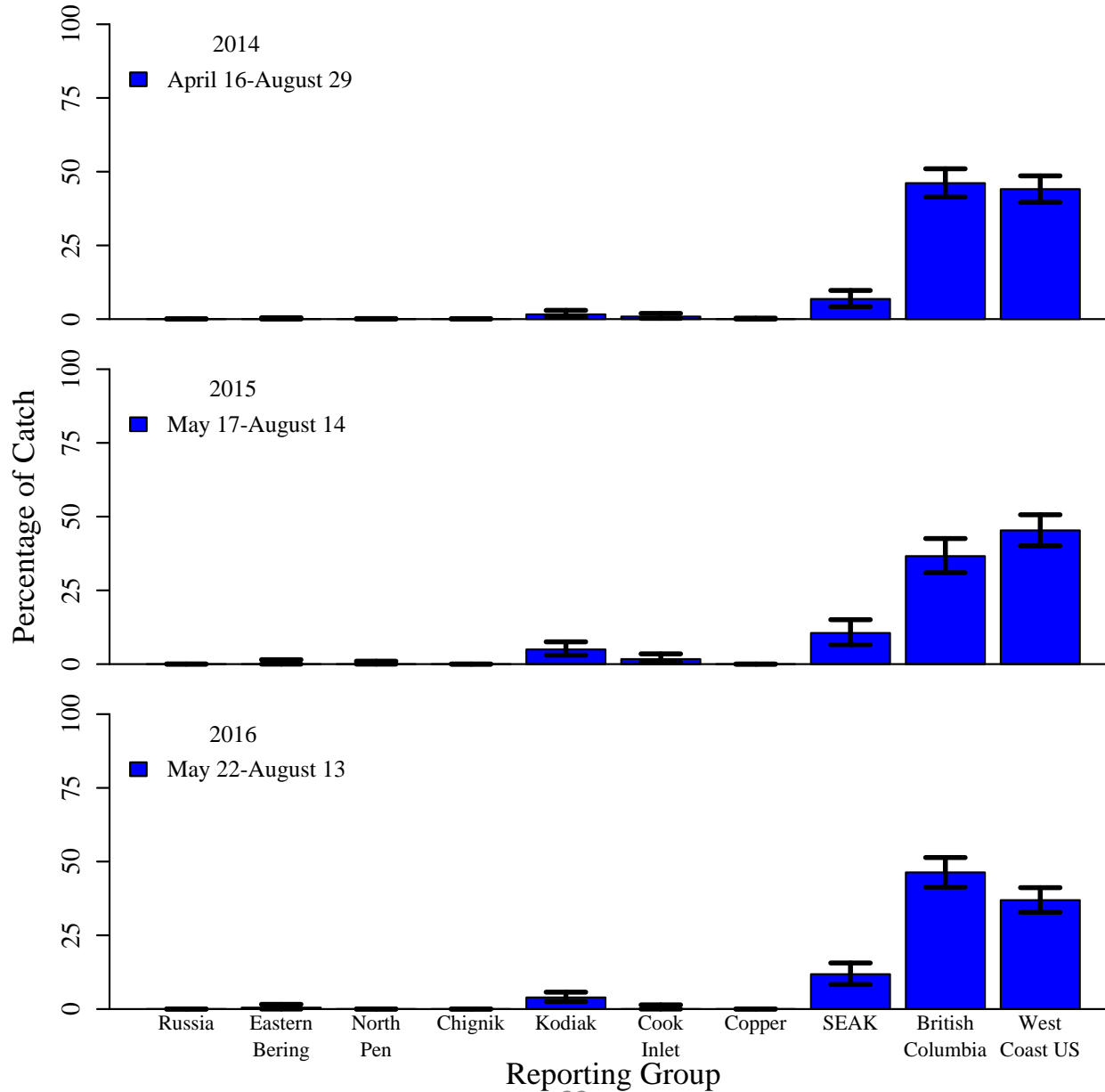
# KMA Comm. Stock-Specific Harvest



Kodiak Management Area

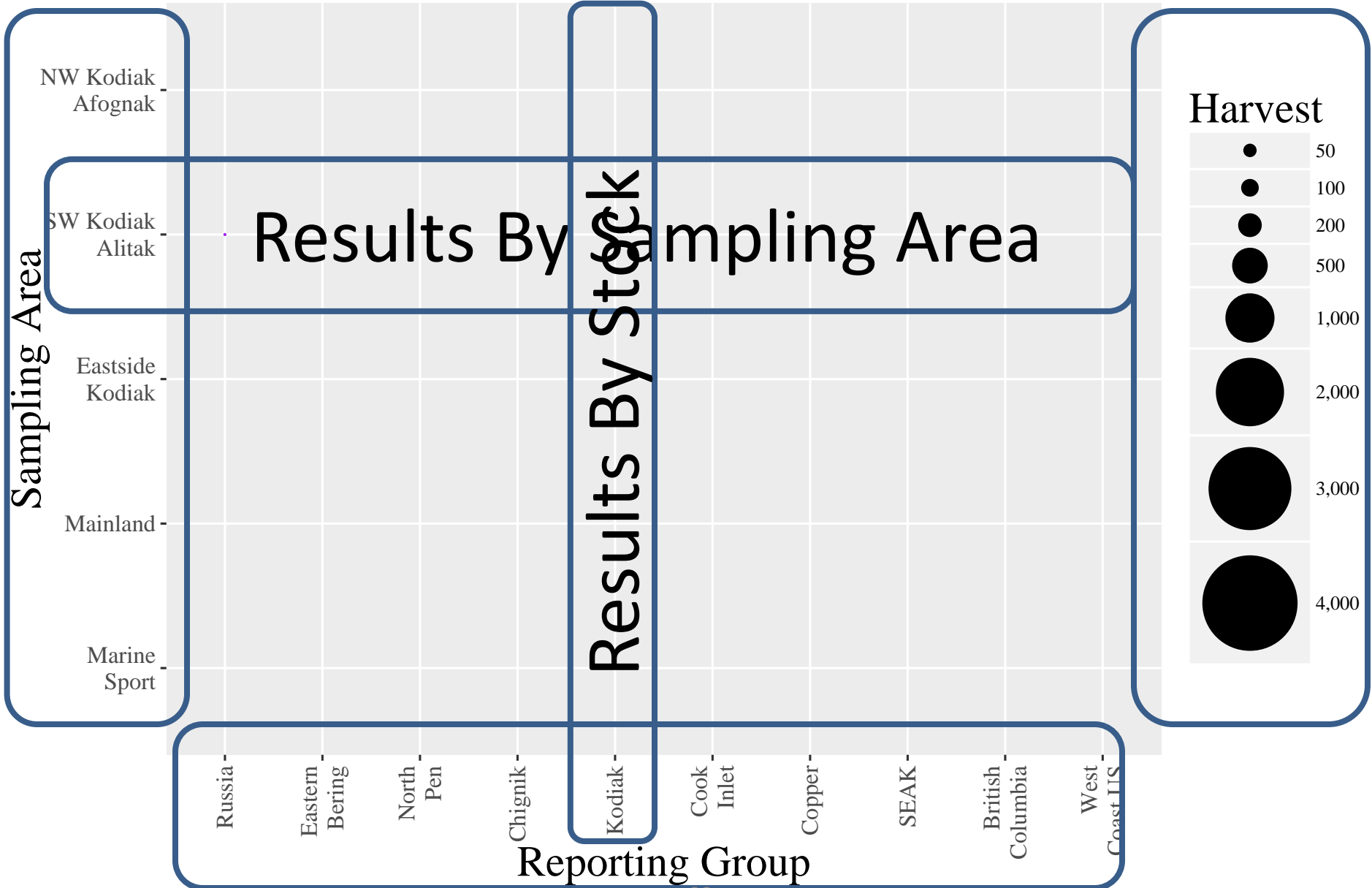


# Marine Sport Stock Composition

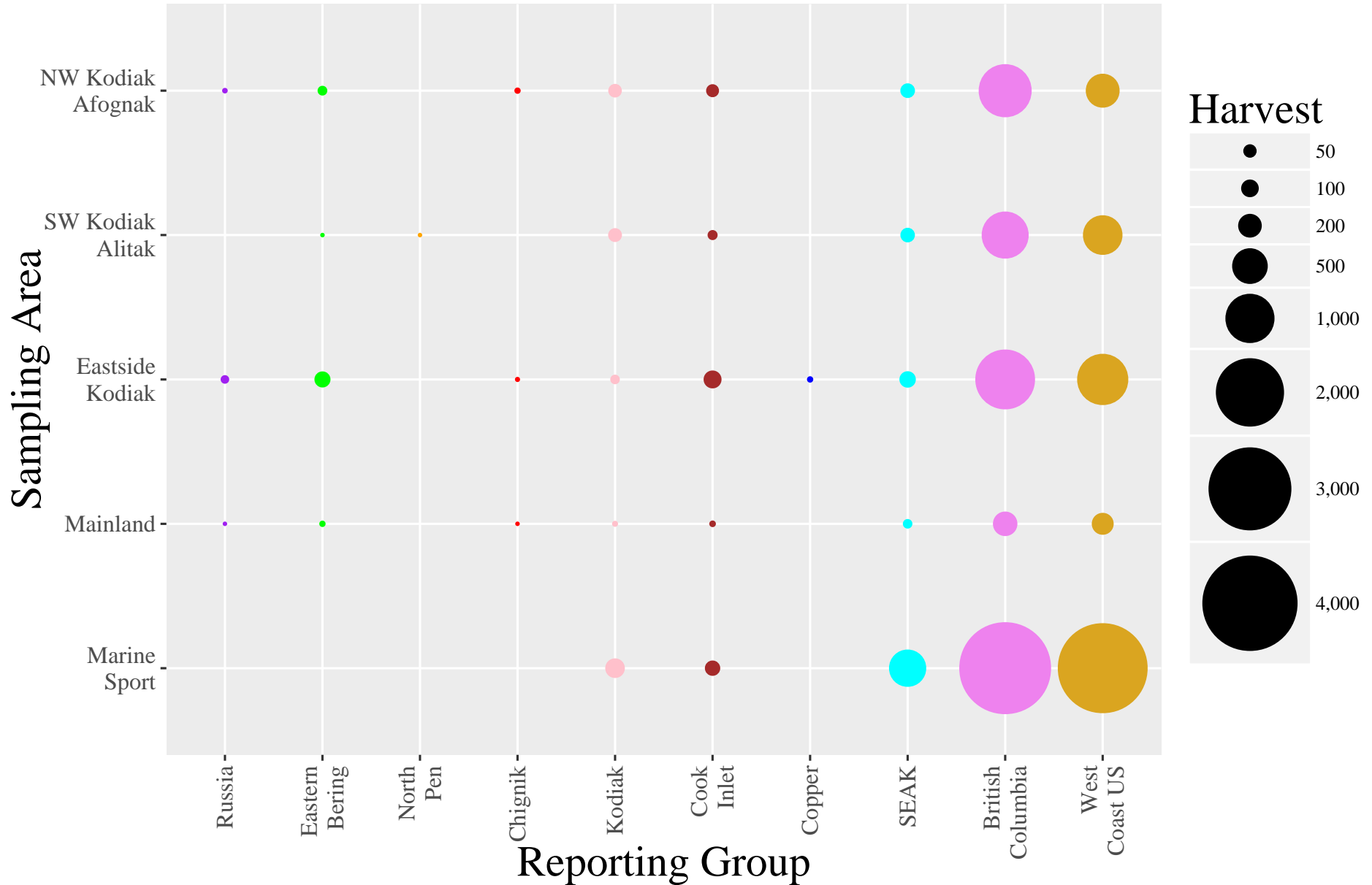




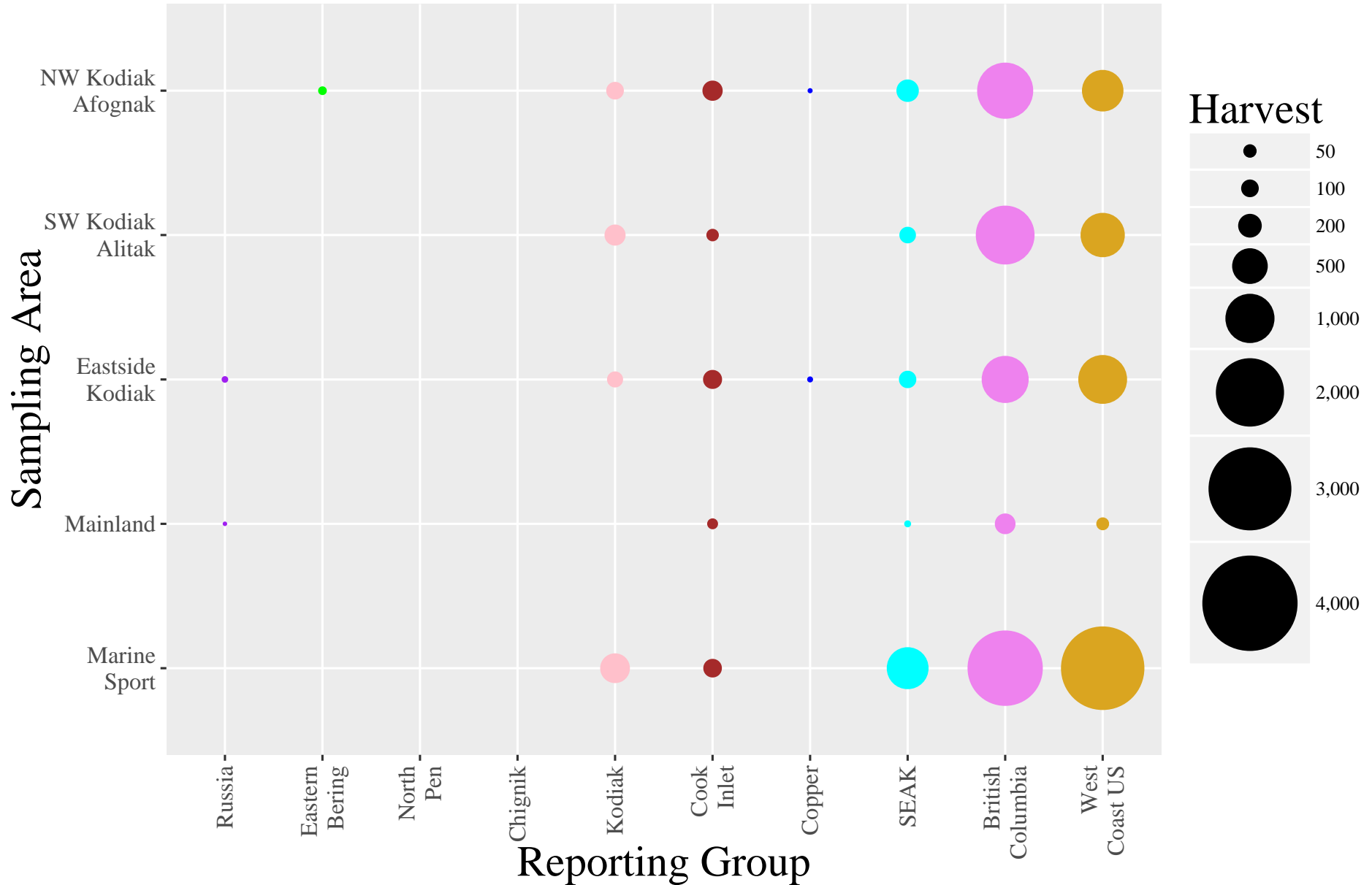
# Example Stock-Specific Harvest



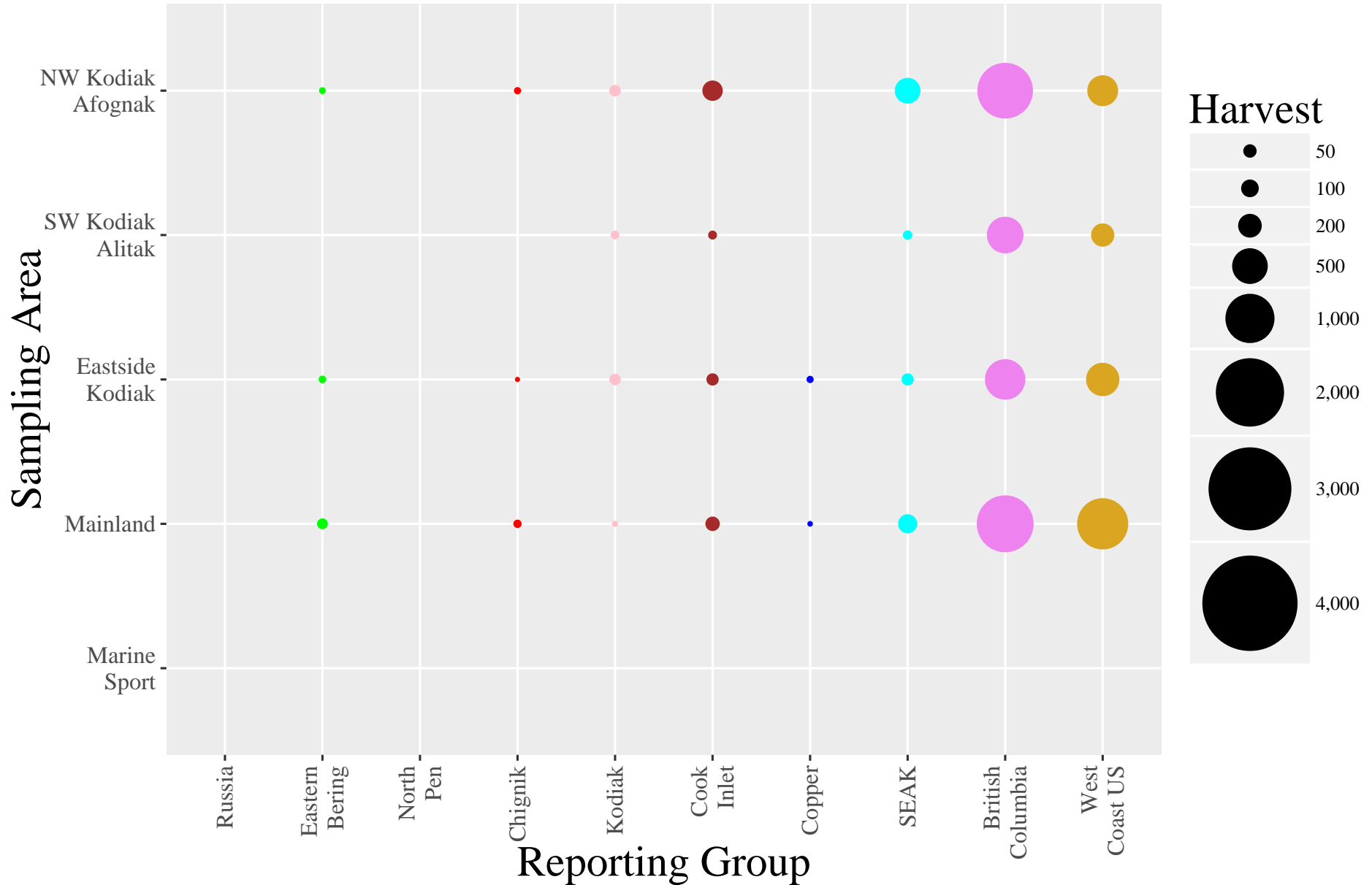
# 2014 Stock-Specific Harvest



# 2015 Stock-Specific Harvest



# 2016 Stock-Specific Harvest





# Interpreting Results

- First information of genetic stock composition of the harvest
- Inferences outside the study years, or temporal periods
  - Production regime
  - Ocean conditions
  - Prosecution of fisheries
- Harvest  $\neq$  Presence
  - Fishing vulnerability may vary by stock
  - Fishing distribution is not random

# Acknowledgements

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- Co-Authors:
  - Birch Foster, Michelle Wattum, Tyler Polum, Mark Witteveen, Michelle Stratton, Tyler Dann, and Heather Hoyt
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Questions?

