

Genetic Stock Composition of the Commercial Harvest of Sockeye Salmon in Kodiak Management Area, 2014–2016

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

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**Division of Commercial
Fisheries**

Oral Report: RC 3; Tab 5

Written Report: RC 3; Tab 9

Topics to be covered:

1. Background
2. Sampling Methods
3. Sampling Results
4. Genetic Baseline
 - Reporting Groups
 - Genetic Diversity
5. Analysis Methods
6. Genetic Mixed Stock Analysis Results
 - Stock Composition
 - Stock-Specific Harvest
7. Interpretation

Background

- Late 70s, BOF mgmt plans (e.g. Westside, Alitak, Igvak)
- Maintain traditional fishing opportunities and allocations
- Mixed stock fisheries (*local and non local*)



Purse seining in Kodiak, 1960s

Background

- Temporal and spatial presence of sockeye is of regional importance
- Tagging studies and scale pattern analysis form basis of knowledge
- Genetic mixed stock analysis (MSA) used successfully for sockeye
- MSA never conducted in the KMA



Background

- 61 sockeye spawning streams
- Directed sockeye fisheries (escapement-based management)
- Pink, chum, coho directed fisheries
- Large overlap in run timing exists



Sampling Methods

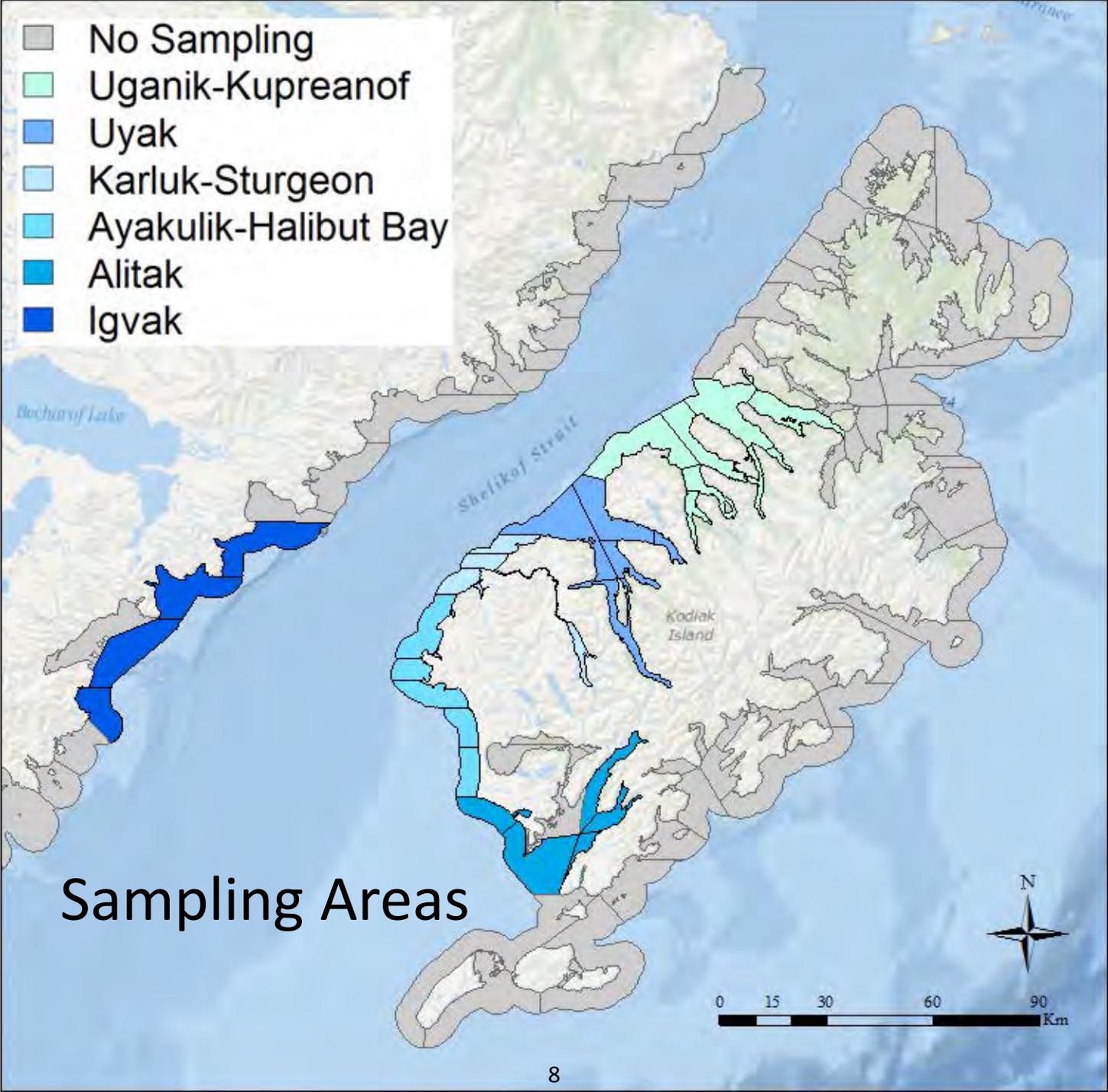
- Sample at 3 ports in the Kodiak Area: Kodiak, Larsen Bay, Alitak
- Analyze a representative 380 samples per spatio-temporal stratum (6 areas, 3 temporal strata)
- Collect 3-5x the analysis goal and post-season subsampling
- Temporal strata
 - Early: June (early-run sockeye)
 - Middle: July (sockeye, pink, chum)
 - Late: Aug (late-run sockeye, pink, chum)

Sampling Methods

- Collect genetic tissue (axillary process)



Sampling sockeye salmon genetic tissue in Alitak



Sampling Results

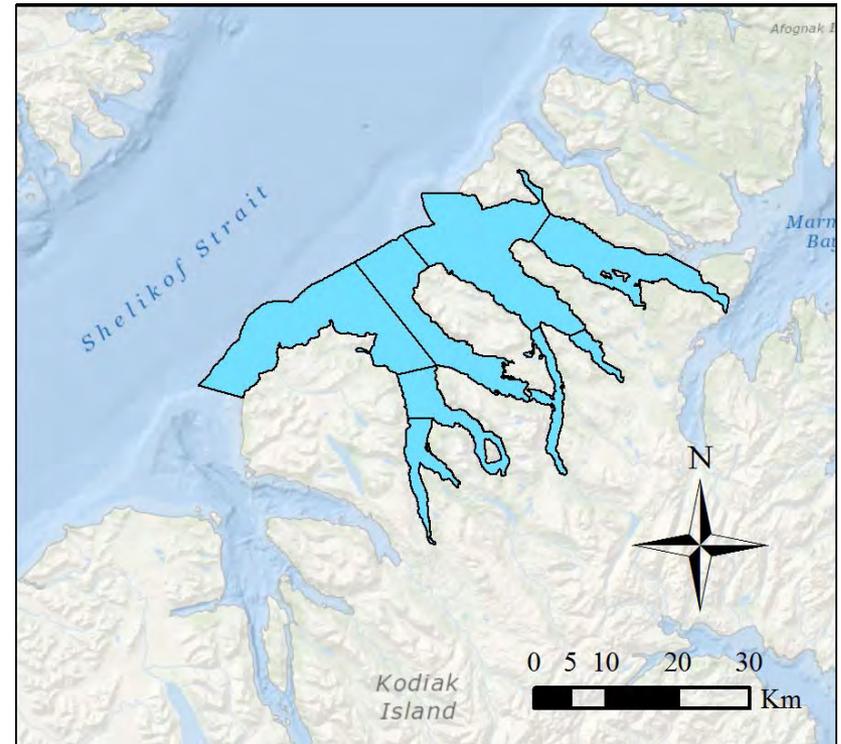


- 45,165 fin clip samples
- 18,558 genotyped for analysis

Uganik-Kupreanof sampling area



2014



2015

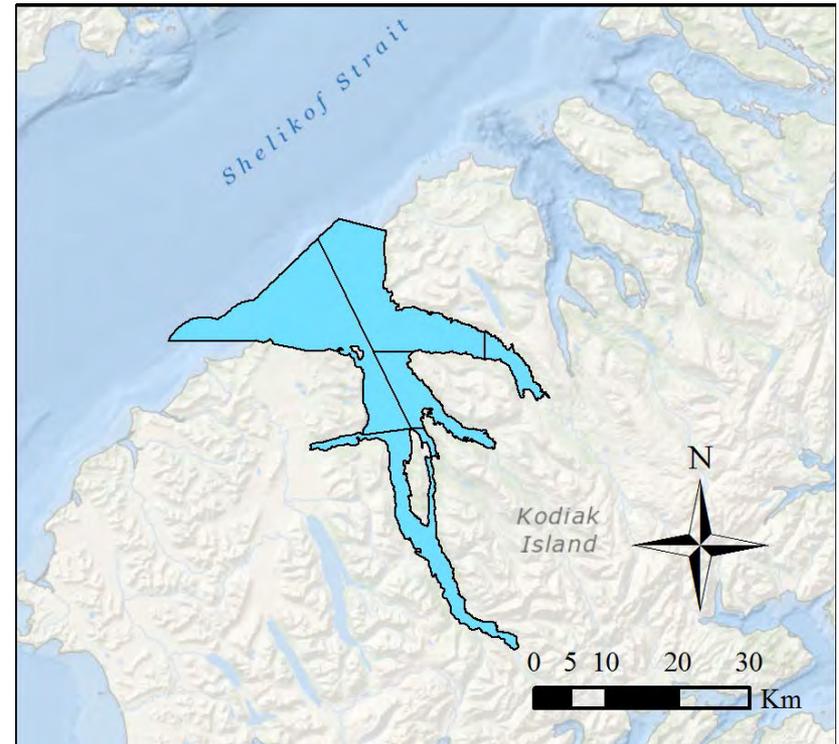
2016

Dates-Strata	Harvest	Samples	Harvest	Samples	Harvest	Samples
6/1–6/27 Early	79,494	1,400	31,607	1,200	62,771	910
6/28–7/25 Middle	128,836	1,400	215,645	800	138,281	900
7/26–8/29 Late	163,843	1,220	143,567	680	139,612	1,100

Uyak sampling area



2014

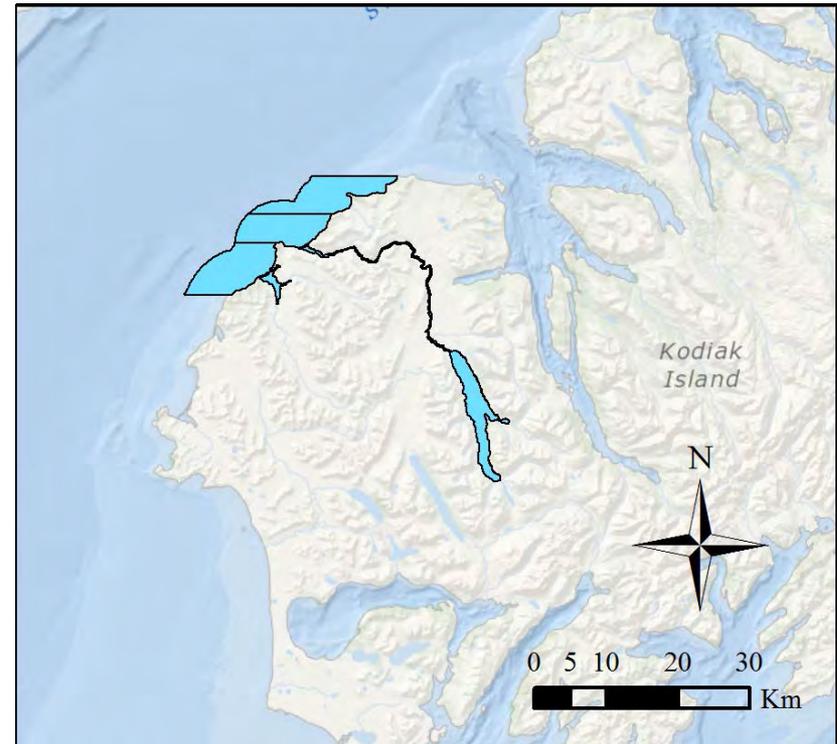
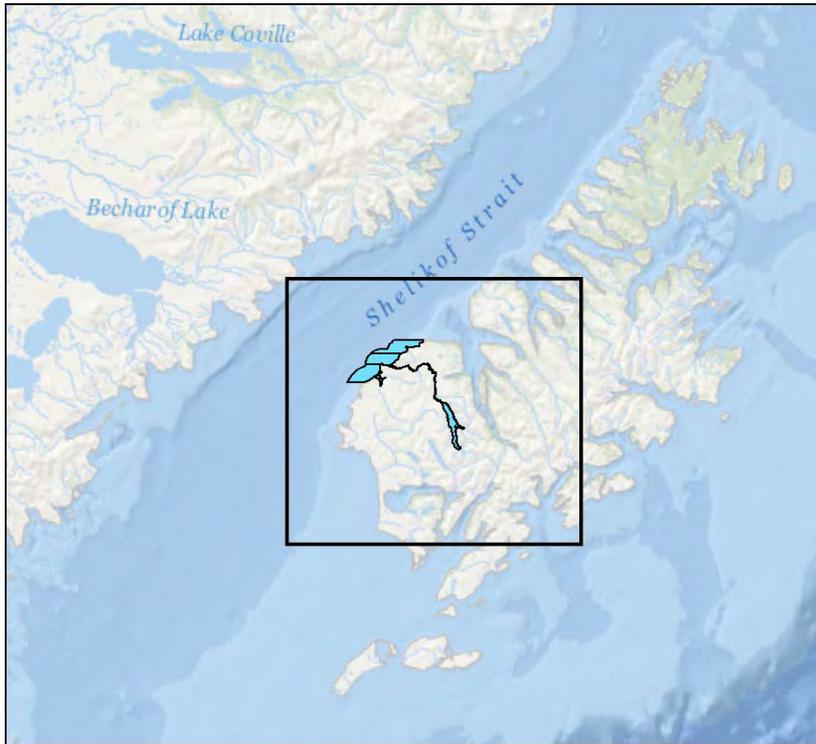


2015

2016

Dates-Strata	2014		2015		2016	
	Harvest	Samples	Harvest	Samples	Harvest	Samples
6/1–6/27 Early	102,346	1,400	49,515	1,215	37,238	900
6/28–7/25 Middle	126,840	1,400	174,009	800	69,803	1,100
7/26–8/29 Late	155,658	1,400	126,126	697	126,837	1,000

Karluk-Sturgeon sampling area



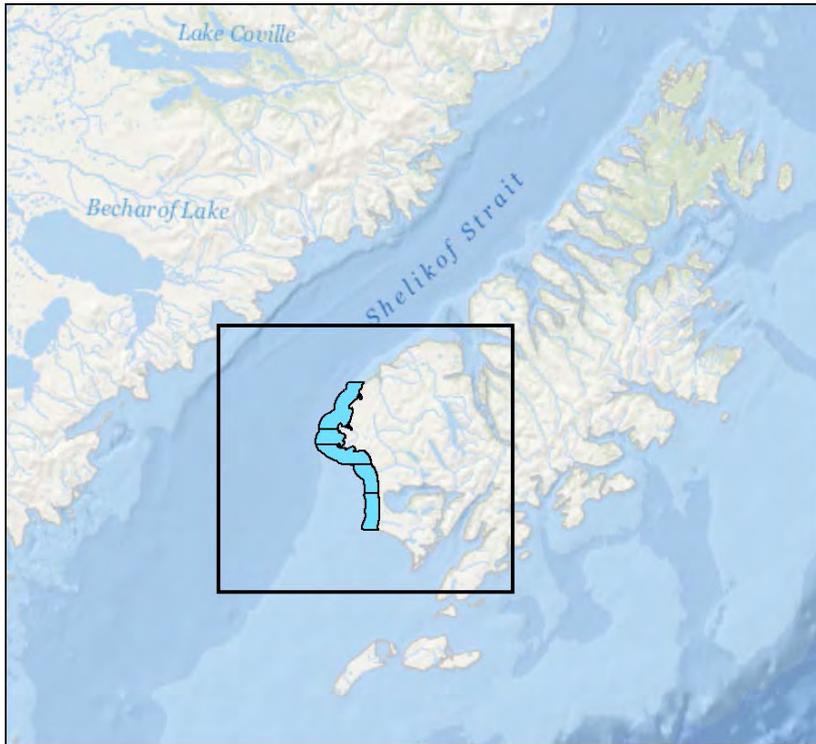
2014

2015

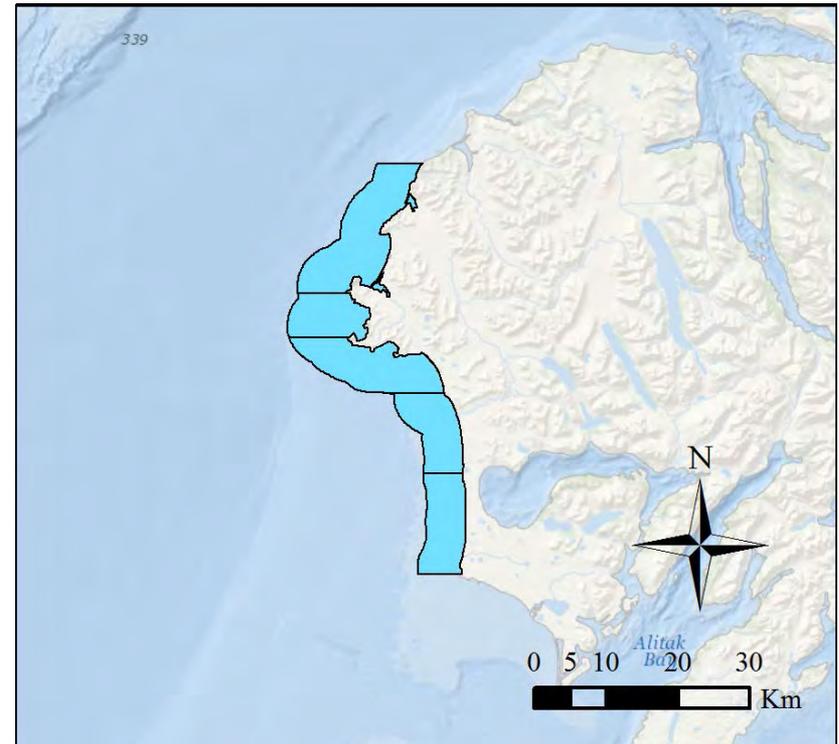
2016

Dates-Strata	Harvest	Samples	Harvest	Samples	Harvest	Samples
6/1–6/27 Early	56,018	1,092	35,183	800	13,856	600
6/28–7/25 Middle	68,438	960	29,915	509	10,700	900
7/26–8/29 Late	124,879	2,000	63,532	800	113,445	800

Ayakulik-Halibut Bay sampling area



2014

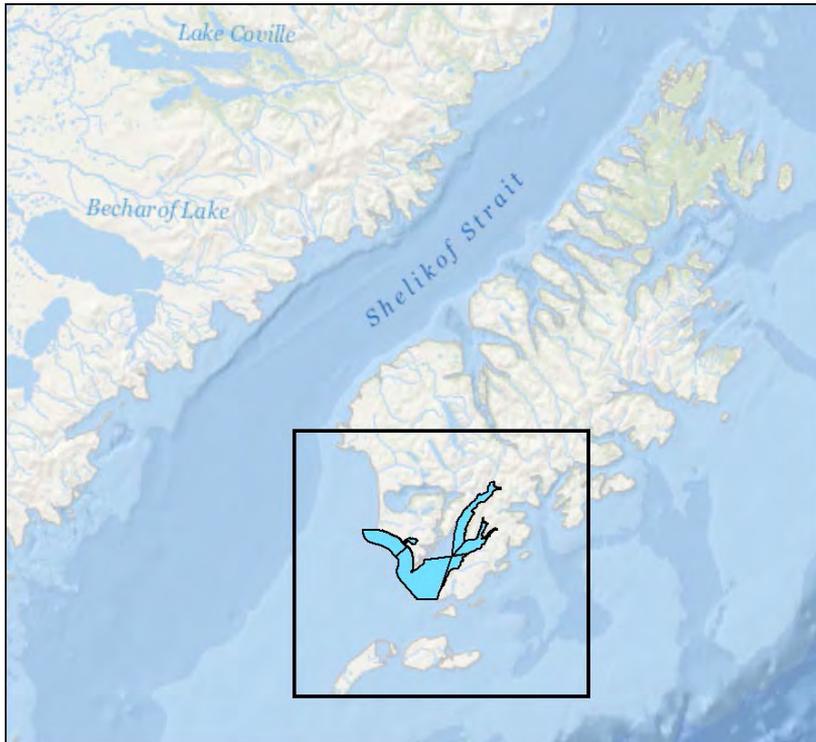


2015

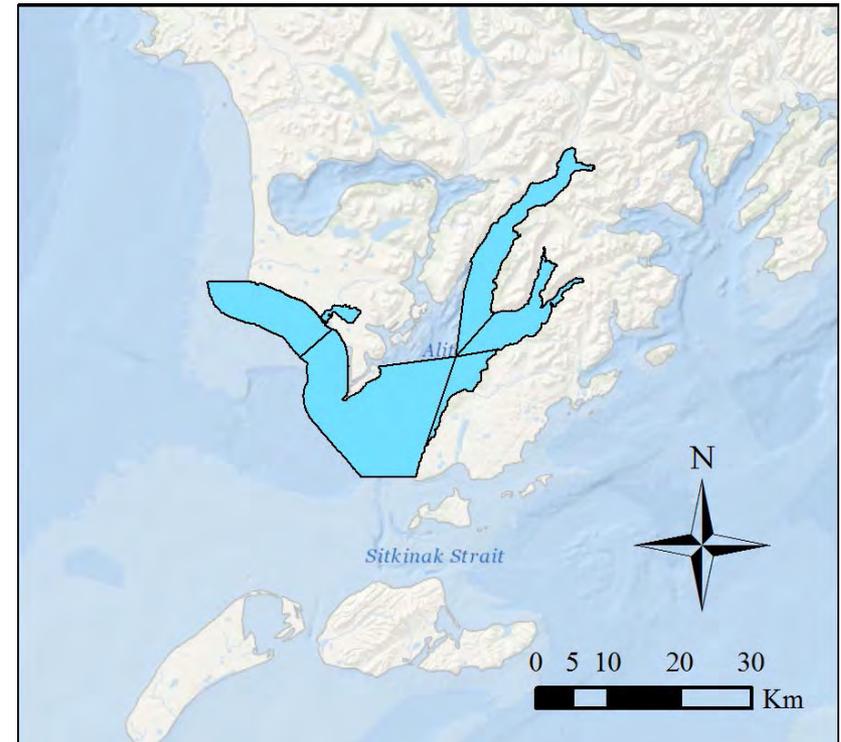
2016

Dates-Strata	2014		2015		2016	
	Harvest	Samples	Harvest	Samples	Harvest	Samples
6/1–6/27 Early	162,984	1,276	203,170	1,200	3,937	220
6/28–7/25 Middle	175,205	600	384,390	800	120,068	1,000
7/26–8/29 Late	57,066	1,050	20,619	400	33,721	800

Alitak sampling area



2014

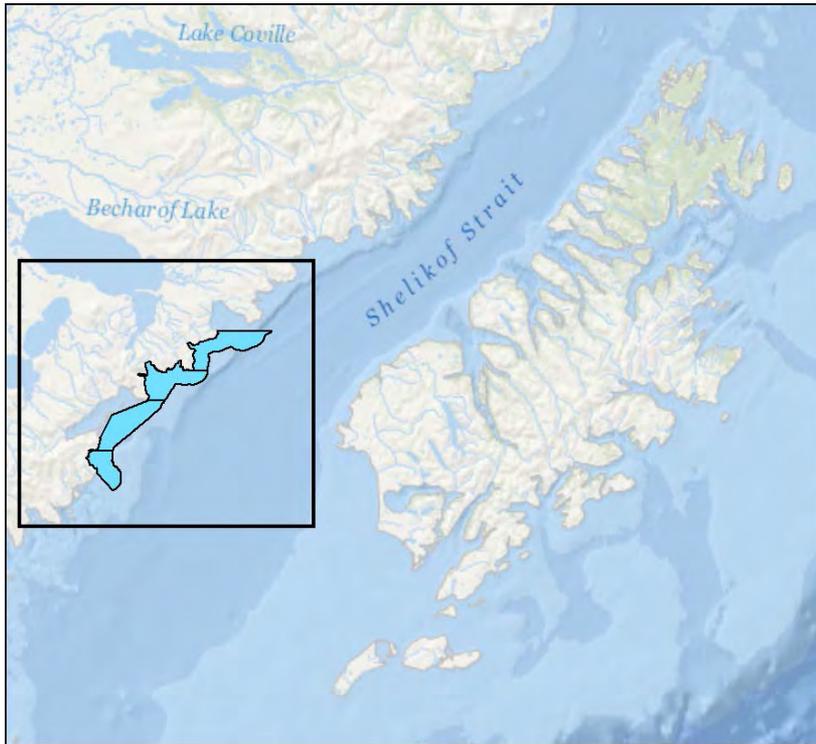


2015

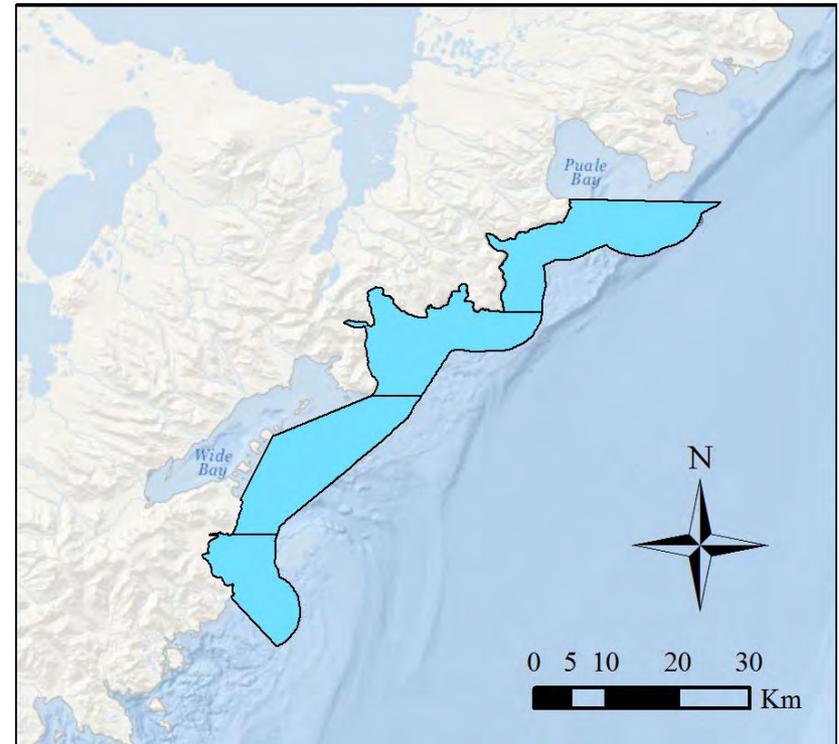
2016

Dates-Strata	Harvest	Samples	Harvest	Samples	Harvest	Samples
6/1–6/27 Early	Closed	-	28,723	600	11,118	400
6/28–7/25 Middle	115,998	1,100	165,894	800	61,930	885
7/26–8/29 Late	5,437	742	31,294	800	21,243	1,309

Igvak sampling area



2014



2015

2016

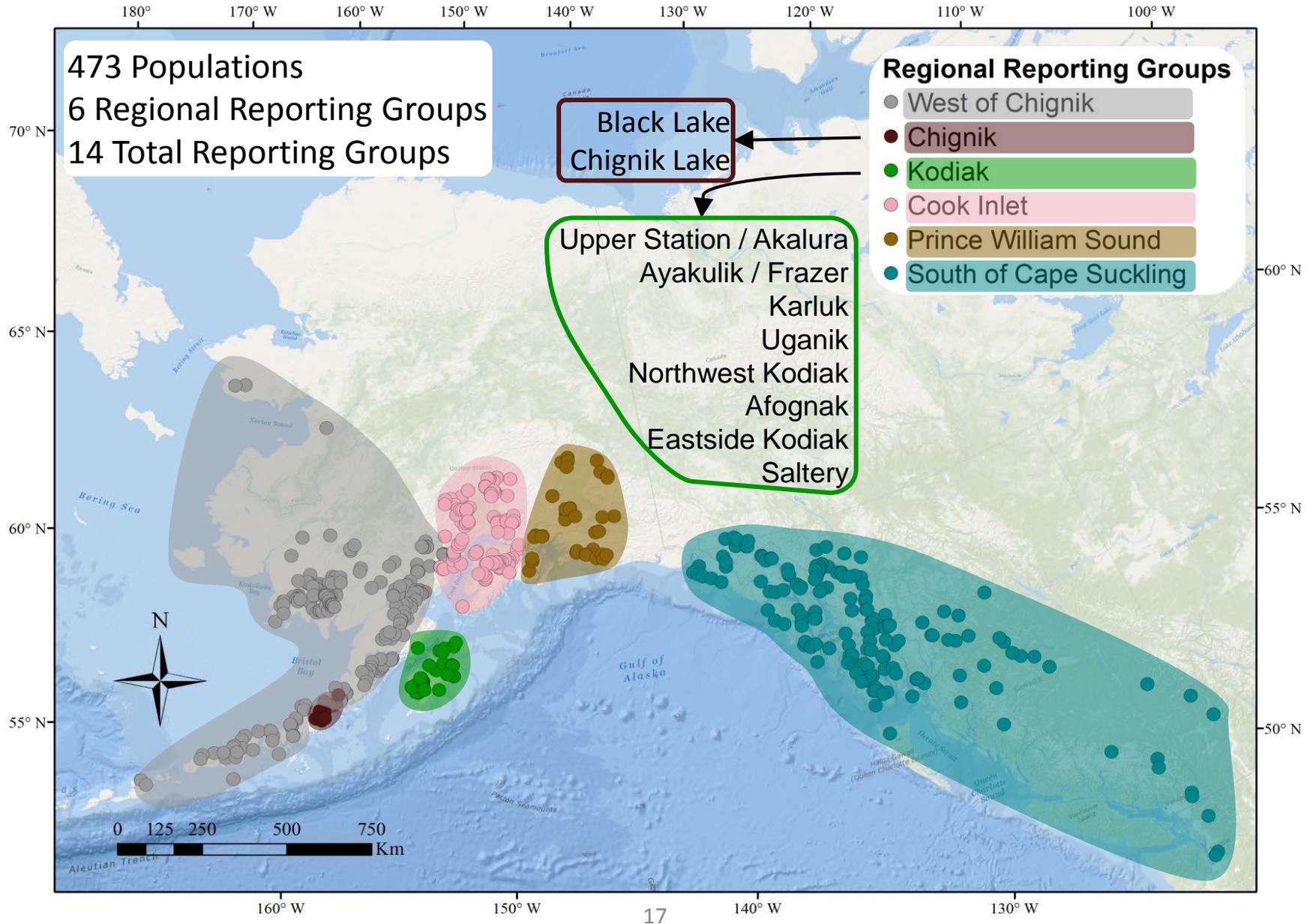
Dates-Strata	2014		2015		2016	
	Harvest	Samples	Harvest	Samples	Harvest	Samples
6/1–6/27 Early	Closed	-	Closed	-	154,318	1,400
6/28–7/25 Middle	Closed	-	6,595	400	177,315	1,400

Genetic Baseline

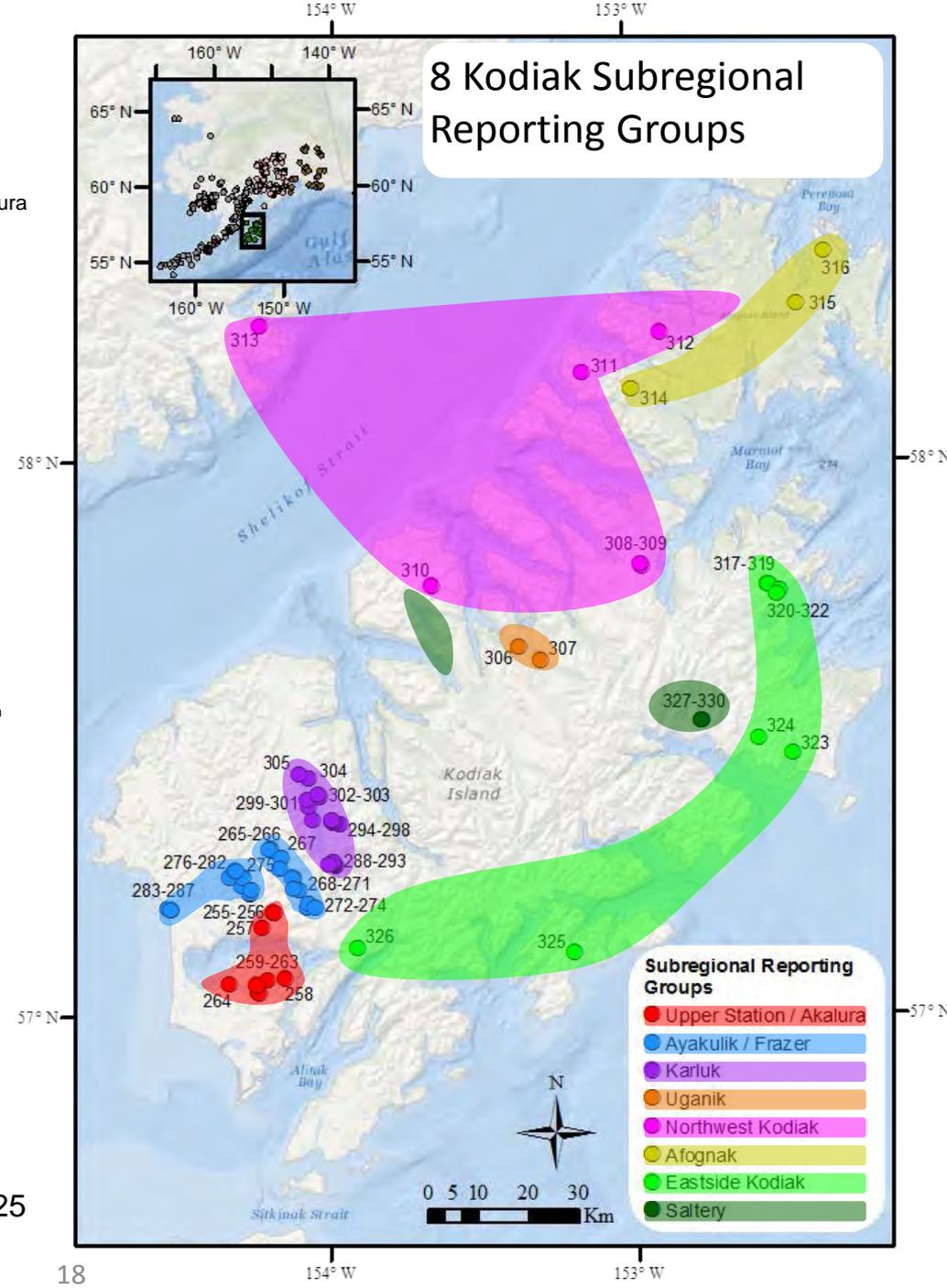
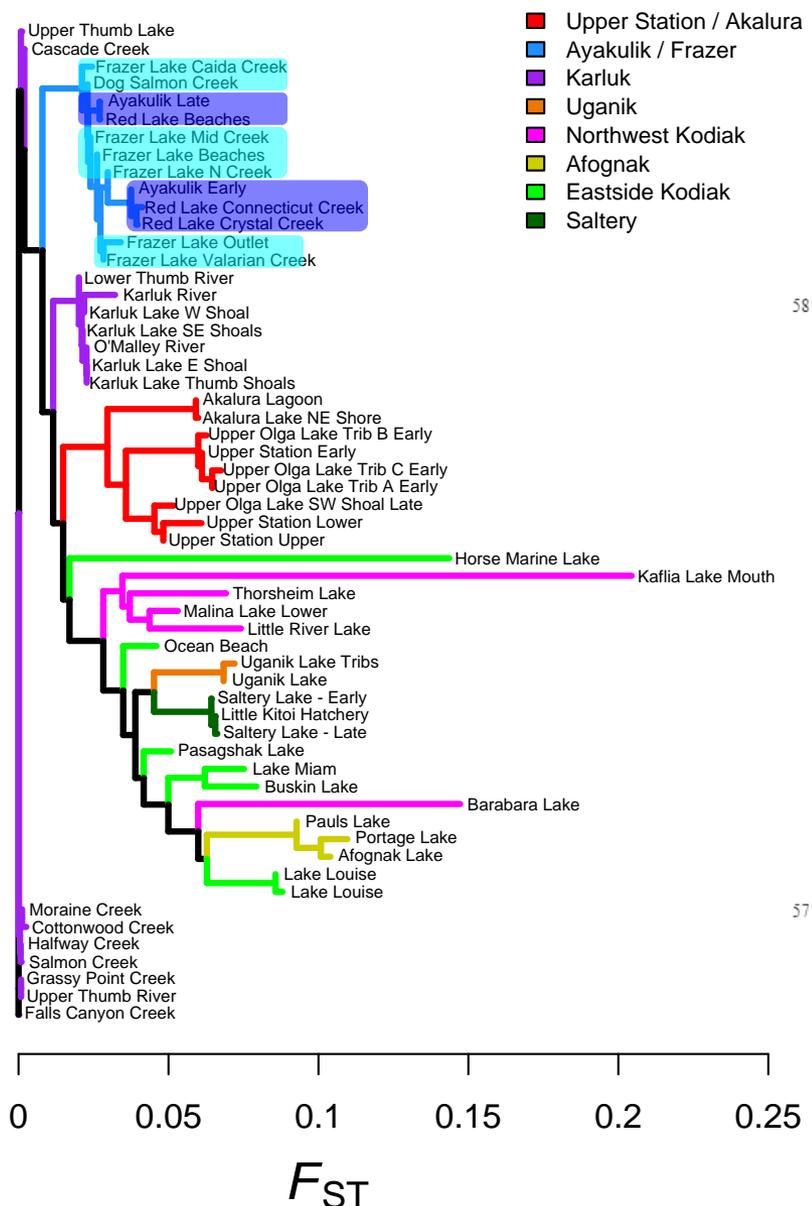
- Sampled populations
 - All potential stocks represented
- Populations genetically characterized
- Reporting groups tested
 - Groups of populations that can be genetically distinguished
- Mixed-stock analysis
 - Used to estimate stock contributions



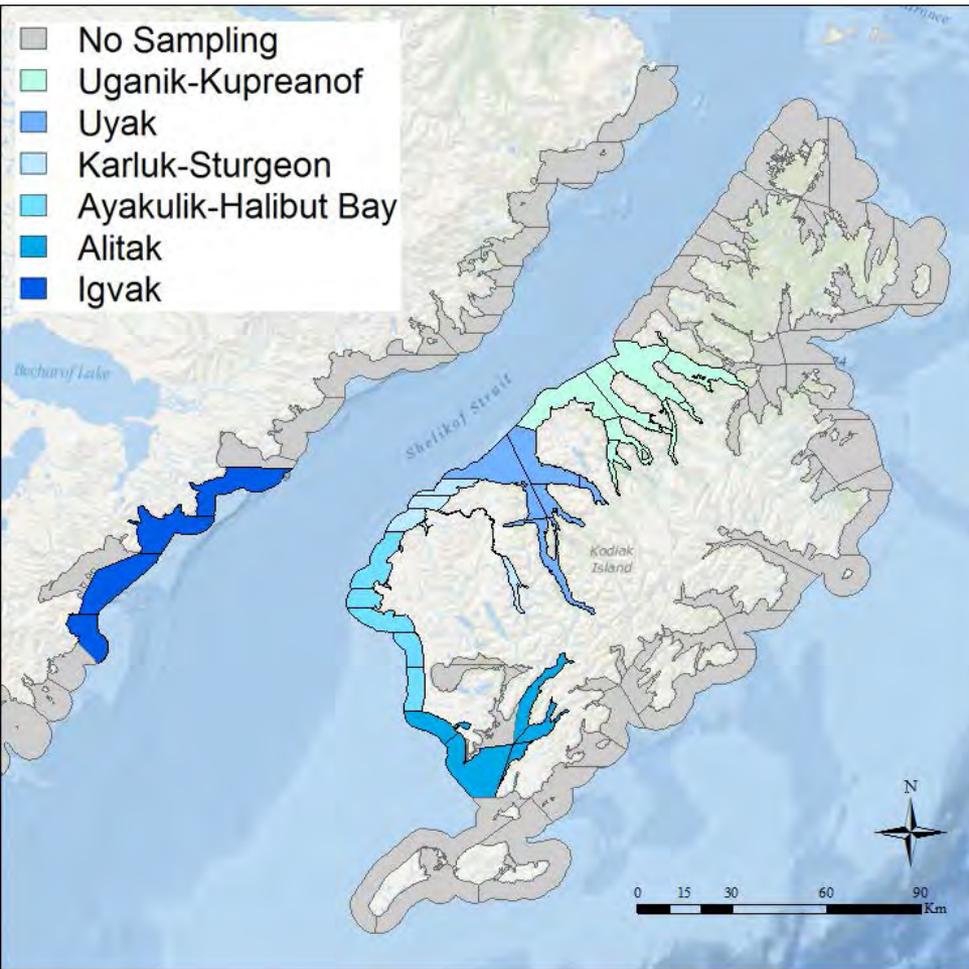
Genetic Baseline



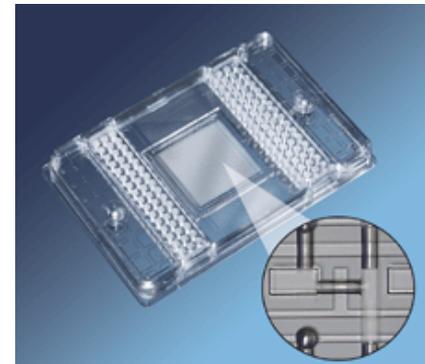
Genetic Baseline



Harvest Sample Analysis



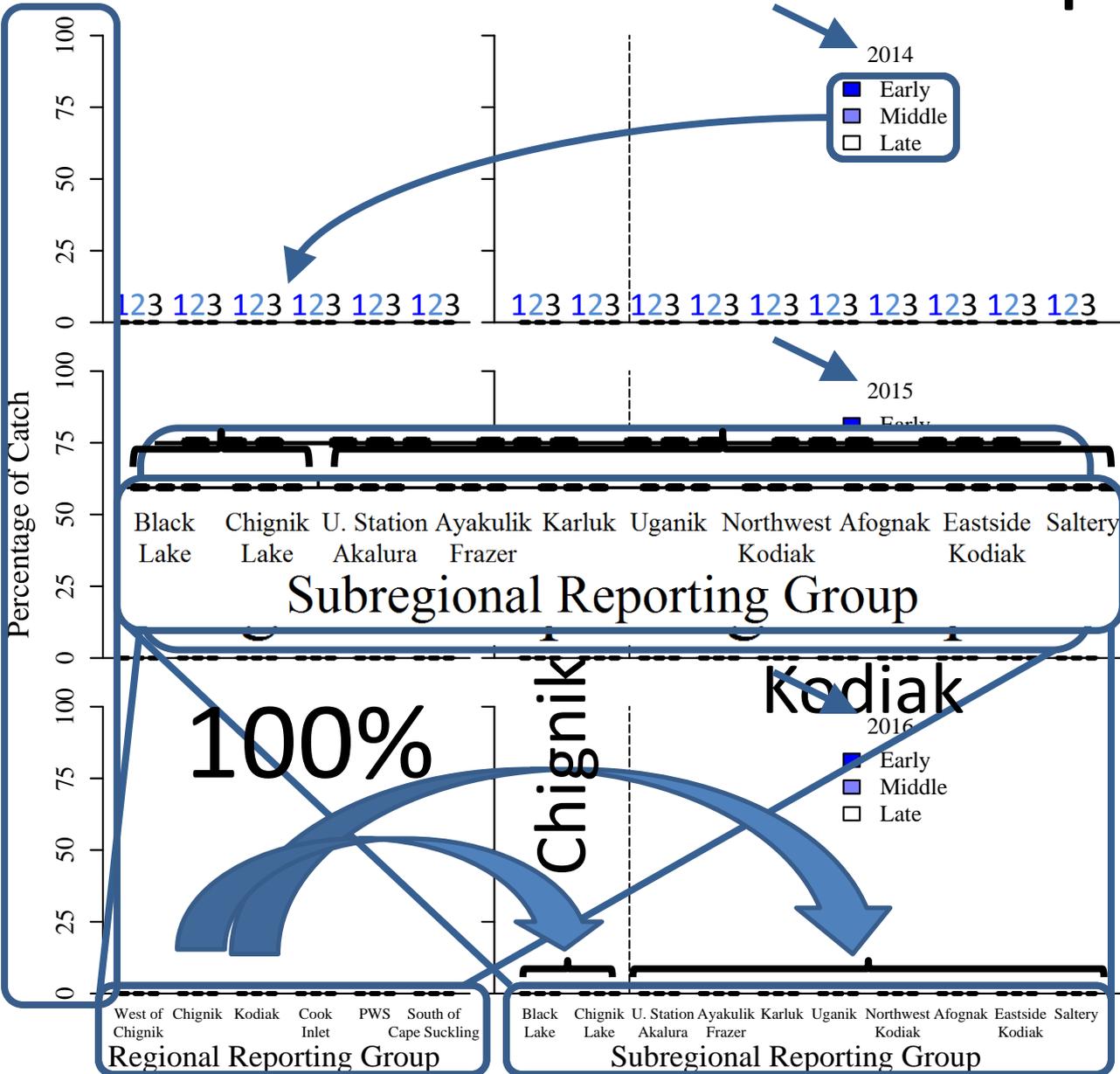
- Selected harvest samples



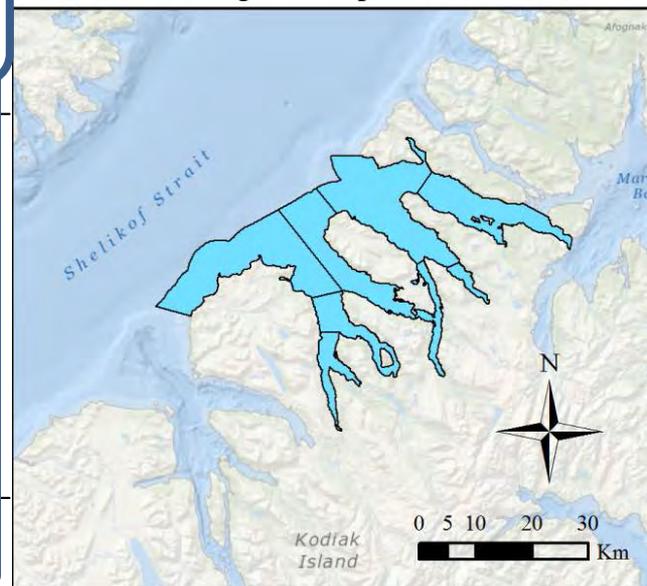
- Analyzed genetic samples



Results-Example

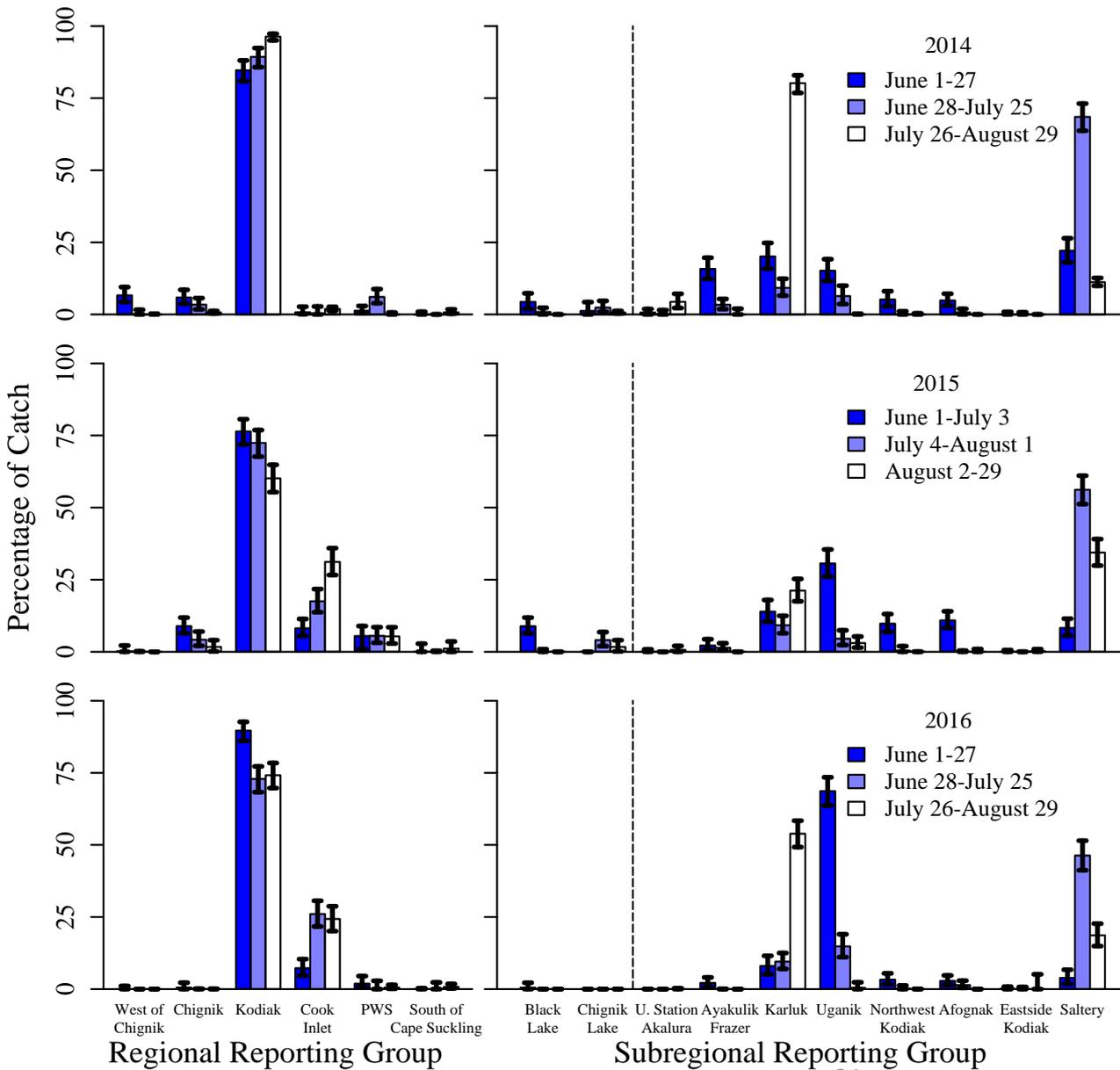


Uganik-Kupreanof

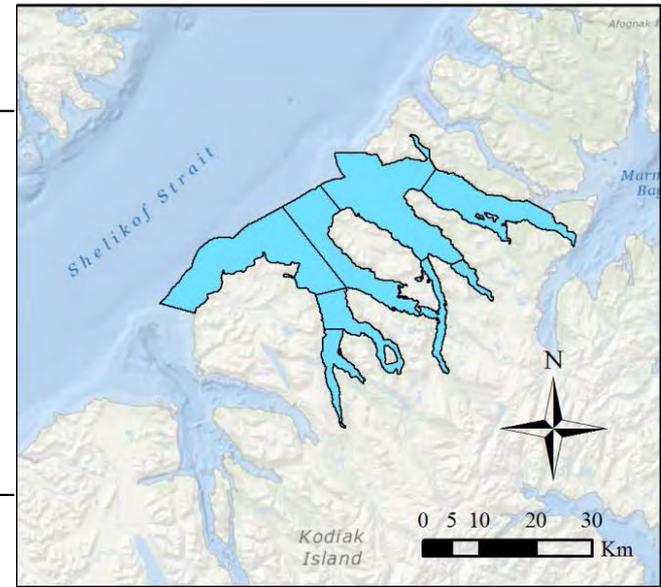


Kodiak Island

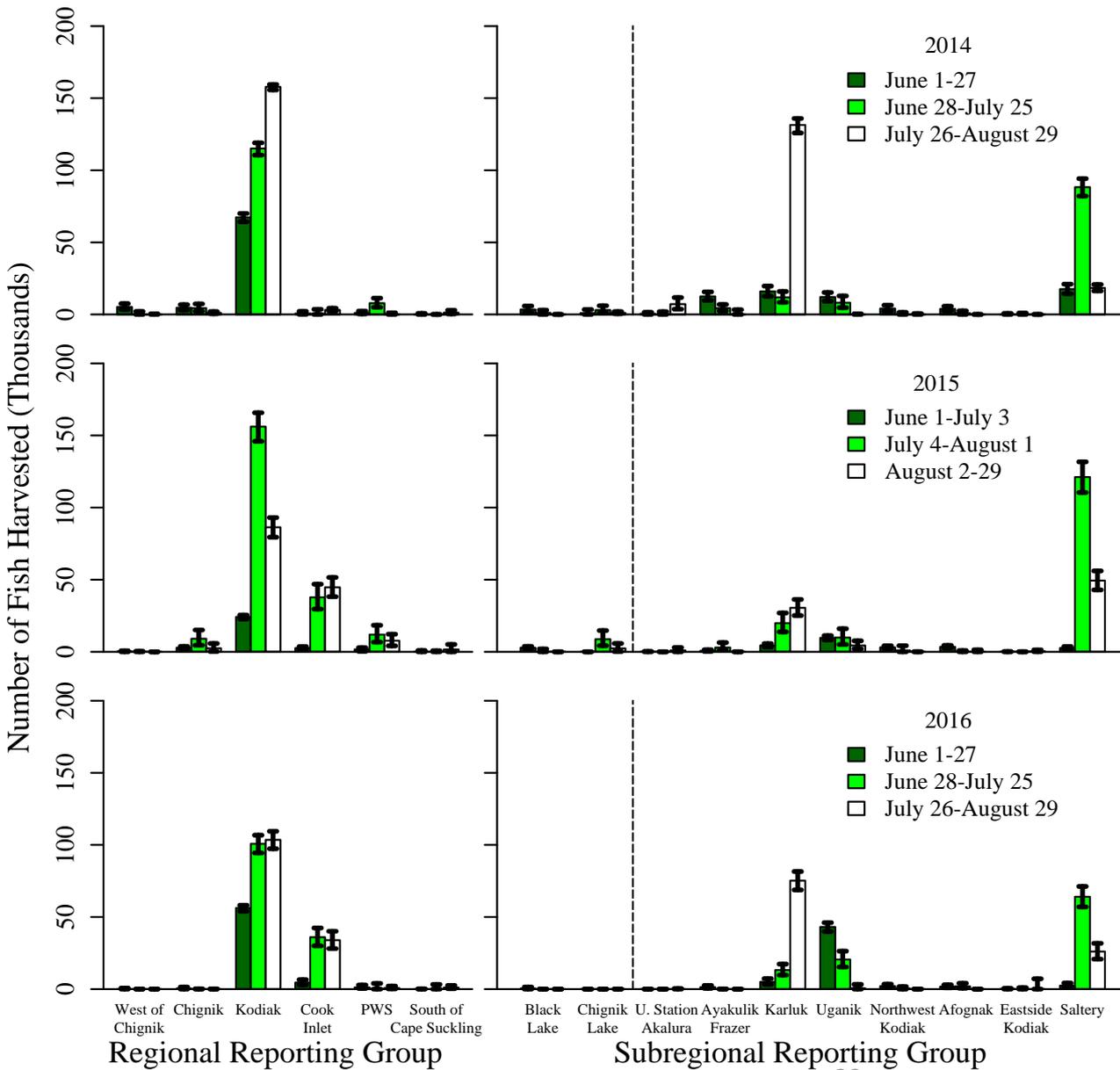
Uganik-Kupreanof Stock Composition



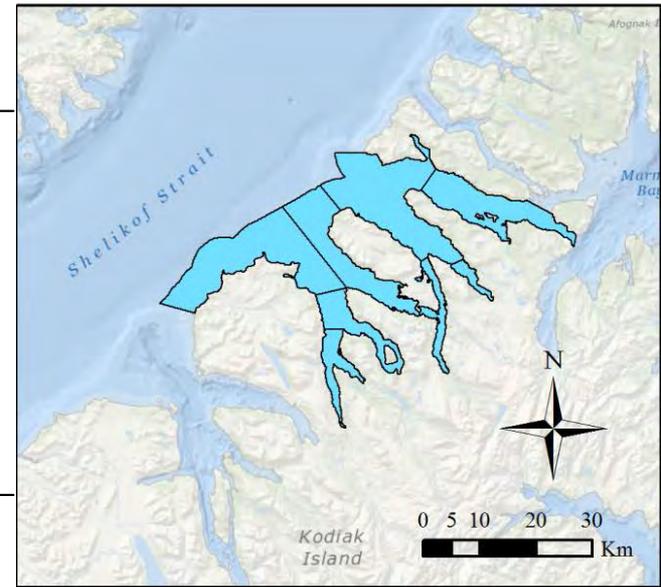
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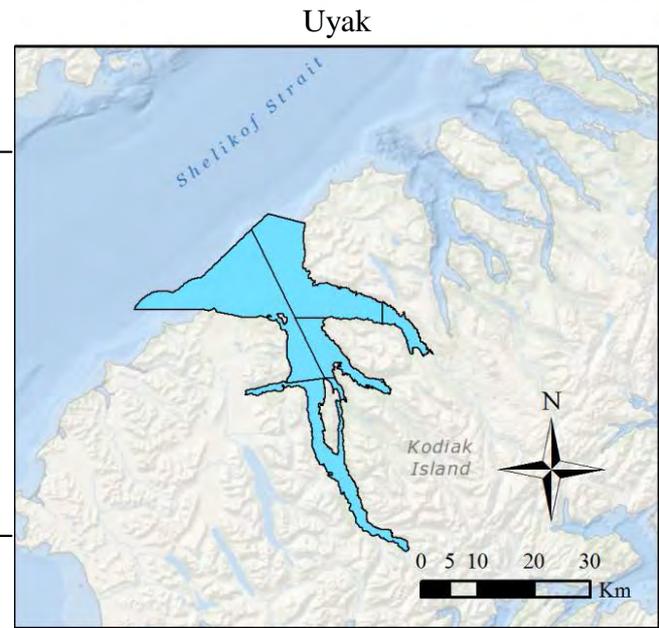
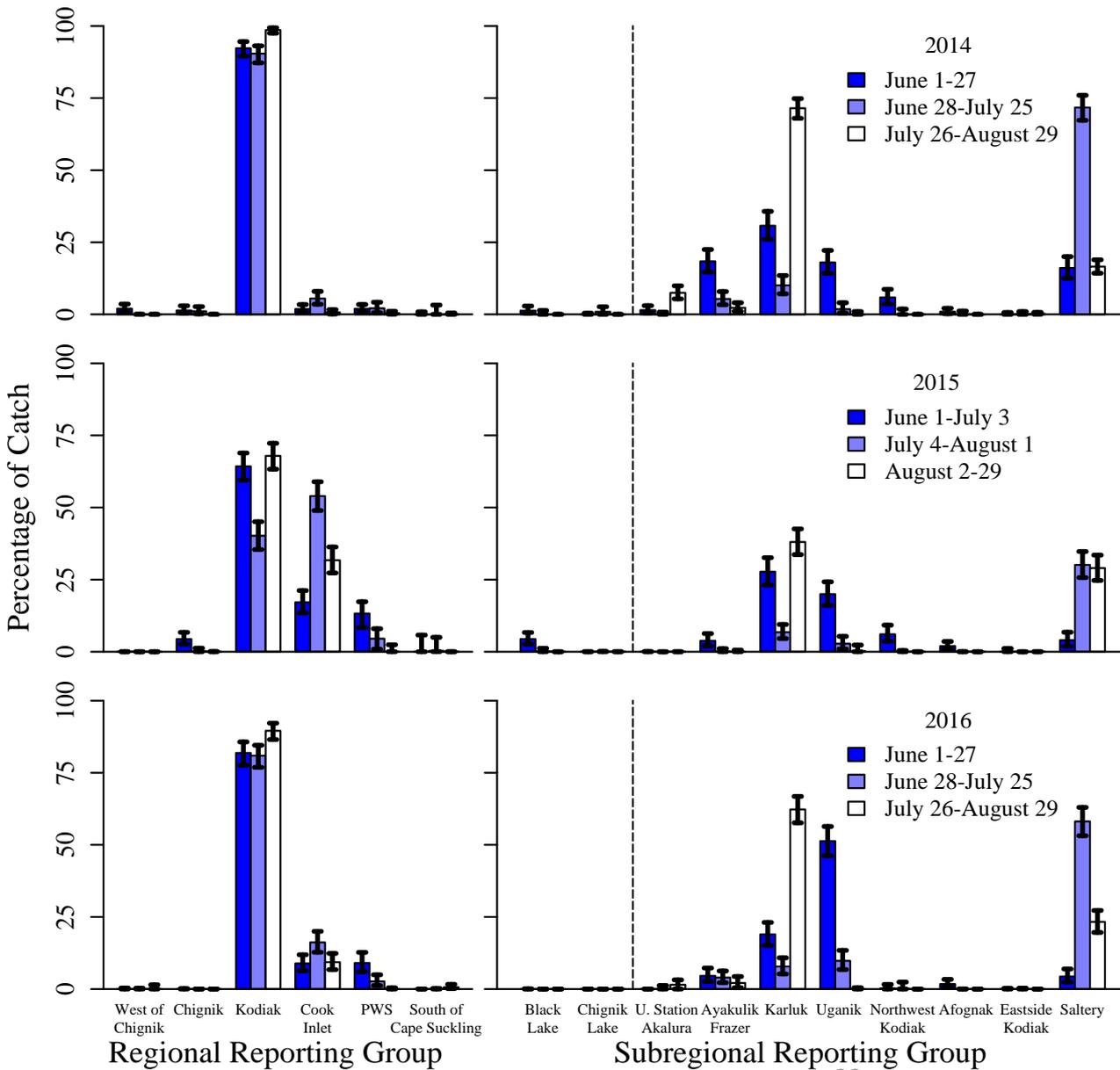
Uganik-Kupreanof Stock-Specific Harvest



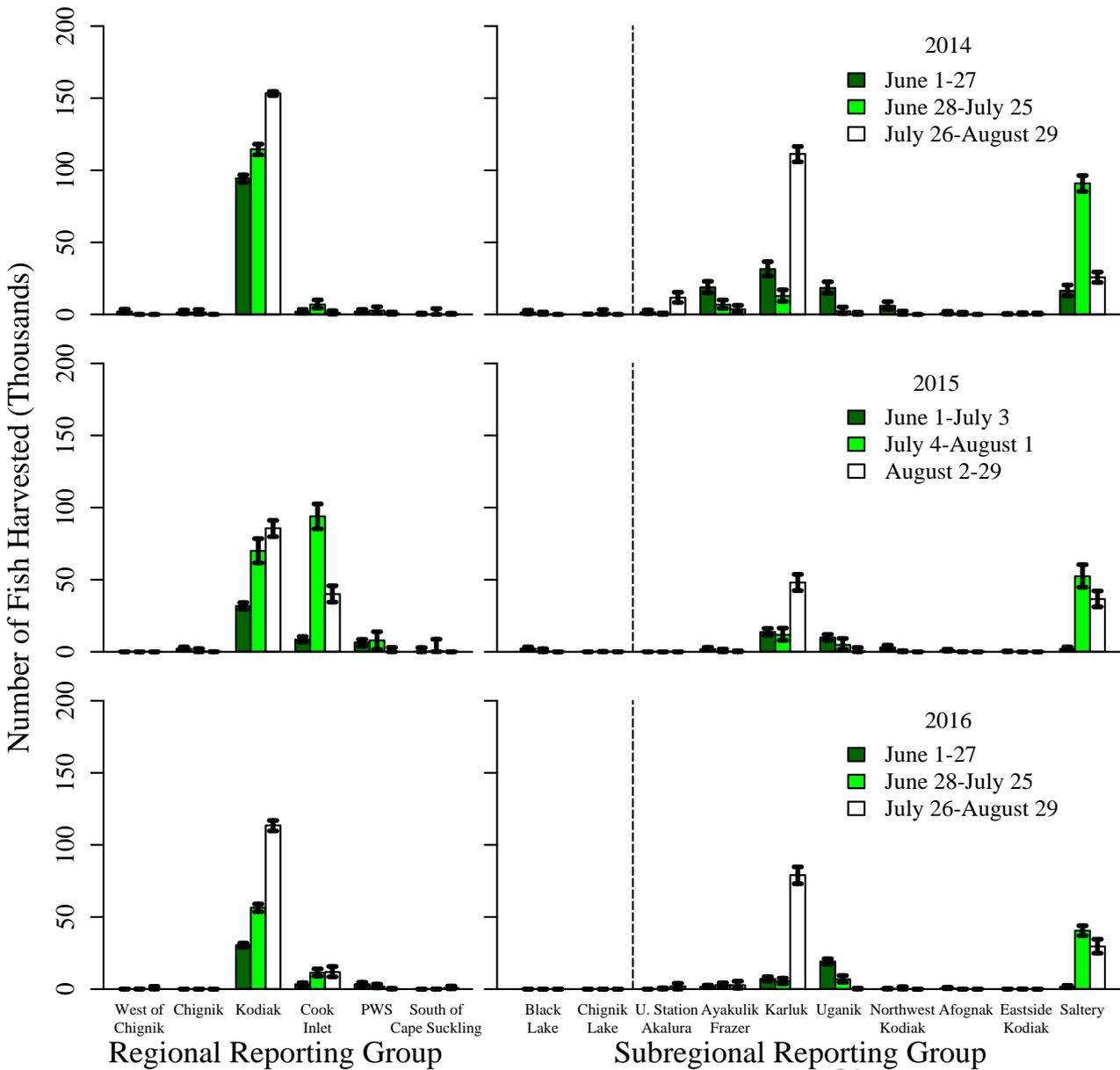
Uganik-Kupreanof



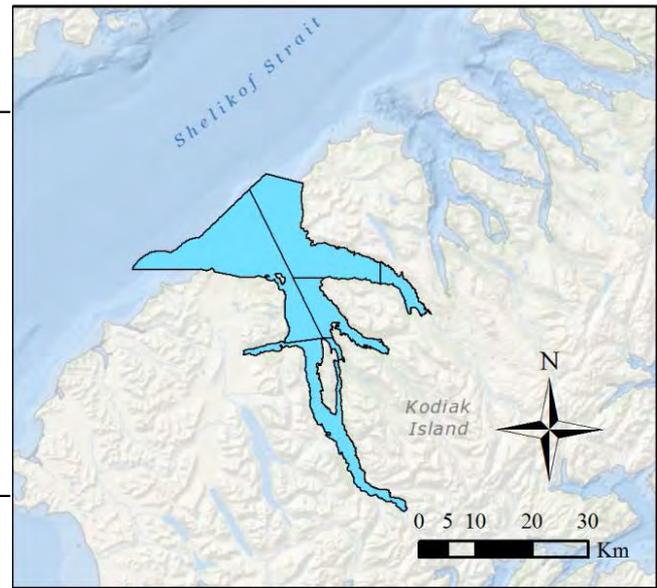
Uyak Stock Composition



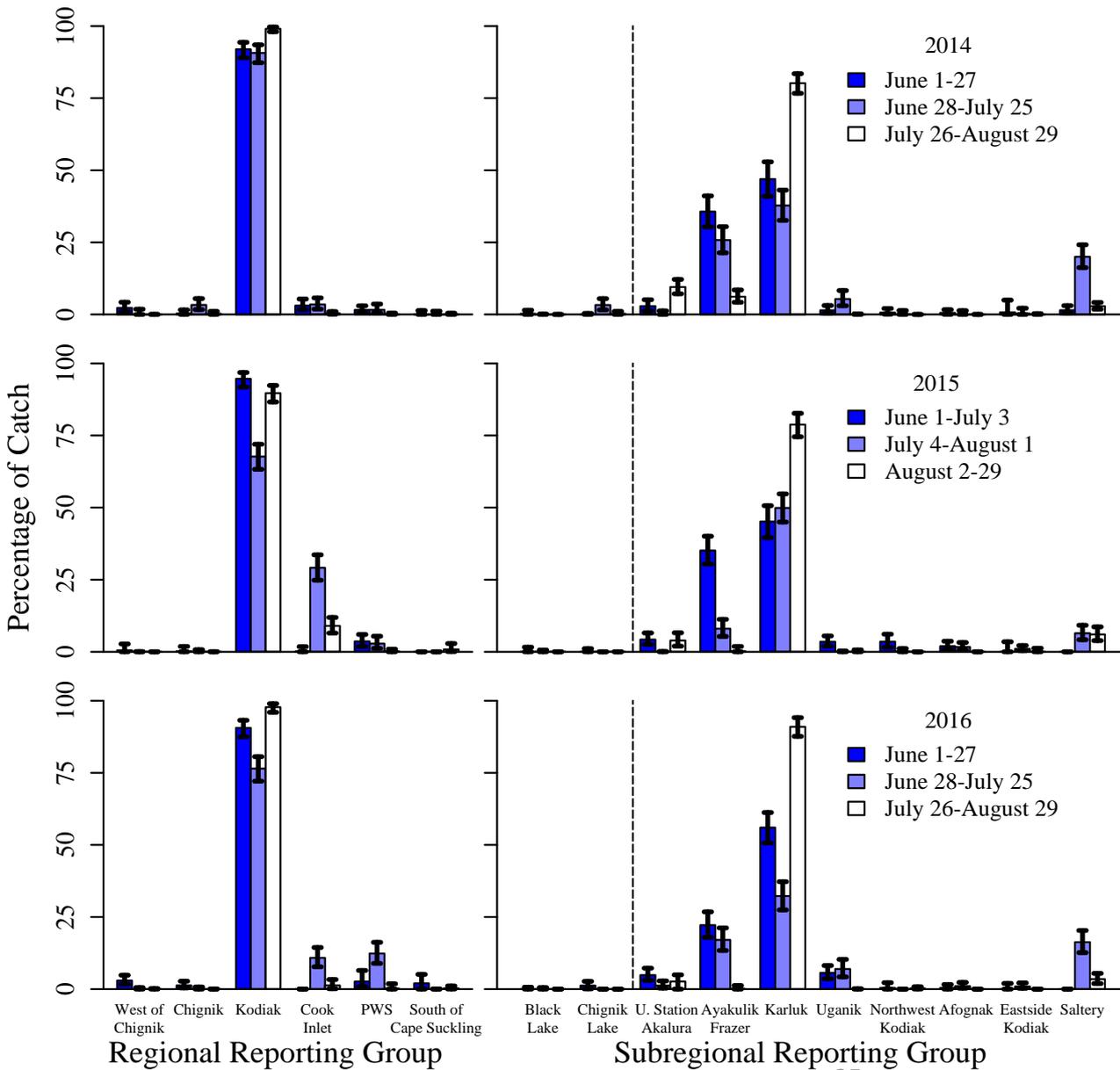
Uyak Stock-Specific Harvest



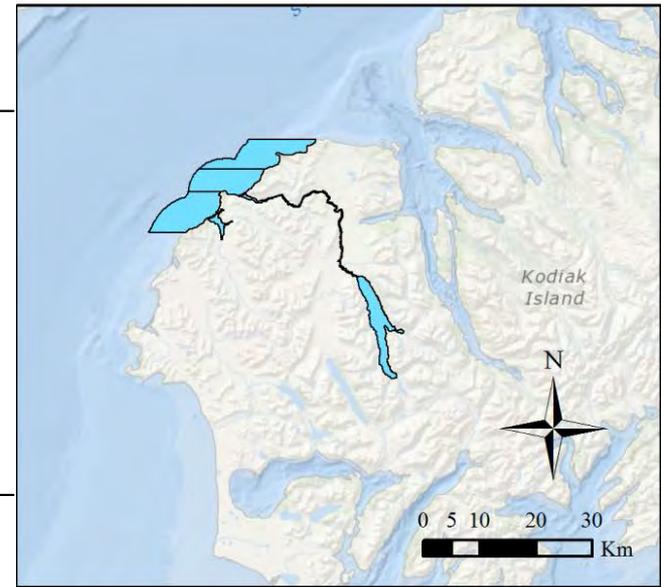
Uyak



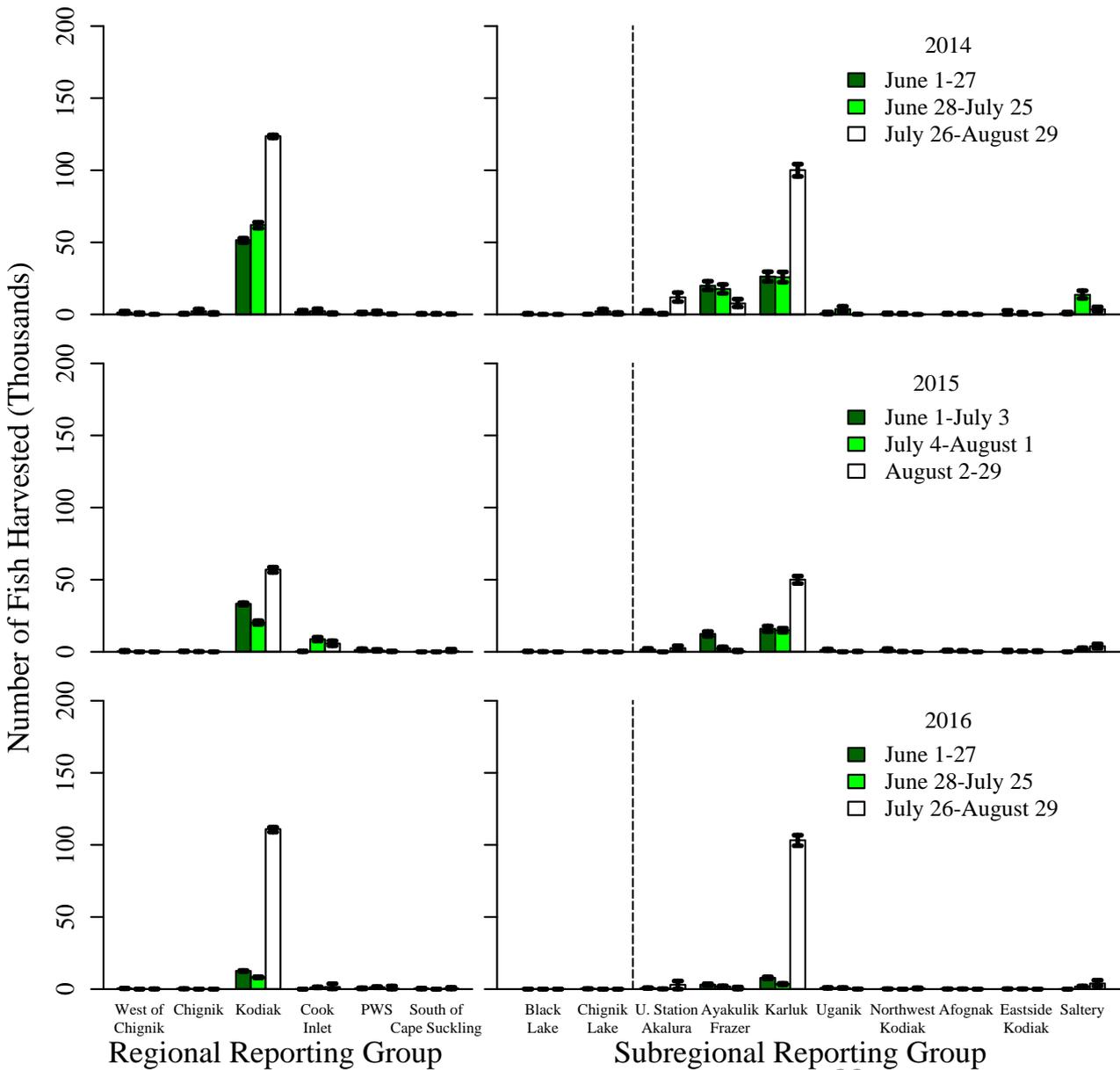
Karluk-Sturgeon Stock Composition



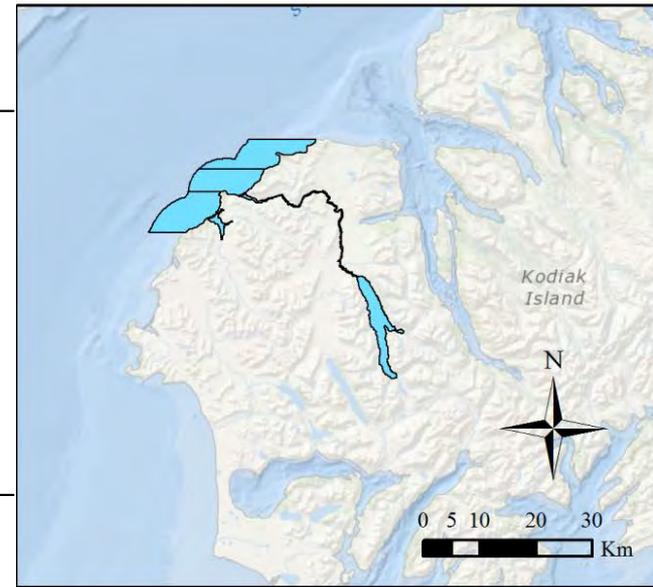
Karluk-Sturgeon



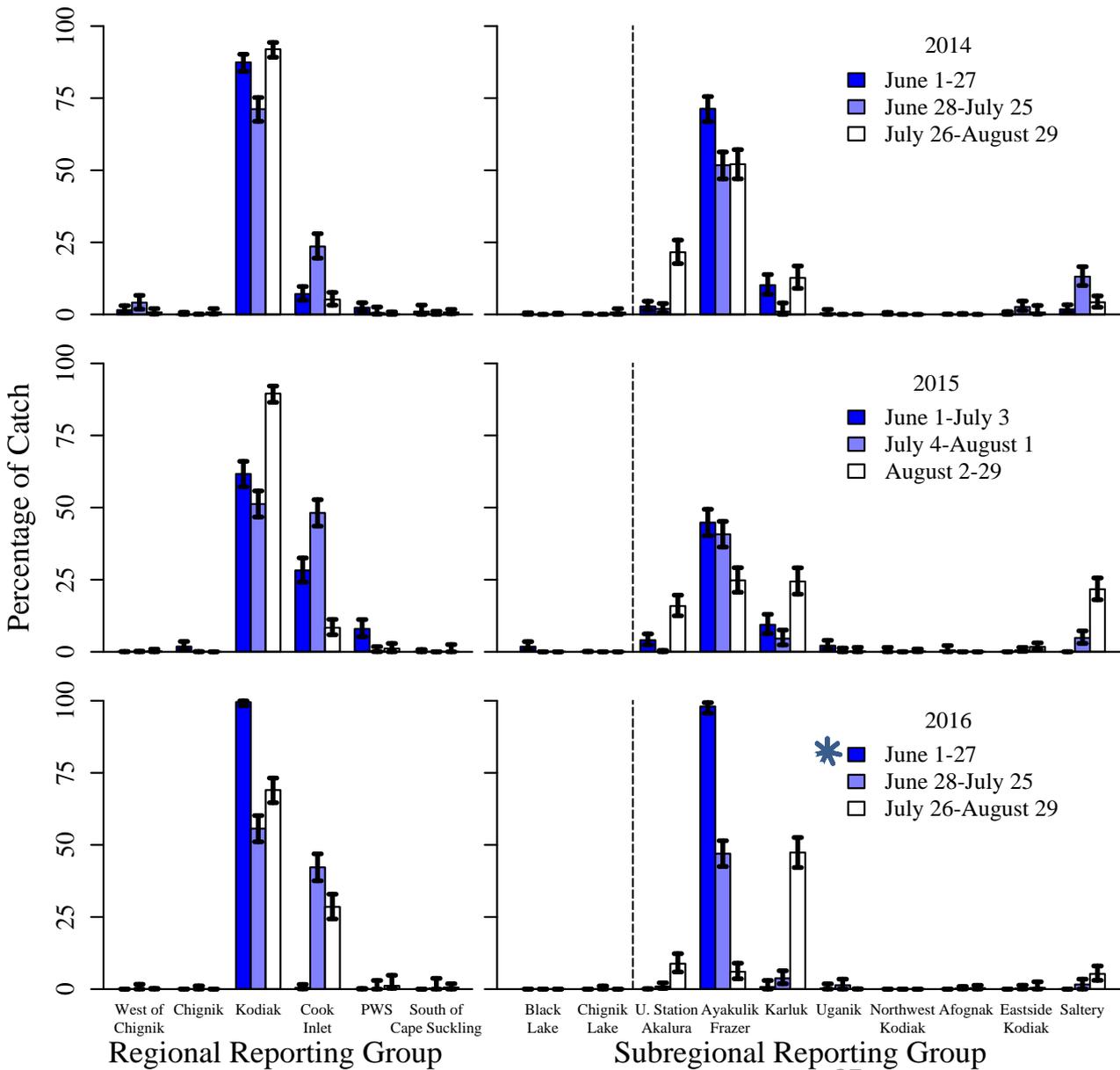
Karluk-Sturgeon Stock-Specific Harvest



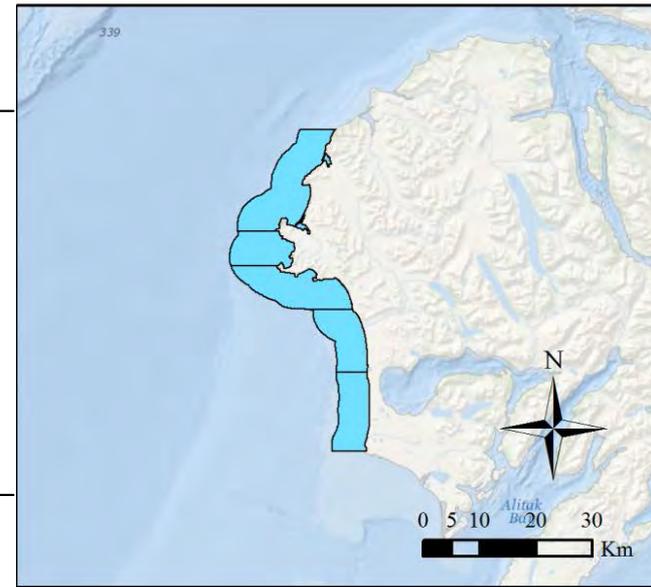
Karluk-Sturgeon



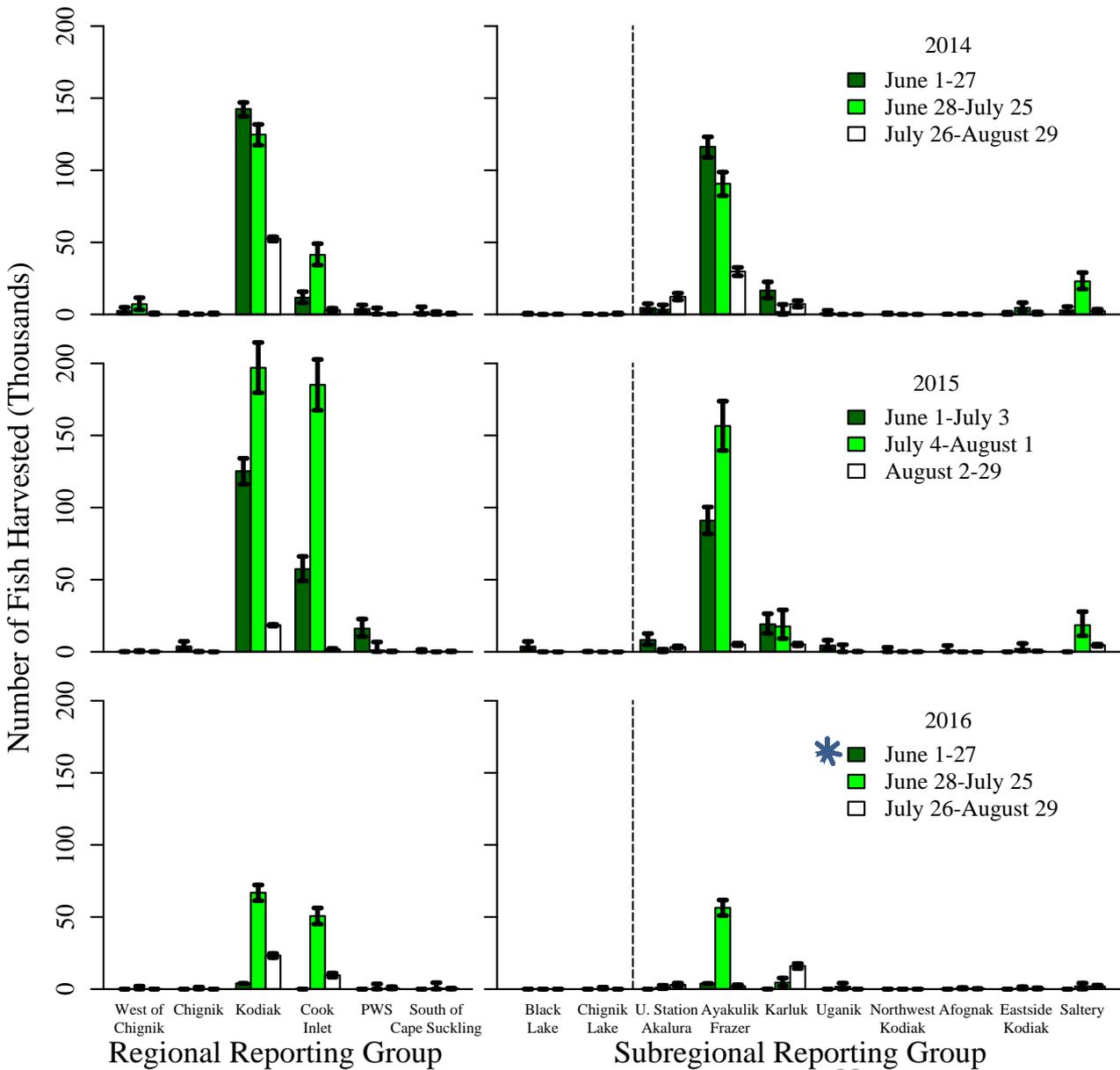
Ayakulik-Halibut Bay Stock Composition



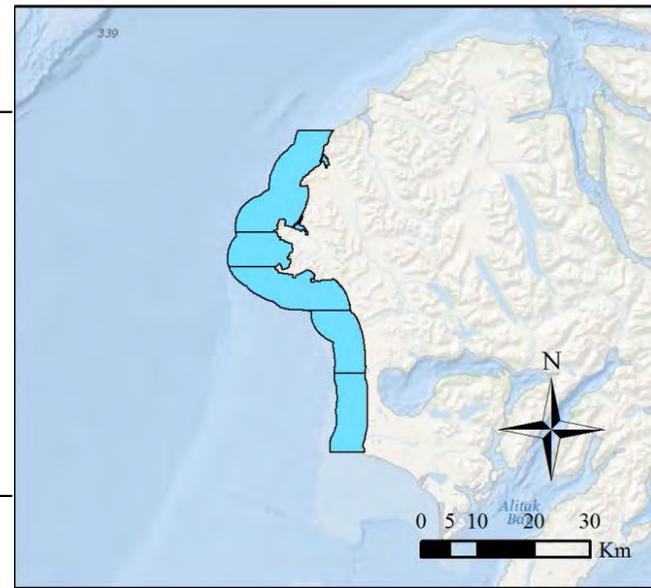
Ayakulik-Halibut Bay



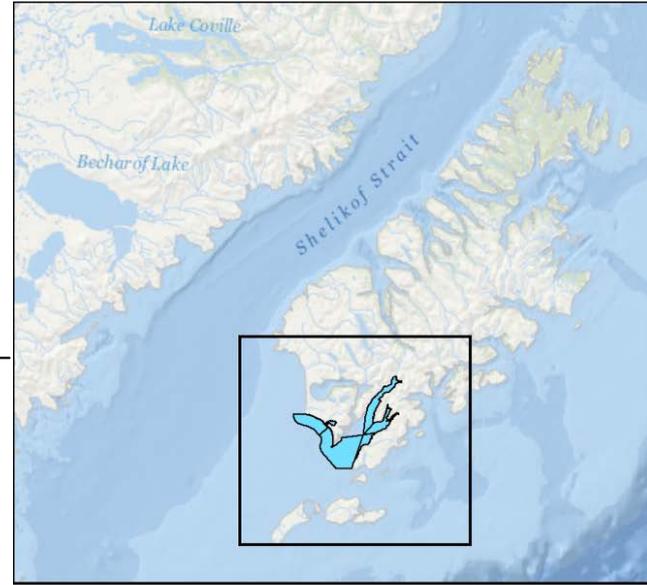
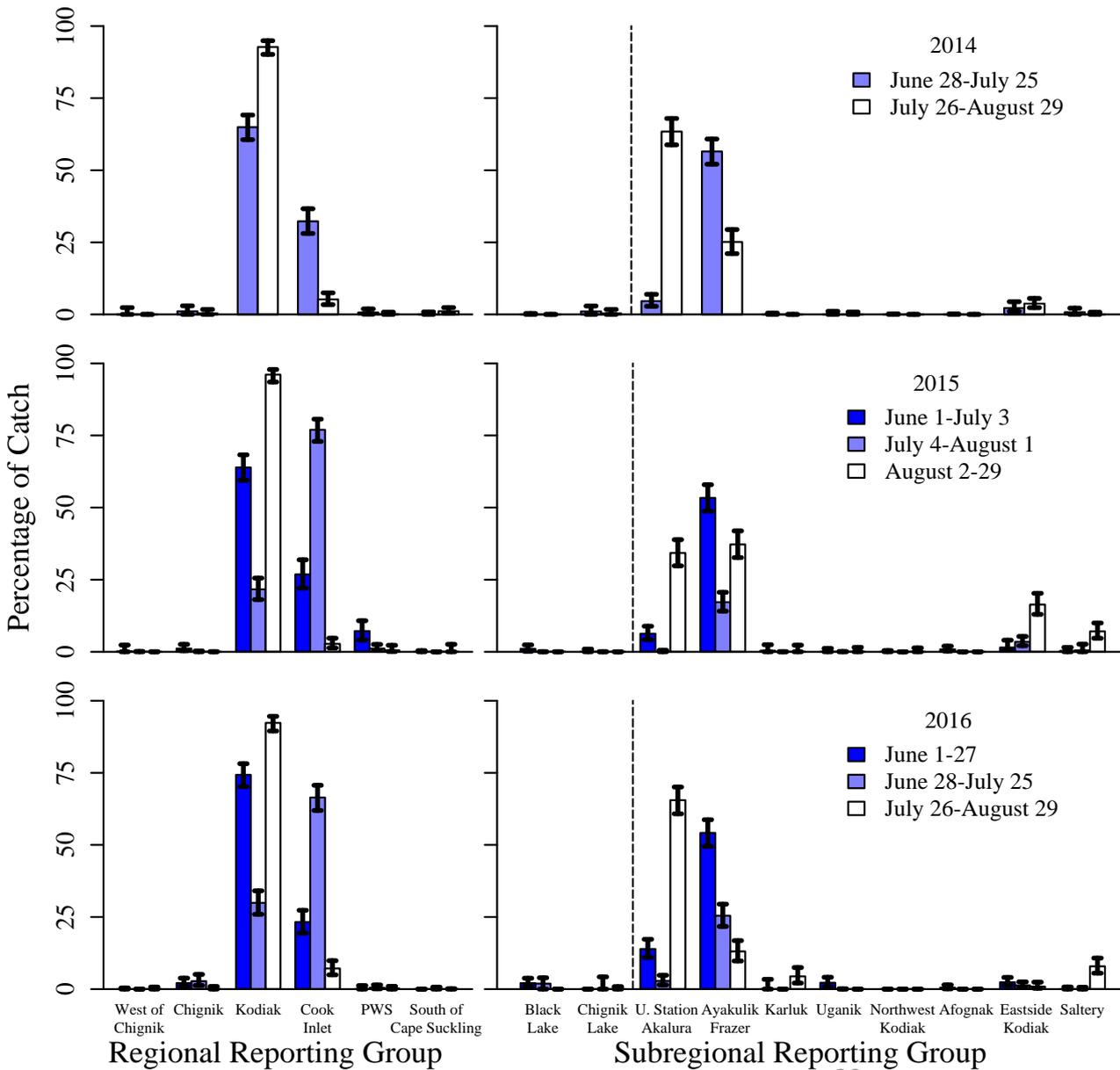
Ayakulik-Halibut Bay Stock-Specific Harvest



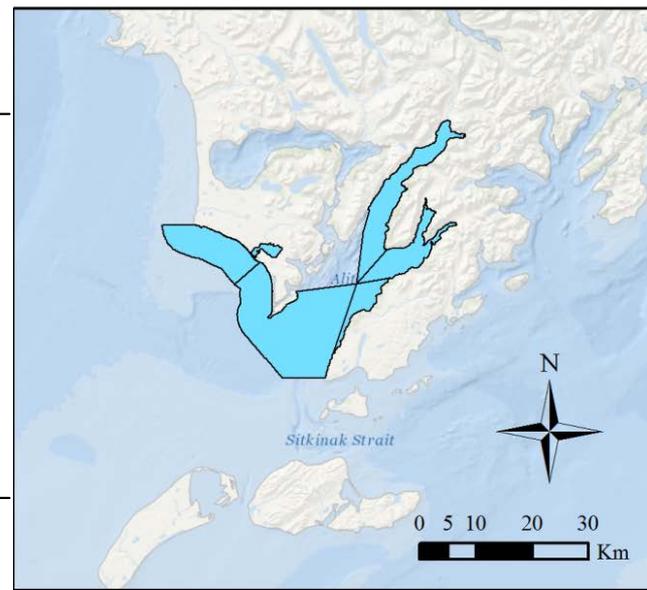
Ayakulik-Halibut Bay



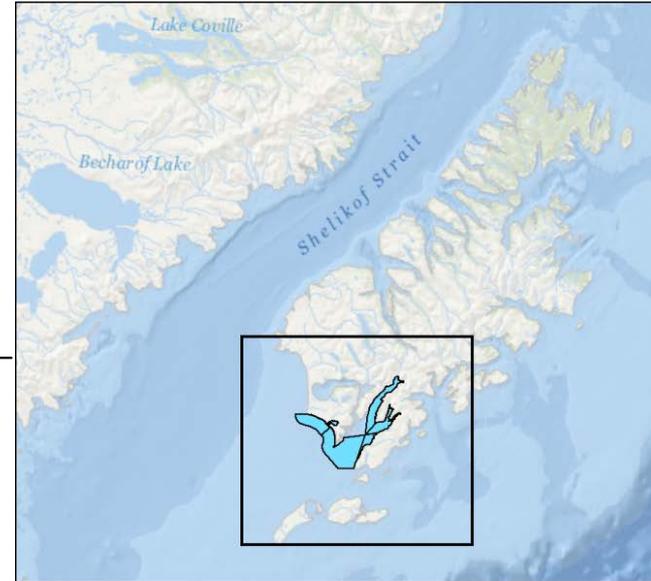
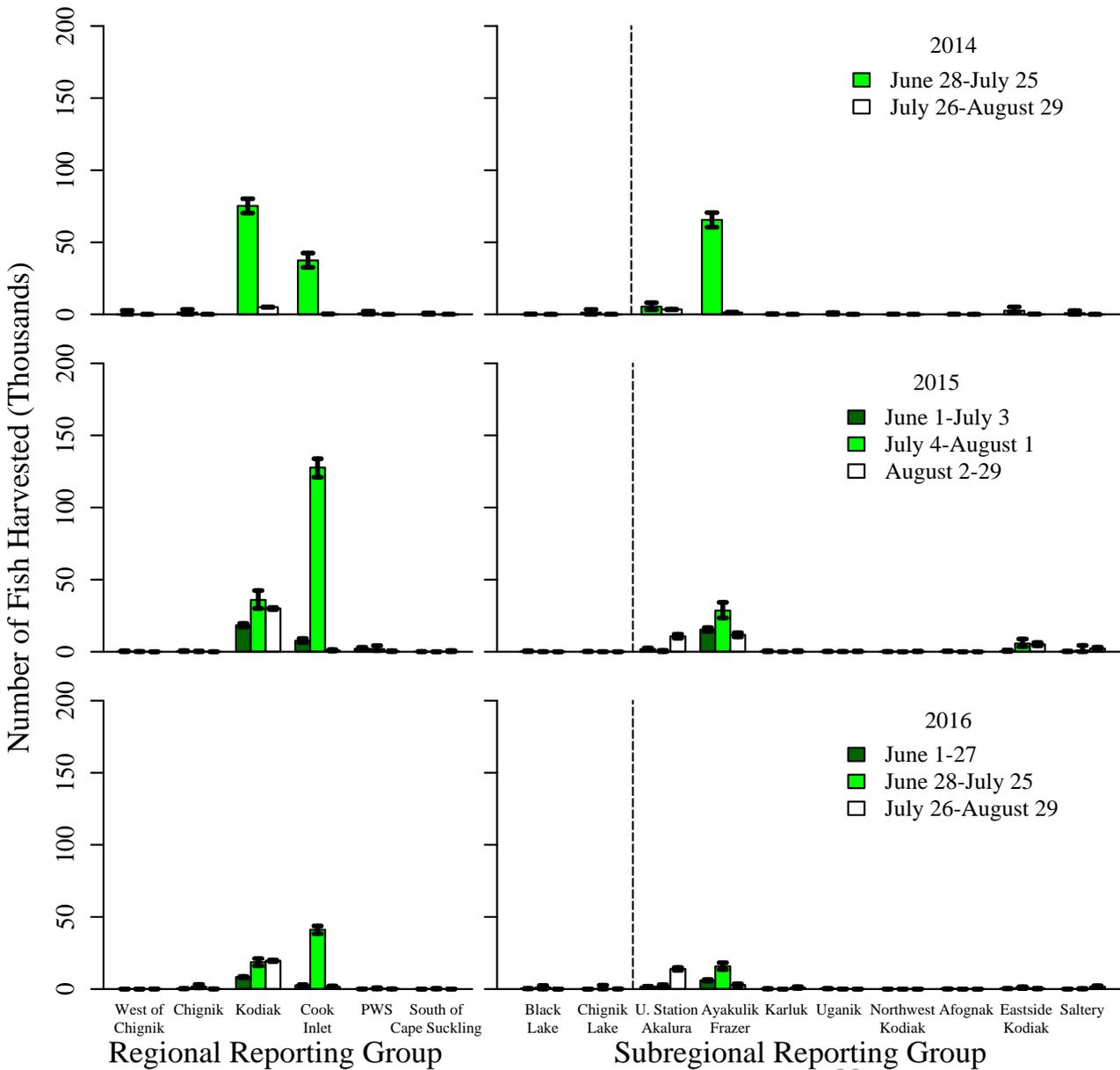
Alitak Stock Composition



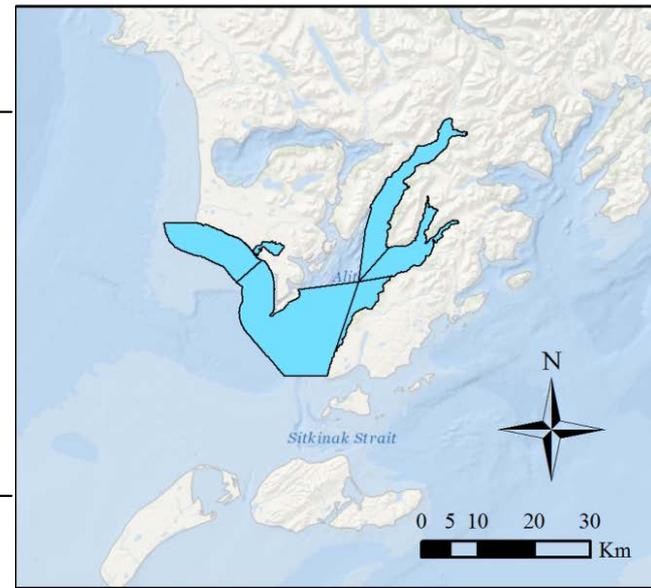
Alitak



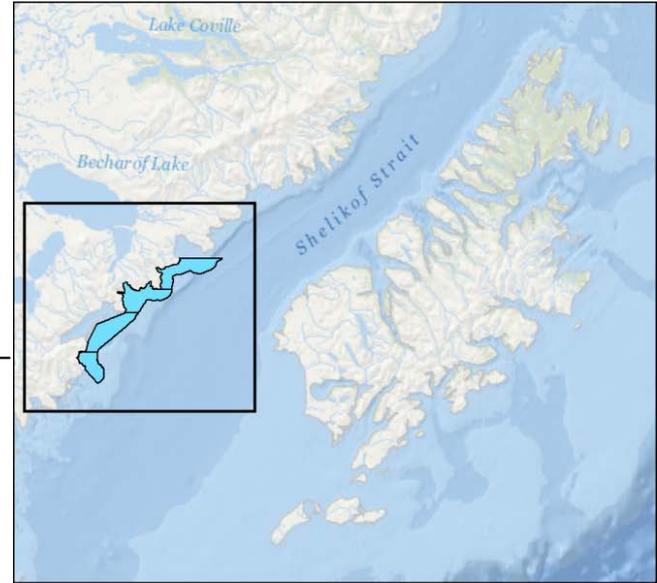
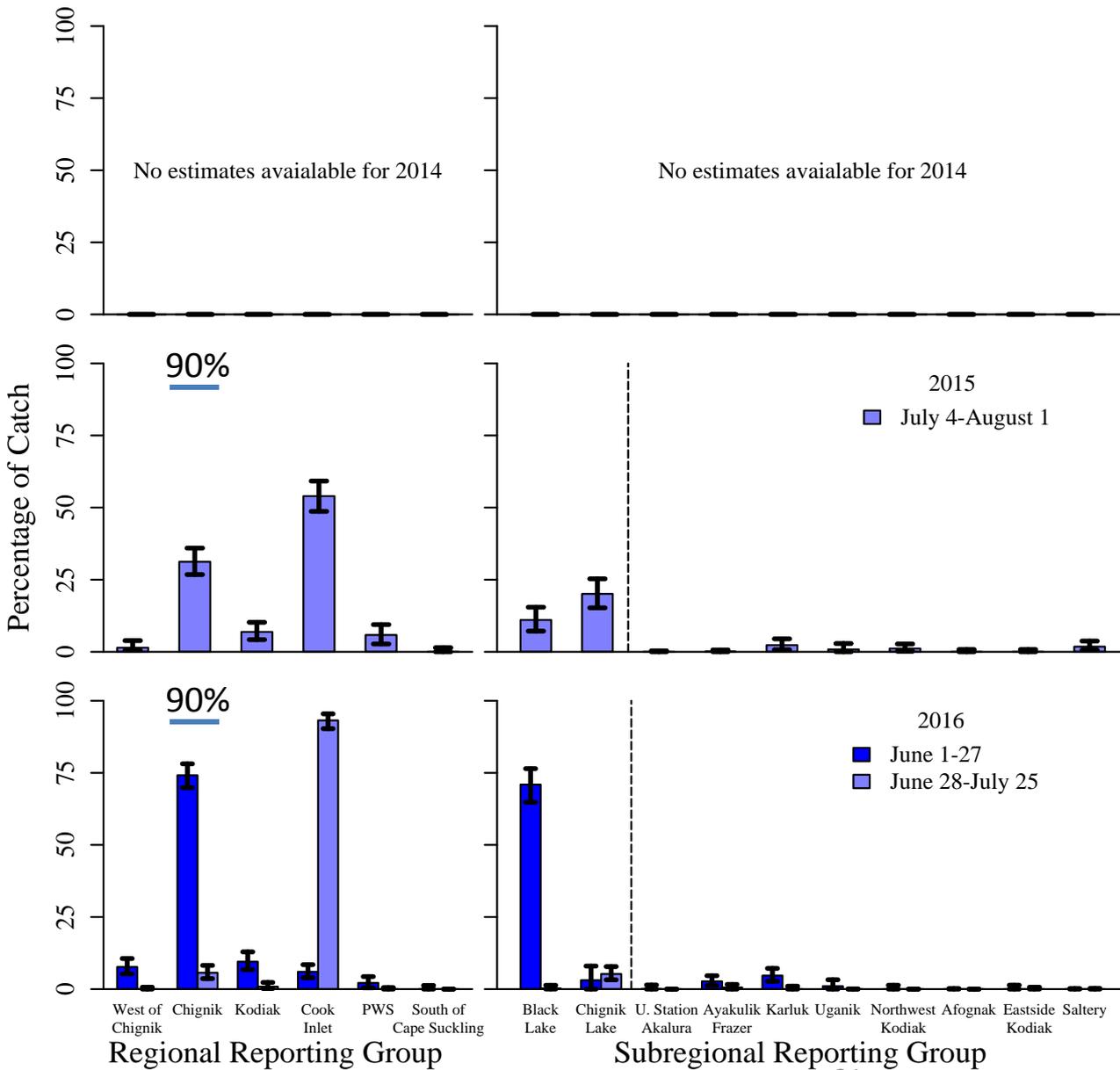
Alitak Stock-Specific Harvest



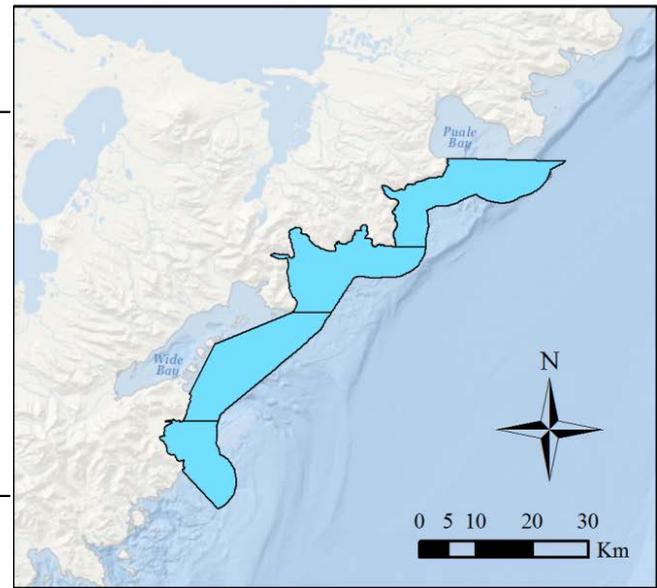
Alitak



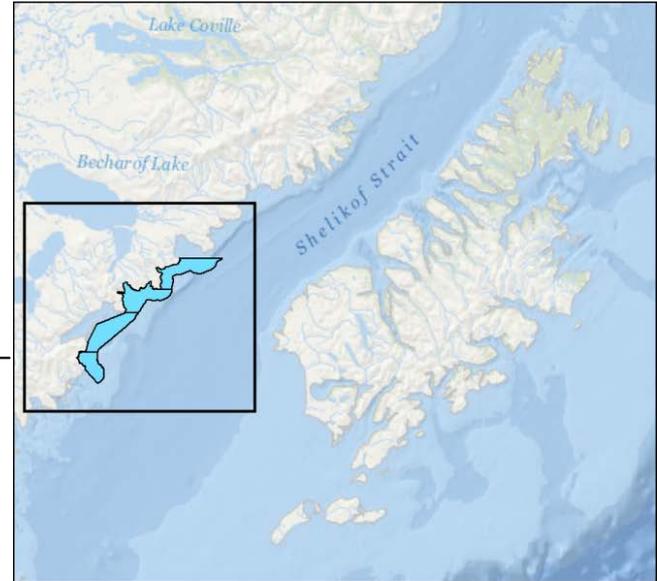
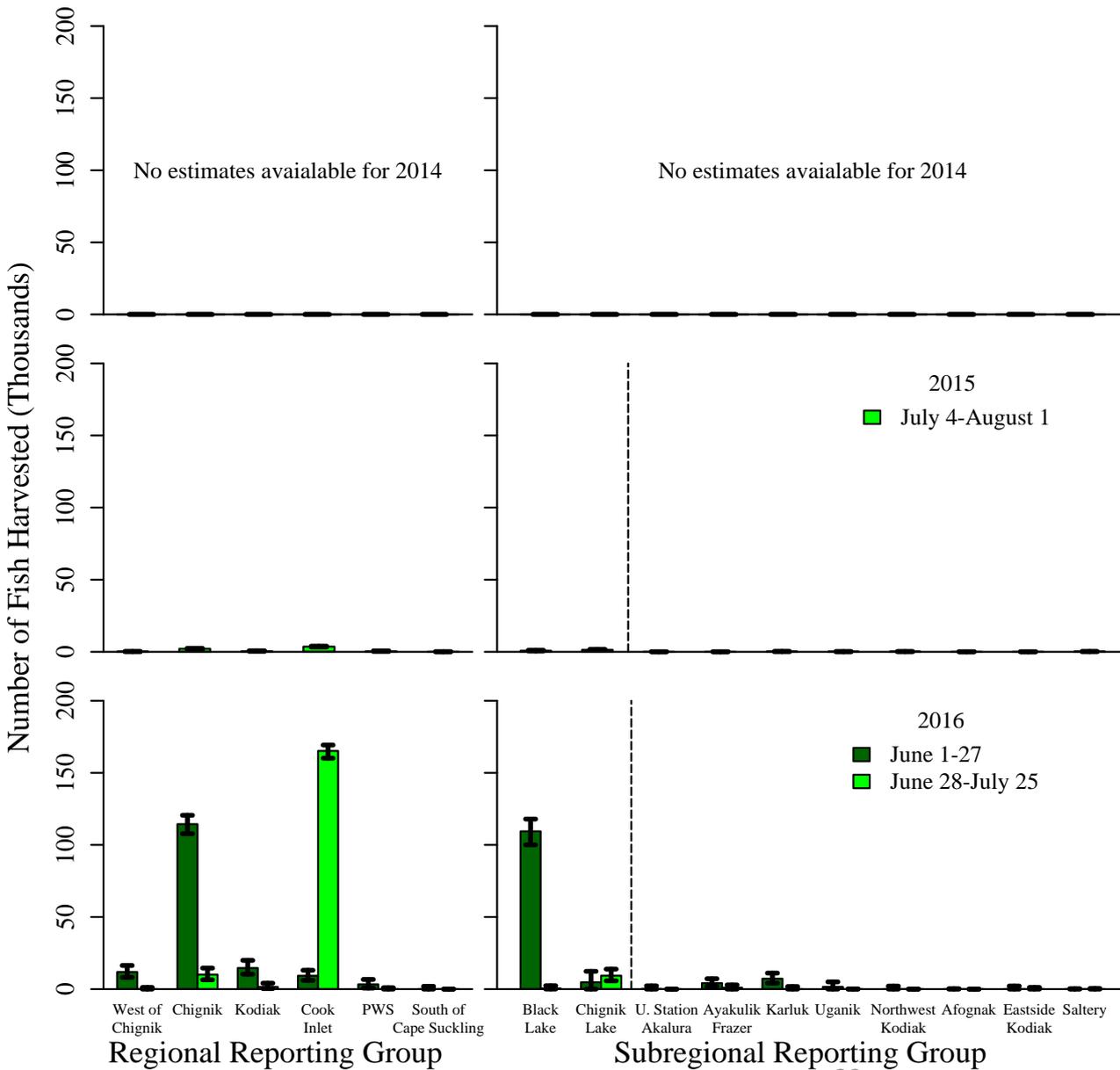
Igvak Stock Composition



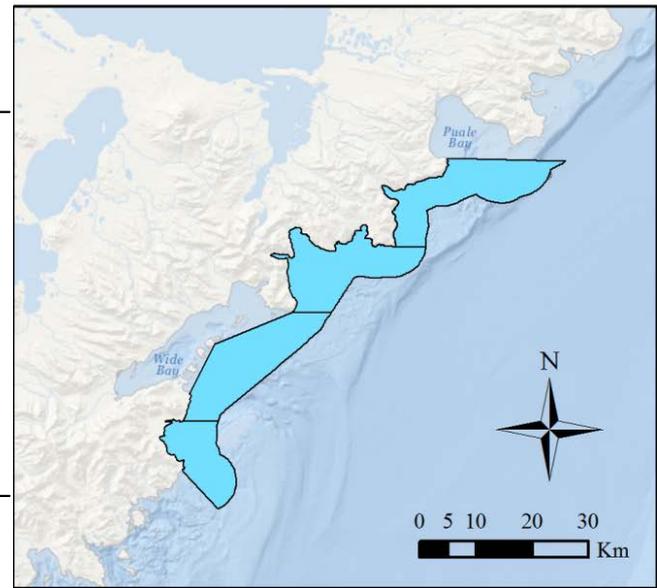
Igvak



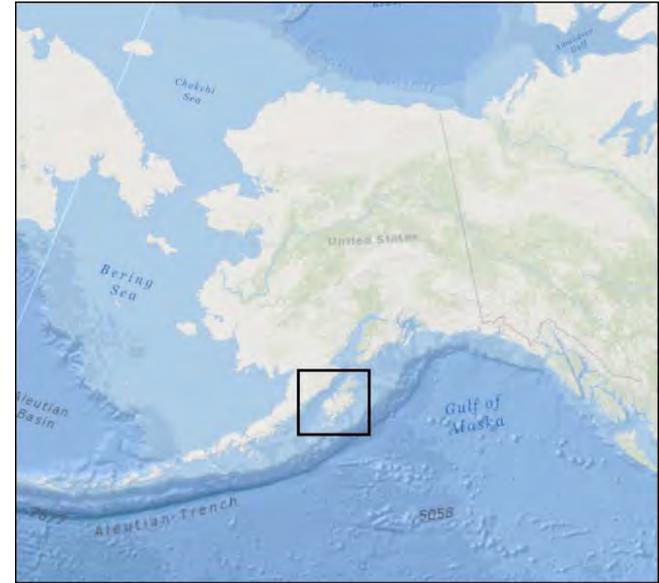
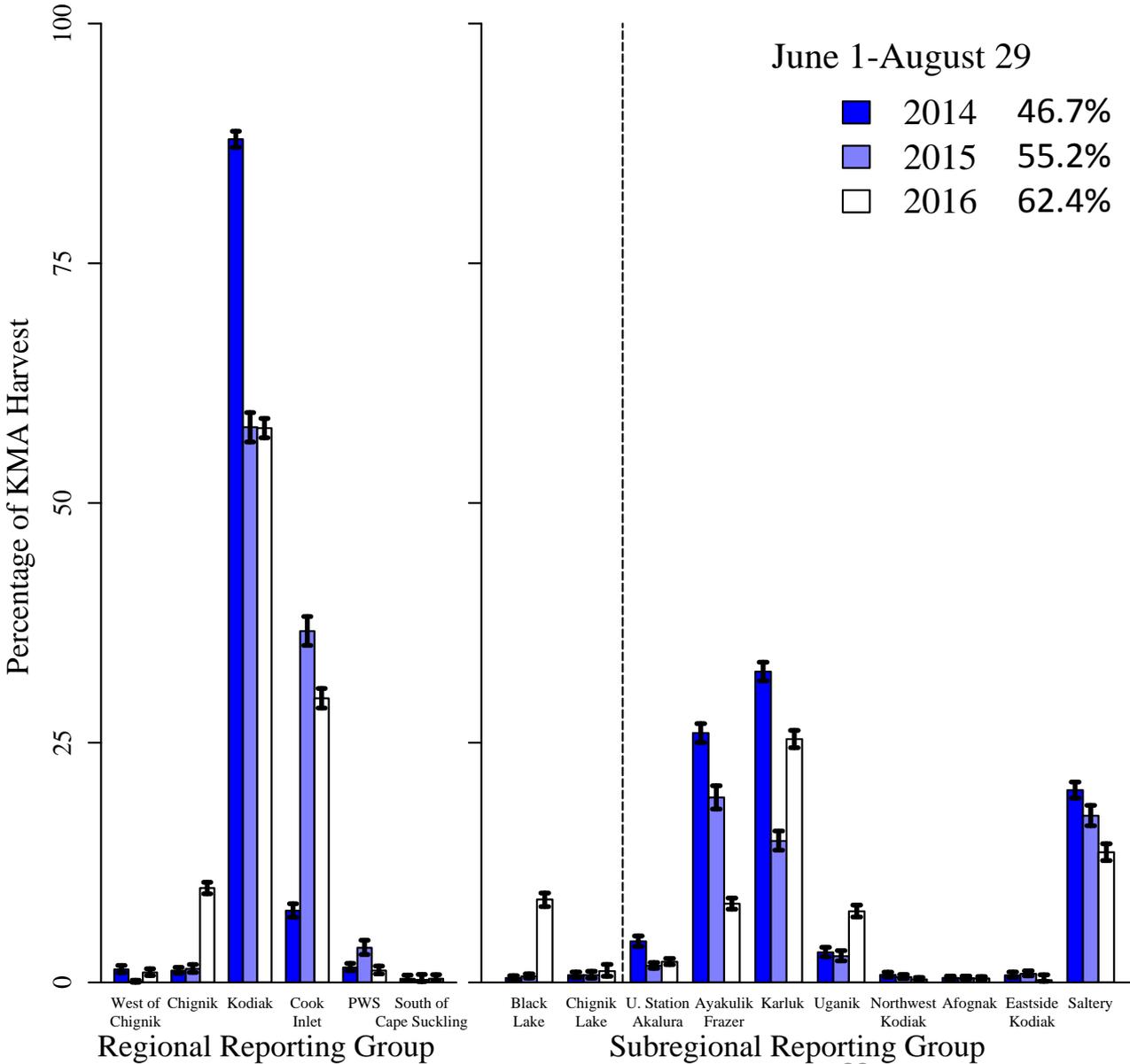
Igvak Stock-Specific Harvest



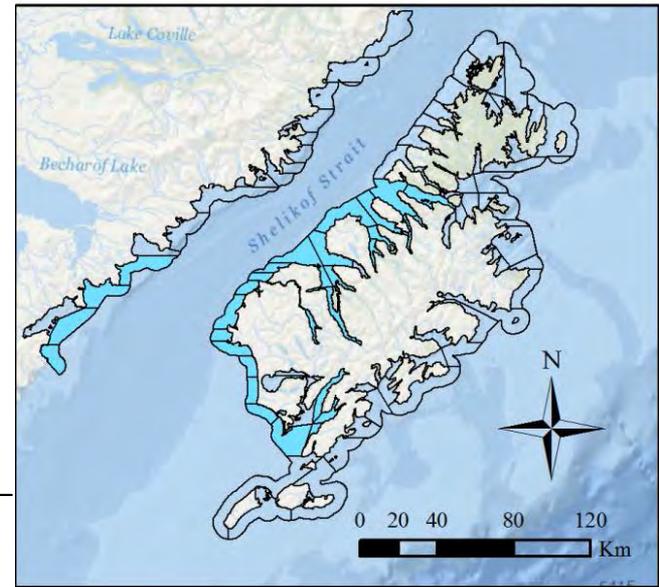
Igvak



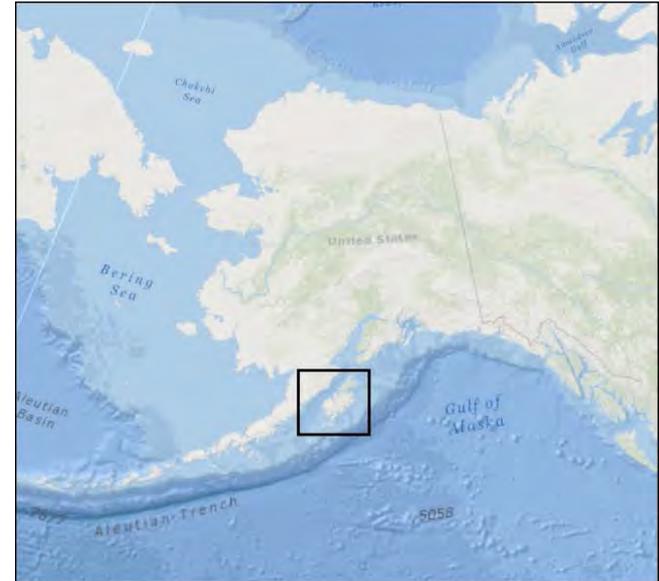
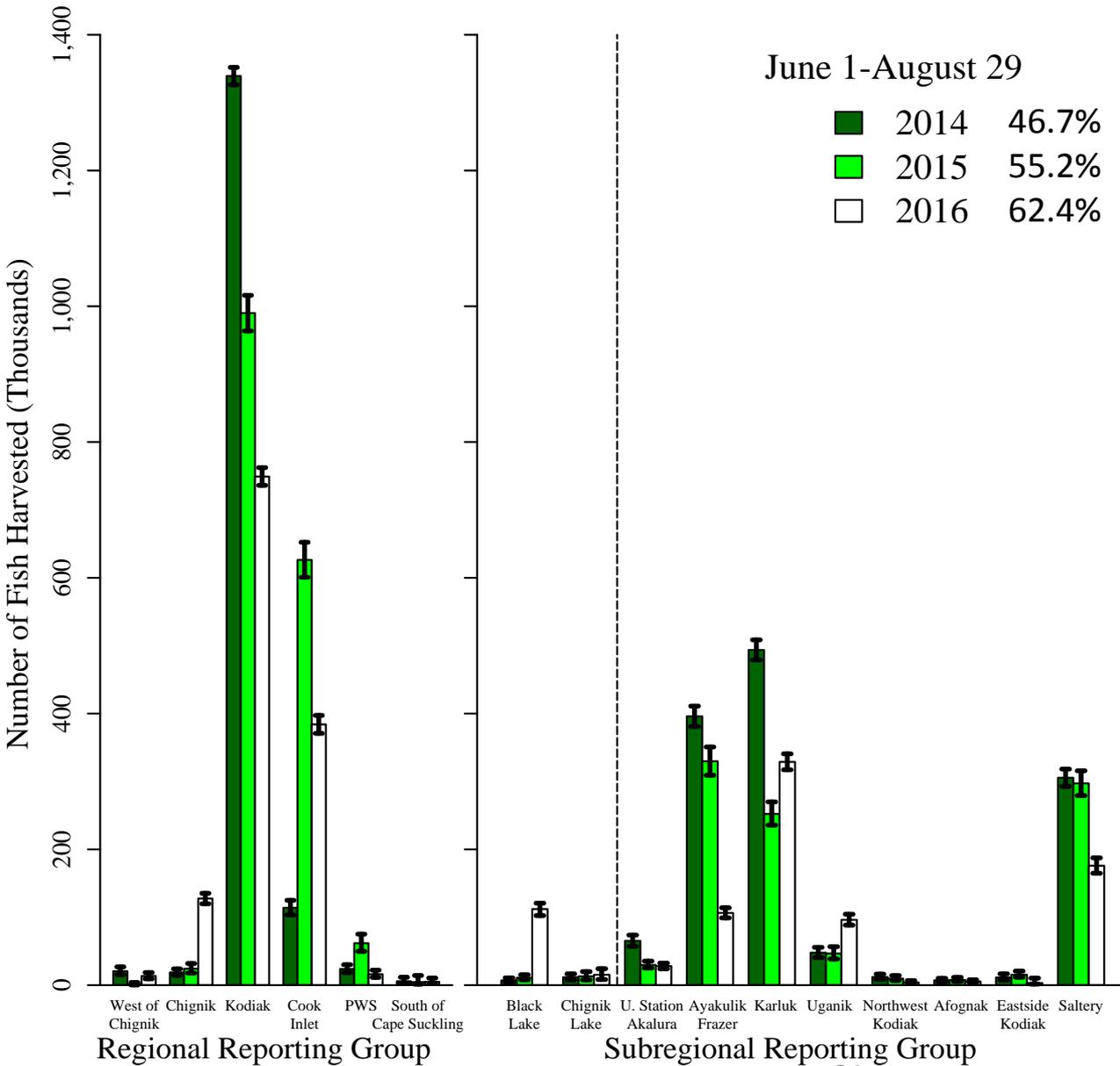
KMA Stock Composition



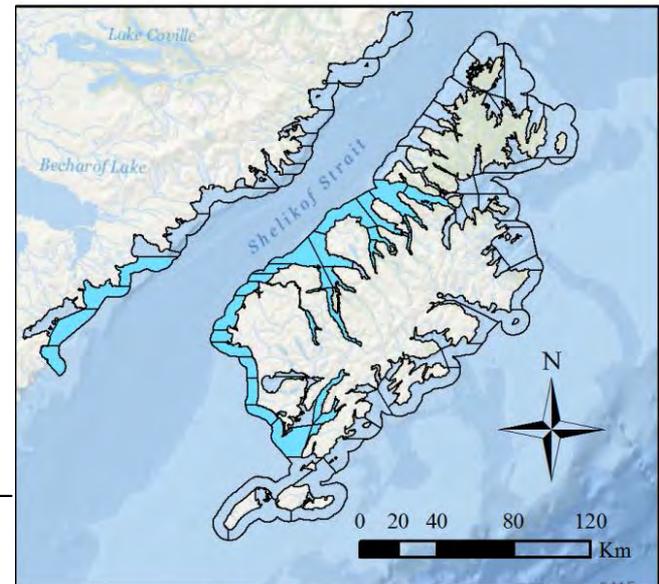
Kodiak Management Area



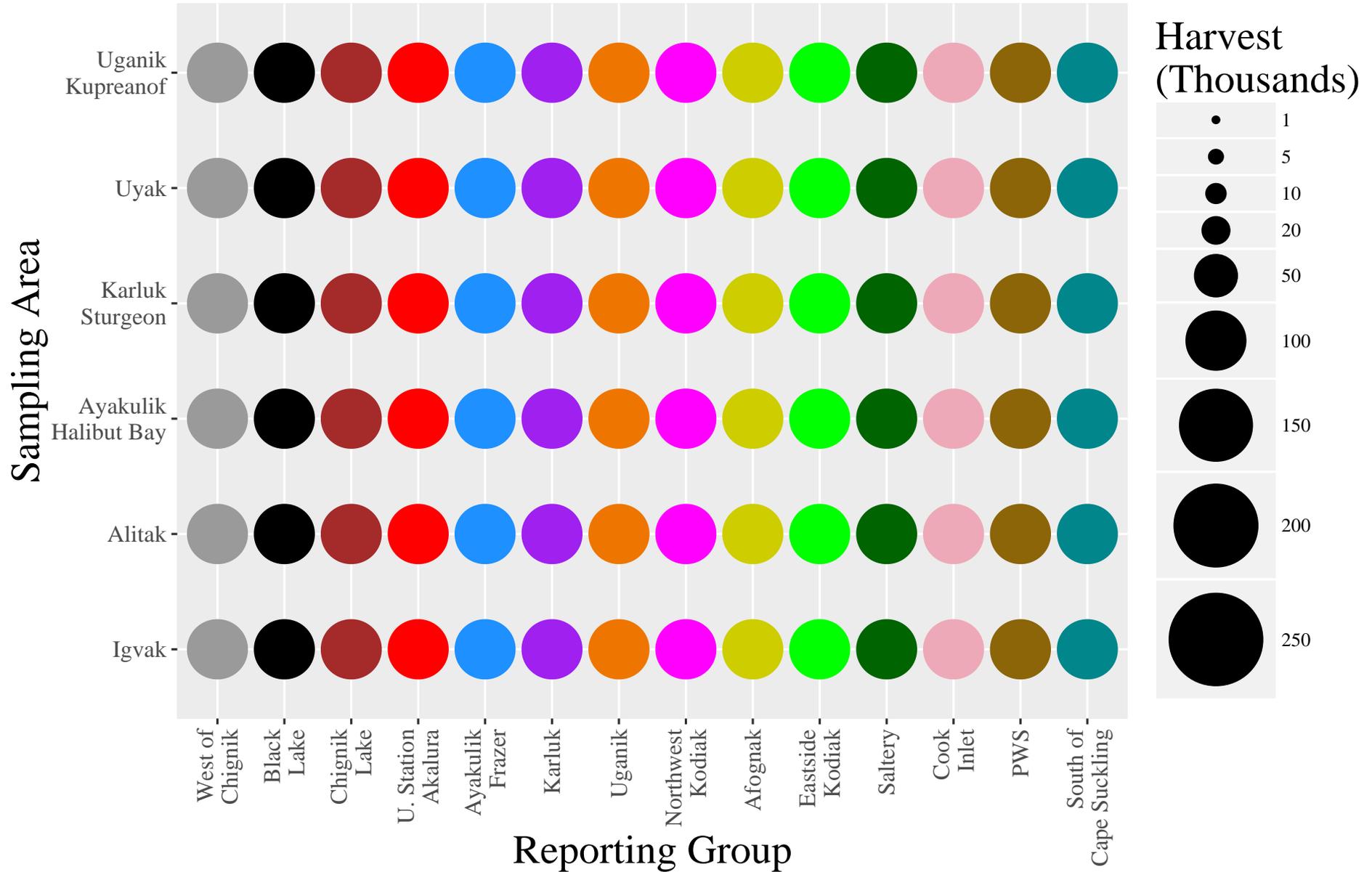
KMA Stock-Specific Harvest



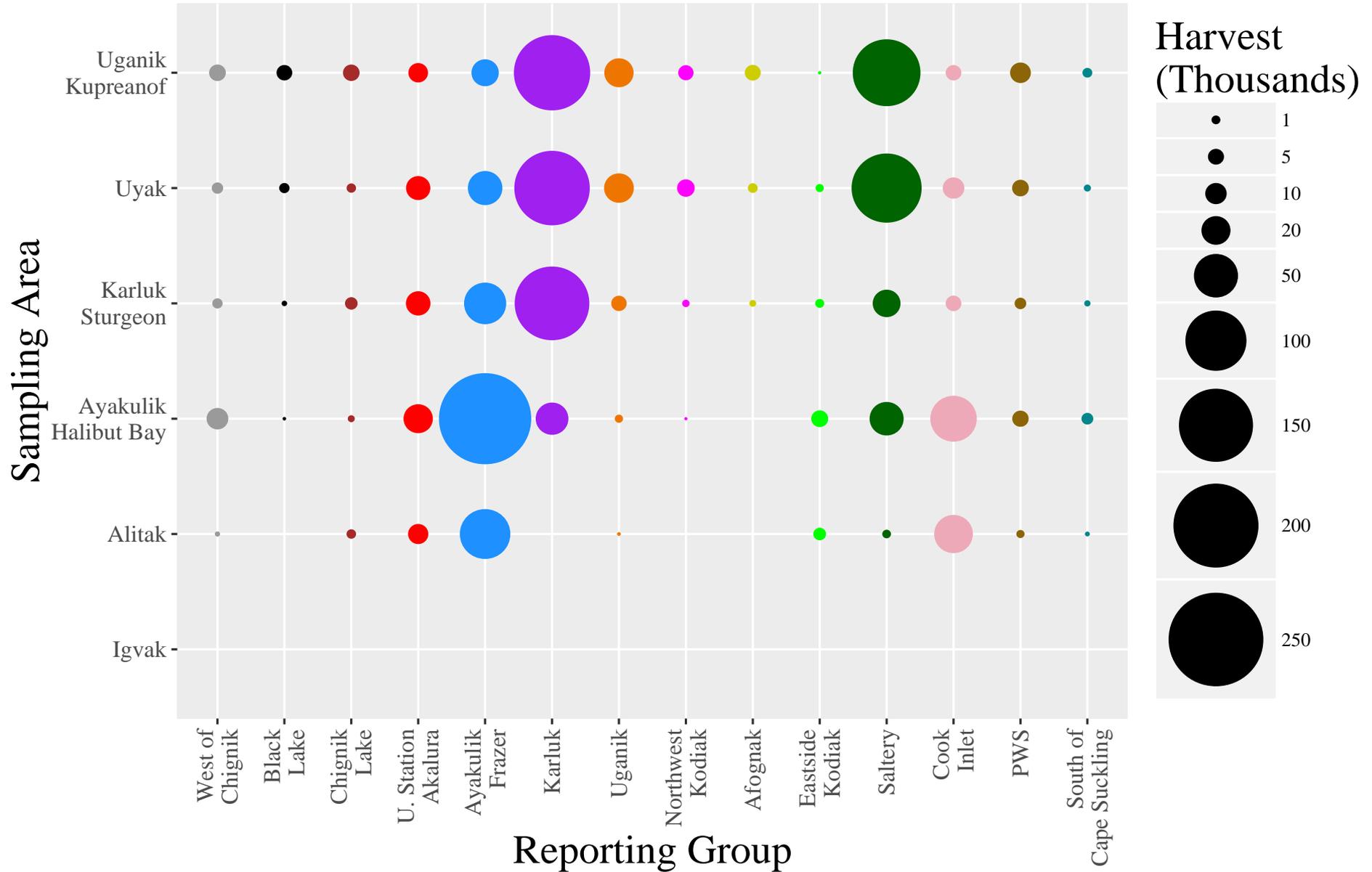
Kodiak Management Area



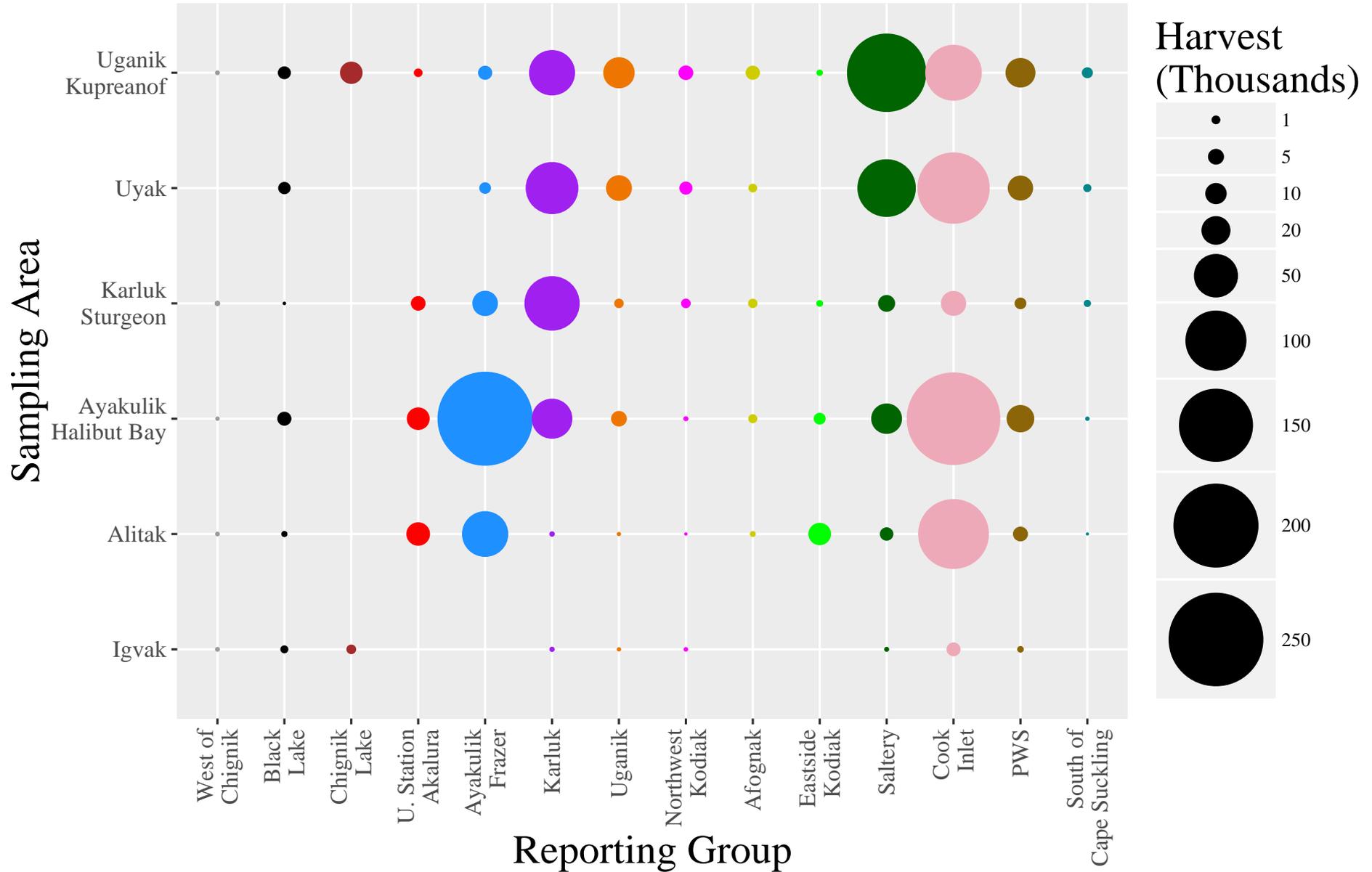
Example Stock-Specific Harvest



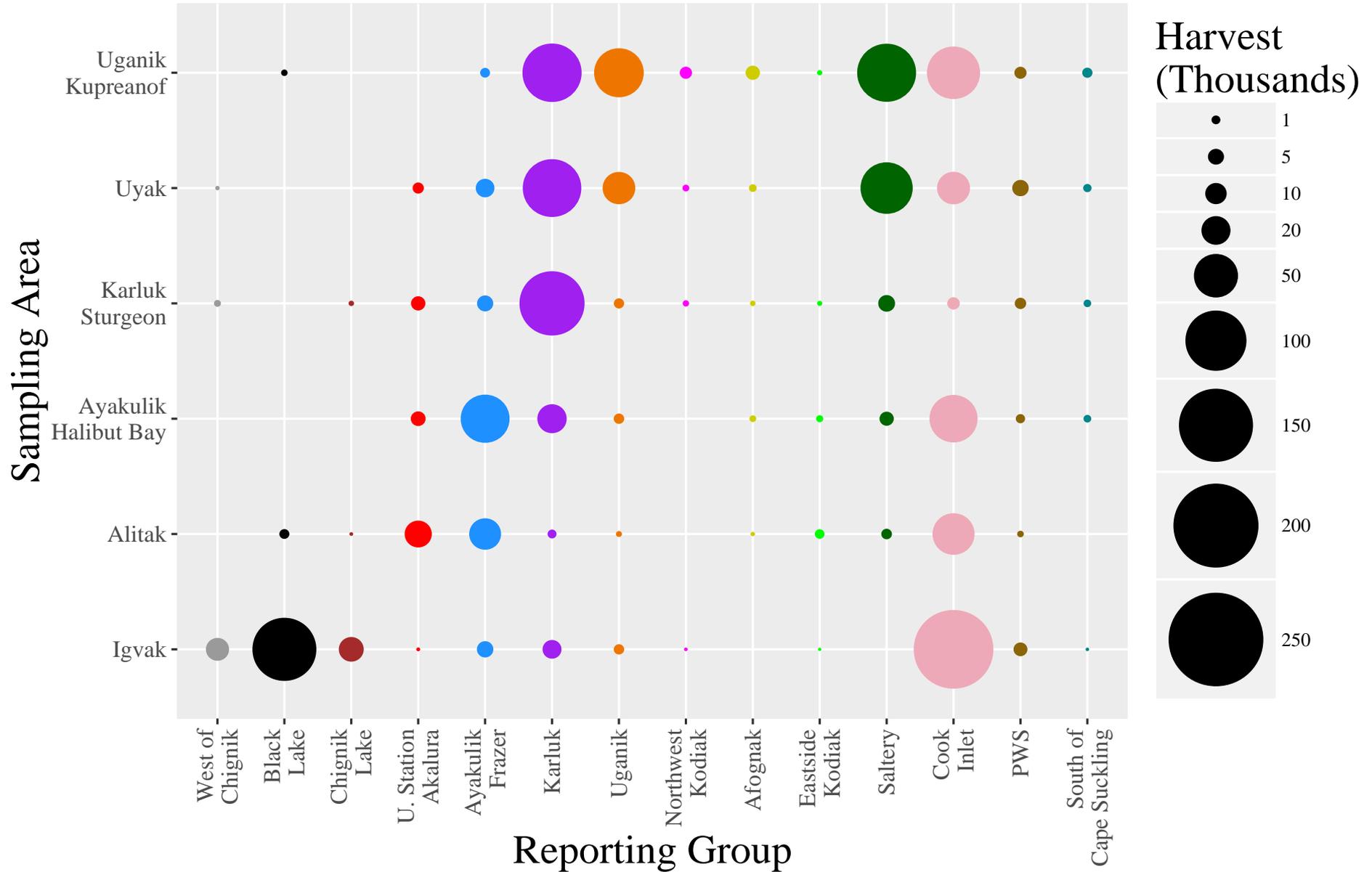
2014 Stock-Specific Harvest



2015 Stock-Specific Harvest



2016 Stock-Specific Harvest



Interpreting Results

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

Acknowledgements

- Jeff Regnart
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Questions?