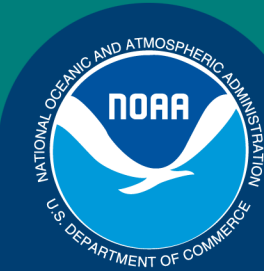


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Genetic Stock Composition Analysis of the Chinook Salmon Bycatch from the 2018 Bering Sea Trawl Fisheries

C. M. Guthrie III, Hv. T. Nguyen, M. Marsh, J. T. Watson

And J. R. Guyon

Genetics Program

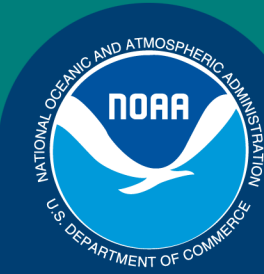
Auke Bay Laboratories

Juneau, AK

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April 2021

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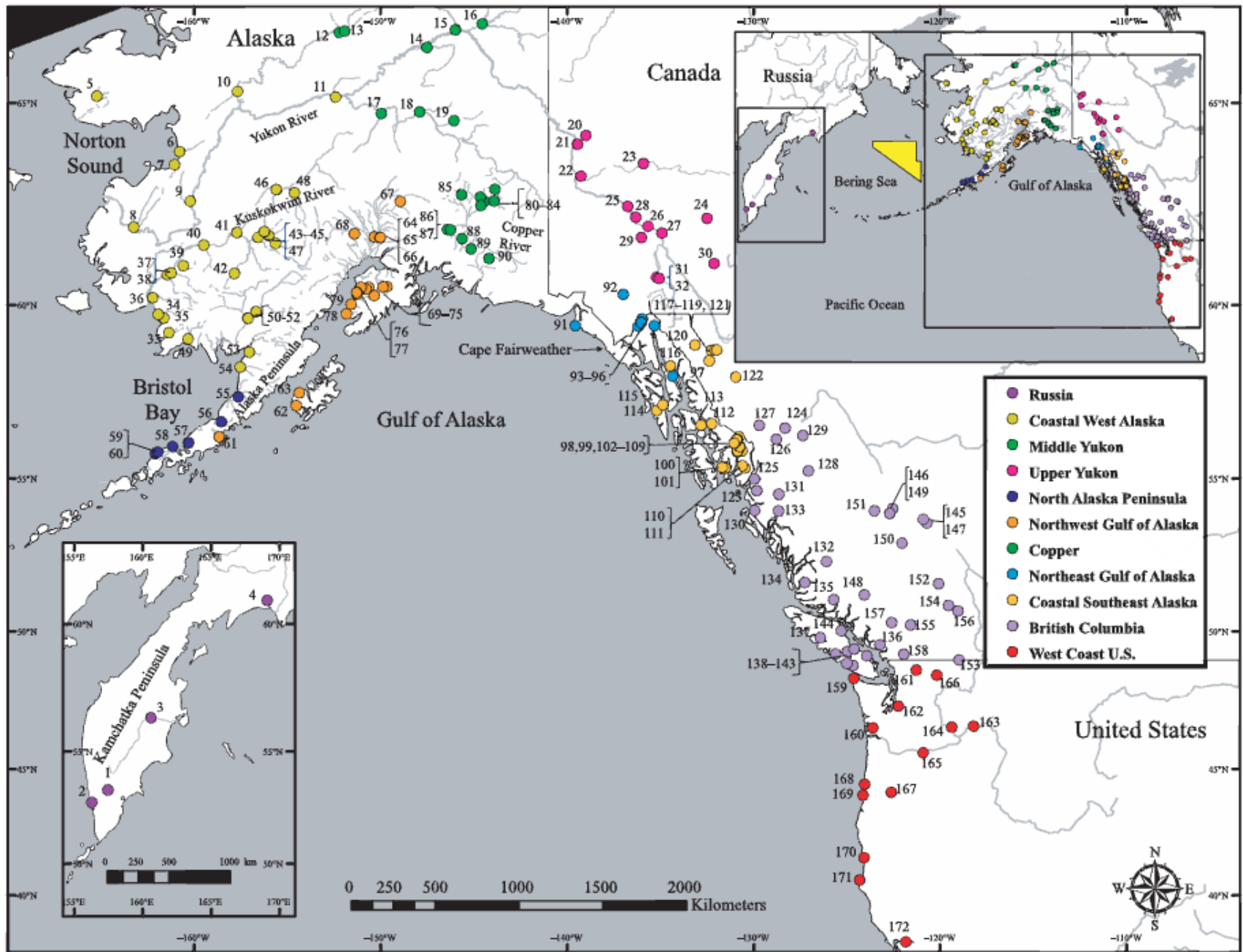


Genetic Stock Composition Analysis of the Chinook Salmon Bycatch from the 2019 Bering Sea Pollock Trawl Fisheries

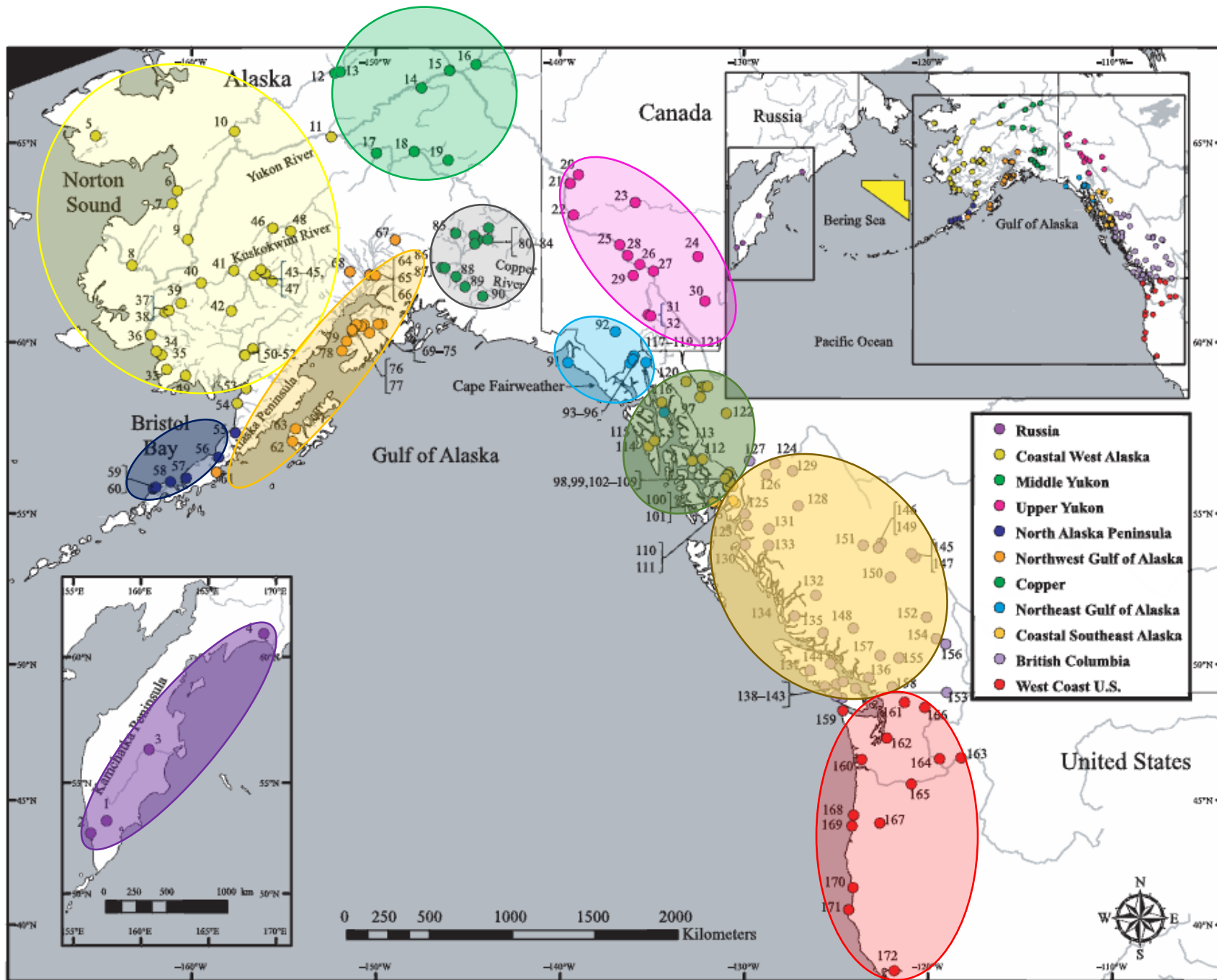
**C. M. Guthrie III, Hv. T. Nguyen, K. Karpan, J. T. Watson
and W. A. Larson**
Genetics Program
Auke Bay Laboratories
Juneau, AK

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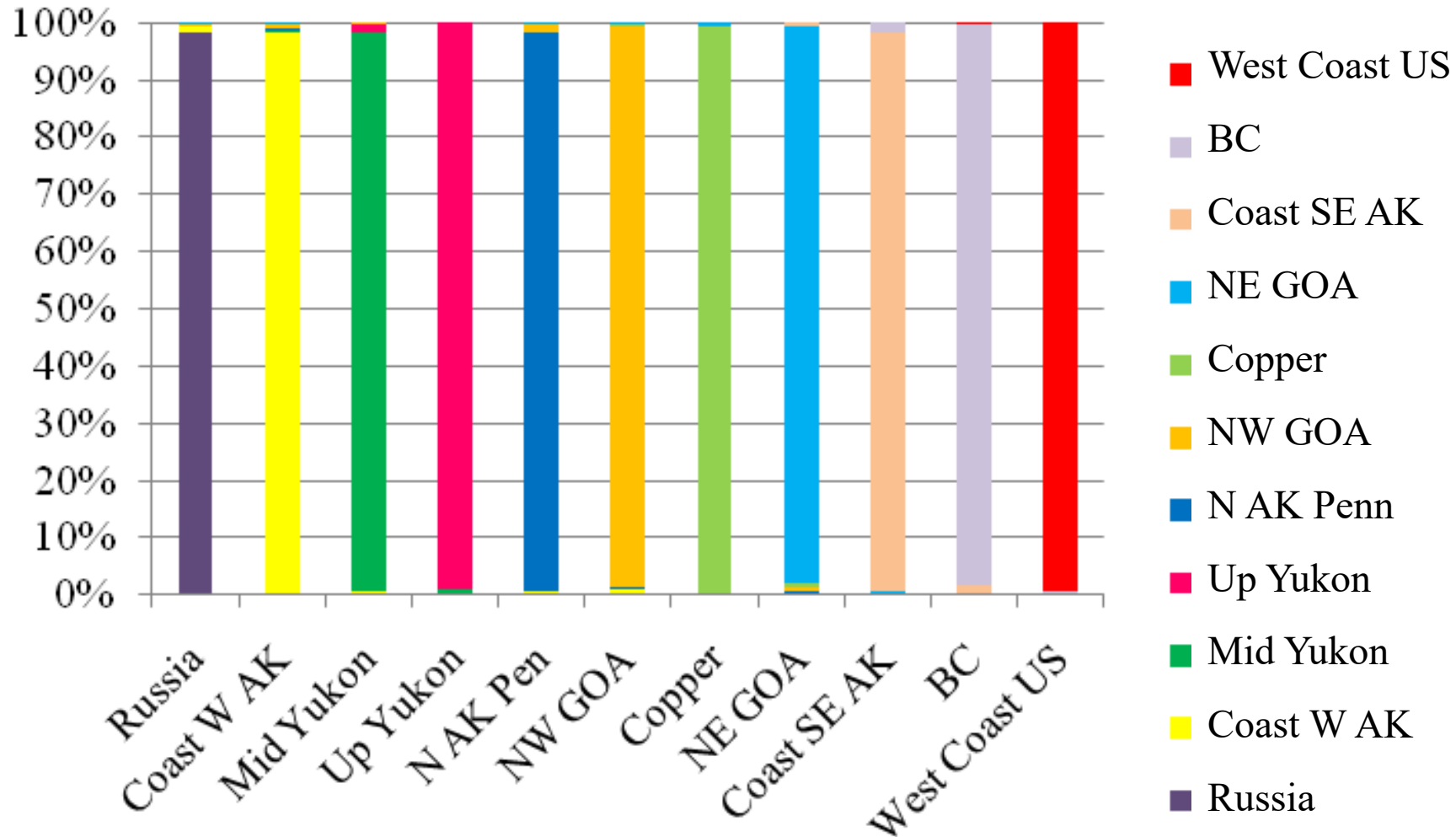


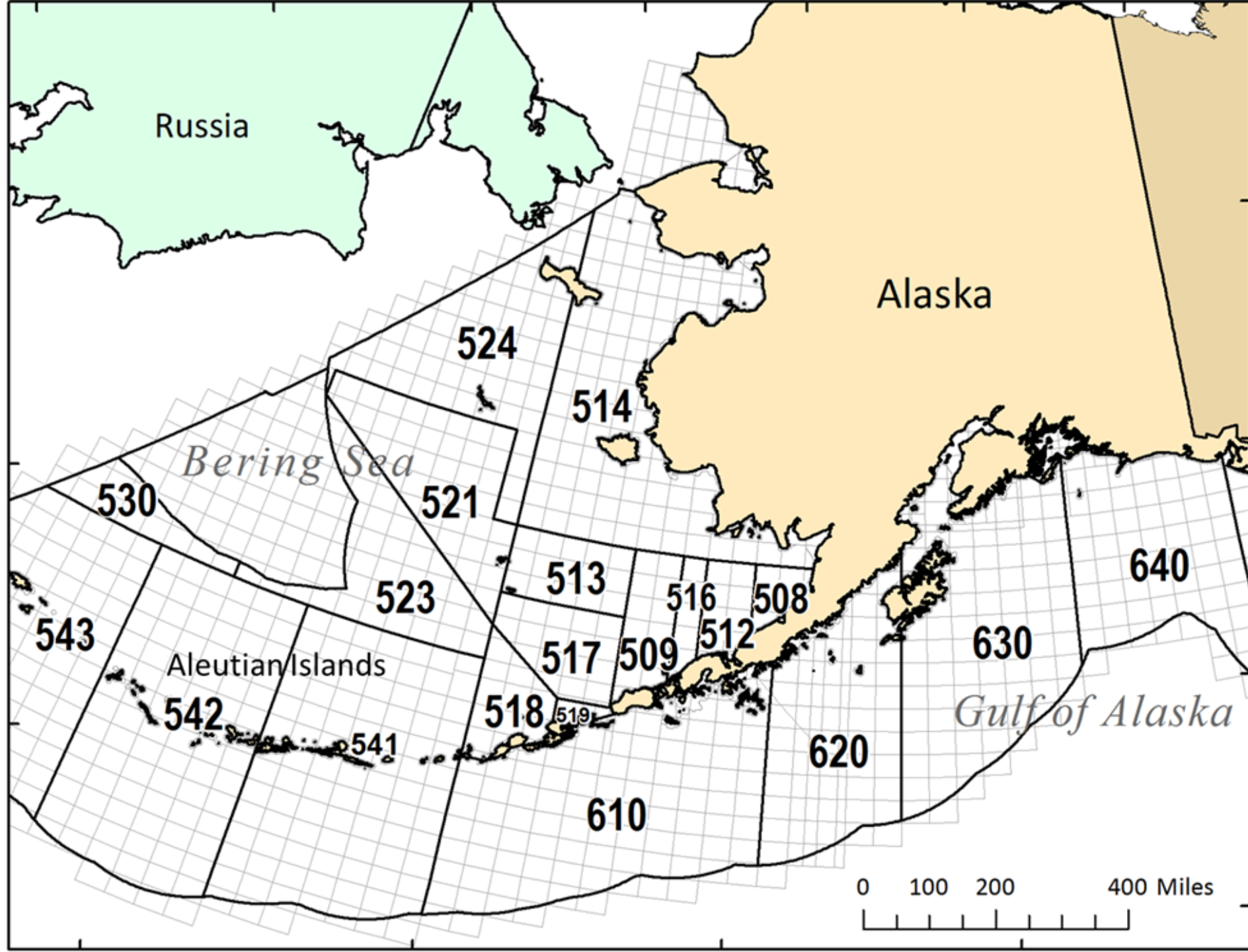
Templin et al., 2011



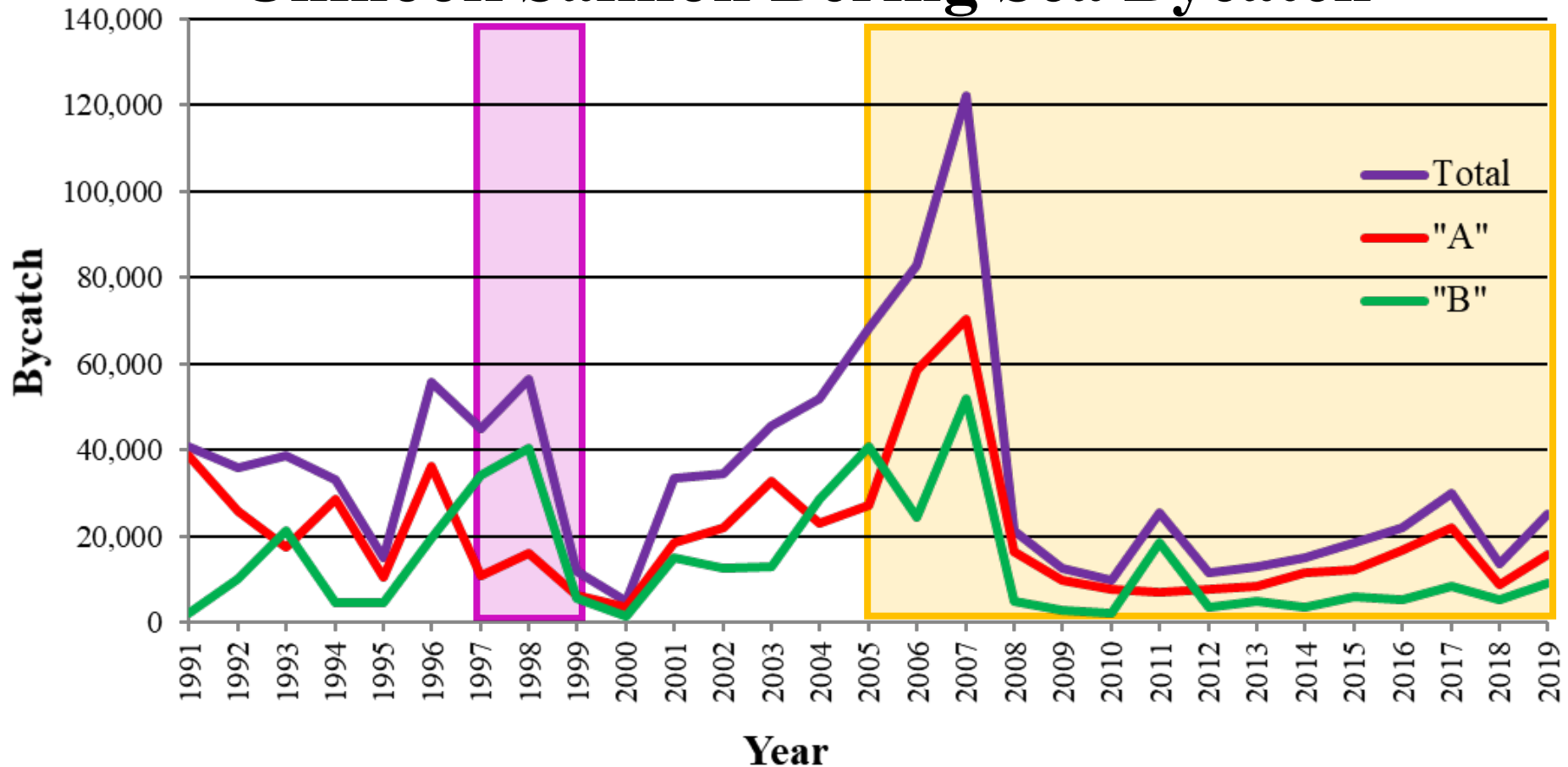
Baseline Analysis – 100% Simulations

43 SNPs





Chinook Salmon Bering Sea Bycatch



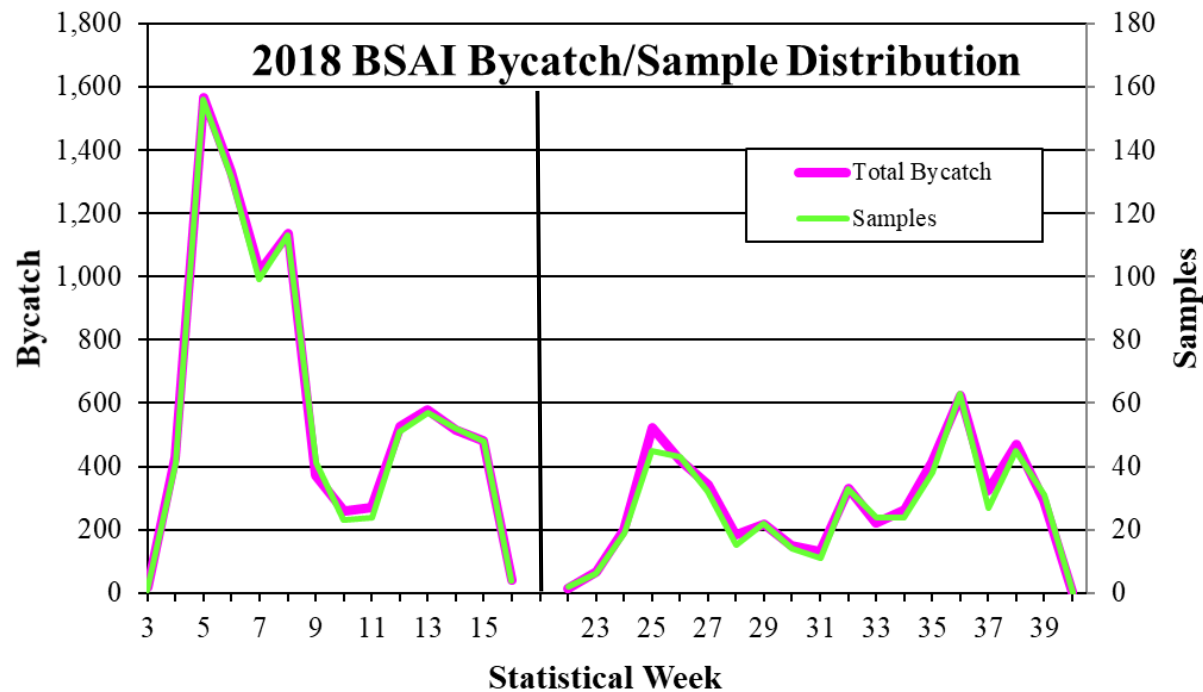
1979-1982: Scales (Myers & Rogers, 1988)

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

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

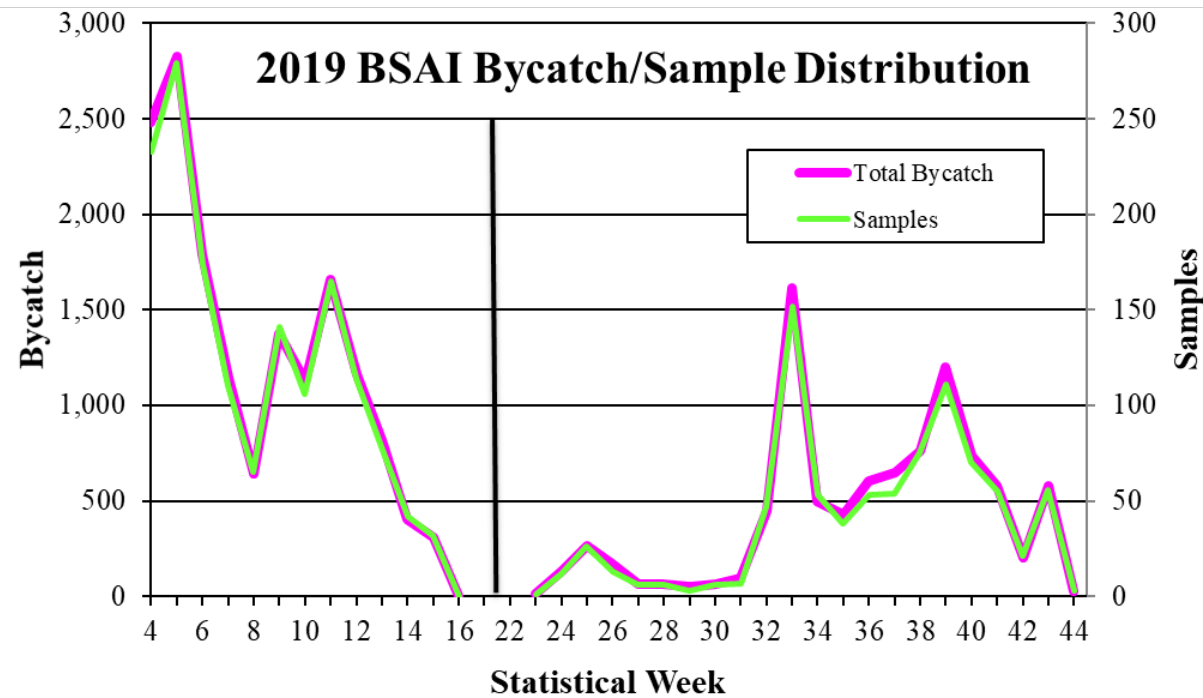
2007-19: SNPs – 867 (2007 "B"), 863 (2008), 386 (2009), 826 (2010), 2,473 (2011), 1,111 (2012), 1,246 (2013), 1,385 (2014), 1,757 (2015), 1,910 (2016), 2,948 (2017), 1,297 (2018), 2,310 (2019) samples.

A (827 samples)



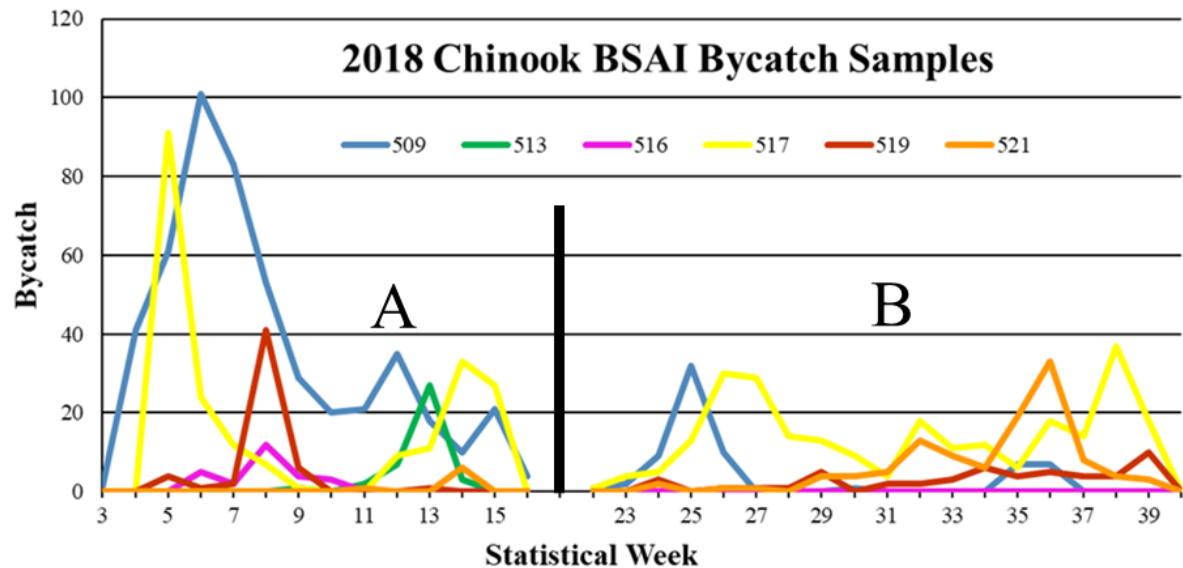
B (470 samples)

A (1,499 samples)

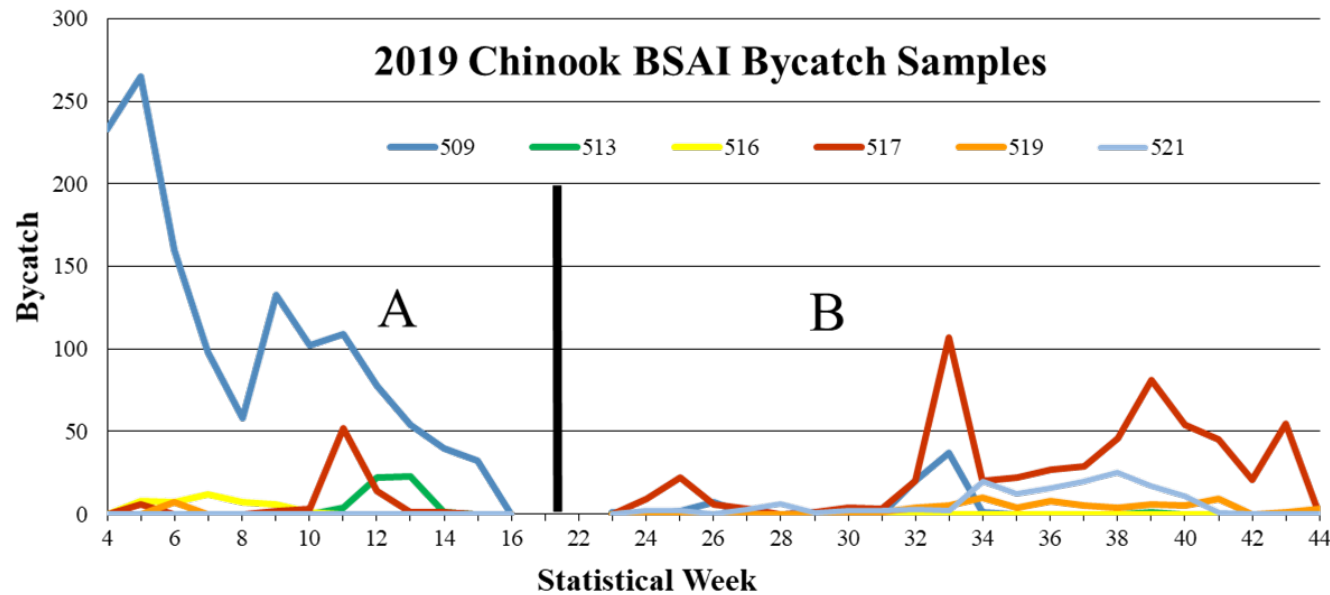


B (811 samples)

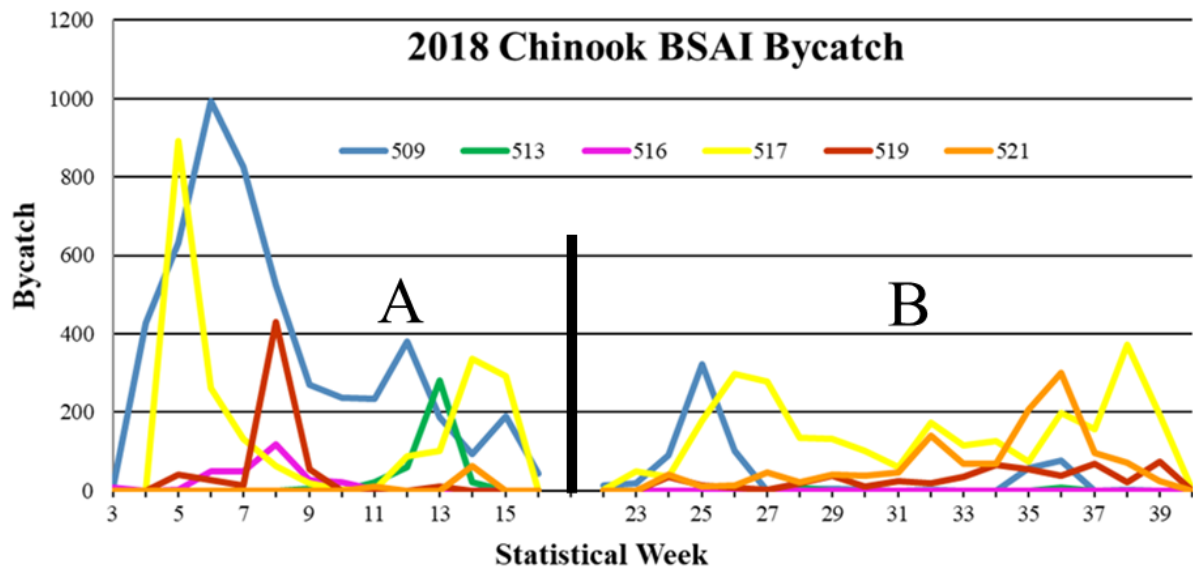
2018 Chinook BSAI Bycatch Samples



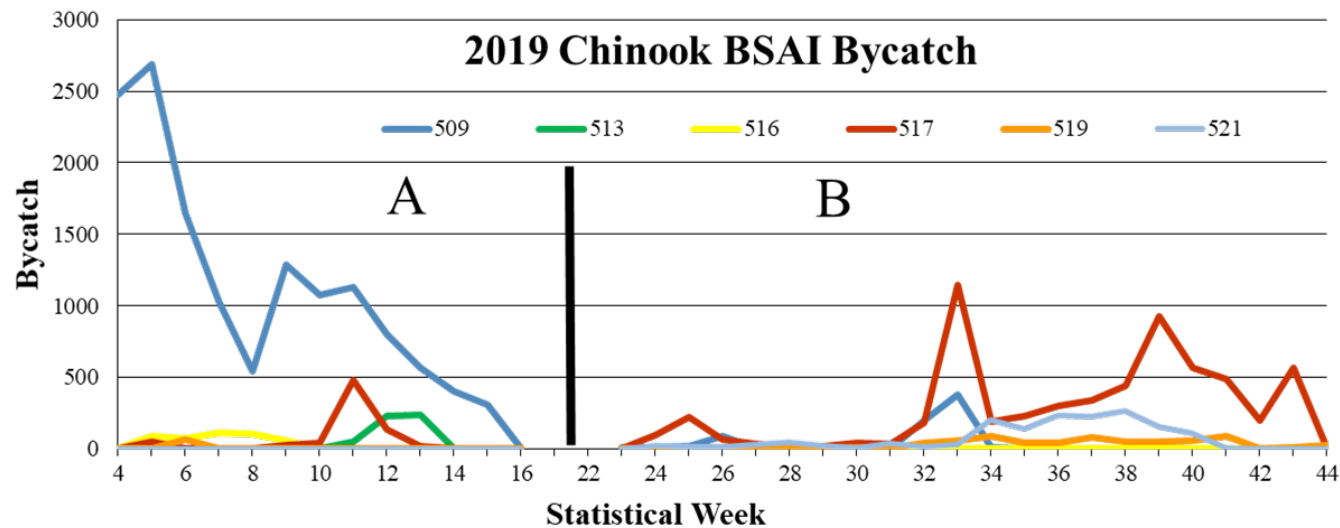
2019 Chinook BSAI Bycatch Samples



2018 Chinook BSAI Bycatch



2019 Chinook BSAI Bycatch



2018

Region	"A" Season (N=827)				"B" Season (N=470)				Bering Sea all (N=1,297)			
	Est. #	Mean	SD	95% CI	Est. #	Mean	SD	95% CI	Est. #	Mean	SD	95% CI
Russia	0	0.0	0.03	(0.0,0.1)	41	0.8	0.46	(0.1,1.9)	43	0.3	0.19	(0.0,0.8)
Coast W AK	2,974	34.8	2.01	(31.0,38.8)	1,613	31.1	2.50	(26.2,36.0)	4,635	33.8	1.64	(30.6,37.0)
Mid Yukon	36	0.4	0.51	(0.0,1.7)	65	1.3	1.14	(0.0,3.8)	62	0.5	0.51	(0.0,1.6)
Up Yukon	69	0.8	0.38	(0.2,1.7)	55	1.1	0.79	(0.0,2.8)	122	0.9	0.31	(0.4,1.6)
N AK Pen	2,187	25.6	1.86	(22.1,29.3)	153	2.9	1.05	(1.2,5.2)	2,395	17.5	1.29	(15.0,20.0)
NW GOA	126	1.5	0.84	(0.1,3.3)	209	4.0	1.34	(1.8,7.0)	312	2.3	0.69	(1.1,3.8)
Copper	2	0.0	0.06	(0.0,0.2)	26	0.5	0.37	(0.0,1.4)	33	0.2	0.16	(0.0,0.6)
NE GOA	6	0.1	0.20	(0.0,0.6)	2	0.0	0.20	(0.0,0.5)	4	0.0	0.09	(0.0,0.3)
Coast SE AK	279	3.3	0.79	(1.9,5.0)	273	5.3	1.66	(2.2,8.7)	509	3.7	0.70	(2.4,5.2)
BC	2,335	27.3	1.62	(24.2,30.6)	1,715	33.0	2.56	(28.1,38.1)	4,060	29.6	1.35	(27.0,32.3)
West Coast US	526	6.2	0.89	(4.5,8.0)	1,039	20.0	1.91	(16.4,23.9)	1,550	11.3	0.91	(9.6,13.1)
Total Catch	8,535				5,191				13,726			

62% from Alaskan river systems flowing into the Bering Sea for "A" Season

36% from Alaskan river systems flowing into the Bering Sea for "B" Season

53% from Alaskan river systems flowing into the Bering Sea for entire year

2019

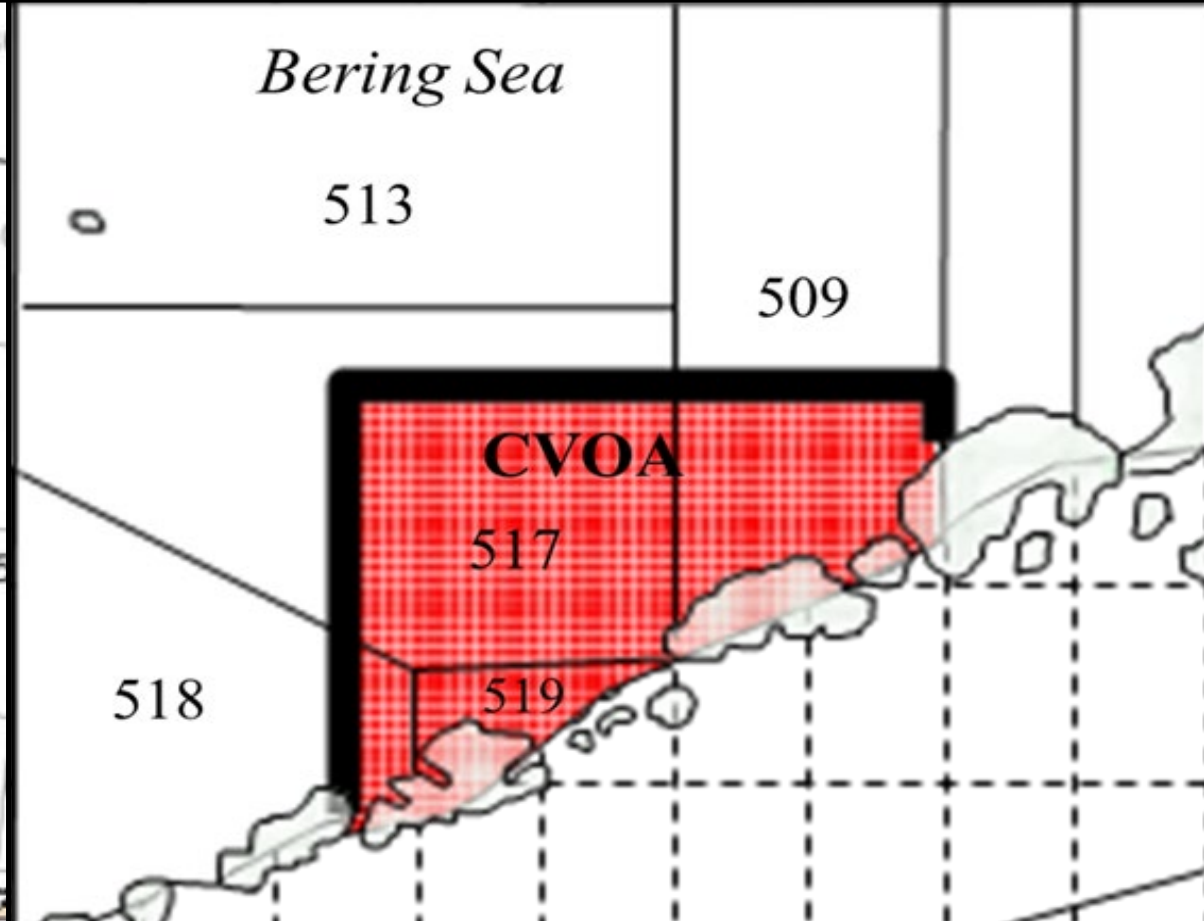
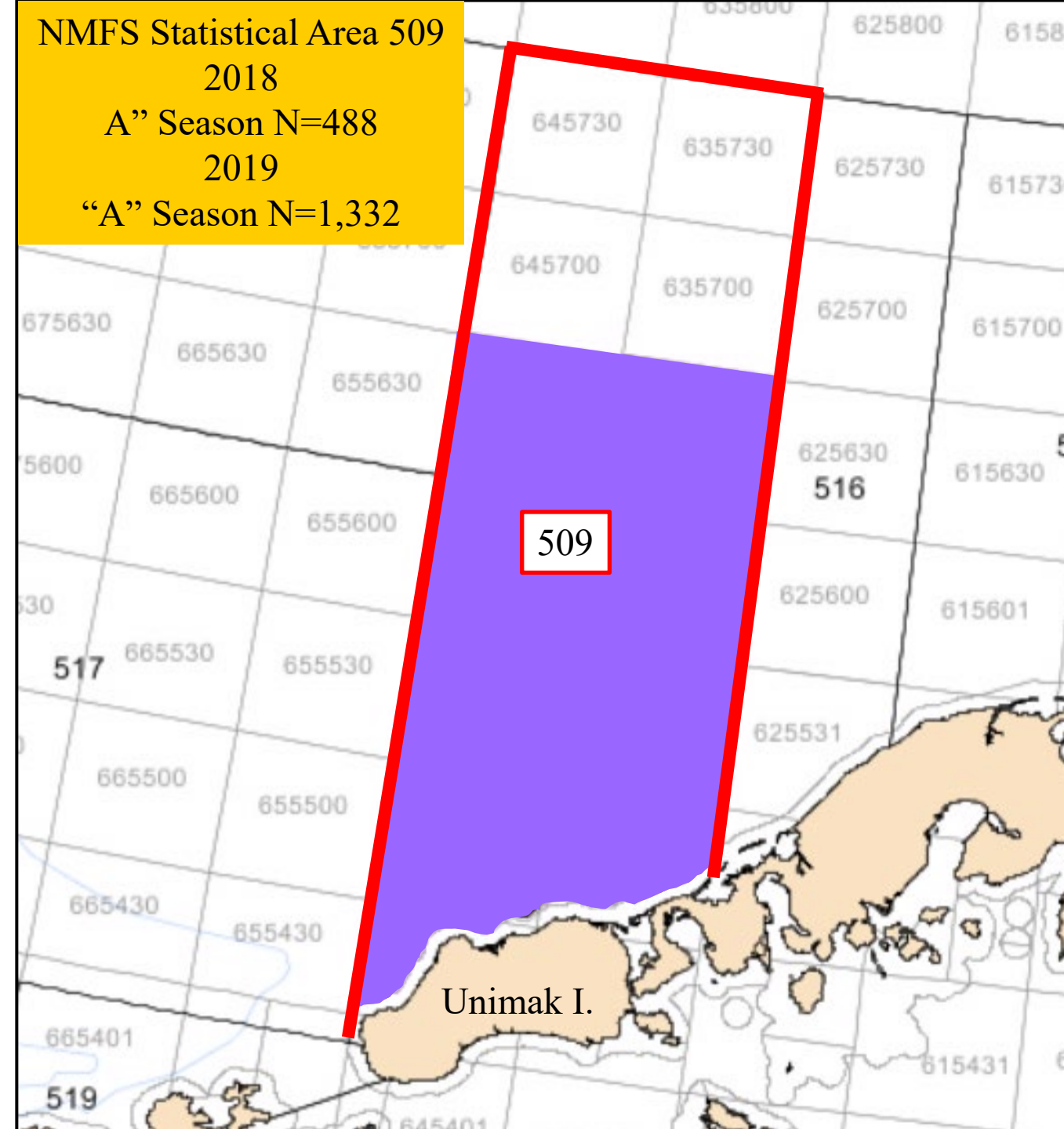
Region	"A" Season (N=1499)				"B" Season (N=811)				Bering Sea all (N=2,310)			
	Est. #	Mean	SD	95% CI	Est. #	Mean	SD	95% CI	Est. #	Mean	SD	95% CI
Russia	8	0.1	0.09	(0.0,0.3)	47	0.5	0.27	(0.1,1.1)	60	0.2	0.13	(0.1,0.6)
Coast W AK	7,055	44.8	1.67	(41.5,48.1)	2,812	30.4	1.88	(26.8,34.1)	9,901	39.6	1.32	(37.0,42.2)
Mid Yukon	6	0.0	0.11	(0.0,0.4)	126	1.4	0.57	(0.5,2.6)	122	0.5	0.21	(0.2,1.0)
Up Yukon	39	0.3	0.20	(0.0,0.7)	55	0.6	0.35	(0.0,1.4)	105	0.4	0.18	(0.1,0.8)
N AK Pen	3,420	21.7	1.50	(18.8,24.7)	32	0.4	0.48	(0.0,1.6)	3,635	14.6	1.12	(12.4,16.8)
NW GOA	36	0.2	0.37	(0.0,1.3)	1,036	11.2	1.43	(8.5,14.1)	964	3.9	0.73	(2.5,5.4)
Copper	3	0.0	0.07	(0.0,0.2)	17	0.2	0.25	(0.0,0.9)	10	0.0	0.09	(0.0,0.3)
NE GOA	2	0.0	0.05	(0.0,0.1)	6	0.1	0.21	(0.0,0.7)	5	0.0	0.07	(0.0,0.2)
Coast SE AK	318	2.0	0.55	(1.0,3.2)	264	2.9	0.75	(1.5,4.4)	550	2.2	0.43	(1.4,3.1)
BC	3,827	24.3	1.18	(22.0,26.7)	2,392	25.9	1.60	(22.8,29.1)	6,236	25.0	0.96	(23.1,26.9)
West Coast US	1,025	6.5	0.67	(5.3,7.9)	2,461	26.6	1.59	(23.5,29.8)	3,395	13.6	0.74	(12.2,15.1)
Total Catch	15,738				9,246				24,984			

67% from Alaskan river systems flowing into the Bering Sea for "A" Season

33% from Alaskan river systems flowing into the Bering Sea for "B" Season

55% from Alaskan river systems flowing into the Bering Sea for entire year

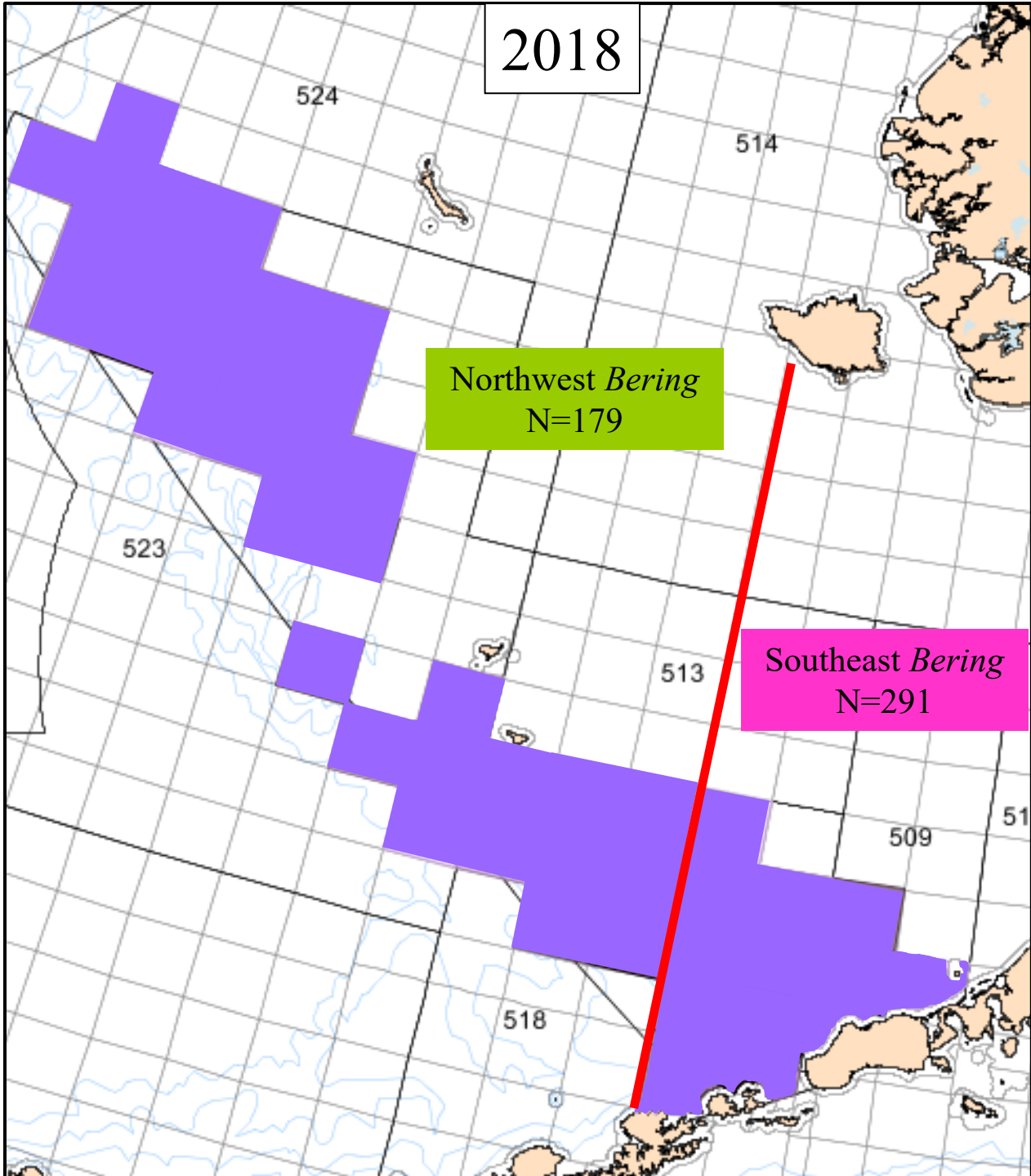
NMFS Statistical Area 509
2018
A" Season N=488
2019
"A" Season N=1,332



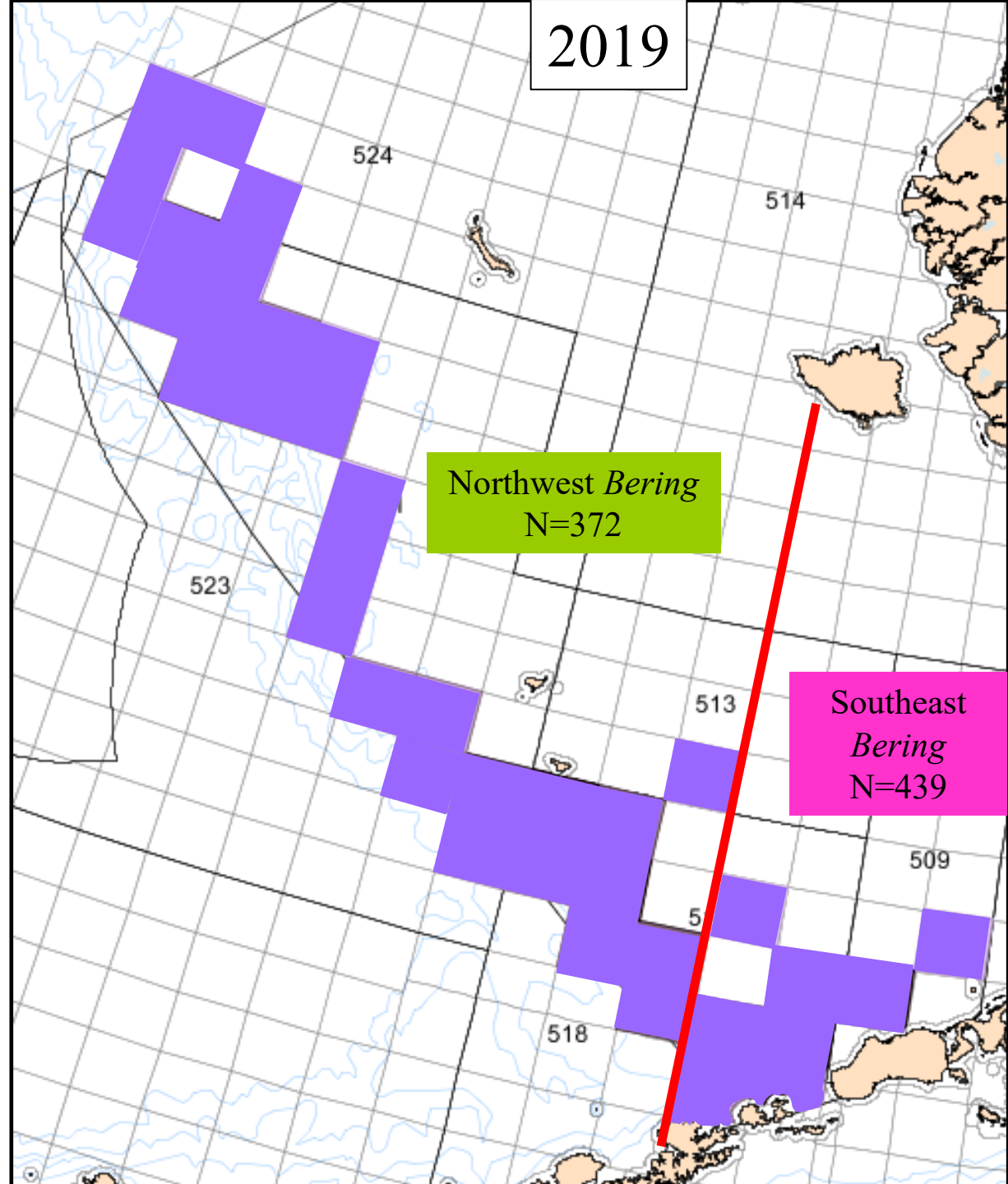
2018
CVOA N=915
"A" N=595
"B" N=320
2019
CVOA N=1,629
"A" N=1,159
"B" N=470



2018

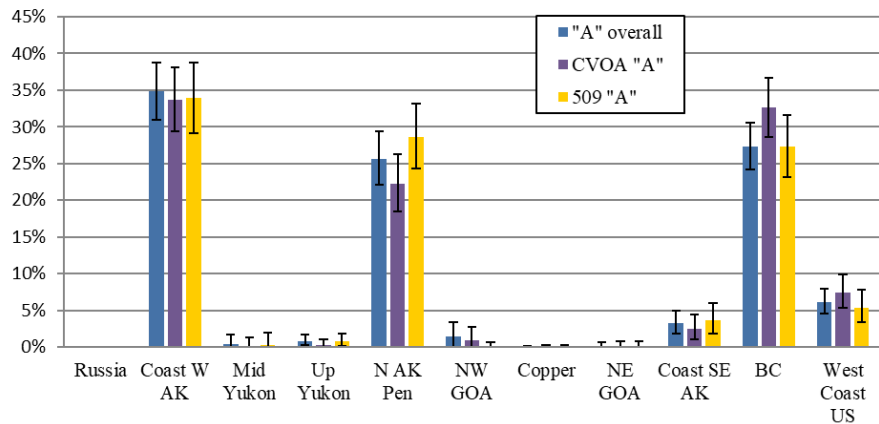


2019

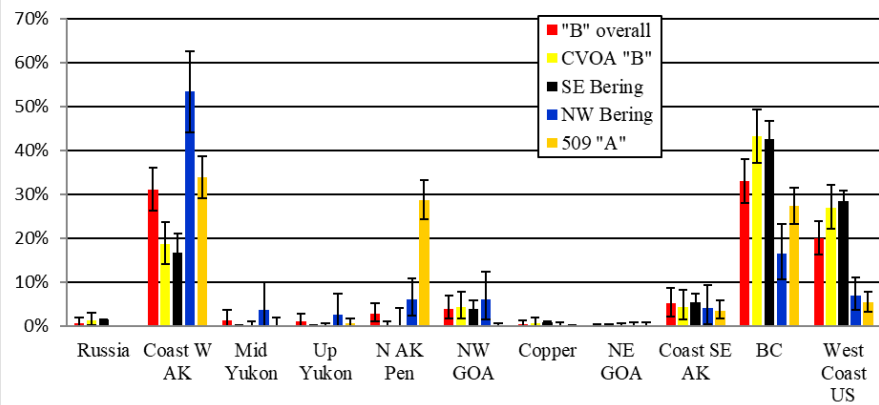


2018

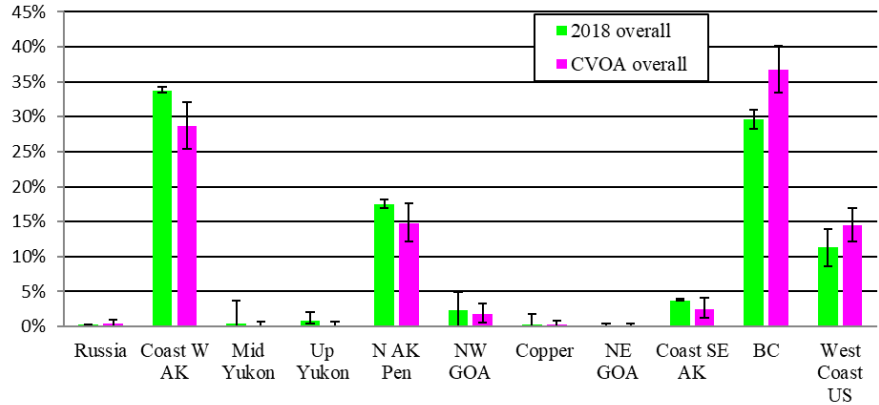
Bering Sea "A"



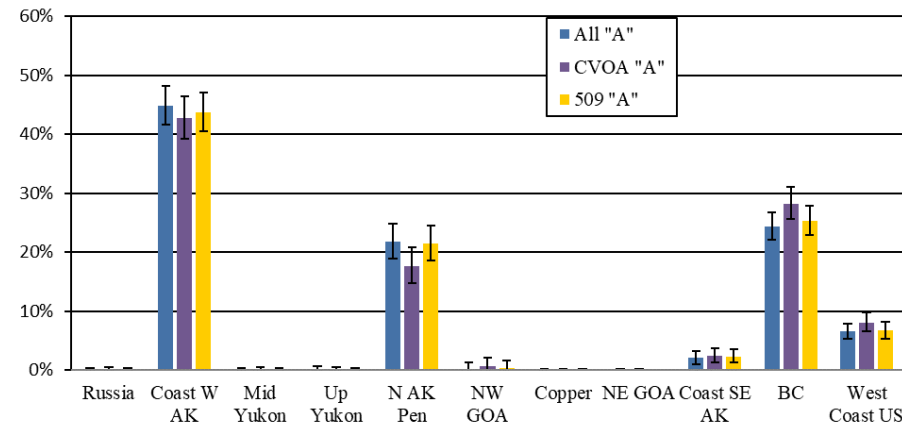
Bering Sea "B"



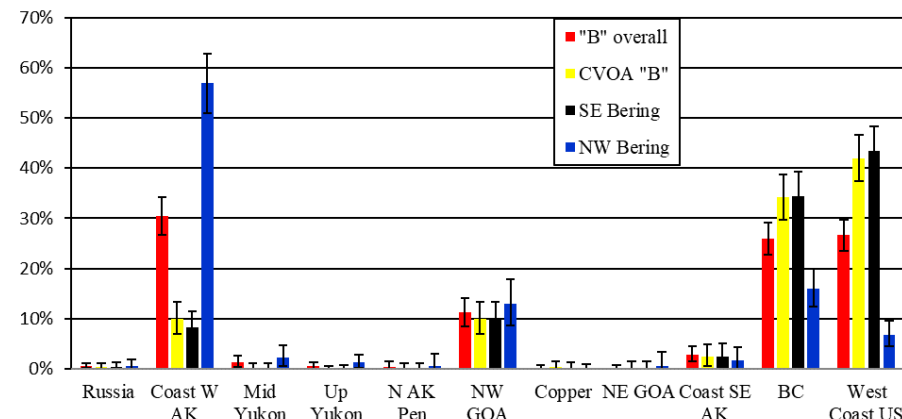
Bering Sea



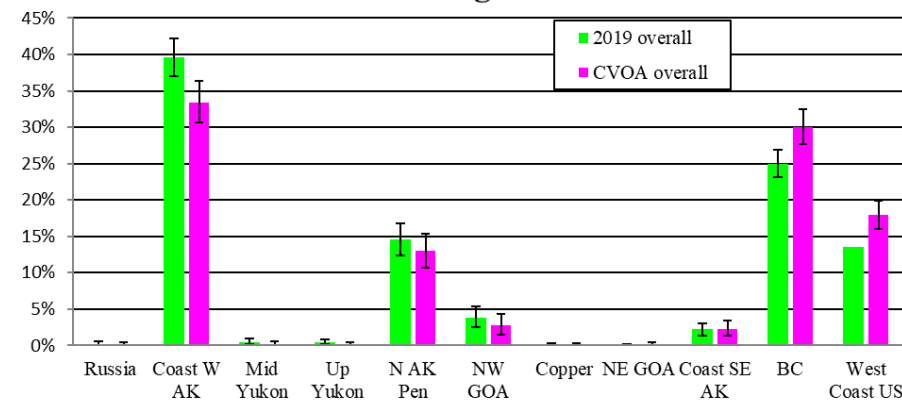
Bering Sea "A"



Bering Sea "B"

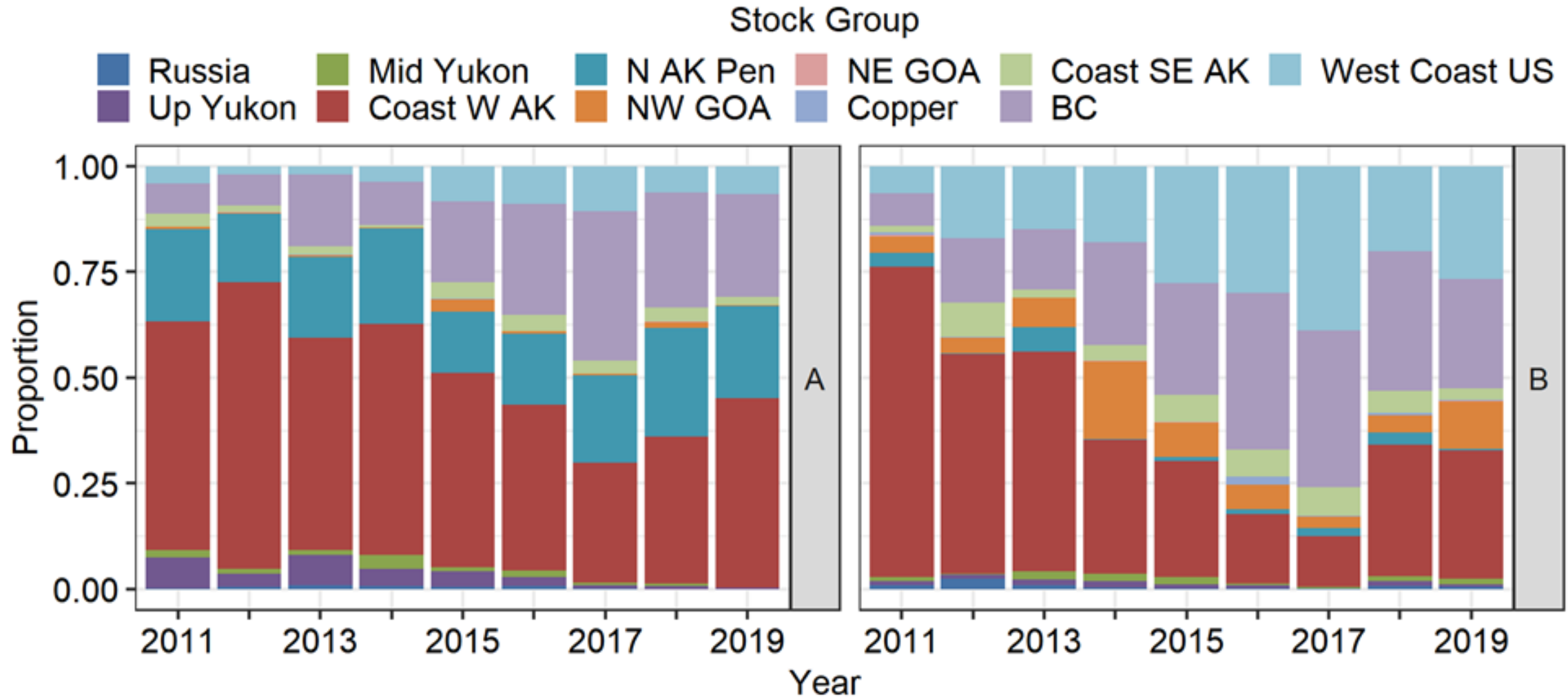


Bering Sea



2019

Chinook Salmon Bering Sea Bycatch Seasonal Stock Differences



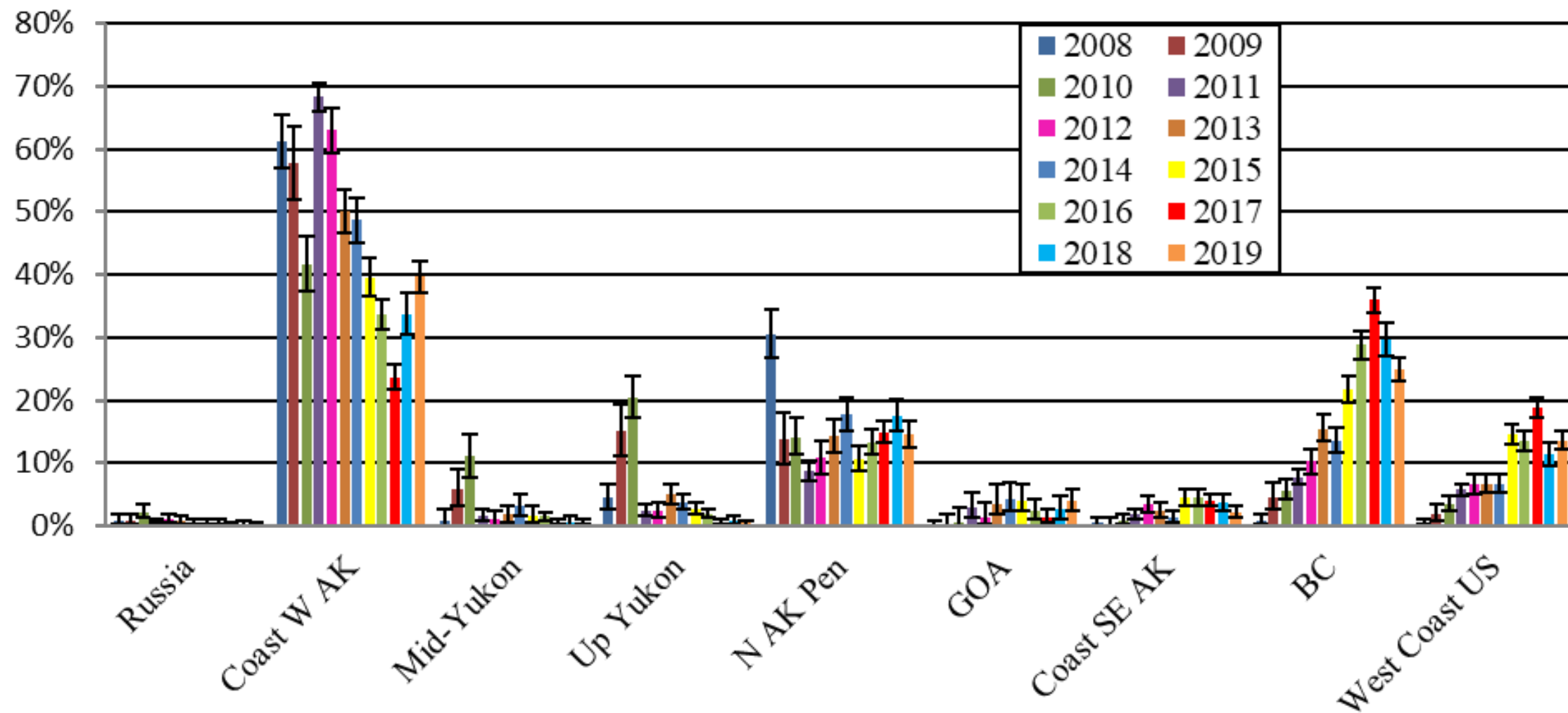
2018 A Season: 827 samples

2019 A Season: 1,499 samples

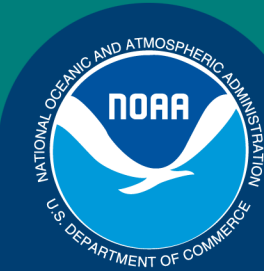
2018 B Season: 470 samples

2019 B Season: 811 samples

BSAI Chinook Bycatch by Year



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NMFS-AFSC-405

<https://repository.library.noaa.gov/view/noaa/24937>

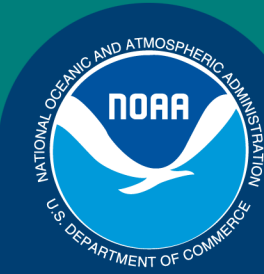
Genetic Stock Composition Analysis to the Chinook Salmon Bycatch Samples from the 2018 *Gulf of Alaska* Trawl Fisheries

C.M. Guthrie, III, Hv. T. Nguyen, M. Marsh, and J.R. Guyon
Genetics Program
Auke Bay Laboratories
Juneau, AK

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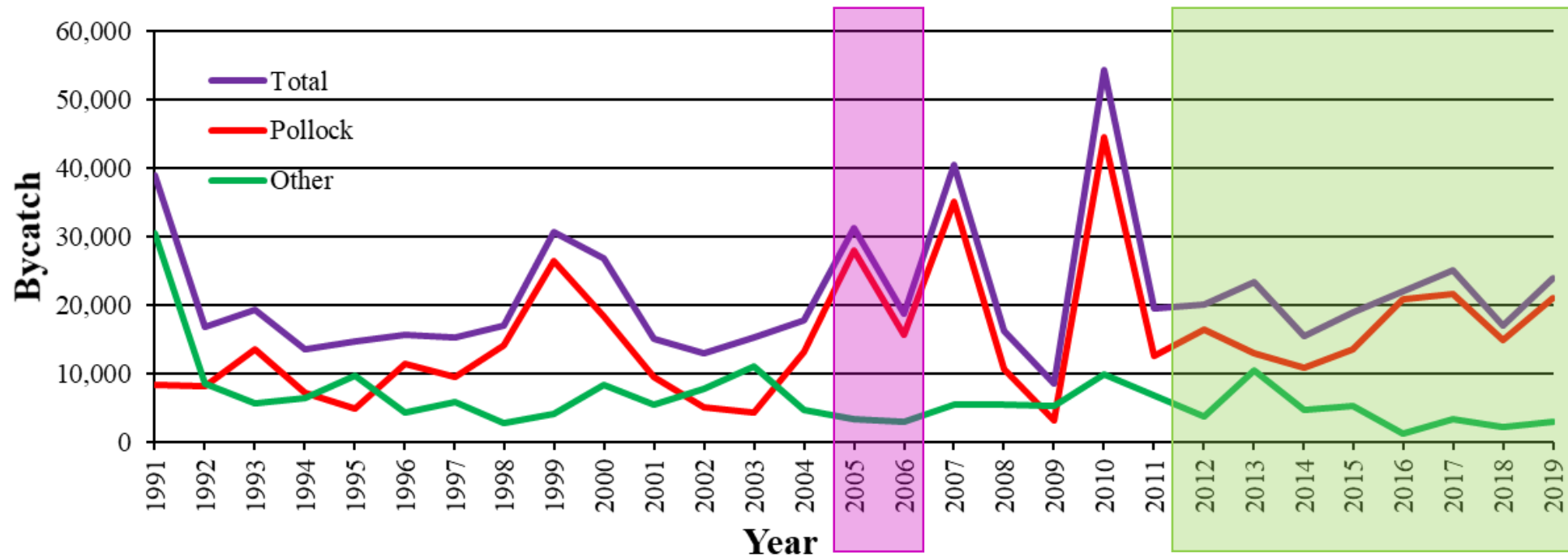
Genetic Stock Composition Analysis to the Chinook Salmon Bycatch Samples from the 2019 *Gulf of Alaska* Trawl Fisheries

C.M. Guthrie, III, Hv. T. Nguyen, K. Karpan and W. A. Larson
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Juneau, AK

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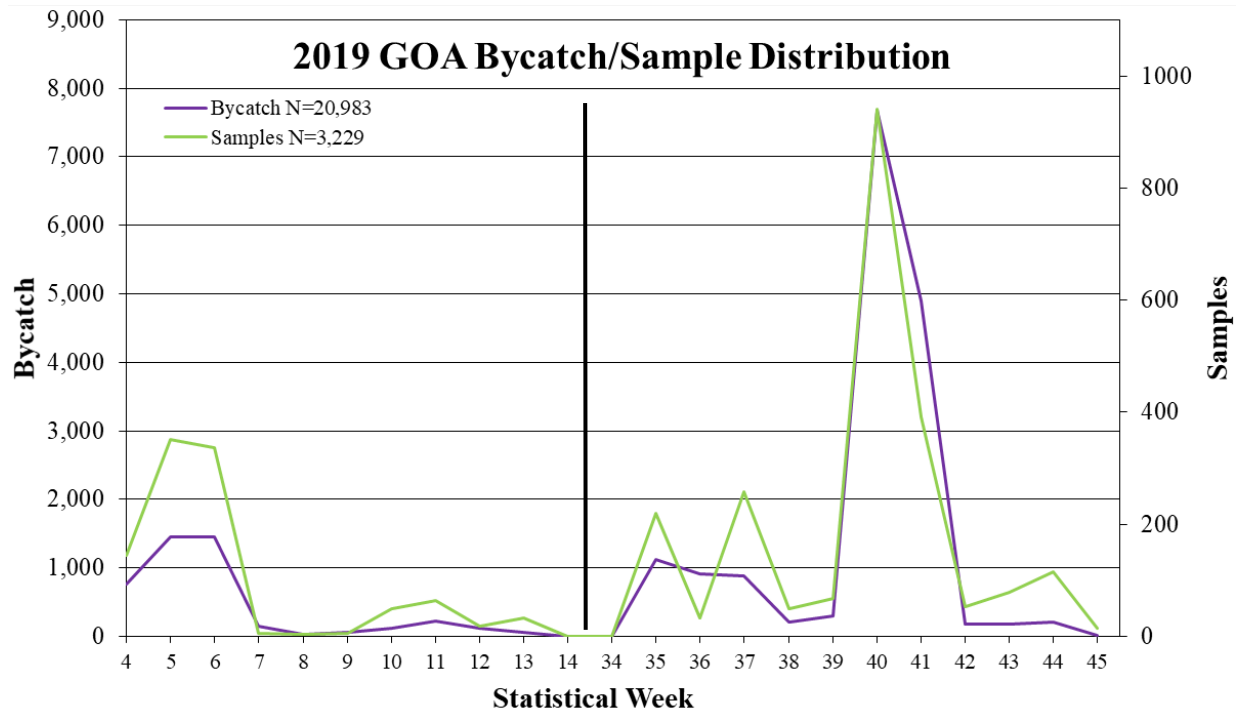
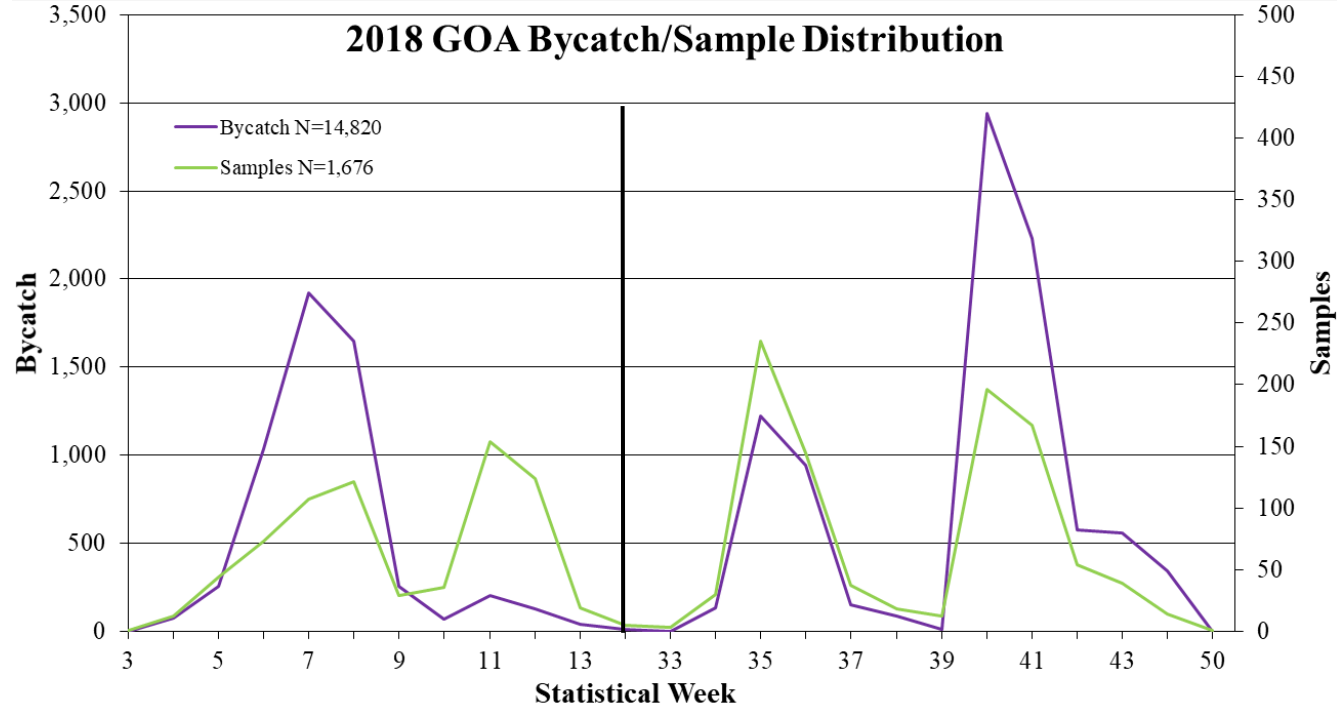
NOAA

Chinook Salmon GOA Bycatch

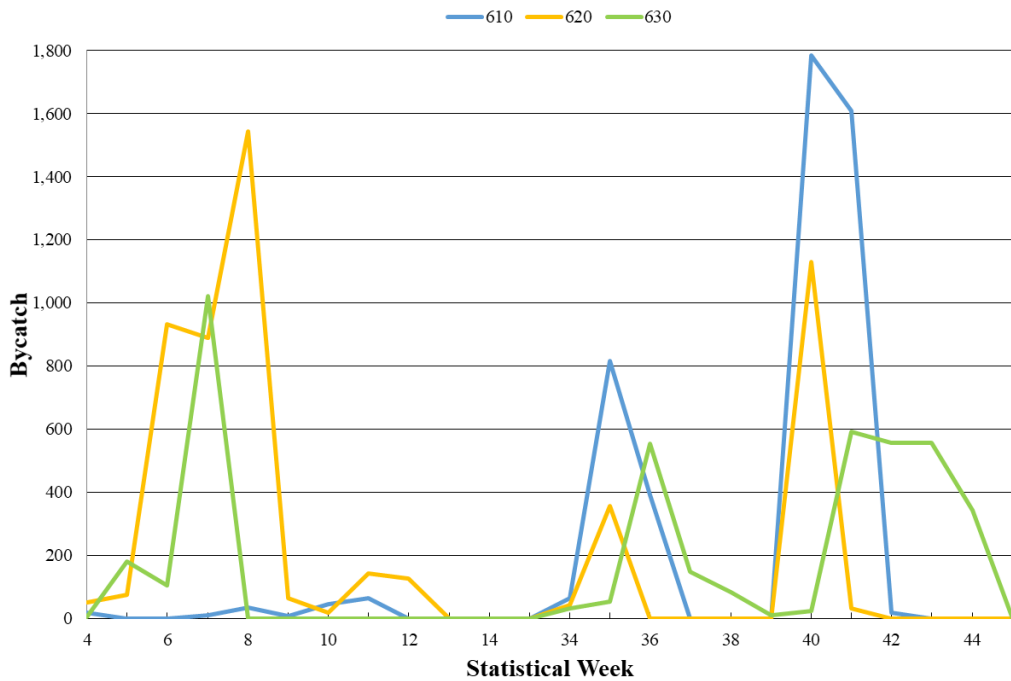


2005 – 2006: SNPs – 219 (Winter 2006), 62 (Summer 2005-6), 127 (Fall 2005-6) samples.

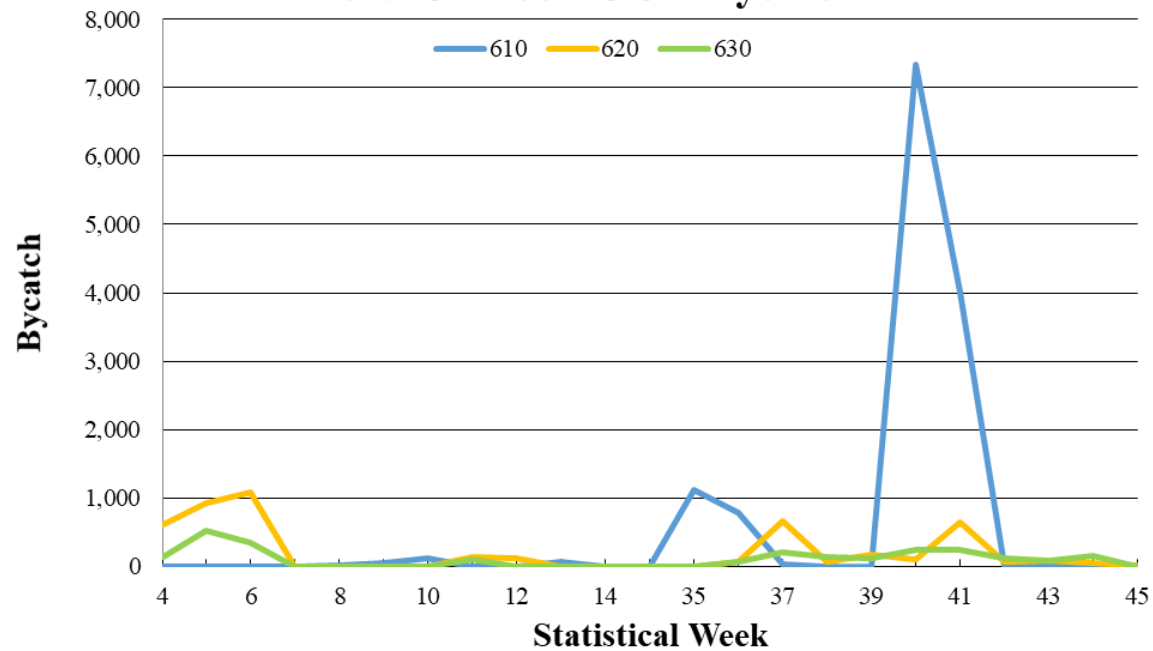
2010–19: SNPs – 161 (2010), 240 (2011), 948 (2012), 693 (2013), 1,163 (2014), 2,414 (2015), 4,962 (2016), 3,571 (2017), 2,226 (2018), 2,883 (2019) samples.



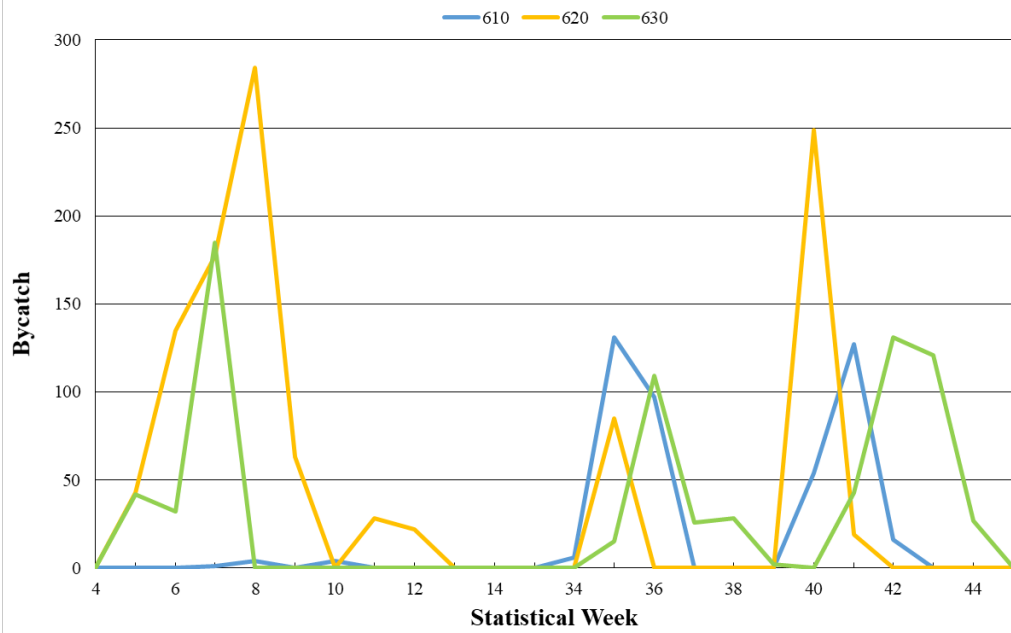
2018 Chinook GOA Bycatch



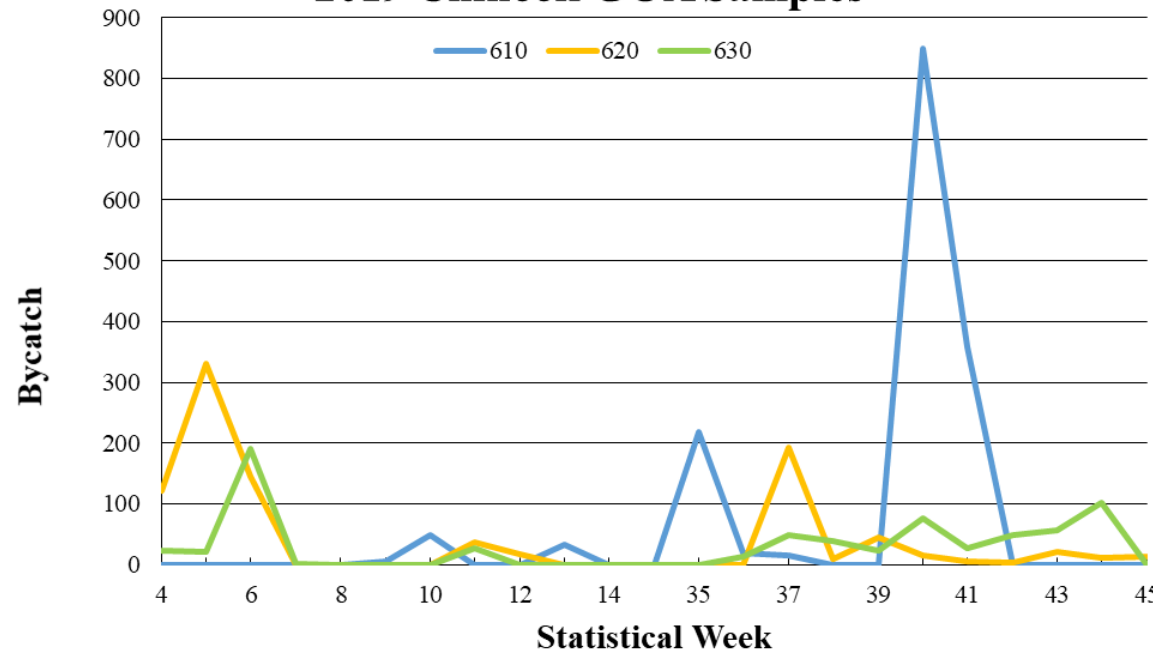
2019 Chinook GOA Bycatch



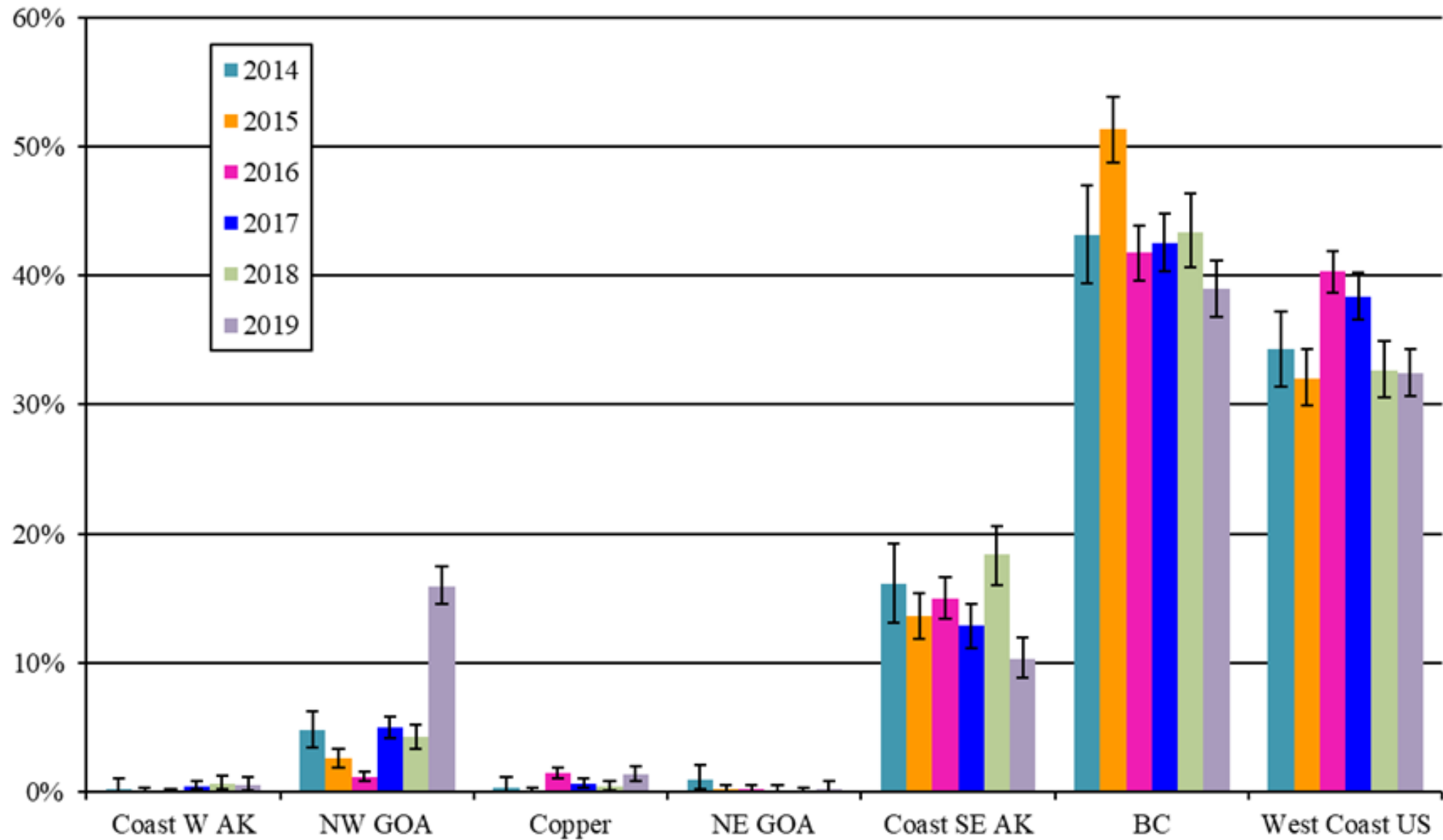
2018 Chinook GOA Samples



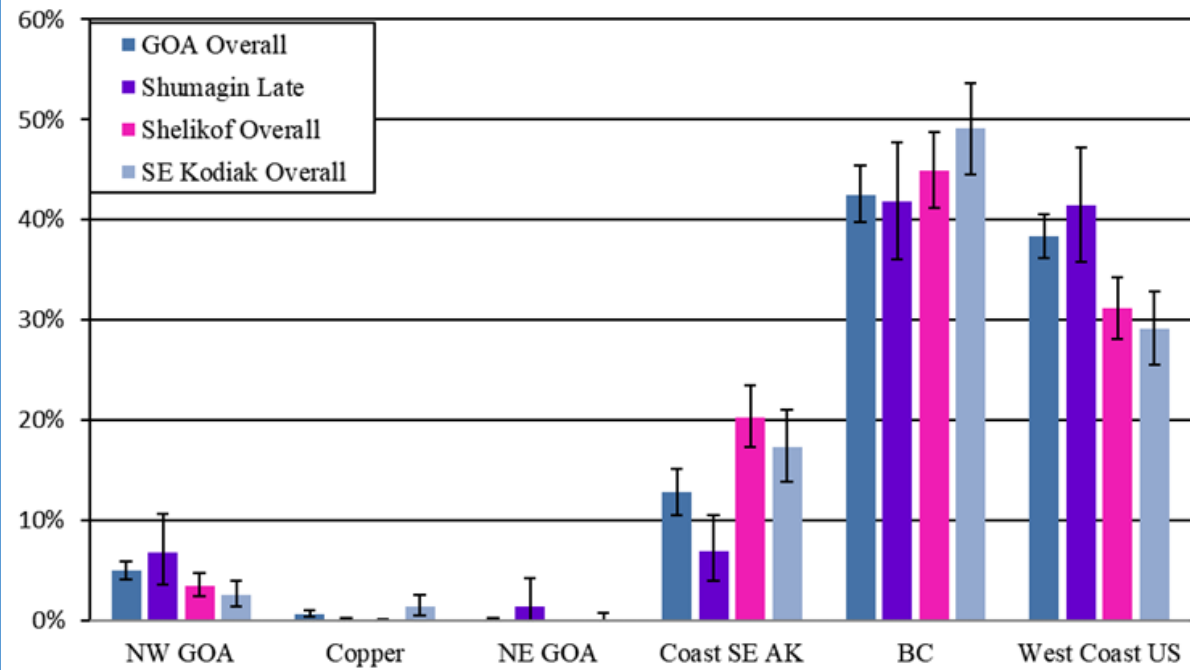
2019 Chinook GOA Samples



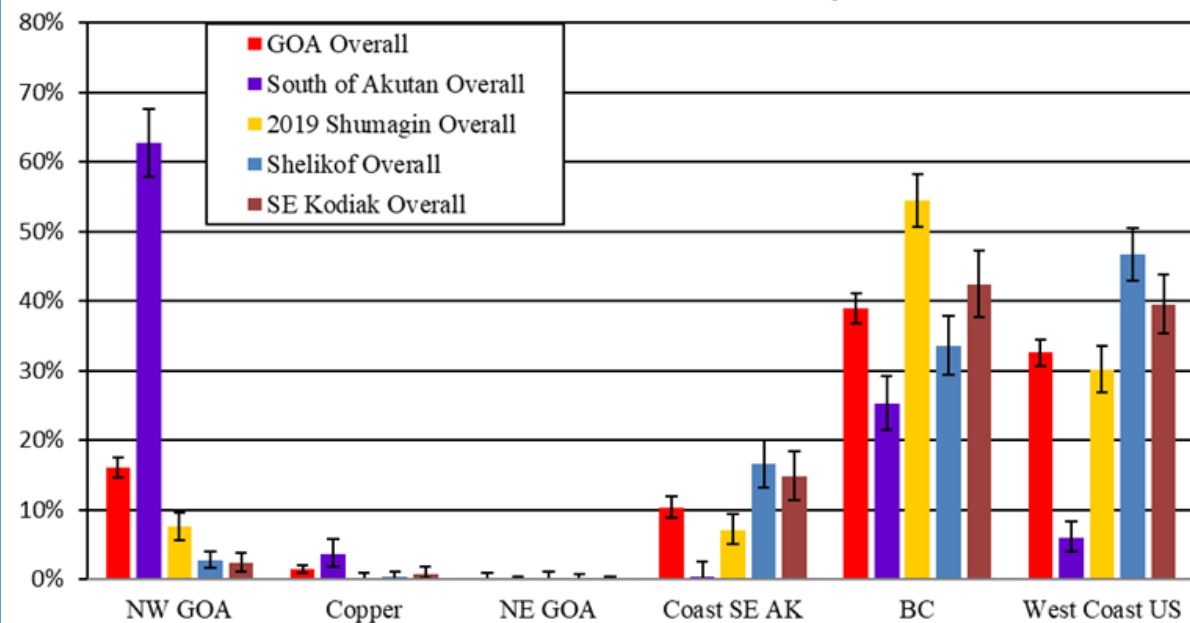
Yearly Chinook Salmon GOA Bycatch - Pollock



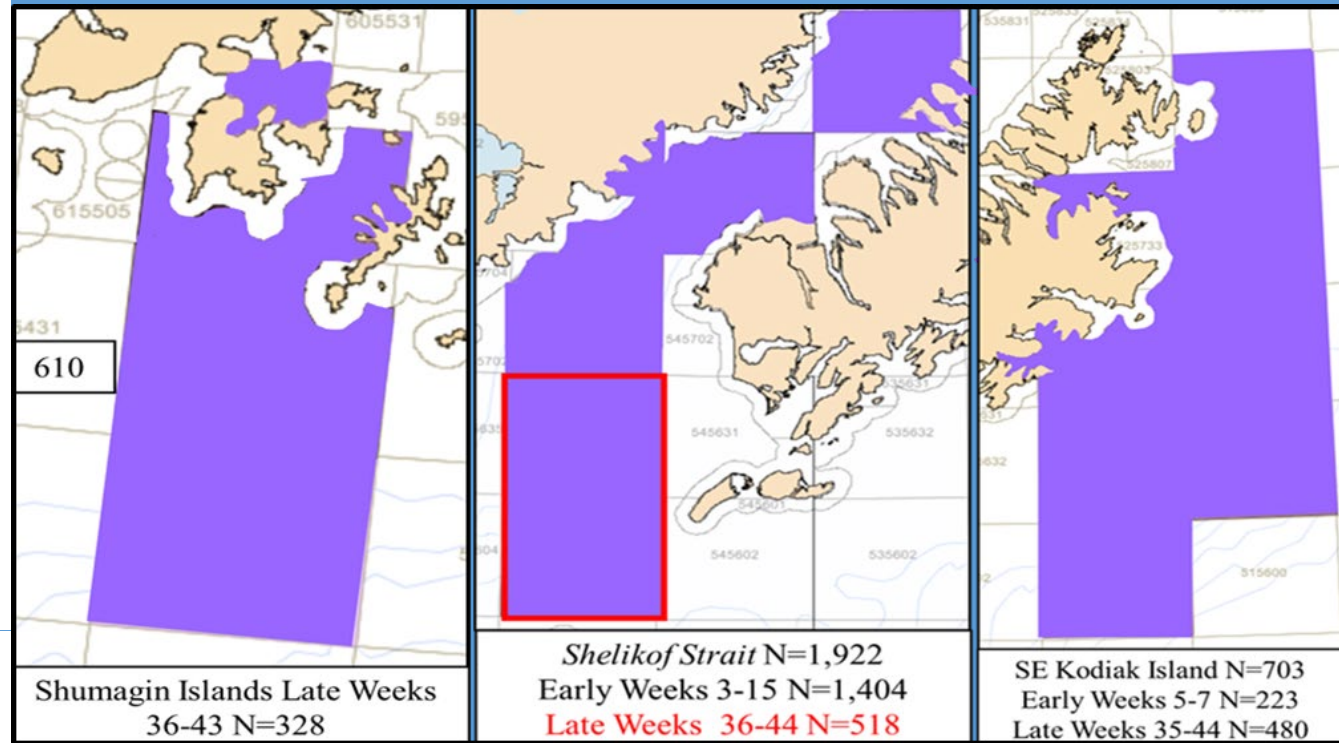
2018 GOA Chinook Salmon Bycatch



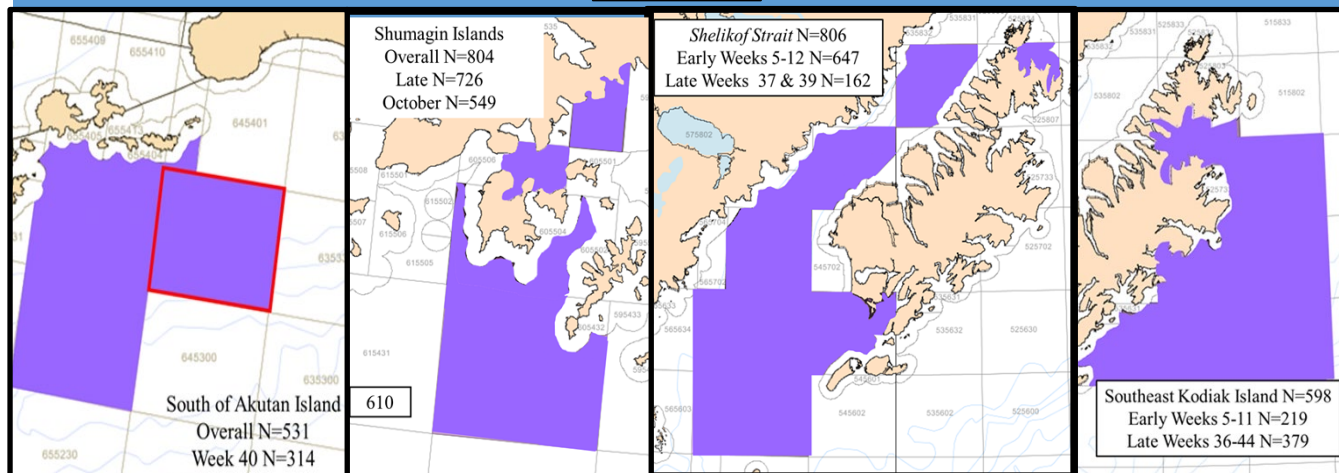
2019 GOA Chinook Salmon bycatch



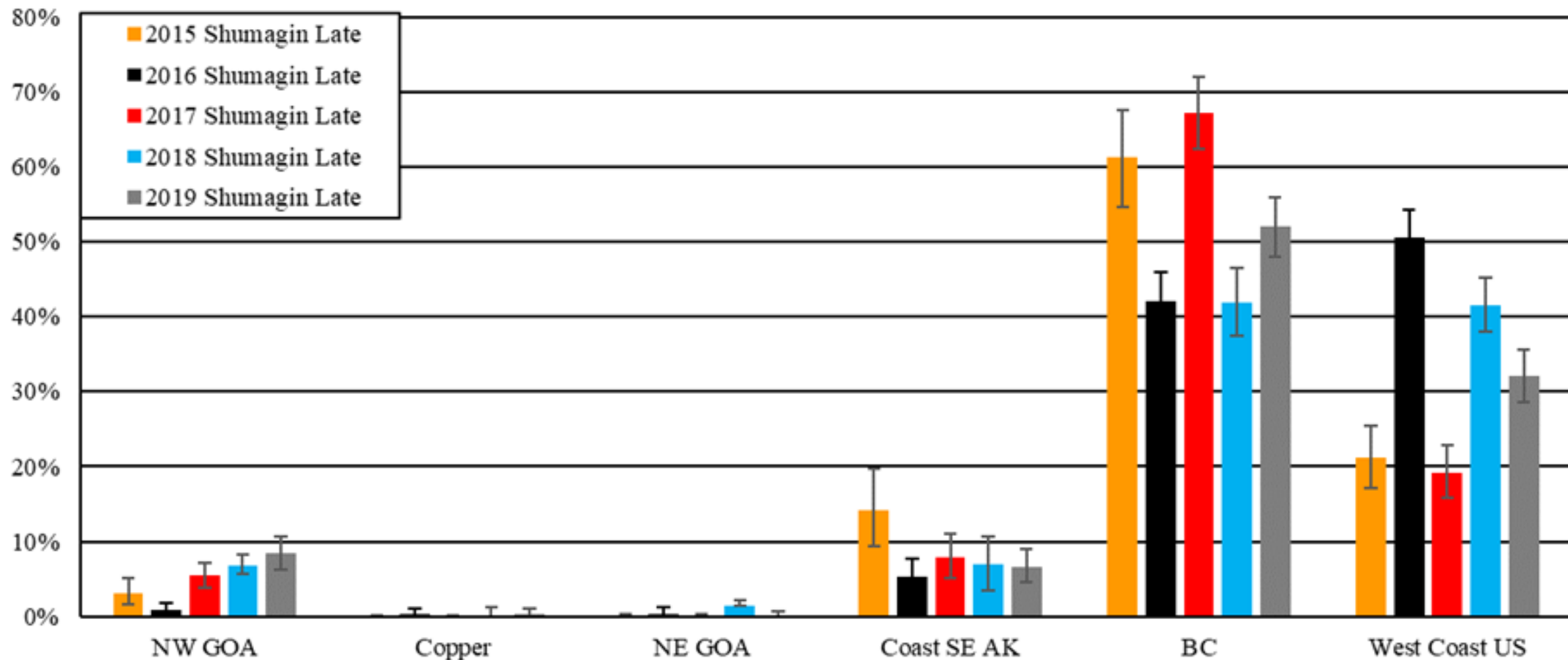
2018



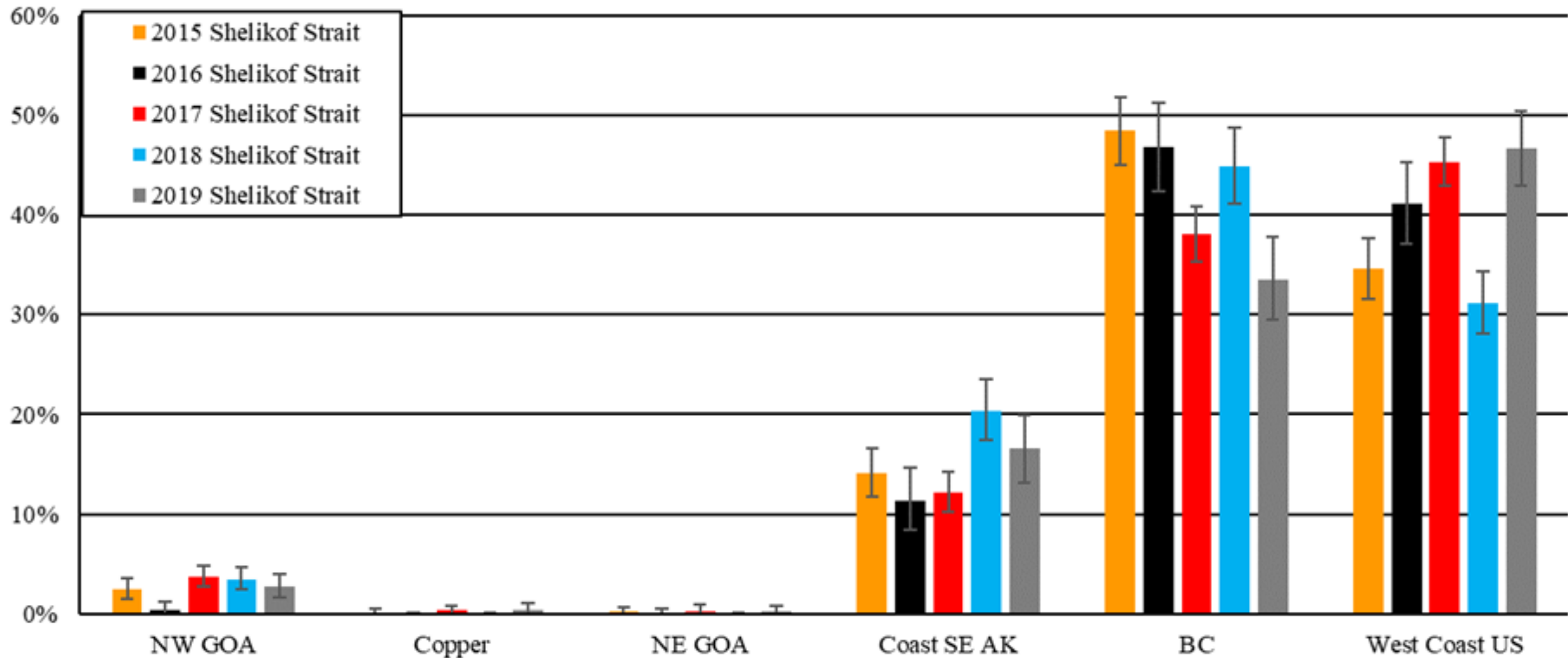
2019



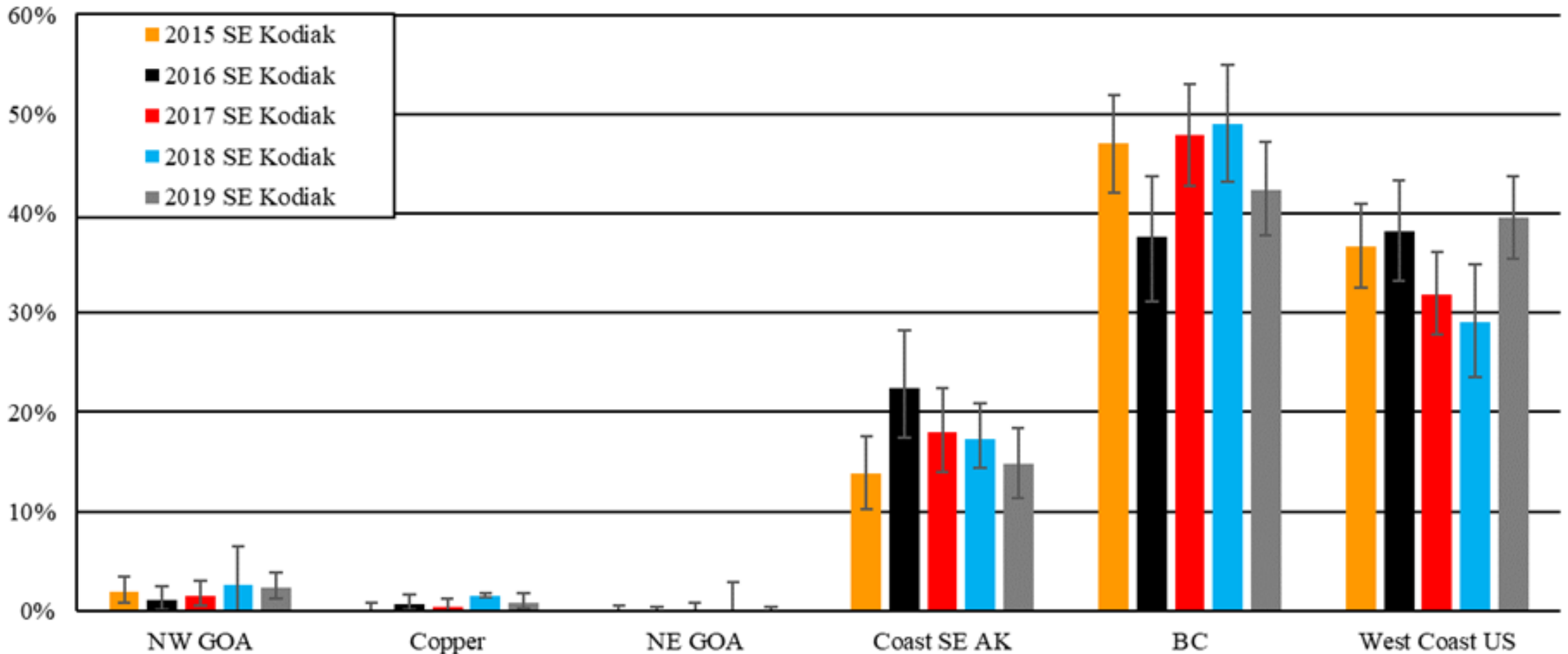
Shumagin Islands Late 2015-2019



Shelikof Strait 2015-2019



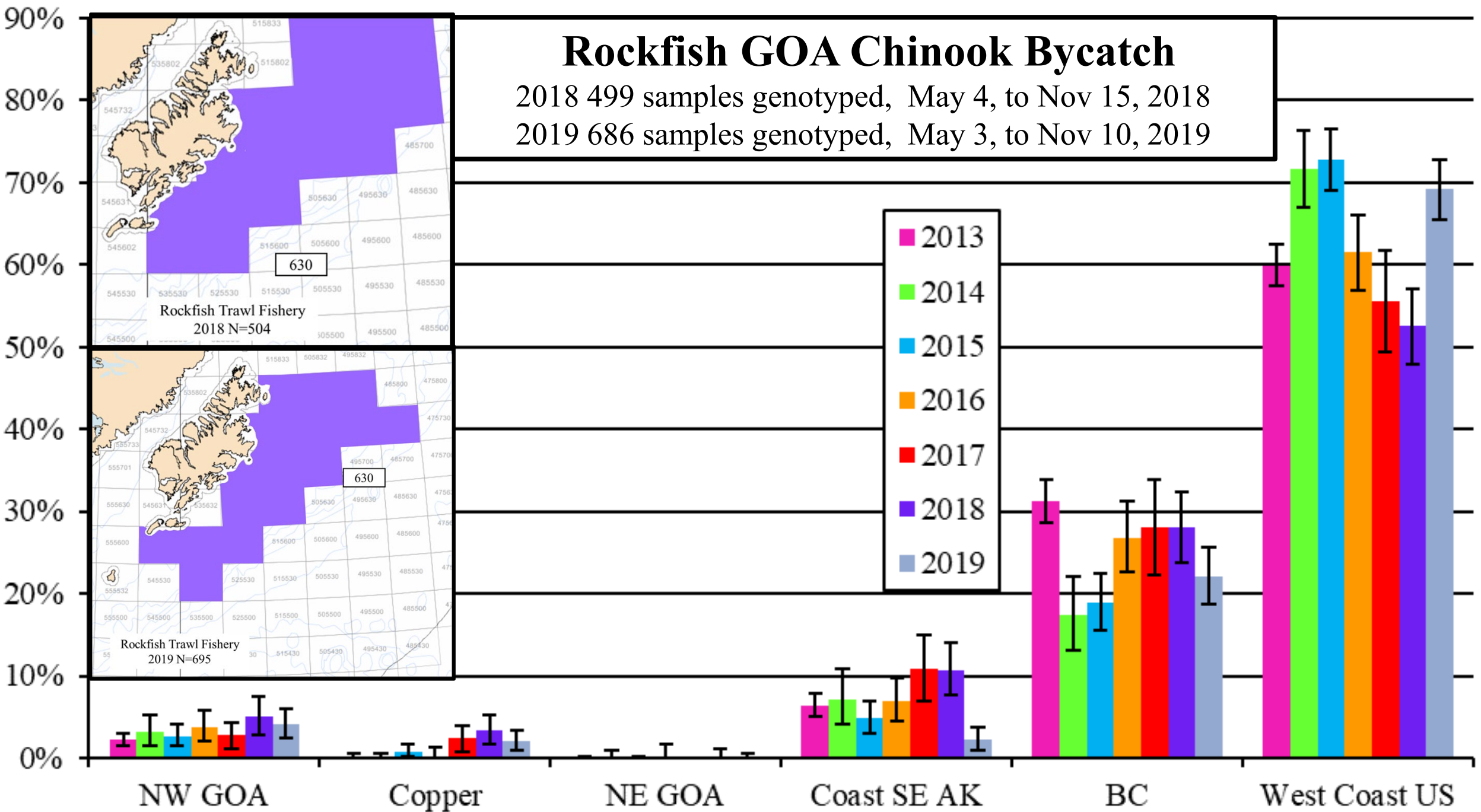
SE Kodiak 2015-2019



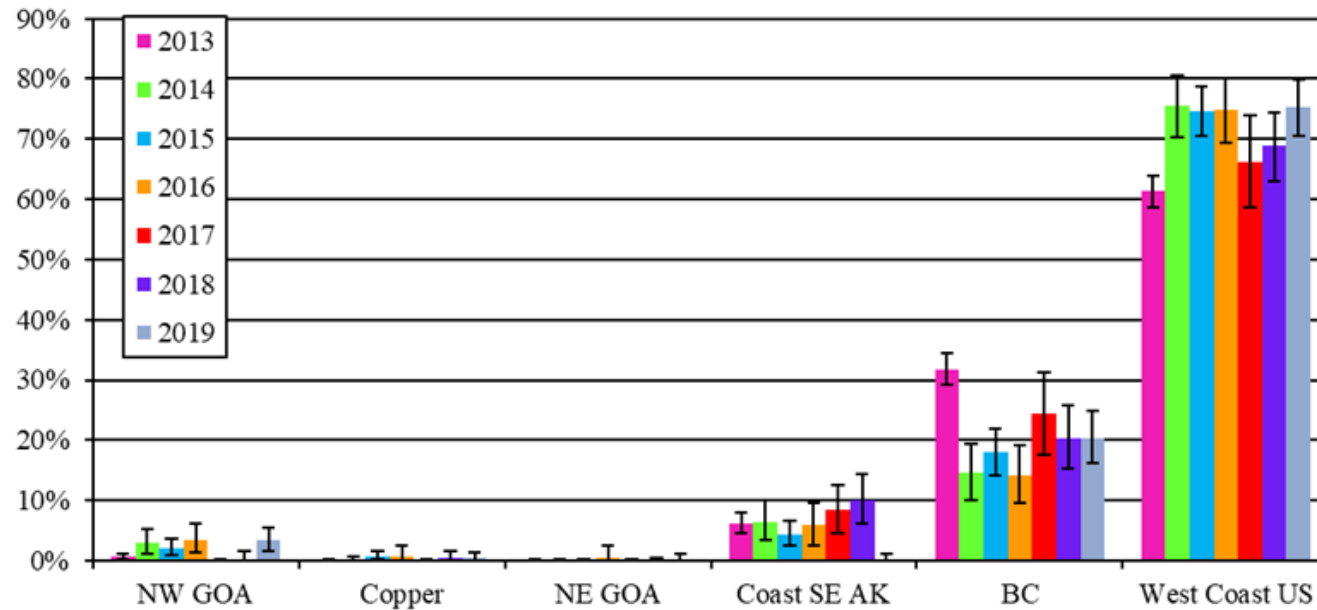
Rockfish GOA Chinook Bycatch

2018 499 samples genotyped, May 4, to Nov 15, 2018

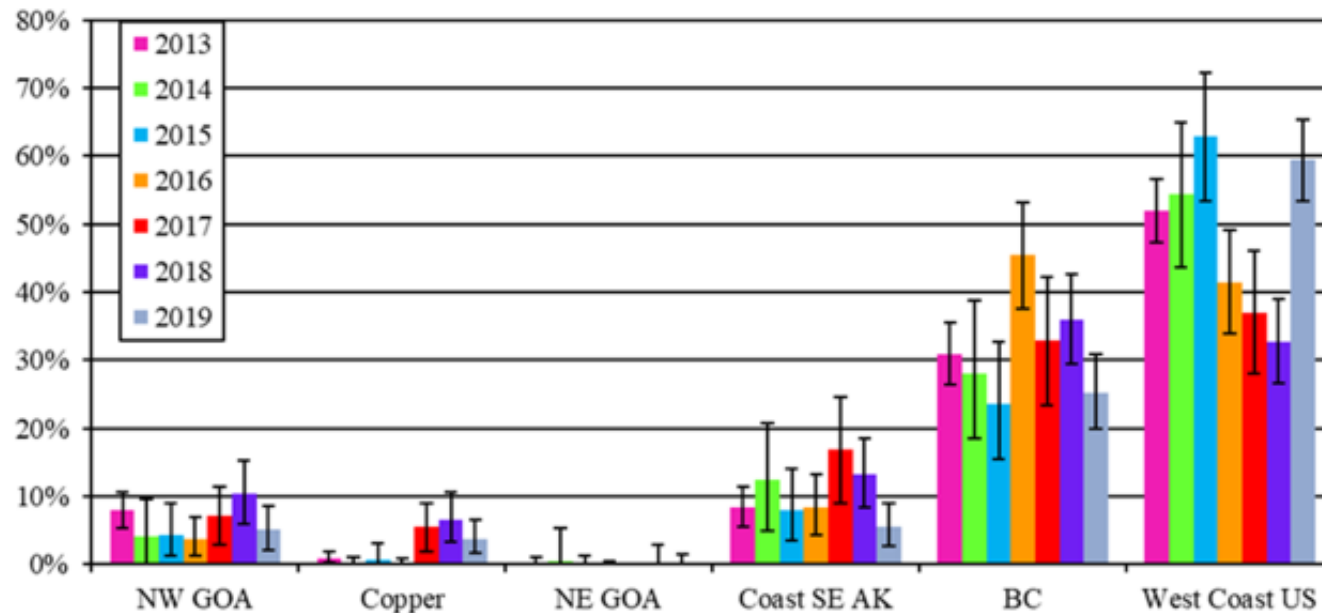
2019 686 samples genotyped, May 3, to Nov 10, 2019



Chinook Bycatch from GOA Rockfish Early



Chinook Bycatch from GOA Rockfish Late



CHINOOK SALMON BYCATCH ASSESSMENT: MARK LAB, ADF&G COMPONENT

by

Bev Agler, Lorna Wilson, and Jodi Neil

Alaska Department of Fish and Game Division Commercial Fisheries, Juneau

Origin of thermal-marked Chinook Salmon otoliths collected in 2017-19 from the Gulf of Alaska trawl fishery for rockfish as sampled by Alaska Groundfish Data Bank

Country	State/Province	2017	2018	2019	Grand Total
U.S.	South Central Alaska	1	6	4	11
U.S.	Southeast Alaska	9	15	3	27
Canada	British Columbia	9	10	20	39
U.S.	Washington	1	4	8	13
U.S.	Oregon	2	2	1	5
Total		22	37	36	95

Release and recovery information for coded-wire tagged Chinook salmon captured as bycatch in the 2017-19 Gulf of Alaska trawl fishery for rockfish as sampled by Alaska Groundfish Data Bank. The number of Chinook salmon with readable coded-wire tags (CWTs) and clipped adipose fins (ad-clipped) is in parentheses.

From Michele Masuda – NOAA-Auke Bay Labs

Detection method	Number sampled			Number ad-clipped			Number with readable CWTs		
	2017	2018	2019	2017	2018	2019	2017	2018	2019
Electronic wand	299	504	695	42	67	98	14 (12)	27 (23)	35 (28)
Release state	Number of CWTs			Ad-clipped			Not ad-clipped		
	2017	2018	2019				2019		
Alaska	2	5	0				0		
British Columbia	2	1	2				2		
Washington	7	14	23				18		
Idaho	0	0	0				0		
Oregon	3	7	10				8		
Rearing type	Number of CWTs			Ad-clipped			Not ad-clipped		
	2017	2018	2019	2017	2018	2019	2017	2018	2019
Hatchery	12	27	34	10	23	27	2	4	7
Wild	2	0	1	2	0	1	0	0	0

Acknowledgements

NMFS

Chris Kondzela

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Jordan Watson

Michele Masuda

North Pacific Groundfish and
Halibut Observer Program

Alaska Region

AKFIN

Rob Ames

Bob Ryznar

ADF&G

Chris Habicht

Bill Templin

Dani Evenson

Katie Howard

Mark Lab

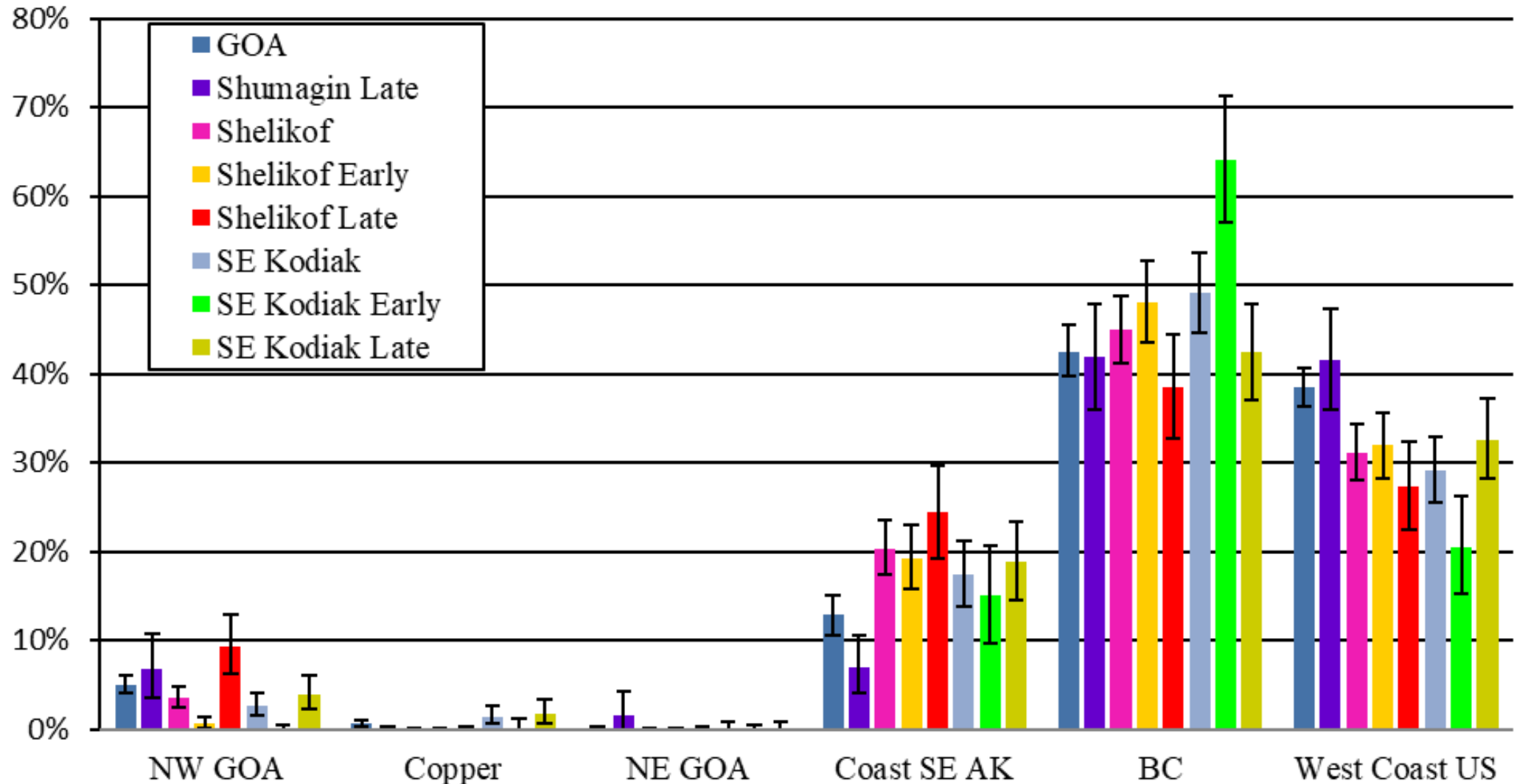
Alaska Groundfish Data Bank

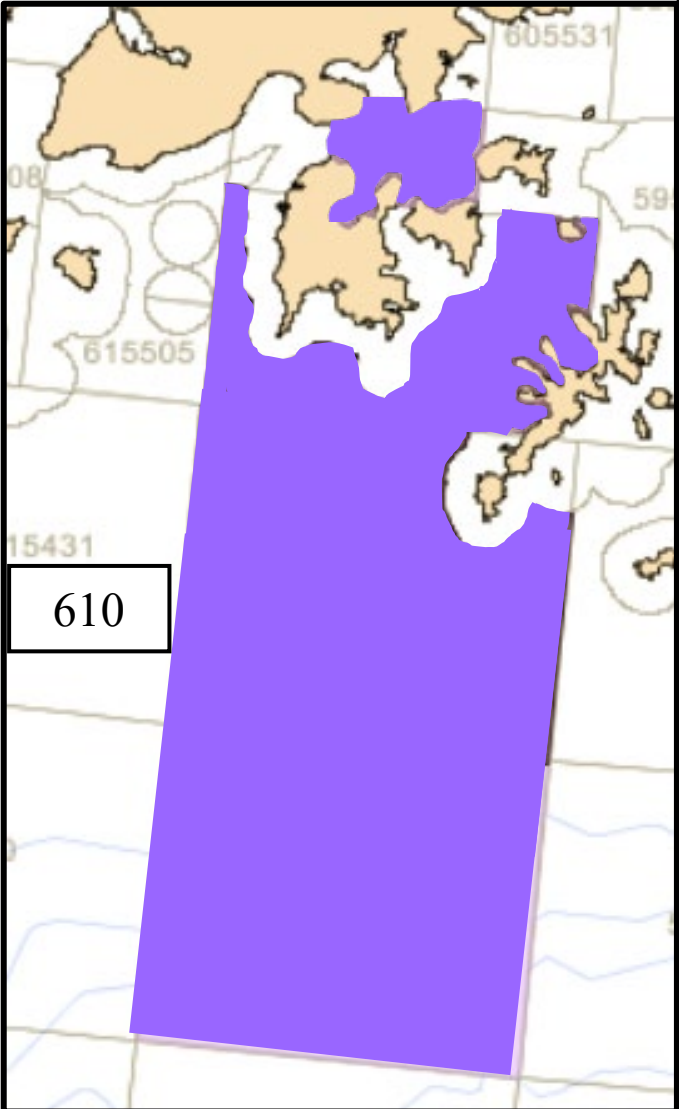
Julie Bonney

Katy McGauley

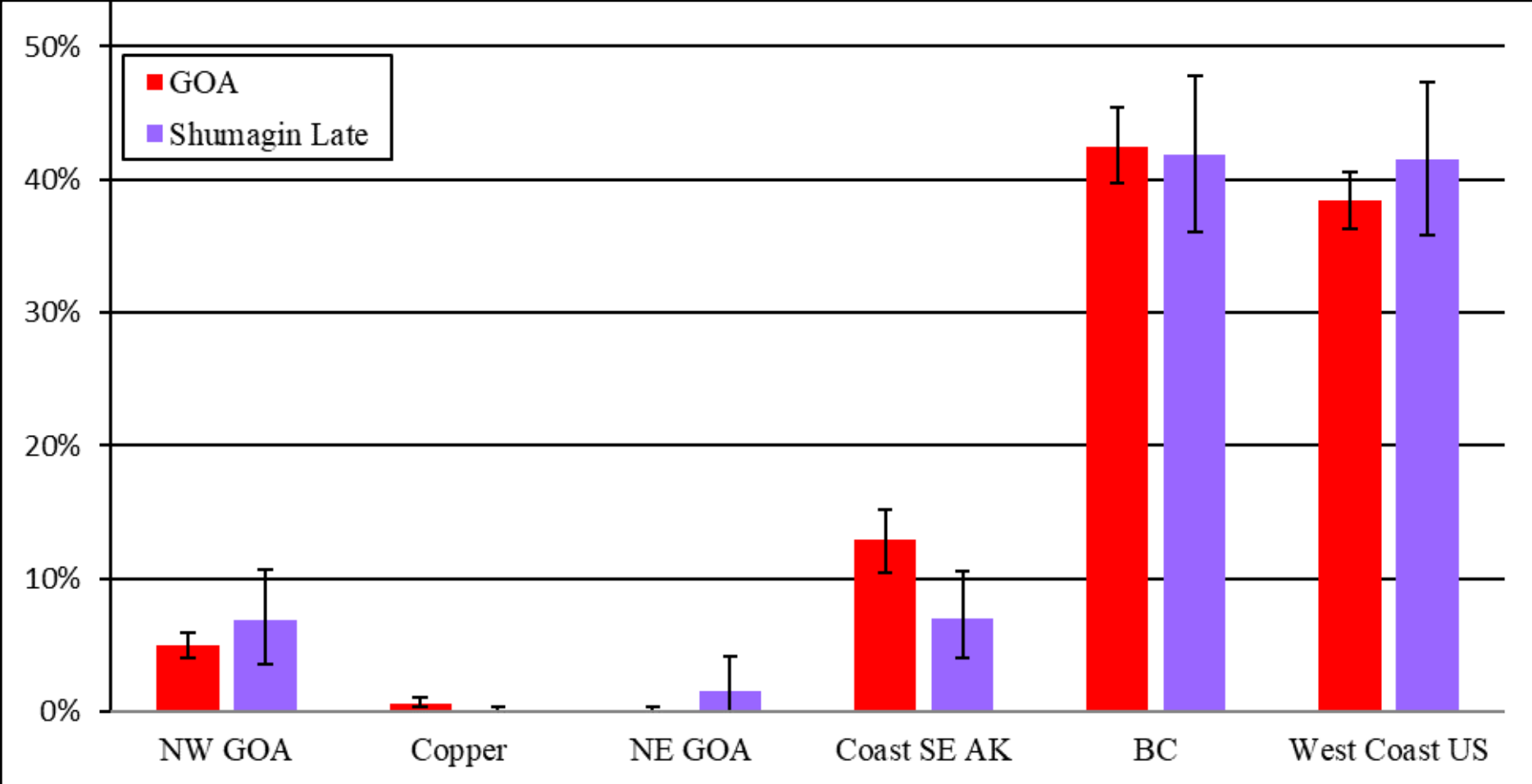
Extra Slides

2018 GOA by Area and Time Comparison



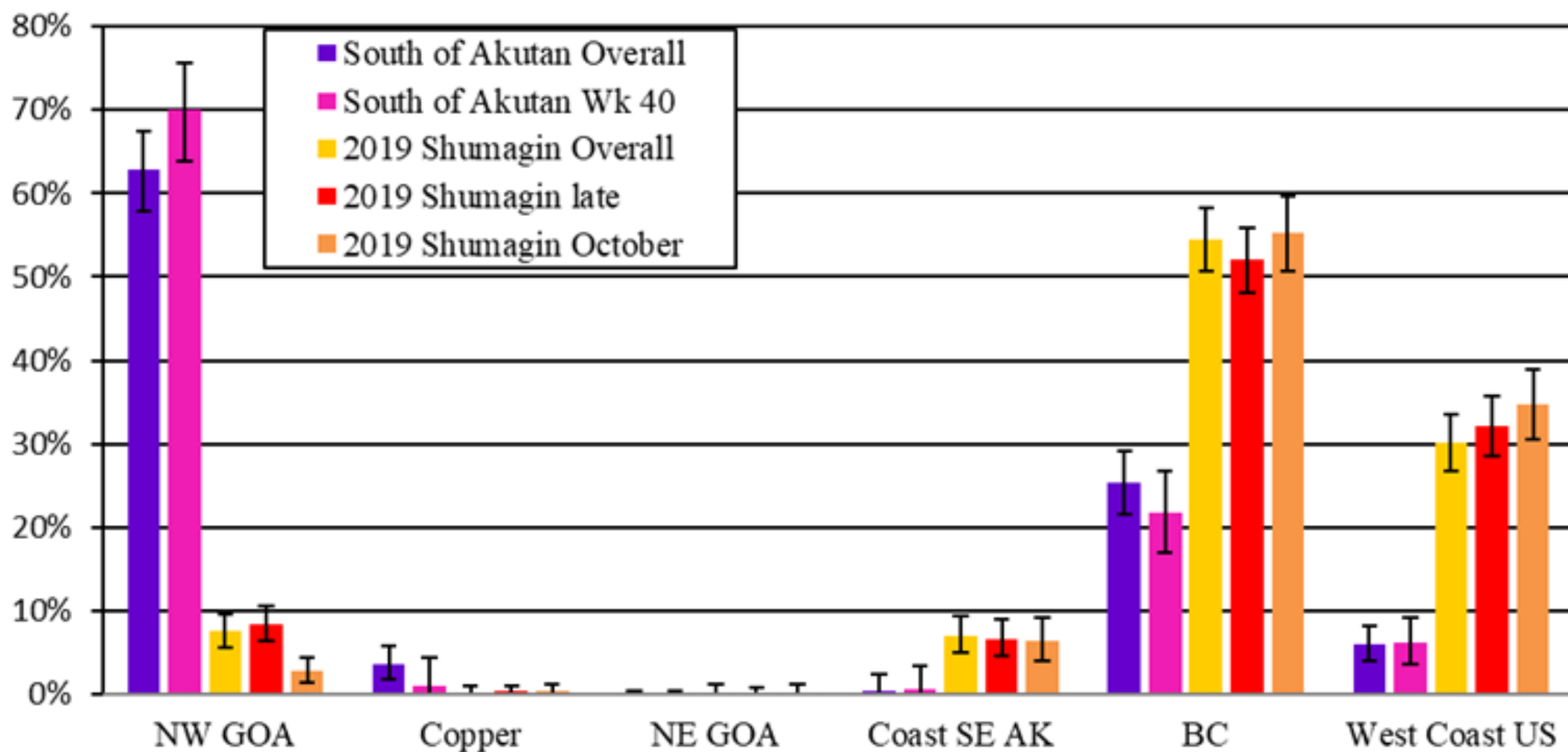


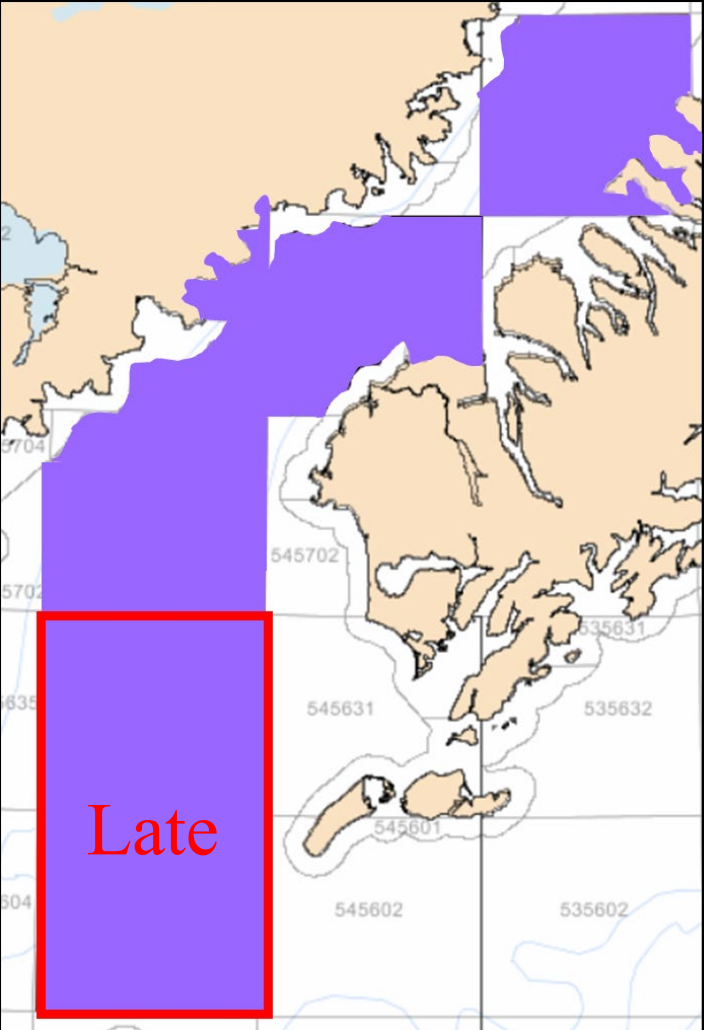
Shumagin Islands Late
Weeks 36-43 N=328



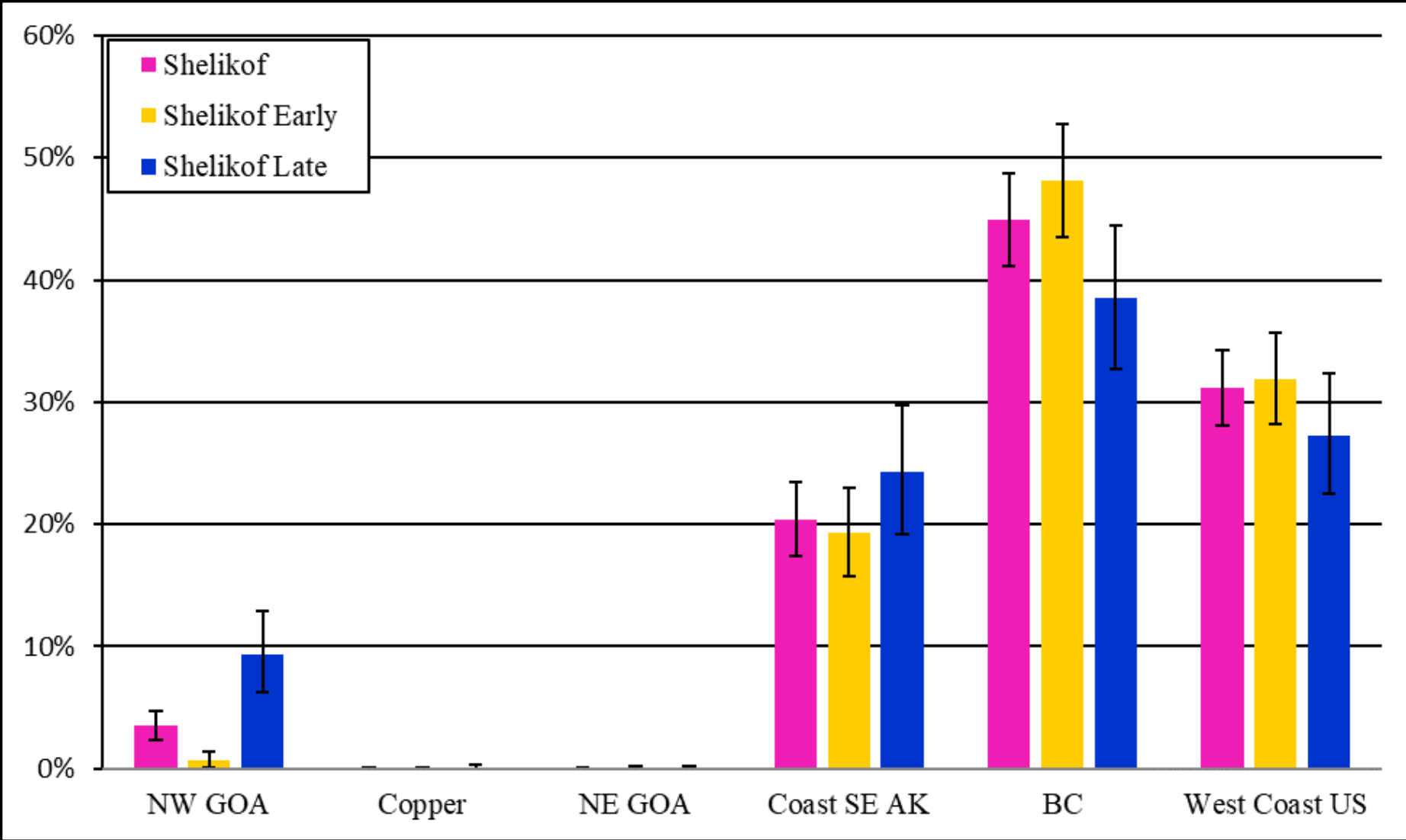
2018 Shumagin Islands Chinook Salmon Bycatch

2019 S. of Akutan I. and Shumagin I. Chinook Salmon bycatch



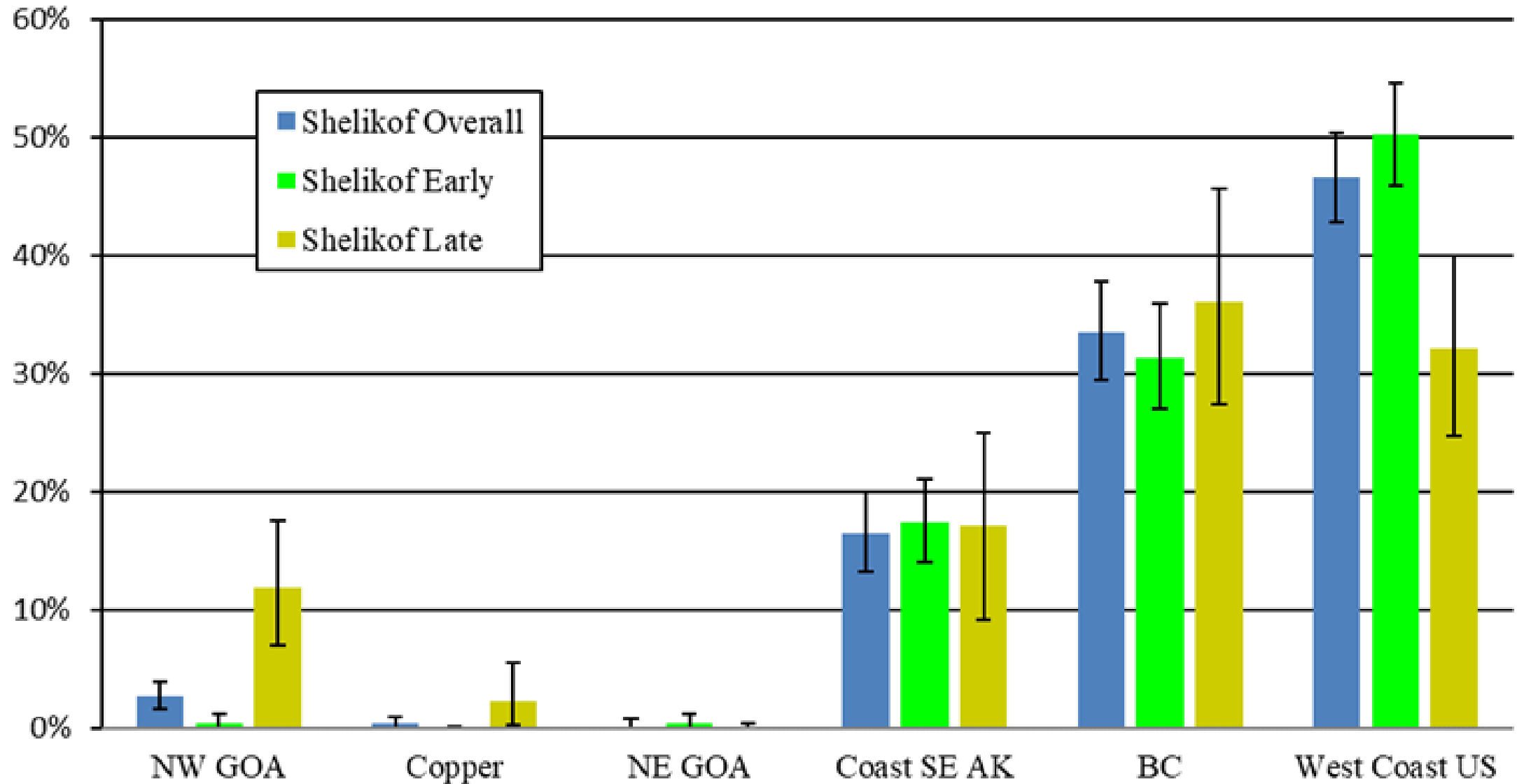


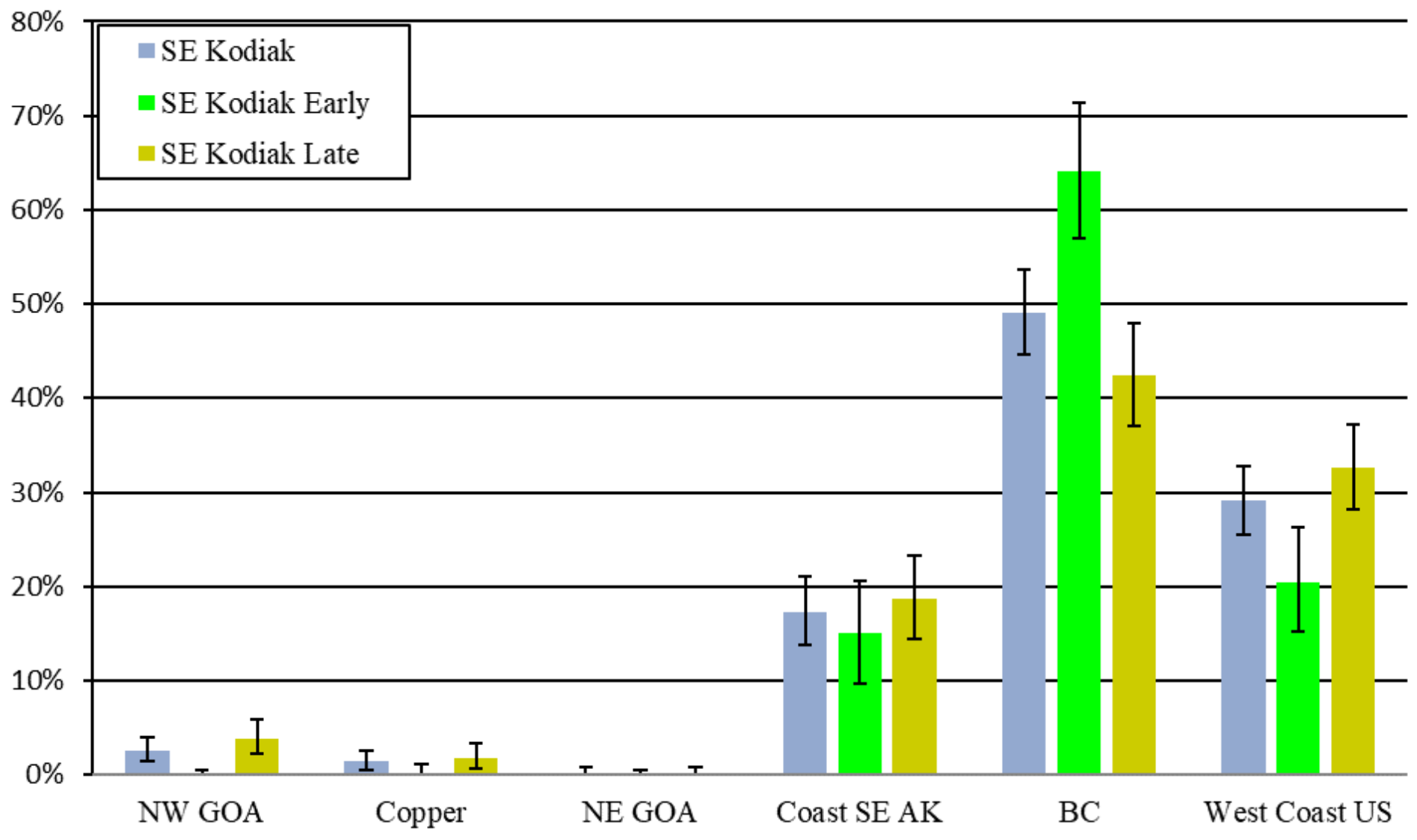
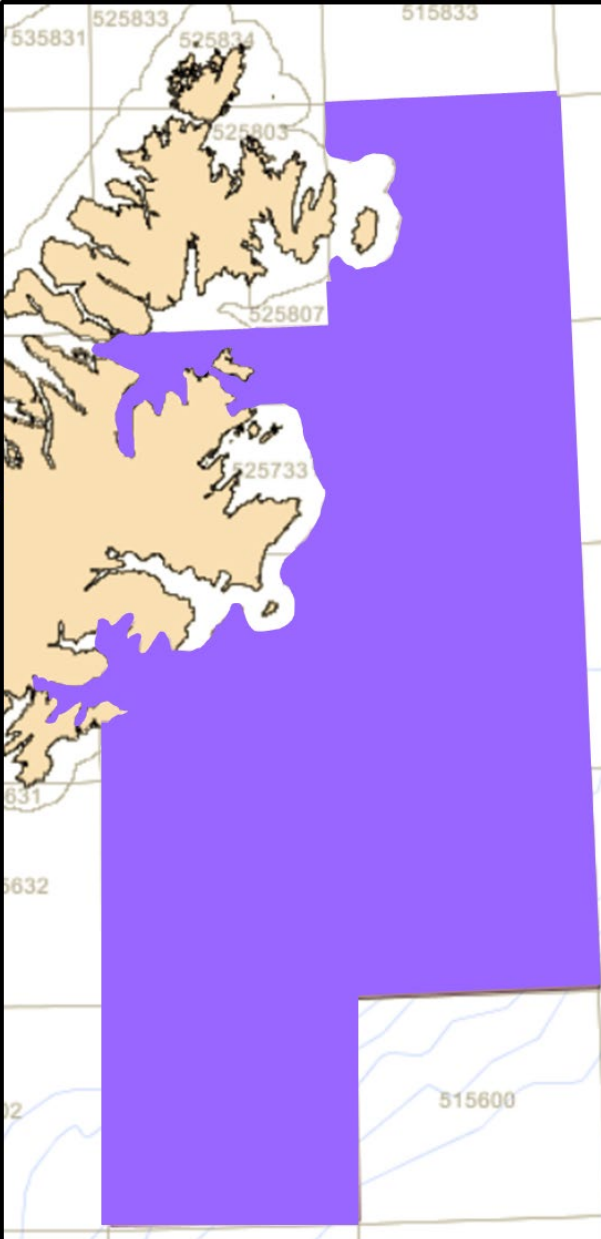
Shelikof Strait N=1,922
 Early Weeks 3-15 N=1,404
 Late Weeks 36-44 N=518



2018 Shelikof Chinook Salmon Bycatch

2019 Shelikof Chinook Salmon bycatch

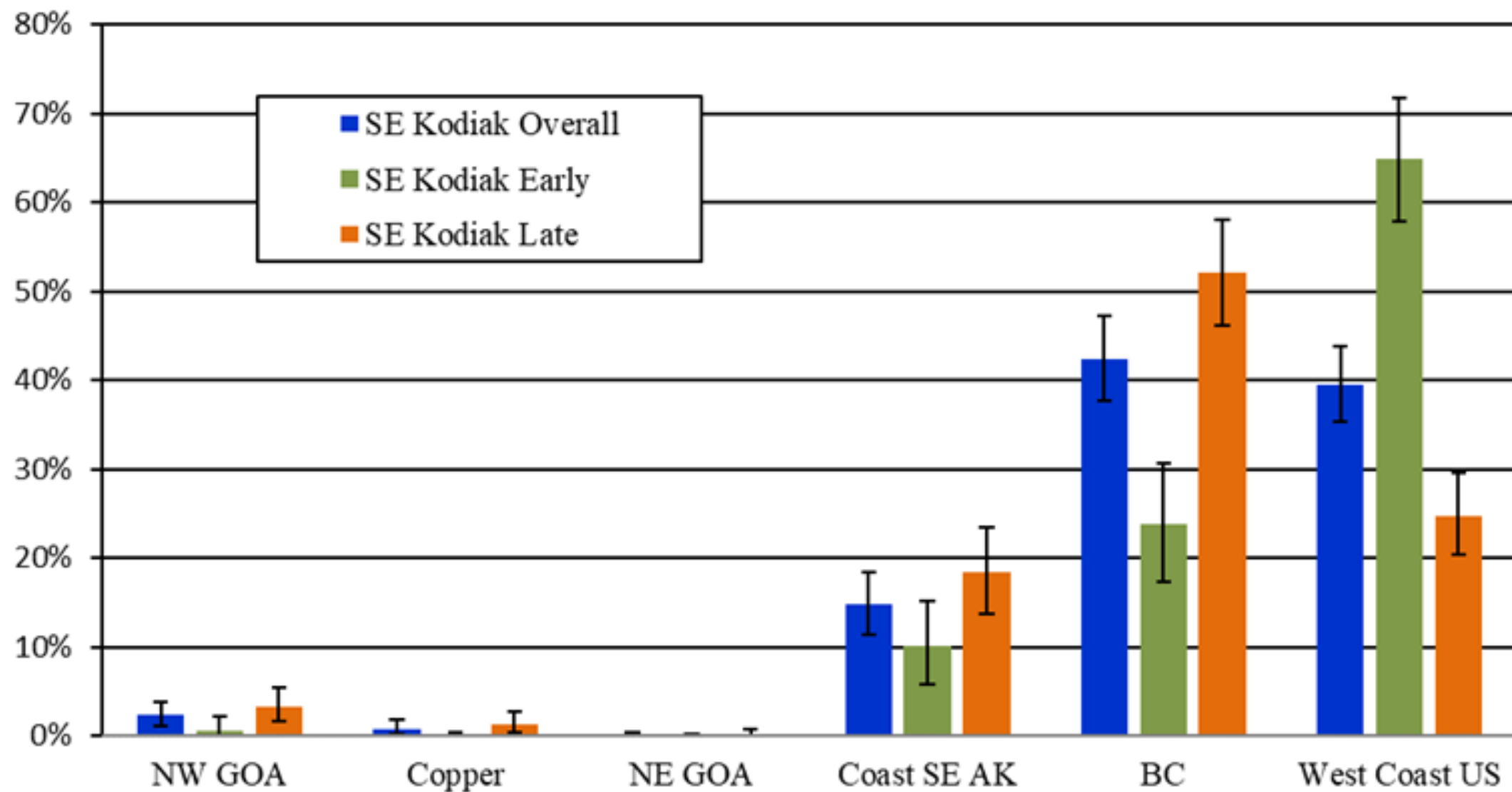




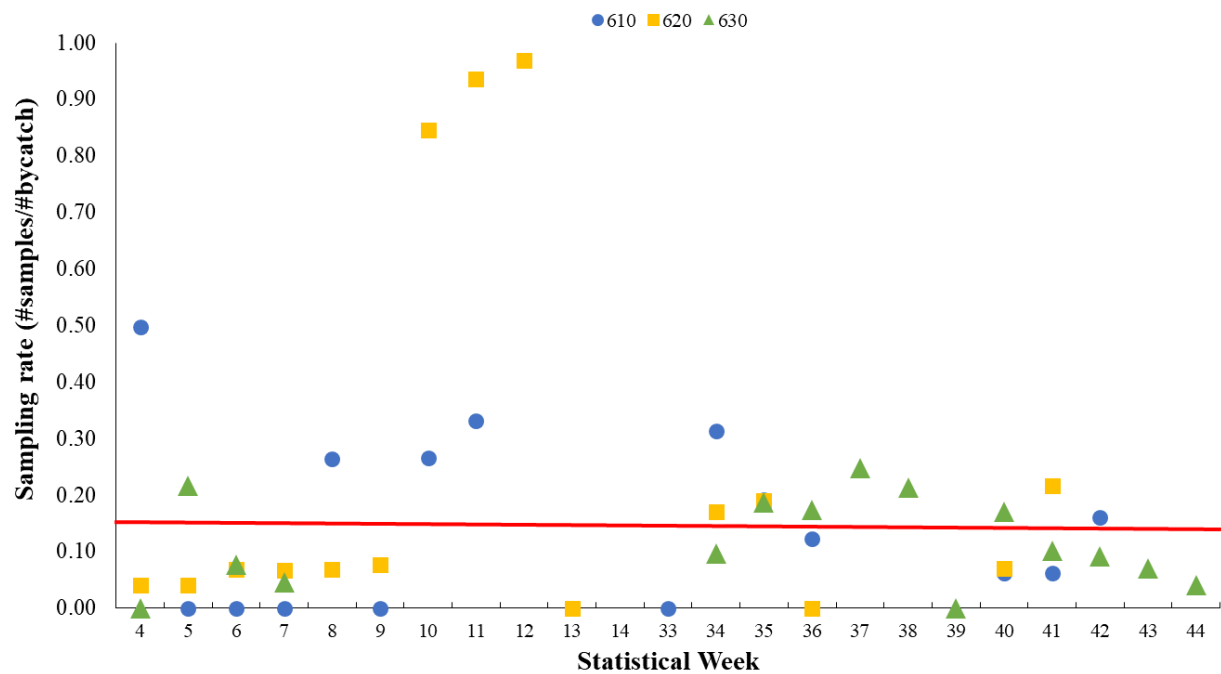
SE Kodiak Island N=703
 Early Weeks 5-7 N=223
 Late Weeks 35-44 N=480

2018 SE Kodiak Chinook Salmon Bycatch

2019 SE Kodiak Chinook Salmon bycatch



2018 Chinook GOA Samples



2019 Chinook GOA Samples

