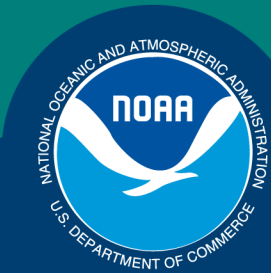


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NMFS-AFSC-291

Genetic Stock Composition Analysis of the Chinook Salmon Bycatch in the Gulf of Alaska Walleye Pollock (*Gadus chalcogrammus*) Trawl Fisheries, 2013

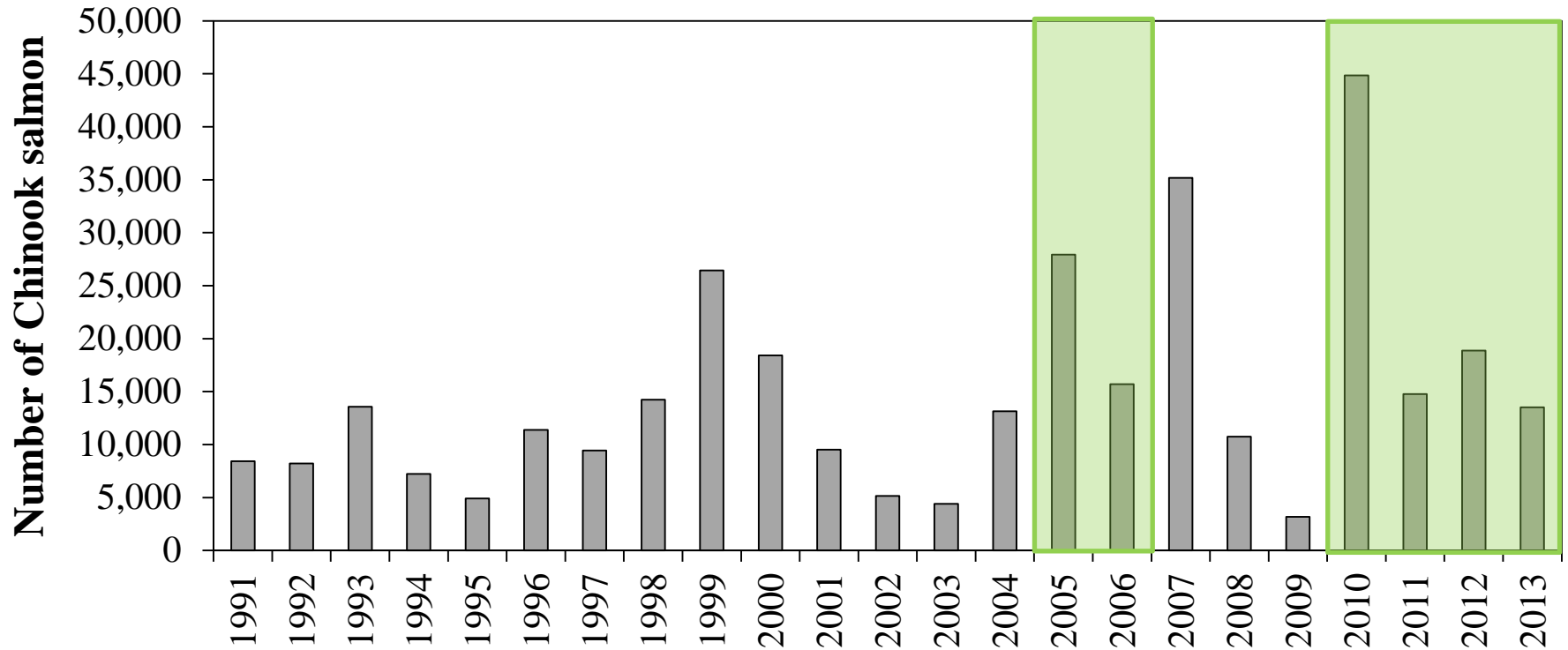
Jeff Guyon
Charles Guthrie, III
Genetics Program
Auke Bay Laboratories
Juneau, AK

Andrew Munro
William Templin
Jim Jasper
Gene Conservation Laboratory
Alaska Dept of Fish and Game
Anchorage, AK

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2013 Chinook Salmon GOA Bycatch



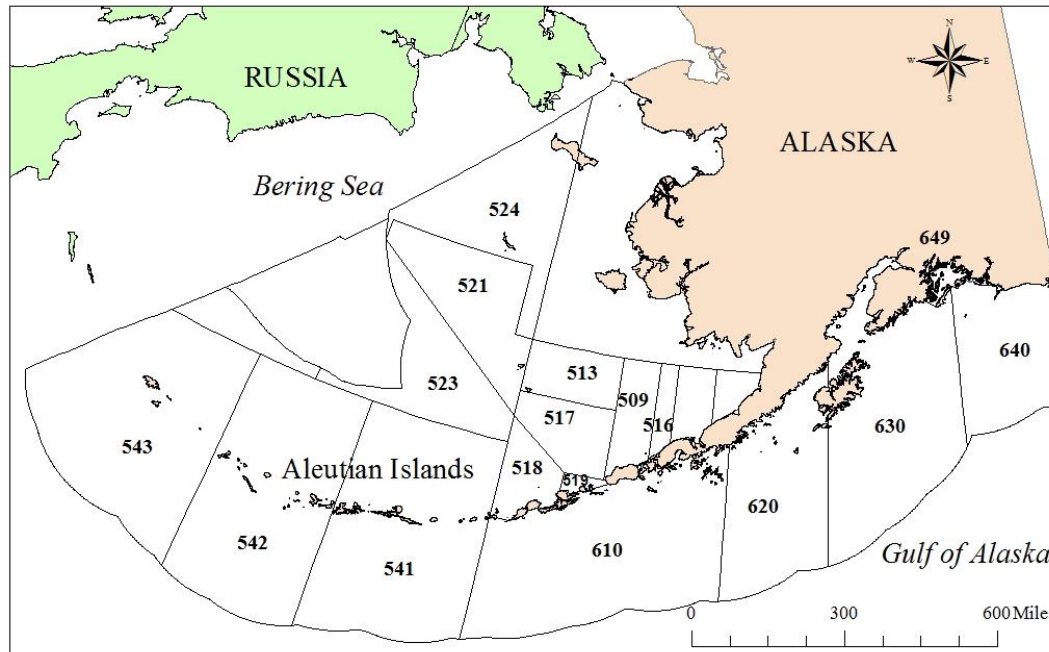
2005 – 2006: SNPs – 219 (Winter 2006), 62 (Summer 2005-6), 127 (Fall 2005-6) samples

2010 – 2013: SNPs – 161 (2010), 240 (2011), 948 (2012), and 693 (2013) samples.

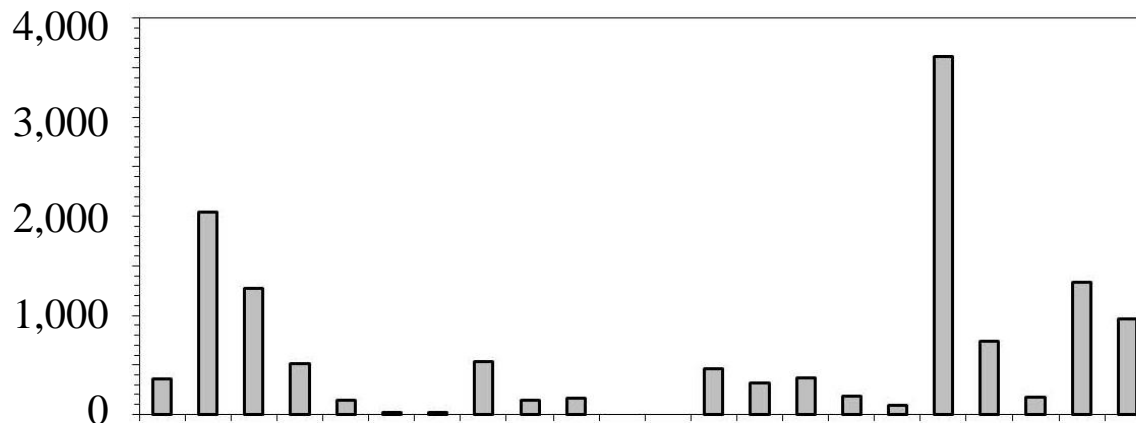
2013 Chinook Salmon GOA Bycatch

Areas 620-640

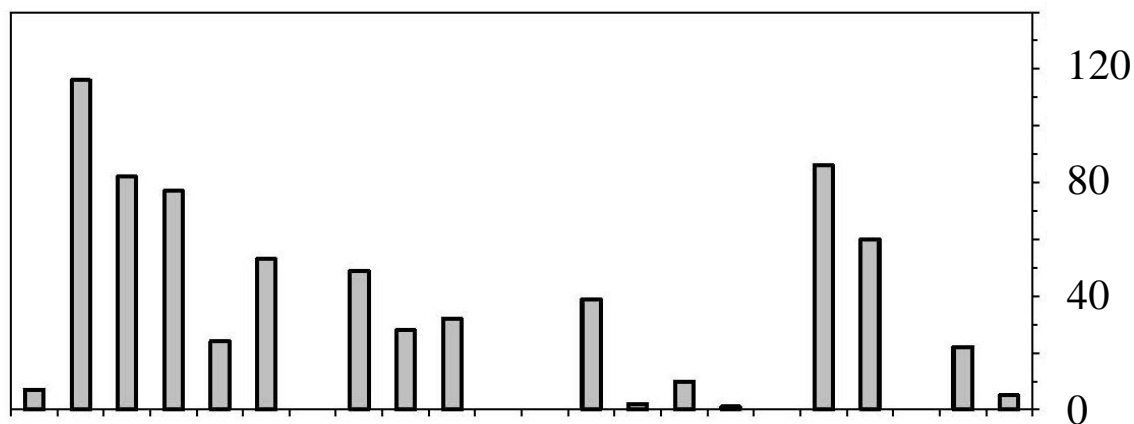
Area	Early season			Late season		
	Bycatch	Sample size	Sample fraction	Bycatch	Sample size	Sample fraction
610	261	5	0.019	1,900	0	0.000
620	3,696	256	0.069	4,573	111	0.024
630	977	105	0.107	1,829	114	0.062
640	244	107	0.439	3	0	0.000
649	27	0	0.000	0	0	0.000



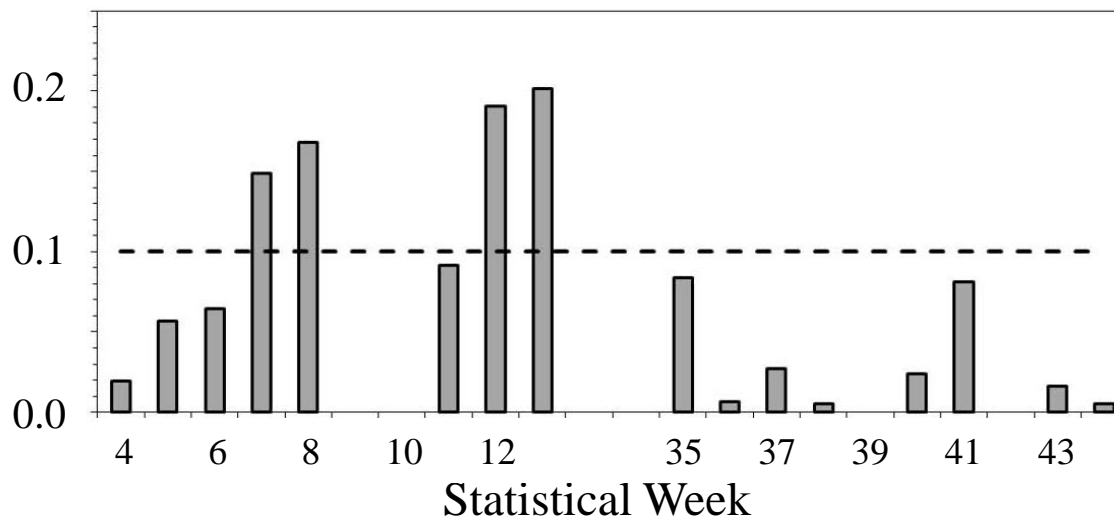
Total Bycatch



Genetic Samples

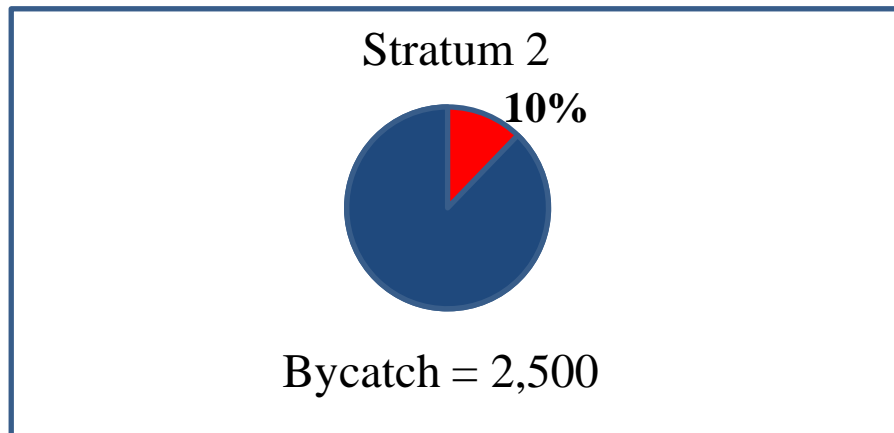
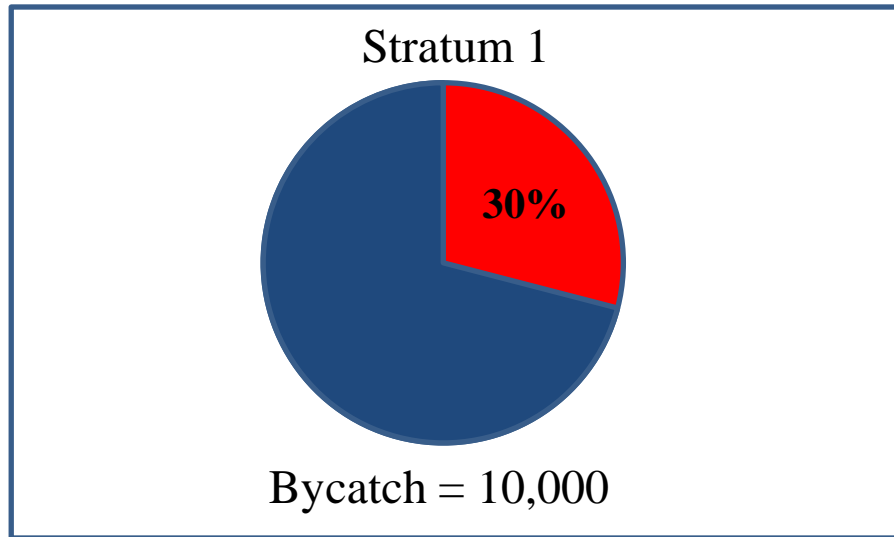


Sample Fraction



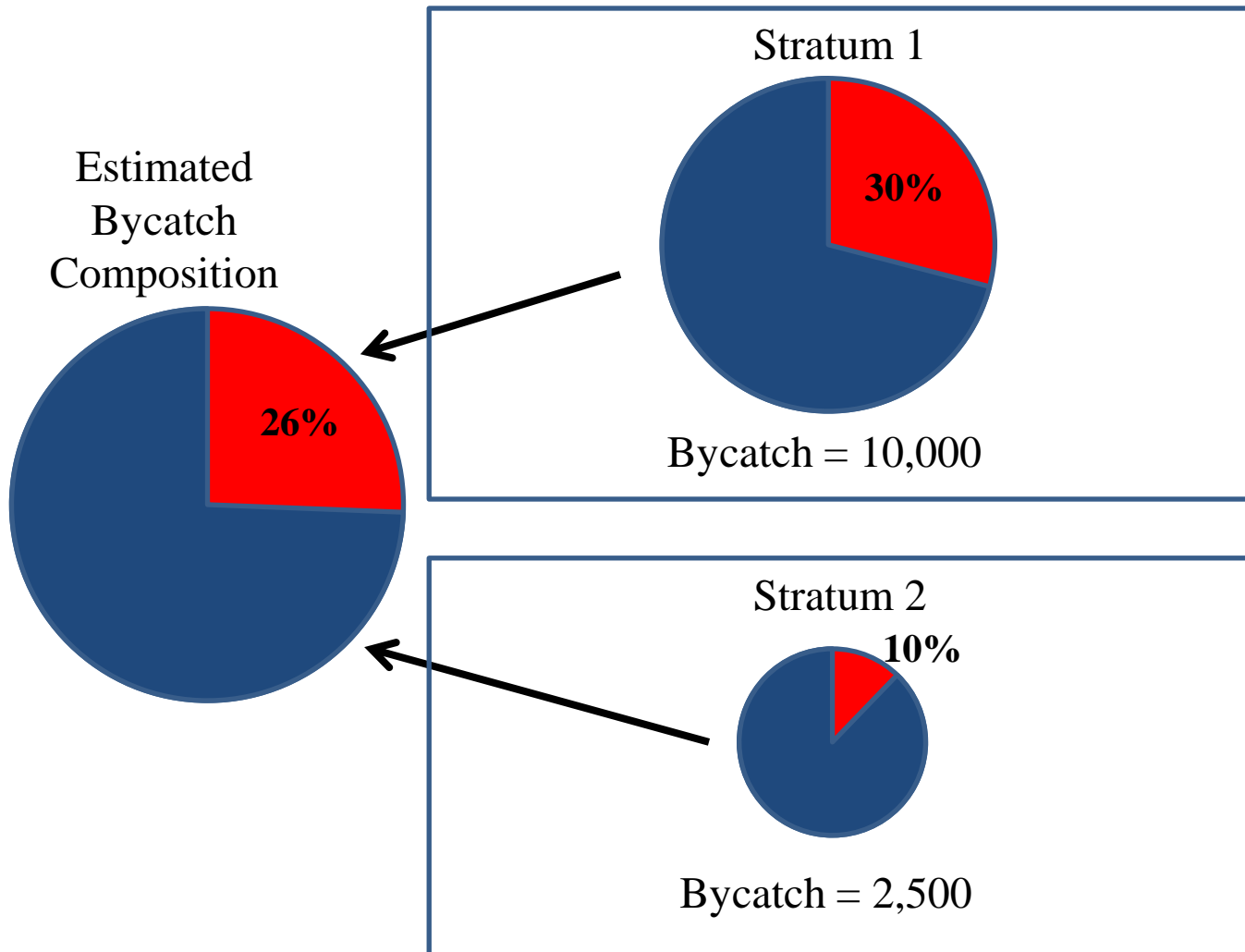
Stratified estimate weighted by bycatch

Weighted



Stratified estimate weighted by bycatch

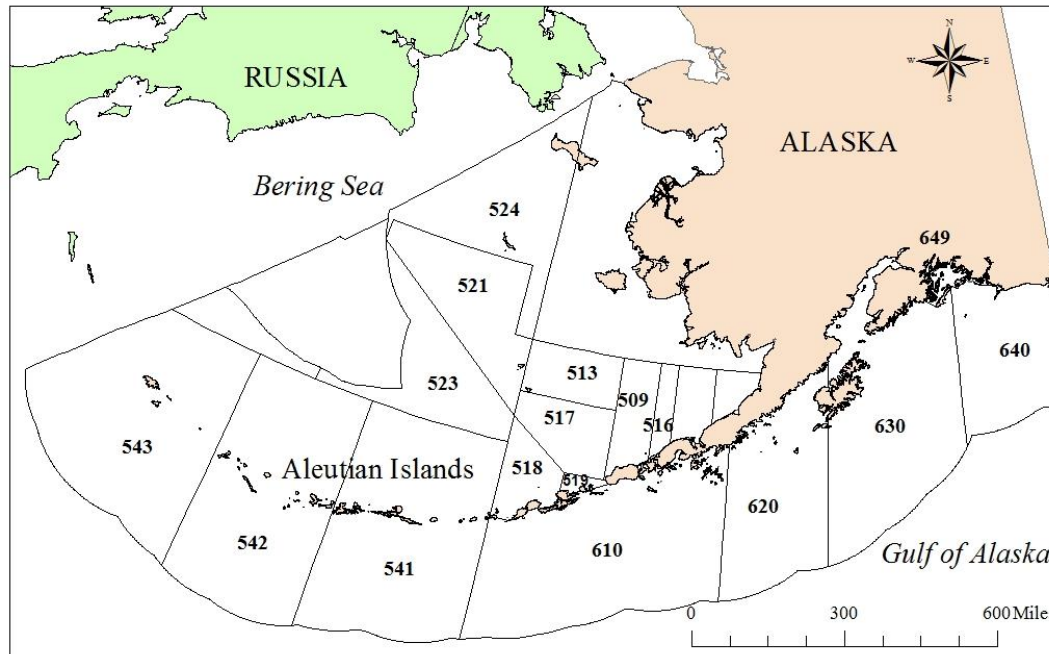
Weighted

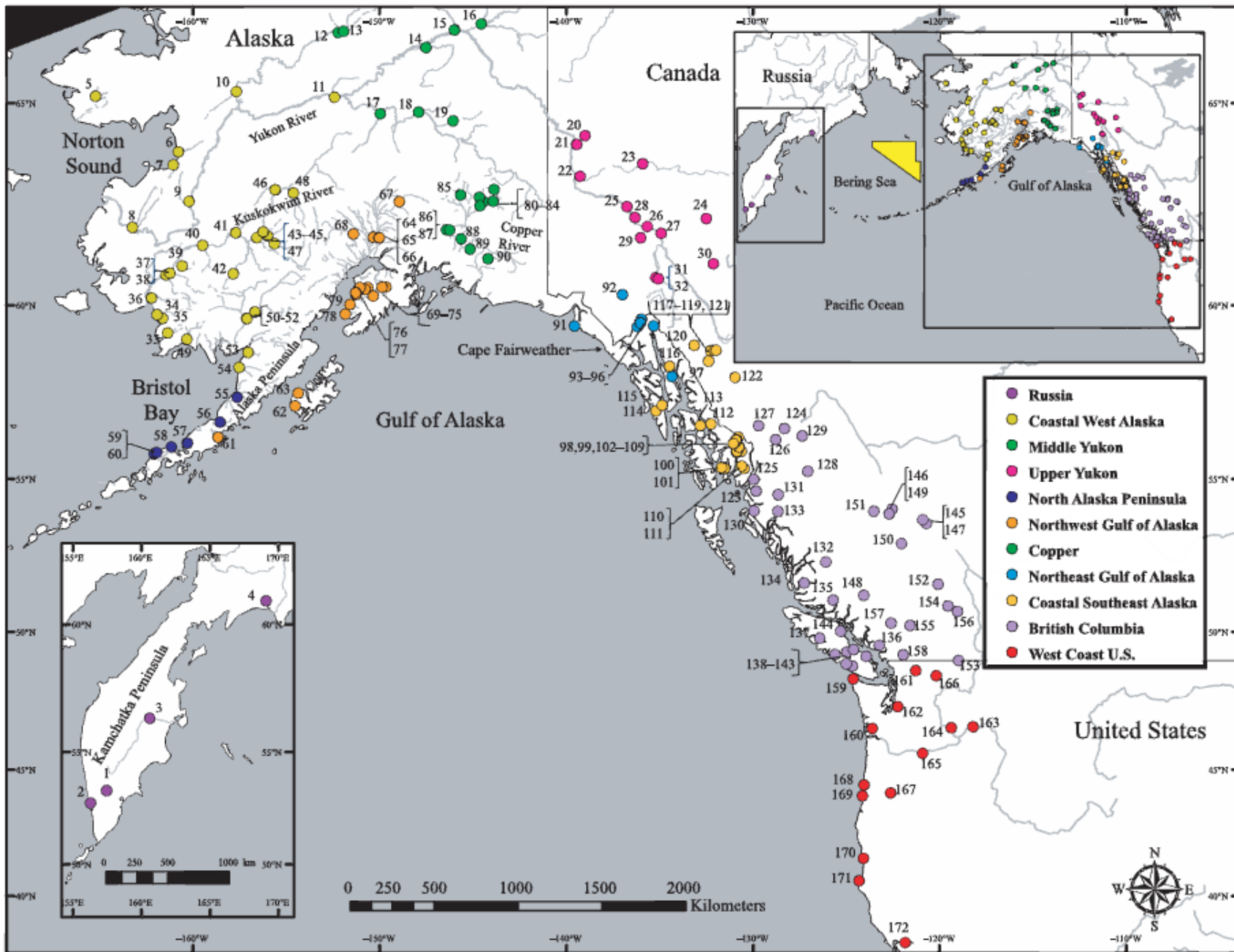


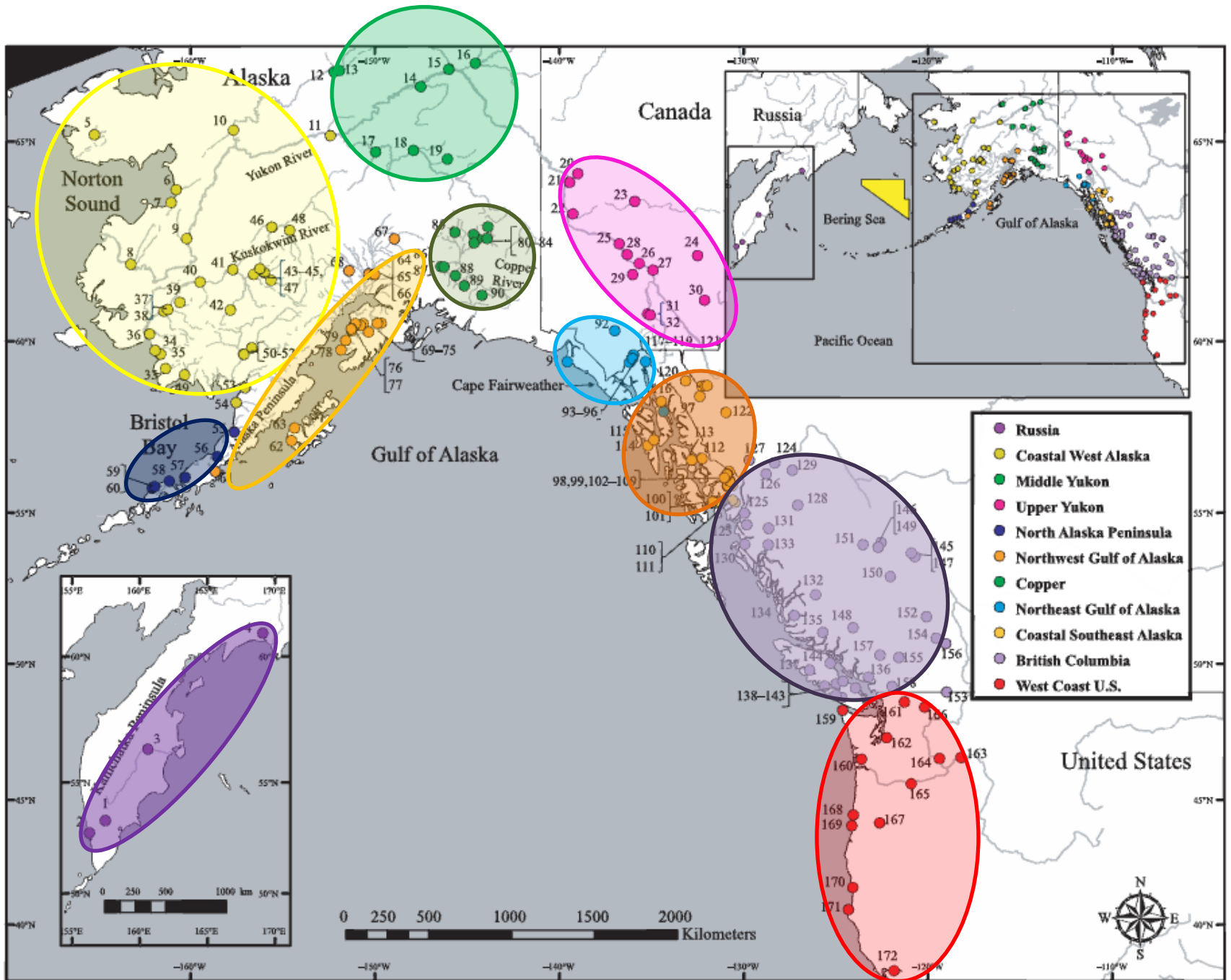
2013 Chinook Salmon GOA Bycatch

Areas 620-640

Area	Early season			Late season		
	Bycatch	Sample size	Sample fraction	Bycatch	Sample size	Sample fraction
610	261	5	0.019	1,900	0	0.000
620	3,696	256	0.069	4,573	111	0.024
630	977	105	0.107	1,829	114	0.062
640	244	107	0.439	3	0	0.000
649	27	0	0.000	0	0	0.000

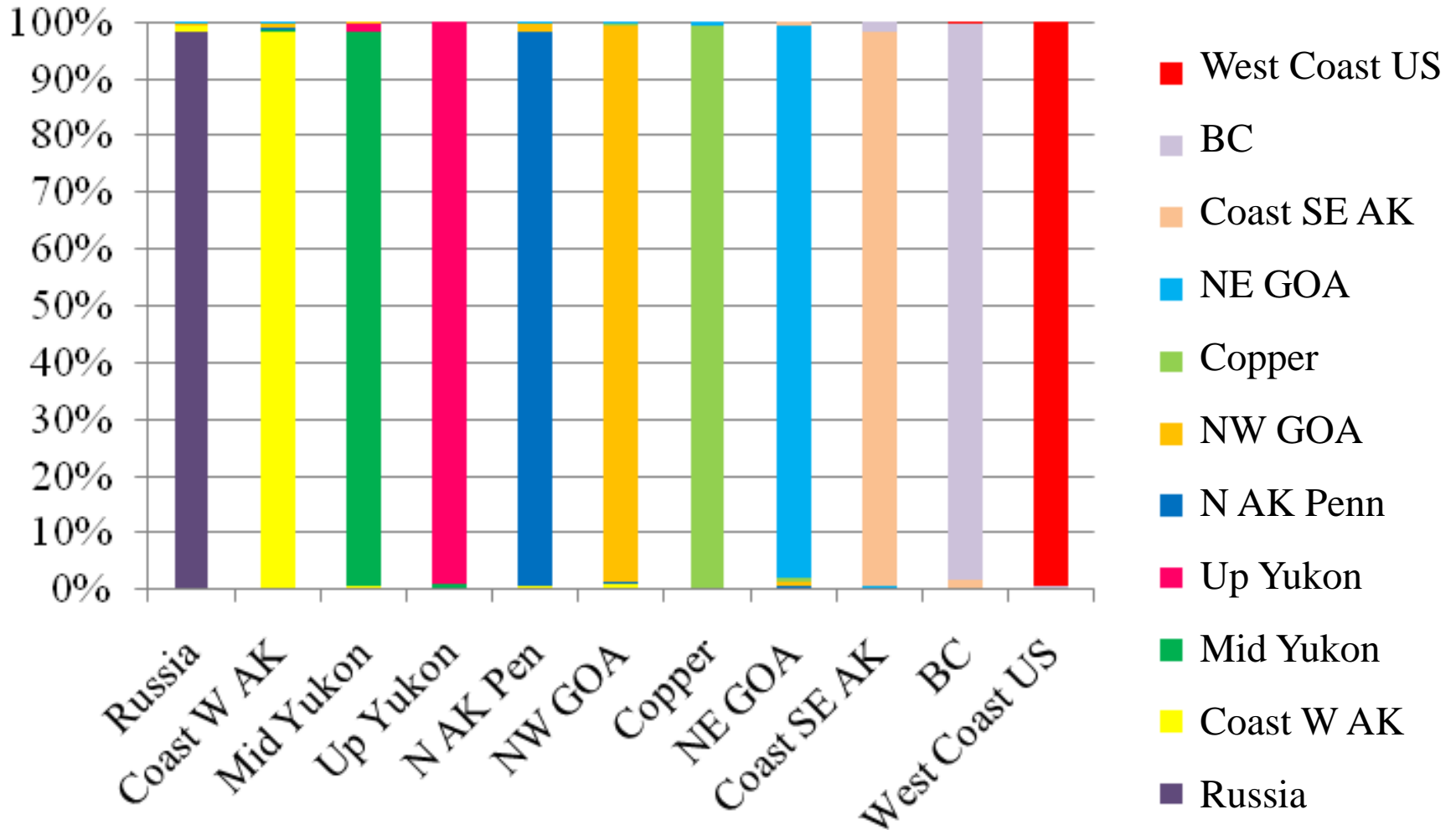






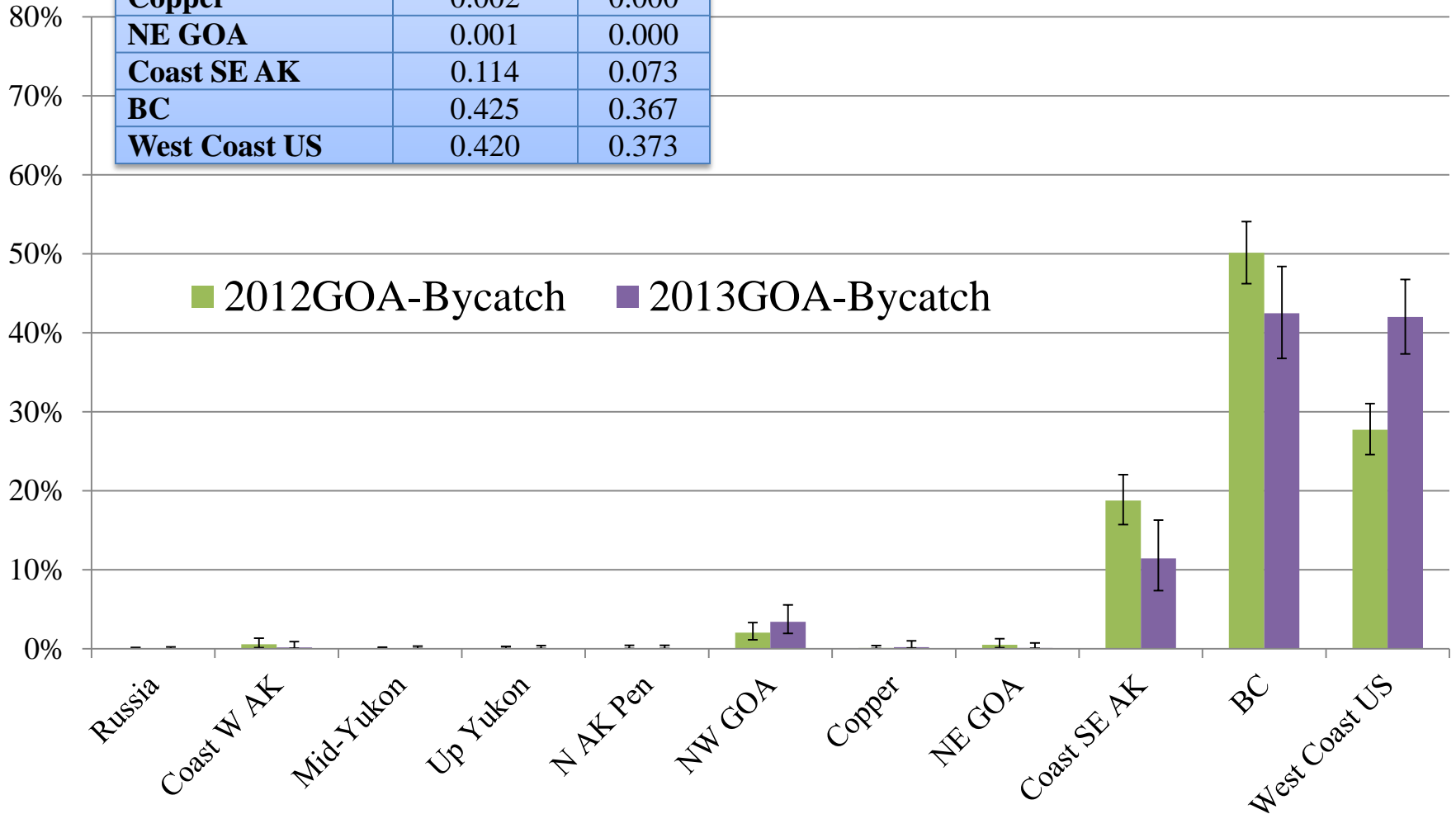
Baseline Analysis – 100% Simulations

43 SNPs



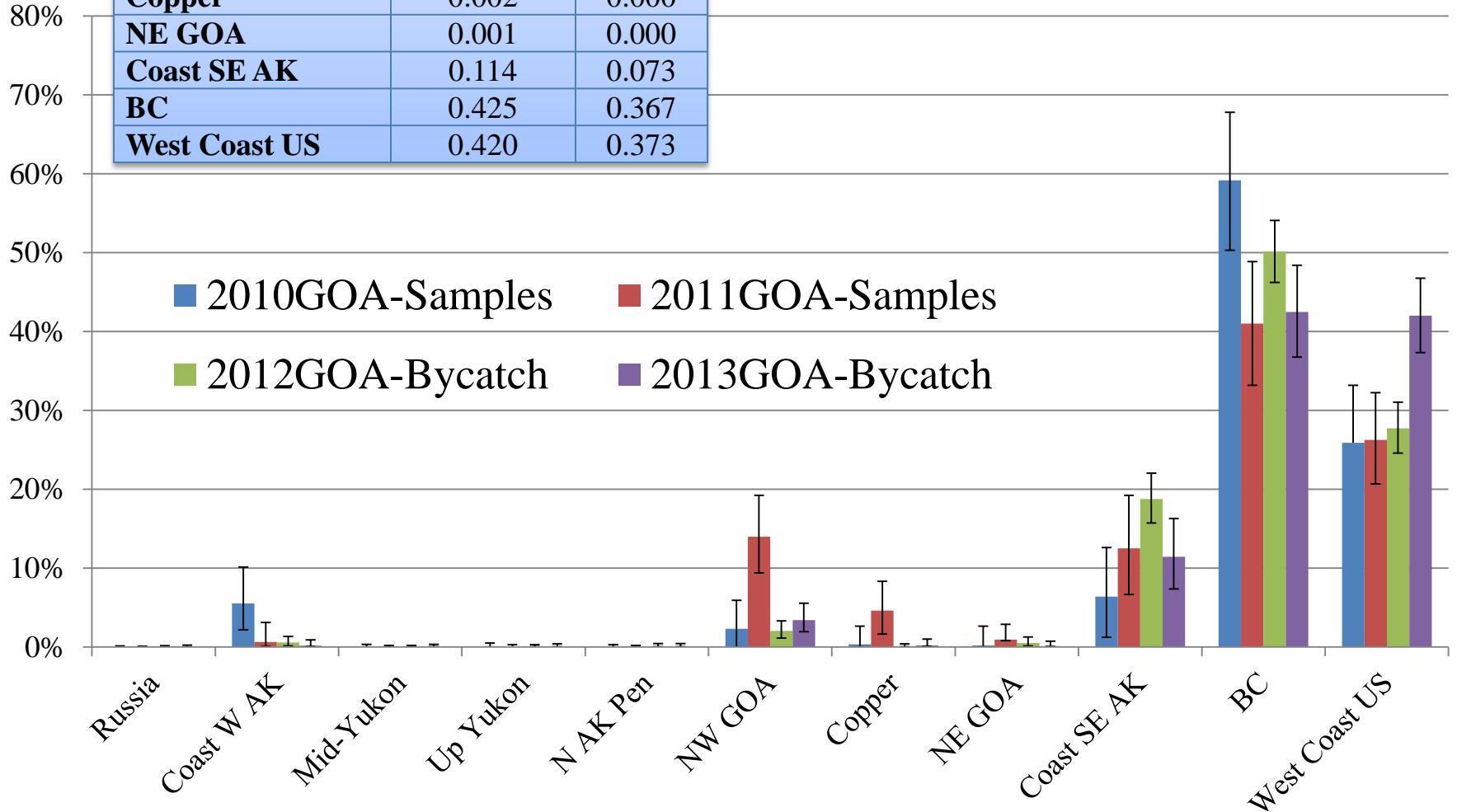
2013 Chinook Salmon GOA Bycatch

Region	BAYES	SD
Russia	0.000	0.000
Coastal W AK	0.002	0.000
Middle Yukon	0.000	0.000
Upper Yukon	0.001	0.000
N AK Peninsula	0.000	0.000
NW GOA	0.034	0.019
Copper	0.002	0.000
NE GOA	0.001	0.000
Coast SE AK	0.114	0.073
BC	0.425	0.367
West Coast US	0.420	0.373



2013 Chinook Salmon GOA Bycatch

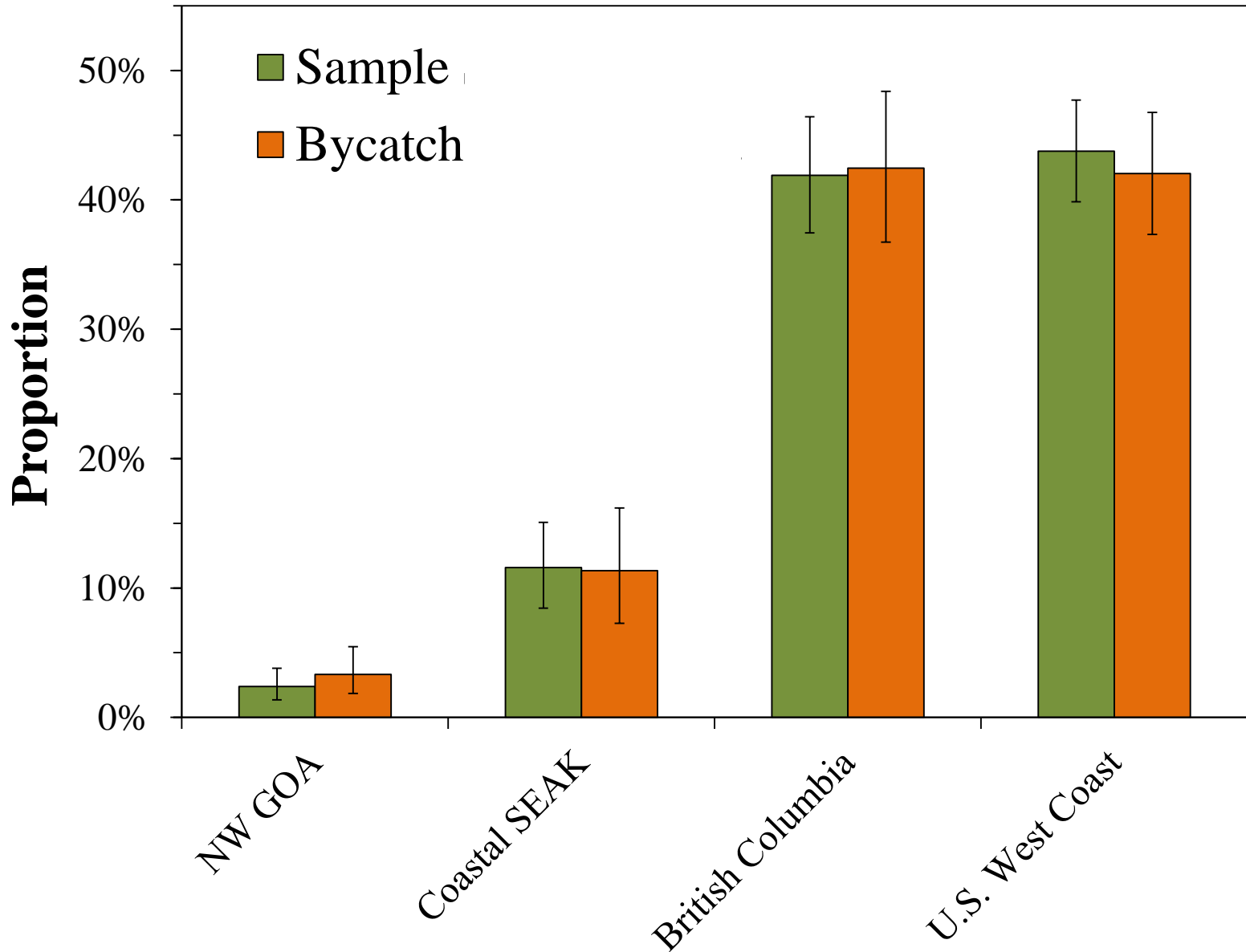
Region	BAYES	SD
Russia	0.000	0.000
Coastal W AK	0.002	0.000
Middle Yukon	0.000	0.000
Upper Yukon	0.001	0.000
N AK Peninsula	0.000	0.000
NW GOA	0.034	0.019
Copper	0.002	0.000
NE GOA	0.001	0.000
Coast SE AK	0.114	0.073
BC	0.425	0.367
West Coast US	0.420	0.373



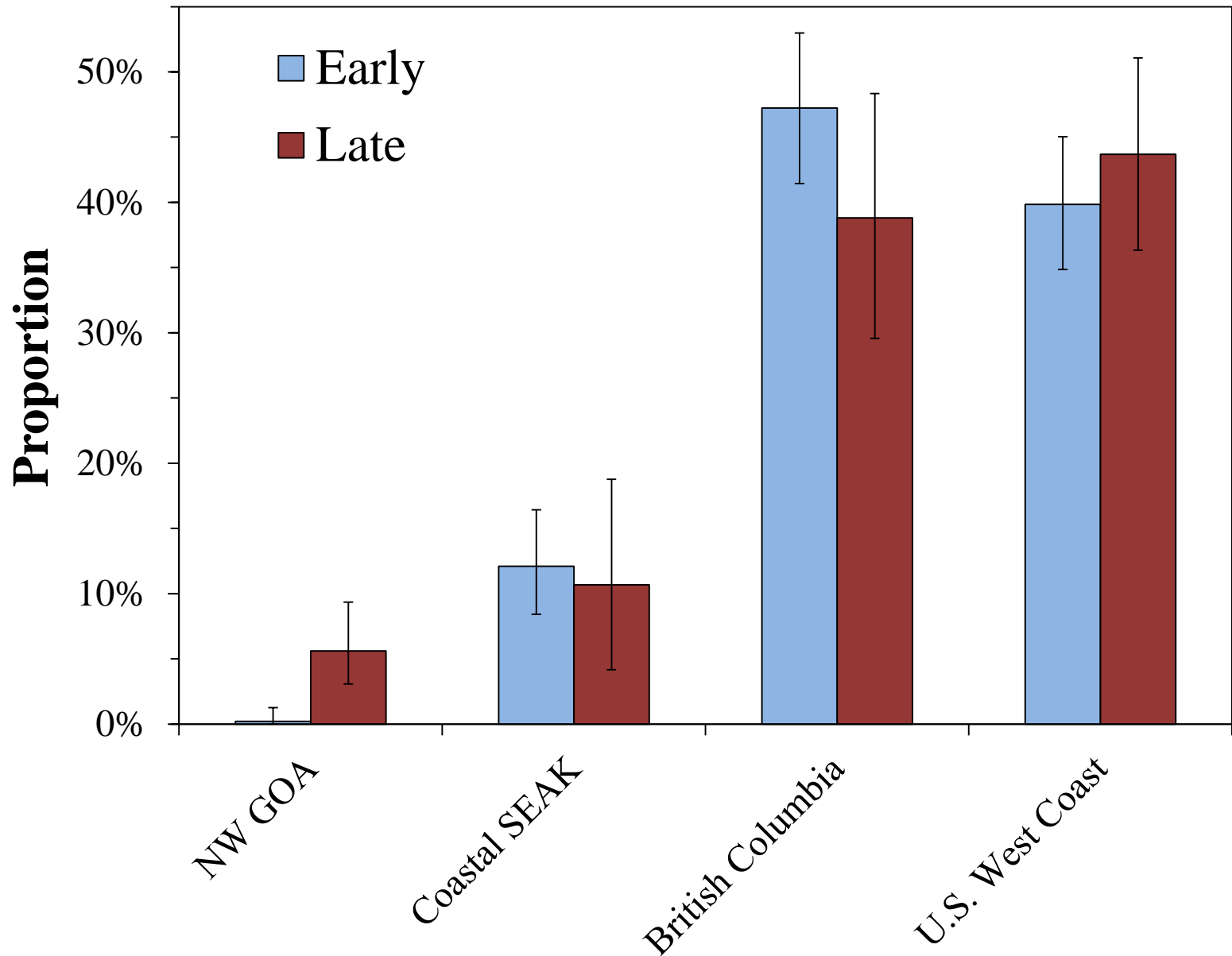
**Estimated number of Chinook salmon taken as
bycatch in the 2013 Gulf of Alaska (GOA) pollock
trawl fishery – Areas 620-640**

	2013 bycatch whole season – Areas 620-640 (H = 11,319; n = 693)				
		95% CI			
Reporting group	Mean	2.5%	97.5%	Median	SD
Russia	2	0	23	0	8
Coastal W. AK	19	0	95	10	27
Middle Yukon R.	4	0	35	0	12
Upper Yukon R.	6	0	41	2	13
N AK Peninsula	5	0	45	0	15
NW GOA	385	209	618	375	105
Copper R.	25	0	103	14	30
NE GOA	11	0	74	2	22
Coastal SEAK	1,295	822	1,832	1,283	260
British Columbia	4,808	4,159	5,477	4,805	337
U.S. West Coast	4,757	4,224	5,293	4,757	273
Total	11,317				

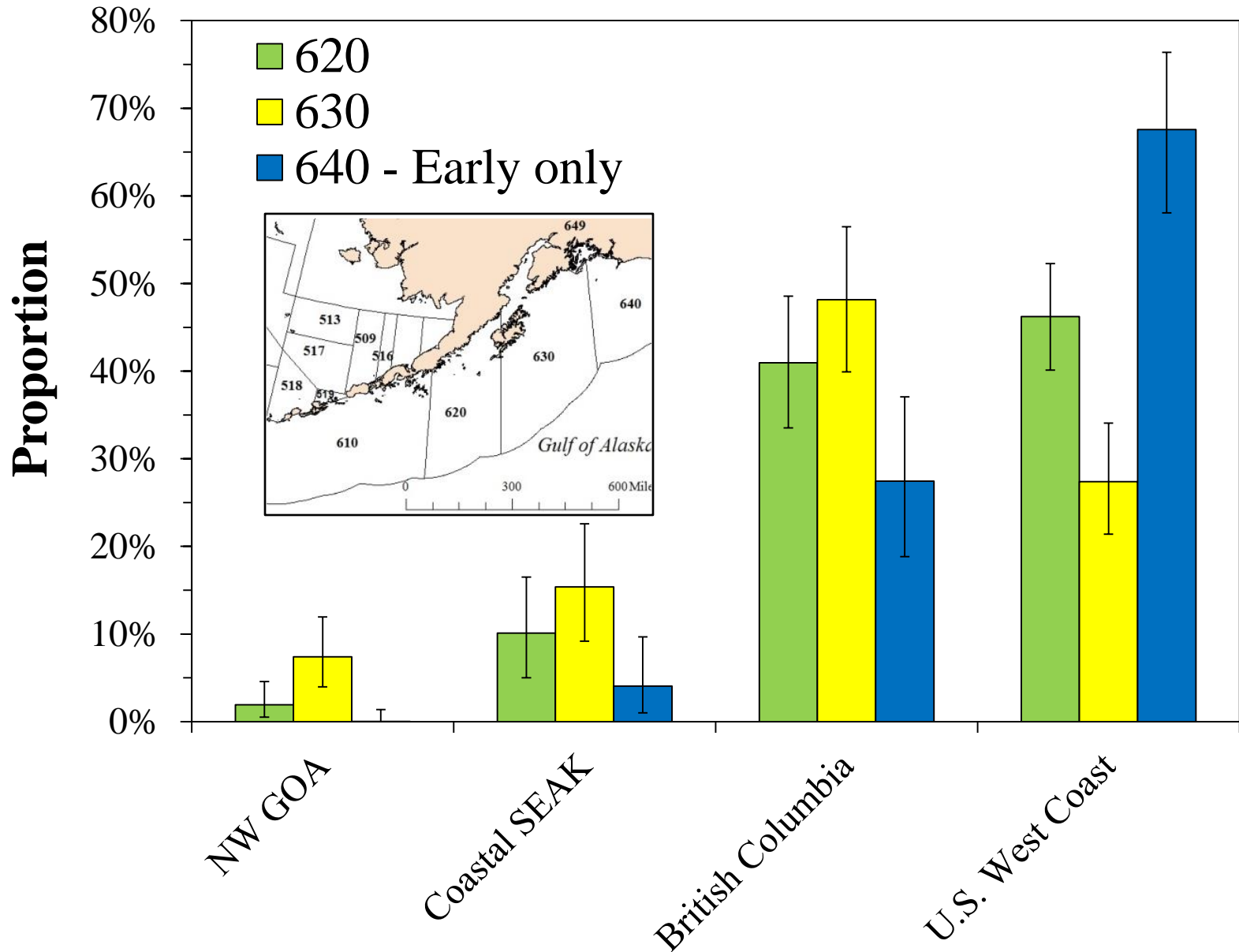
2013 Chinook Salmon GOA Bycatch - Areas 620-640

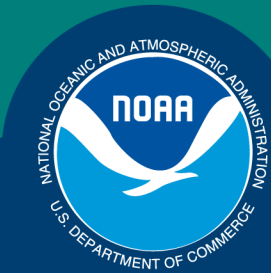


2013 Chinook Salmon GOA Bycatch - Areas 620-640



2013 Chinook Salmon GOA Bycatch - Areas 620-640





NMFS-AFSC-289

Genetic Stock Composition Analysis of Chinook Salmon Bycatch Samples from the Rockfish and Arrowtooth Flounder 2013 Gulf of Alaska Trawl Fisheries and the Gulf of Alaska Salmon Excluder Device Test

Jeff Guyon, Hanhvan Nguyen
Charles Guthrie, III
Genetics Program
Auke Bay Laboratories
Juneau, AK

Julie Bonney, Katy McGauley,
and Ken Hansen
Alaska Groundfish Data Bank
Kodiak, AK

John Gauvin
Alaska Seafood Cooperative
Seattle, WA

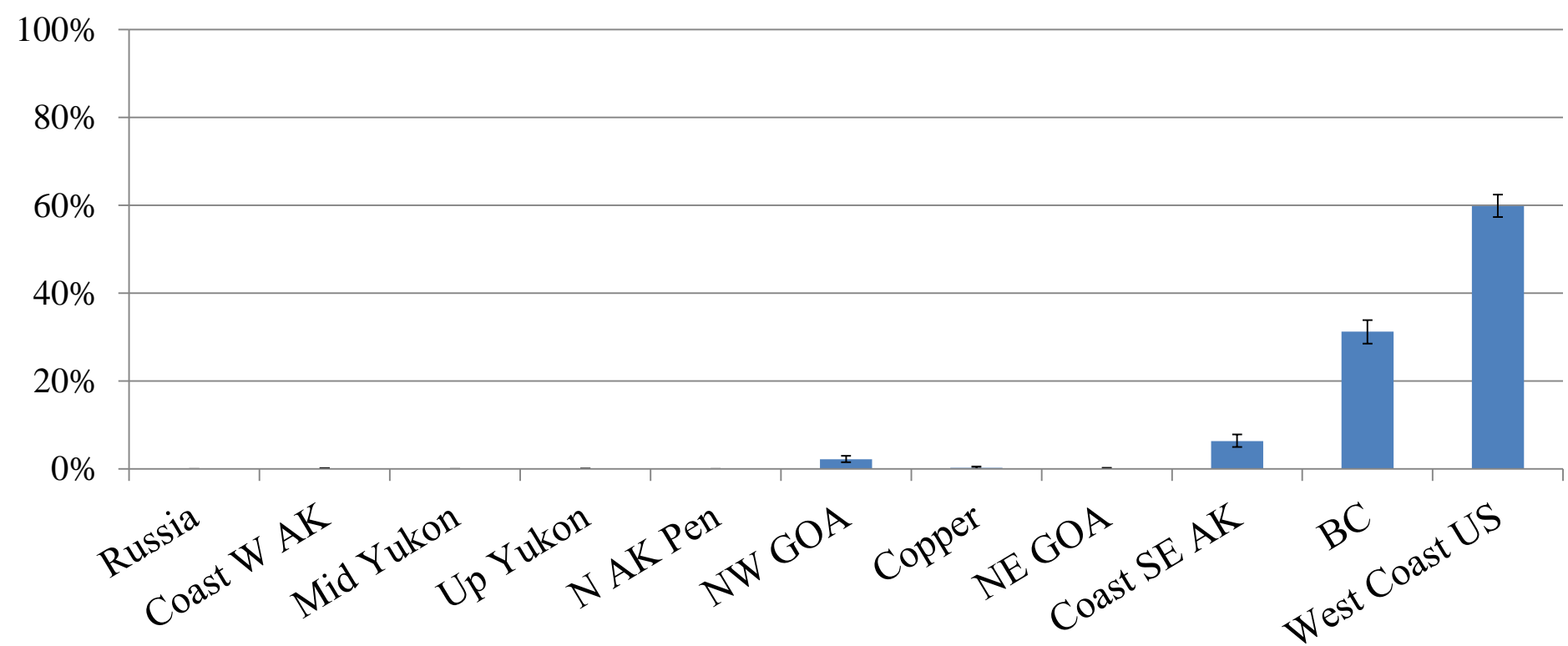
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Rockfish - GOA

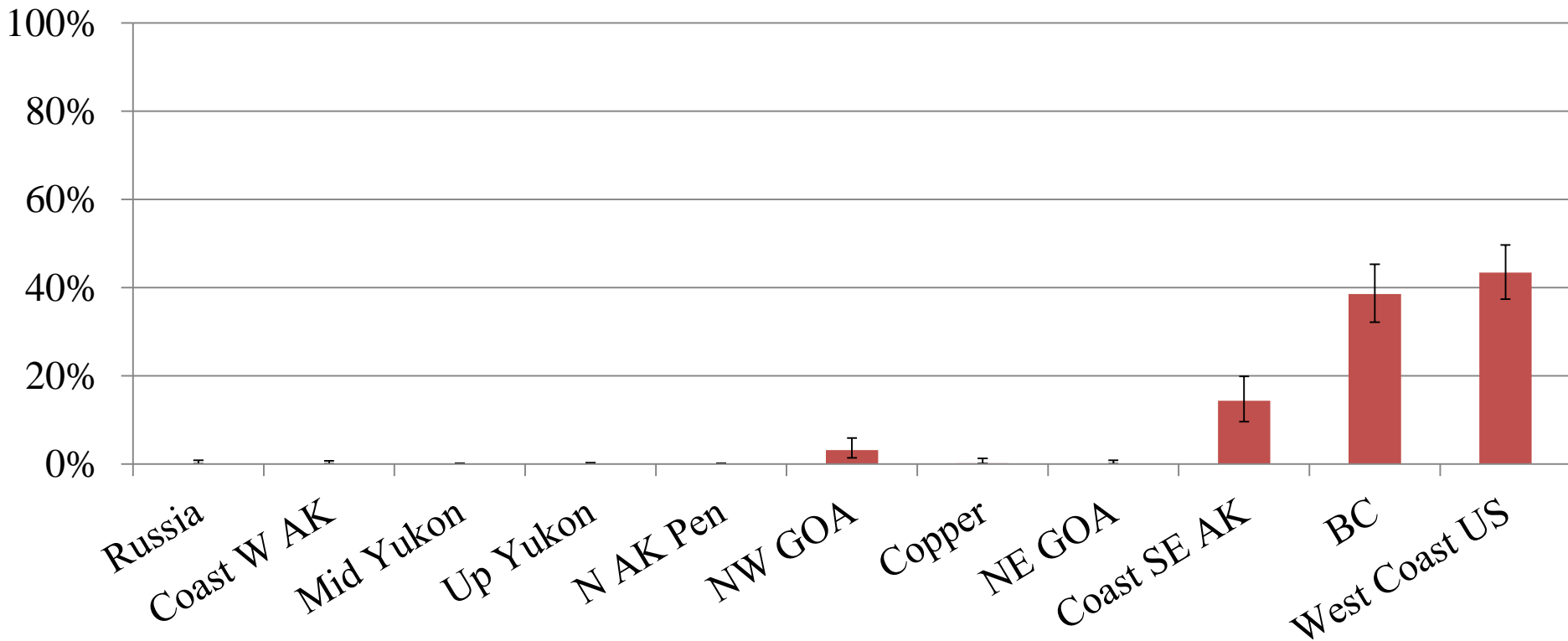
2013 Chinook Bycatch

2,070 samples, 2,029 genotyped
May 1, 2013 to Nov 15, 2013



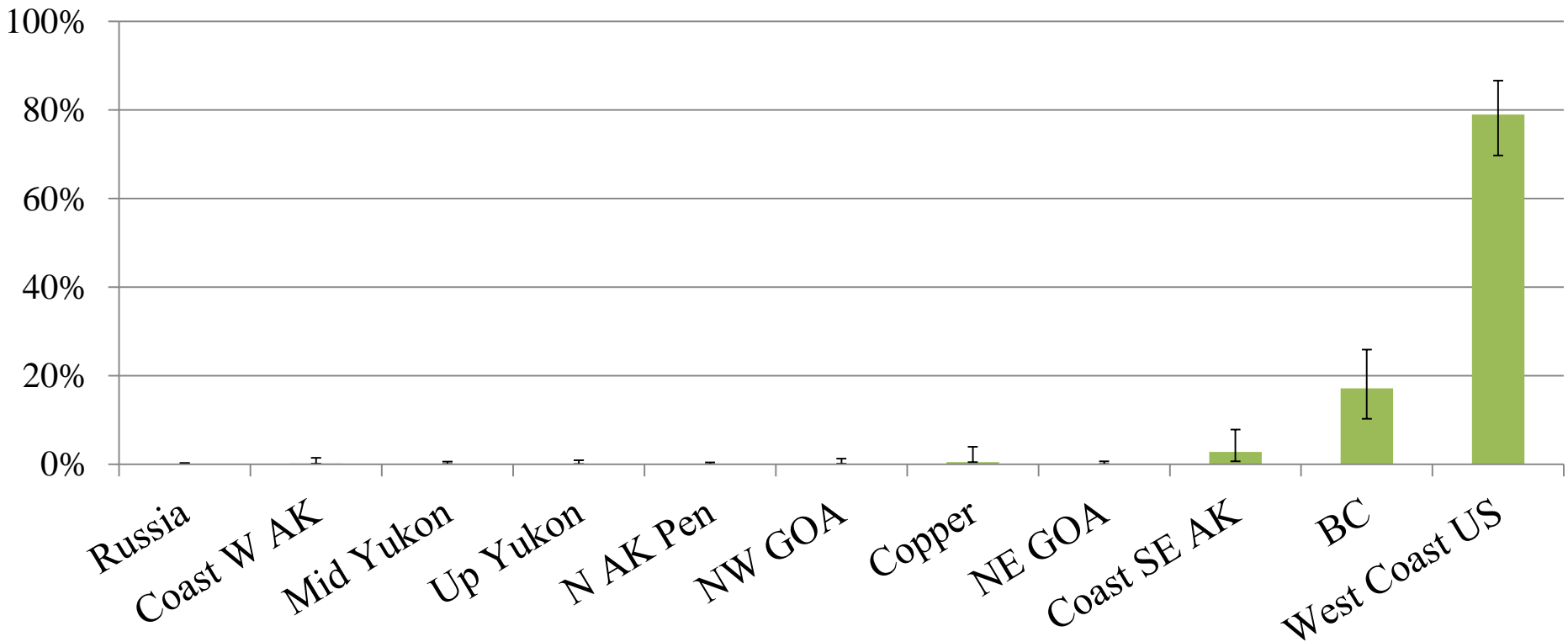
Arrowtooth Flounder 2013 Chinook Bycatch

66 tows, 302 Samples, 279 Genotyped
April 28, 2013 to May 18, 2013

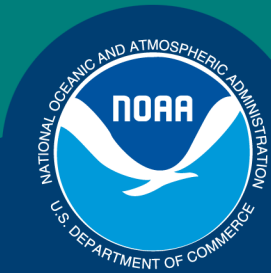


2013 Chinook Salmon Excluder Samples

F/V Caravelle Haul 18 on April 11, 2013
105 Samples, 95 Genotyped



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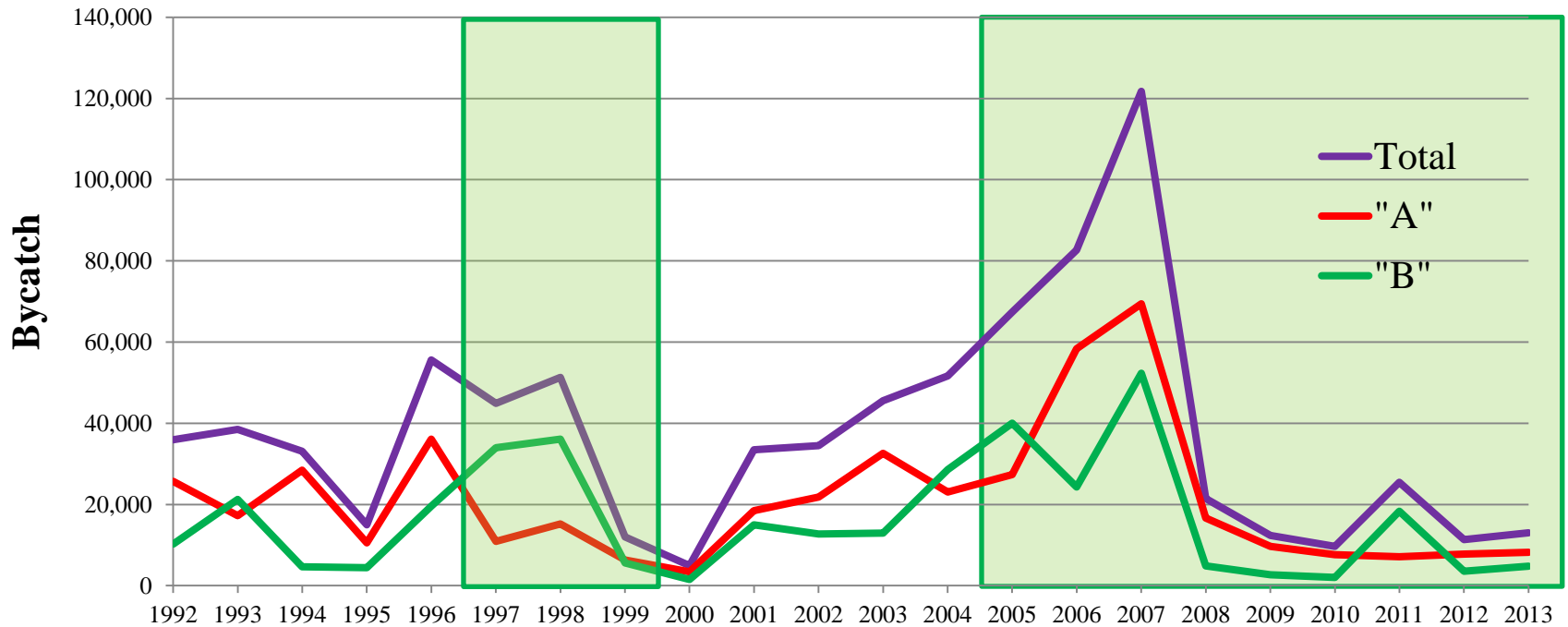
**Genetic Stock Composition Analysis of the
Chinook Salmon Bycatch from the 2013
Bering Sea Walleye Pollock (*Gadus
chalcogrammus*) Trawl Fishery**

Charles Guthrie, III
Hanhvan Nguyen
Jeff Guyon, PhD
Genetics Program
Auke Bay Laboratories
Juneau, AK

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SERVICE

April 6, 2015

2013 Chinook Salmon Bering Sea Bycatch

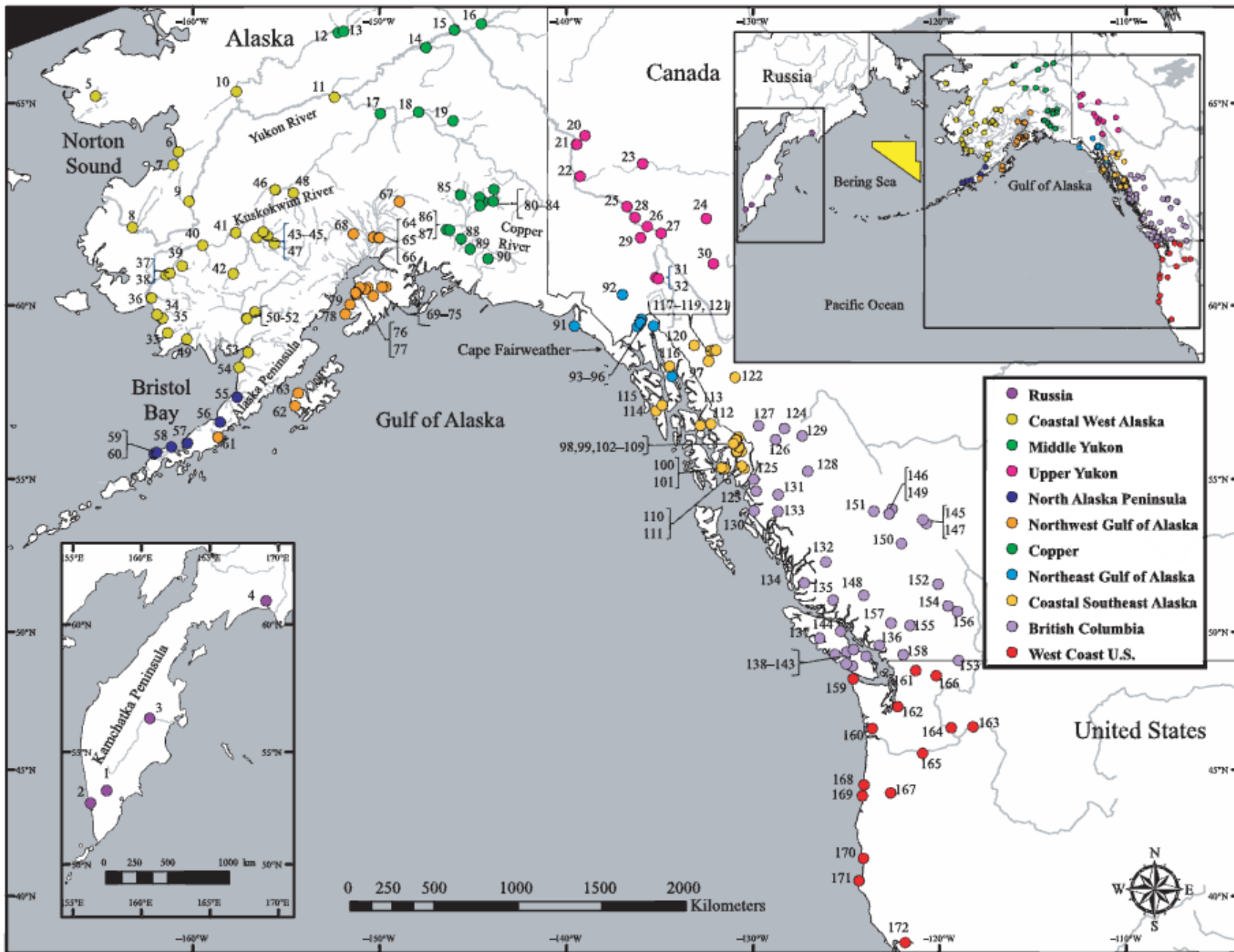


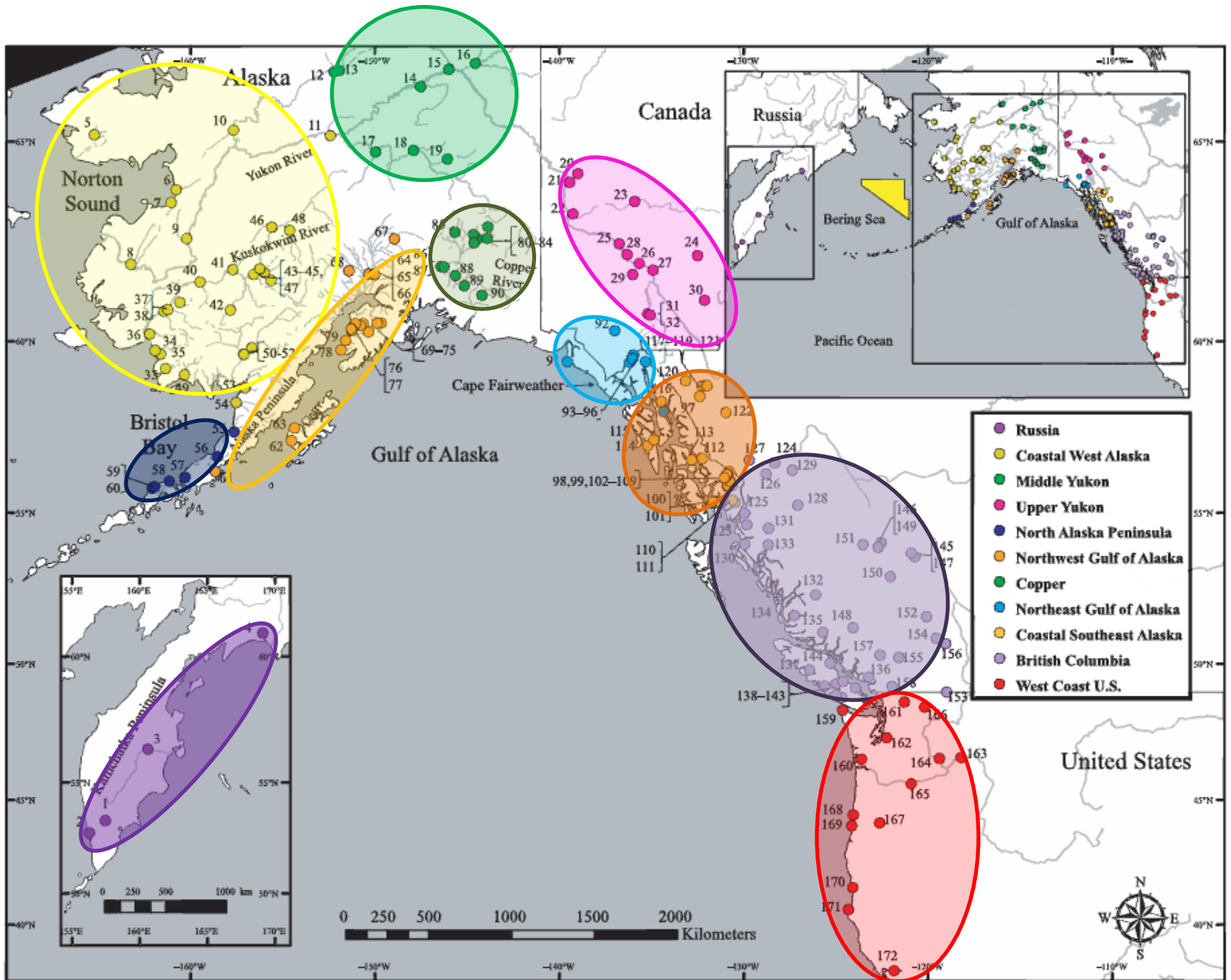
1979-1982: Scales (Myers and Rogers, 1988)

1997-1999: Scales (Myers et al., 2004)

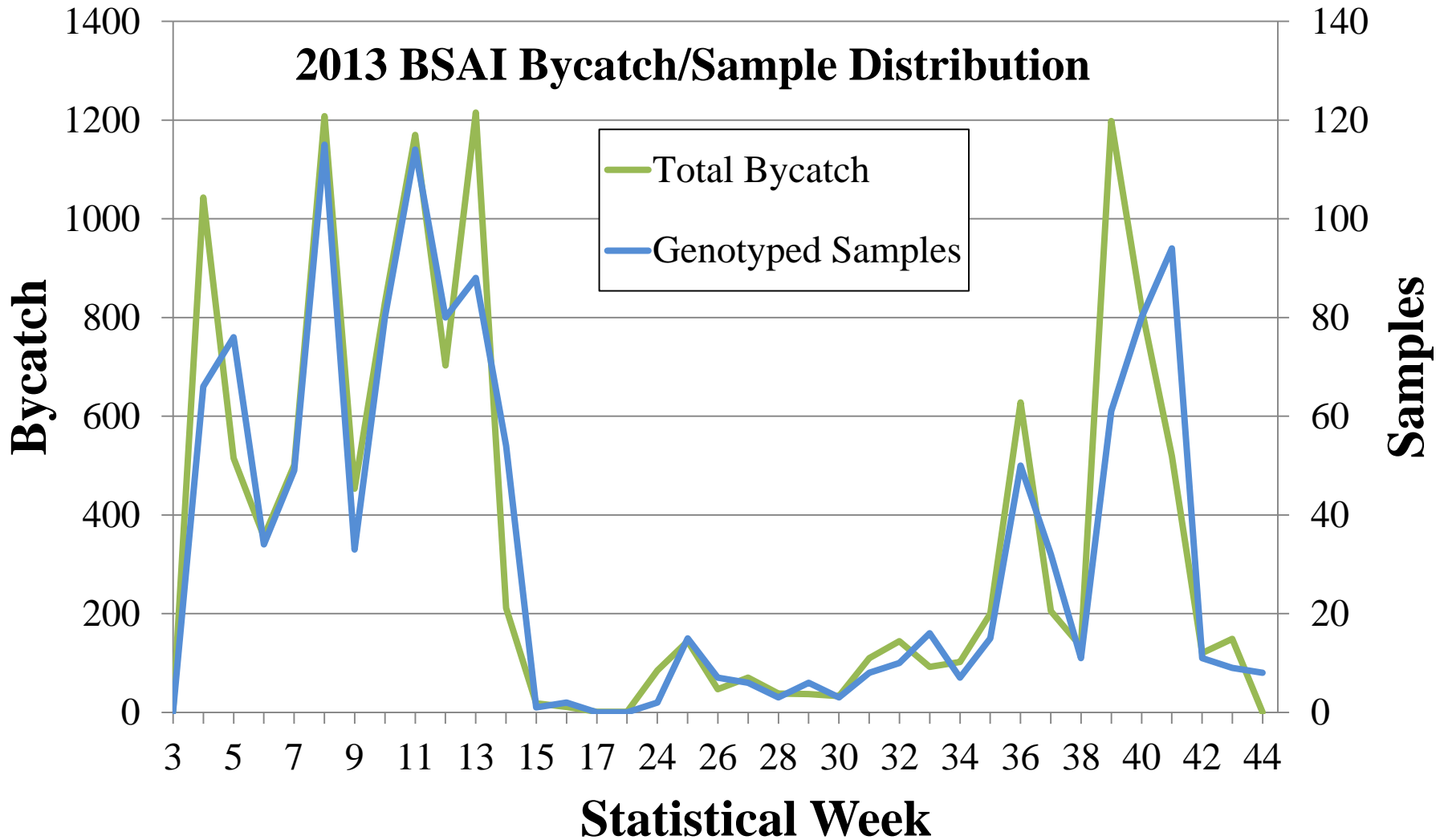
2005 "B" - 2006: SNPs (ADF&G, NMFS, Chinook Salmon EIS)

2007 – 2013: SNPs – 867 (2007 "B"), 863 (2008), 386 (2009), 826 (2010), 2,473 (2011), 1,111 (2012), and 1,246 (2013) samples.

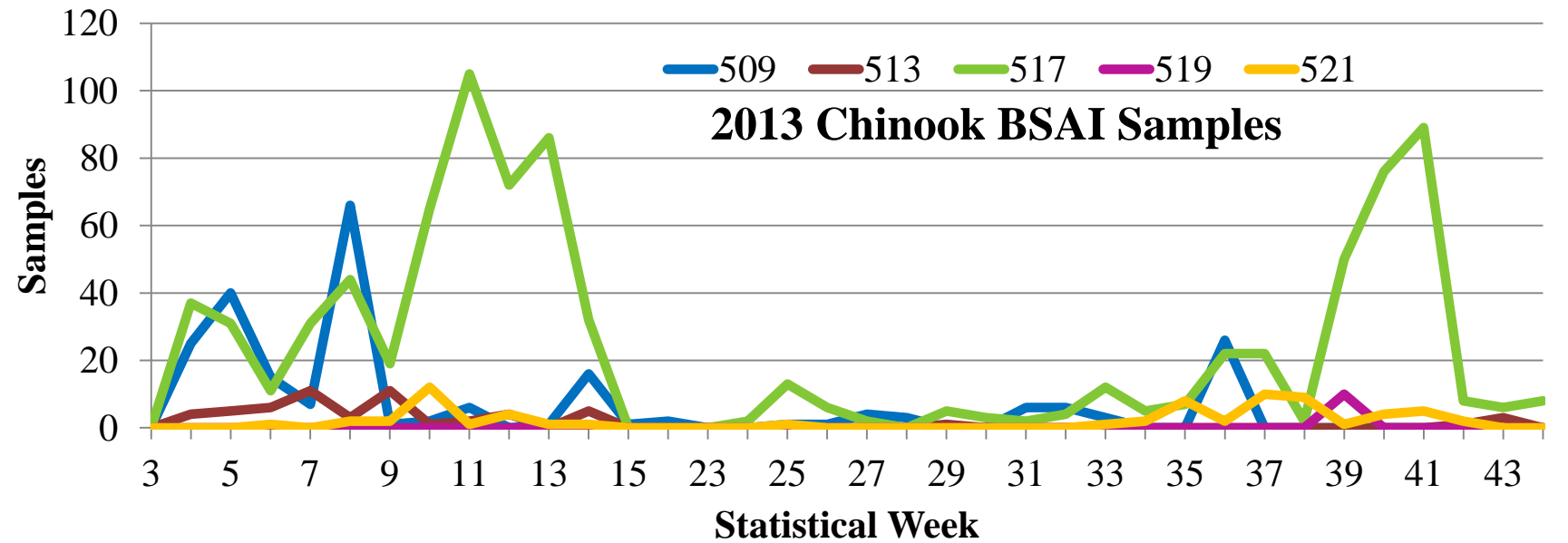
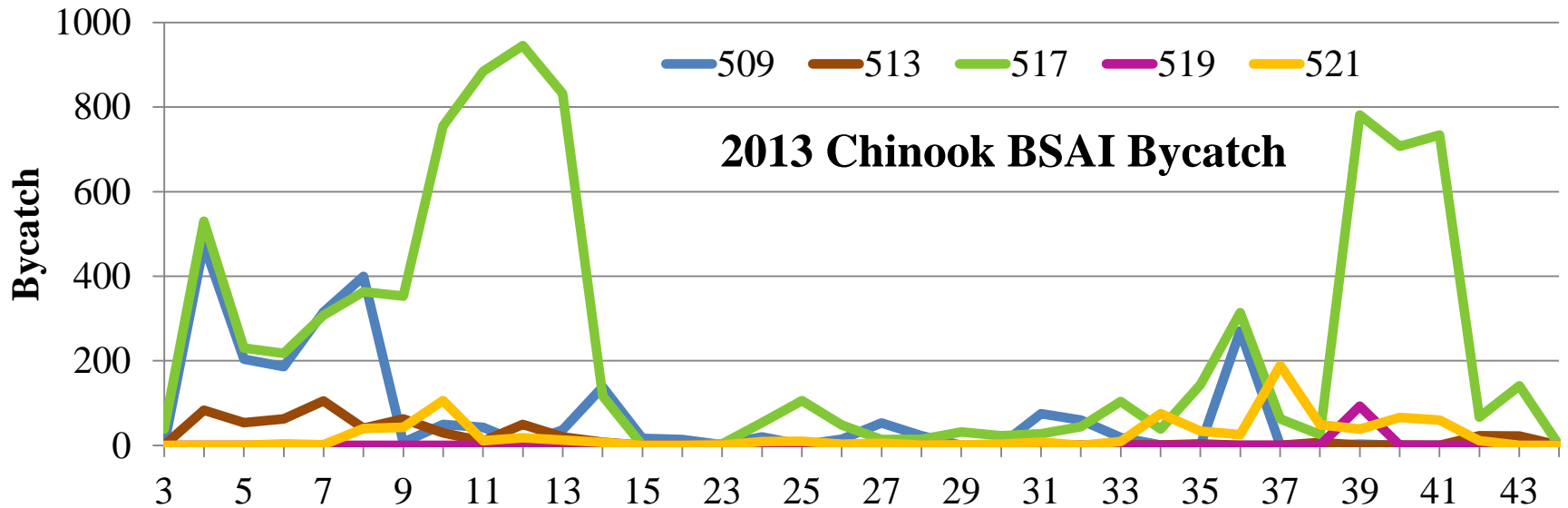




2013 Chinook Salmon Bering Sea Bycatch

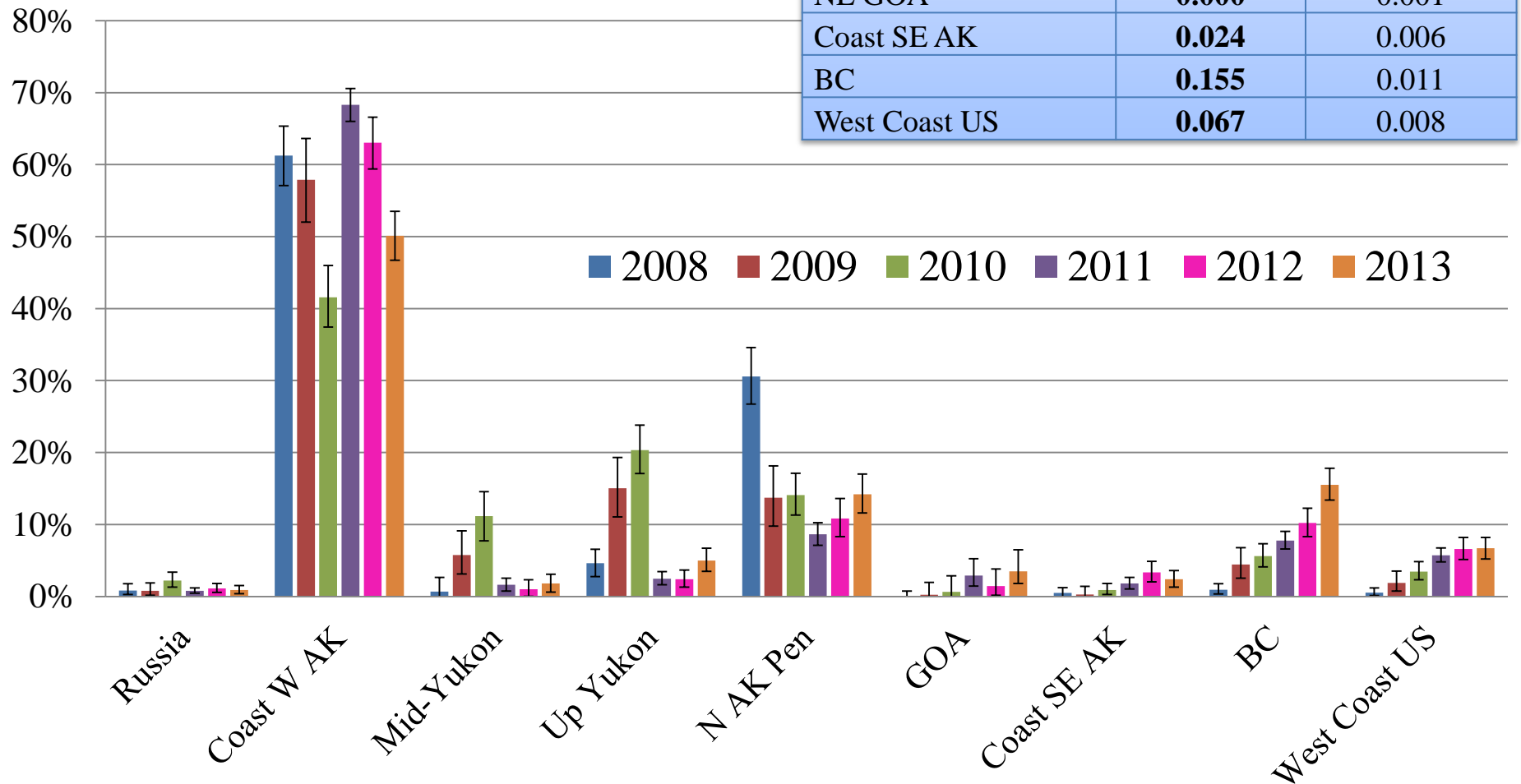


2013 Chinook Salmon Bering Sea Bycatch



2013 Bering Sea Chinook Stock Proportions (1,246 bycatch samples)

Region	BAYES	SD
Russia	0.009	0.003
Coast W AK	0.501	0.018
Middle Yukon	0.018	0.007
Up Yukon	0.050	0.008
N AK Penn	0.142	0.014
NW GOA	0.034	0.010
Copper	0.001	0.002
NE GOA	0.000	0.001
Coast SE AK	0.024	0.006
BC	0.155	0.011
West Coast US	0.067	0.008



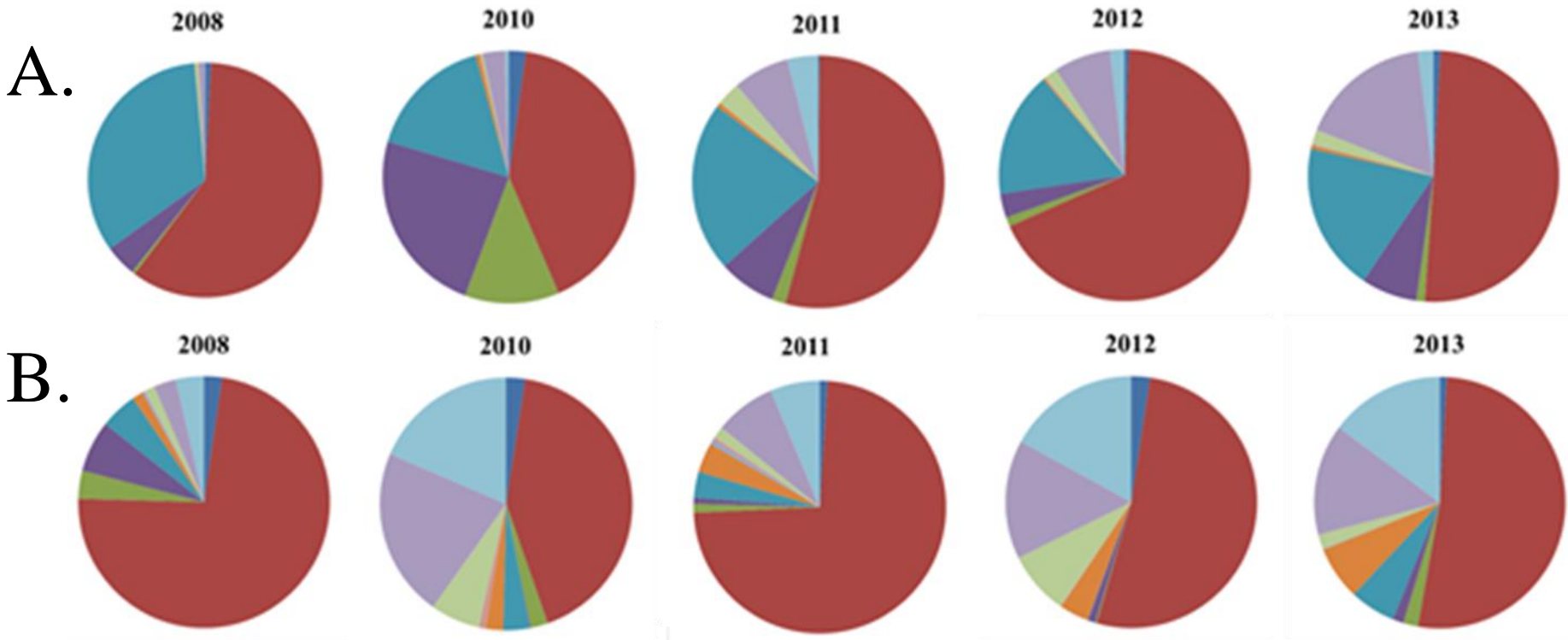
2013 Chinook Salmon Bering Sea Bycatch



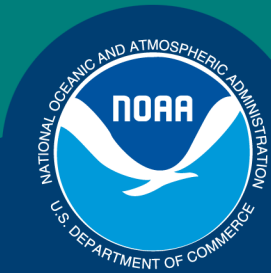
Seasonal Stock Differences

A Season: 792 samples

B Season: 454 samples



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NMFS-AFSC-292

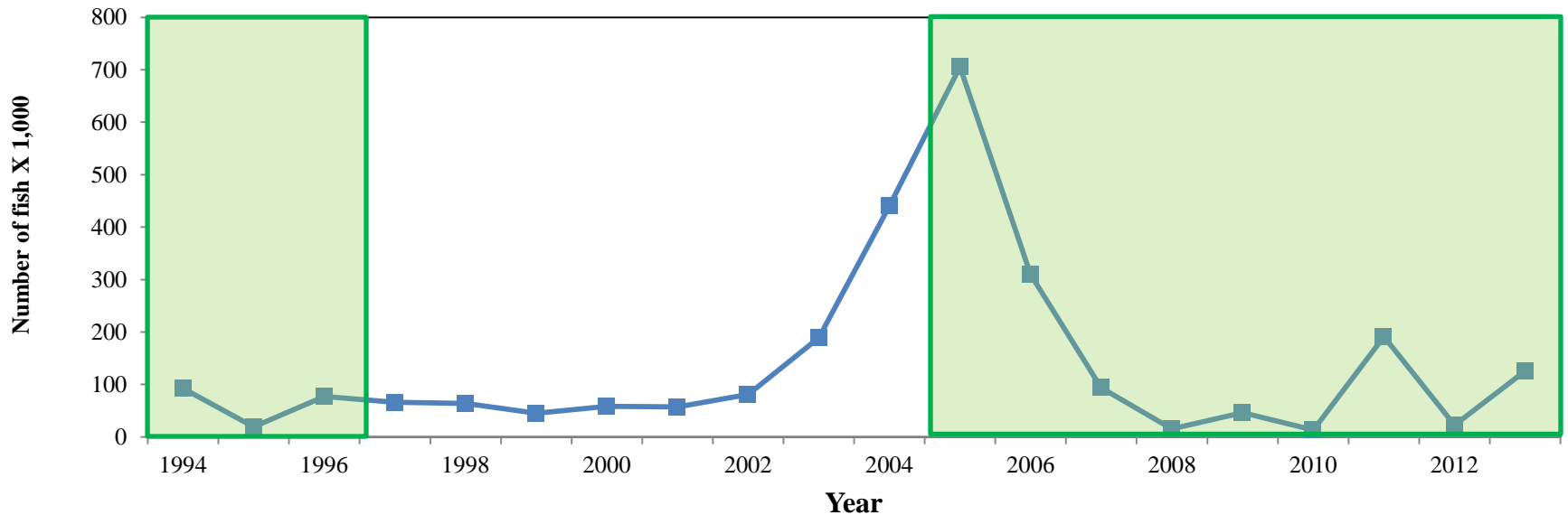
Genetic Stock Composition Analysis of Chum Salmon Bycatch from the 2013 Bering Sea Walleye Pollock Trawl Fishery

Jacqueline Whittle
Scott Vulstek
Chris Kondzela, PhD
Jeff Guyon, PhD
Genetics Program
Auke Bay Laboratories
Juneau, AK

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2013 Chum Salmon Bering Sea Bycatch



1994: Scales (Patton et al., 1998) - 1,204 samples

1994-1995: Allozymes (Wilmot et al., 1998) - 457 (1994) and 1,680 (1995) samples

1996: Allozymes (Seeb et al., 2004) – Eastern shelf

2005–2013: Microsatellites - 1,084 (2005), 1,367 (2006), 1,279 (2007), 629 (2008), 1,437 (2009), 1,048 (2010), 1,472 (2011), 673 (2012), 4,094 (2013) samples

DFO Microsatellite Chum Salmon Baseline

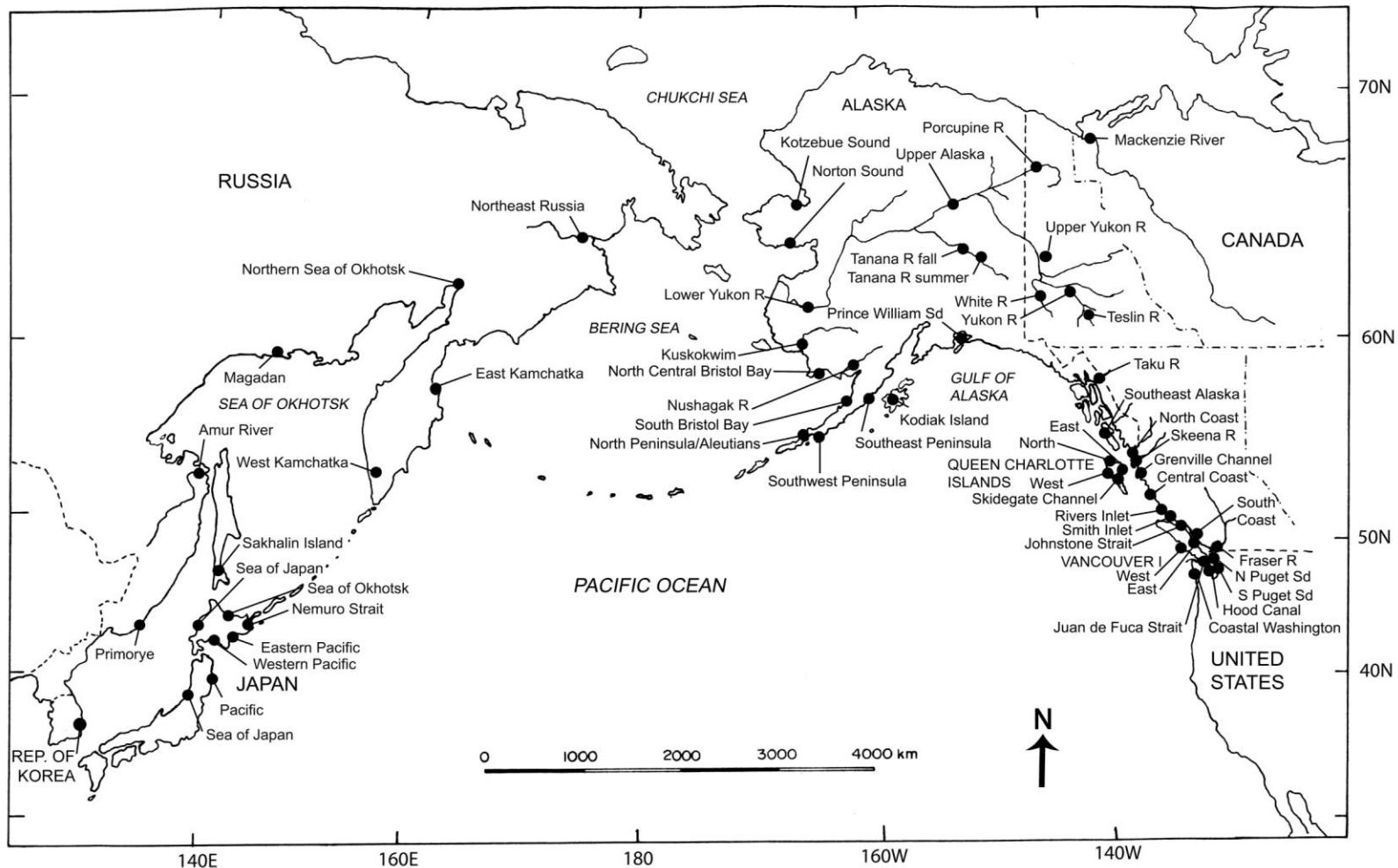


Figure 1

Map of the Pacific Rim indicating the general geographic regions where chum salmon (*Oncorhynchus keta*) from 381 populations were surveyed. The regions are listed in Table 1.

Our Stock Groupings

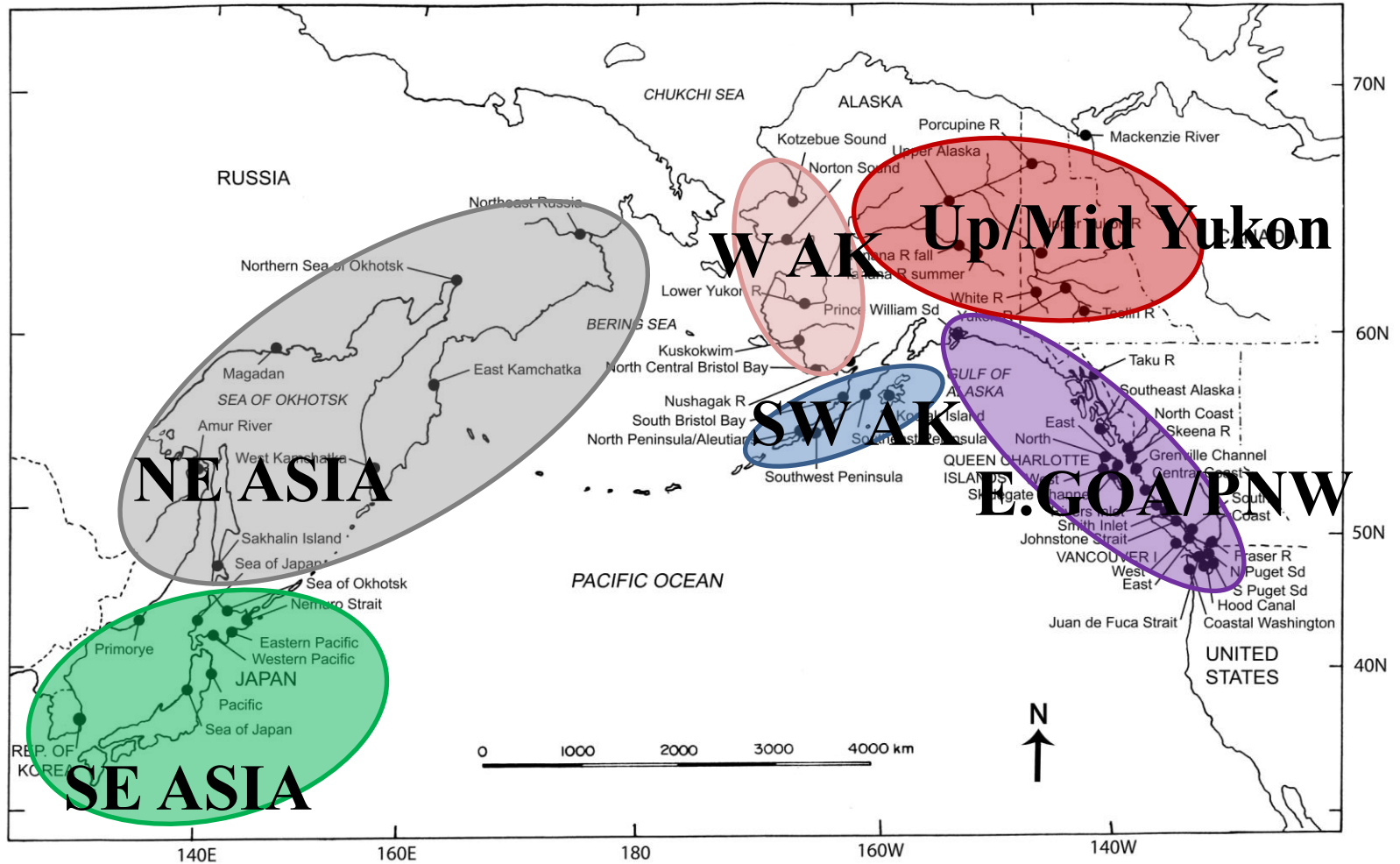
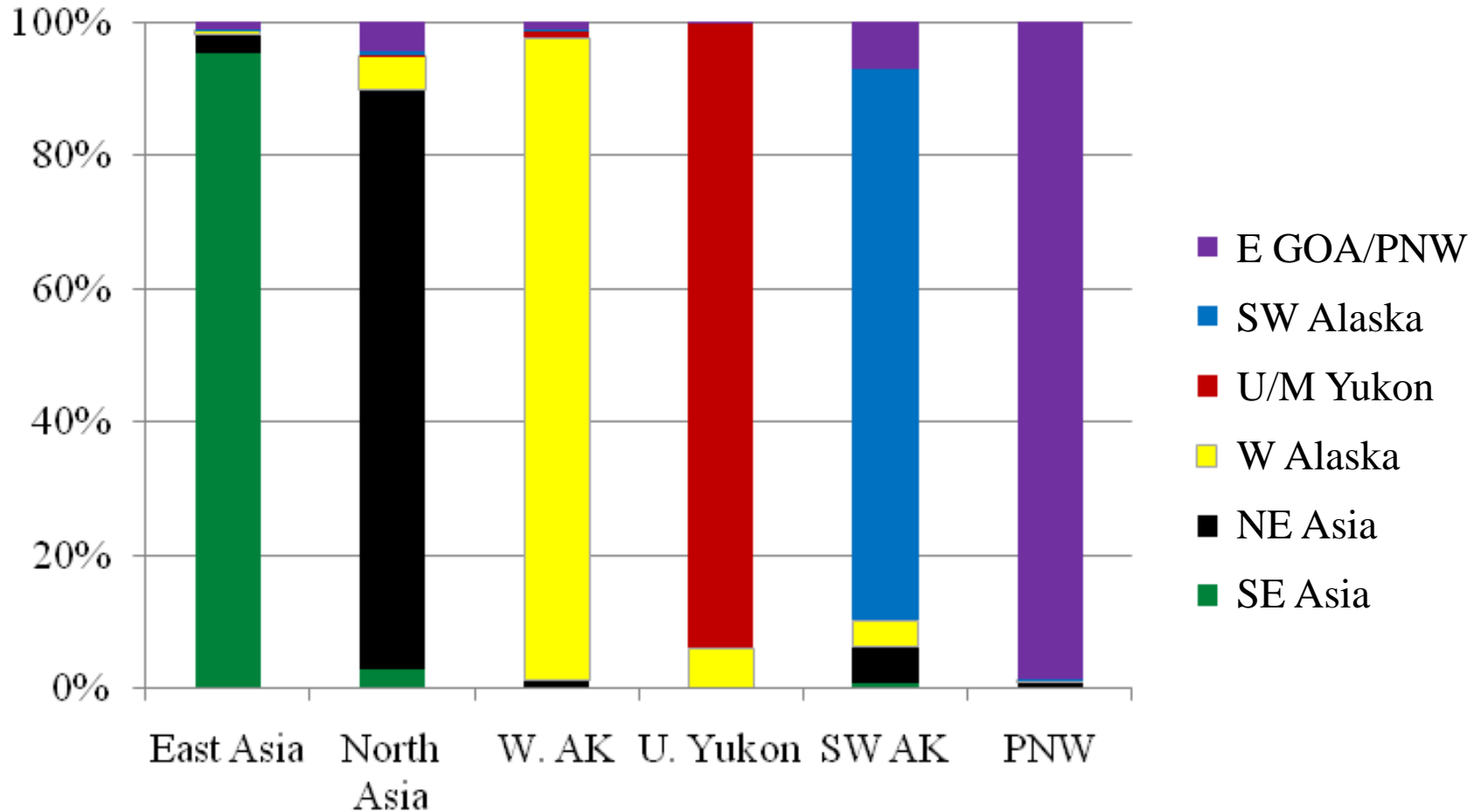


Figure 1

Map of the Pacific Rim indicating the general geographic regions where chum salmon (*Oncorhynchus keta*) from 381 populations were surveyed. The regions are listed in Table 1.

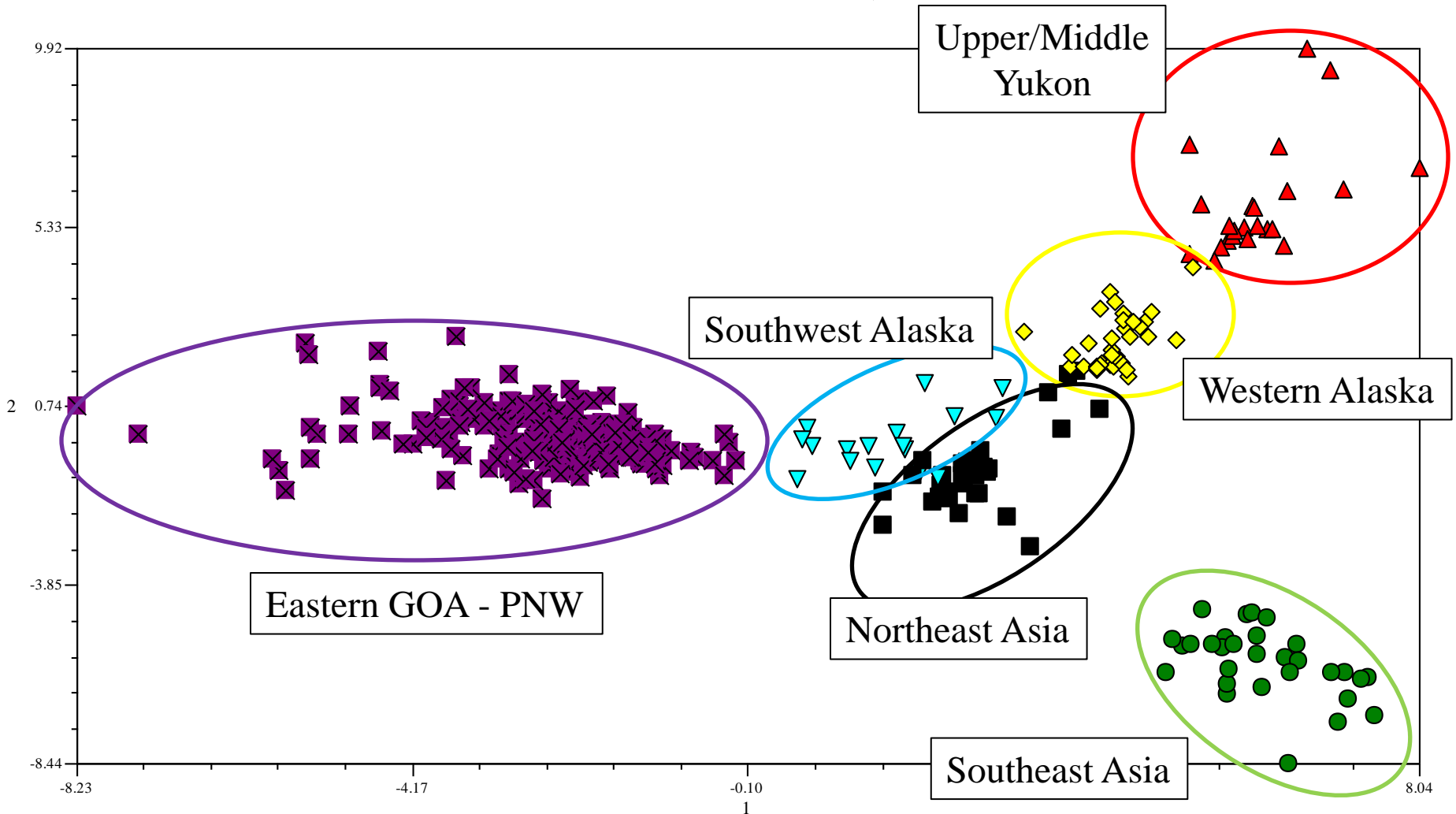
Baseline Analysis – 100% Simulations

11 Markers

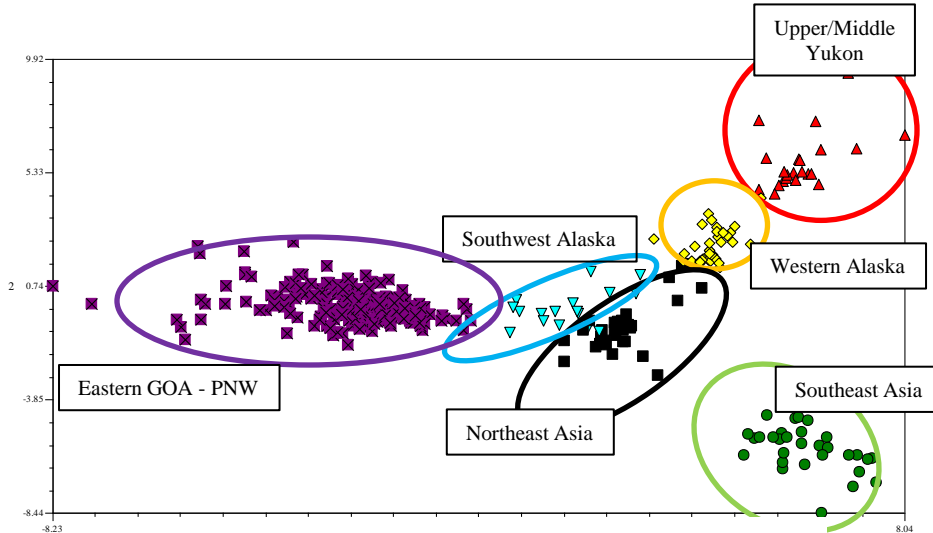


Principal Coordinate Analysis

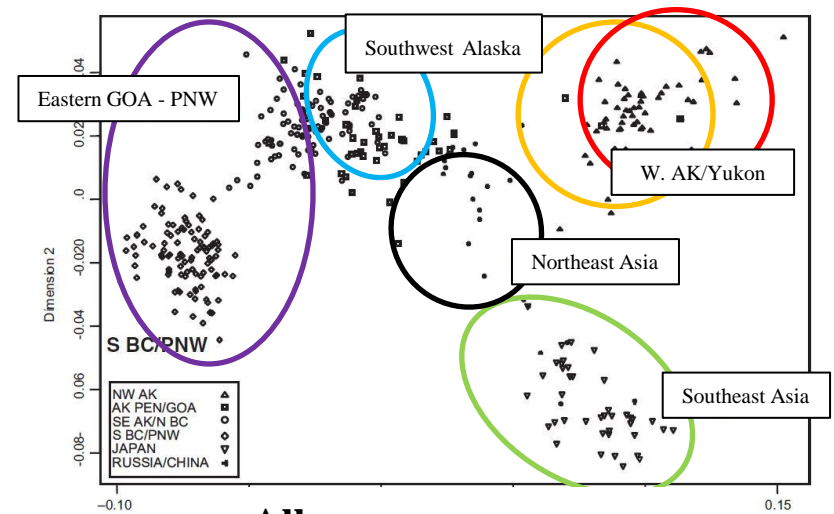
11 microsattelites, CSE



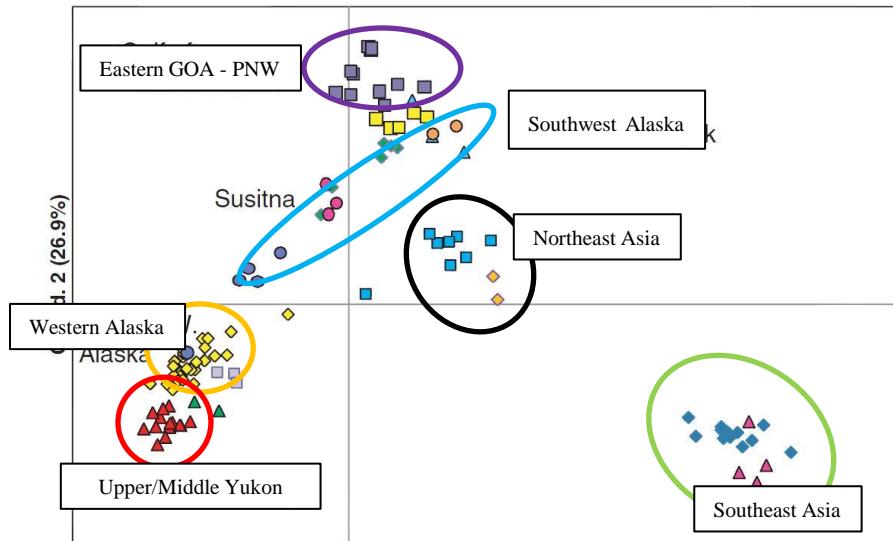
Principal Coordinate Analysis – Chum Salmon



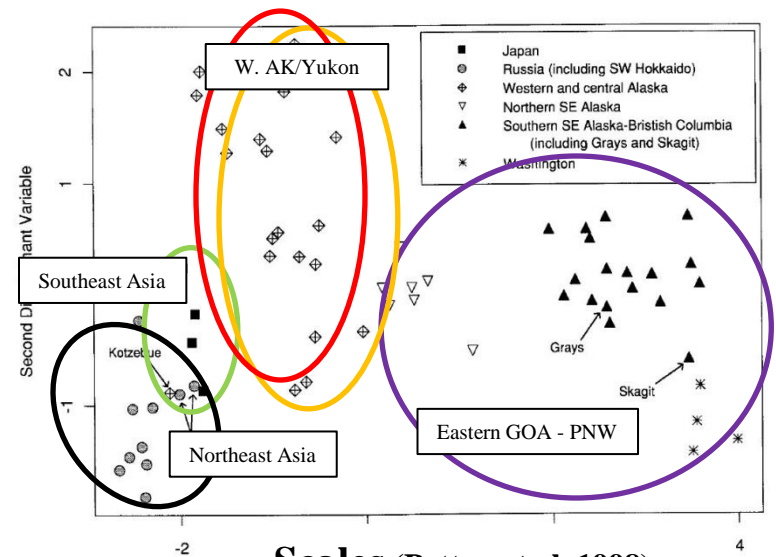
Microsatellites (Beacham et al, 2009)



Allozymes (Seeb et al, 2004)



SNPs (Seeb et al, 2011)



Scales (Patton et al, 1998)

CIAP-WASC chum salmon collections

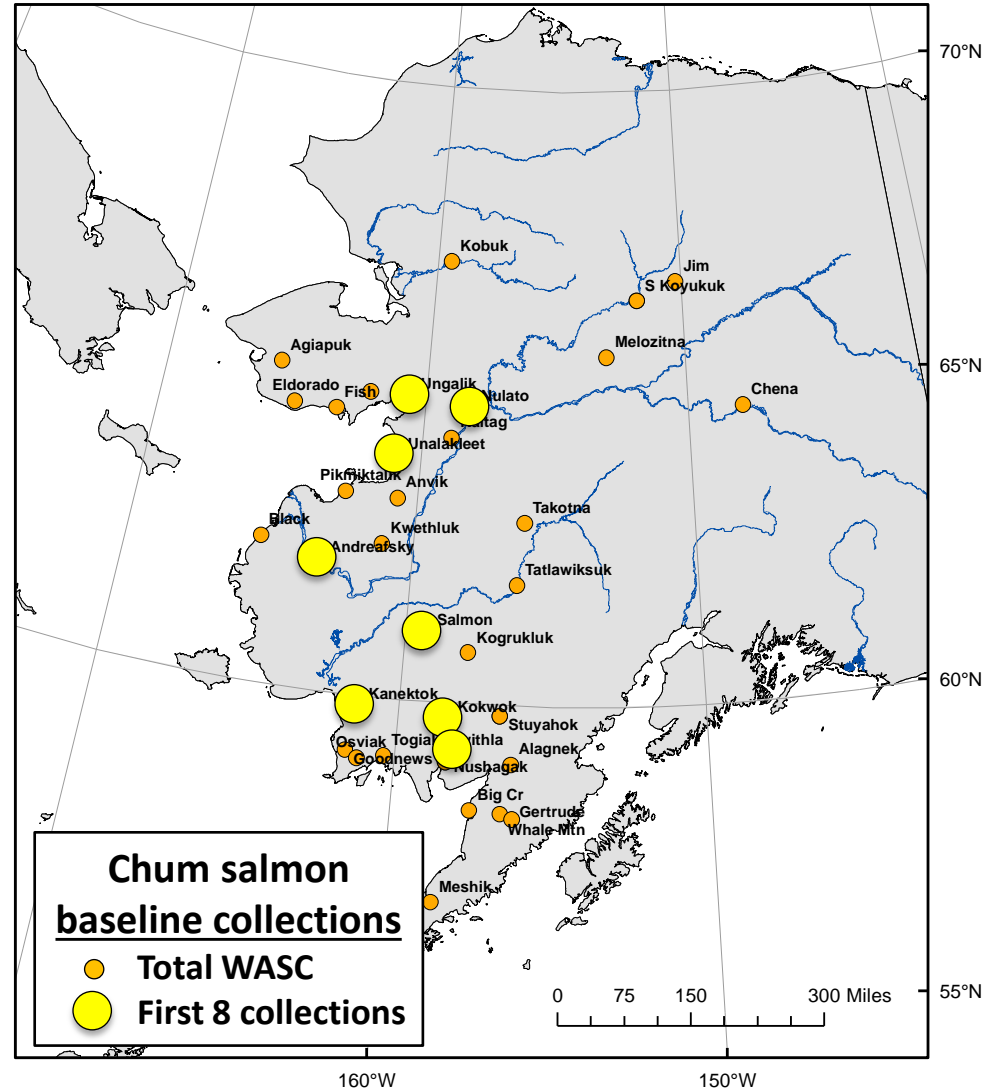
Goal II

Objective 1

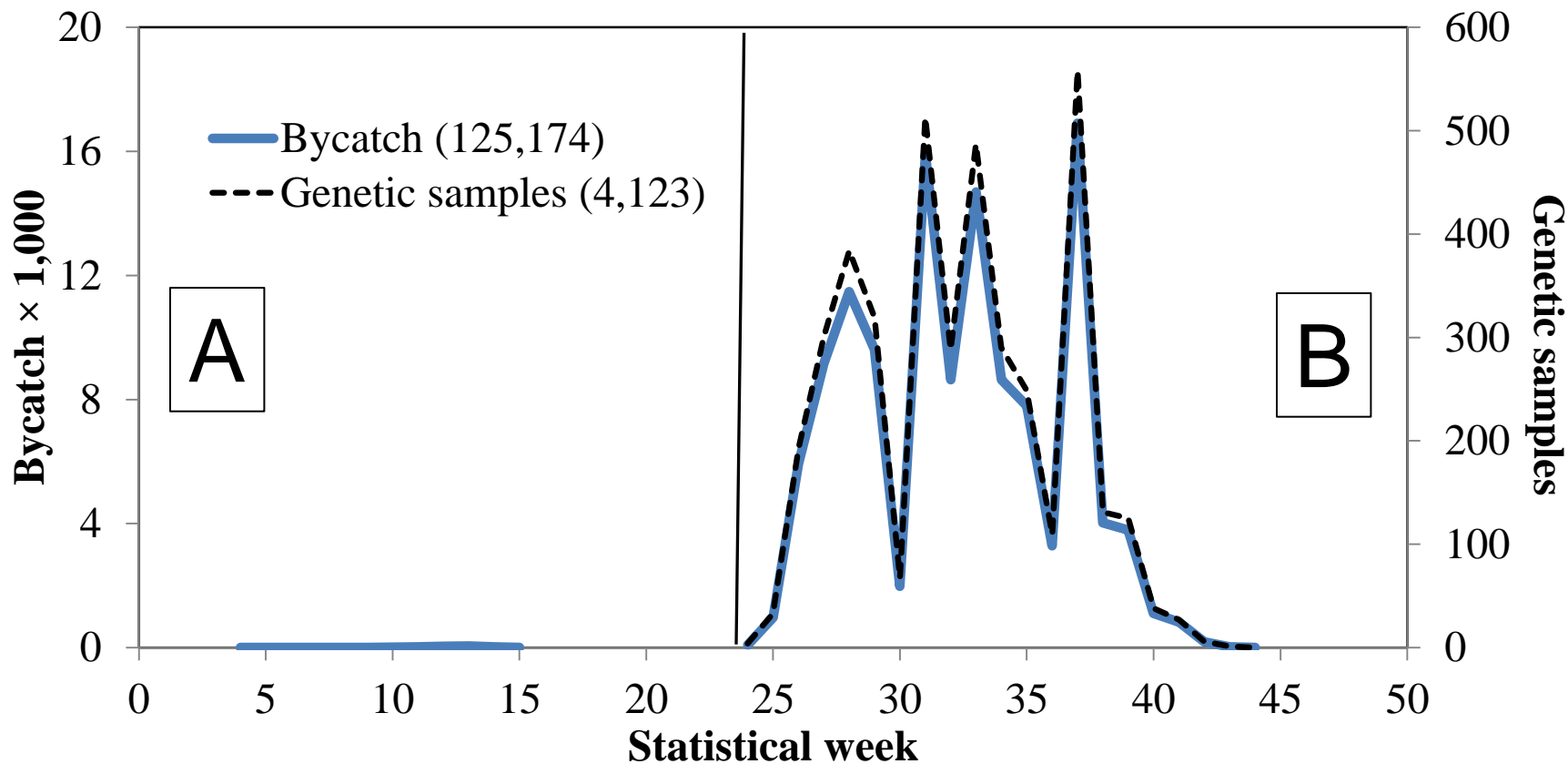
- Genotype 144 samples from each of 32 collections at pre-existing and new microsatellite markers.

Objective 2

- Genotype mixture samples from lower Yukon and Kuskokwim rivers.



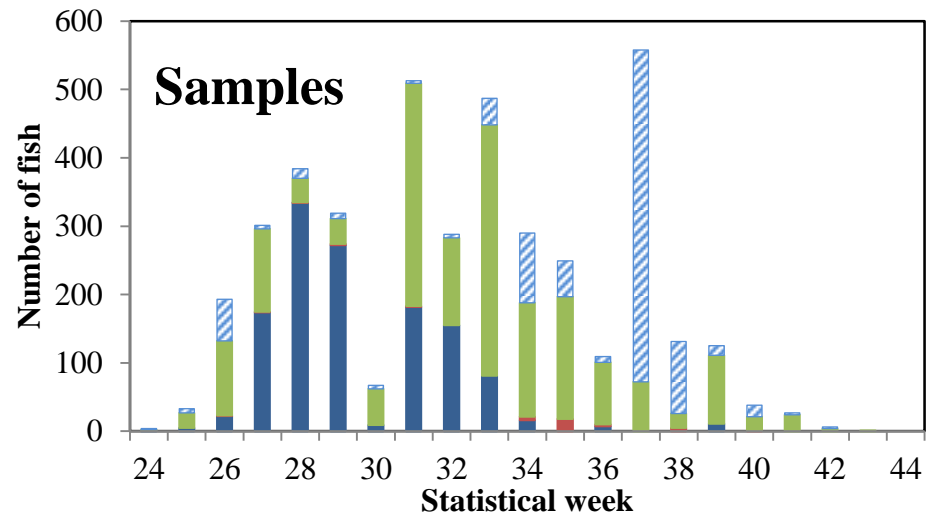
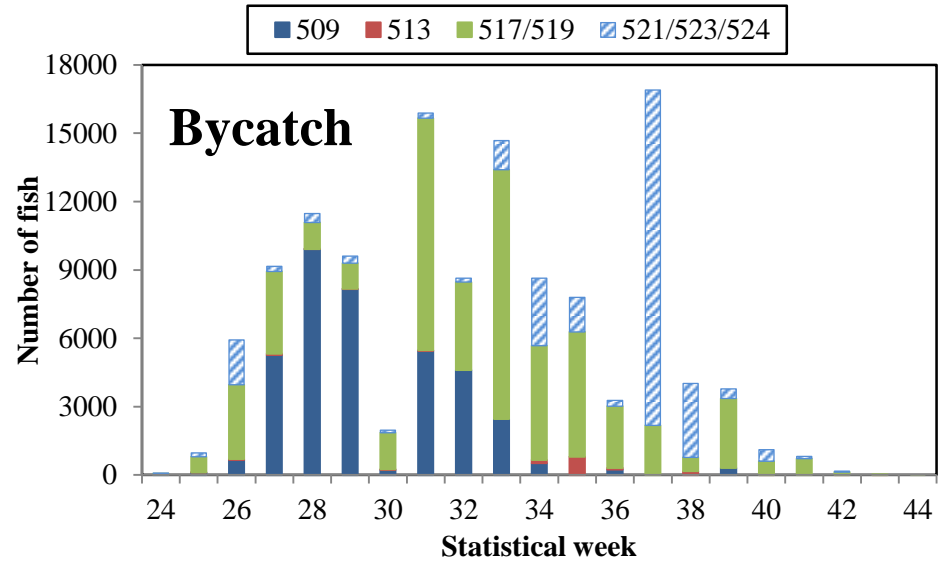
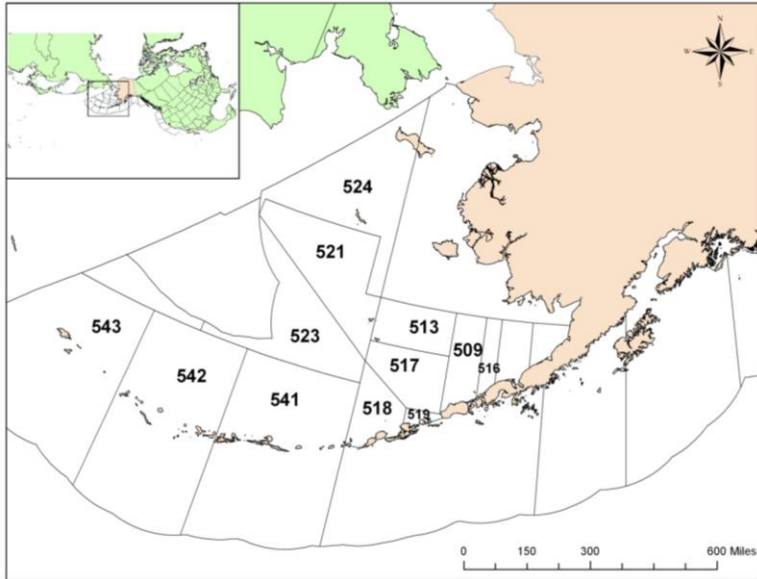
2013 Chum Salmon Bering Sea Bycatch



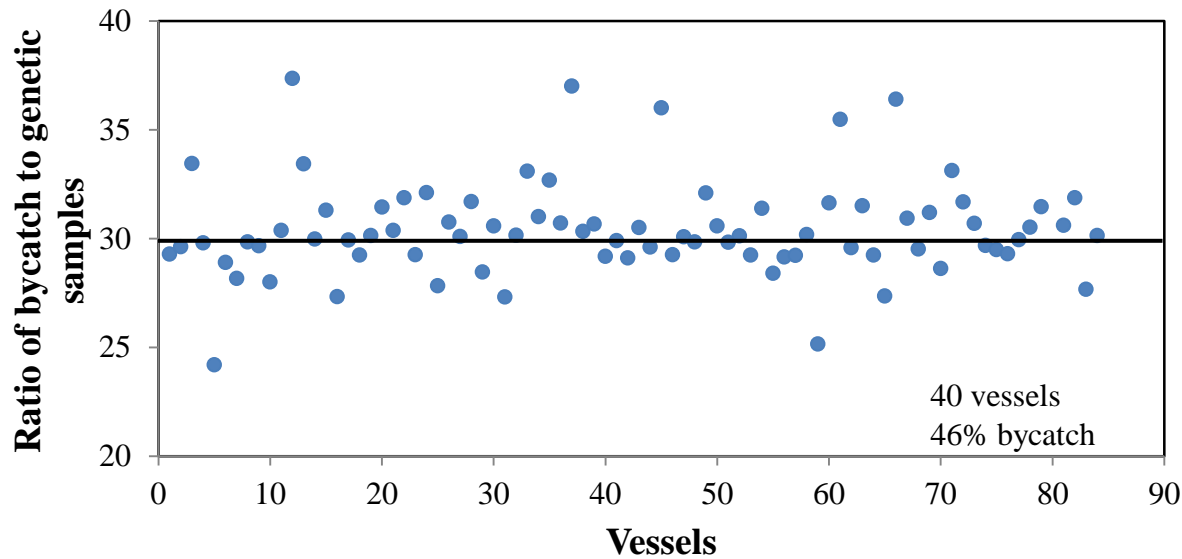
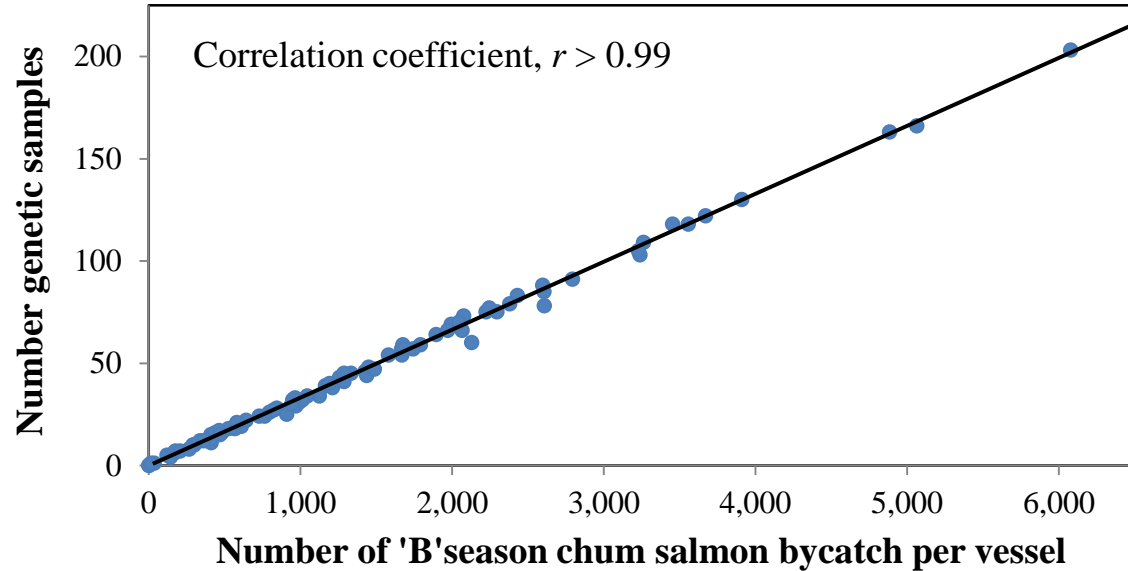
Sample set	X ²	d.f.	P-value
Collected	1.437	17	>0.99
Genotyped	3.325	17	>0.99
Analyzed	22.806	17	0.16

2013 Chum Salmon Bering Sea Bycatch

BSAI Statistical Areas



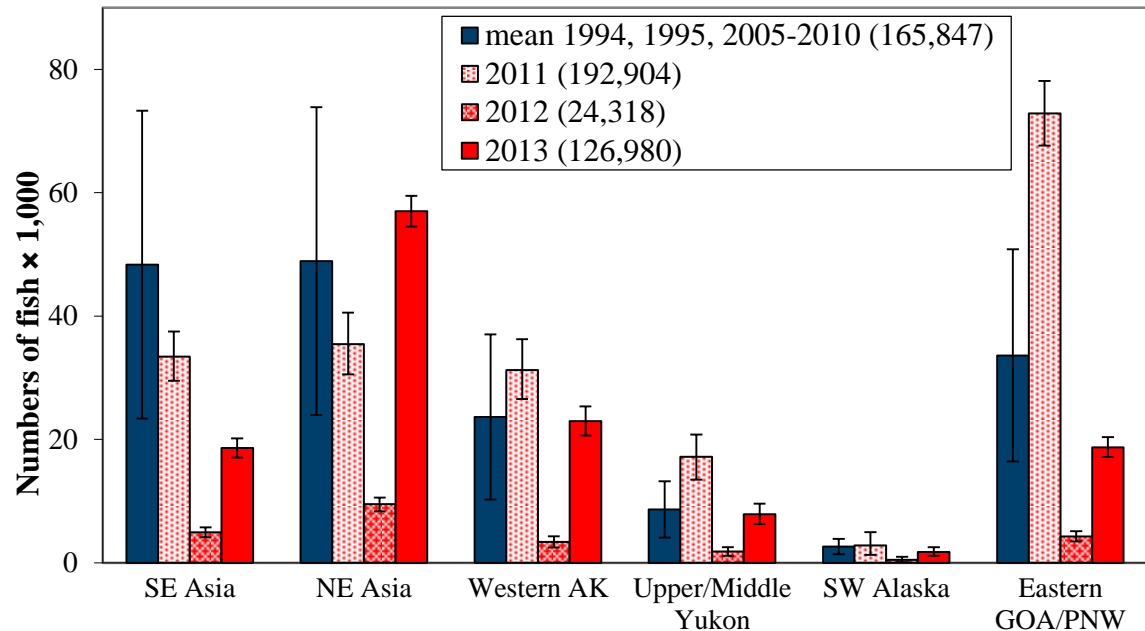
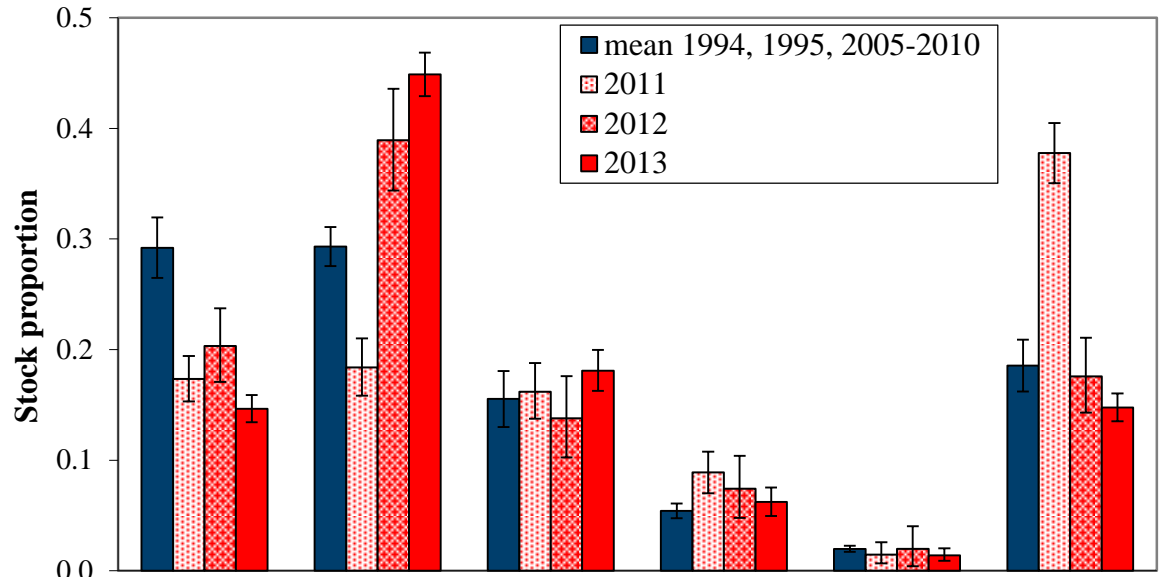
2013 Chum Salmon Bering Sea Bycatch



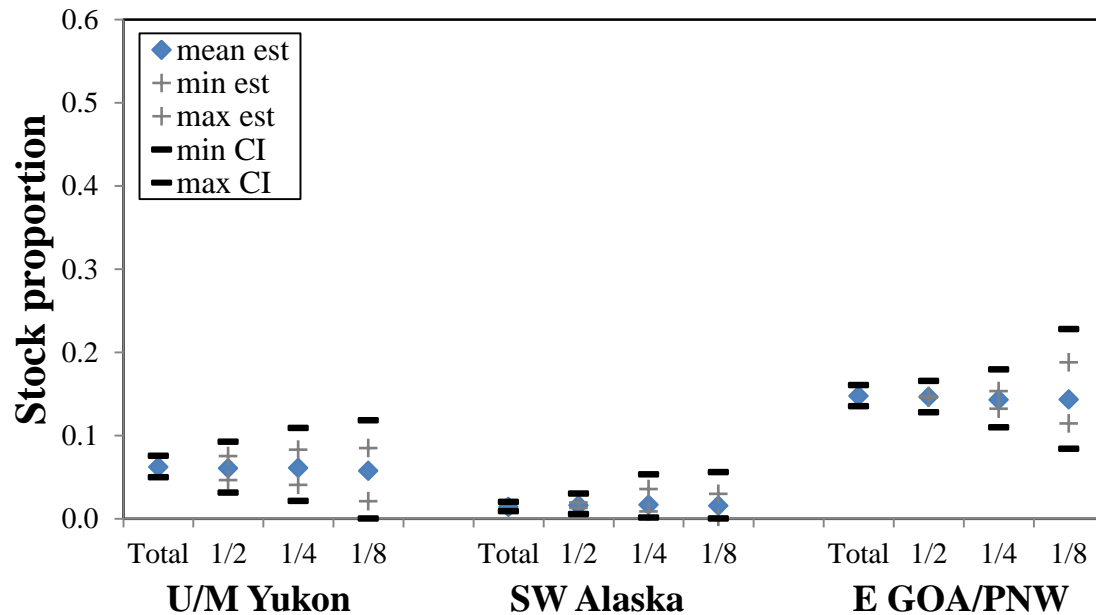
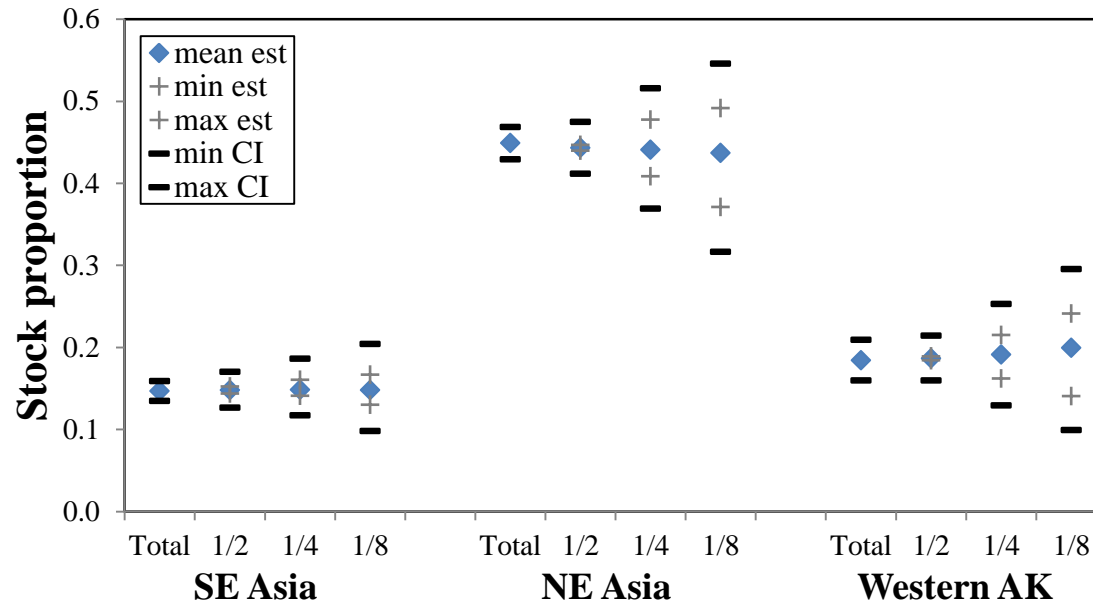
2013 Chum Salmon Bering Sea Bycatch

2013 Chum Proportions (3,880 bycatch samples)

BAYES Region	Mean	SD
Southeast Asia	0.1465	0.0063
Northeast Asia	0.4489	0.0101
Western Alaska	0.1809	0.0095
Upper/Middle Yukon	0.0622	0.0066
Southwest Alaska	0.0140	0.0029
Eastern GOA/PNW	0.1475	0.0065

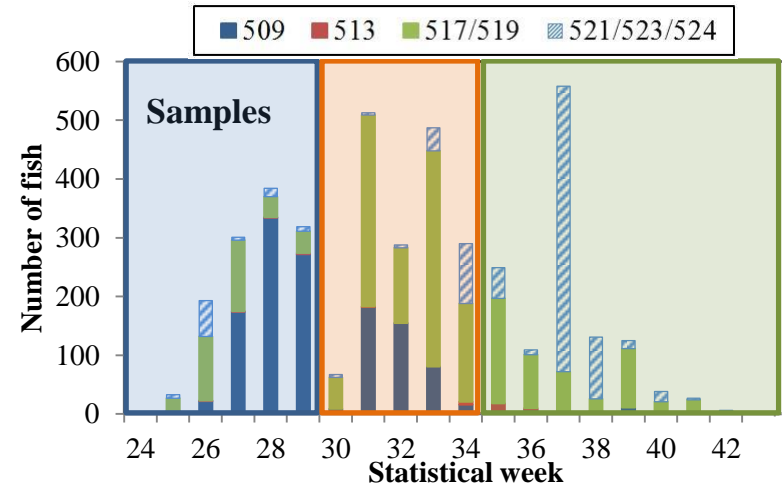


2013 Chum Salmon Bering Sea Bycatch

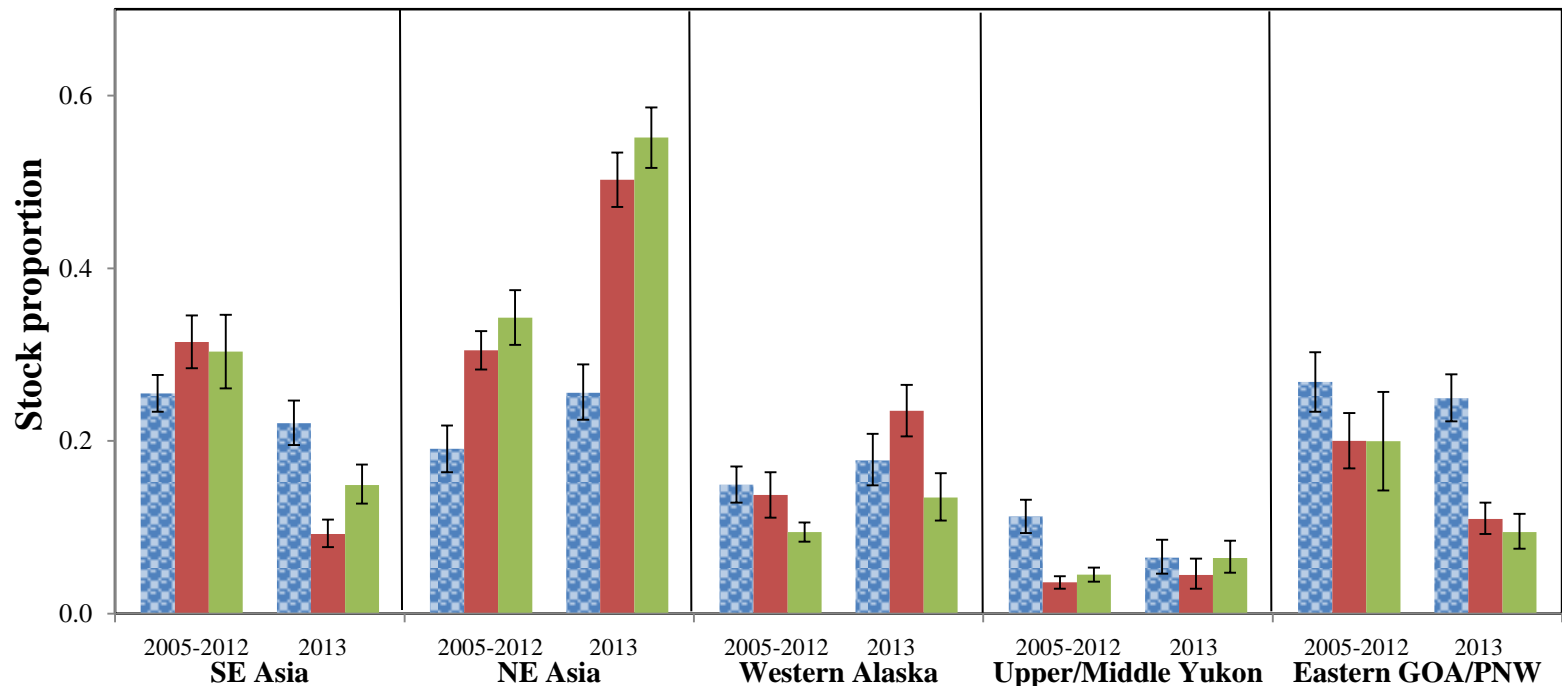


2013 Chum Salmon Bering Sea Bycatch

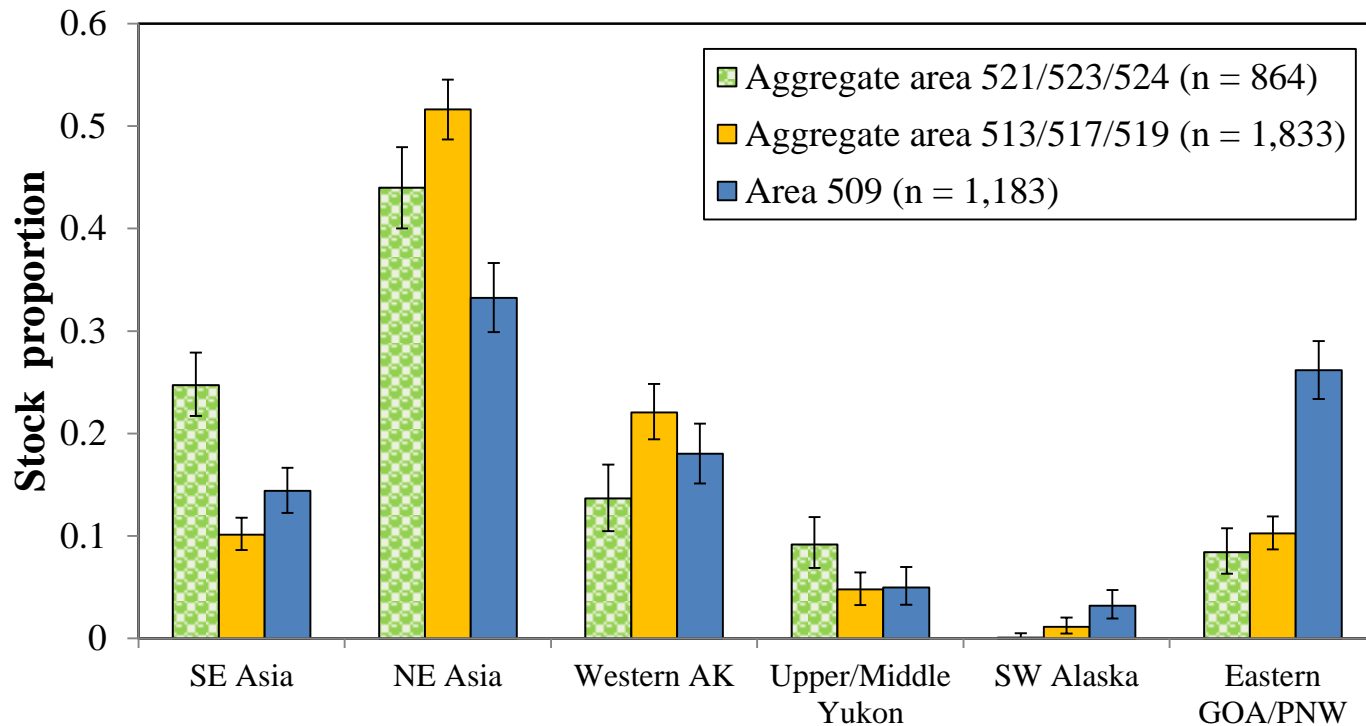
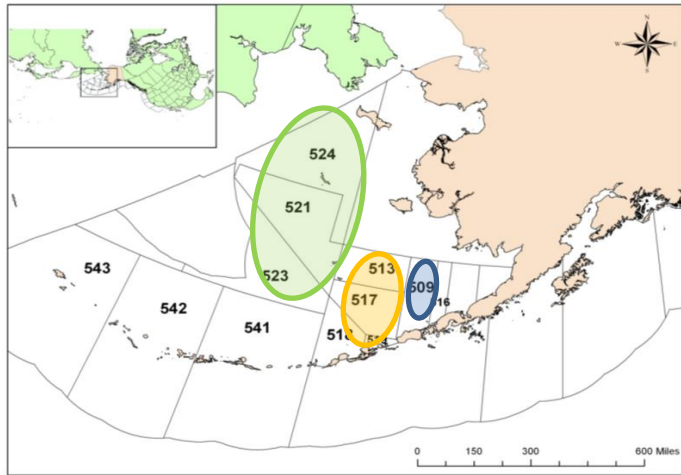
Weeks	Dates	Number Samples
24-29	June 10 – July 20	1,132
30-34	July 21 – August 24	1,582
35-43	August 25 – October 24	1,166



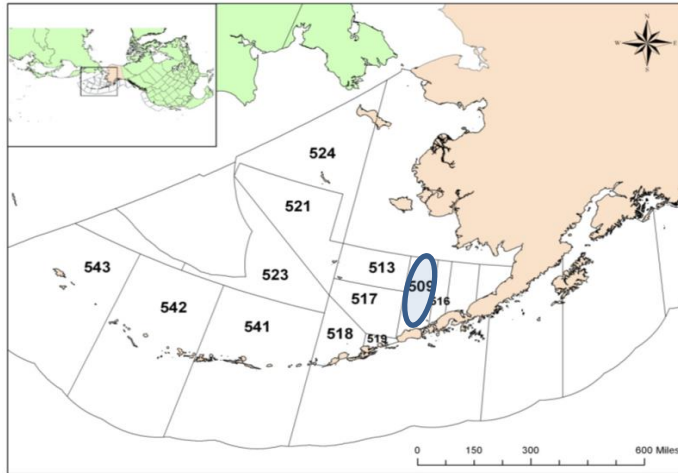
■ Early ■ Middle ■ Late



2013 Chum Salmon Bering Sea Bycatch

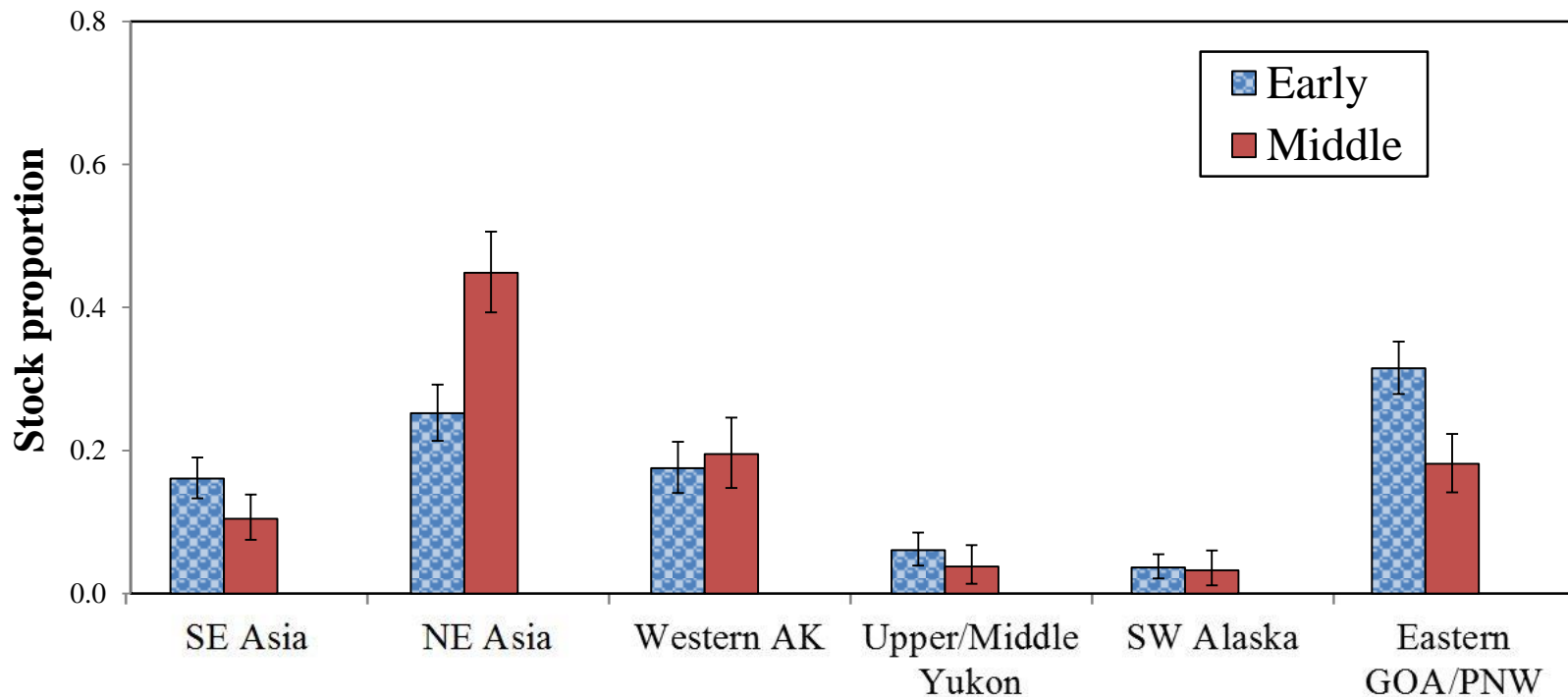


2013 Chum Salmon Bering Sea Bycatch

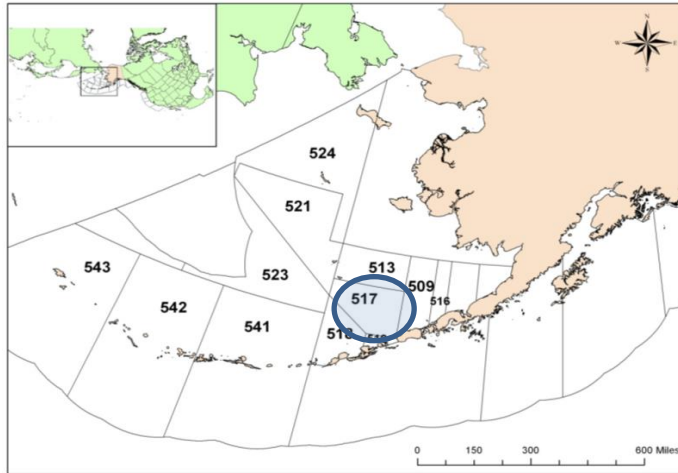


Area 509

Reporting area	Time period	Number of samples
509	Early	738
509	Middle	428

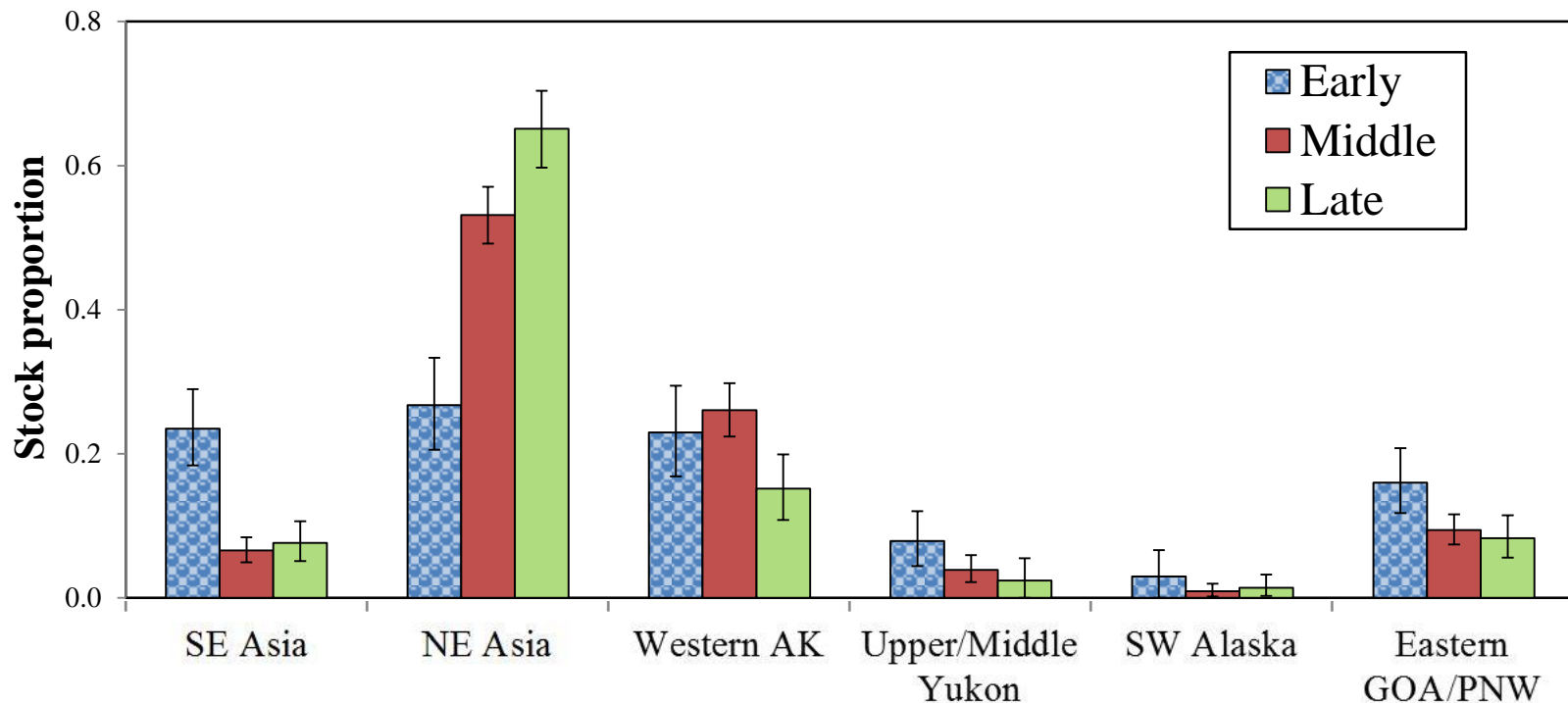


2013 Chum Salmon Bering Sea Bycatch

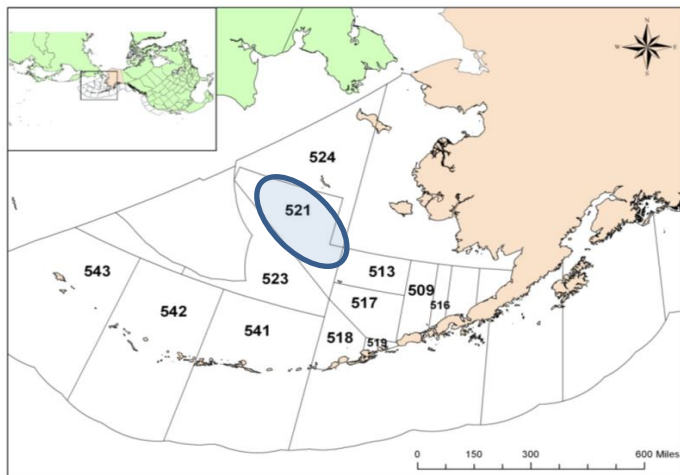


Area 517

Reporting area	Time period	Number of samples
517	Early	304
517	Middle	1,004
517	Late	473

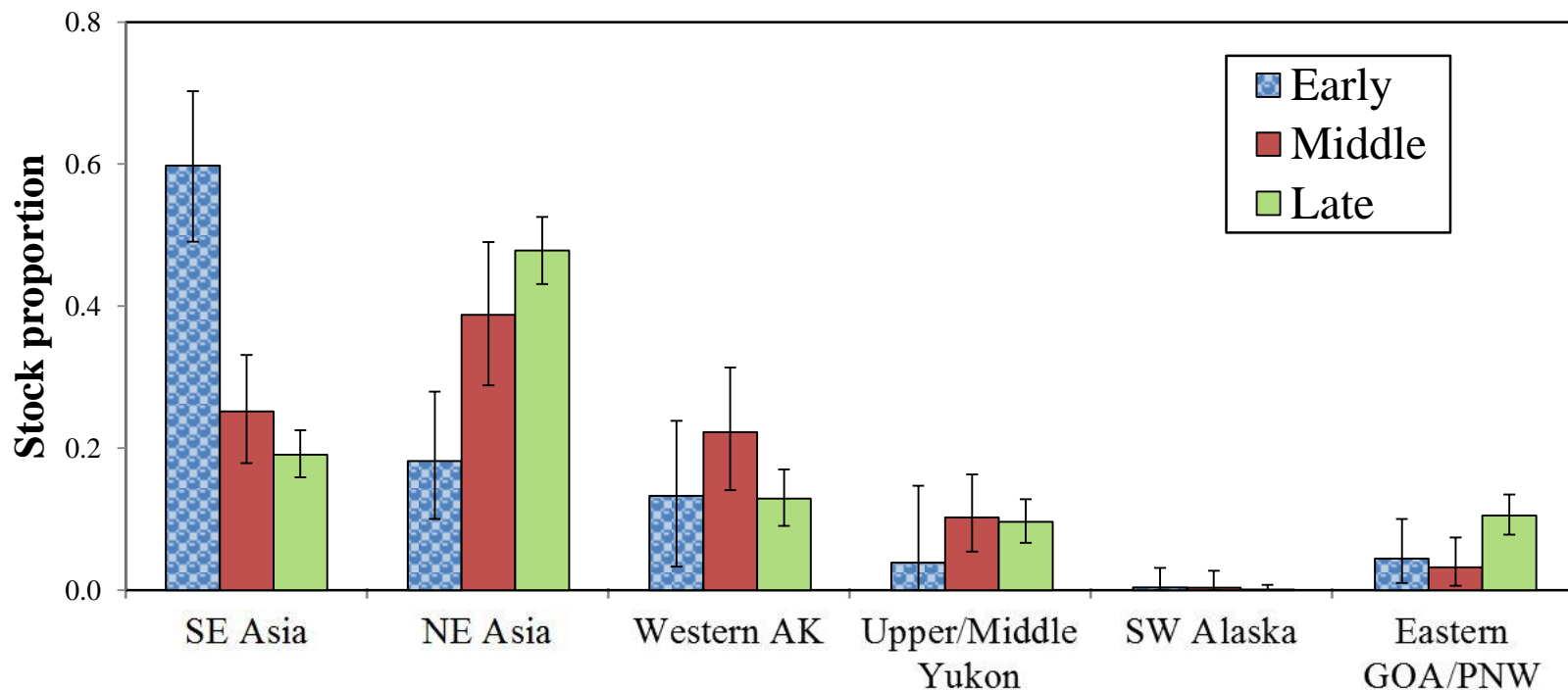


2013 Chum Salmon Bering Sea Bycatch



Area 521

Reporting area	Time period	Number of samples
521	Early	85
521	Middle	144
521	Late	627



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