

# D1b Chum Salmon Discussion Paper Overview

NPFMC  
December 2022



Diana L. Stram  
Council Staff

# Outline

- Review of 2021-2022 Council motion and requests
  - Context for June 2022 review and outcomes
- Chum and Chinook salmon bycatch trends
- Chum salmon bycatch genetics
- Historical overview of chum and Chinook bycatch management actions
- 2012 Chum salmon bycatch management overview
- Hatchery releases
- WAK chum salmon stock status

# Some background: October 2021 Council motion

- 1) An updated bycatch impact (AEQ) analysis which includes current genetic stock identification information and an updated age/length composition for Chinook salmon along with estimates of how many Chinook salmon taken as bycatch in the Bering Sea pollock fishery would have returned to Western Alaska Chinook salmon stock groupings. The analysis should include a PSC harvest rate analysis and an estimate of the Chinook salmon bycatch impacts to each specific stock grouping at the current cap levels and at actual bycatch levels in recent years. The Council also requests that the report include recommendations to evaluate impacts of chum salmon bycatch in the pollock fishery with currently available data.
- 2) A stock status update of Western Alaska Chinook and chum salmon stocks.
- In addition, the Council requests staff write a letter to the Secretary of State to request help to identify levels and stock composition of bycatch of salmon in waters outside of the jurisdiction of the United States. The Council requests staff write a letter in support of recent requests to the Secretary of Commerce for increased and dedicated funding for salmon research, observation, and monitoring, including on the lifecycle of salmon species in the freshwater, nearshore, and marine environments, and the effects that environmental changes are having on salmon throughout their lifecycle.

# Presentations to the Council in June 2022

- **Salmon stock status and research updates**
  - Stock status update for WAK Chinook and chum
  - AFSC overview of salmon research and mandates
  - ADF&G overview of ongoing research and plans
- **BSAI and GOA salmon genetics reports**
  - BSAI Chum salmon bycatch genetics from 2020-2021
  - Chinook salmon genetics 2020 (BSAI and GOA)
- **Update on ongoing genetics works and plans**
  - AFSC progress and plans
- **Bering Sea Chinook Adult Equivalency and Impact rate report; staff recommendation for assessing chum impacts**
  - Update on 2015/2018 report; changes noted in age/length updates and maturity estimates
  - Staff feedback on assessing chum bycatch impacts
- **Salmon Excluder final report**
- **Reports from the IPAs (3)**
- **SeaShare update**

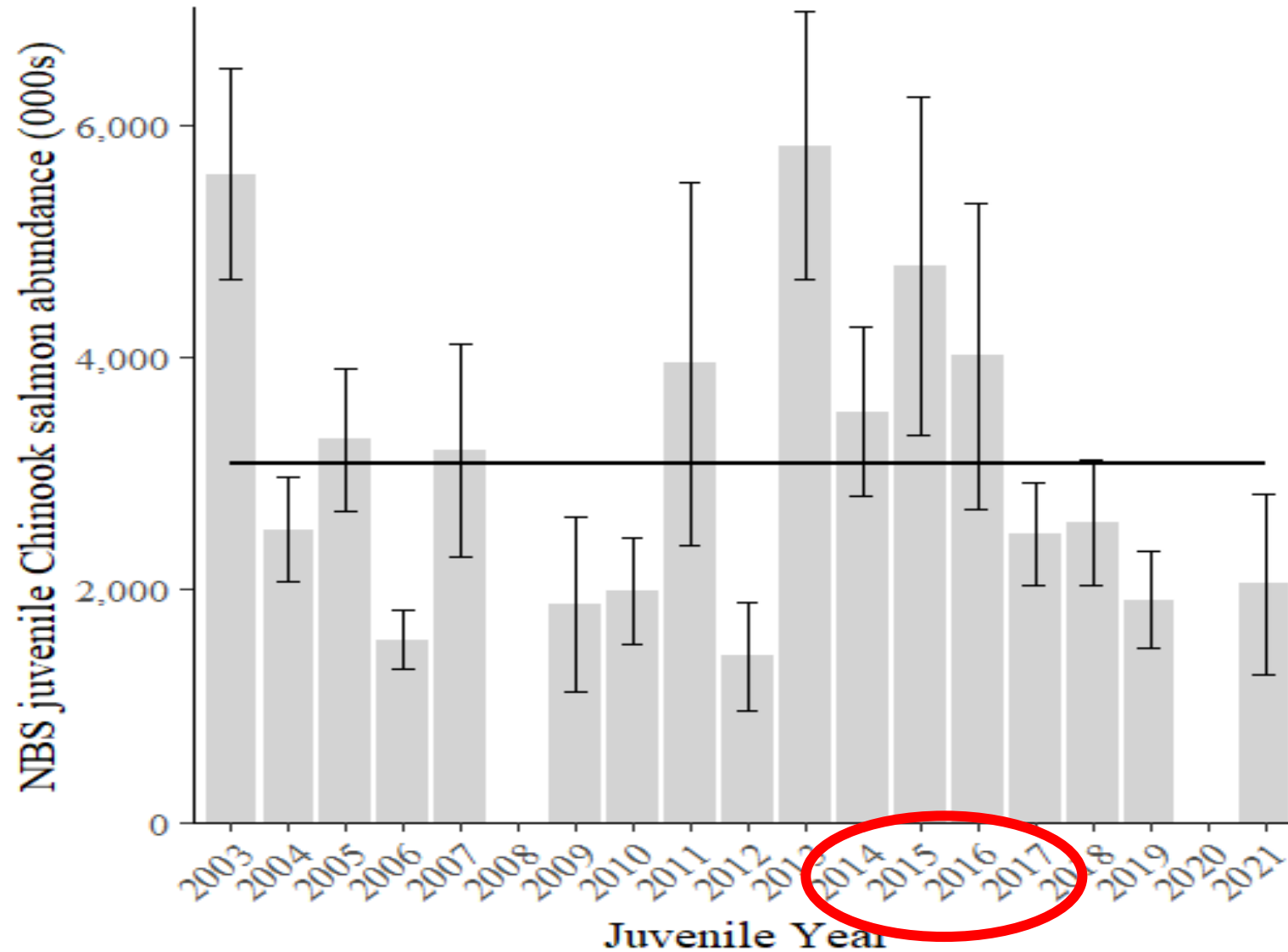
# Non-Chinook salmon bycatch category

<b>Salmon Species</b>	<b>2016</b>	<b>2017</b>	<b>2018</b>	<b>2019</b>	<b>2020</b>	<b>2021</b>	<b>2022</b>
<b>Sockeye</b>		150	87	185	228	48	15
<b>Coho</b>		53	9	169	125	60	36
<b>Pink</b>	144	926	125	1,600	385	385	47
<b>Chum</b>	342,789	466,549	294,841	345,928	342,887	545,549	242,259
<b>Total non-Chinook</b>	342,933	467,678	295,062	347,882	343,625	546,042	242,357
<b>Percent Chum of non-Chinook</b>	99.96%	99.76%	99.93%	99.44%	99.79%	99.91%	99.96%



Research updates:  
NOAA and ADF&G

# Juvenile Chinook salmon abundance



**Abundance of Juvenile Chinook has been below average since 2017**

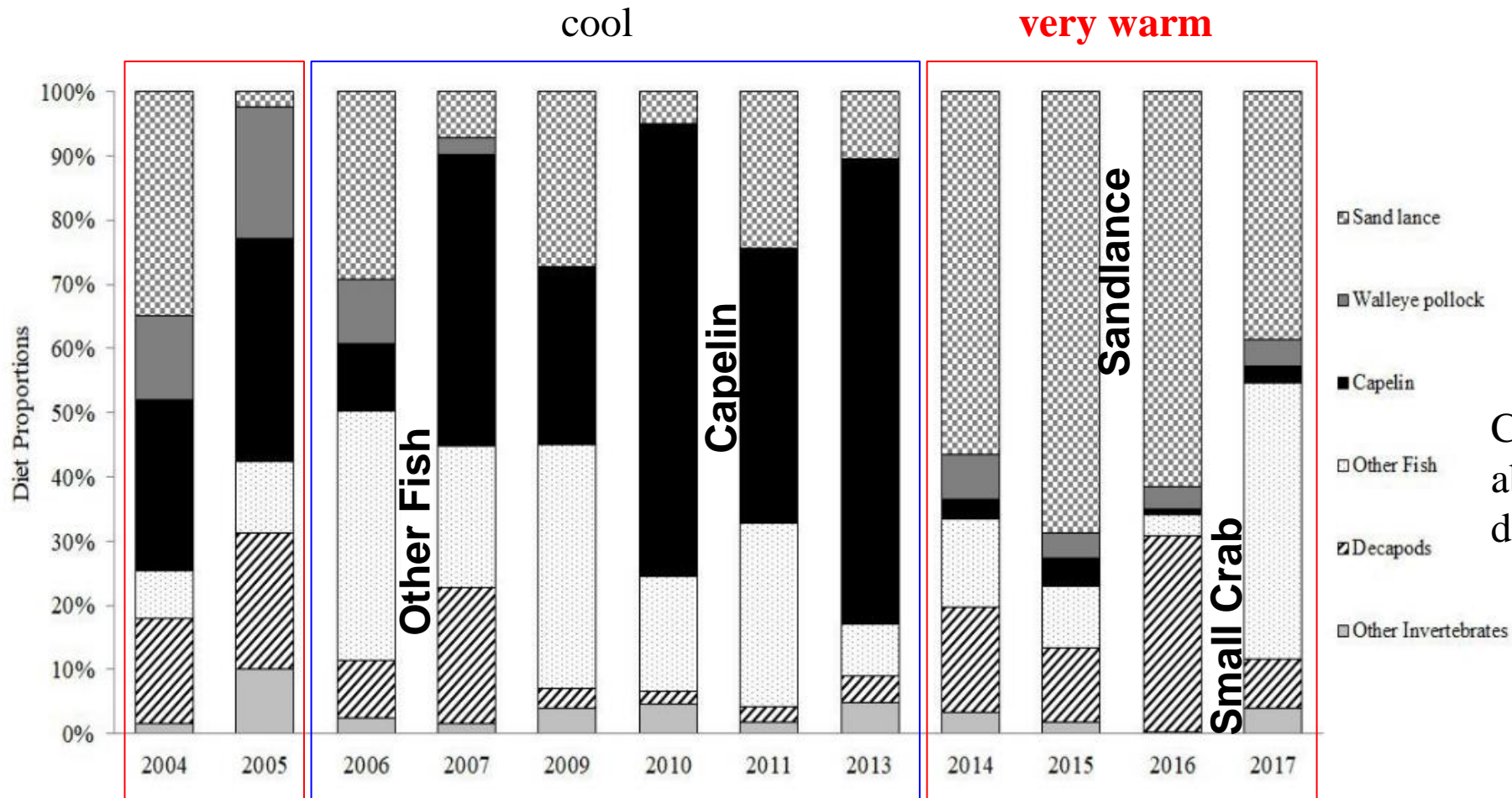
**Smaller than average size during recent warm years**



**NOAA  
FISHERIES**



# Juvenile Chinook Salmon Diet

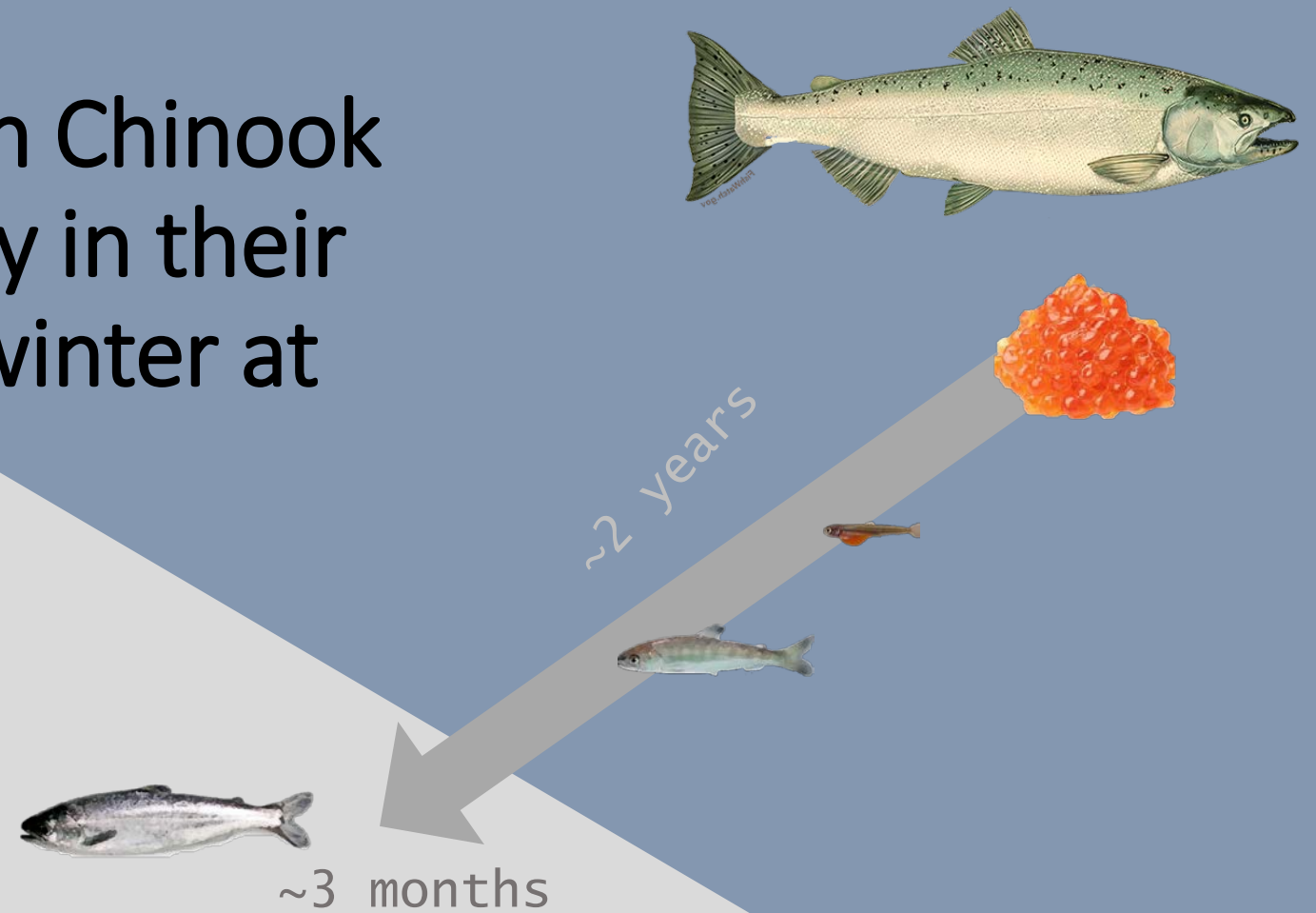


Capelin, a high quality prey, are absent from Chinook salmon diet during recent warm years.



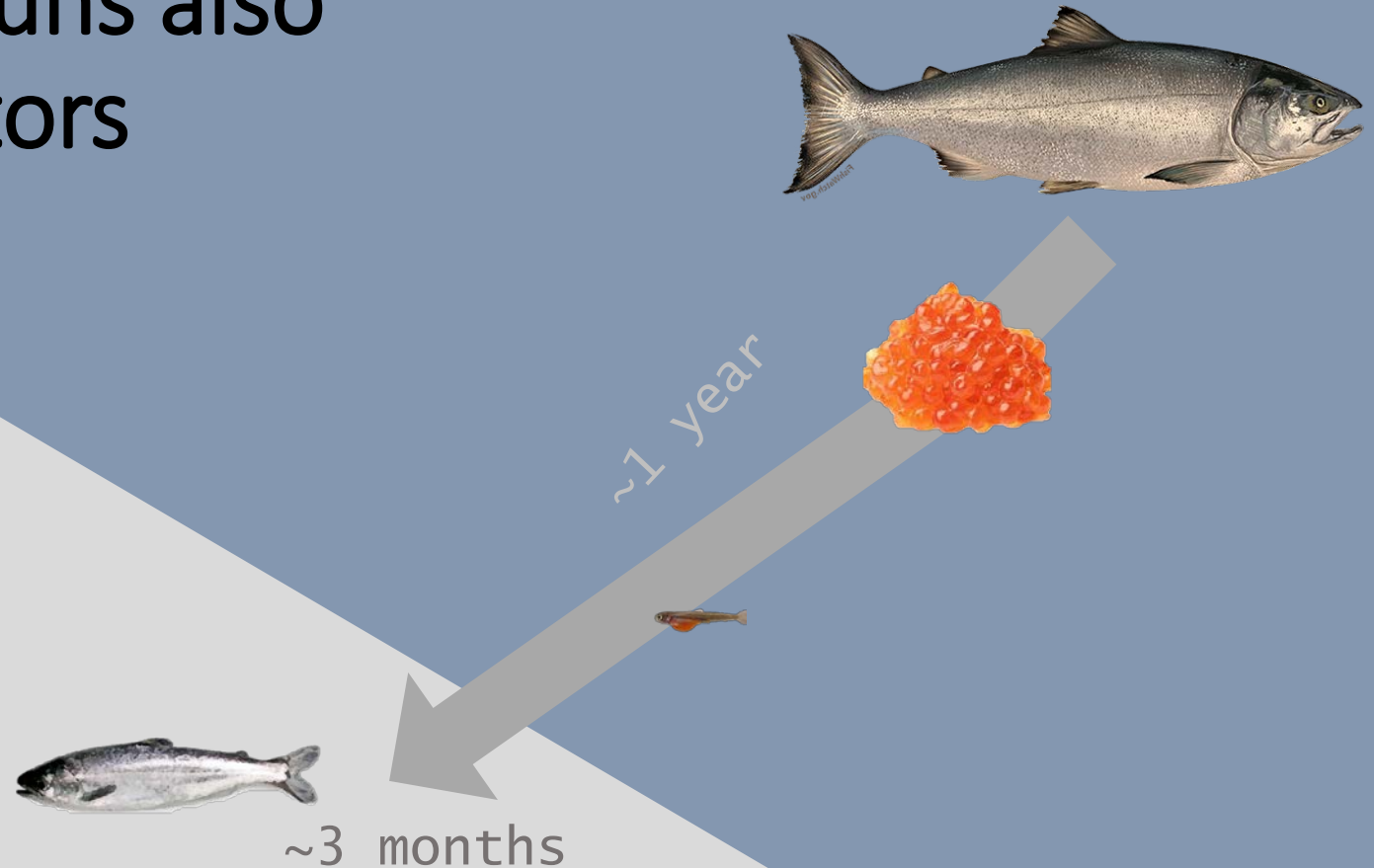


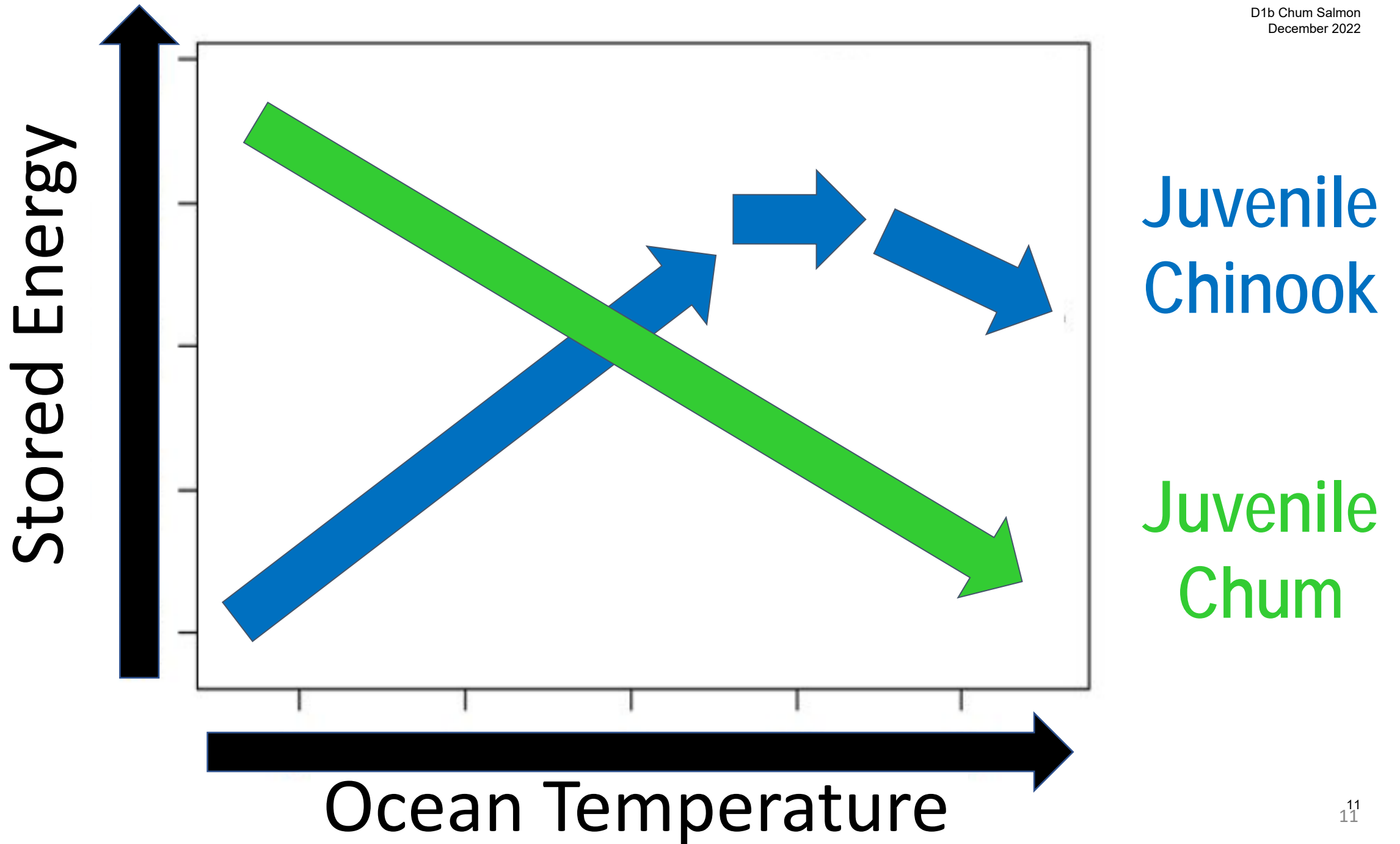
Future run size of Yukon Chinook is determined very early in their life – before their first winter at sea

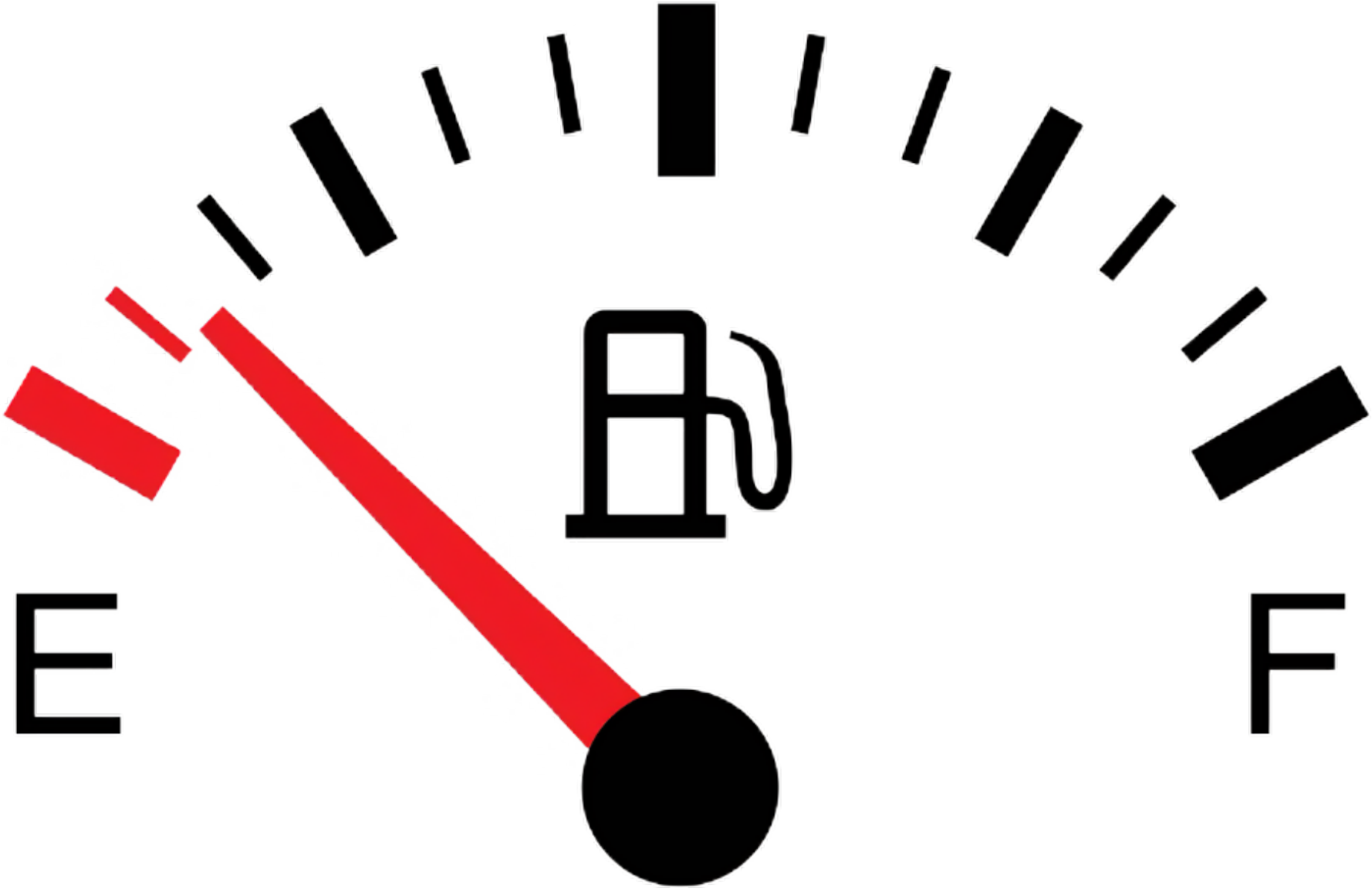


Yukon fall chum salmon runs also seem to be driven by factors early in life...

.....until 2016

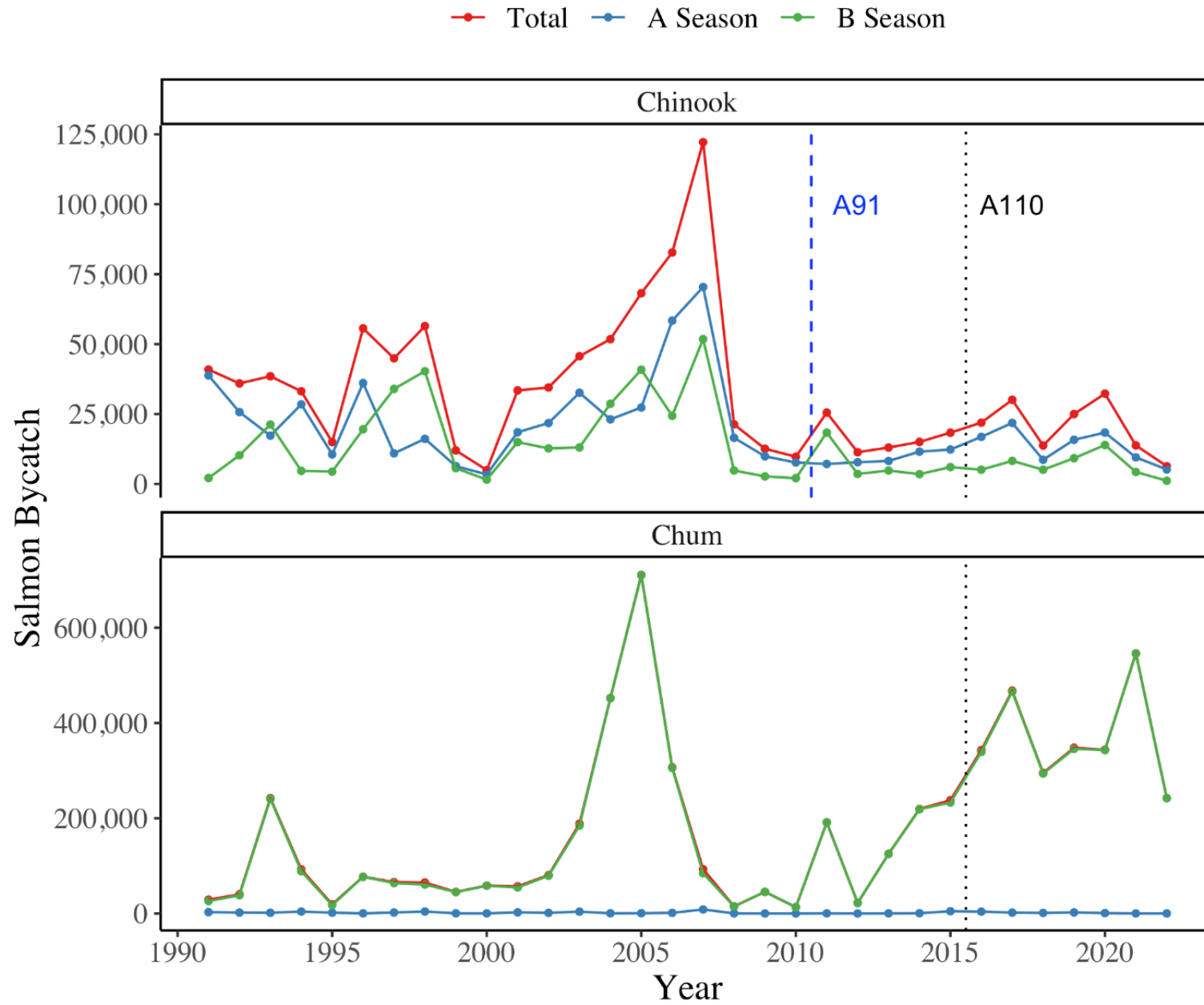






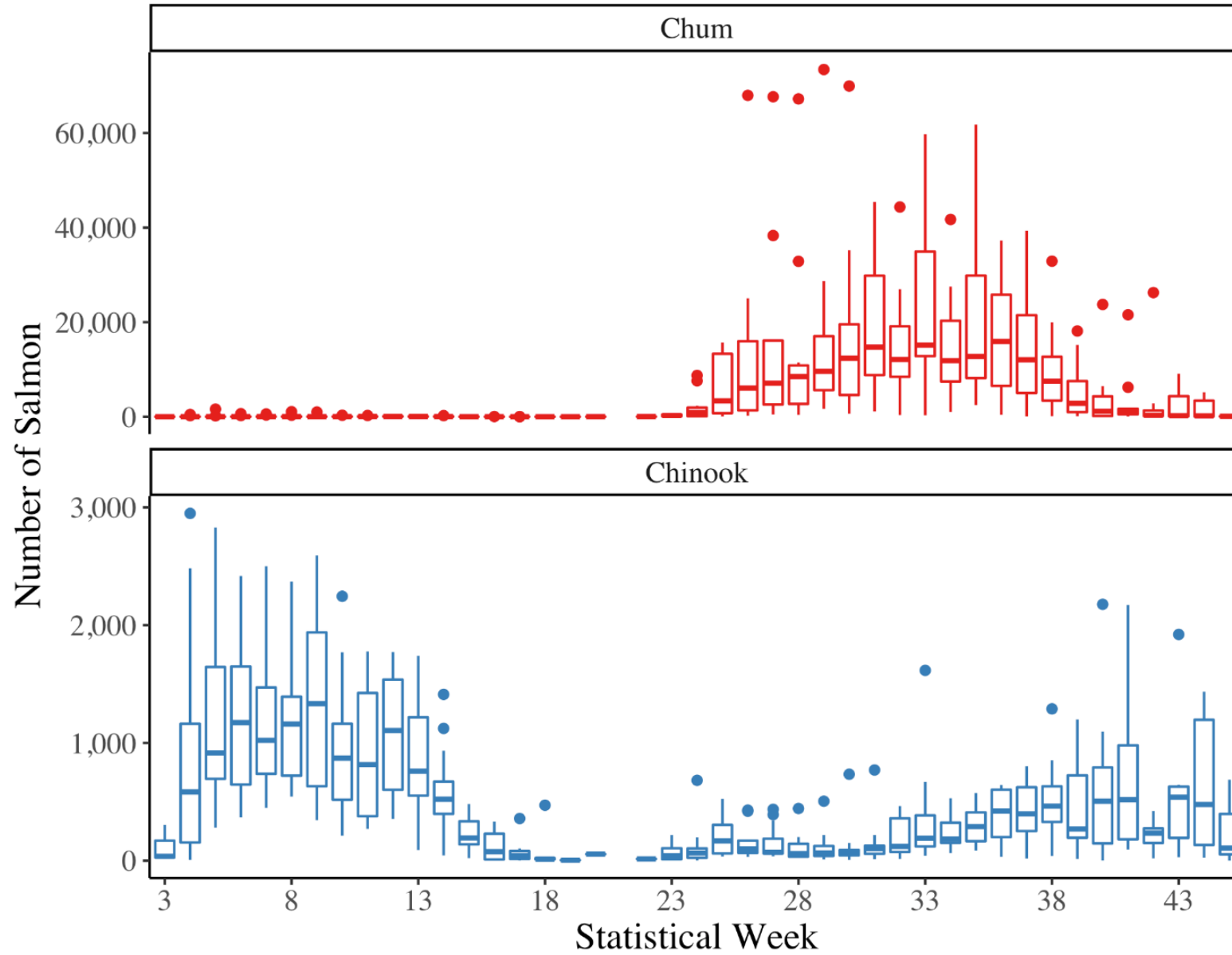


# Chum and Chinook salmon bycatch trends in EBS pollock fishery

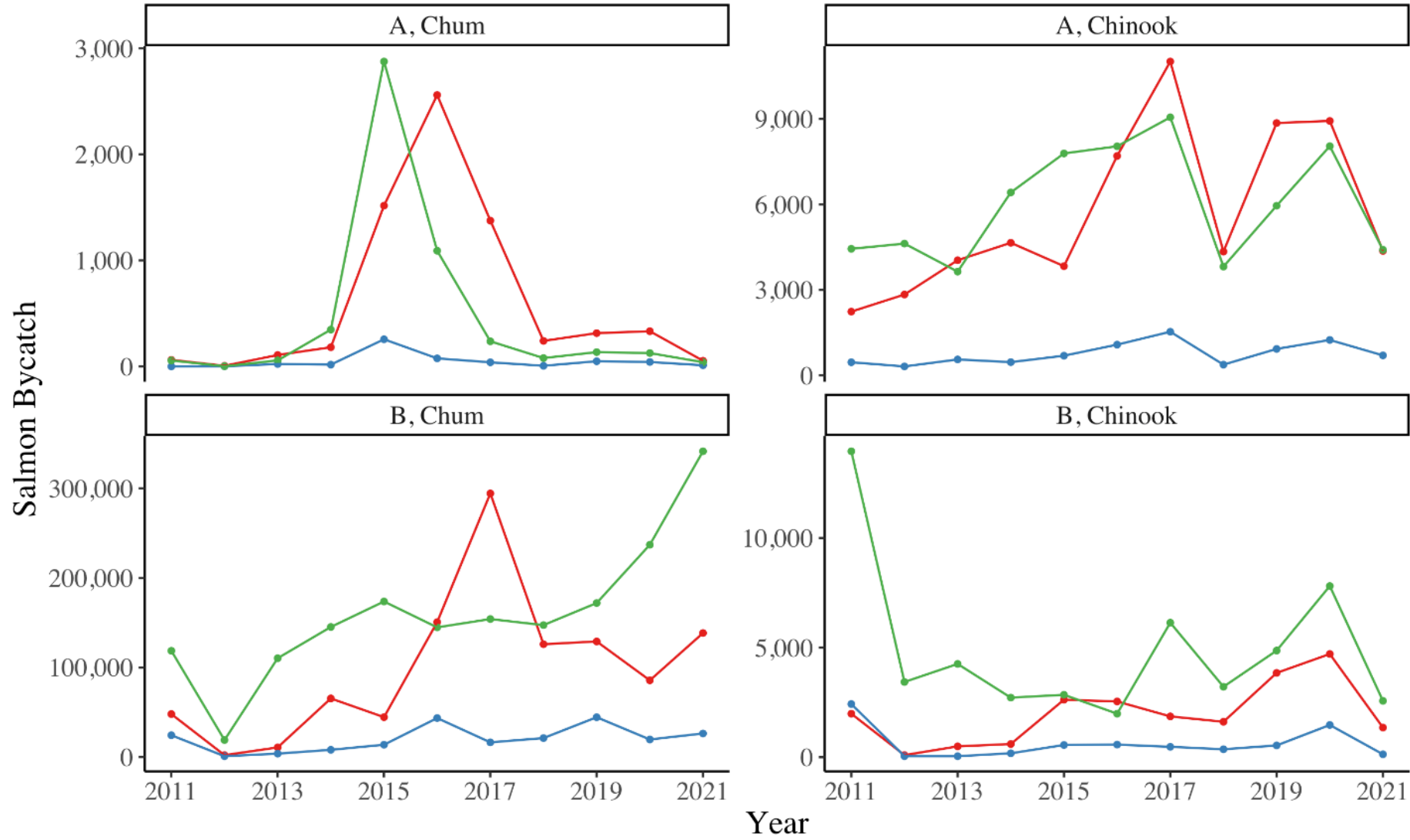




Chum Chinook

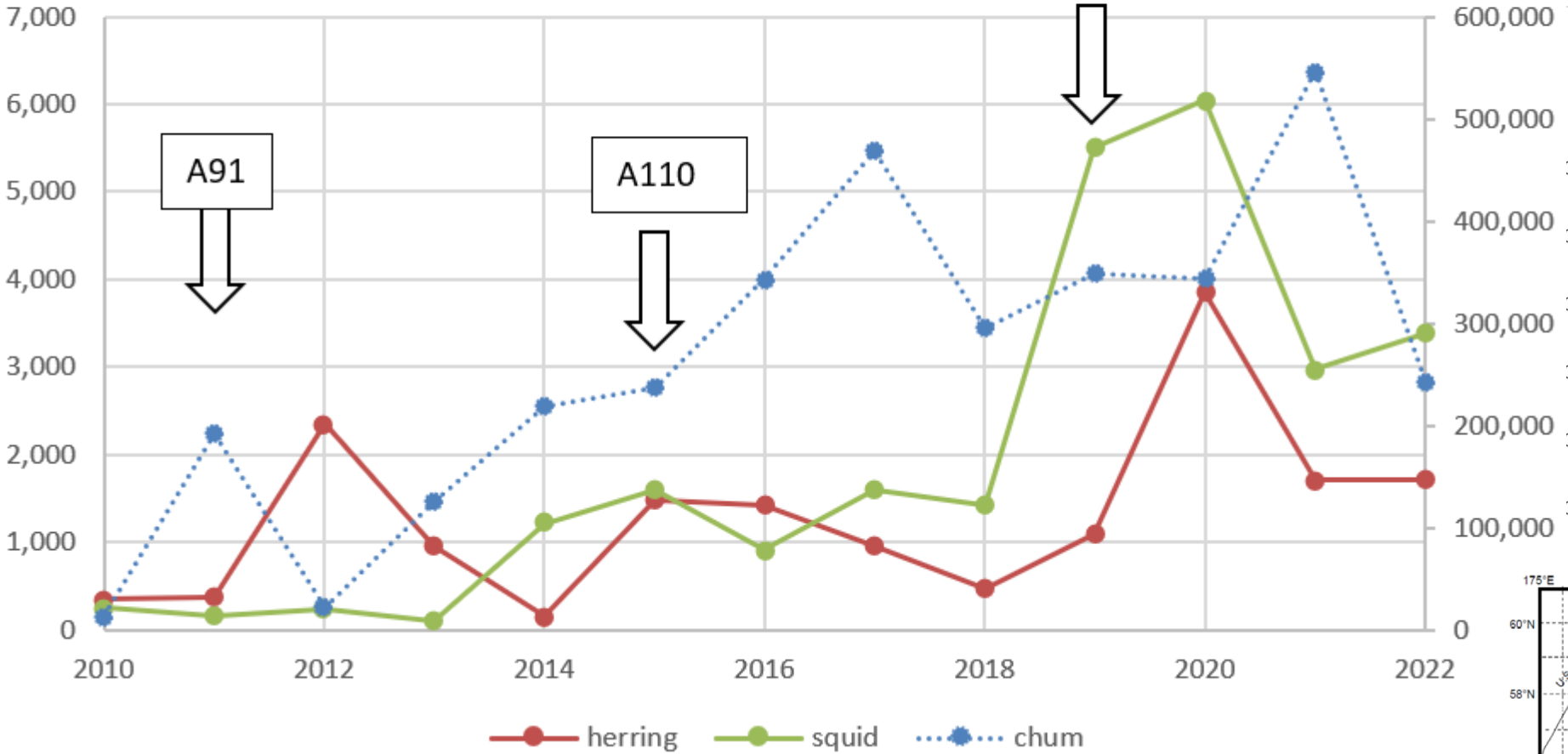


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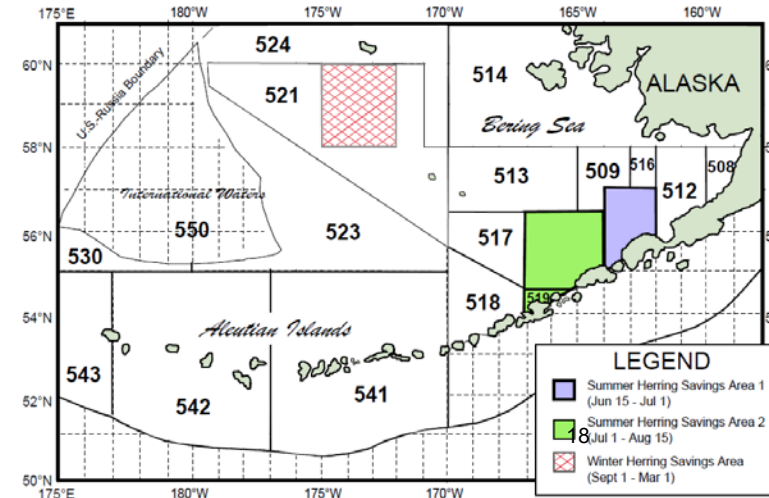


# Chum salmon bycatch, herring and squid catch by EBS pollock fishery 2010-2022

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December 2022

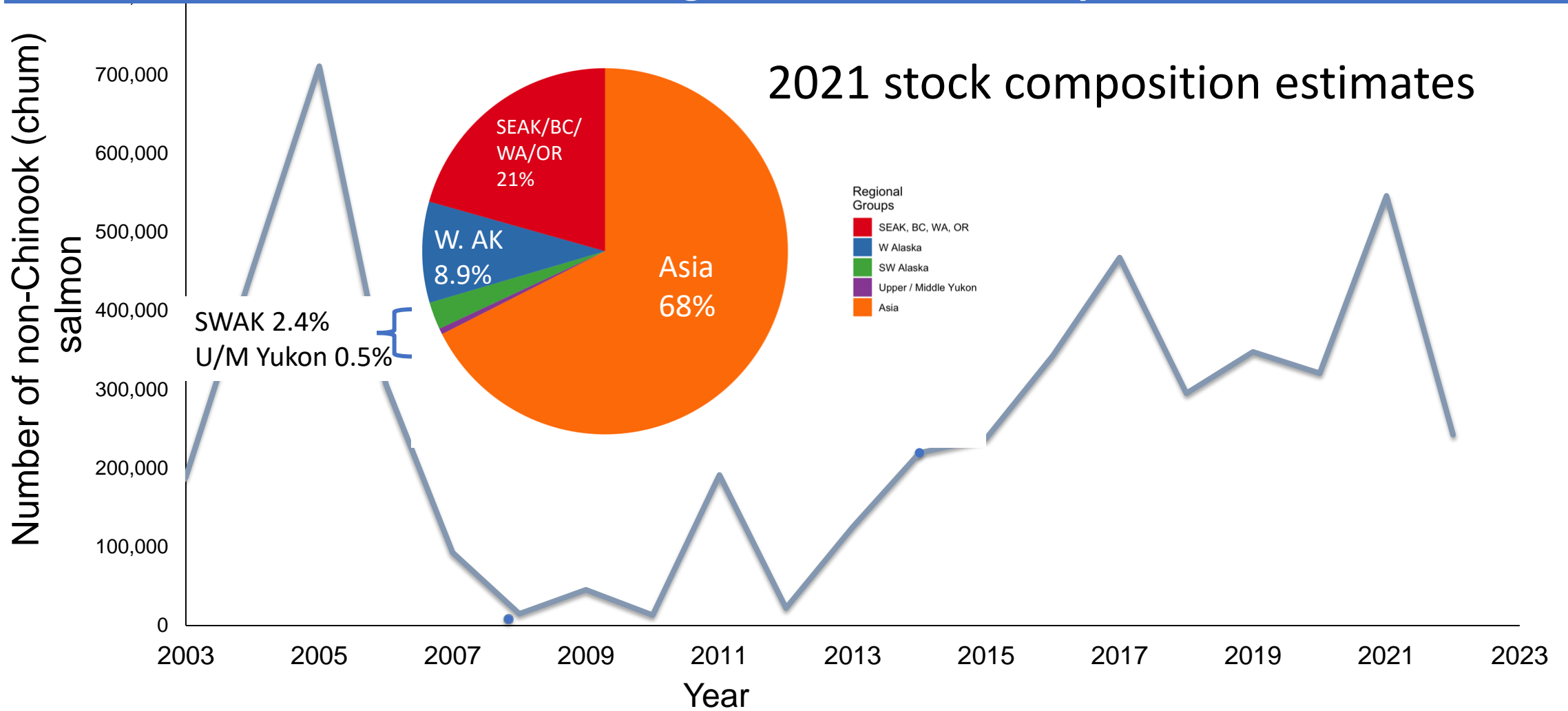


—●— herring    —●— squid    ····●···· chum

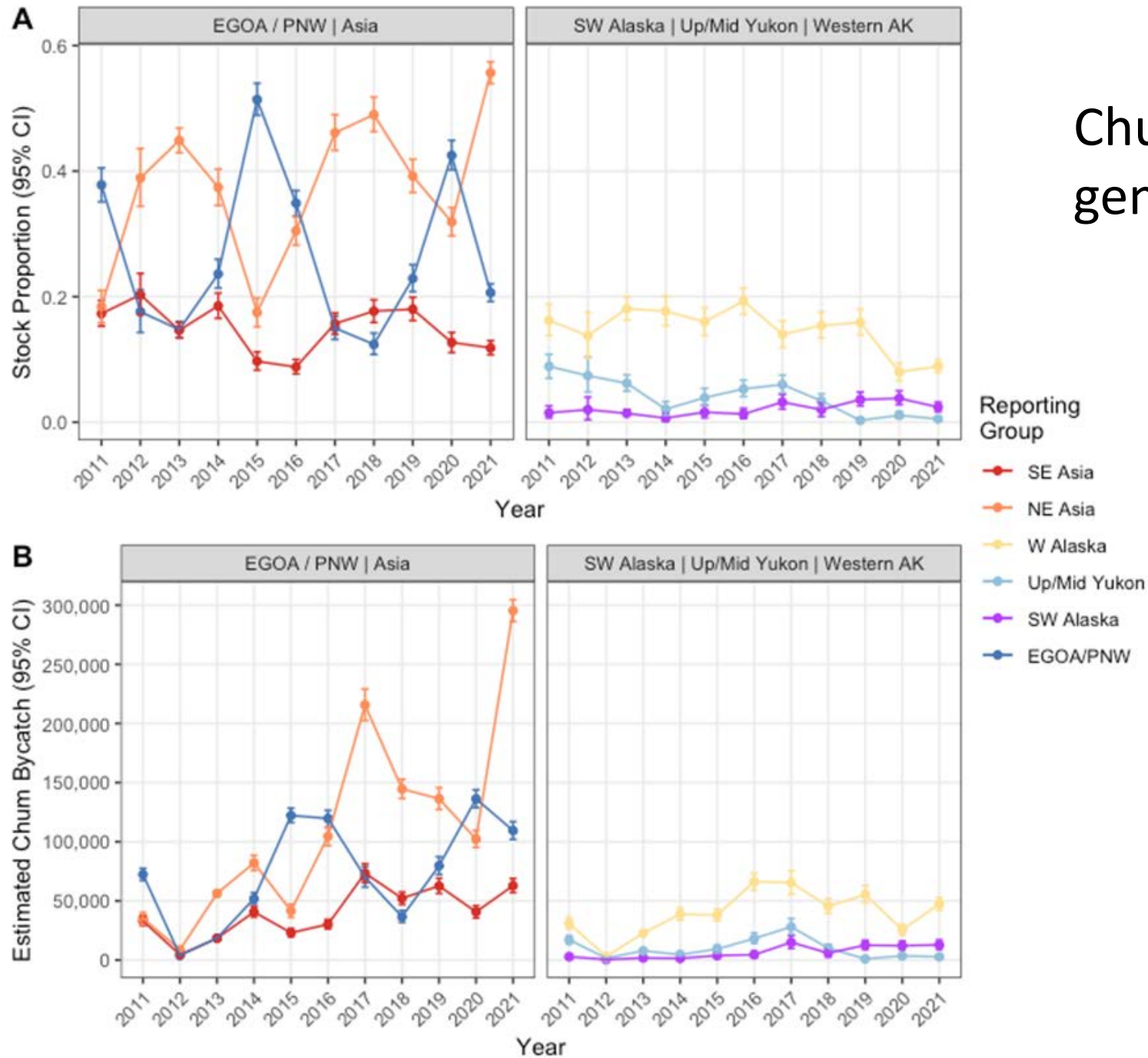


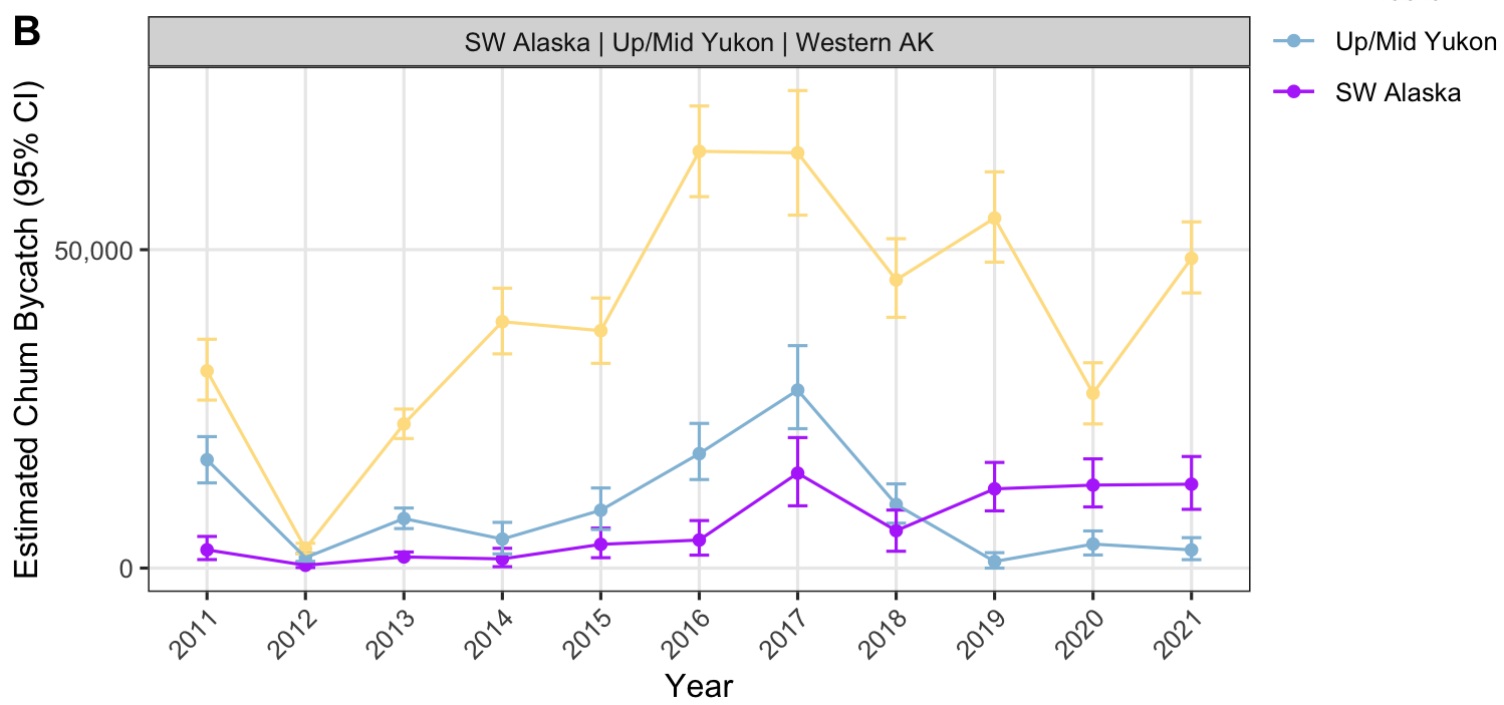
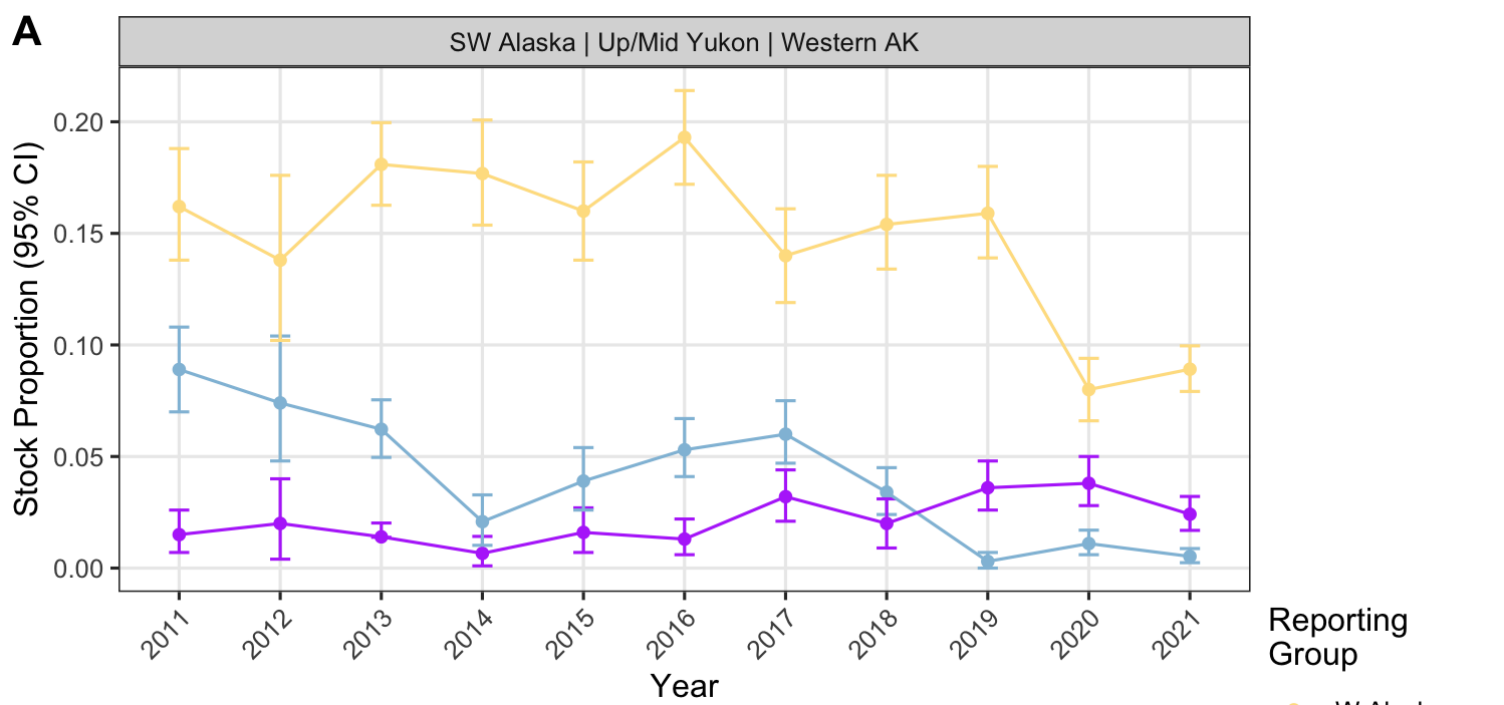
# Review of chum salmon bycatch genetics

## 2003-2022 Bering Sea Chum Salmon Bycatch

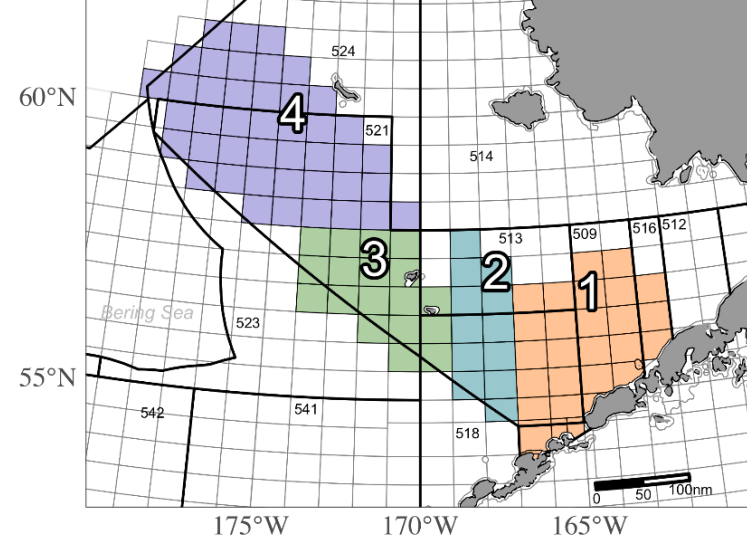


# Chum salmon bycatch genetics

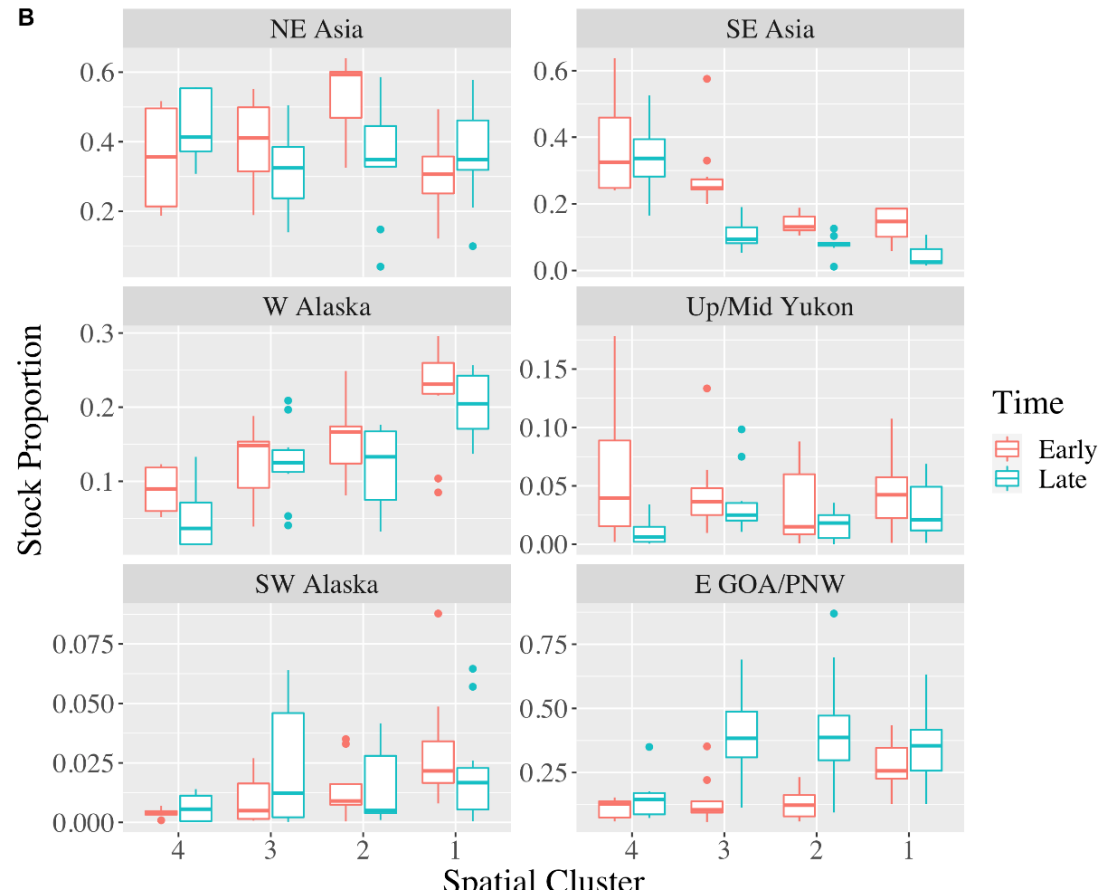


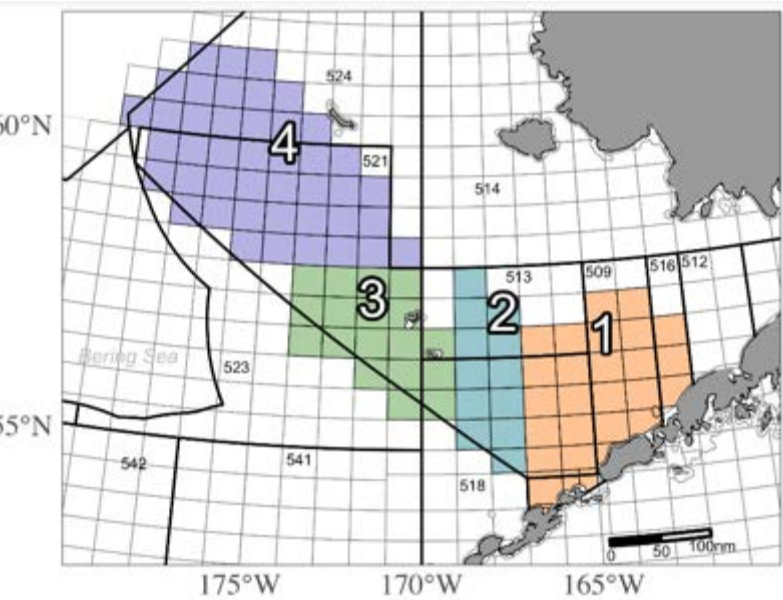




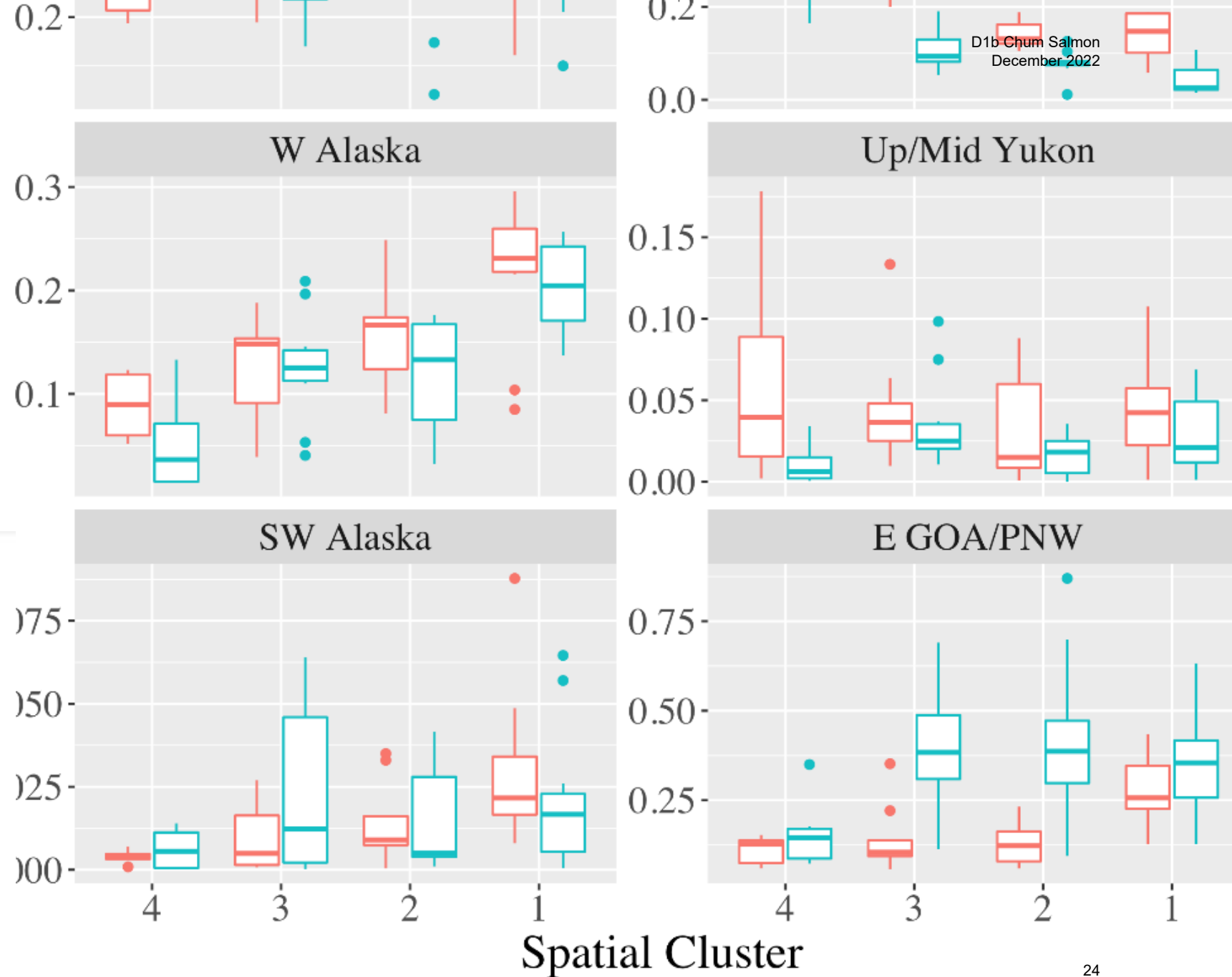


# Early versus late season differences

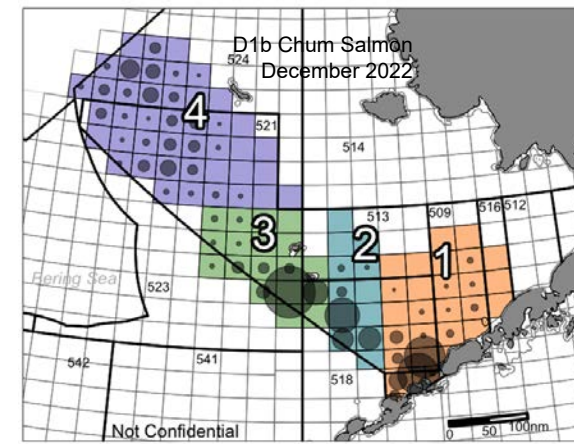
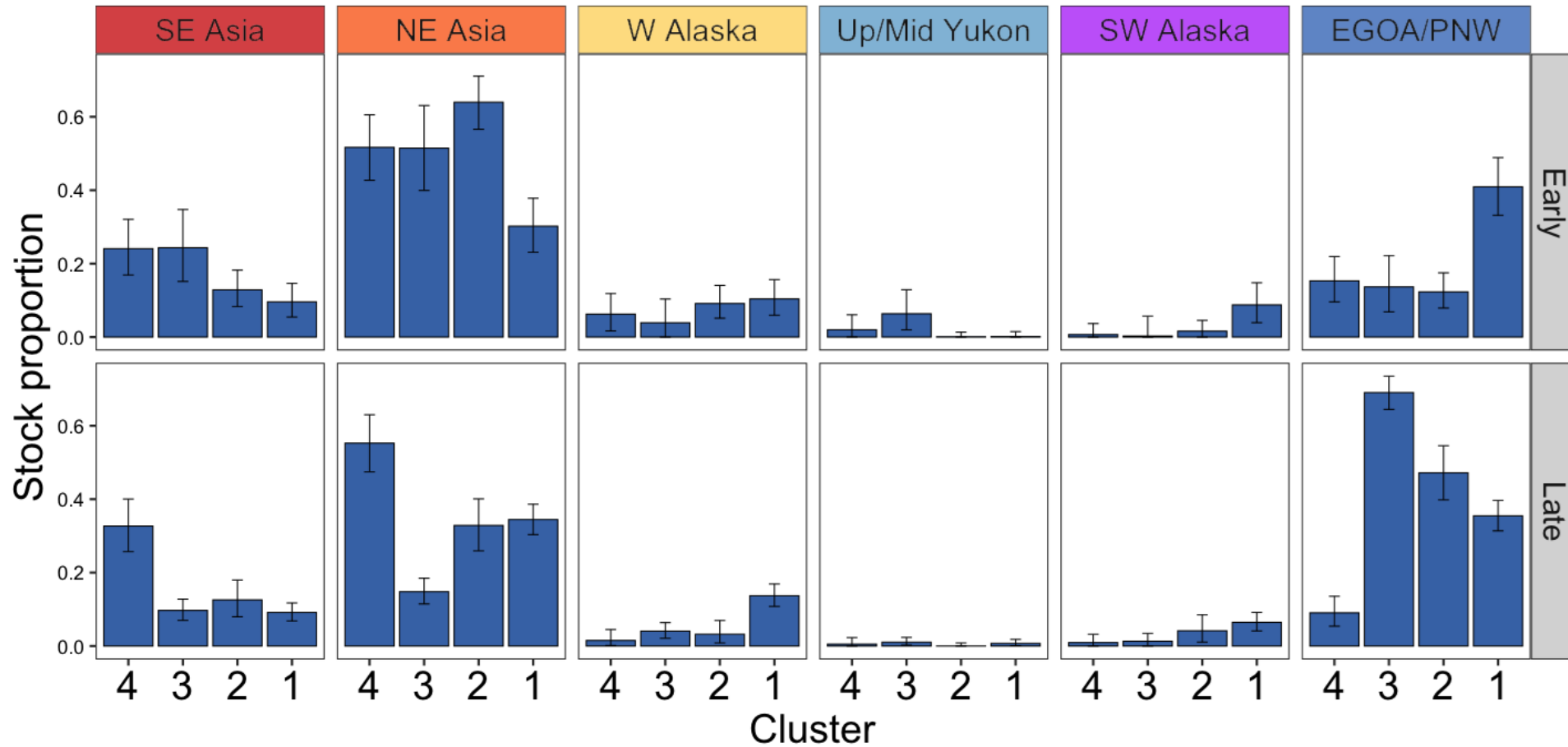




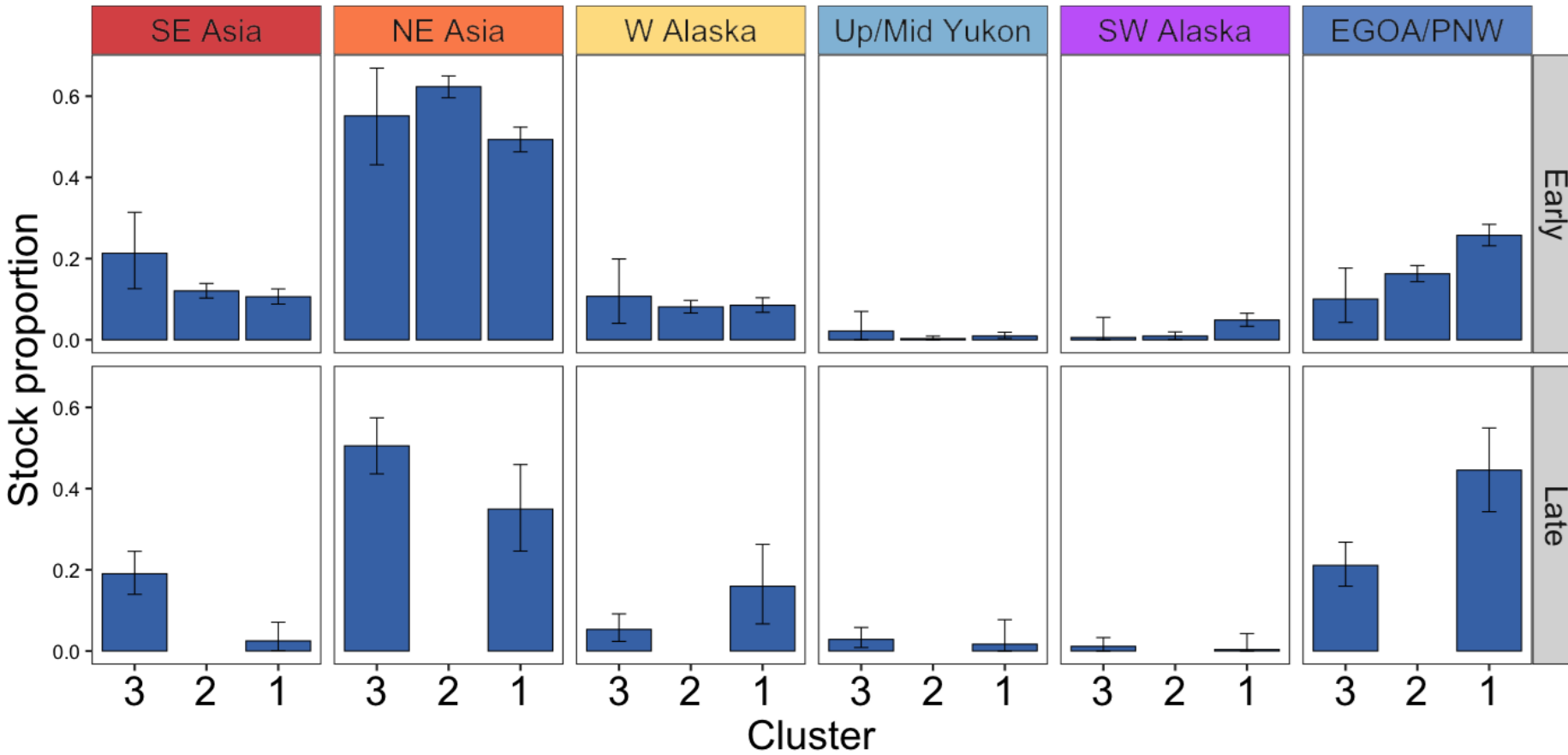
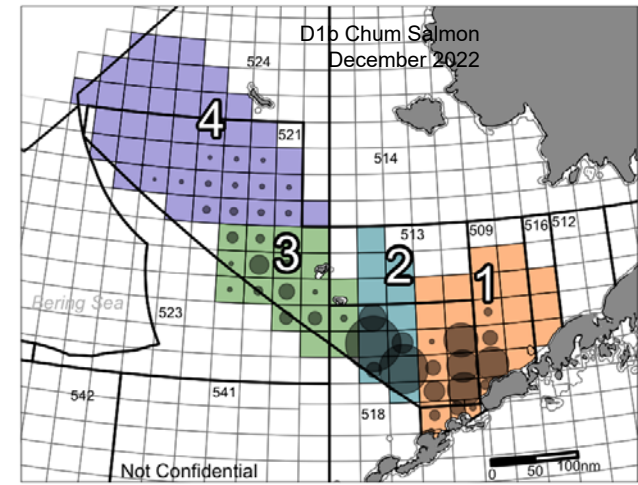
Stock Proportion



# Spatio-temporal variation 2020

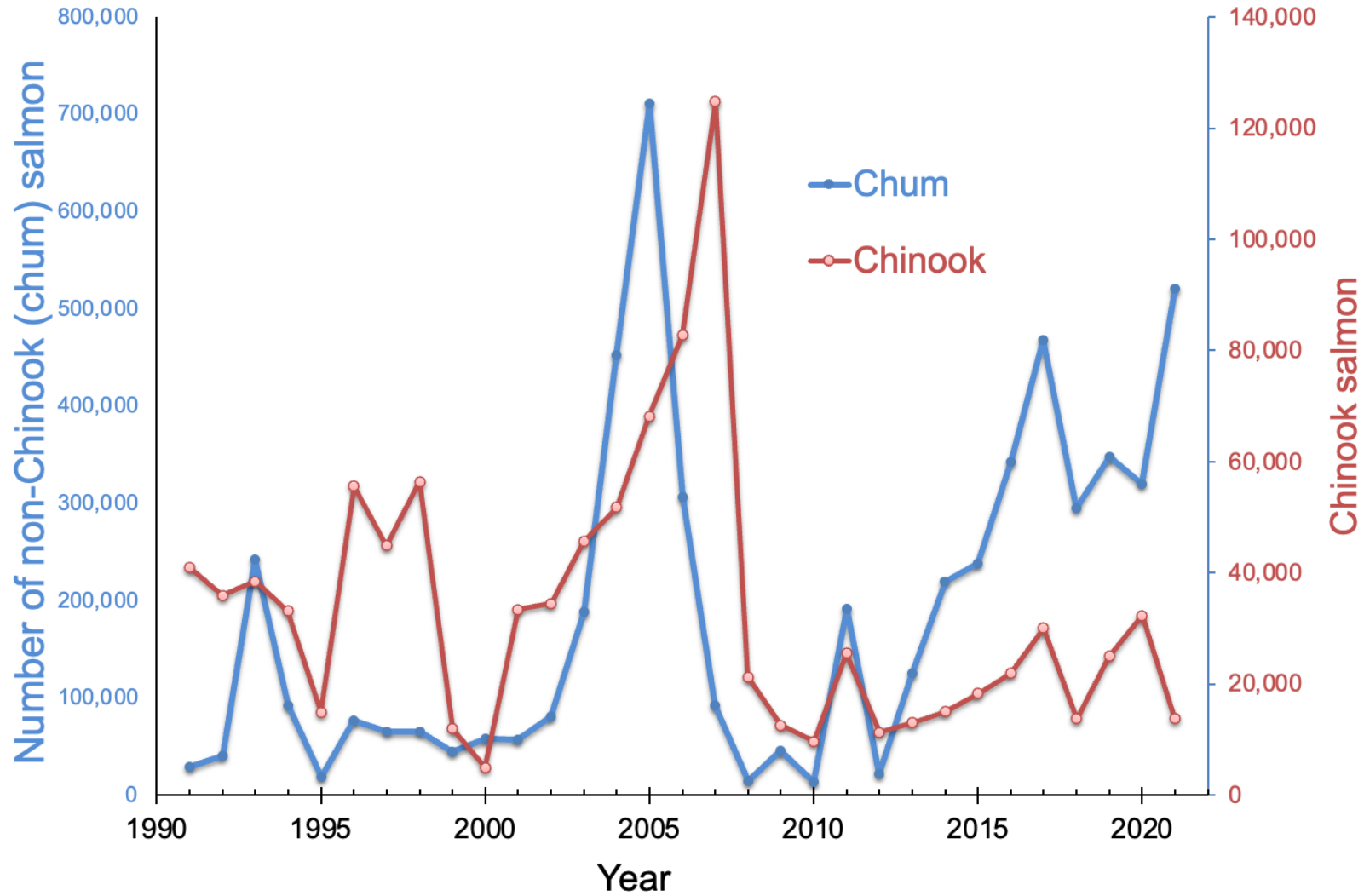


# Spatio-temporal variation 2021

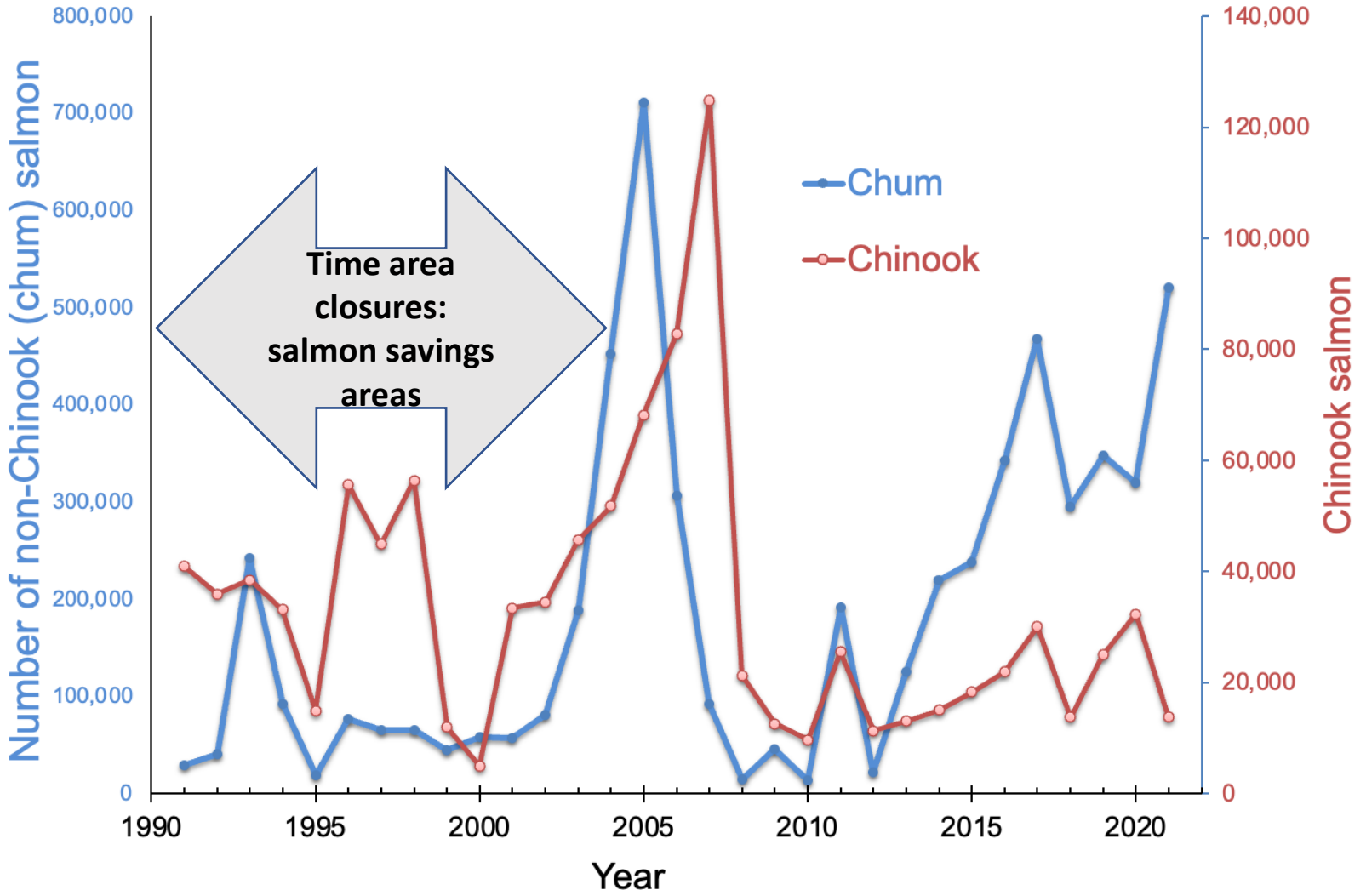


# Brief history of actions related to Chinook and chum salmon bycatch management

## 1991-2021 Bering Sea Chinook and chum salmon bycatch

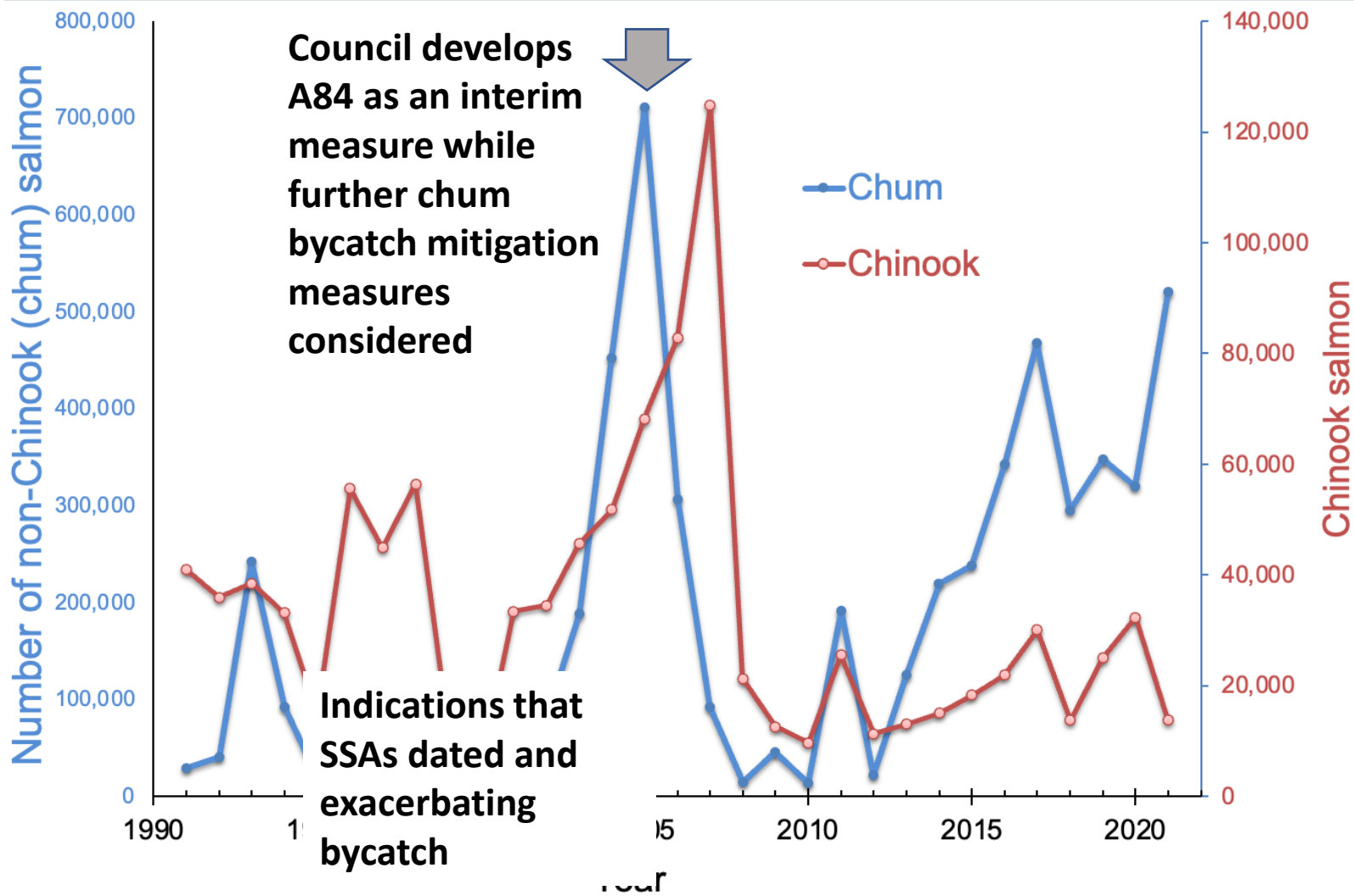


# 1991-2021 Bering Sea Chinook and chum salmon bycatch

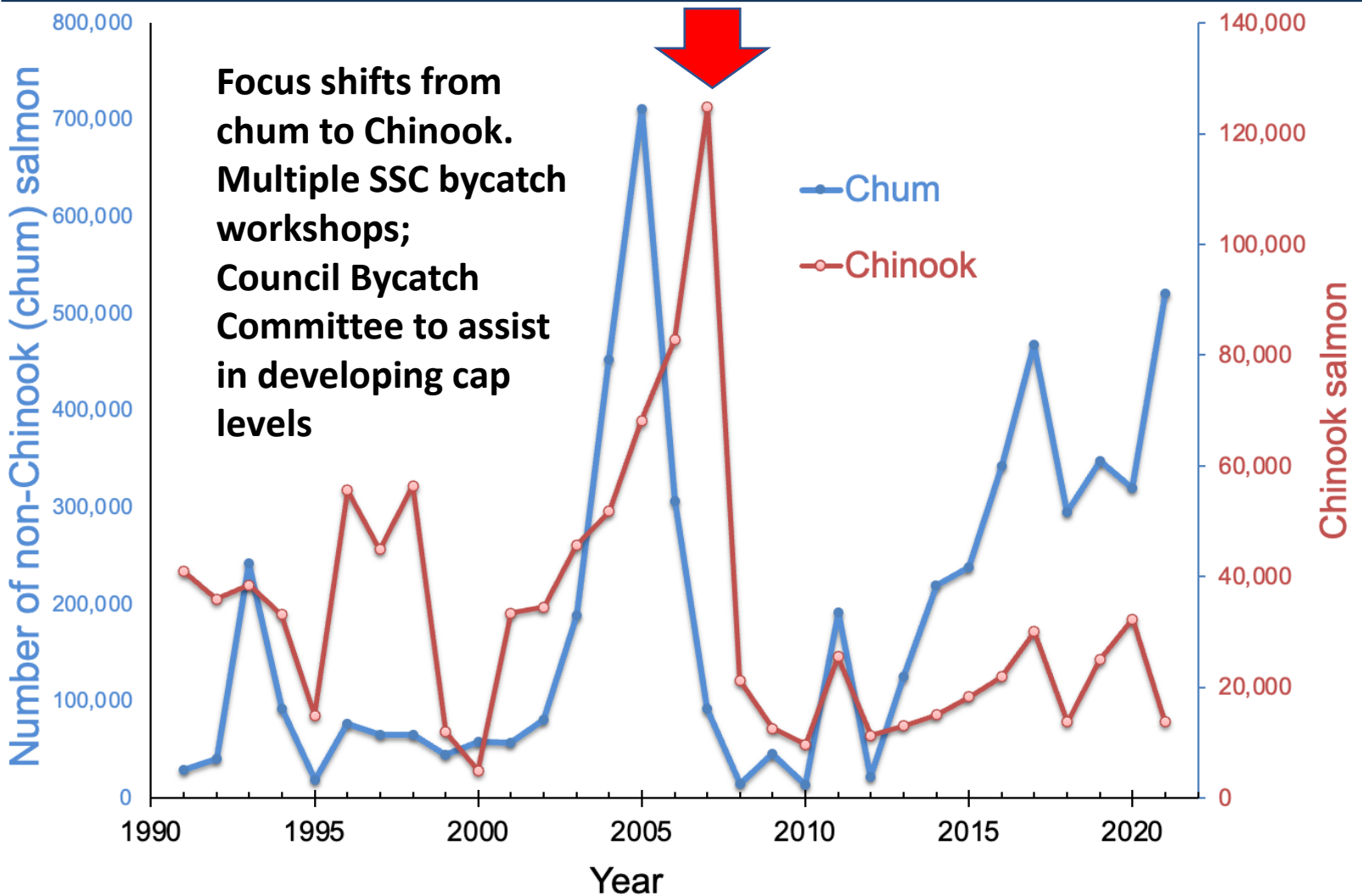




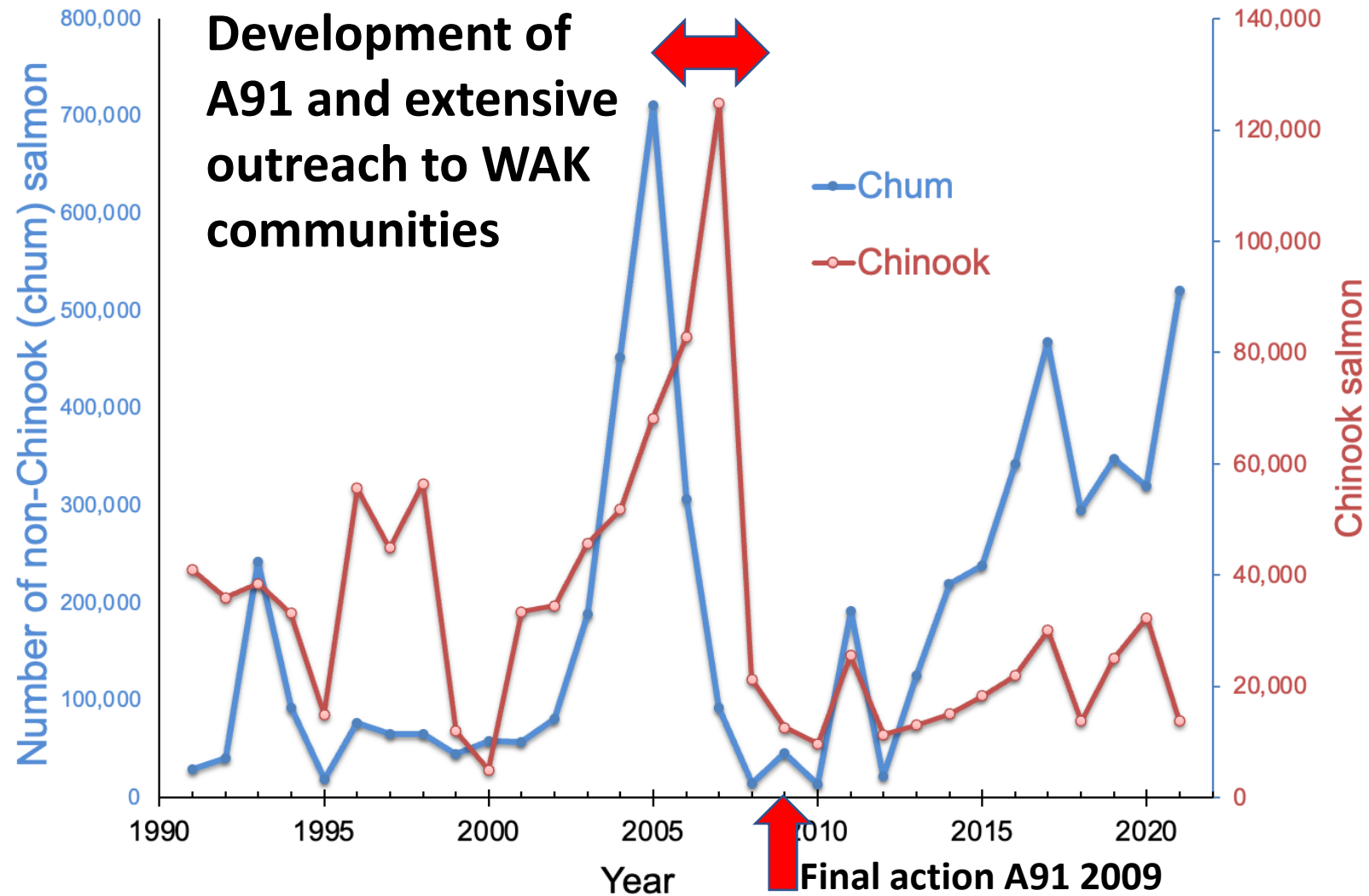
## 1991-2021 Bering Sea Chinook and chum salmon bycatch



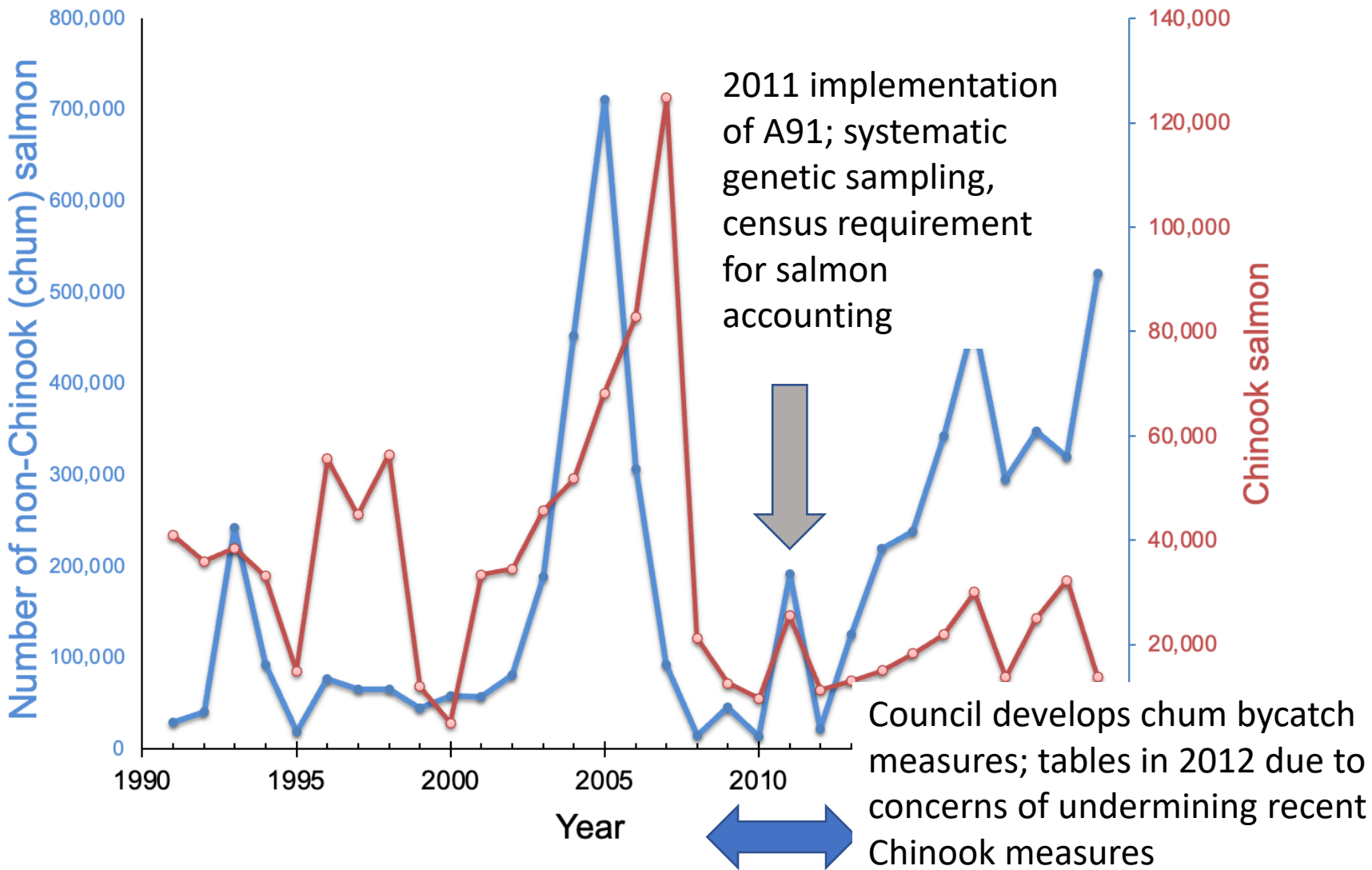
## 1991-2021 Bering Sea Chinook and chum salmon bycatch



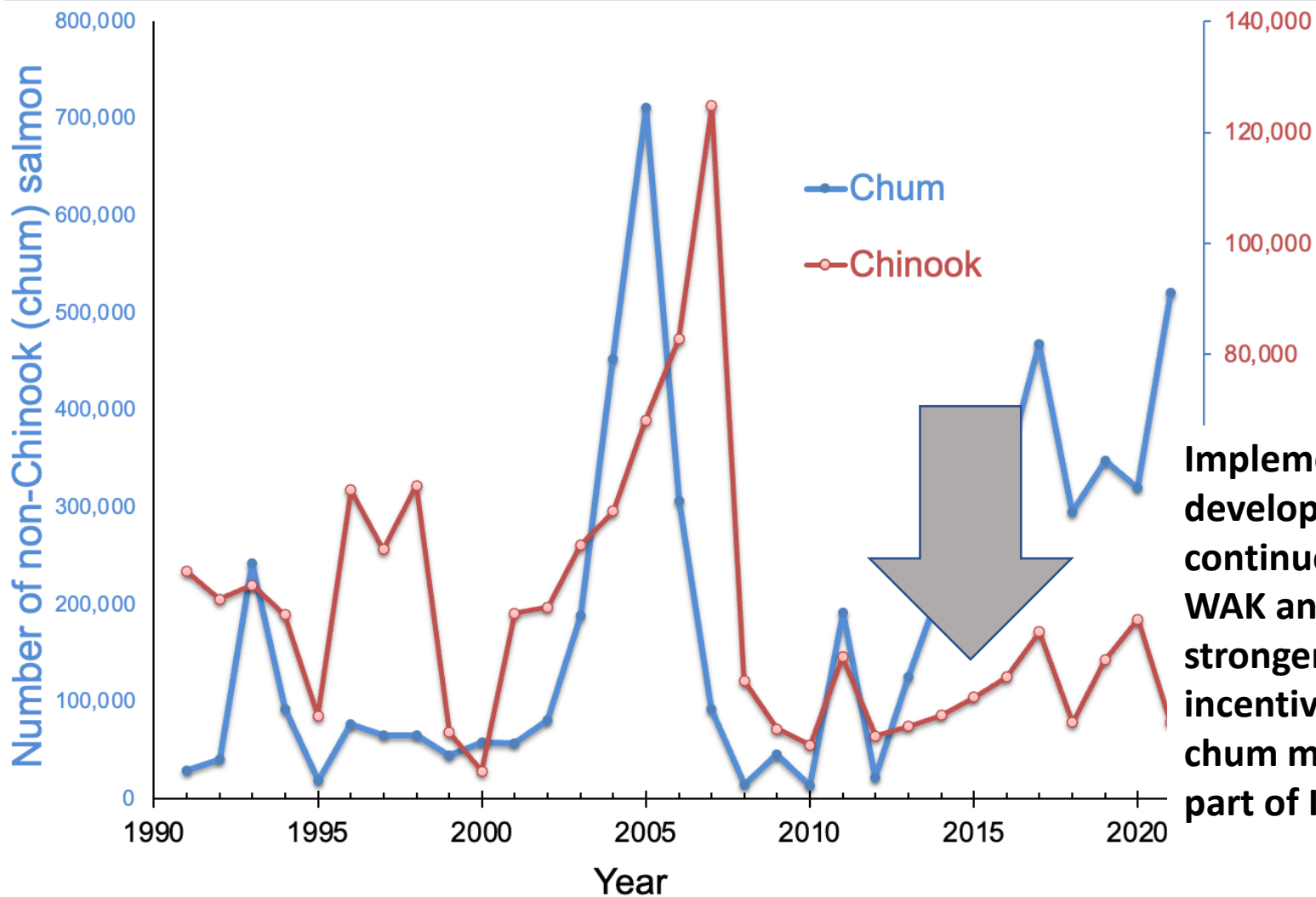
## 1991-2021 Bering Sea Chinook and chum salmon bycatch



## 1991-2021 Bering Sea Chinook and chum salmon bycatch



## 1991-2021 Bering Sea Chinook and chum salmon bycatch



**Implementation of A110; developed in response to continued low Chinook in WAK and the need for stronger vessel level incentives in IPA structure; chum measures included as part of IPA requirements**

# 2012 Chum salmon bycatch analysis overview

# Purpose and Need (2012 chum)

- *Magnuson-Stevens Act National Standards direct management Councils to balance achieving optimum yield with bycatch reduction as well as to minimize adverse impacts on fishery dependent communities. Non-Chinook salmon (primarily made up of chum salmon) prohibited species bycatch (PSC) in the Bering Sea pollock trawl fishery is of concern because chum salmon are an important stock for subsistence and commercial fisheries in Alaska. **There is currently no limitation on the amount of non-Chinook PSC that can be taken in the directed pollock trawl fisheries in the Bering Sea. The potential for high levels of chum salmon bycatch as well as long-term impacts of more moderate bycatch levels on conservation and abundance, may have adverse impacts in fishery dependent communities.***
- *Non-Chinook salmon PSC is managed under chum salmon savings areas and the voluntary Rolling Hotspot System (RHS). Hard caps, area closures and perhaps and enhanced RHS may be needed to ensure that non-Chinook PSC is limited and remains at a level that will minimize adverse impacts on fishery dependent communities. The Council should structure non-Chinook PSC management measures to **provide incentive for the pollock trawl fleet to improve performance in avoiding non-Chinook salmon** while achieving optimum yield from the directed fishery and **objectives of the Amendment 91 Chinook salmon PSC management program. Non-Chinook salmon PSC reduction measures should focus, to the extent possible, on reducing impacts to Alaska chum salmon as a top priority.***



# Alternatives considered

## PSC limits

- June/July only
- B season limit

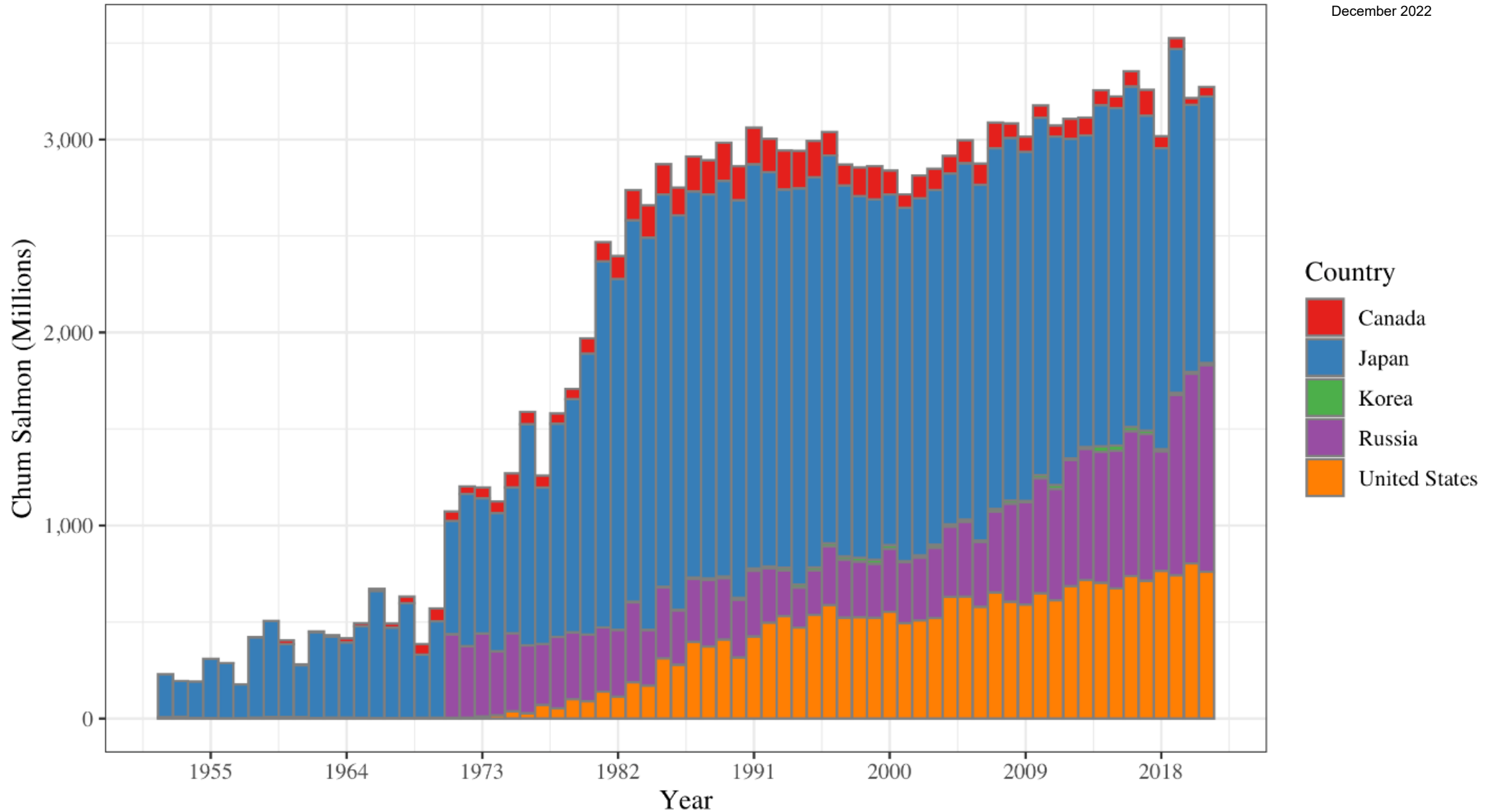
## Area closures associated with triggered PSC limit

- June/July only closure
- B season closure

Table 2-1 Summary table from the Chum 2012 PSC management measures analysis to indicate relative differences between alternatives in terms of changes in Chum, Chinook and Pollock catch

Option	Cap	Change in Chum salmon AEQ (numbers that would have returned to spawn)			Pollock forgone or diverted	Chinook PSC change
		Western Alaska	Asian	Total chum	Pollock	Chinook
<b>Alternative 2</b>	50,000	30,279	99,013	167,610	322,620	17,304
	1a) 200,000	16,269	62,727	101,275	118,561	8,651
	353,000	6,799	34,118	51,093	53,073	5,349
	15,600	12,529	-8,587	11,416	126,796	-5,934
	1b) 62,400	10,300	-3,907	12,247	66,303	-3,373
	110,136	8,584	-1,199	12,339	40,388	-2,142
<b>Alternative 4</b>	25,000	19,529	54,252	97,071	129,898	7,805
	1a) 75,000	16,001	48,006	83,718	86,605	5,686
	200,000	8,804	35,604	57,043	39,090	3,652
	7,800	12,618 (12,194)	227 (16,986)	21,709 (40,790)	47,537 (139,473)	-3,682 (273)
	1b) 23,400	12,573 (11,858)	5,876 (16,001)	27,579 (38,608)	31,951 (116,395)	-2,537 (209)
	62,400	10,372 (9,576)	5,083 (12,575)	22,657 (30,478)	20,553 (86,571)	-1,702 (146)
	25,000	12,085	21,651	46,274	103,527	2,716
	2a) 75,000	10,063	20,716	41,647	65,454	2,185
	200,000	4,645	14,746	25,558	28,970	1,039
	7,800	9,918 (7,762)	1,958 (10,817)	19,059 (25,990)	29,588 (82,323)	-2,464 (84)
	2b) 23,400	10,019 (8,210)	7,321 (10,965)	25,013 (26,536)	17,179 (64,890)	-1,496 (57)
	62,400	8,311 (6,914)	6,486 (8,954)	20,947 (21,777)	9,620 (44,300)	-885 (31)

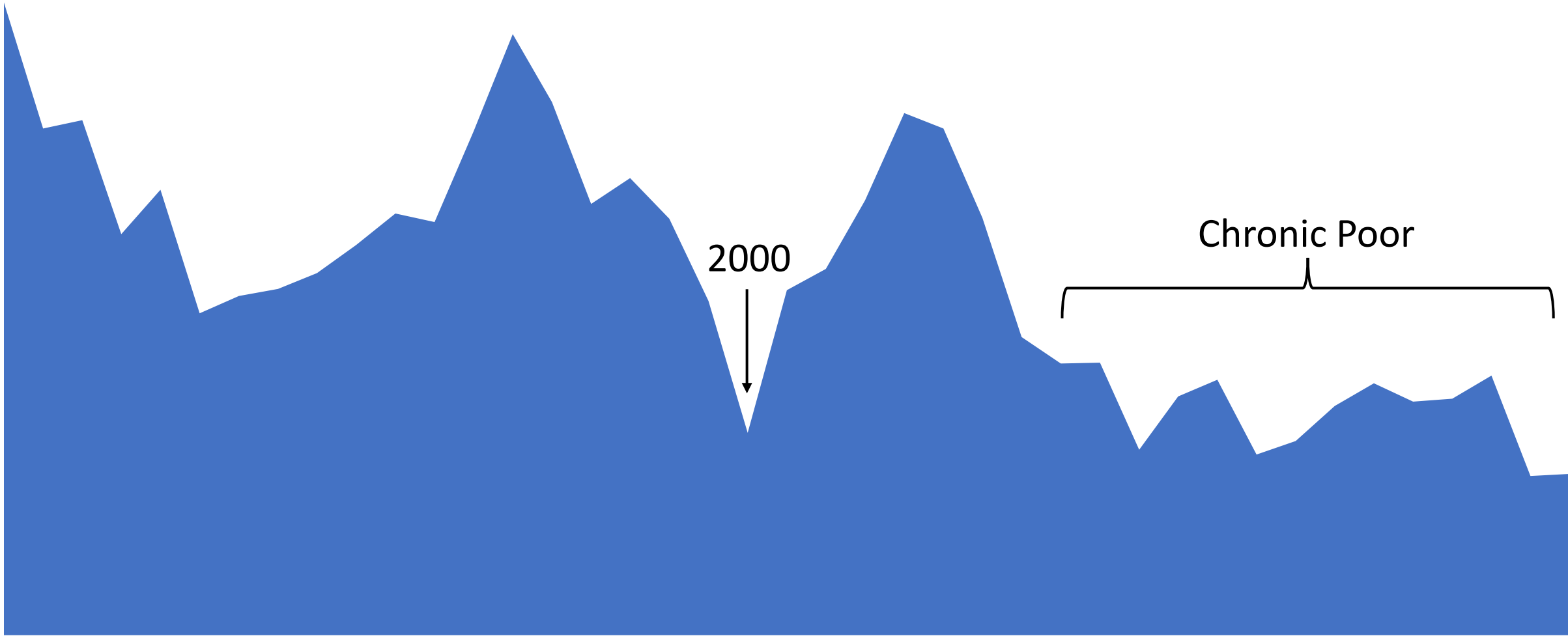
# Hatchery releases Pacific Rim



Hatchery releases NPAFC data 1951-2021

# Western Alaska stock status

# Western Alaska Chinook Salmon Index



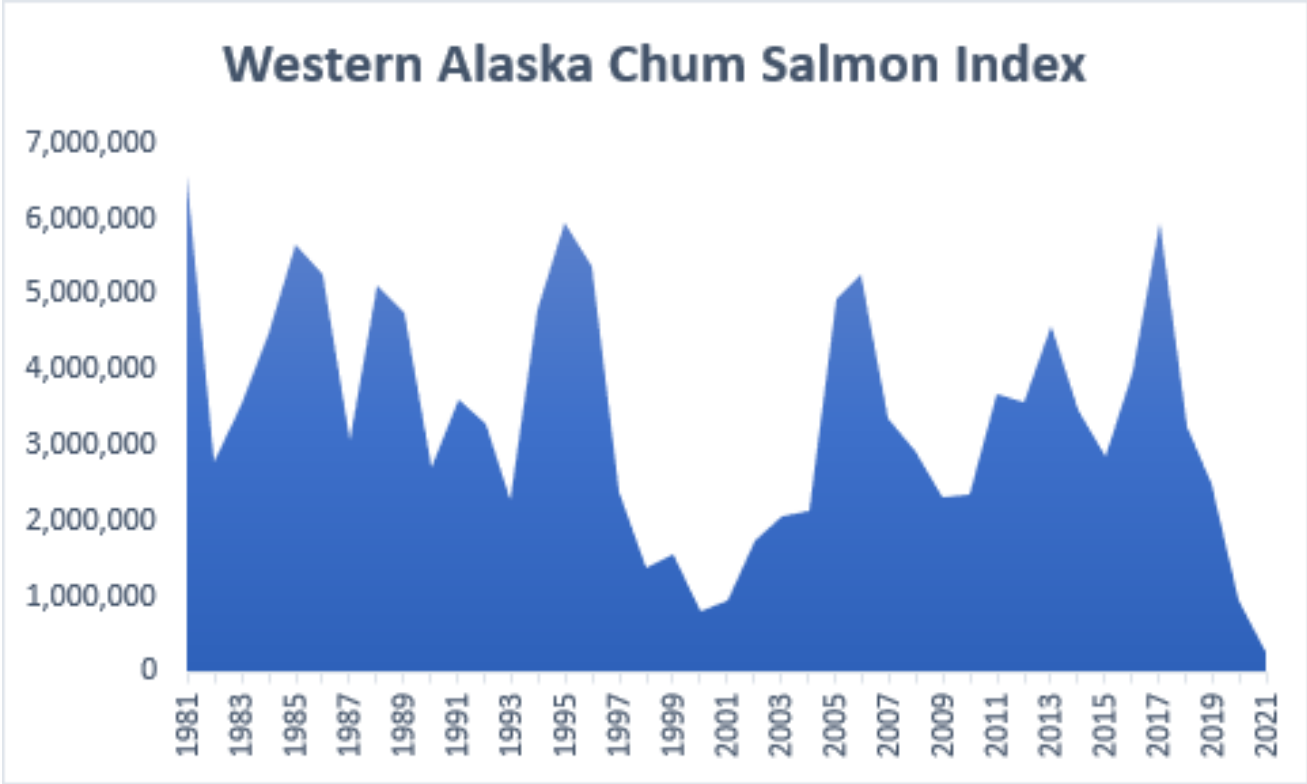
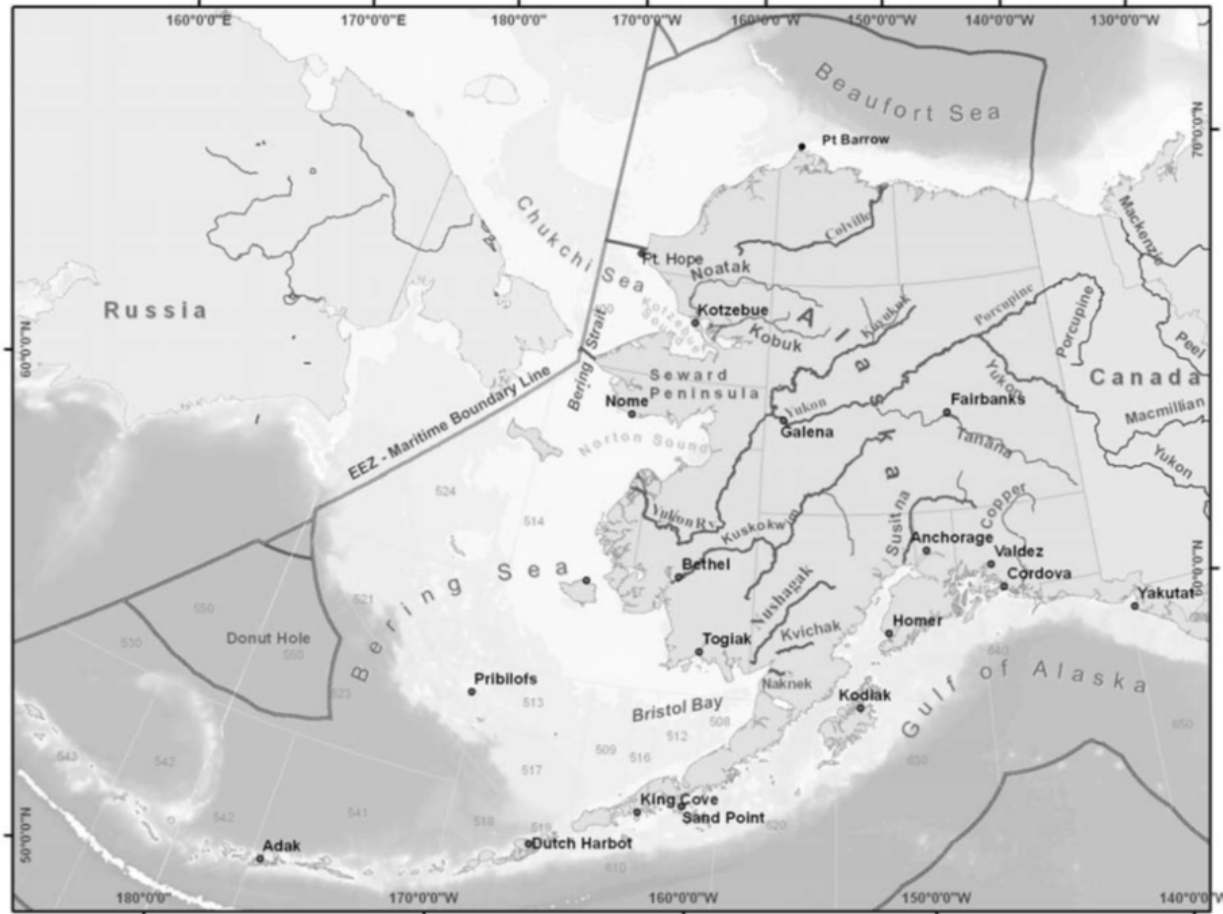
2000

Chronic Poor

1981

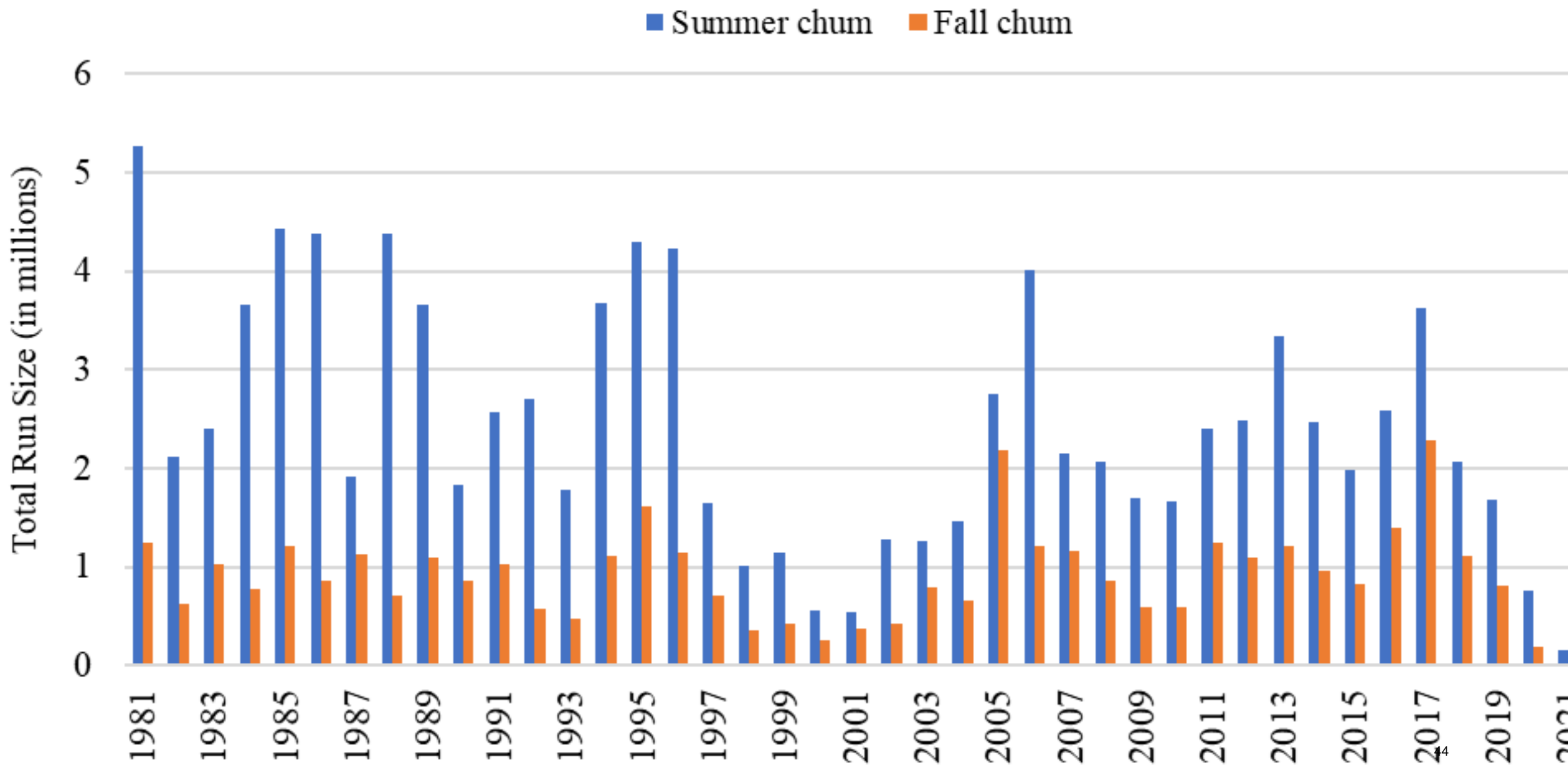
42

2021



# Yukon River Chum Salmon Run Size

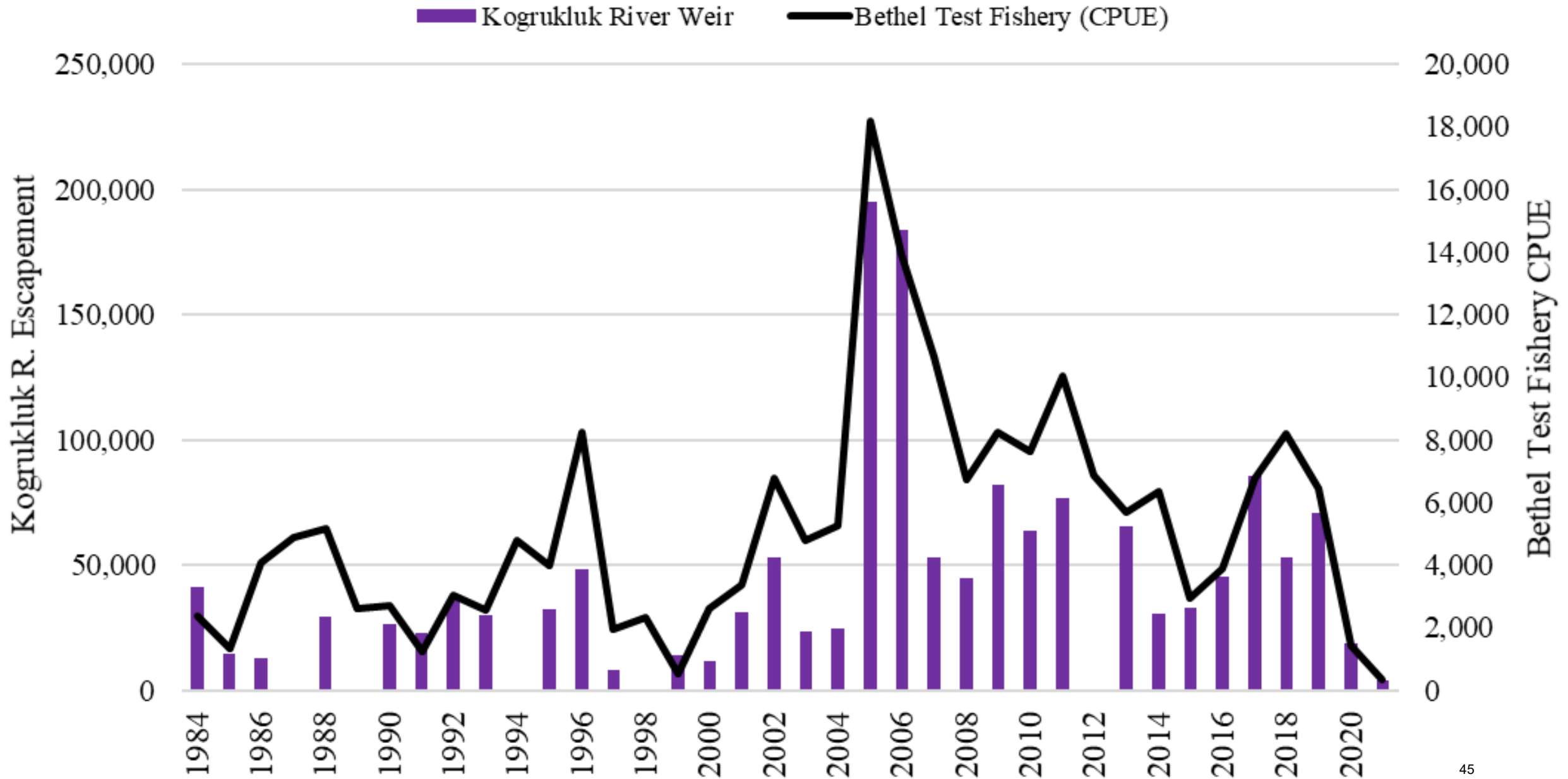
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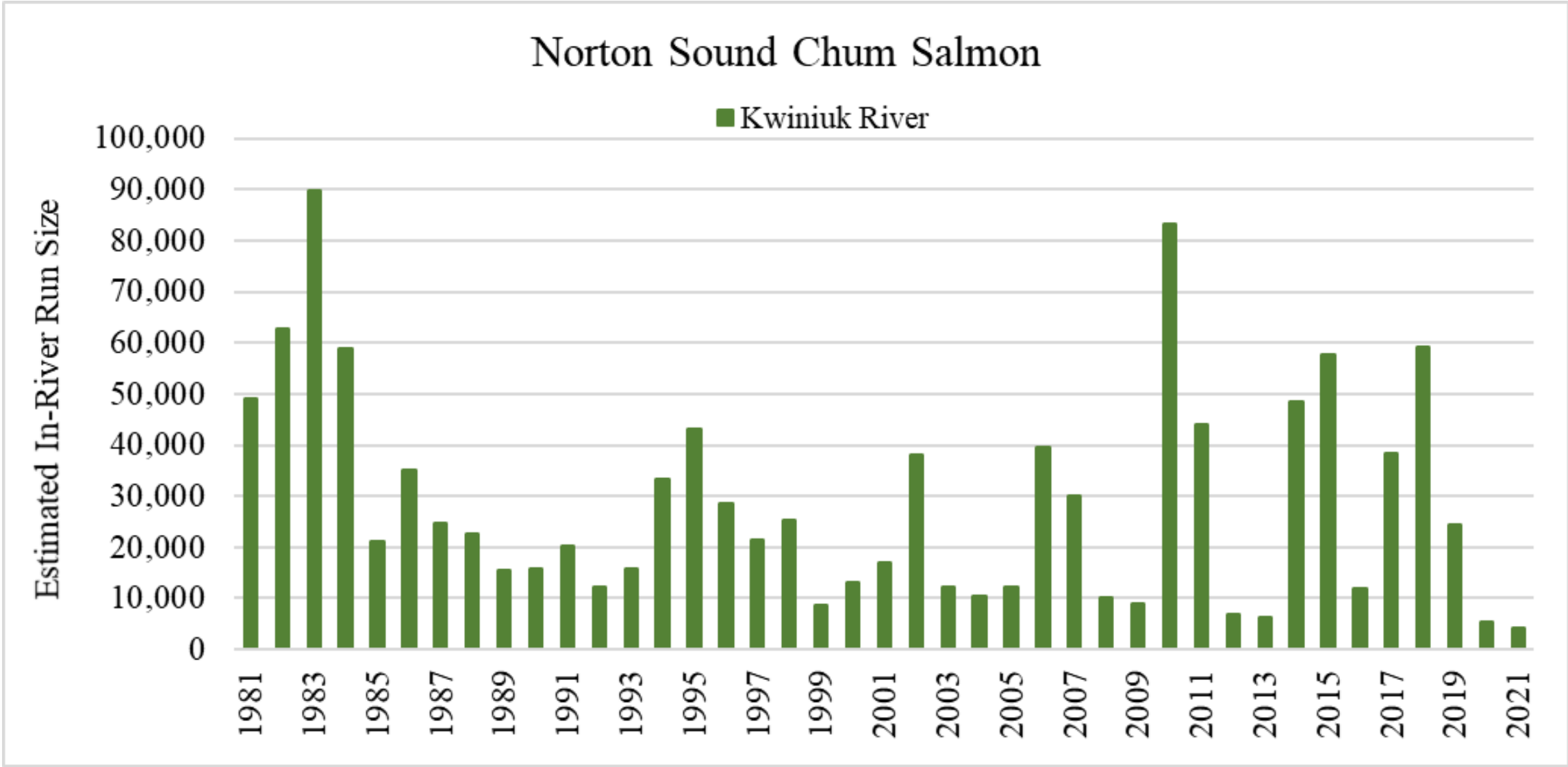




# Kuskokwim River Chum Salmon Abundance

D1b Chum Salmon  
December 2022





# Stock status changes from 2010 (left) to 2020 (right)

Table 4-2 Overview of western Alaskan chum salmon stock performance, 2010

Chum salmon stock	Total run size?	Escapement goals met? <sup>1</sup>	Subsistence fishery?	Commercial fishery?	Sport fishery?	Stock of concern?
Bristol Bay	Above average	1 of 1	Yes	Yes	Yes	No
Kuskokwim Bay	Above average	2 of 2	Yes	Yes	Yes	No
Kuskokwim River	Average	2 of 2	Yes	Yes	Yes	Yield concern discontinued 2007
Yukon River summer run	Average	2 of 2	Yes	Yes, but limited by low Chinook	Yes	Management concern discontinued 2007
Yukon River fall run	Below average	6 of 8	Restrictions	Limited season (Tanana River)	No	Yield concern discontinued 2007
Eastern Norton Sound	Above average	1 of 1	Yes	Yes	Yes	No
Northern Norton Sound	Above average	7 of 7	Yes	Yes	Yes, except for Nome Subdistrict	Yield concern (since 2000)
Kotzebue	Above average	6 of 6	Yes	Yes	Yes	No

<sup>1</sup> Some aerial survey-based escapement goals were not assessed due to inclement weather or poor survey conditions.

Table 1. Summary of Western Alaska chum salmon stock status, 2020.

Stock	Abundance?	Escapement goals met? <sup>a</sup>	Subsistence Fishery?	Commercial Fishery?	Sport Fishery?
Nushagak River	Below average	0 of 1	Yes	Yes	Yes
Kuskokwim Bay	Below average	NS <sup>b</sup>	Yes	No	Yes
Kuskokwim River	Below average	1 of 1	Yes	Limited	Yes
Yukon River summer run	Below average	1 of 1	Limited	Limited	Yes
Yukon River fall run	Below average	1 of 4 <sup>c</sup>	Limited	No	No
Norton Sound	Below average	2 of 4	Yes	Limited	Yes
Kotzebue	Below average	NS <sup>b</sup>	Yes	Limited	Yes

<sup>a</sup> Includes performance for the subset of goals that were assessed. Some escapement goals were not assessed for various logistical reasons, including funding and weather.  
<sup>b</sup> No survey, escapement goal was not assessed.  
<sup>c</sup> Includes 2 U.S./Canada goals.

# Stock status changes from 2011 (left) to 2021 (right)

Table 4-1 Summary of western Alaskan chum salmon stock status 2011.

Chum salmon stock	Total run size?	Escapement goals met? <sup>1</sup>	Subsistence fishery?	Commercial fishery?	Sport fishery?	Stock of concern?
Bristol Bay	Below average	1 of 1	Yes	Yes	Yes	No
Kuskokwim Bay	Average	1 of 1	Yes	Yes	Yes	No
Kuskokwim River	Above Average	2 of 2	Yes	Yes	Yes	No
Yukon River summer run	Above Average	2 of 2	Yes	Yes, but limited by low Chinook	Yes	No
Yukon River fall run	Above average	7 of 8	Yes	Yes	Yes	No
Eastern Norton Sound	Above average	1 of 1	Yes	Yes	Yes	No
Northern Norton Sound	Above average	7 of 7	Yes	Yes	Yes, except for Nome Subdistrict	Yield concern (since 2007)
Kotzebue	Above average	No surveys in 2011	Yes	Yes	Yes	No

<sup>1</sup> Some aerial survey-based escapement goals were not assessed due to inclement weather or poor survey conditions.

Table 2. Summary of Western Alaska chum salmon stock status, 2021.

Stock	Abundance?	Escapement goals met? <sup>a</sup>	Subsistence Fishery?	Commercial Fishery?	Sport Fishery?
Nushagak River	Below average	0 of 1	Yes	Yes	Yes
Kuskokwim Bay	Below average	NS <sup>b</sup>	Yes	No	Yes
Kuskokwim River	Below average	0 of 1	Limited	No	No
Yukon River summer run	Below average	0 of 3	No	No	No
Yukon River fall run	Below average	0 of 5 <sup>c</sup>	No	No	No
Norton Sound	Below average	2 of 4	Yes	Limited <sup>d</sup>	Yes
Kotzebue	Below average	NS <sup>b</sup>	Yes	Limited	Yes

<sup>a</sup> Includes performance for the subset of goals that were assessed. Some escapement goals were not assessed for various

<sup>b</sup> No survey, escapement goal was not assessed.

<sup>c</sup> Includes 2 U.S./Canada goals.

<sup>d</sup> Closed in subdistrict 1.

# Summary

## Bycatch trends

- Increasing chum bycatch trends in recent years with 2<sup>nd</sup> highest historical in 2021; decline in 2022
- Herring catch periodic closures of HSAs
- Squid catch increased and above long term average

## Bycatch management and rationale

- Rationale for chum bycatch management for avoidance of WAK chum without undermining Chinook bycatch management priority

## Genetic stock composition and spatio-temporal variation

- WAK contribution low (average 9% over last two years) while Asian component ~52%
- WAK chum encountered more frequently in S Bering Sea and earlier in B season
- Hatchery releases consistent trends with Japan highest and Russian contributions increasing over last 3 years

## Western Alaska stock status

- Remains poor and declined since 2012