C2 Bering Sea Chum Salmon Bycatch

Preliminary Draft Environmental Impact Statement and Social Impact Assessment

North Pacific Fishery Management Council, April 2024

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Presentation Outline

1. Action timeline
    1. Purpose and need
2. Description of alternatives (Chapter 4)
3. Methods used for impact analysis (Chapter 5)
4. Impact analysis (Chapter 6)

Organization of Presentation of Impact Analysis

- **Chum salmon**
  - Status of chum stocks
  - Environmental causes of decline
  - Subsistence harvests
  - Commercial chum salmon fishing in WAK
  - Impacts to chum
  - Impacts to communities and regions engaged in subsistence and commercial chum salmon fishing
- **Pollock**
  - Distribution
  - AFA sectors
  - CDQ program
  - Community participation and engagement in the Bering Sea pollock fishery
- **Chinook and herring**
  - PSC tradeoffs and related considerations
- **Assessment of IPA Proposals**

Council Timeline for the Bering Sea Chum Salmon Bycatch Action

June 2022

- Initiated in June 2022
- Convened for three meetings
- Recommendations on concepts for alternatives finalized in March 2023

April 2023

- Received annual update on scientific and industry reports
- Council adopted Purpose and Need statement as well as preliminary set of alternatives

October 2023

- Council reviewed preliminary analysis on the feasibility of alternatives
- Finalized alternatives for analysis of potential impacts

April 2024

- Council receives Initial Review analysis
- Council may modify or refine alternatives
- Council may request additional review
- Council may recommend publication by NMFS as a DEIS

We are here

Summary of Council Action

1. The Council may modify or refine its alternatives at this time
2. The Council may determine if/how it would like to move this action forward
    1. Schedule additional review of this analysis
    2. Recommend the preliminary DEIS be revised based on input at this meeting and released for publication by NMFS as a DEIS
        1. The Council may choose to identify a Preliminary Preferred Alternative

NEPA Procedural Changes Influencing this Environmental Impact Statement

- NMFS Alaska Region determined this action will require an Environmental Impact Statement (EIS) be prepared (June 2023)
  - The Notice of Intent to prepare an EIS for the Bering Sea chum salmon bycatch action was published on July 11, 2023
- The Fiscal Responsibility Act was signed on June 3, 2023
  - Effective immediately it constrains the overall timeline for preparing and completing an EIS to **two years** and **limits the EIS to 150 pages in length**
- Time clock starts with the publication of the Notice of Intent and **ends with the publication of the Final EIS**
  - Would allow for additional review in 2024

Purpose and Need Statement

Objectives in the purpose and need statement

- Minimize chum salmon bycatch in the Eastern Bering Sea pollock fishery
- Minimize Western Alaska (WAK) chum salmon bycatch
  - Do so while maintaining the priority objective of the Chinook salmon bycatch avoidance program
- Balance the National Standards
- Considering this action in light of the recent and ongoing declines in Western Alaska chum salmon abundance

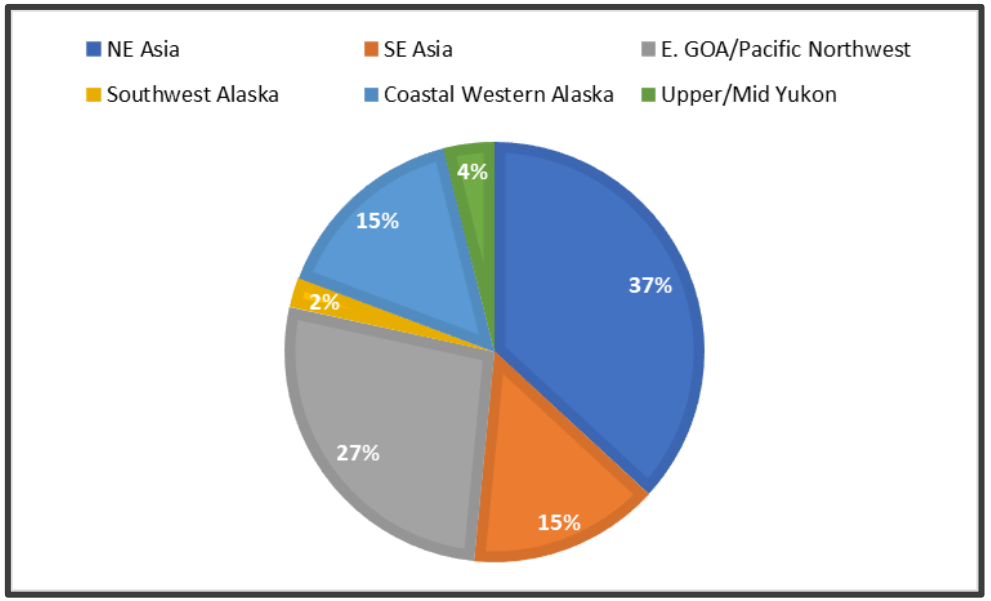


Figure 1-1 Average proportion of genetic stock composition estimates for chum salmon bycatch, 2011-2022

Section 1.1 Pg. 33-34 DEIS

Dutch Harbor, ASMI Industry and Partner Use

DESCRIPTION OF ALTERNATIVES (CHAPTER 4)

Alternative 1

Alternative 1 – Chum Salmon Savings Area

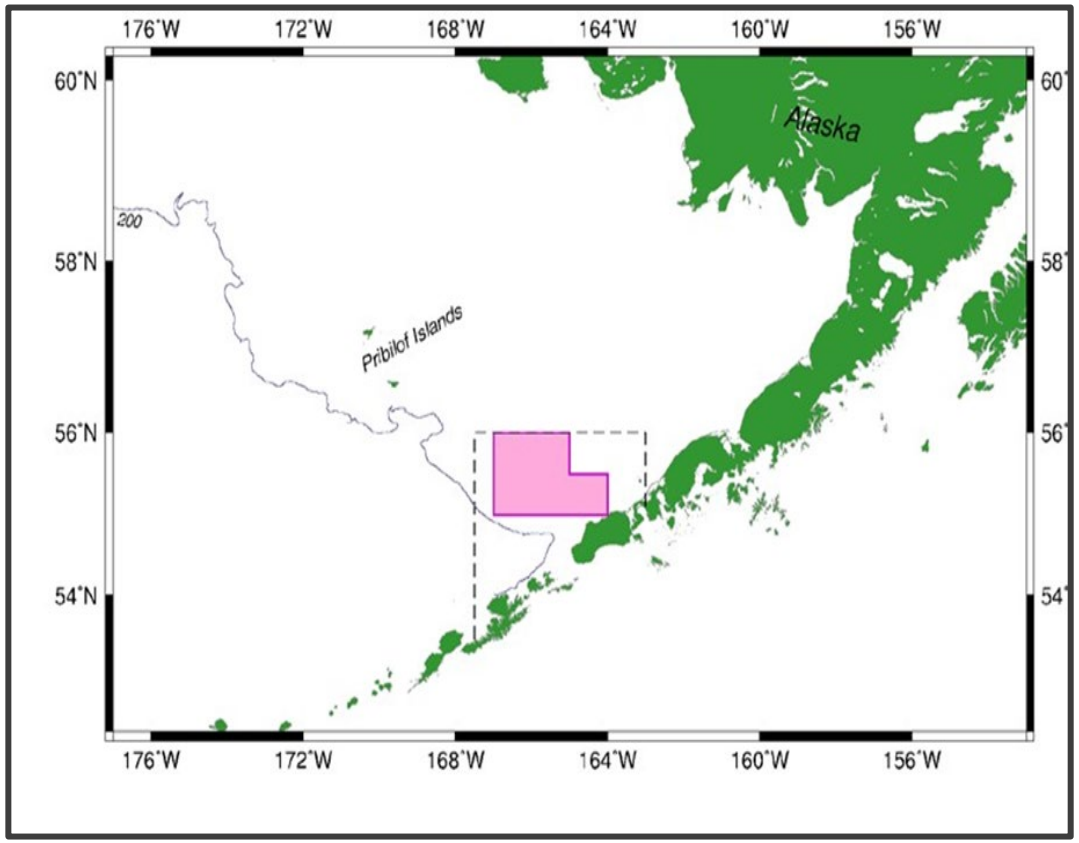


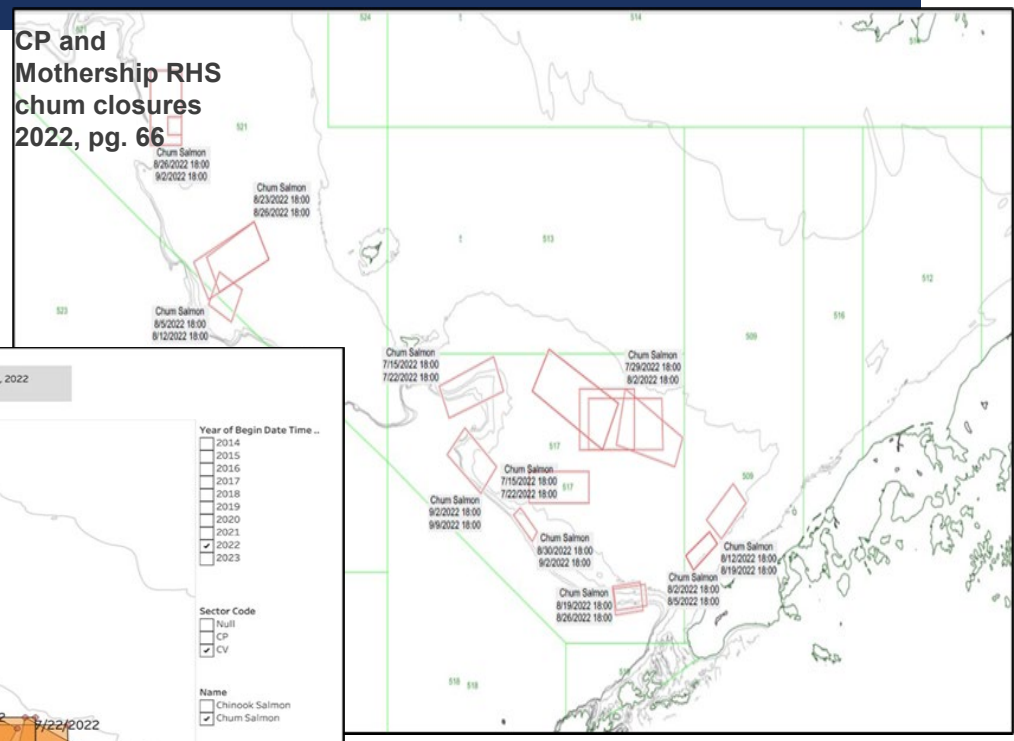
Figure 4-1 Chum Salmon Savings Area
Notes: Chum Salmon Savings Area shaded in pink, CVOA in dashed line

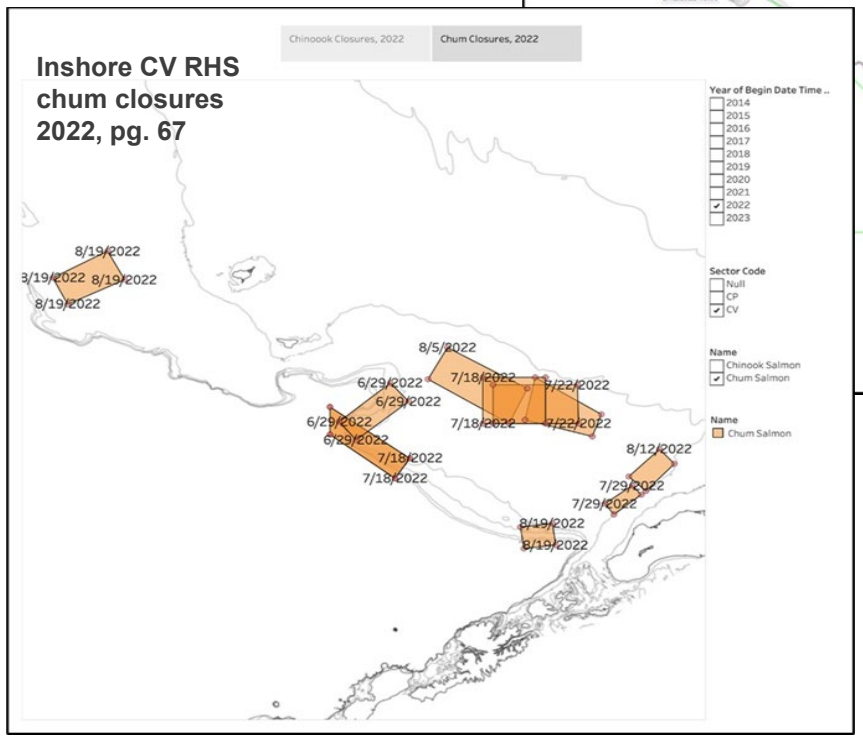
- Time/area closure in the southeastern Bering Sea
- Closed to all trawling Aug 1 – 31, and if 42,000 non-Chinook salmon are caught Aug 15 – October 14, the area remains closed
- Regulations exempt pollock vessels from Chum Salmon Savings Area if they are governed by an IPA

Section 4.1, pg. 59

Alternative 1 – Rolling Hotspot (RHS) System for Chum Salmon Avoidance

- Identify areas on the pollock fishing grounds with high chum salmon bycatch rates and move the fleet away from the areas
- Dynamic area closures
- Near real-time pollock catch and salmon bycatch data
- Local Knowledge of pollock fishermen and IPA/cooperative managers





Section 4.1, pg. 60

Other Components to the RHS System for Chum Salmon Avoidance

Duration of RHS Closure Areas

- Inshore and Mothership CVs issue avoidance areas weekly (Friday - Friday)
- Since 2022 B season, CP sector has issued avoidance areas bi-weekly (Tuesday-Friday)

Vessel-level Bycatch Performance

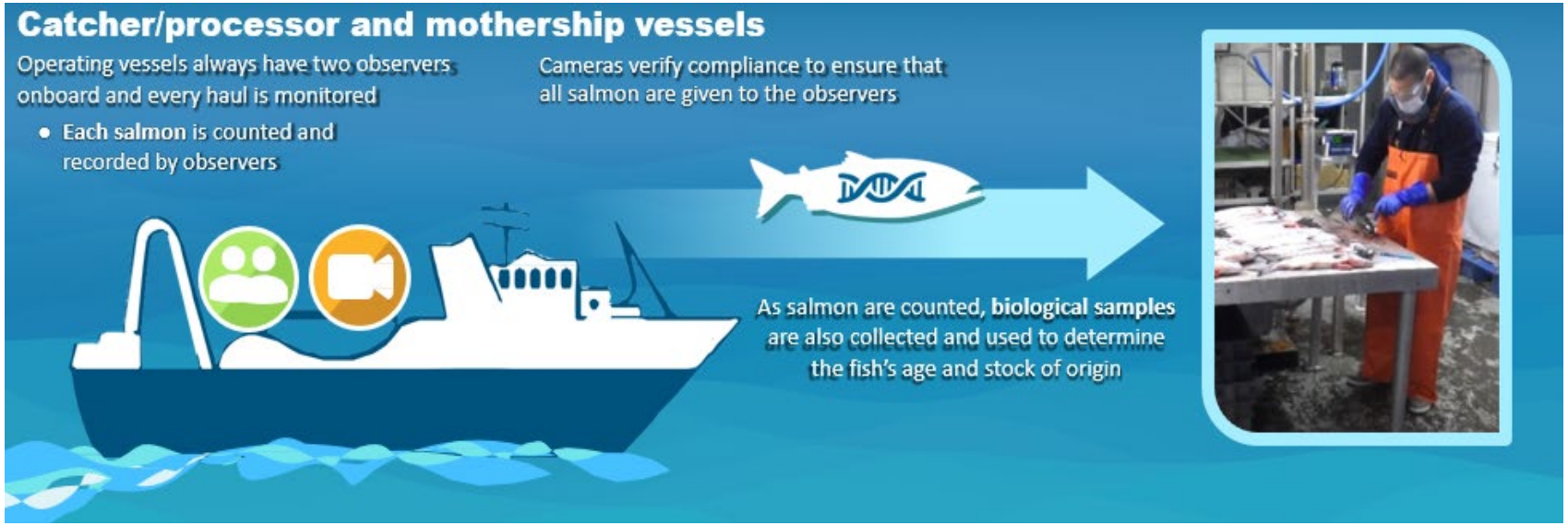
- Vessel's bycatch rates are calculated for the prior two weeks which is compared to a measure of average performance (standard varies by IPA)
  - Determines vessels required to stay out of a closure area

Application of Genetic Information

- Combined size of area closures largest East of 168 degrees West longitude in June and July
- Base Rate floor is stair-stepped across the B season and lowest in June and July

Section 4.1, pg. 64

Observer Coverage and Monitoring Requirements



- Complete enumeration of all bycaught salmon
  - how many Chinook and chum salmon caught
  - where those fish came from
  - whether or not a potential violation of laws occurred
- Biological data
- Reliable genetic sampling
- Alternatives would not result in changes

Alternative 2

Chum Salmon Bycatch Data from 2011 - 2022

- Amendment 91 regulations (Chinook salmon hard cap) came into effect in 2011
- NMFS implemented a comprehensive monitoring program to collect data on salmon bycatch in 2011
- Systematic genetic sampling of salmon bycatch since 2011

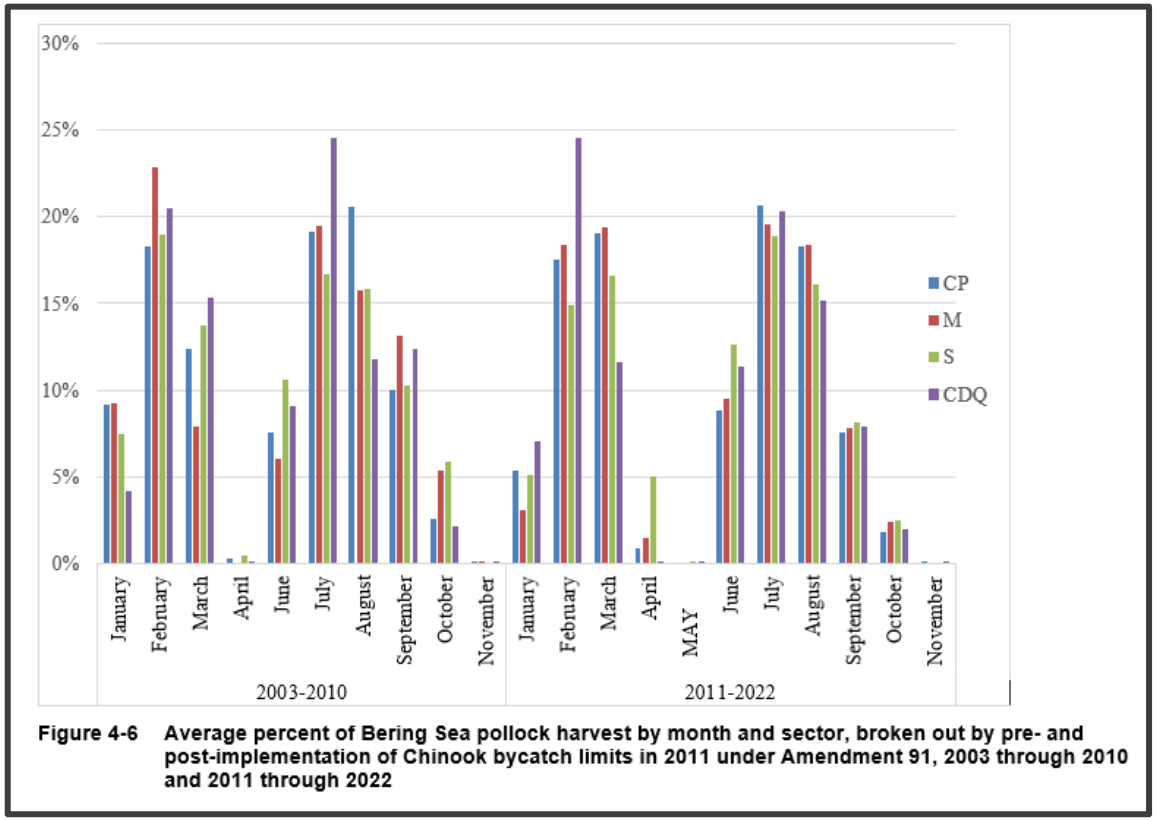


Figure 4-6 **Average percent of Bering Sea pollock harvest by month and sector, broken out by pre- and post-implementation of Chinook bycatch limits in 2011 under Amendment 91, 2003 through 2010 and 2011 through 2022**

Section 4.2.1,pg. 73

Alternative 2 Option 1: Overall Chum Salmon PSC Limit

Option 1: Setting the overall PSC limit

Table 4-3 Summary of chum salmon PSC limits under option 1 of Alternative 2 and the Council's rationale for each value

Chum Salmon PSC Limit	Council Rationale
200,000	Balances public testimony requesting a "very low" or a PSC limit of zero with practicability considerations
300,000	Rounded down from the 10-year average (2013-2022) level of bycatch of 315,449 chum salmon
350,000	Rounded down from the 5-year average (2018-2022) level of bycatch of 354,654 chum salmon
400,000	Rounded up from the 3-year average (2020-2022) level of bycatch of 377,102 chum salmon
450,000	Middle value between 400,00 and 550,000 chum salmon
550,000	Rounded value of the highest level of chum salmon bycatch in the analyzed period (2021 at 545,901 chum salmon)

Section 4.2.1,pg. 74

Review of Alternatives: Alternative 2 option 2: Indices

Management Area		Available Data	Rationale for Data Use	Applicable suboption(s)
Yukon	Summer	Run reconstruction	Reliable run abundance information is available for both Yukon River summer and fall chum salmon as both runs have full run reconstruction information available, meaning there is total accounting of catch and escapement within the drainage	Suboption 1, Suboption 2a, suboption 2b
	Fall	Run reconstruction		Suboption 1 and Suboption 2b
Kuskokwim		Bethel test fishery cumulative CPUE	Data are readily available and a reliable estimate of run abundance Less impacted by weather conditions (flooding) compared to weir assessment Used by salmon fisheries managers	Suboption 1
Norton Sound		Standardized index of escapements to the Snake, Nome, Eldorado, Kwiniuk, and North Rivers + total Norton	Representative of chum salmon returns across several management subdistricts across Norton Sound	Suboption 1

Index thresholds and rationale

Management area		Index threshold	Council Rationale
Yukon	Summer	950,000	Rounded value of the midpoint of Yukon River Drainage escapement goal (500,000-1,200,000) + ANS (83,500-142,192)
	Fall	575,000	Rounded value of the midpoint of Yukon River Drainage escapement goal (300,000-600,000) + ANS (89,500-167,900)
Kuskokwim		2,800	When CPUE is less than 2,300, the run size typically fails to meet ANS (41,200-116,400) and escapement goals; the selected value was also derived by rounding the 25th percentile
Norton Sound		57,000	Rounded from the 25th percentile for the standardized index (57,029)

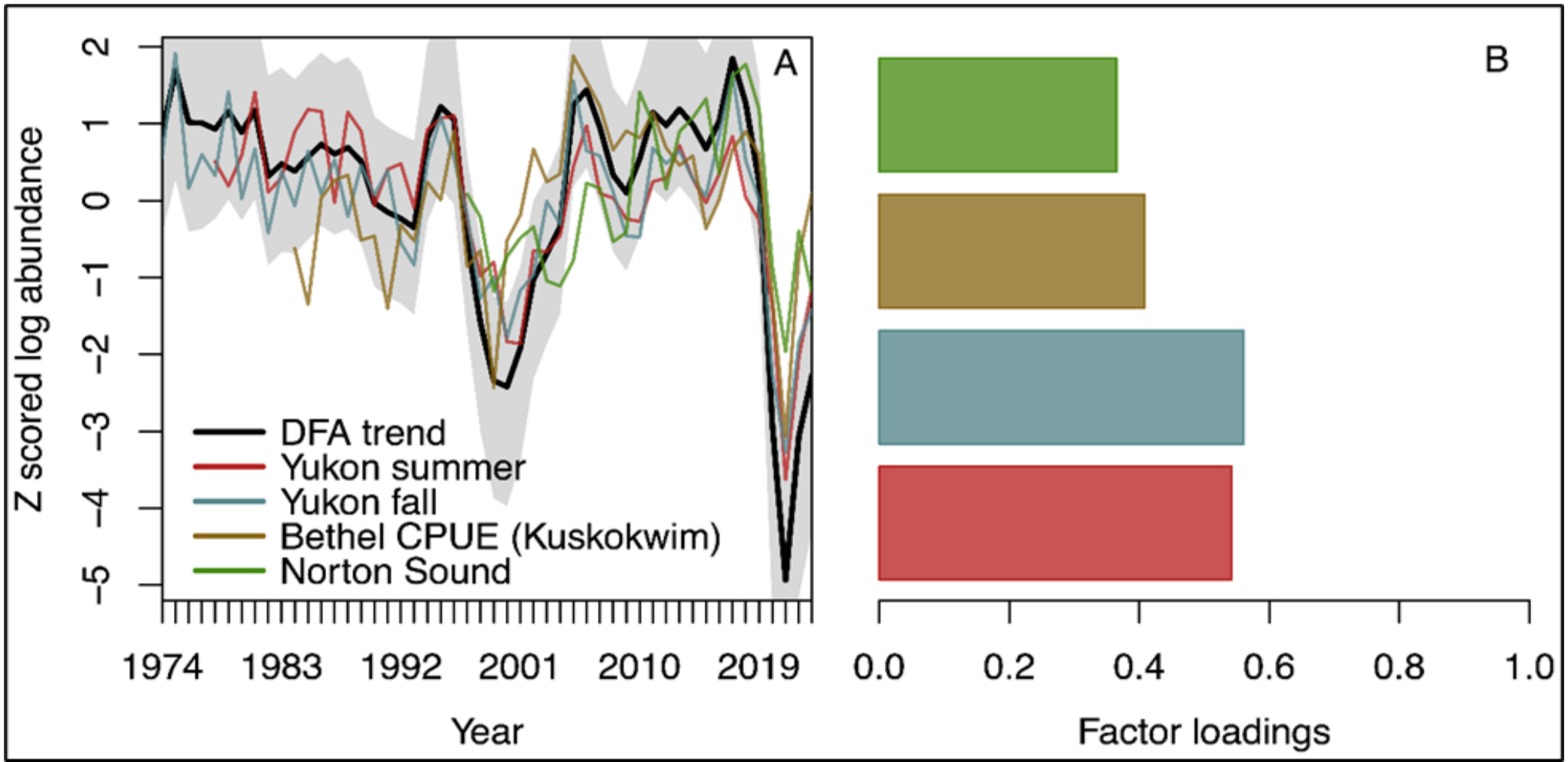
Index thresholds and suboptions

Management area		Index threshold	Suboption 1 3 Area index	Suboption 2a Yukon Summer	Suboption 2b Yukon Summer and Fall
Yukon	**Summer**	**950,000**	If 3/3 above thresholds = no PSC limit If 1/3 areas below threshold, PSC limit in following year = X If 2 or 3 areas are below thresholds PSC limit in following year = X	If Summer run above threshold no PSC limit If Summer run below threshold PSC limit = X	If 2/2 above thresholds = no PSC limit If 1 or both indices below threshold, PSC limit in following year = X
	Fall	**575,000**			
Kuskokwim		**2,800**			
Norton Sound		**57,000**			

Implementation of Alt2, Option 2

- ADF&G would evaluate whether index thresholds for "low WAK chum salmon abundance" are met based on area assessments.
- Information ADF&G would use for area assessments would ultimately depend on the suboption selected.
  - The data sources available for determining whether an area is at a "low" level of historical abundance (i.e., below index thresholds) varies by area
- ADF&G would provide NMFS (and Council) an assessment of area performance against index thresholds each year during harvest specifications.
  - Depending on index selected some information would be preliminary or not available for preliminary specifications in October (and preliminary in December for Yukon fall)
- Timing = consistent with Council's annual October meeting where preliminary groundfish harvest specifications (including PSC limits) are set. Note that the herring estimate is only available for December
- Follow procedures for proposed and final rulemaking following October and December Council meetings

Dynamic factor analysis (DFA) derived shared latent trend and factor loadings



Alternative 2 Option 3: Apportionments

Table 4-7 Summary table for sectors' apportionment percentages under each suboption

Apportionments	*CDQ*	*CP*	*Inshore*	*Mothership*
Suboption 1: 3-yr avg.	6.1%	21.9%	62.9%	9.1%
Suboption 2: 5-yr avg.	7.1%	25.2%	58.2%	9.5%
Suboption 3: pro-rata	7.1%	25.4%	58.4%	9.1%
Suboption 4: AFA	10%	36%	45%	9%

Section 4.2.3,pg. 80

Other Components to Alternative 2

- Inshore sector's apportionment further divided among inshore open access fishery and the inshore cooperatives based on the cooperative's pollock allocation
- CDQ apportionment further divided among the CDQ groups based on the group's pollock allocations
- PSC limit would be transferable: inter-cooperative transfers, transfers among CDQ groups, intra-cooperative transfers, post delivery transfers

Inshore cooperative 2022 pollock allocations	
Akutan Catcher Vessel Assoc.	(33.788%)
Arctic Enterprise Assoc.	(0.000%)
Northern Victor Fleet Cooperative	(10.773%)
Peter Pan Fleet Cooperative	(2.512%)
Unalaska Fleet Cooperative	(11.454%)
UniSea Fleet Cooperative	(22.094%)
Westward Fleet Cooperative	(19.380%)
Inshore Open Access	(0.000%)

CDQ group pollock allocations (fixed since 2005)	
APICDA	14%
BBEDC	21%
CBSFA	5%
CVRF	24%
NSEDC	22%
YDFDA	14%

Section 4.2.3 and 4.2.4

Alternative 3

Alternative 3 – Annual WAK Chum Salmon Threshold

- Establish an annual WAK chum threshold of 40,000 to 53,000 WAK chum salmon
- Alternative 3 must be implemented in conjunction with Alternative 2
- The number of chum salmon caught as bycatch during the B season pollock fishery that are estimated to be WAK chum through genetic sampling analyses would accrue to this threshold amount
- Several policy considerations remain for the Council

Table 4-11 3-, 5-, and 10-year average (2011-2022) estimated proportion of WAK chum salmon stocks in the overall B season chum salmon bycatch over the most recent 3-, 5-, and 10- year periods as well as the 95% credible interval (CI) over those averages

Time Period		*Coastal Western Alaska*	*Upper Middle Yukon*	*Western Alaska*
3-year avg.	Proportion	12.7%	1.2%	**13.8%**
	95% CI	11.4 - 14.0%	0.7-1.7%	**12.1 - 15.7%**
	Number	42,401	3,748	**46,150**
	95% CI	37,747 - 47,163	2,213 - 5,630	**39,960 - 52,794**
5-year avg.	Proportion	13.9%	1.5%	**15.3%**
	95% CI	12.3 - 15.5%	0.9 - 2.1%	**13.8 - 17.6%**
	Number	45,483	4,455	**49,938**
	95% CI	40,132 - 51,085	2,739 - 6,507	**42,871 - 57,592**
10-year avg.	Proportion	15.4%	3.1%	**18.5%**
	95% CI	13.6 - 17.3%	2.2 - 4.1%	**15.8-21.4%**
	Number	45,668	8961	**54,629**
	95% CI	40,055 - 51,431	6,398 - 11,938	**46,453 - 63,369**

Section 4.3, pg. 89

Alternative 3 – Apportionments

- Annual WAK chum salmon bycatch limit apportioned among the sectors, inshore cooperatives, and the CDQ groups
  - Apportioned based on suboptions under option 3 of Alternative 2

Table 4-12 Amount of the WAK chum threshold (number of fish) each Bering Sea pollock sector would be apportioned under the apportionment suboptions considered under option 3 of Alternative 2

	Apportionment suboptions	*CDQ*			*CP*			*Inshore*			*Mothership*		
40,000 - 53,000 WAK chum	Suboption 1: 3-yr avg.	6.1%	2,440	3,233	21.9%	8,760	11,607	62.9%	25,160	33,337	9.1%	3,640	4,823
	Suboption 2: 5-yr avg.	7.1%	2,840	3,763	25.2%	10,080	13,356	58.2%	23,280	30,846	9.5%	3,800	5,035
	Suboption 3: Pro-rata	7.1%	2,840	3,763	25.4%	10,160	13,462	58.4%	23,360	30,952	9.1%	3,640	4,823
	Suboption 4: AFA	10%	4,000	5,300	36%	14,400	19,080	45%	18,000	23,850	9%	3,600	4,770

Section 4.3, pg. 90

Performance Standard

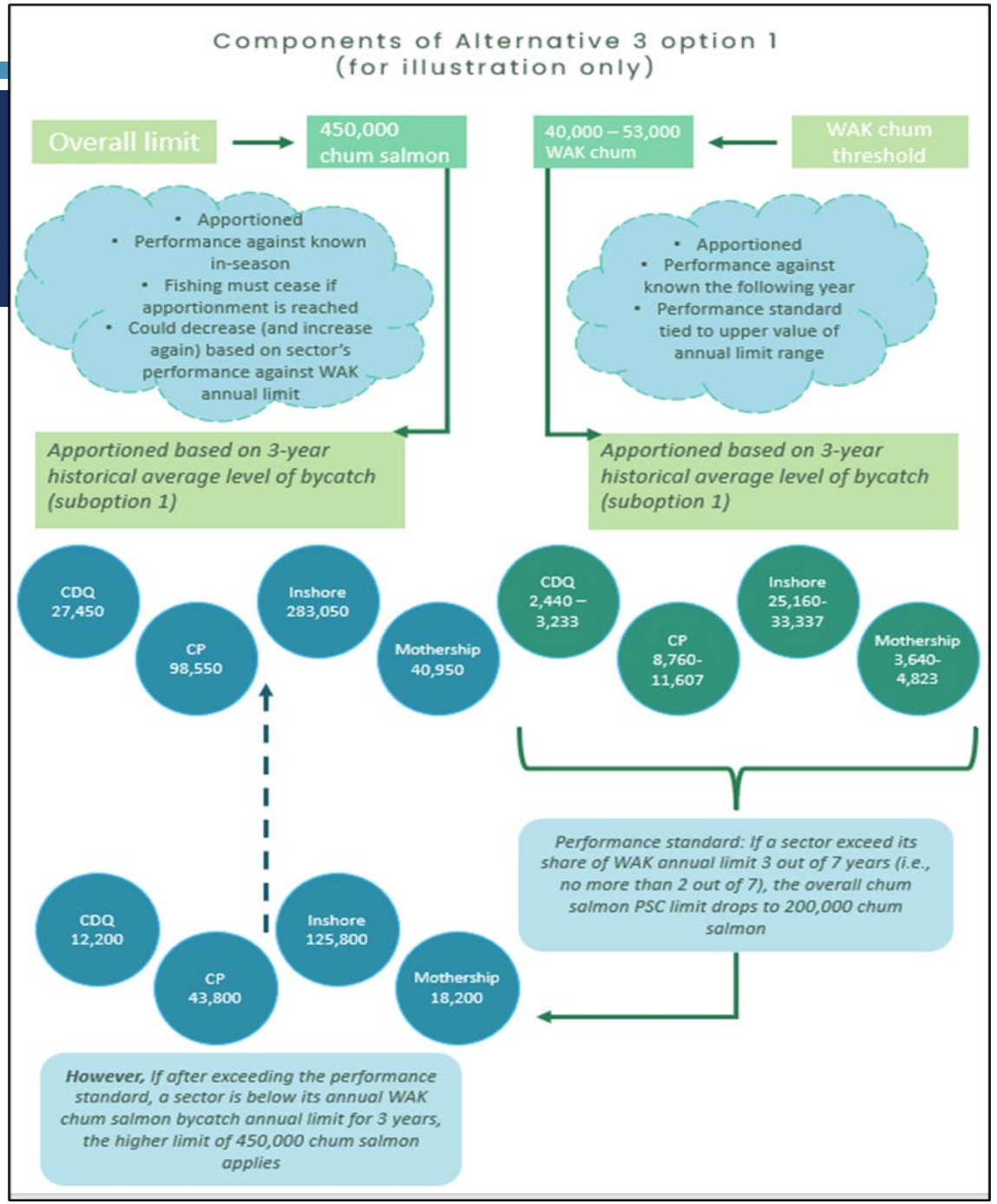
Option 1 of Alternative 3

- Overall chum salmon PSC limits in effect would be either 450,000 chum salmon or 200,000 chum salmon

Option 2 of Alternative 3

- Overall chum salmon PSC limits in effect would be either 550,000 chum salmon or 300,000 chum salmon

PSC limit in effect for a sector would depend on their performance against the performance standard



Alternative 3 – Implementation Timing

June – Nov. 2025

The B season pollock fishery occurs with a regulatory opening on June 10 and has a regulatory closure of November 1

Oct. – Dec. 2025

The annual groundfish harvest specifications process occurs

The overall chum salmon PSC in effect for the 2026 B season would be set

The WAK chum salmon threshold would also be set but its value does not vary with sector's performance

April 2026

Information on the genetic stock composition estimates of the overall bycatch are available but cannot inform the overall chum salmon PSC limit in effect for the 2026 B season – the limit was set in the prior year

June – Nov. 2026

The B season pollock fishery would occur with the overall PSC limit set in fall 2025 in effect

Oct. – Dec. 2026

Fishing sectors would receive their formal evaluation how they performed against the 2025 WAK chum threshold

Overall PSC limit in effect in the 2027 B season would be determined

2027 B season limit based on 2025 genetics

Section 4.3.2.1.1

Alternative 4

Alternative 4 – Modify Regulations Implementing Salmon Bycatch IPAs

- Alternative 4 would modify current regulations implementing salmon bycatch IPAs
- There are differences between the Council's October 2023 motion, and the proposals submitted by IPA representatives
- In order to move forward with Alternative 4, the Council would need to specify the provisions that would be added to (or modify) the current regulations
- Staff are looking for the Council to provide its priorities on the specific points or measures that would be included into the regulatory provisions

Section 4.3

Alternatives Considered But Not Moved Forward

Alternatives Considered But Not Moved Forward

- The Council received recommendations on concepts for alternatives from the Salmon Bycatch Committee in April 2023
- **Alternative previously considered:**
  - Chum salmon reduction plan agreement managed by *either* NMFS or the IPAs
    - NMFS cannot manage dynamic area closures similar to the IPAs
  - Chum salmon PSC limits of zero chum salmon; 22,000 chum salmon; 54,000 chum salmon
    - NMFS Alaska Regional Office has prepared a supplement to the alternatives considered but not moved forward

Section 4.5

Supplement to Section 4.5 of DEIS

- Alternatives Considered but Not Moved Forward for Further Analysis

- Public comments at October 2023 Council Meeting

- Question: are the impacts at a 200,000 chum PSC limit indicative of impacts at lower limits?

Supplement to Section 4.5 of DEIS

- Retrospective analysis of overall chum PSC limits (Alt 2, Option 1); (2011-2022)
- Analyzed PSC limits of 150,000, 100,000, 50,000 and 0 and, for comparison, 200,000
- Pro Rata Approach
- For each PSC limit, answered two questions:
  1) On what day of the year would each sector have met its apportionment that would have triggered a closure?
  2) Once the sector met its apportionment, how much pollock and chum had yet to caught?

Supplement to Section 4.5 of DEIS

- Results

  -Table A-2: cumulative forgone pollock and avoided chum

  -Figure A-1 - interannual variability

- Qualitative description of impacts on communities
- Questions?

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METHODS FOR IMPACT ANALYSIS (CHAPTER 5)

Retrospective Analysis

- Estimate the potential amount of chum salmon avoided and pollock harvest forgone because of a fishery closure in the B season (similar to Am. 91 and 110)
  - Overlays apportionments of analyzed PSC limits on pollock sector's historically observed chum salmon bycatch (2011-2022)
  - Staff analyzed a subset of PSC limits – 200,000; 300,000; 450,000; 550,000
- Estimate the timing of when a sector would have closed in the B season
  - Used to provide estimates of total bycatch and pollock harvest taken by that date compared to the amount of pollock harvest and total bycatch for the entire B season
- Numerical estimates provide a frame of reference, ***but the analysis expects fishing behavior would change***

Section 5.2, pg. 106

Analytical Approach: Using the Upper Bound of the Range

Table 6-38 Historical performance against the WAK chum threshold apportioned under Alternative 2, option 3, suboption 1 (3-year historical average level of bycatch), 2011 through 2022

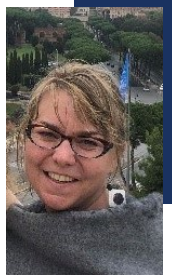
Suboption 1 (3-year average)	6.10% 2,440 - 3,233	21.90% 8,760 - 11,607	9.10% 3,640 - 4,823	62.90% 25,160 - 33,337
Year	CDQ	CP	Mothership	Inshore
2011	NA	8,917	4,430	32,444
2012	NA	NA	NA	3,932
2013	NA	2,468	801	28,219
2014	NA	8,715	NA	31,650
2015	NA	5,133	1,928	36,262
2016	3,031	21,946	13,758	38,236
2017	22,674	33,435	4,673	35,288
2018	6,272	17,644	4,503	30,391
2019	2,898	5,090	7,637	40,237
2020	NA	1,926	1,148	25,620
2021	6,092	7,736	3,447	33,522
2022	902	8,037	7,891	37,278

Source: NMFS Alaska Region Catch Accounting System; QuotaGrp_AnnualEst

Notes: NA denotes insufficient samples were available to estimate genetic stock proportions. Orange cells indicate the years when genetic analyses indicate a sector would have exceeded the upper bound of the apportionment of the WAK chum threshold (which could have an associated management action); yellow cells indicate when the sector would have exceeded the lower bound of the apportionment; gray cells indicate years where the WAK proportion was not able to be estimated for a sector.

Section 6.2.3, pg. 214

Environmental scan for impact analysis



Environmental categories

PSC species

Other Marine resources

Ecosystem

Crab

Halibut

Chinook salmon

Herring

Seabirds

Habitat

Marine Mammals

Climate change on resource categories including chum and pollock

Other Marine Resources

Habitat

Seabirds

Marine Mammals

Sections included but

No anticipated impacts under alternatives from status quo

Habitat

Seabirds

Marine Mammals

All PSC categories

- Crab
- Halibut
- Chinook salmon
- Herring

All PSC categories

Crab

Halibut

Chinook salmon

Herring

Non-constraining PSC limits
-unlikely to affect fleet behavioral changes from status quo

Potentially constraining PSC limits

PSC limits for time area closures

Environment

Climate change

- Chum salmon
- Habitat
- Impacts of environment on pollock stock
- Impacts of alternatives on pollock and food web interactions

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IMPACT ANALYSIS (CHAPTER 6)

Chum salmon

Outline of chum salmon sections

- Impacts under Status Quo (Alternative 1)
  - Status of chum stocks
  - Environmental causes of decline
  - Subsistence harvests
  - Commercial chum salmon fishing in WAK
  - Impacts to chum
  - Impacts to communities and regions engaged in subsistence and commercial chum salmon fishing

Chum salmon biology, status and distribution

	Past 11 years (2010–2020)	Last 3 years (2018–2020)	Preliminary 2021
NW Pacific			
Russia			
W Bering Sea & NW Pacific	⇦⇨	↓	↑
Sea of Okhotsk	↑	↓	↓
Primor'e & SW Sakhalin	↓	↓	↓
Japan			
Hokkaido Pacific side	↓	↓	↓
Hokkaido W & Okhotsk sides	→	↓	→
Honshu Pacific side	↓	↓	↓
Honshu western side	→	→	↓
Korea	↓	↓	↓

	Past 11 years (2010–2020)	Last 3 years (2018–2020)	Preliminary 2021
NE Pacific			
USA (Alaska)			
Northern EBS	⇦⇨	↓	↓
Southern EBS	⇦⇨	↓	↓
Western GOA	⇦⇨	↓	↓
Northern GOA	⇦⇨	↓	↓
Eastern GOA/SE Alaska	⇦⇨	↓	↓
Canada			
Northern B.C./Yukon	⇦⇨	↓	↓
Southern B.C.	⇦⇨	↓	↓
USA (Washington)			
Puget Sound (not ESA listed)	↓	↓	↓
Hood Canal (ESAt listed)	⇦⇨	↓	↑
Coast	↑	↑	↑
Lower Columbia River	↑	↑	↑

Table 6-2, page 117

Figure 6-4 Total hatchery chum salmon production around the Pacific rim from 1952 – 2021 NPAFC 2022

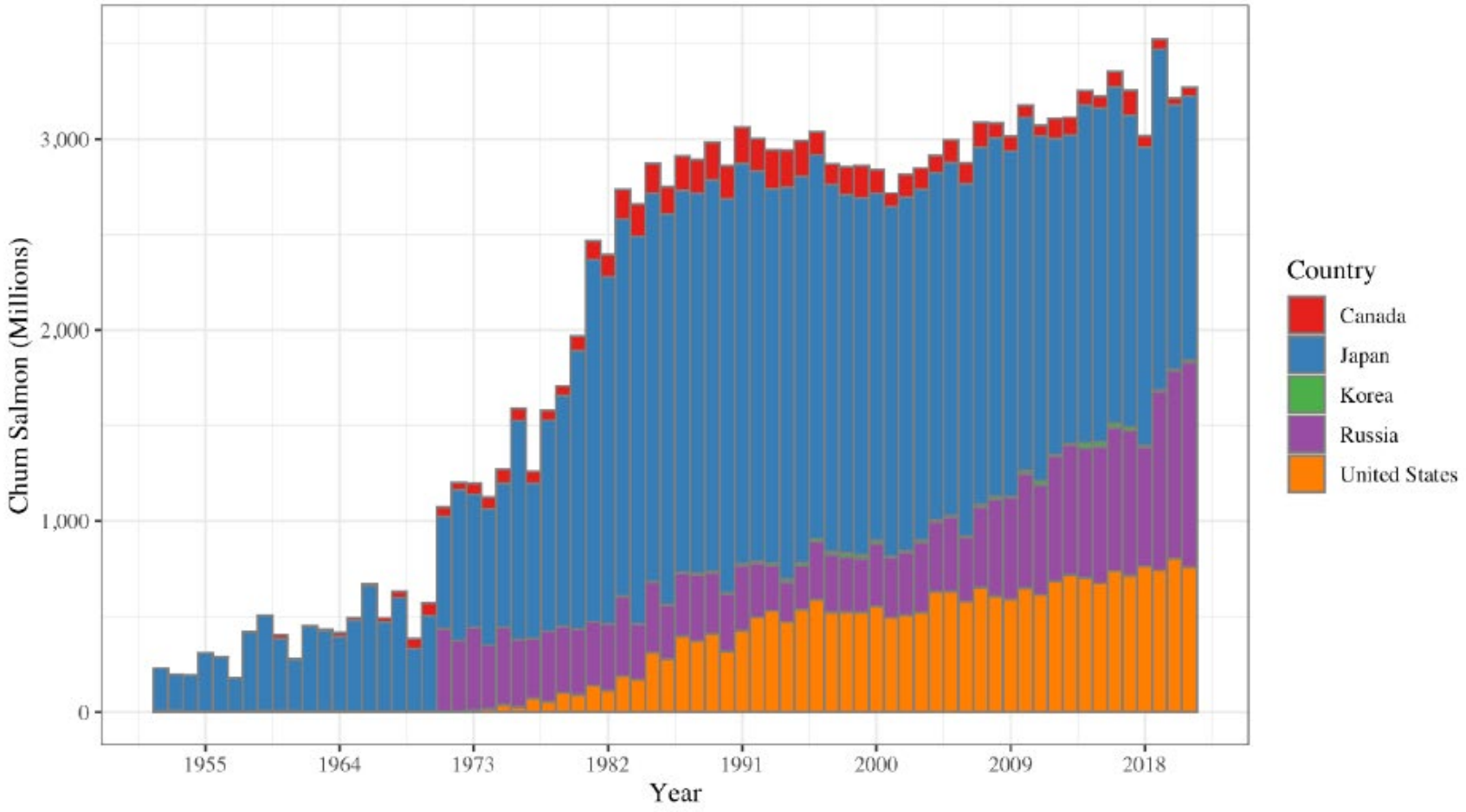


Figure 6-4, page 118

Western Alaskan stock status

2022

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

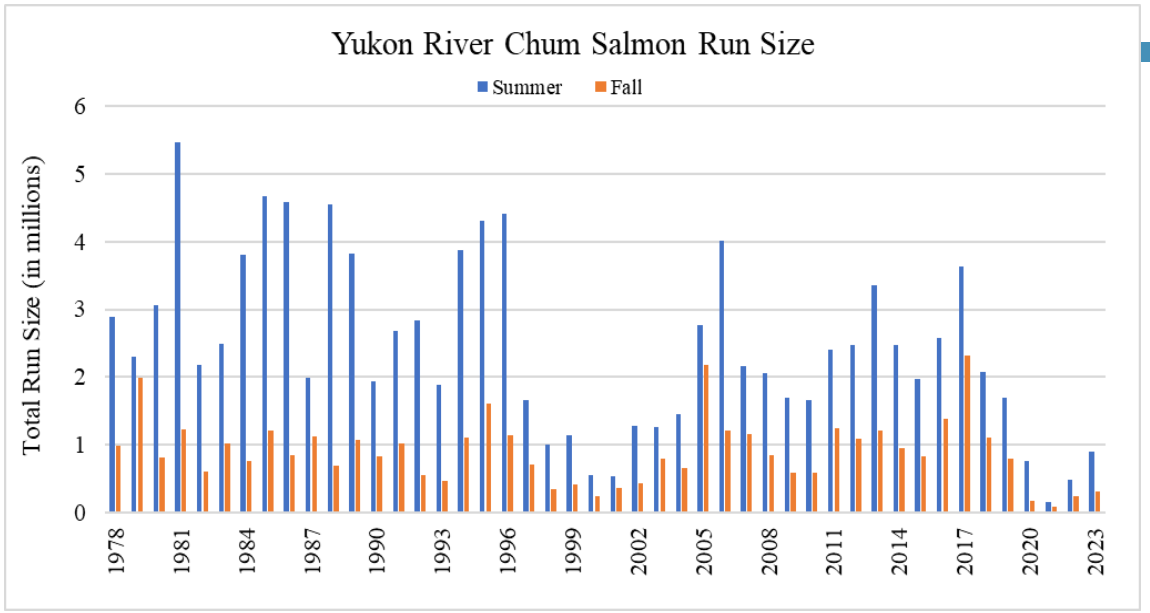
[a] Includes performance for the subset of goals that were assessed. Some escapement goals were not assessed for various logistical reasons, including funding and weather.
[b] No survey, escapement goal was not assessed.
[c] Includes 2 U.S/Canada goals.

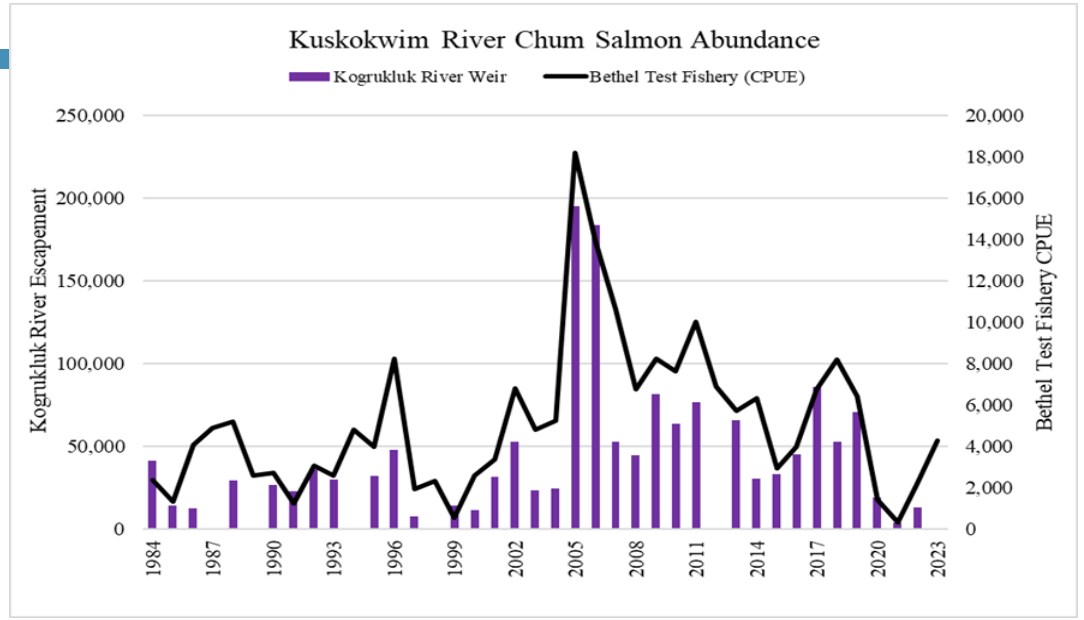
2023

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

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

Section 6.1.2.2, pages 110-125


Yukon River Chum Salmon Run Size
Summer
Fall
Total Run Size (in millions)
0
1
2
3
4
5
6
1978
1981
1984
1987
1990
1993
1996
1999
2002
2005
2008
2011
2014
2017
2020
2023


Kuskokwim River Chum Salmon Abundance
Kogrukluk River Weir
Bethel Test Fishery (CPUE)
Kogrukluk River Escapement
Bethel Test Fishery CPUE
0
50,000
100,000
150,000
200,000
250,000
0
2,000
4,000
6,000
8,000
10,000
12,000
14,000
16,000
18,000
20,000
1984
1987
1990
1993
1996
1999
2002
2005
2008
2011
2014
2017
2020
2023

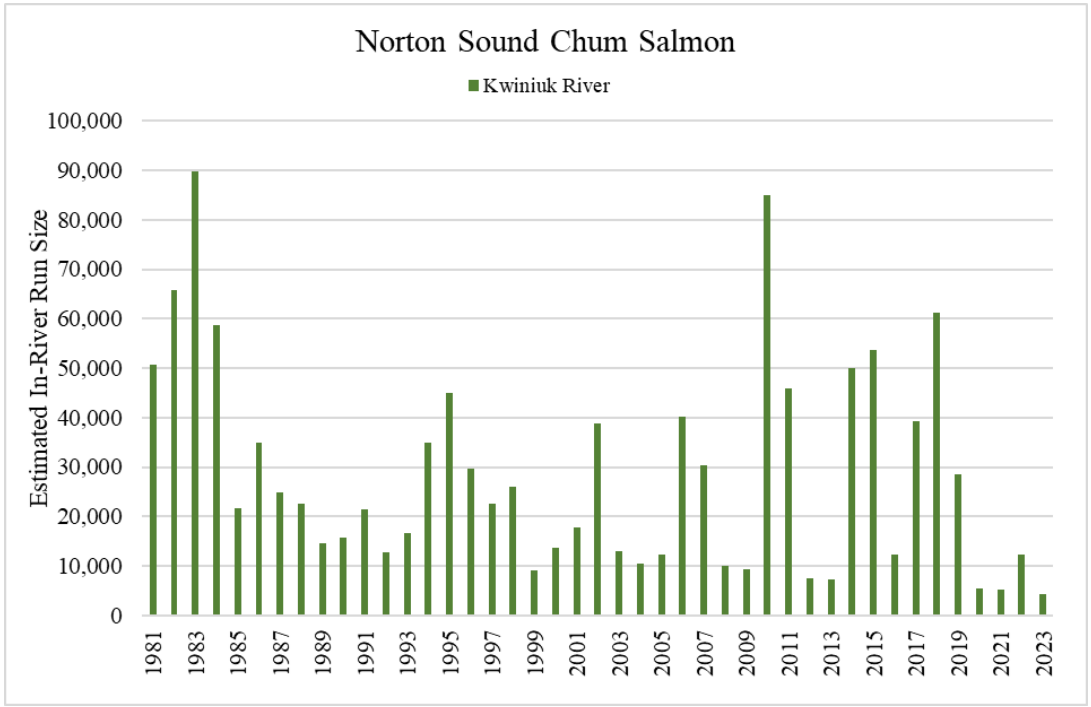

Norton Sound Chum Salmon
Kwiniuk River
Estimated In-River Run Size
0
10,000
20,000
30,000
40,000
50,000
60,000
70,000
80,000
90,000
100,000
1981
1983
1985
1987
1989
1991
1993
1995
1997
1999
2001
2003
2005
2007
2009
2011
2013
2015
2017
2019
2021
2023


Photo credit T. Vicente

Section 6.1.3: Environmental Factors related to chum declines

Ages 3-5 encountered as bycatch

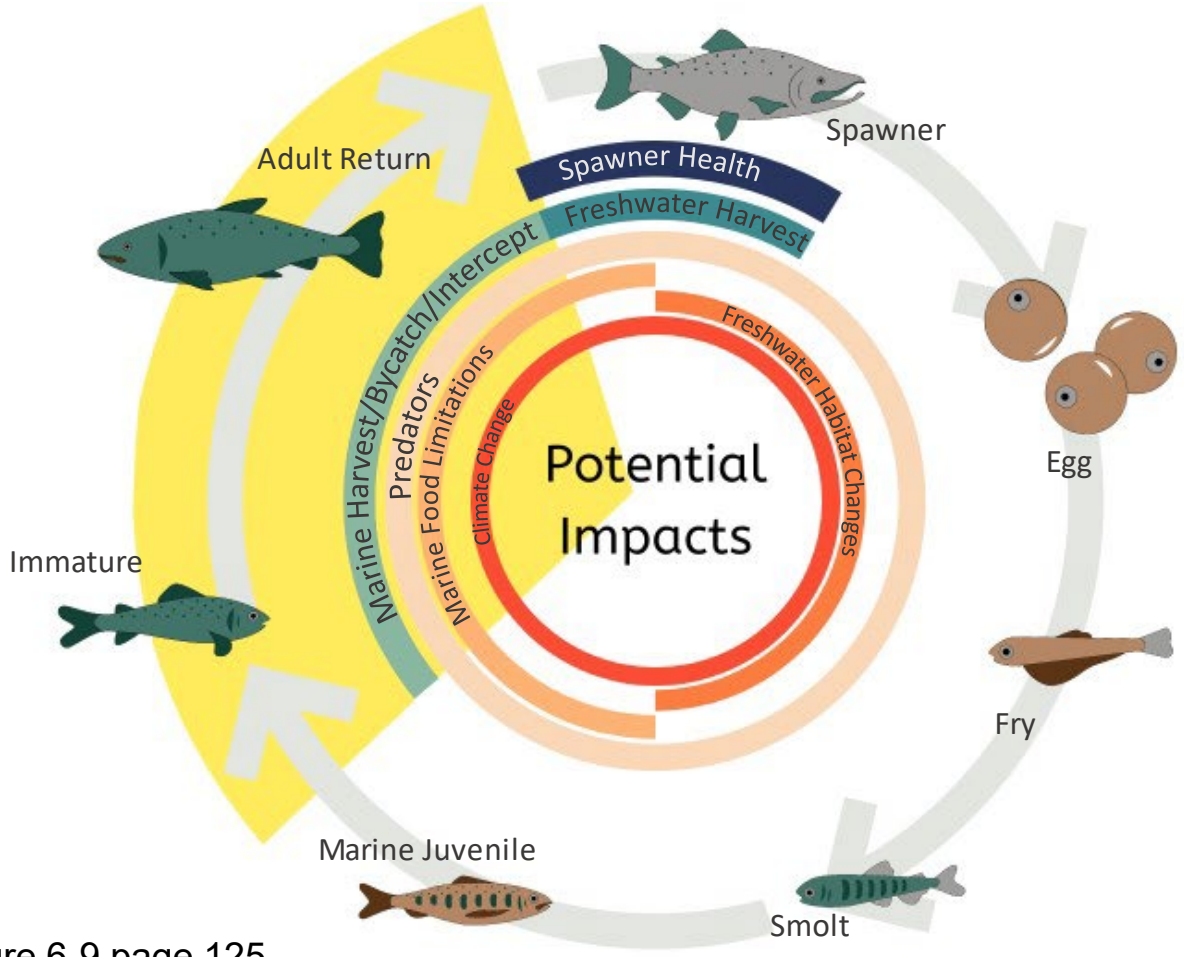
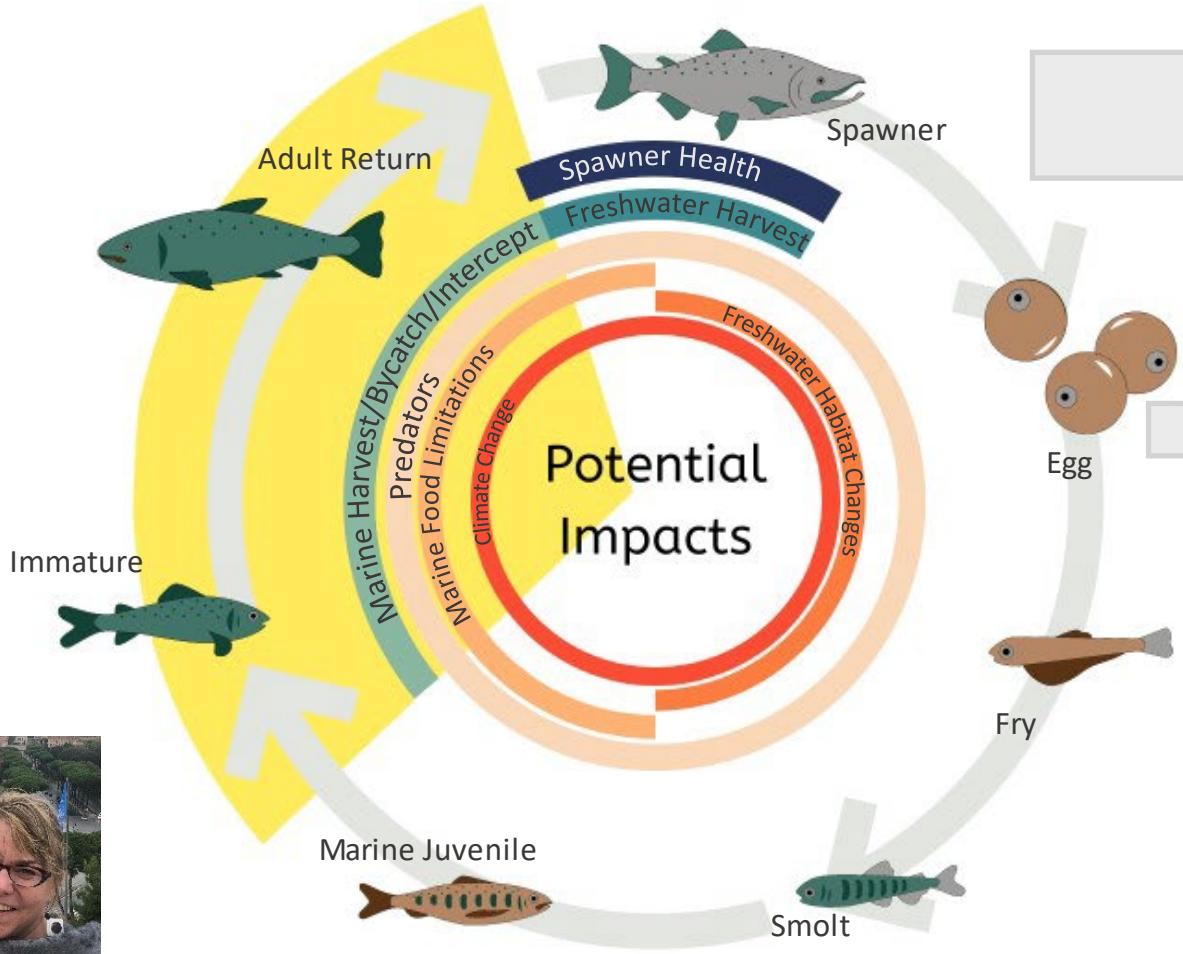


Figure 6-9 page 125

Section 6.1.3, page 125-129

Causes of decline by life history stage



Warmer freshwater environments cause:

- Increased metabolic needs
- Spawning success (temps outside of optimal range)

Changes in stream habitat can affect egg survival

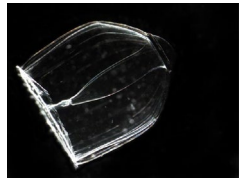
- Prey availability and quality
- Metabolic needs and warmer waters
- Predation

Section 6.1.3, page 125-129

Causes of decline by life history stage

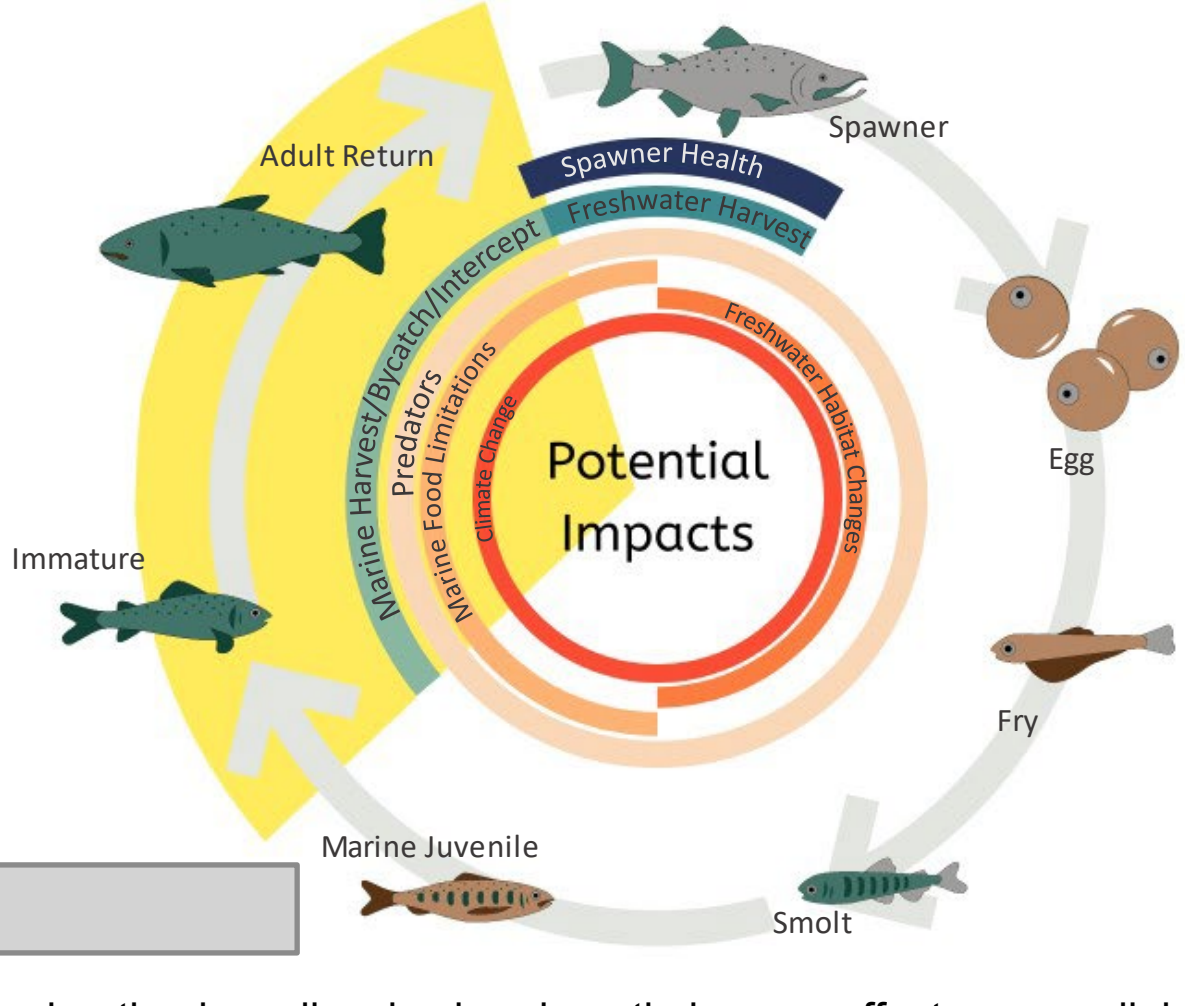
Exacerbated by Marine Heatwaves

- Decreased prey availability
- Increased metabolism
- Lower quality prey items



Other issues:

- Pathogen load
- Predator density
- Competition for prey with Asian hatchery fish



Section 6.1.3, page 125-129

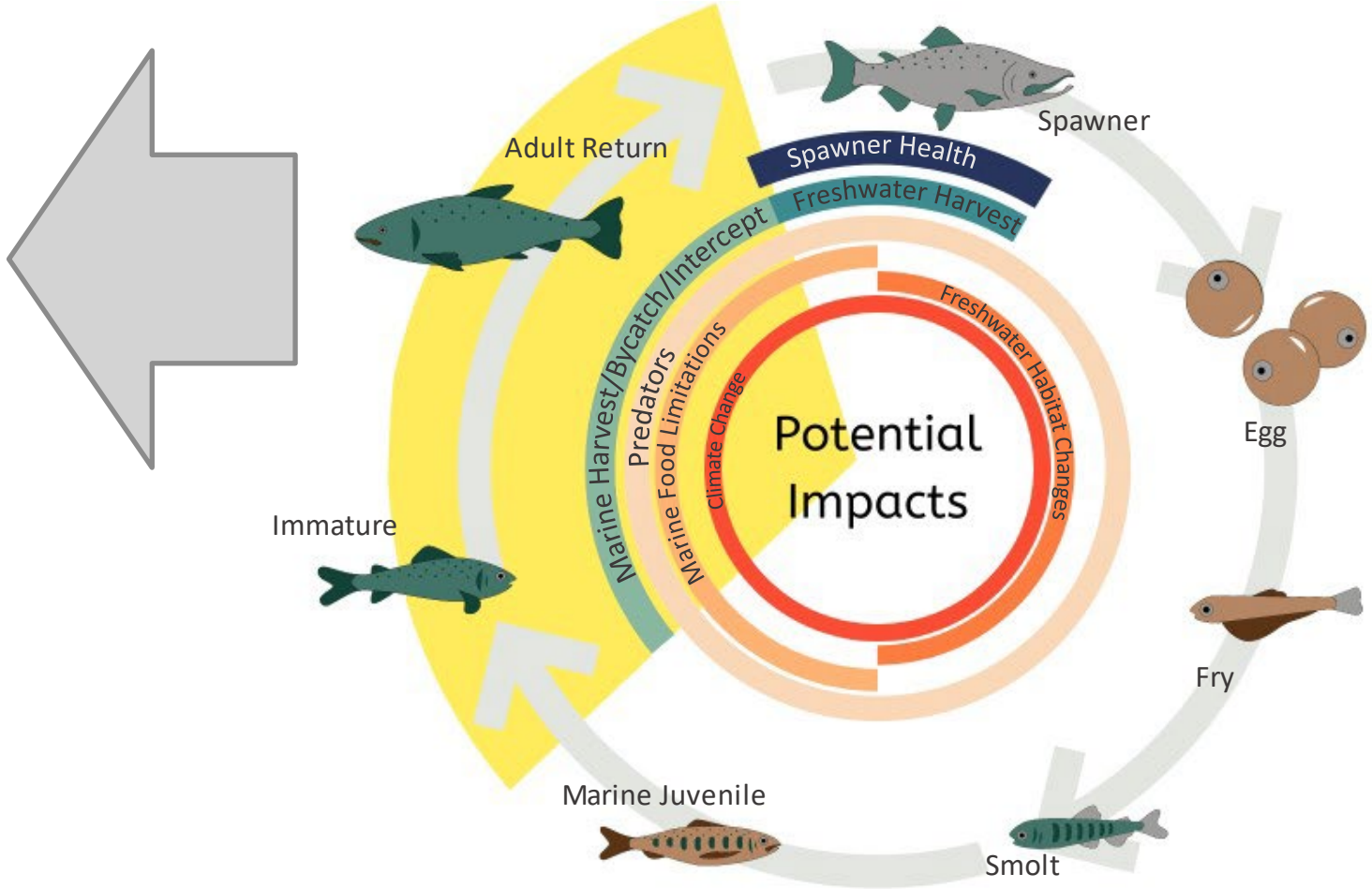
Changes in stream discharge affect migrating juveniles; ice break up timing can affect prey availability

Causes of decline by life history stage

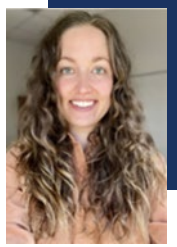
Ages 3-5 caught as bycatch in pollock fishery

State of Alaska commercial fishery catch of AYK stocks

Competition for prey with hatchery fish



Overview of Subsistence Harvests



Statutory and Regulatory Background of Alaska Subsistence Fisheries

- State and Federal components to subsistence management
- Alaska state law defines subsistence fishing as the taking of fish, shellfish, or other fisheries resources by residents for subsistence uses (AS 16.05.940 (31))
  - Non-commercial, customary and traditional uses

State of Alaska definition for subsistence

Direct personal or family consumption as food, shelter, fuel, clothing, tools, or transportation, for the making and selling of handicraft articles out of nonedible byproducts of fish and wildlife resources taken for personal or family consumption, and for the customary trade, barter, or sharing for personal or family consumption (AS 16.05.940(34)).

Chapter 3, Pg. 43

Amounts Reasonably Necessary for Subsistence

- Alaska BOF must identify salmon and other fish stocks that support subsistence fisheries
- Customary and traditional findings (C&T findings)
- If there is a harvestable surplus of these stocks, BOF must provide reasonable opportunities for subsistence uses
- Amounts reasonably necessary for subsistence (ANS)
- Table 3-2 provides ANS amounts for Arctic-Yukon-Kuskokwim Areas by salmon species (pg. 53 DEIS)

Section 3.2 of the DEIS

Subsistence Harvests of Chum Salmon in the Yukon Area

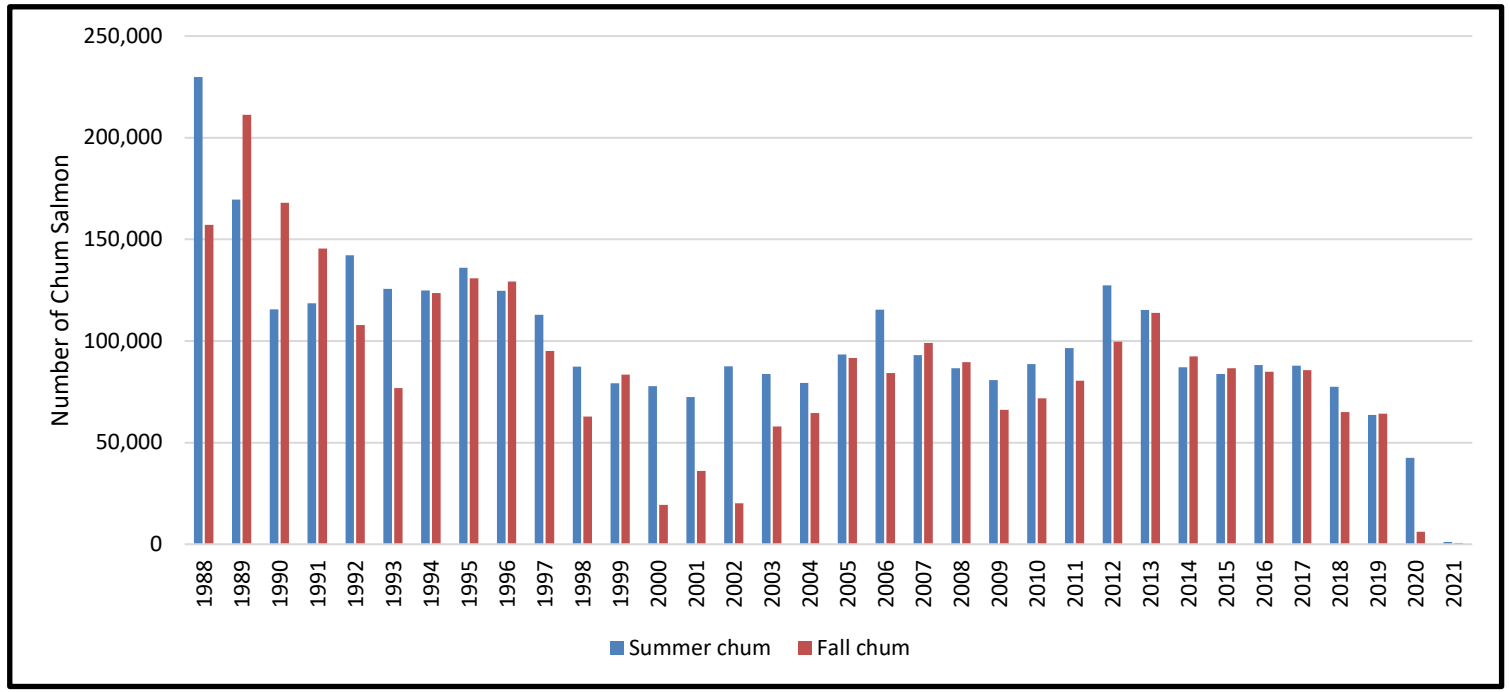
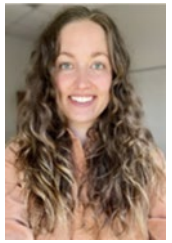


Figure 4-24 of the SIA Estimated summer and fall chum subsistence harvests, Yukon Area, 1988-2021
ADFG



Summer chum

- Ranged from 229,838 (1988) and 1,234 fish (2021)
- Subsistence harvests relatively stable from 2011-2020
- No subsistence fishing 2021 and 2022

Fall chum

- Subsistence harvests ranged from 211,303 (1989) and 705 (2021)
- Two low periods: 2000-2002 and 2020-2021
- No subsistence fishing 2021 - 2023

Section 4.3.2.3 of the SIA, pg. 107

Subsistence Harvests of Chum Salmon in the Kuskokwim Area

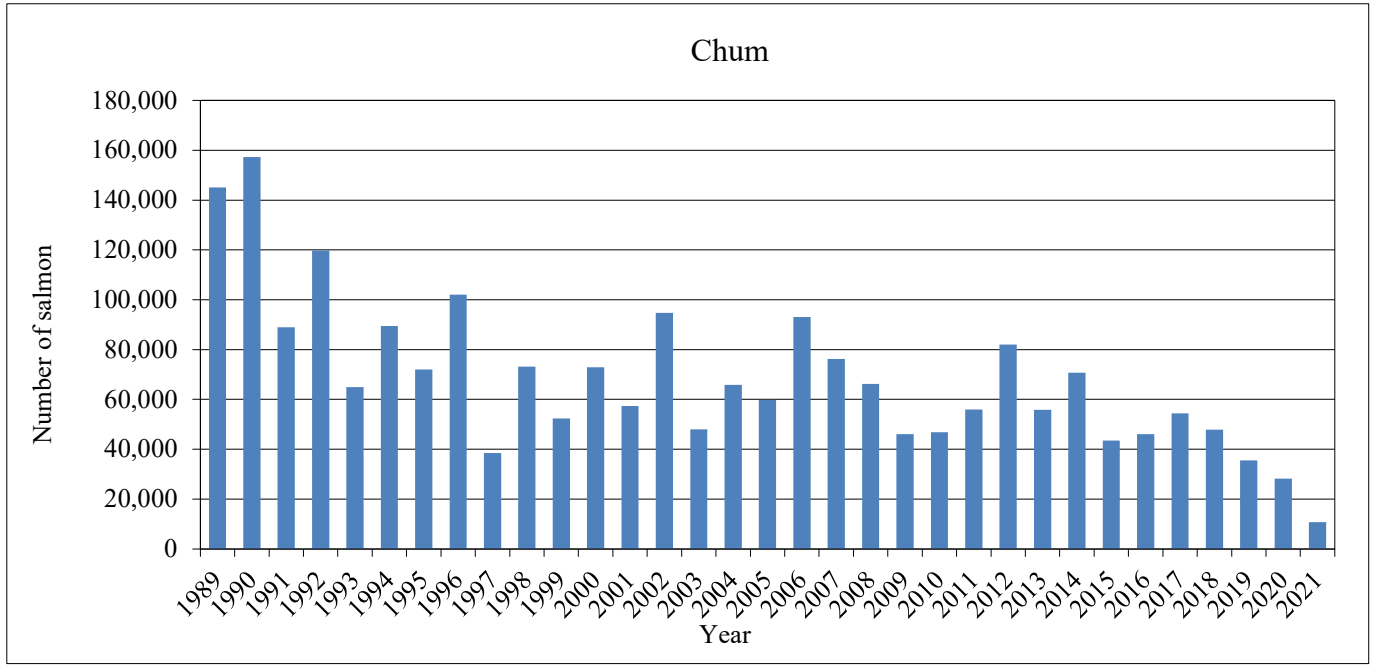
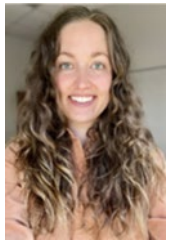


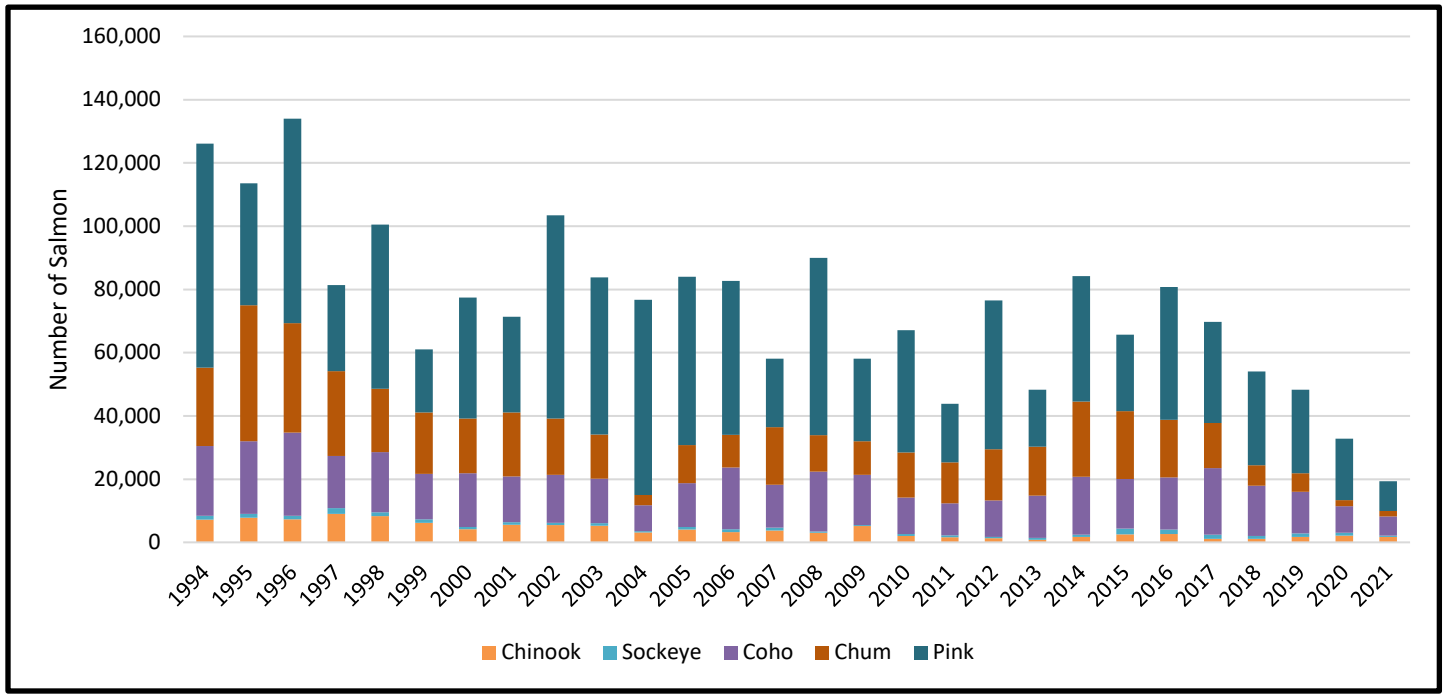
Figure 4-32 of the SIA Estimated subsistence harvests of chum salmon, Kuskokwim Area, 1989-2021
ADFG

- Subsistence harvests of chum salmon ranged between 157,335 (1990) and 10,690 (2021)
- 10-yr average: 35,332
- 2020 subsistence fishery; limited 2021, 2022, and 2023



Section 4.3.3.3 of the SIA, pg. 122

Subsistence Harvests of Salmon in Norton Sound



- Subsistence harvests of chum salmon have ranged between 43,014 (1995) and 1,681 (2021) fish
- 10-yr average: 12,545 chum salmon
- Subsistence fisheries in recent years

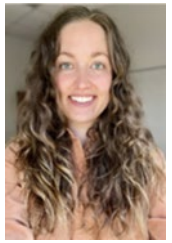


Figure 4-39 of the SIA Estimated historical subsistence salmon harvests, Norton Sound District, 1994-2021
ADFG

Section 4.3.4.3 of the SIA, pg. 135

Subsistence Harvests of Salmon in Port Clarence

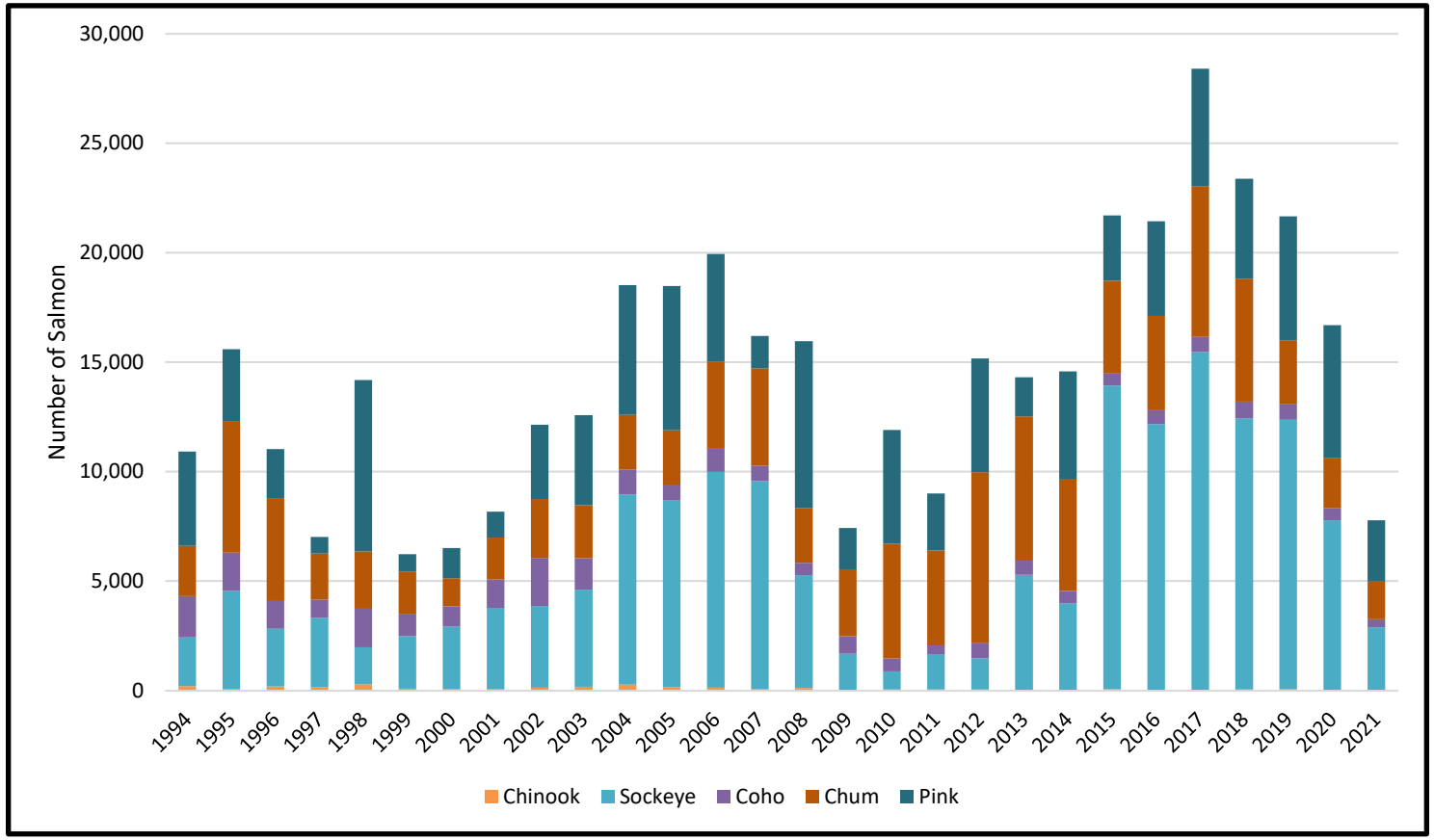
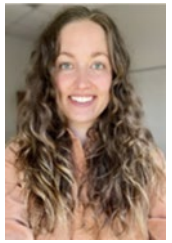


Figure 4-41 of the SIA Historical subsistence salmon harvests, Port Clarence District, 1994-2021

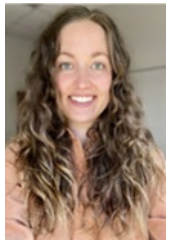
- Subsistence harvests of chum salmon have ranged between 6,886 (2017) and 1,275 (2000)
- 10-year average: 4,774
- Subsistence fisheries in recent years



Section 4.3.4.3 of the SIA, pg. 138

Summary of Subsistence Harvest Trends

- Subsistence harvests of chum salmon have declined across Western and Interior Alaska, but the patterns of decline vary
  - Abundance and associated fishing restrictions
  - Households have different needs for subsistence year to year
  - Shifts in species distribution, weather conditions, personal commitments



Section 6.1.11.1, pg. 199

The role of Subsistence Harvests of Salmon in Mixed Economies and Food Security

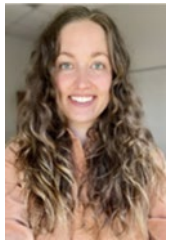
- Contemporary subsistence uses occur within a **mixed economy**

  "For local families, commercial fishing income was used to purchase equipment and supplies used for subsistence fishing and hunting…Core village subsistence activities were not eroded or replaced but reinforced with earnings of commercial fishers." Wolfe & Spaeder (2009)

- Salmon play an important role in meeting **food security** needs and supporting mental and physical wellbeing

  - Includes many components including sufficient quantities as well as access to culturally preferred foods

    "It's like how you have to have maybe milk every day, or sugar. That's how dried fish is. It's something you have to have." Fisher from Tuntutuliak, as quoted in Ikuta et al. (2013:14).



  - Chum salmon can play an important dietary role

    Chum salmon are also a unique source of traditional foods, such as eggamarrlluk (half-dried, half-smoked salmon), and for feeding Elders or other family members that cannot digest oil rich species like Chinook salmon (KRITFC 2021).

Section 4.3.5 of the SIA

Knowledge Sharing, Family, and Relationships

- Chum salmon have been a critical food source for sled dogs throughout the Arctic-Yukon-Kuskokwim region used for transportation, hauling goods, subsistence hunting and fishing, trapping, and recreation

> *"Yeah, that was one of my favoritest things to do was bale…make the bales of dog food. And then my dad used to get, oh, my word, they used to cut thousands and thousands of dog salmon for dog fish. Thousand[s], and I remember long time ago when we used to get like 3,000 dog fish a day, my mom and dad would cut them all." Judy Vanderpool, McGrath, as quoted in Native Village of Georgetown (2021:57).*

- The act of fishing brings people together – to teach, to learn, to share knowledge and connect with family

> *"[at fish camp] …during fishing activities, everyone has a role to play from the young children to the oldest Elder. Salmon fishing [in Russian Mission] is a group effort with family groups establishing fish camps along the banks of the river in the community or nearby. Often a child's first jobs are to haul fish and water, wash and hang the fish, gather wood for the smokehouse, and, when old enough handling a knife…" Moncrieff 2017: 20*

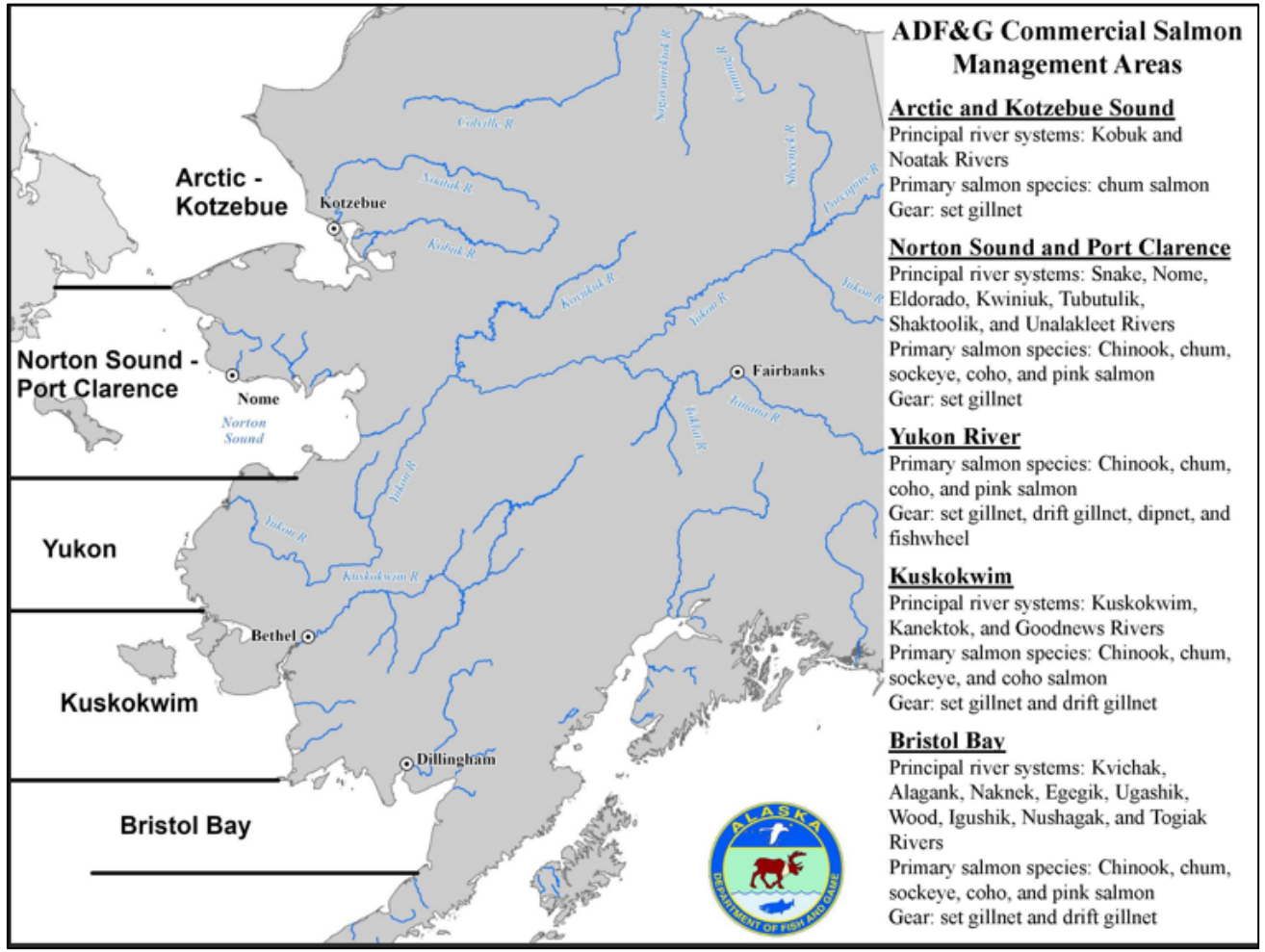
- Households are shifting subsistence use patterns but there is no replacement for the reciprocal relationships people hold with salmon

> *"If animals are treated with respect, they return; if they are abused, they do not. According to the Yup'ik view, the world is inhabited by humans and animals in constant communication. Crashes in animal populations are never biological processes separable from these fundamentally social relations. This positive reciprocity is the defining feature of Yup'ik life, as it is for many arctic peoples, as well as hunters and gatherers worldwide." Fienup-Riordan (2020:25)*

Section 4.3.5 of the SIA

Overview of Commercial Chum Salmon Fishing in Western and Interior Alaska

Commercial Salmon Fishing in Western and Interior Alaska



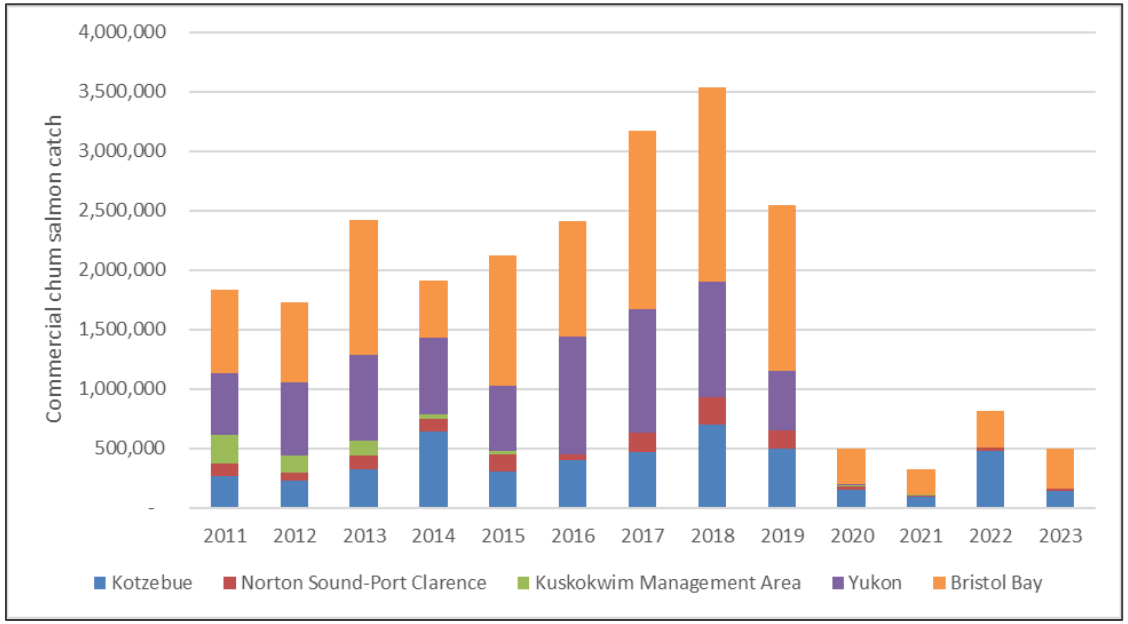
- Section 4.4. in the SIA provides status quo description of commercial salmon fisheries for WAK chum
- Given the consistency and accessibility of commercial data, covers 5 ADF&G management areas
- ADF&G considers salmon surplus above escapement needs and subsistence uses prior to opening commercial fisheries.

SIA: Figure 4-44, page 159

Summary of Commercial Chum Salmon Trends

Fisheries Management Area	Most recent year with directed commercial chum fishery	Chum catch in most recent year opened (number of fish)	Chum ex-vessel value in most recent year opened	% of total salmon value chum represents in most recent year opened	10-year average catch from most recent year opened (number of fish)	10-year average ex-vessel value beginning in from most recent year opened	Historic high catch (number of fish)
Kotzebue	2023	141,781	$733,061	100%	385,919	$1,426,326	695,153 (2018)
Norton Sound-Port Clarence[a]	2023	15,693	$62,606	54%	94,609	$430,303	319,437 (1983)
Yukon River Summer Run	2020	13,968	$51,067	99%	386,991	$1,378,825	1,616,682 (1988)
Yukon River Fall Run	2019	268,360	$1,073,146	76%	268,923	$1,304,167	489,702 (2017)
Kuskokwim River	2020[b]	*	*	*	51,194	$129,564	1,318,647 (1988)
Remainder of Kuskokwim Area[c]	2021	5,845	$6,453	1%	21,029	$115,686	133,524 (2010)
Bristol Bay	2023	342,905	$574,777	0%	822,485	$1,478,778	2,243,569 (2006)

SIA: Table 4-55, page 161



SIA: Figure 4-45, page 162

CFEC Commercial Salmon Permits

Kuskokwim aerial; Photo credit: N. Pollock/KRITFC

Percent of total ex-vessel value of salmon fisheries by species, 1976-2021

Species	Upper Yukon Fish Wheel (S08P)	Upper Yukon Gillnet (S04P)	Lower Yukon Gillnet (S04Y)	Kuskokwim Gillnet (S04W)	Norton Sound (304Z)	Kotzebue Gillnet (S04X)	Bristol Bay Drift Gillnet (S03T)	Bristol Bay Set Gillnet (S04T)
Chinook	11.8%	32.0%	62.5%	17.5%	12.9%	0.1%	1.3%	1.0%
Sockeye	0.0%	0.0%	0.0%	16.0%	0.4%	0.0%	95.7%	95.9%
Coho	3.1%	0.1%	3.6%	46.1%	43.1%	0.0%	0.6%	1.5%
Pink	0.0%	0.0%	0.0%	0.3%	8.0%	0.0%	0.5%	0.6%
Chum	85.0%	67.9%	33.8%	20.1%	35.6%	99.7%	1.8%	1.1%

SIA: Table 4-56, page 167

Commercial Salmon Community Engagement and Dependence

Three sets of tables for each management area:

- **First two sets of tables:** patterns of community and regional (i.e., local versus non-local) **engagement** through number of permit holders and value
  - 'Local' and 'non-local' distinctions adopted from recent CFEC reports
- **Third set of tables:** community and regional **dependence** by commercial revenue from chum salmon specifically, at the community level aggregated, relative to other fisheries revenue

		Annual Average 2011-2022 (number)	Annual Average 2011-2022 (percent)	Unique Persons 2011-2022 (number)
Kotzebue gillnet	Local Total	83	98%	208
	Non-Local Total	2	2%	10
Norton Sound gillnet	Local Total	129	98%	271
	Non-Local Total	2	2%	15
Upper and Lower Yukon gillnet and fishwheel	Local Total	359	96%	847
	Non-Local Total	15	4%	70
Kuskokwim gillnet	Local Total	206	99%	715
	Non-Local Total	3	1%	15
Bristol Bay drift and set gillnet	Local Total	607	25%	1,329
	Non-Local Total	1,803	75%	4,150

SIA: Summary of tables in Section 4.4.3, page 166-182

Regional Economics of Commercial Salmon Fishing

Declines in commercial chum salmon fishing opportunities fit into a broader economic and social framework

Many communities across Western and Interior Alaska have mixed economies

- Depend on both subsistence food production component as well as a cash component from employment
- Subsistence and commercial fishing can be interconnected in many ways Joint subsistence and commercial closures can represent a "double-blow" to food access

Economic impacts and "support sectors" can look different than typical economic impact analytical framework may employ.

- These commercial fisheries are highly local (less so for Bristol Bay), there are a limited number of for-profit businesses within most communities, and cultural importance of sharing – including one's labor.
- Cash may be exchanged for assistance or use of equipment, but also bartering/sharing of salmon harvest, and expectations/responsibly to participate.
- With limited businesses available, developing the skills and knowledge for commercial fishing, boat maintenance, equipment repair, etc. another extremely important value.
- CFEC permit reports demonstrate high rates of transfers within families and rates at which permits are gifted rather than sold

Boats lined up for tender after 6-hour chum salmon commercial fishery in 2014; Photo credit: S.Evans/KRITFC

The presence of commercial processors or fish buyers are another important component for commercial opportunities.

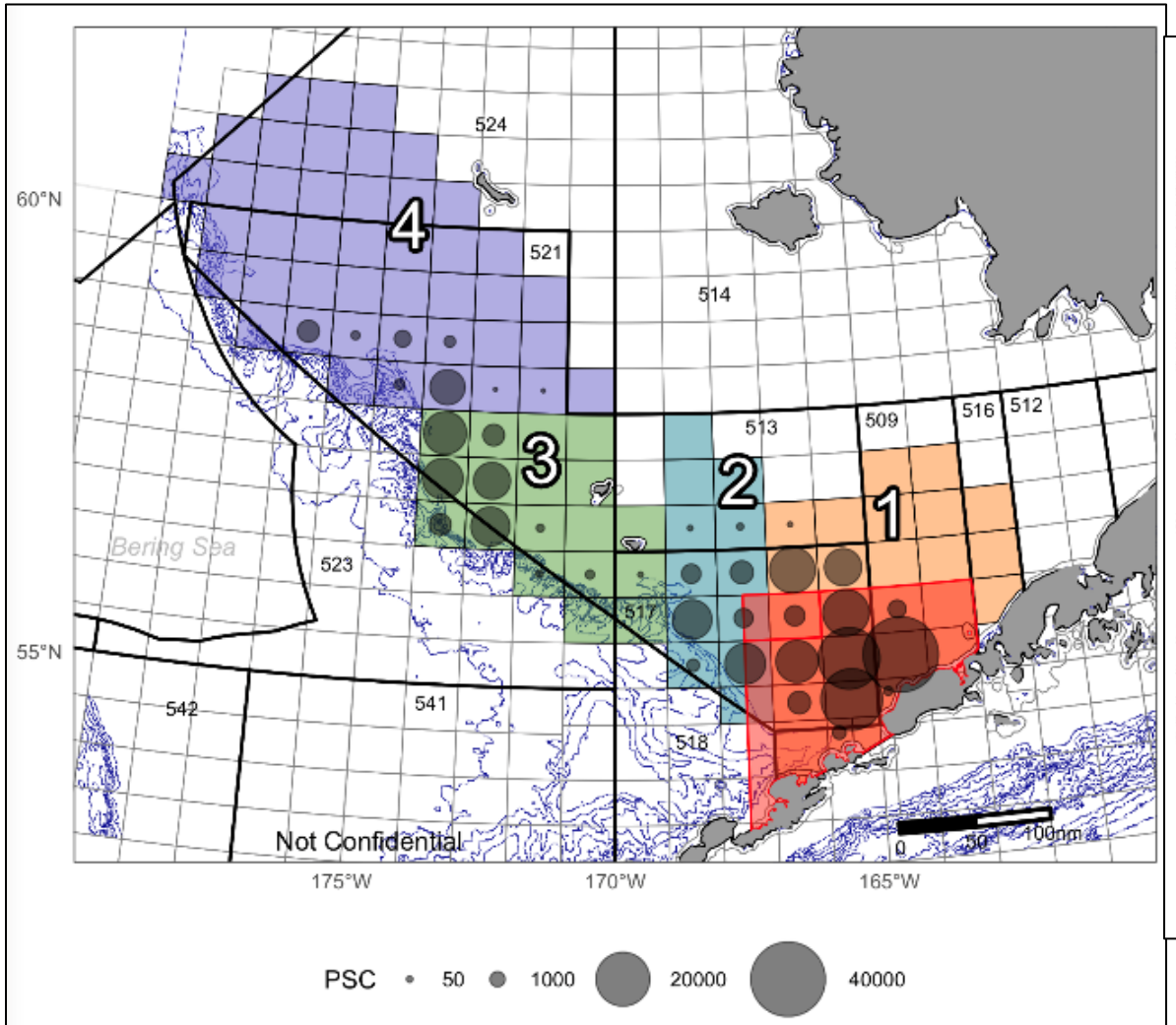
SIA: Section 4.4.4, page 183-184

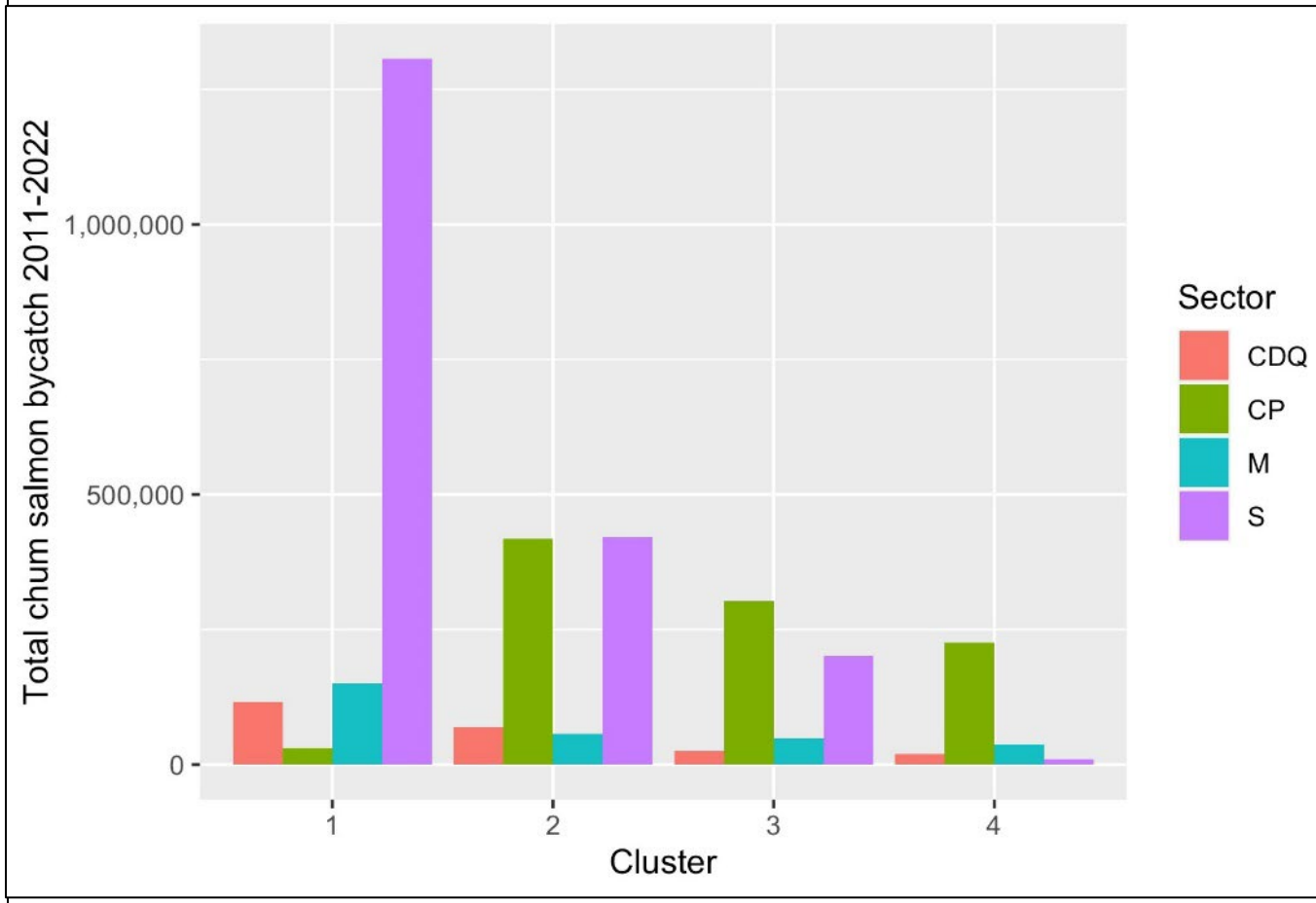
Impacts on chum under Alternative 1: Status quo

B season chum salmon bycatch (number of fish) by Bering Sea pollock fishery sector as well as the 3-, 5-, 10-, and 12-year average levels of bycatch, 2011 through 2022

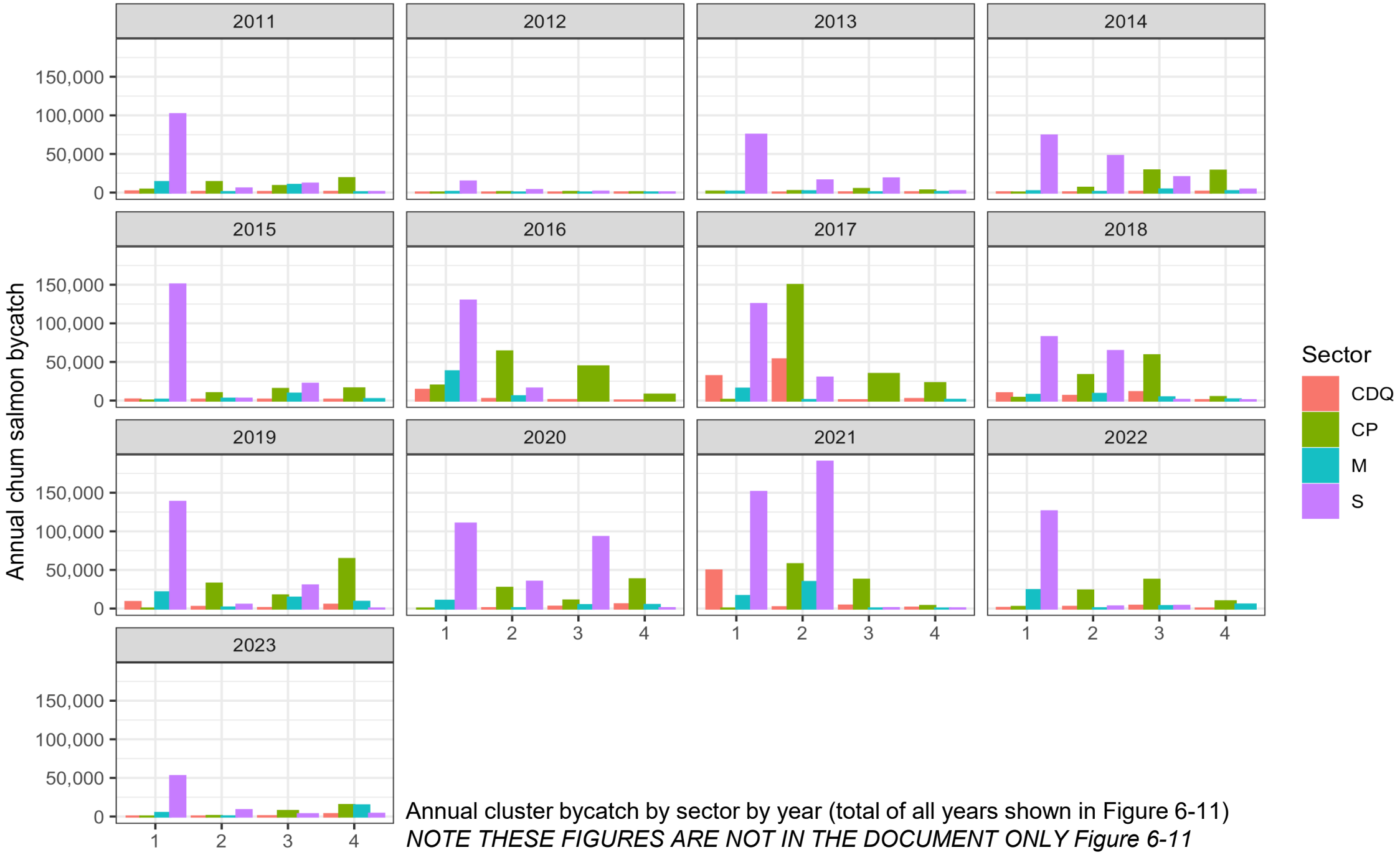
Year	CDQ	CP	Mothership	Inshore	Total
2011	3,758	44,299	24,399	118,857	191,313
2012	200	1,928	977	19,067	22,172
2013	554	10,229	3,835	110,496	125,114
2014	2,407	63,066	8,091	145,322	218,886
2015	4,650	40,046	14,046	174,343	233,085
2016	16,342	134,750	43,629	144,882	339,236
2017	87,058	207,355	16,825	154,610	465,848
2018	26,586	99,447	21,303	147,339	294,675
2019	15,726	113,428	44,860	172,798	346,671
2020	8,582	77,138	19,743	237,632	343,094
2021	55,663	97,917	50,542	341,779	545,901
2022	6,365	71,786	32,262	131,896	242,309
3-yr. avg. (2020-2022)	23,537	82,280	34,182	237,102	377,102
5-yr. avg. (2018-2022)	22,584	91,943	33,742	206,295	354,564
10-yr. avg. (2013-2022)	22,393	91,516	25,477	176,113	315,499
12-yr. avg. (2011-2022)	18,991	80,116	23,345	158,255	280,707

Spatial distribution of chum salmon by genetic cluster areas 1 through 4 (2022 only) and by cluster and sector (2011-2022)





Figures 6-10, 6-11, pages 131-132



Annual cluster bycatch by sector by year (total of all years shown in Figure 6-11)

NOTE THESE FIGURES ARE NOT IN THE DOCUMENT ONLY Figure 6-11

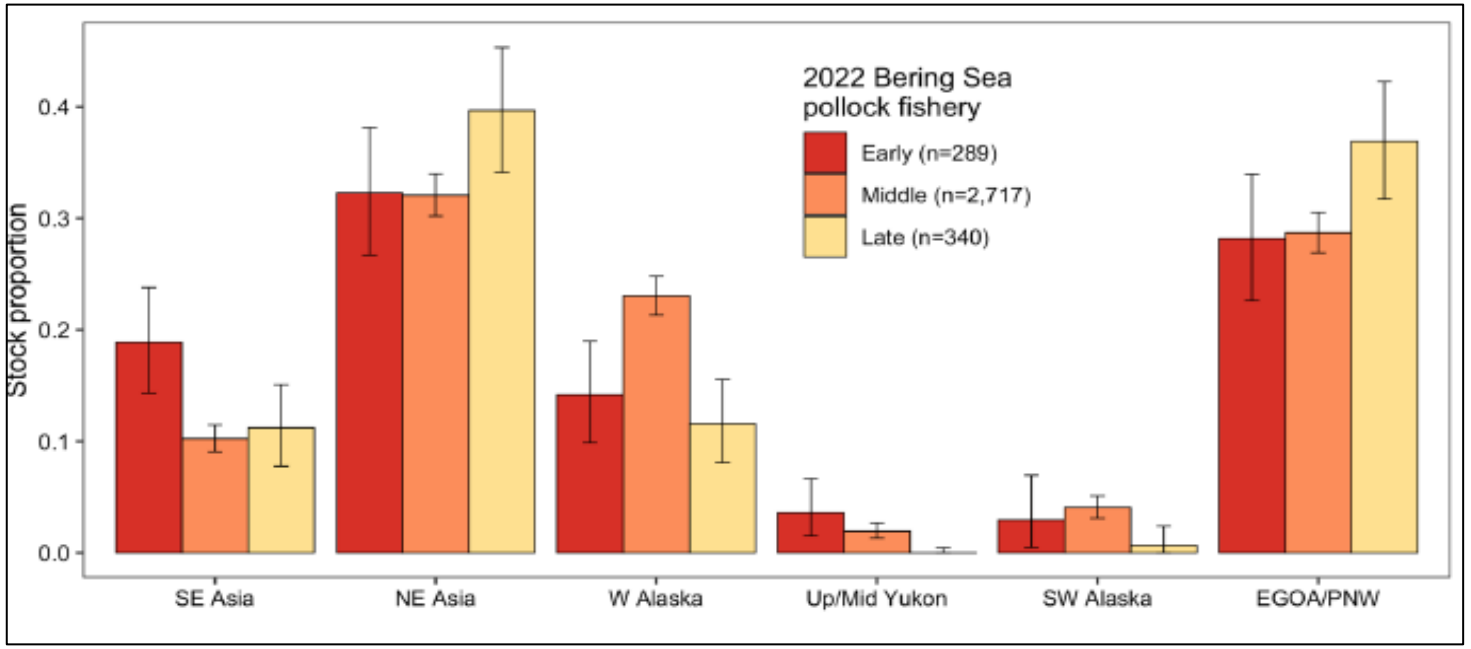
Cluster Area (East to West)

Estimated number of WAK chum salmon caught as bycatch by pollock fishing sector, 2011 through 2022

	CDQ	CP	Mothership	Inshore
2011	NA	8,917	4,430	32,444
2012	NA	NA	NA	3,932
2013	NA	2,468	801	28,219
2014	NA	8,715	NA	31,650
2015	NA	5,133	1,928	36,262
2016	3,031	21,946	13,758	38,236
2017	22,674	33,435	4,673	35,288
2018	6,272	17,644	4,503	30,391
2019	2,898	5,090	7,637	40,237
2020	NA	1,926	1,148	25,620
2021	6,092	7,736	3,447	33,522
2022	902	8,037	7,891	37,278

Table 6-10, pages 136

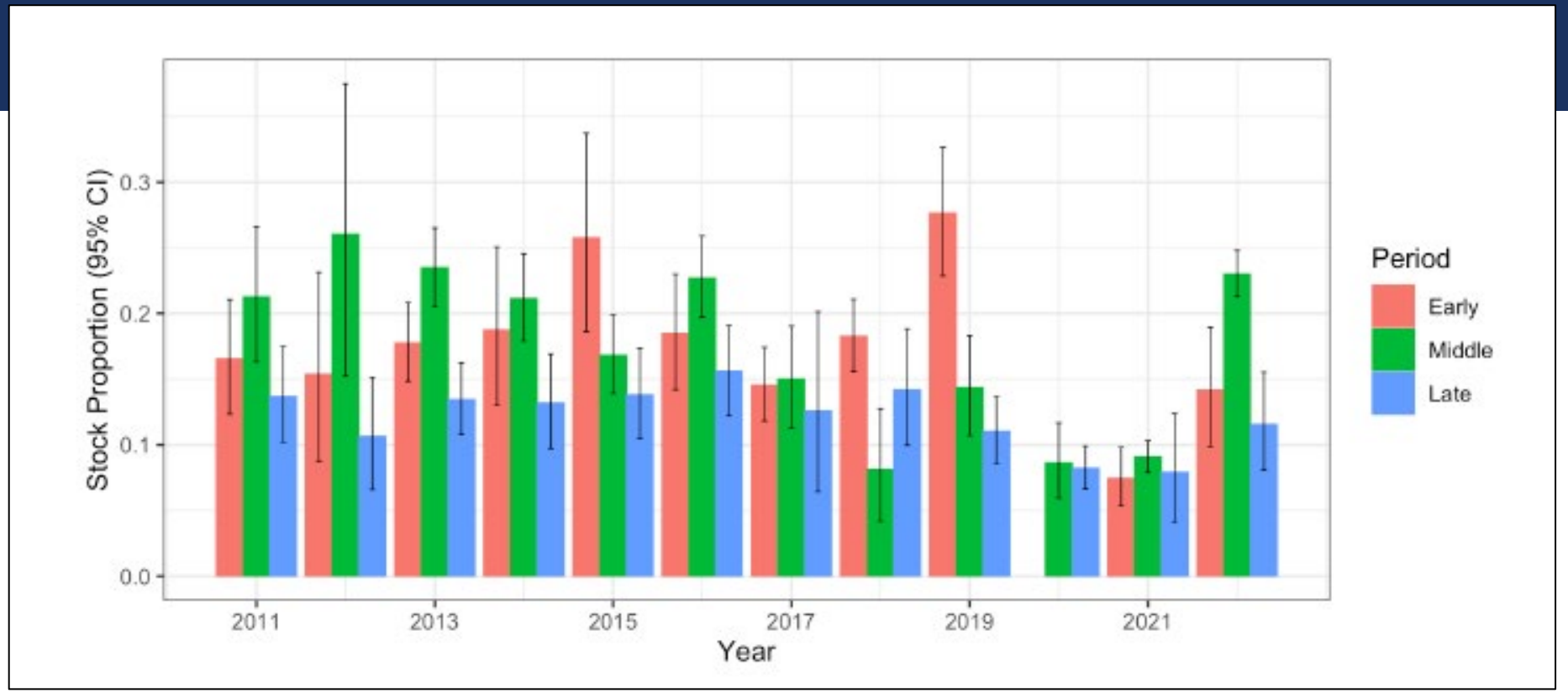
Stock composition estimates with 95% credible interval for the chum salmon bycatch from the Early, Middle, and Late periods of the 2022 Bering Sea B season pollock fishery



When Analyzed as Three Distinct Time Periods		
Period	Statistical Weeks	Associated Week-end Calendar Dates
Early	24-29	June 10-July 29
Middle	30-34	July 29-August 26
Late	35-44	August 26 -November 4

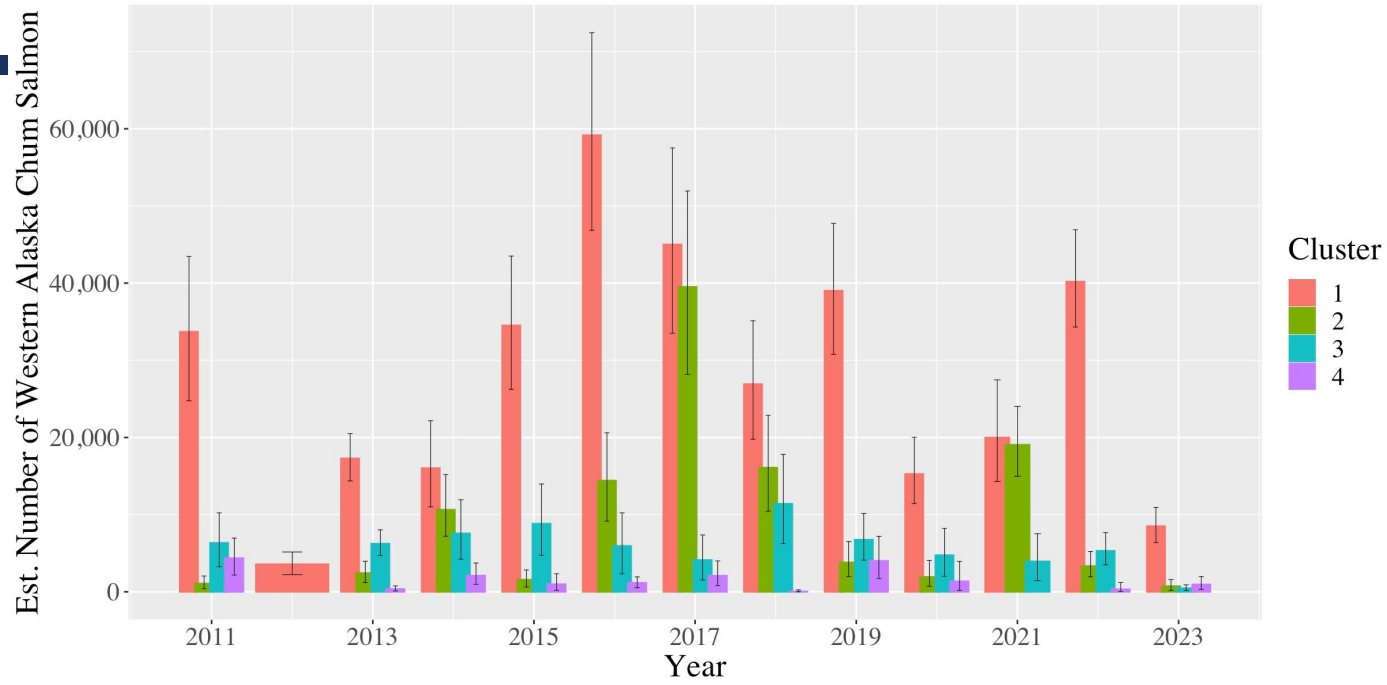
Figure 6-13, page 136

Mean stock composition estimates for the WAK reporting group from the Early, Middle, and Late periods from the B season pollock fishery, 2011 through 2022

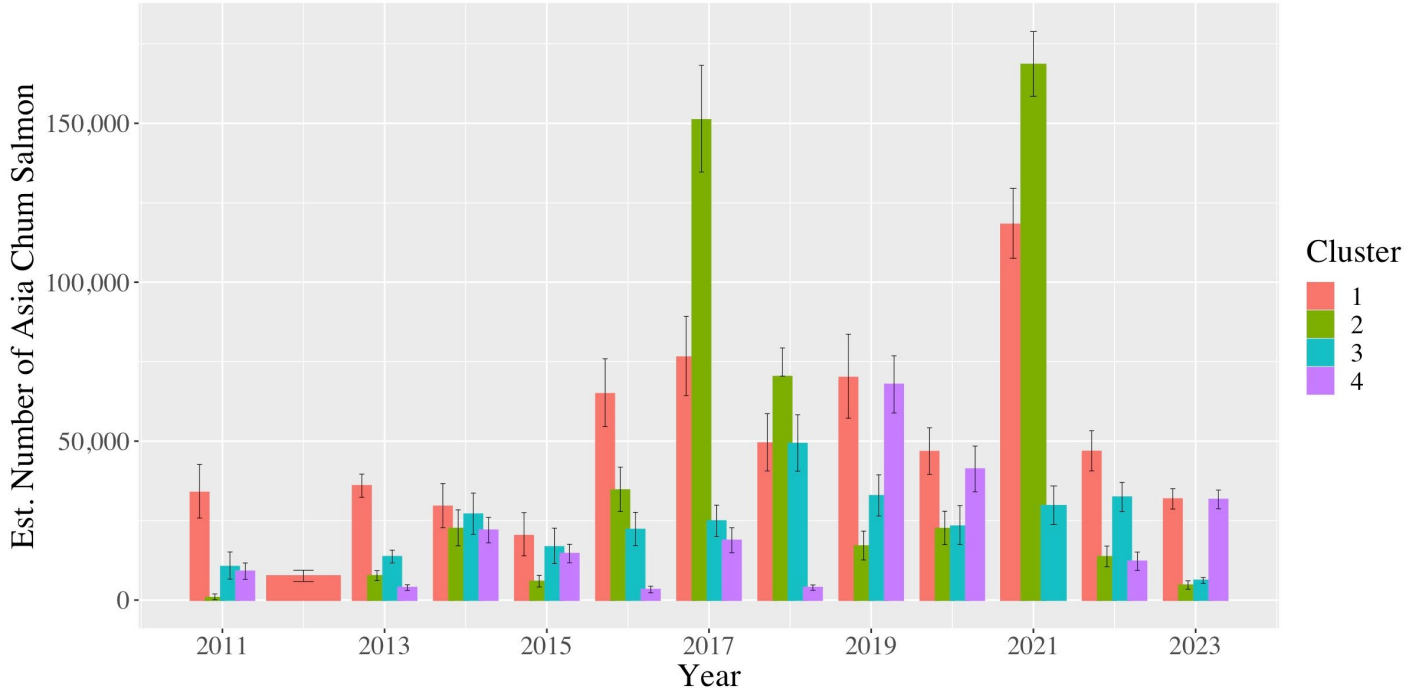


When Analyzed as Three Distinct Time Periods		
Period	Statistical Weeks	Associated Week-end Calendar Dates
Early	24-29	June 10-July 29
Middle	30-34	July 29-August 26
Late	35-44	August 26 -November 4

Figure 6-14, page 137



WAK chum by cluster and year



Asian chum by cluster and year

NOTE THESE FIGURES ARE NOT IN THE DEIS

All chum salmon bycatch avoidance areas within genetic cluster areas 1 and 2 2017- 2023 Source: Sea State

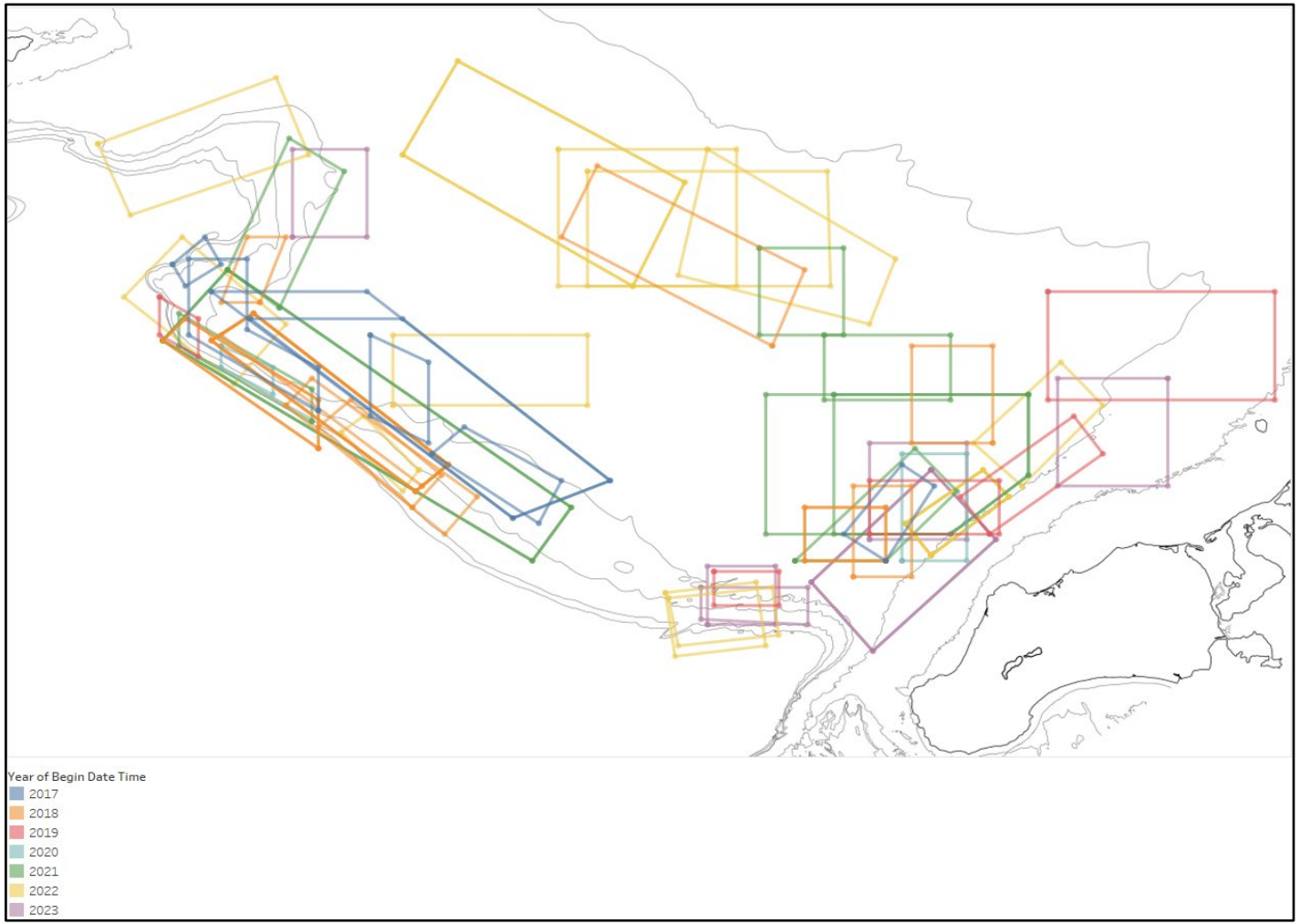


Figure 6-20, page 148

Adult Equivalency analysis

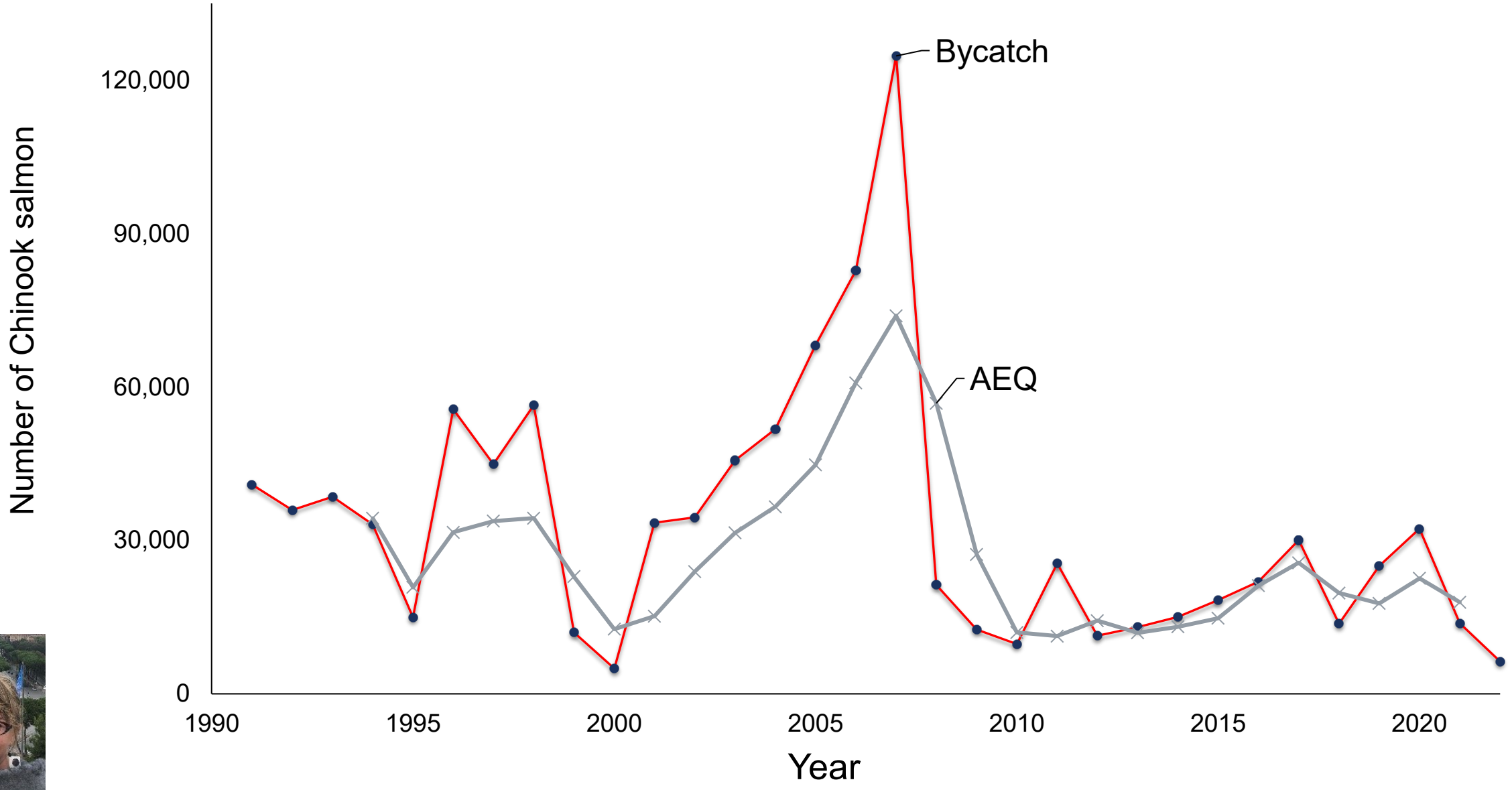
What does this tell us?

- We estimate the number of fish in a given year that would have returned to a river system based upon the number caught, age of bycatch and what proportion by age would return in a given year.
- Provides information on fish in a given year as well as the lag on fish in subsequent years
- Information needs to do this (next slides)

What has been done previously?

- Done for Chinook (most recently updated in 2022)
- Because **run sizes for WAK Chinook river systems** are available for the majority of the WAK rivers for Chinook we can also estimate the **impact rate**
  - AEQ/Run size
  - i.e. what percent of the run did not return due to bycatch

Bering Sea Chinook Salmon: Bycatch vs AEQ



Data available for Chinook AEQ

Data	Source
Number of chum caught in bycatch	NMFS Observers Census of all salmon
Age of chum in bycatch	Scale analysis of ages by Auke Bay Lab (ABL) scientists
Genetic Stock of Origin	Annual analysis by ABL scientists - temporal - spatial - by age group
Maturation rates by river systems	ADF&G
Ocean mortality	estimated

	Age					Mean	Weighting
	3	4	5	6	7	run size	factor
Kuskokwim Bay	5.10%	35.10%	36.00%	23.10%	0.60%	40,709	0.077
Kuskokwim River	1.30%	30.00%	42.00%	26.00%	0.60%	124,100	0.2346
Lower Yukon	0.00%	31.70%	48.00%	20.00%	0.30%	57,554	0.1088
Middle Yukon	0.00%	18.20%	45.70%	35.30%	0.80%	46,245	0.0874
Norton Sound and Point Clarence	1.10%	23.30%	51.10%	22.30%	2.20%	9,417	0.0178
Nushagak	1.20%	37.60%	44.70%	16.30%	0.20%	178,144	0.3368
Upper Yukon	0.00%	8.60%	43.40%	45.40%	2.60%	72,836	0.1377
Weighted mean in-river age composition	1.10%	29.10%	43.80%	25.30%	0.70%		
Oceanic natural mortality	0.3	0.2	0.1	0.1	0		
Oceanic maturity (this study)	3%	23%	75%	97%	100%		
Council update from 2018	4%	18%	64%	100%	100%		
Original (Ianelli and Stram 2015)	0%	19%	50%	94%	100%		

From June 2022 Council Chinook AEQ update

Uncertainties associated with a chum salmon AEQ for purposes of this analysis

More certainty

>> uncertainty

Data Needed to Estimate Impacts of Bycatch

Data	Source
Number of chum caught in bycatch	NMFS Observers Census of all salmon
Age of chum in bycatch	Scale analysis of ages by Auke Bay Lab (ABL) scientists
Genetic Stock of Origin	Annual analysis by ABL scientists - temporal - spatial - stock specific ages
Maturation rates by river systems	ADF&G
Ocean mortality	Published literature e.g., Beamish et. al 2018 (limited to Asian stocks)

What is the purpose in estimating a highly uncertain AEQ when we cannot do a run reconstruction for all WAK chum to estimate an impact rate?

What can we do with the information we have for WAK chum?

CWAK chum

- Estimated age composition by stock
- Assumption of maturity
  - Bookend high and low assumption by age
  - Informed by available estimates in the Yukon summer chum
- Assumption of oceanic mortality
  - Bookend high and low assumption by age

Yukon Fall chum (~Upper Yukon chum)

- Estimated age composition by stock
  - Non-trivial contribution of summer run stocks in the areas that are currently defined as Upper Yukon in the genetic reporting groups (could be re-run to address)
- Assumption of maturity
- Assumption of oceanic mortality
- Impact rate for Yukon fall chum only
  - Run reconstruction

Example Coastal West Alaska age proportions

Need to infer age 2 and age 6

Ages	2	3	4	5	6+
numbers at age		9,770	35,777	10,173	
Variability		5,477-14,618	28,245-43,826	6,613-14,090	

Need to make some assumptions of maturity and oceanic mortality

Ages	2	3	4	5	6+
Maturity					
Oceanic mortality					

Coastal Western Alaska (CWAK), Upper/Middle Yukon and combined Western Alaska (CWAK + Upper/Middle Yukon) resulting numbers of fish 2011-2022

	Chum Bycatch	Coastal Western Alaska		Upper/Middle Yukon		Western Alaska Combined	
Year	Total	Mean	Est. #	Mean	Est. #	Mean	Est. #
2011	191,313	16.20%	30,993	8.90%	17,027	25.10%	48,020
2012	22,172	13.80%	3,060	7.40%	1,641	21.20%	4,701
2013	125,114	18.10%	22,633	6.30%	7,782	24.40%	30,415
2014	218,886	17.70%	38,699	2.10%	4,553	19.80%	43,252
2015	233,085	16.00%	37,294	3.90%	9,090	19.90%	46,384
2016	339,236	19.30%	65,473	5.30%	17,980	24.60%	83,453
2017	465,848	14.00%	65,219	6.00%	27,951	20.00%	93,170
2018	294,675	15.40%	45,385	3.40%	10,020	18.80%	55,405
2019	346,671	15.90%	55,143	0.30%	1,040	16.20%	56,183
2020	343,094	8.00%	27,448	1.10%	3,774	9.10%	31,222
2021	545,902	8.90%	48,658	0.50%	2,854	9.40%	51,512
2022	242,309	21.10%	51,106	1.90%	4,618	23.00%	55,724

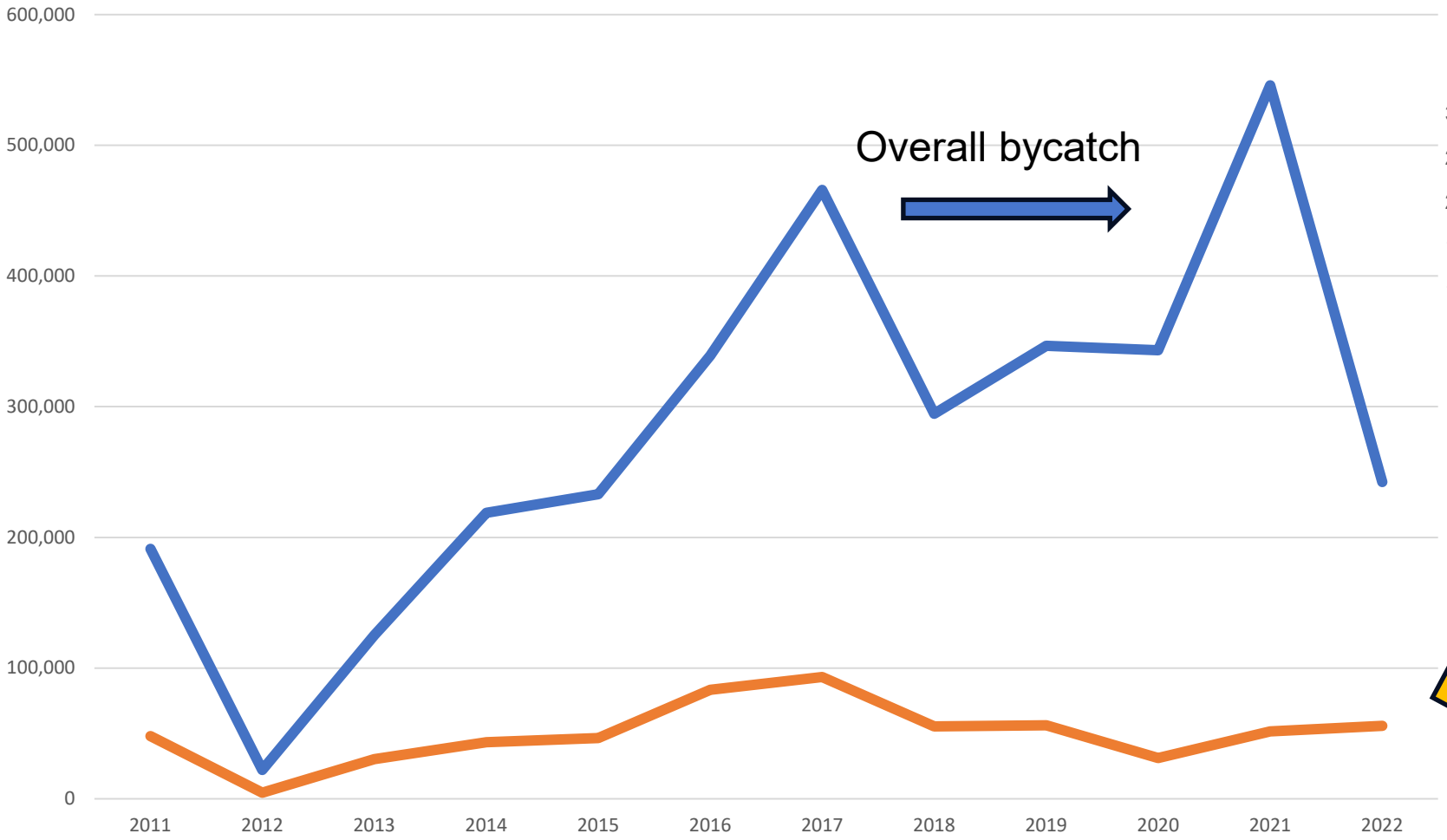
Estimated number per year comprises a maximum amount that could return:

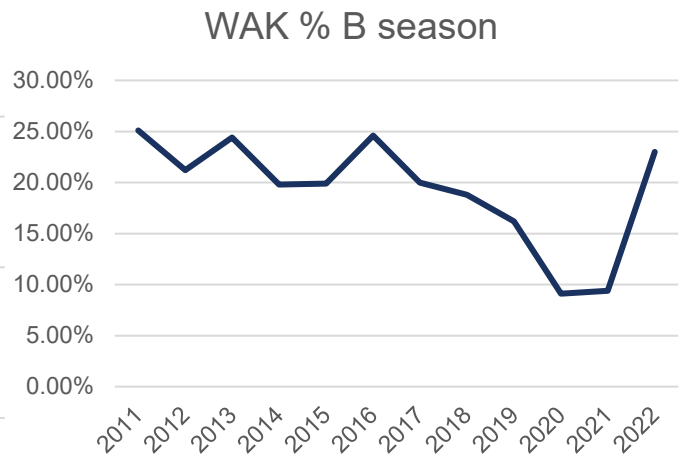
We know that not all chum return in a given year due to:

Oceanic mortality
Age specific maturity

Table 6-11 page 142

Overall B season bycatch as compared to WAK component





Section 6.1.4.5
Brief overview of 2023 chum salmon bycatch and genetic results

- Non-Chinook salmon PSC in the BSAI pollock fishery in 2023 was 112,303
- CWAK chum = 8.3% (estimated 9,246 fish)
- Upper/Middle Yukon component = 2.3% (estimated 2,540 fish)

- Drop in the genetics proportion of CWAK from 2022 (CWAK in 2022 was 21.1%)
- Slight increase in the Upper/Middle Yukon component (1.9% in 2022)

Summary of impacts to chum under Alternative 1

- Coastal WAK (CWAK) estimated contribution to the overall chum bycatch (2011-2022)
  - low of 3,060 in 2012
  - high of 65,473 in 2016

- Relative proportions of CWAK stocks to overall bycatch can be highly variable by year
- 2021
  - 545,902 total chum salmon were caught as bycatch, but the proportion of CWAK stocks was 8.90% resulting in a relative number of CWAK chum of 48,658 fish.
- 2022
  - almost half the total amount of chum salmon was caught (242,309) but the higher proportion of CWAK chum (21.20%) meant a similar number of CWAK chum salmon (51,106) were caught in 2021.
- Upper/Middle Yukon reporting groups are variable (ranging from 0.50% to 8.90%)
  - relative contribution to the overall bycatch tend to be much lower resulting in a range of Upper/Middle Yukon chum taken over this time frame from 1,641 in 2012 to 27,951 in 2017.
- Proportions are highly influenced by fishing locations annually by sector.

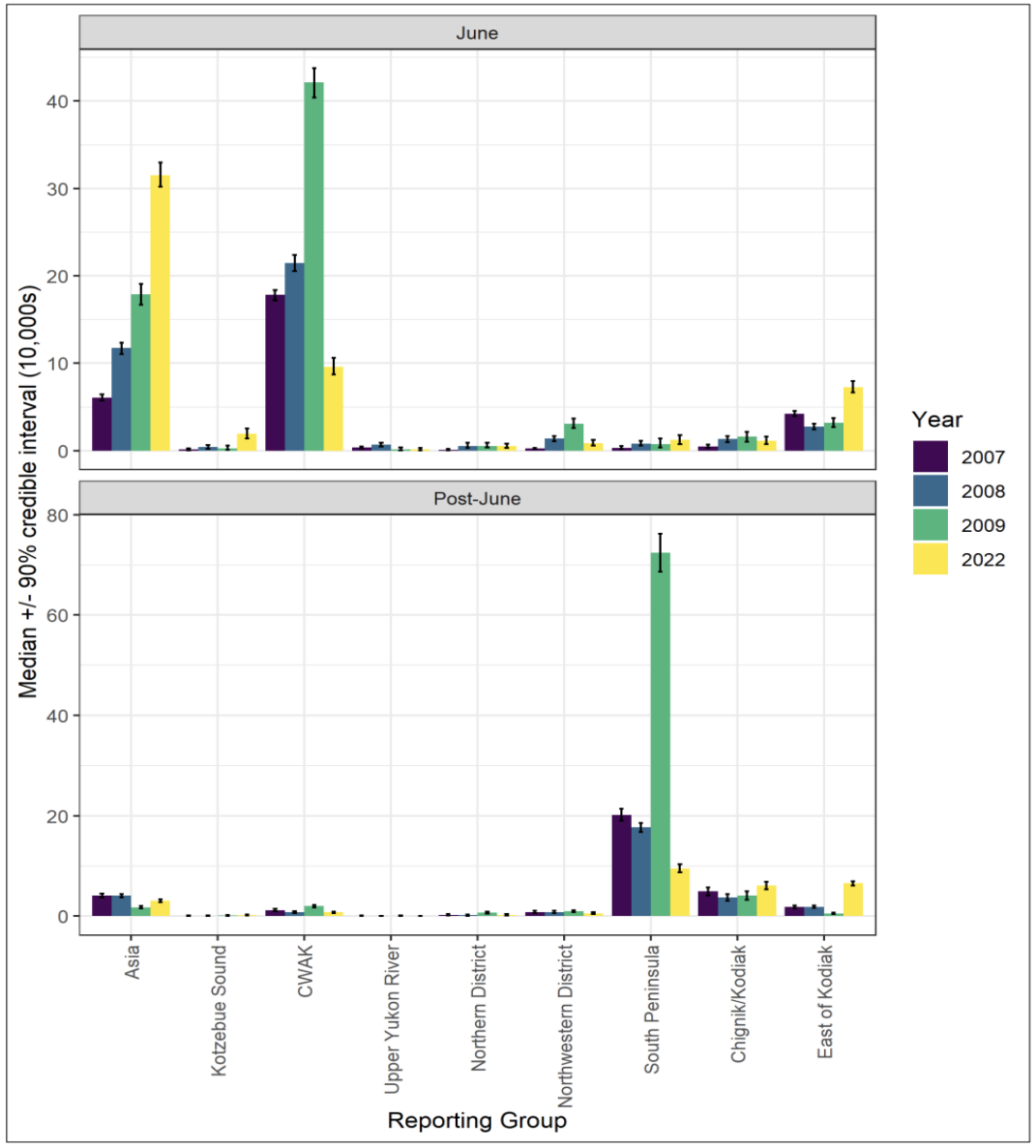
Summary of impacts and limitations to estimate impacts to chum under Alternative 1 (p 143)

- WAK salmon populations vary in their productivity and life history characteristics.
  - may contribute to their sustainability or population viability, which may be important for the resiliency of chum salmon stocks, particularly in the face of climate change
  - limited information on specific spawning populations of chum salmon, which makes it difficult to understand how each specific population may or may not respond to bycatch and other environmental factors

- Data to estimate the impacts of bycatch on specific spawning populations of chum salmon are not available, these data would be extremely difficult to collect, and even if they were available there are many assumptions that would need to be made to estimate impacts.
- Footnote p 143 regarding potential impacts on discrete spawning populations
  - analysts are not able to estimate impacts to these levels
  - Feedback sought on feasibility of including this type of discussion in a future iteration of analysis

Cumulative effects

Area M chum harvests



Figures 6-18, page 145

Estimates of stock-specific compositions of harvest rate South Alaska Peninsula June and post-June chum salmon harvests, 2022 (source Dann et al. 2023)

On average, between 2007 to 2009, 57% of chum salmon harvest in the South Alaska Peninsula were of CWAK origin

2023 study = relative proportion of CWAK stocks declined from the WASSIP study findings to 18%, (varies by time)

Status quo bycatch and Area M harvests of AYK stocks

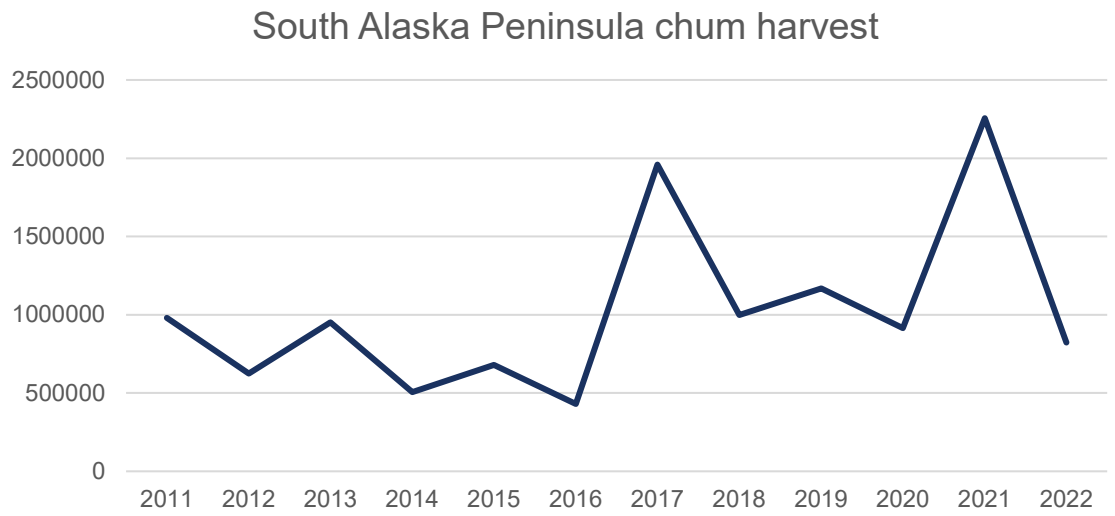


Figure 6-19 South Alaska Peninsula historical harvest of chum salmon 2011-2022
from ADF&G Fishery Management Report No. 22-32, 2022

This table is not in DEIS

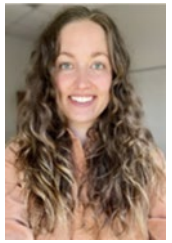
Year	Total WAK chum	Area M commercial fisheries June CWAK contribution*
2011	48,020	76,200
2012	4,701	71,111
2013	30,415	71,830
2014	43,252	70,225
2015	46,384	32,169
2016	83,453	48,711
2017	93,170	115,360
2018	55,405	96,744
2019	56,183	98,833
2020	31,222	88,223
2021	51,512	210,348
2022	55,724	97,937

**Using harvest data from Figure 6-19 and 2022 Dann et al results of 18% contribution from CWAK applied over annual harvest (noting that this does not account for variations over time as shown in Figure 6-18)*

Figures 6-19 page 145

Potential Impacts to Communities and Regions Engaged in and Dependent on Subsistence Harvests of Chum Salmon Under Alternative 1

- The impact of chum salmon bycatch occurring in the Bering Sea pollock fishery on adult chum salmon returns to Western and Interior Alaska river systems under the status quo **is uncertain**
- Although not quantified in this analysis, **Alternative 1 would be expected to continue this current level of impact** as it relates to subsistence salmon fishing
  - Alternative 1 is not anticipated to have inherent benefits to the overall health of the resource such that abundance improves where less restricted subsistence opportunities could be provided, ***but*** fishing behavior could still change into the future under status quo regulations
- ***However,*** the outcomes for subsistence users are uncertain and also affected by a variety of factors external to this impact analysis



Section 6.1.11.1, pg. 199

Potential Impacts to Communities and Regions Engaged in Commercial Chum Salmon Fishing under Alternative 1

- Commercial salmon fisheries would continue to be managed by the State of Alaska
  - Surplus above escapement needs and subsistence would be made available for other consumptive uses, such as commercial fishing opportunities.

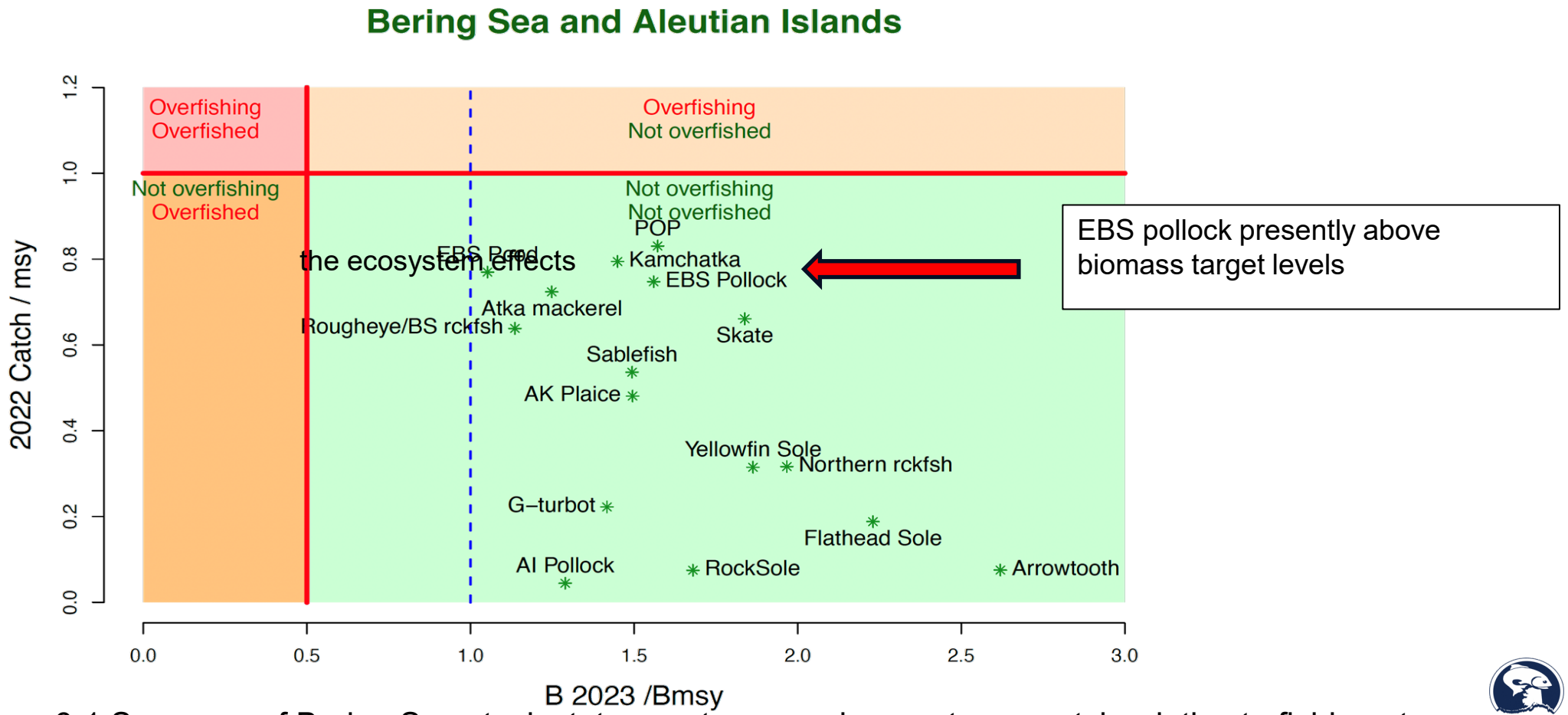
- While chum PSC in the pollock fishery is documented and genetics indicate the estimated proportion expected to originate from WAK, the analysis cannot further estimate the impact that chum salmon bycatch has had on adult returns to Western and Interior river systems
- Although not quantified in this analysis, **Alternative 1 would be expected to continue this current level of impact** as it relates to commercial salmon fishing

- ***However,*** the outcomes for commercial users are uncertain and also affected by a variety of factors external to this impact analysis

SIA: Section 5.1.3.2, page 188

Pollock Under the Status Quo

Pollock impacts under Alternative 1



the ecosystem effects

EBS pollock presently above biomass target levels

Figure 6-1 Summary of Bering Sea stock status next year and current year catch relative to fishing at Fmsy where FOFL is taken to equal FMSY.

Pollock spawning, feeding and predators- Status quo

Pollock spawn during March-May

- East middle shelf warm years, west outer shelf colder years
- Planktonic eggs and larvae for about 90 days
  - Advection affects dispersal (separation from predators)
  - Available feed affects overwintering survival (can vary warm and cold)

Main prey for juvenile pollock calanoid copepods and euphausiids

- Diets become more piscivorous with age
- Age-0 less able to avoid cold pool, adult pollock move away

Pollock predators

- Cannibalism might be expected to increase as the biomass of older, larger fish increases
- Fur seal consumption of adult pollock generally increases in years when juveniles less abundant
- Chum consumption on Age-0 pollock

Climate impacts and pollock

- Pollock distributions affected by cold pool extent
  - Included in current assessment biomass estimates
  - Adults tend to avoid cold pool
- During warm years distribution shifts northward
- Sea Ice extent affects timing of spawning
  - Pollock move from inner to outer shelf as mature
  - warmer years earlier spawning
- Increased metabolic rate in warm years

AFA Participation and Revenue Dependence Under the Status Quo

Bering Sea Pollock Sectors

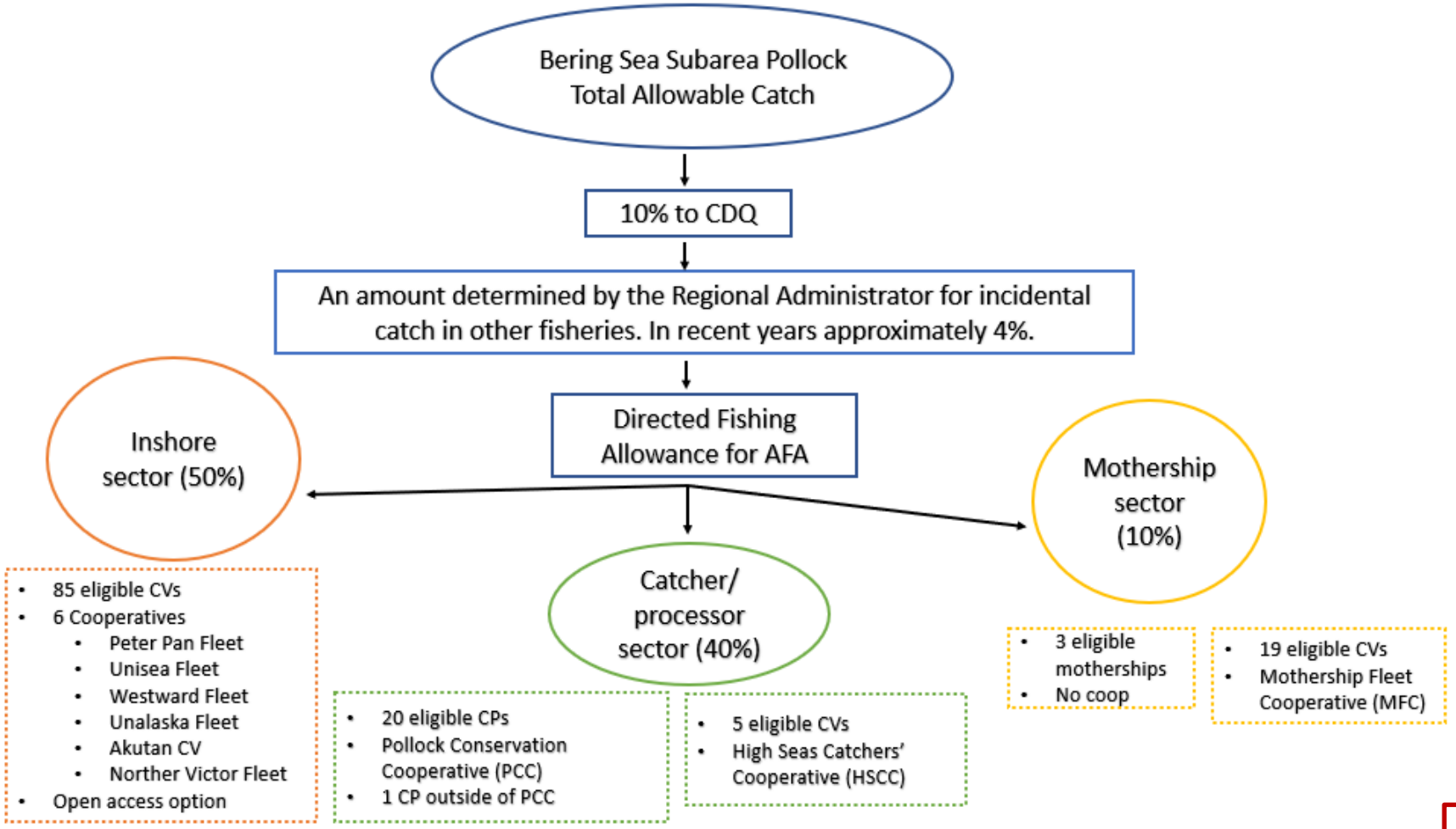


Figure 2.2, page 40

AFA Participation and Landings

Participation (2022):

- 13 CPs, 71 inshore CVs and 13 mothership CVs (Table 2-3)
- Generally stable participation, slight decline in shoreside CVs in timeseries (Table 2-3)

Landings (2022):

- 1.06 mil mt (Table 2-5)
- 587,000 mt in the B season (Table 2-6)
- 98% of the TAC (Table 2-3)
- Typical to harvest 98-99% of TAC (exceptions 2011, 2020)

B Season Revenue (2022):

- $264 million gross ex-vessel, across sectors
- $798 million gross first wholesale, across sectors
- Trends shown in the figure

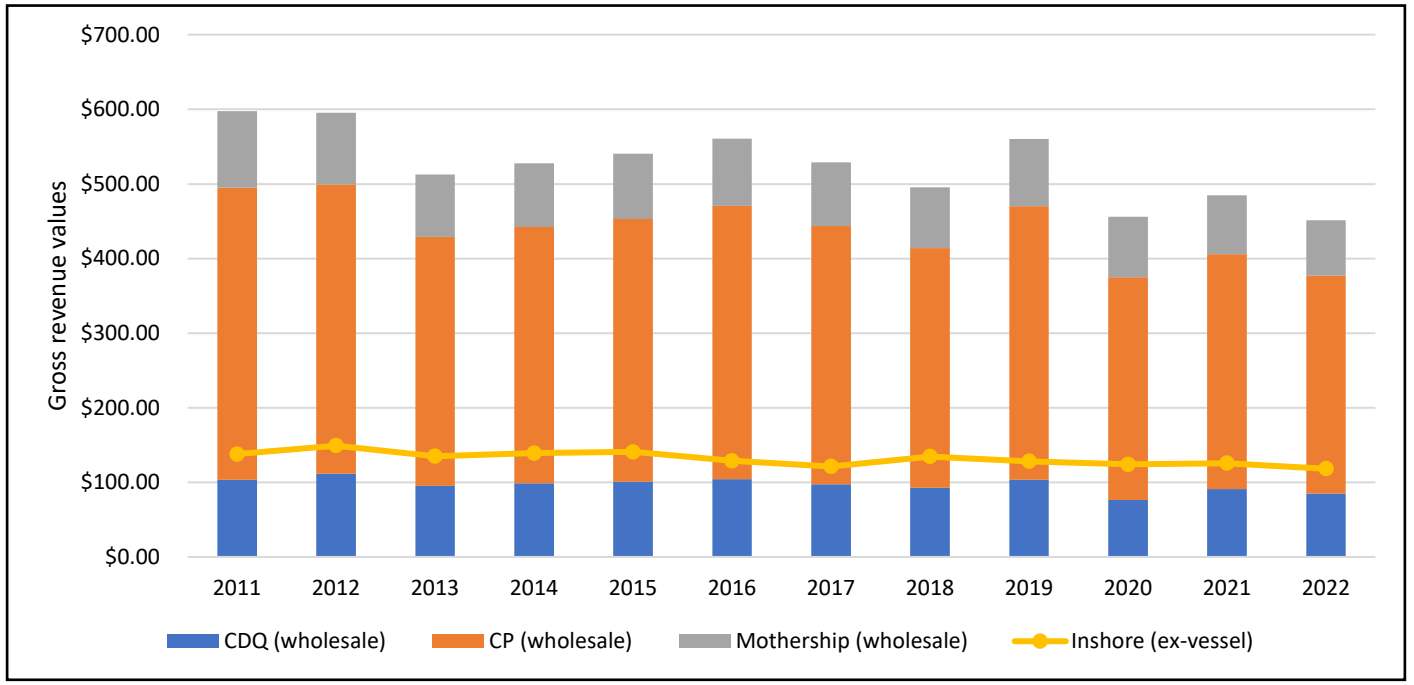


Table 6-23 and 6-24, page 188

Pollock Products and Markets

Pollock Products and Markets

Draws from Alaska Groundfish Market Profiles published in the 2022 BSAI Groundfish Economic SAFE:

- U.S. accounts for 42% of the global pollock market (2020)
- Russia is a competitor and there can be substitute whitefish species
- B season pollock is primarily made into surimi and fillets which are primarily sold to export markets
  - Between 2016-2020: ~88% surimi and ~72% fillets exported
  - There are domestic markets for both and increased commitments from USDA for purchasing pollock products (15 mlb in 2024)

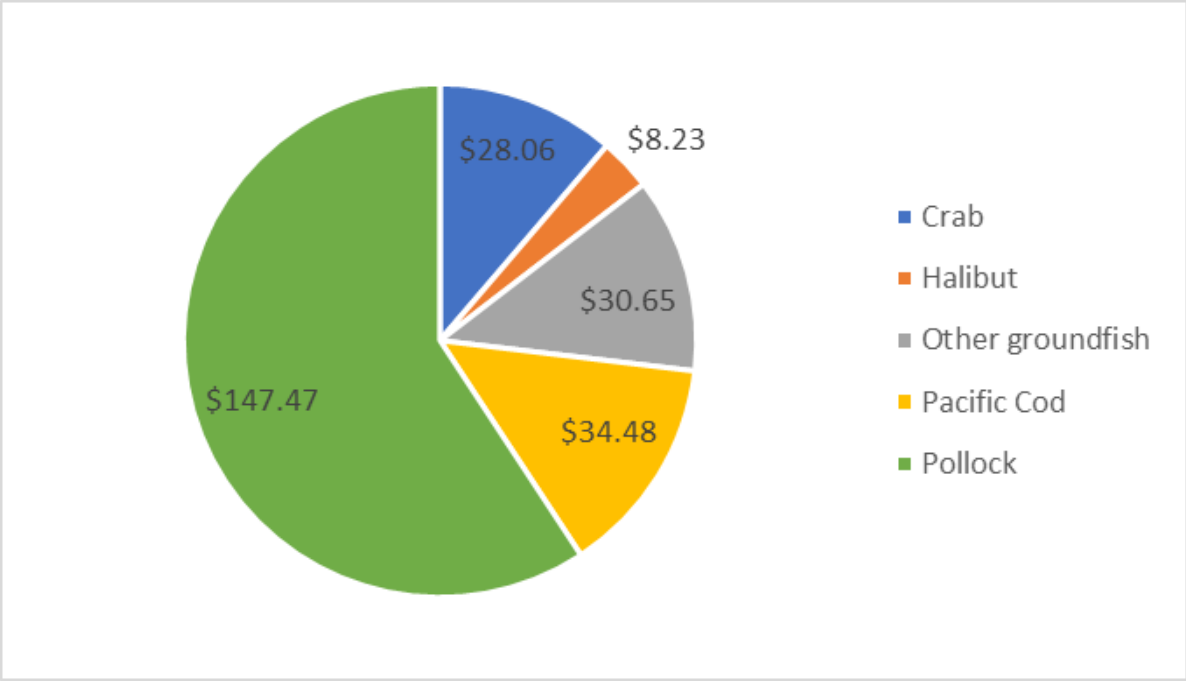
Alaska Seafood Market Challenges

Draws from a recent Alaska Seafood Marking Institute letter highlighting 'extraordinary circumstances' facing Alaska fisheries, including:

- Increased operational costs
- High interest rates
- Labor supply shortfalls
- Supply and demand imbalances
- Geopolitical actions that have constrained market opportunities and impacted competition
- Declines in other species (e.g., crab) that can affect the resilience of processing plants

Section 6.1.10.3 page 193–196

Revenue from CDQ Allocations



- Between 2011-2022 pollock wholesale value accounted for 59% of the CDQ allocation wholesale value
- However, with crab fishery closures and diminished crab catch limits, pollock has grown to make up a greater proportion
- In 2022, pollock CDQ accounted for 67% of the CDQ allocation wholesale value

Figure 6-33 Annual average gross first wholesale revenues (millions of $) associated with CDQ allocations by species, 2011 through 2022

Revenue from CDQ Investments in AFA Vessels

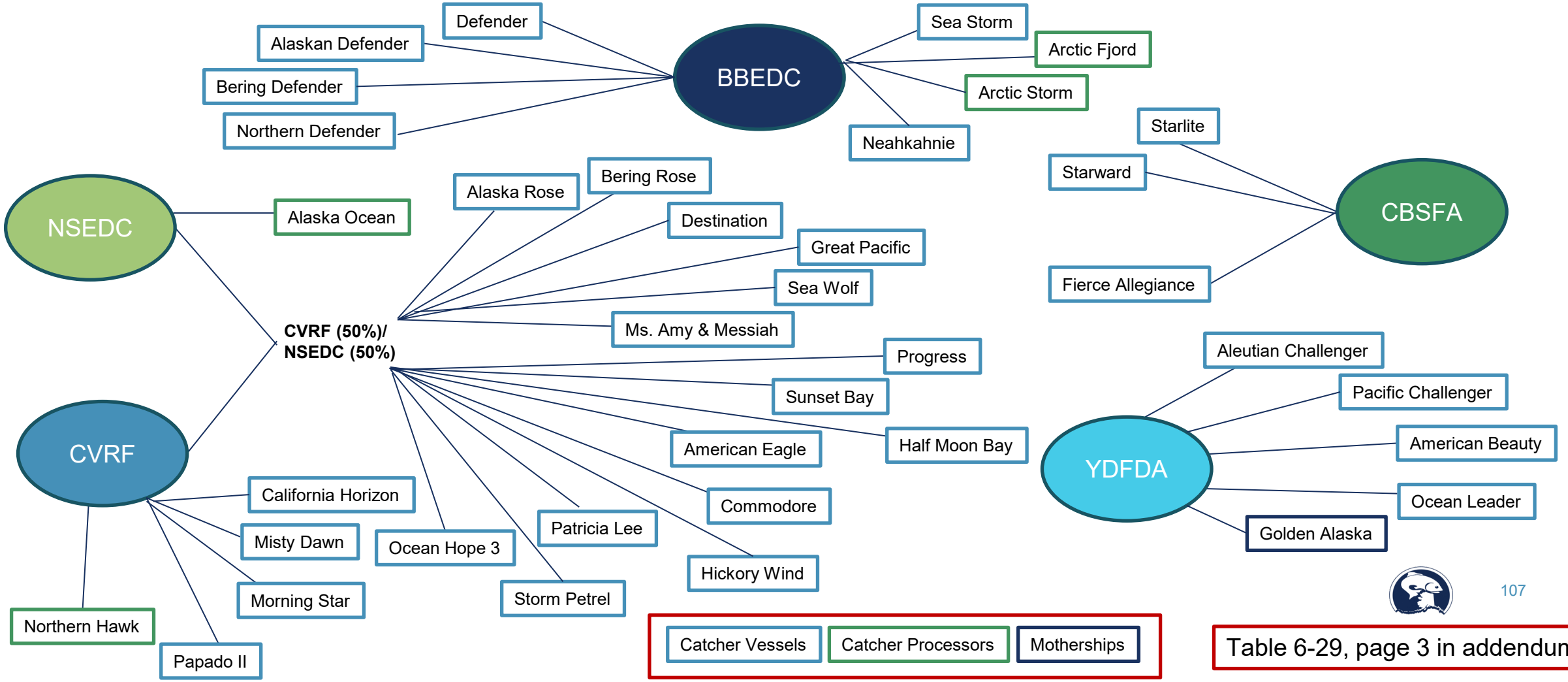


Table 6-29, page 3 in addendum

CDQ Communities

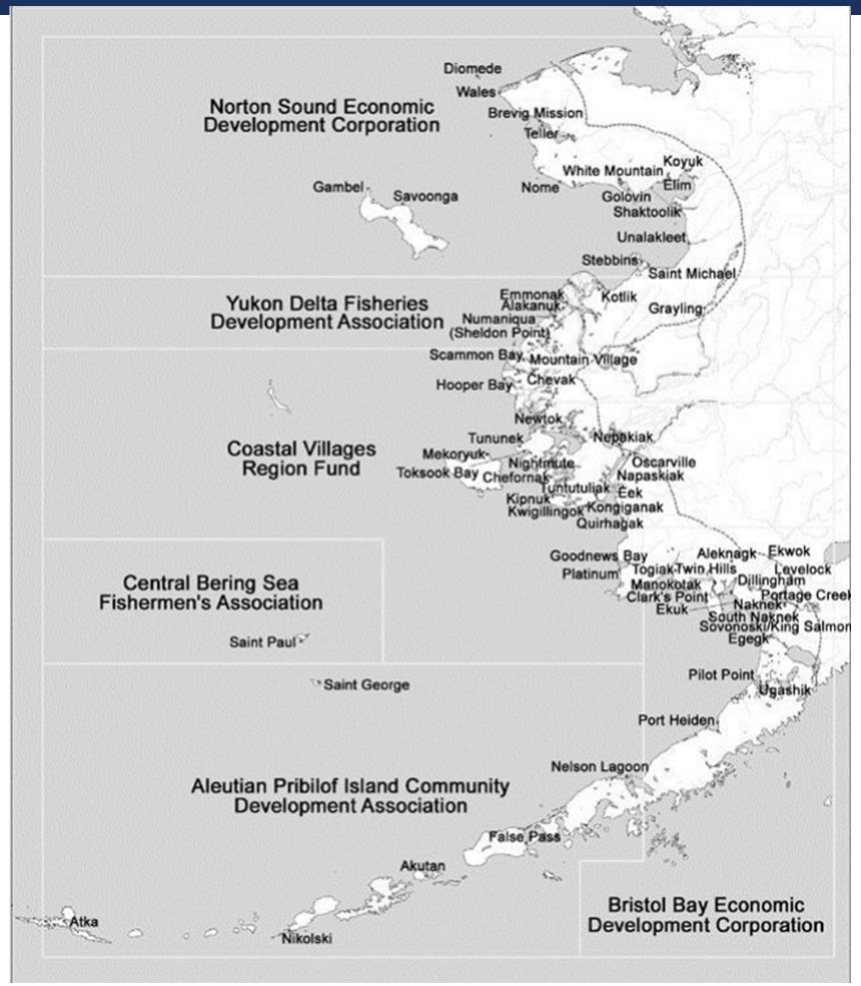


Figure 4-16 SIA CDQ program, eligible communities and CDQ groups

Employment opportunities for residents

- Example: BBEDC's Seasonal Employment Opportunities Program and NSEDC's Norton Sound Seafood Products

Financial support for local participation in small boat fisheries

- Example: CBSFA's support for the local halibut fleet

Community development grants and infrastructure support

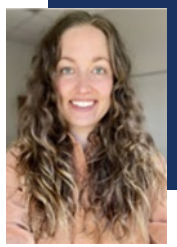
- Example: APICDA's Community Development Grant

Support for subsidizing fuel, gear, and other equipment

- Example: CVRF's People Propel

Section 4.2 pg. 74 of SIA

Overview of Community Engagement and Dependence in B Season Pollock Under the Status Quo



Patterns of Community Engagement in the Harvesting and At-Sea Processing Sectors

Ownership of vessels engaged in the harvesting and at-sea processing of B season pollock was concentrated in Seattle City or Seattle MSA (2011-2022)

- 92.77% of CPs harvesting AFA and CDQ pollock during the B season pollock (see Table 4-1)
- 47.62% of mothership/floating processors (see Table 4-5)
- 80.20% of inshore CVs (see Table 4-10)
- 92.45% of mothership CVs (see Table 4-11)

Consistent level of engagement from CVs registered in Kodiak and Newport (2011-2022)

- 6 CVs with a registered ownership address in Kodiak (Table 4-10 and 4-11)
- 10 CVs with a registered ownership address in Newport (Table 4-10)

Section 4.1 of SIA

Patterns of Dependence on the B Season Fishery

- **Seattle City/Anchorage CPs**: On average, 55.27% ($439.22 million) of CPs' total gross first wholesale revenues (Table 4-3 and 4-4)
- **Seattle City/Dutch Harbor floating processor/motherships:** On average, 58.49% ($107.96 million) of floating processor/motherships' total gross first wholesale revenues (Table 4-7)
- **Seattle MSA CVs (inshore and mothership combined):** On average, 51.45% ($137.60 million) of total gross ex-vessel revenues (Table 4-13)
- **Kodiak CVs (inshore and mothership combined):** On average, 26.45% ($3.57 million) of these vessels' gross ex-vessel revenues (Table 4-13)
- **Newport inshore CVs:** On average, 25.79% ($5.85 million) of these vessel's gross ex-vessel revenues (Table 4-13)

Section 4.1 of SIA

Patterns of Community Engagement and Dependence in the Shoreside Processing Component

- B season pollock deliveries have been made to shoreside processing facilities in Akutan, King Cove, and Unalaska/Dutch Harbor
- The majority of facilities are concentrated in Unalaska/Dutch Harbor
- **Shoreside processing facilities in Akutan/King Cove/Unalaska:** On average, B season pollock fishery contributed 43.73% ($358.3 million) of these entities total gross first wholesale revenues (Table 4-17)
- Section 4.1.4.1 provides information on the annual processing round

Section 4.1.4 of SIA

Estimates of Direct Fishery-Related Tax Revenues

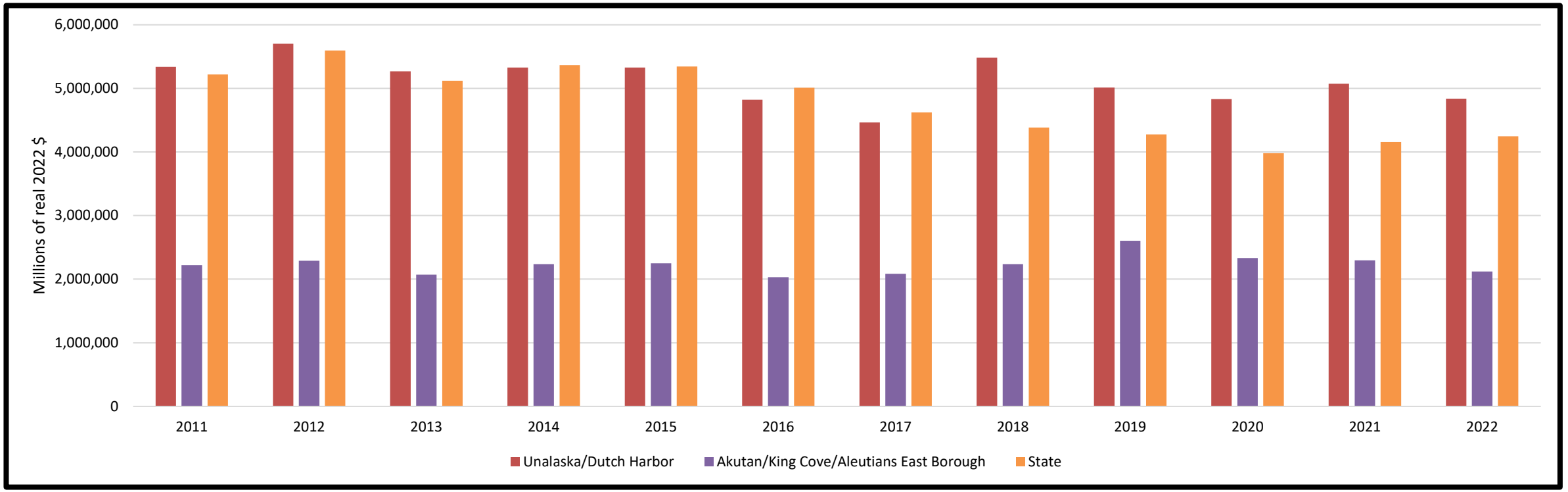


Figure 4-15 SIA Total estimated State and local tax revenues (FBT, FRLT, and City Raw Seafood) generated from the B season pollock fishery by locale, 2011 through 2022 (millions of 2022 real $)

Section 4.1.6 SIA, pg. 70

Summary of Conditions and Potential Impacts Under Status Quo

- The degree of effect the status quo regulations for chum salmon bycatch have on community engagement and participation in the B season pollock fishery is uncertain
  - Communities identified as being substantially engaged in or dependent on the B season fishery include Seattle, Kodiak, Newport, Akutan, King Cove, and Dutch Harbor/Unalaska
  - 65 CDQ communities and broader regions have benefitted from social and economic development programs funded in part by Bering Sea pollock
- Patterns of community engagement and dependence on the B season pollock fishery could change

Section 5.1.1 of SIA

Dutch Harbor, ASMI Industry and Partner Use

ALTERNATIVES 2 AND 3 (CHAPTER 6)

Chum salmon

Closure dates by sector and apportionment suboption under a chum salmon PSC limit of 200,000

Year	CDQ				CP				Mothership				Inshore			
	3-year avg.	5-year avg.	Pro-rata	AFA	3-year avg.	5-year avg.	Pro-rata	AFA	3-year avg.	5-year avg.	Pro-rata	AFA	3-year avg.	5-year avg.	Pro-rata	AFA
2011					10/29				9/17	9/17	9/17	9/17		10/15	10/15	8/27
2012																
2013																9/14
2014					9/6	9/6	9/6						9/6	8/30	8/30	8/9
2015													8/29	8/22	8/22	8/15
2016	8/6	8/13	8/13		8/6	8/6	8/6	8/13	8/13	8/13	8/13	8/13	9/10	9/10	9/10	8/13
2017	7/8	7/15	7/15	7/15	7/22	7/22	7/22	7/22					8/5	7/29	7/29	7/22
2018	6/30	7/7	7/7	7/7	7/7	7/7	7/7	7/21	9/1	9/8	9/1	9/1	9/1	9/1	9/1	7/28
2019	9/21	9/28	9/28		8/31	8/31	8/31	8/31	8/31	8/31	8/31	8/31	9/7	8/17	8/17	7/27
2020					9/5	9/12	9/12	10/3	10/31	10/31	10/31	10/24	9/5	9/5	9/5	8/29
2021	7/17	7/17	7/17	7/17	7/31	7/31	7/31	8/14	7/31	7/31	7/31	7/31	7/31	7/24	7/31	7/24
2022					8/20	8/27	8/27		8/13	8/13	8/13	8/13	8/20	8/13	8/13	8/13

Table 6-31, DEIS

Suboption 2: Chum salmon PSC limit index to WAK chum salmon abundance

Year	Yukon River Summer Chum	Yukon River Fall Chum	Yukon River Summer + Fall	Bethel Test Fishery CPUE	Norton Sound Summed
2011	2,406,000	1,244,141	3,650,141	10,028	202,421
2012	2,479,900	1,089,200	3,569,100	6,894	107,359
2013	3,349,600	1,215,809	4,565,409	5,739	188,104
2014	2,467,600	956,669	3,424,269	6,345	215,382
2015	1,978,400	828,453	2,806,853	2,945	259,441
2016	2,581,500	1,390,329	3,971,829	3,998	124,397
2017	3,635,100	2,315,883	5,950,983	6,785	324,148
2018	2,074,700	1,114,684	3,189,384	8,205	363,939
2019	1,689,400	802,964	2,492,364	6,429	234,270
2020	763,200	184,233	947,433	1,443	49,762
2021	156,130	95,249	251,379	327	21,735
2022	478,690	242,465	721,155	2,191	70,702

Suboption 2a: Three Area index whereby independant thresholds by river reached

Year	Yukon River Summer Chum	Yukon River Fall Chum	Yukon River Summer + Fall	Bethel Test Fishery CPUE	Norton Sound Summed
2011	2,406,000	1,244,141	3,650,141	10,028	202,421
2012	2,479,900	1,089,200	3,569,100	6,894	107,359
2013	3,349,600	1,215,809	4,565,409	5,739	188,104
2014	2,467,600	956,669	3,424,269	6,345	215,382
2015	1,978,400	828,453	2,806,853	2,945	259,441
2016	2,581,500	1,390,329	3,971,829	3,998	124,397
2017	3,635,100	2,315,883	5,950,983	6,785	324,148
2018	2,074,700	1,114,684	3,189,384	8,205	363,939
2019	1,689,400	802,964	2,492,364	6,429	234,270
2020	763,200	184,233	947,433	1,443	49,762
2021	156,130	95,249	251,379	327	21,735
2022	478,690	242,465	721,155	2,191	70,702

Suboption 2b: Yukon Summer Chum

Year	Yukon River Summer Chum	Yukon River Fall Chum	Yukon River Summer + Fall	Bethel Test Fishery CPUE	Norton Sound Summed
2011	2,406,000	1,244,141	3,650,141	10,028	202,421
2012	2,479,900	1,089,200	3,569,100	6,894	107,359
2013	3,349,600	1,215,809	4,565,409	5,739	188,104
2014	2,467,600	956,669	3,424,269	6,345	215,382
2015	1,978,400	828,453	2,806,853	2,945	259,441
2016	2,581,500	1,390,329	3,971,829	3,998	124,397
2017	3,635,100	2,315,883	5,950,983	6,785	324,148
2018	2,074,700	1,114,684	3,189,384	8,205	363,939
2019	1,689,400	802,964	2,492,364	6,429	234,270
2020	763,200	184,233	947,433	1,443	49,762
2021	156,130	95,249	251,379	327	21,735
2022	478,690	242,465	721,155	2,191	70,702

Suboption 2c: Yukon Summer and Fall chum

Year	Yukon River Summer Chum	Yukon River Fall Chum	Yukon River Summer + Fall	Bethel Test Fishery CPUE	Norton Sound Summed
2011	2,406,000	1,244,141	3,650,141	10,028	202,421
2012	2,479,900	1,089,200	3,569,100	6,894	107,359
2013	3,349,600	1,215,809	4,565,409	5,739	188,104
2014	2,467,600	956,669	3,424,269	6,345	215,382
2015	1,978,400	828,453	2,806,853	2,945	259,441
2016	2,581,500	1,390,329	3,971,829	3,998	124,397
2017	3,635,100	2,315,883	5,950,983	6,785	324,148
2018	2,074,700	1,114,684	3,189,384	8,205	363,939
2019	1,689,400	802,964	2,492,364	6,429	234,270
2020	763,200	184,233	947,433	1,443	49,762
2021	156,130	95,249	251,379	327	21,735
2022	478,690	242,465	721,155	2,191	70,702

Index thresholds and suboptions

Management area		Index threshold	Suboption 1 3 Area index	Suboption 2a Yukon Summer	Suboption 2b Yukon Summer and Fall
Yukon	**Summer**	**950,000**	If 3/3 above thresholds = no PSC limit 2011-2019 If 1/3 areas below threshold, PSC limit in following year = X 2022 If 2 or 3 areas are below thresholds PSC limit in following year = X 2020-2021	If Summer run above threshold no PSC limit 2011-2019 If Summer run below threshold PSC limit = X 2020-2022	If 2/2 above thresholds = no PSC limit 2011-2019 If 1 or both indices below threshold, PSC limit in following year = X 2020-2022
	Fall	**575,000**			
Kuskokwim		**2,800**			
Norton Sound		**57,000**			

Alternative 3 WAK thresholds

Suboption 1 (3-year average)	6.10% 2,440 - 3,233	21.90% 8,760 - 11,607	9.10% 3,640 - 4,823	62.90% 25,160 - 33,337
Year	**CDQ**	**CP**	**Mothership**	**Inshore**
2011	NA	8,917	4,430	32,444
2012	NA	NA	NA	3,932
2013	NA	2,468	801	28,219
2014	NA	8,715	NA	31,650
2015	NA	5,133	1,928	36,262
2016	3,031	21,946	13,758	38,236
2017	22,674	33,435	4,673	35,288
2018	6,272	17,644	4,503	30,391
2019	2,898	5,090	7,637	40,237
2020	NA	1,926	1,148	25,620
2021	6,092	7,736	3,447	33,522
2022	902	8,037	7,891	37,278

Pollock forgone, overall chum salmon avoided and % reduction (annual and B season) of each cumulatively (2011-2022) with sector allocations: cap 200,000

If a 200,000 chum PSC limit had been in place 2011-2022:		Sum of Forgone B Season Pollock (mt)	Reduction as % of B Season Total	Reduction as % of Annual Total	Sum of B Season Chum Avoided (#)	Reduction as % of B Season Total	Reduction as % of Annual Total
3-year avg. sector apportionment	**Total**	**1,783,255**	**20.4%**	**11.8%**	**852,347**	**25.3%**	**25.2%**
	CDQ	189,218	21.4%	12.1%	99,035	43.5%	43.2%
	CP	808,749	25.9%	14.9%	347,317	36.1%	35.9%
	Mothership	117,955	14.9%	8.6%	65,310	23.3%	23.2%
	Inshore	667,332	16.9%	9.9%	340,685	17.9%	17.9%
5-year avg. sector apportionment	**Total**	**1,907,248**	**21.8%**	**12.6%**	**994,447**	**29.5%**	**29.4%**
	CDQ	164,173	18.5%	10.5%	63,497	27.9%	27.7%
	CP	785,612	25.1%	14.5%	325,469	33.9%	33.7%
	Mothership	114,457	14.5%	8.4%	62,513	22.3%	22.2%
	Inshore	843,005	21.3%	12.4%	542,968	28.6%	28.5%
Pro-rata sector apportionment	**Total**	**1,889,098**	**21.6%**	**12.5%**	**866,573**	**25.7%**	**25.6%**
	CDQ	164,173	18.5%	10.5%	63,497	27.9%	27.7%
	CP	785,612	25.1%	14.5%	325,469	33.9%	33.7%
	Mothership	117,955	14.9%	8.6%	65,310	23.3%	23.2%
	Inshore	821,358	20.8%	12.1%	412,297	21.7%	21.7%
AFA sector apportionment	**Total**	**2,235,419**	**25.5%**	**14.8%**	**1,092,360**	**32.4%**	**32.3%**
	CDQ	147,739	16.7%	9.5%	61,612	27.0%	26.9%
	CP	621,440	19.9%	11.4%	235,752	24.5%	24.4%
	Mothership	120,149	15.2%	8.8%	66,894	23.9%	23.8%
	Inshore	1,346,090	34.1%	19.9%	728,102	38.3%	38.2%

Table 6-42, page 218

Estimated total WAK chum saved by sectors and years under a 200,000 chum salmon PSC limit and suboption 1 (3-year average) apportionment scheme as well as cumulative total across all years (2011-2022) as shown in Table 6-46

Year	CDQ	CP	Mothership	Inshore	Total
2011	0	3	940	0	**943**
2012	0	0	0	0	**0**
2013	0	0	0	0	**0**
2014	0	1,026	0	3,871	**4,897**
2015	0	0	0	9,289	**9,289**
2016	601	12,216	6,016	796	**19,628**
2017	19,012	17,830	0	6,076	**42,918**
2018	3,066	7,198	612	3,326	**14,203**
2019	635	844	3,469	9,412	**14,361**
2020	0	805	0	10,518	**11,323**
2021	696	2,956	661	17,535	**21,848**
2022	0	2,830	2,017	636	**5,484**
Total	**24,009**	**45,708**	**13,716**	**61,460**	**144,893**

Table 6-47, page 224

Summary of impacts to chum salmon under Alternatives 2-3

- Reduction in the number of chum salmon caught as bycatch in the Bering Sea pollock fishery may have a positive and indirect impact on the overall health of the resource as more adult chum salmon may return to their natal streams.
- The proposed action is focused on reducing WAK chum salmon bycatch in particular, and increased adult chum salmon returns could increase abundance, which may improve run strength over time.

- **Analysts are unable to quantify the relative magnitude of these potential indirect and positive benefits**
  - **unable to determine the absolute impact of chum salmon bycatch occurring in the Bering Sea pollock fishery on chum salmon returns or the overall run size**
  - **unable to break out the WAK genetic stock reporting group (Coastal Western Alaska + Upper/Middle Yukon reporting groups) into smaller river systems or areas because of the current understanding of genetic structure among Western Alaska chum salmon**
  - **uncertainty in the level of bycatch reduction that would need to be achieved to result in escapement goals being met or improvements in chum salmon harvest opportunities**.

Section 6.2.4.2 pages 224-225

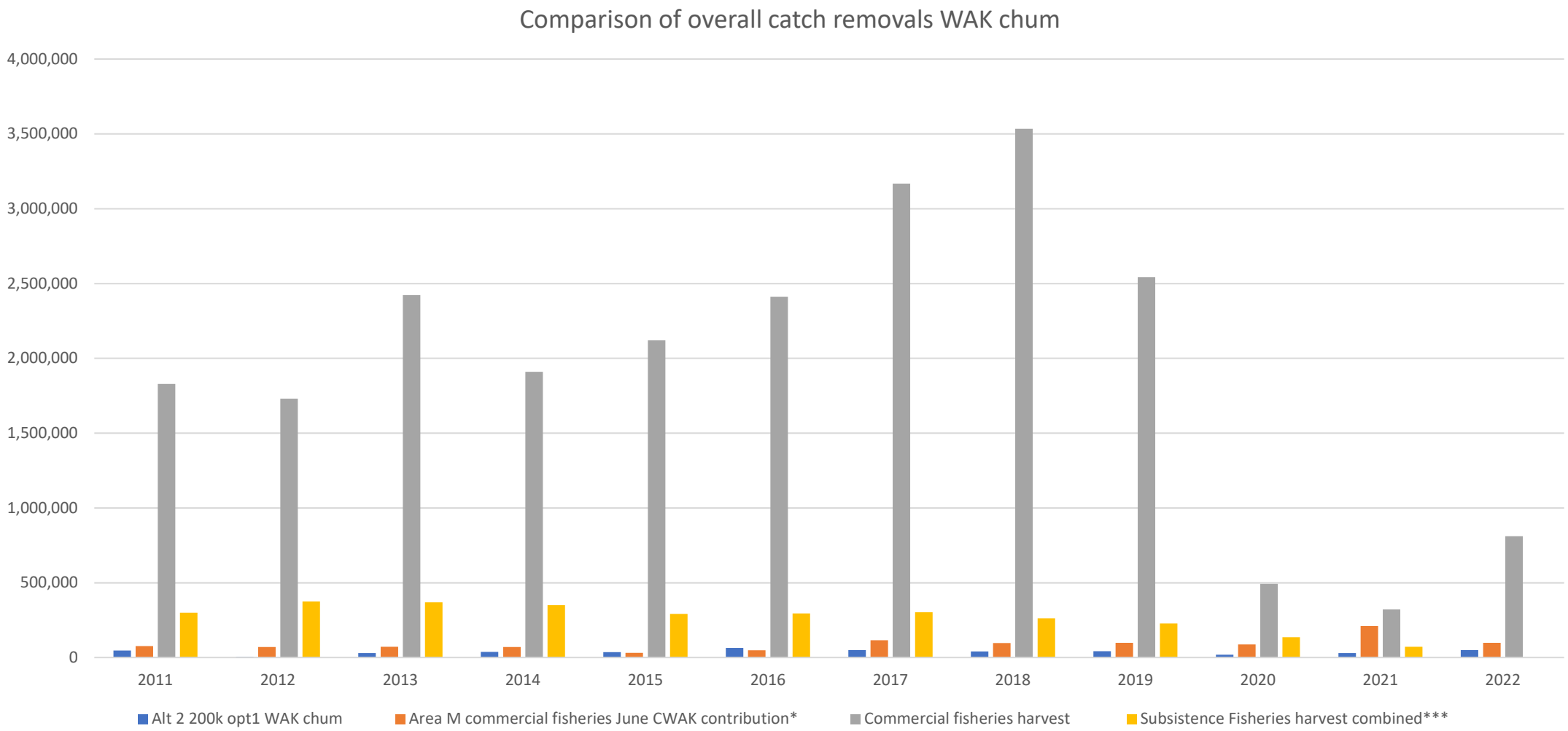
WAK chum salmon PSC impacts under Alternative 2 200,000 chum salmon PSC limit and suboption 1 (3-year average) apportionment scheme compared with commercial and subsistence catches

This table is not in DEIS

Year	Alt 2 200k opt1 Total WAK chum	Area M commercial fisheries June CWAK contribution*	Commercial fisheries harvest combined**	Subsistence Fisheries harvest combined***
2011	47,077	76,200	1,829,422	300,236
2012	4,701	71,111	1,730,289	375,033
2013	30,415	71,830	2,422,608	370,174
2014	38,355	70,225	1,909,752	350,473
2015	37,095	32,169	2,120,060	292,236
2016	63,825	48,711	2,412,277	295,818
2017	50,252	115,360	3,167,952	302,987
2018	41,202	96,744	3,534,473	262,721
2019	41,822	98,833	2,542,701	227,419
2020	19,899	88,223	492,613	135,459
2021	29,664	210,348	320,997	71,592
2022	50,240	97,937	810,346	NA

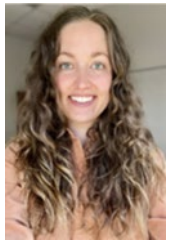
- Area M CWAK contribution uses Dann et al 18% estimate applied across June harvest for all years
- ** Sum of commercial catch across Bristol Bay, Kotzebue, Yukon summer and fall, Kuskokwim, Norton Sound Port Clarence
- *** Sum of subsistence catch across Bristol Bay, Kotzebue, Yukon summer and fall, Kuskokwim, Norton Sound Port Clarence

WAK chum salmon PSC impacts under Alternative 2 200,000 chum salmon PSC limit and suboption 1 (3-year average) apportionment scheme compared with commercial and subsistence catches



Potential Impacts to Communities and Regions Engaged in and Dependent on Subsistence Harvests of Chum Salmon Under the Proposed Action Alternatives

- The magnitude of the potential positive and indirect effects for communities engaged in and dependent on subsistence harvests of chum salmon resulting from the proposed action alternatives are uncertain
- To the extent that any of the action alternatives result in savings of WAK chum to a level where inseason managers are able to provide less restricted (or unrestricted) subsistence opportunities, there could potentially be positive and indirect social impacts
  - Mixed economies, sharing networks, and food security
  - Cultural practices, wellbeing, and identity



Section 6.1.11.1, pg. 199

Potential Impacts to Communities and Regions Engaged in Commercial Chum Salmon Fishing, Under Action Alternatives

- Commercial salmon fisheries would continue to be managed by the State of Alaska
  - Surplus above escapement needs and subsistence would be made available for other consumptive uses, such as commercial fishing opportunities.

- Although the marginal impacts on WAK salmon returns are not able to be quantified, **to the extent that any of the action alternatives result in savings of WAK chum to the river system of origin, this could have a positive indirect effect on commercial fishing opportunities in these management areas.**
- For the reason discussed previously, even a few hundred fish made available to commercial harvesters could provide a family or multiple families with income needed to support subsistence or other cost of living expenditures.

Pollock Under Alternative 2 and 3

Impacts to pollock under Alternatives 2-4

Impacts to pollock stock and food web of lower pollock catches under alternatives 2-3 in the B season

Pollock stock

- More adults
- Average size at age may decrease
- prey limitation and density-dependance

Pollock prey

- Possibly fewer prey items
- Greater impact on competitors

Predators of pollock

- Possibly more pollock as prey for seabirds, larger fish, marine mammals and fur seals
- More cannibalism, could lead to lower recruitment

Analysis of Potentially Forgone Revenue for Bering Sea Pollock Sectors

Approach to the Analysis of Potentially Forgone Revenue for the Bering Sea Pollock Sectors

- This section primarily **focuses on costs** (or reduced benefits) of a chum PSC limit (i.e., applies to both Alternative 2 and 3) on the pollock sectors.
- Relies on the retrospective tables for a frame of reference for possible reductions in **gross ex-vessel revenue** and **gross first wholesale revenue** from unharvested pollock.
- However, **these tables are one piece of the analysis**. Given an expectation that *fishing patterns would be altered under a constraining chum PSC limit*, the analysis includes additional context for expected impacts.
- Lack of empirical data means much of this analysis is qualitative and characterized as expected directional impacts, highlighting important external factors and the potential distributional impact of the costs.
- The importance of external factors in the magnitude of impacts.

Section 6.2.9.1, page 237- 257

Approach to Forgone Revenue Analysis

- Potential forgone revenue based on retrospective tables
- Operational changes and impacts
- Avoidance costs
- Broader implications of a B season pollock closure
- Specific considerations under Alternative 3

Section 6.2.9.1, page 237- 257

Potentially Forgone Revenue – Retrospective Assessment

	CDQ	CP	Mothership	Inshore
PSC limit and apportionment with the greatest potential adverse impact	200,00 PSC limit with 3-yr apportionment	200,000 PSC limit with 3-yr apportionment	200,000 PSC limit with AFA apportionment	200,000 PSC limit with AFA apportionment
How many of the 12 years closed?	5	9	7	11
Average % reduction in gross revenue relative to annual pollock revenue	11.4%	14.2%	8.7%	19.3%
Average reduction in gross revenue relative to annual pollock revenue	$47M	$113M	$22M	$47M
Range of % reduction in gross revenue relative to annual pollock revenue	0%-46%	0%-46%	0%-27%	0%-34%

*Inshore values are gross ex-vessel revenues, all other sectors are gross first wholesale revenues

Section 6.2.9.1.3, page 246-255

Fleet Operational Effects

Differences from the Chinook PSC limit:

- Encounter patterns differ as do associated risk of a sudden increase in PSC
- "Very constraining" limit could elicit a different operational response (e.g., less participation, more test tows, stand-downs?)
- Transferability of PSC may be more important – "very constraining" limit could result in pockets of stranded pollock within coops
- This chum limit would be in addition to the Chinook PSC limit (i.e., PSC tradeoffs discussion)

Similarities to the Chinook PSC limit:

- Could be apportioned to the vessel level by the coops to avoid race for fish
- Could build in buffers to reduce likelihood of pollock forgone
- Still unlikely that chum PSC would be transferred frequently or efficiently

Section 6.2.9.1, page 237- 257

Increased Avoidance Costs

Increased travel costs	Increase in fuel usage and opportunity cost given transit time to move away from chum
Increased costs (and decreased value) with lower operational efficiency in harvesting, which may require longer trips/seasons	Potential to move to areas with potentially lower pollock CPUE or lower quality products If lower CPUE and time spent moving means longer trips/seasons – increased costs associated with crew provisions, observer costs, increased Chinook concerns later in the season. Lower compensation for the crew that make share-based wages, unless payment structure specifically designed to insulate
Increased costs and risks associated with exploring new fishing areas	Increased use of test tows to identify high pollock CPUE and low chum salmon encounters which could result in greater costs in the gear damage. Greater risk for encountering other PSC species
Potential gear conflicts or safety at sea concerns	Decreased flexibility in time or space for pollock fishing that could possibly contribute to gear conflicts or safety concerns.

Section 6.2.9.1.2, page 241- 246

Implications of a B Season Closure

- **The degree of impacts of a B season closure would greatly depend on the point in the B season when the closure occurred and how much pollock was left unharvested**
  - Pollock could also be 'stranded' at the cooperative level due to an expectation of inefficient transfer of PSC

- Not all AFA vessels and companies are equally reliant on B season pollock, thus impacts may be more pronounced for some companies than others
  - Most vessels are primarily reliant on pollock, but some diversified into BS Pacific cod, yellowfin sole, west coast fisheries (e.g., hake)
  - Could be some spillover impacts if vessel shift away from B season pollock; however, sideboards can limit opportunities

Section 6.2.9.1.4, page 256-257

Implications of a B Season Closure – CDQ Groups and Crew

- **CDQ groups** could be adversely affected by a pollock B season closure.
  - These groups rely on revenue generated from both their CDQ pollock allocation as well as additional investments in AFA vessels.
  - Like other AFA companies, CDQ groups will still have obligations to cover certain costs (e.g., debt service on vessels), thus decreased pollock revenue could affect their ability to support their community program in the way they have under status quo

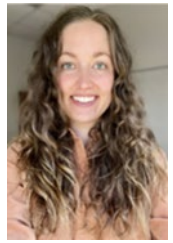
- A closure would adversely impact AFA **crew** through reduced employment and income. If closures become common in the B season the variability and uncertainty of employment may lead to challenges with crew retention.

➢ **These impact categories are further discussed in relation to associated communities**

Section 6.2.9.1.4, page 256-257

Potential Impacts to CDQ Communities Under the Proposed Action Alternatives

- The extent to which the proposed action alternatives would affect CDQ communities participating in the Bering Sea pollock fishery through their respective CDQ groups is uncertain
- Each CDQ group would receive an apportionment of the overall PSC limit and many CDQ groups have also made additional investments into the AFA sectors
- To the extent the potential action alternatives could reduce revenue payments or increase avoidance costs to a degree where the CDQ groups would be unable to sustain programs in their communities, CDQ communities could be adversely and negatively impacted
- Adverse impacts could be mitigated by adaptive fishing behaviors on part of CDQ partners but the ability of harvesters to modify their fishing behavior is uncertain



Section 5.2.2 of the SIA, pg.198

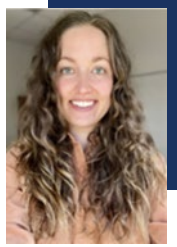
Implications of a B Season Closure – Processors and Markets

- Primarily **export markets**, thus depending on the extent of closures, minimal impact to U.S. consumers expected

- **However,** if repeated B season closures occur, and result in more widespread impacts to the viability of **processing entities**, this could have cascading effects for the multiple species they process and the associated U.S. consumers of those species.
  - Some processing plants in the region are affiliated through joint ownership, and so the sustainability of one plant could have implications for other plants
  - Other processing entities (i.e., crab processing share holders) rely on the infrastructure of these plants for custom processing
- **B season closures could exacerbate the current market challenges on processors**
- Analysts do not have access to processor cost data, so cannot empirically predict what level of unharvested pollock may be unsustainable. However, operational costs are extremely high in the AI (and increasing) and this region has experienced processor consolidation.

Section 6.2.91.4, page 256-257

Potential Impacts to Communities Engaged in or Dependent on Harvests and Deliveries of B Season Pollock Under the Proposed Action Alternatives



Potential Impacts to Seattle MSA

High degree of vulnerability to potentially adverse effects

- Potential for adverse and indirect economic effects if any sector were to close prior to its B season allocation being harvested
  - Potentially **forgone revenue**s affiliated for vessels affiliated with the community
    - Impacts to skipper and crew income
    - Consolidation
- Absent a closure, anticipated there would be **avoidance costs**
  - Potential for indirect and negative effects on trip length, crew morale, as well as overall job satisfaction

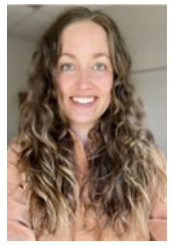
The *community* of Seattle also has a **high degree of resilience**

Section 5.2.1.1 of SIA, pg. 190

Potential Impacts to the Communities of Kodiak and Newport

Kodiak

- On average, B season pollock fishery contributed 26.45% ($3.57 million) of total revenues
- Kodiak community fleet is large and diverse – participating in other groundfish, IFQ, crab, and salmon fisheries
- On average, B season pollock contributed 2.83% of the community fleet's total revenues (2011-2022)
- Remote island community whose economic base has long been anchored in commercial fisheries
- Place-based identity centered on fishing



Newport

- On average, B season pollock fishery contributed 25.79% ($5.85 million) of total revenues
- Large commercial fleet that prosecutes local West Coast fisheries and Alaska fisheries; regional support services
- On average, B season pollock contributed 20.54% of the community fleet's total revenues (2011-2022)
- Located in lower 48 and on the road system, more typical commercial development and wage-earning opportunities
- Place-based identity centered on fishing

Section 5.2.1.1 of SIA, pg. 192

Potential Impacts to Unalaska/Dutch Harbor

Unalaska/Dutch Harbor has a relatively **high degree of vulnerability** under the proposed action alternatives

- Four shoreside processing facilities and a primary location for product transfers

- If a sector were to close prior to the B season TAC being harvested, the community would experience adverse economic effects inclusive of but not limit to direct fishery-related taxes

  - On average, estimated the B season pollock fishery (FBT, FRLT, and local raw seafood taxes) contributed $5.12 million in revenues

    - 15.9% of the City's total general fund revenues (on average, 2011-2022) (see Table 5-3)

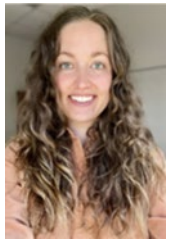
- Center of support services for the BSAI region and there could be some spillover effects to other fisheries in the region

- Absent a closure, there could experience some positive and indirect economic effects resulting from avoidance behaviors but uncertain whether

Section 5.2.1.3 of SIA

Potential Impacts to Akutan and King Cove

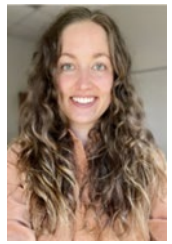
- Akutan, King Cove, and the Aleutians East Borough would be indirectly and adversely affected by a closure prior to a cooperative's B season TAC being harvested
  - Akutan and King Cove are each home to one shoreside processing facility during the analyzed period
- Estimated fishery-related tax revenues derived from the B season pollock fishery for community grouping ranged between $2.03 million and $2.60 million
- High volume fisheries like pollock can support processor's capacity to engage in other small-scale operations
  - Not a key source of income for the plant but an important income source for local fishermen and plural incomes in rural communities



Section 5.2.1.3 of SIA

Other Potential Cross-Cutting Community Effects

- Shoreside processing entities and the communities where they are located could be adversely affected ***absent a B season closure***
- If avoidance measures result in slower or lower volume deliveries, there could be implications for shoreside processors to operate economies of scale
- If avoidance measures result in lower quality product deliveries, that could affect shoreside prices and tax revenues



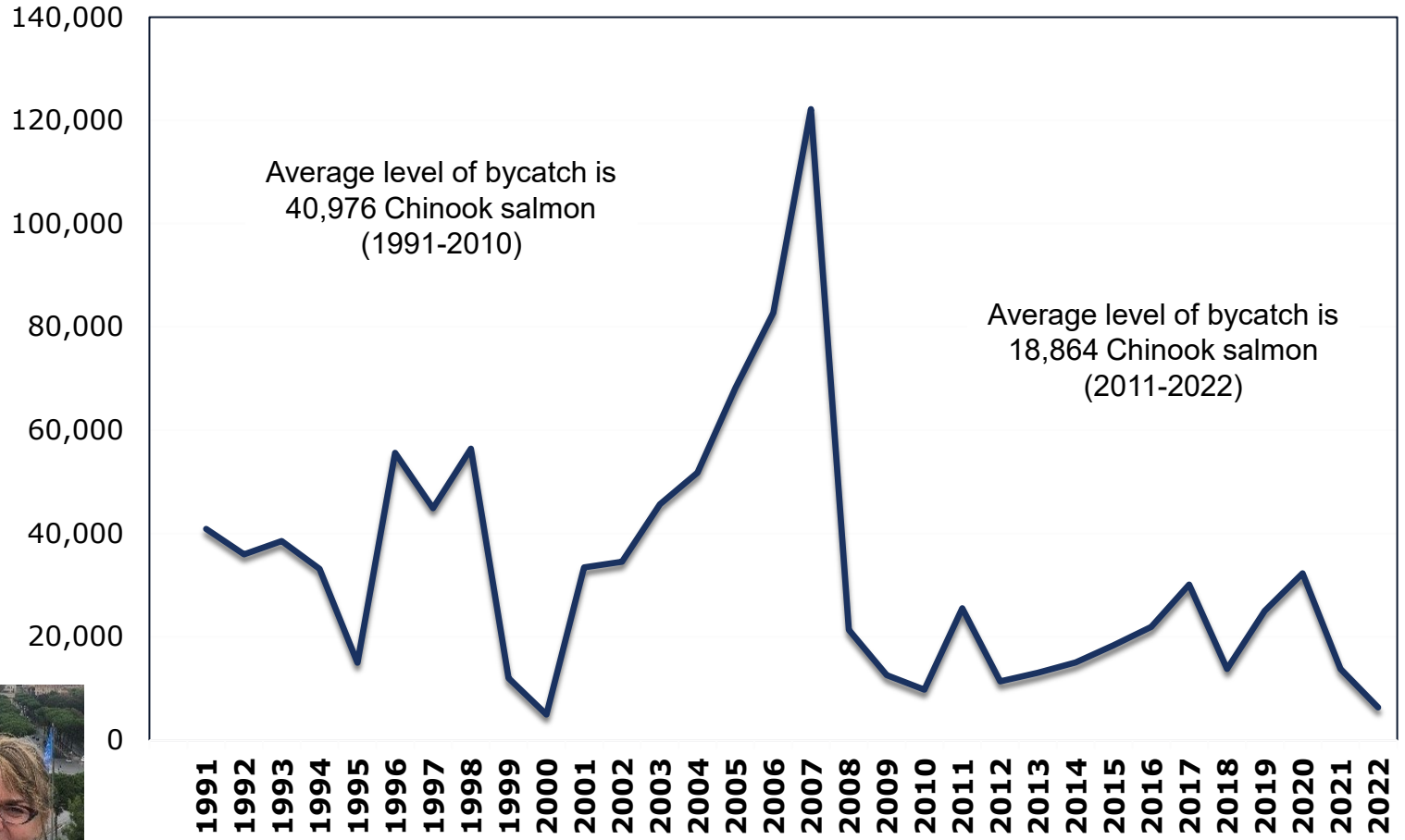
Section 5.2.1.2 and 5.1.2.3 of SIA

Points of Consideration Under Alternative 3

- AFA sectors will not know what their WAK chum catch is in season, therefore may be more of a reliance on historical WAK chum encounter data
- If this results in more conservative fishing behavior or more targeted avoidance, there may be increase avoidance costs associated with the marginal difference between Alternative 2 and the addition of Alternative 3.

Section 6.2.9.1.5, page 257

Chinook Salmon Under the Status Quo

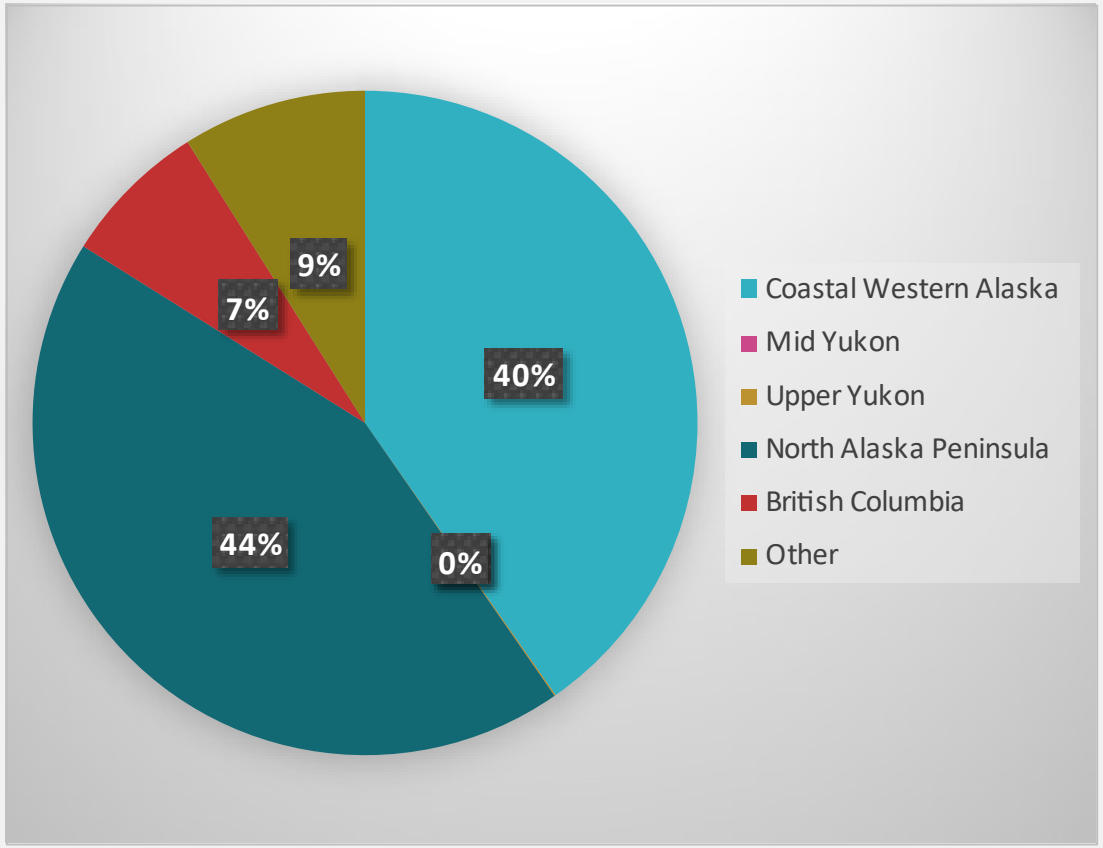


Year	Chinook
2011	25,499
2012	11,351
2013	13,036
2014	15,037
2015	18,329
2016	22,005
2017	30,076
2018	13,731
2019	24,985
2020	32,203
2021	13,784
2022	6,337

Summary of Chinook bycatch genetics, 2022

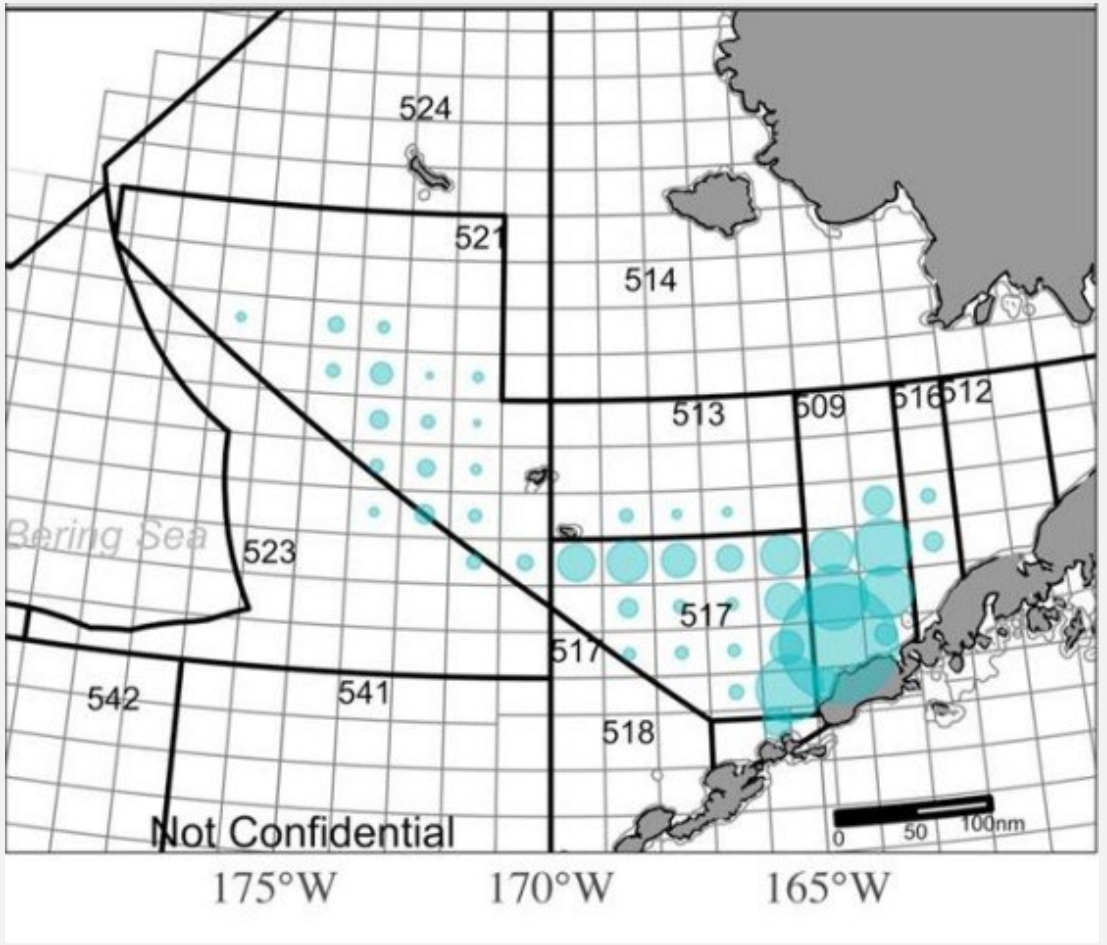
The Bering Sea pollock fishery caught 6,337 Chinook salmon as bycatch in 2022

2022 stock composition estimates



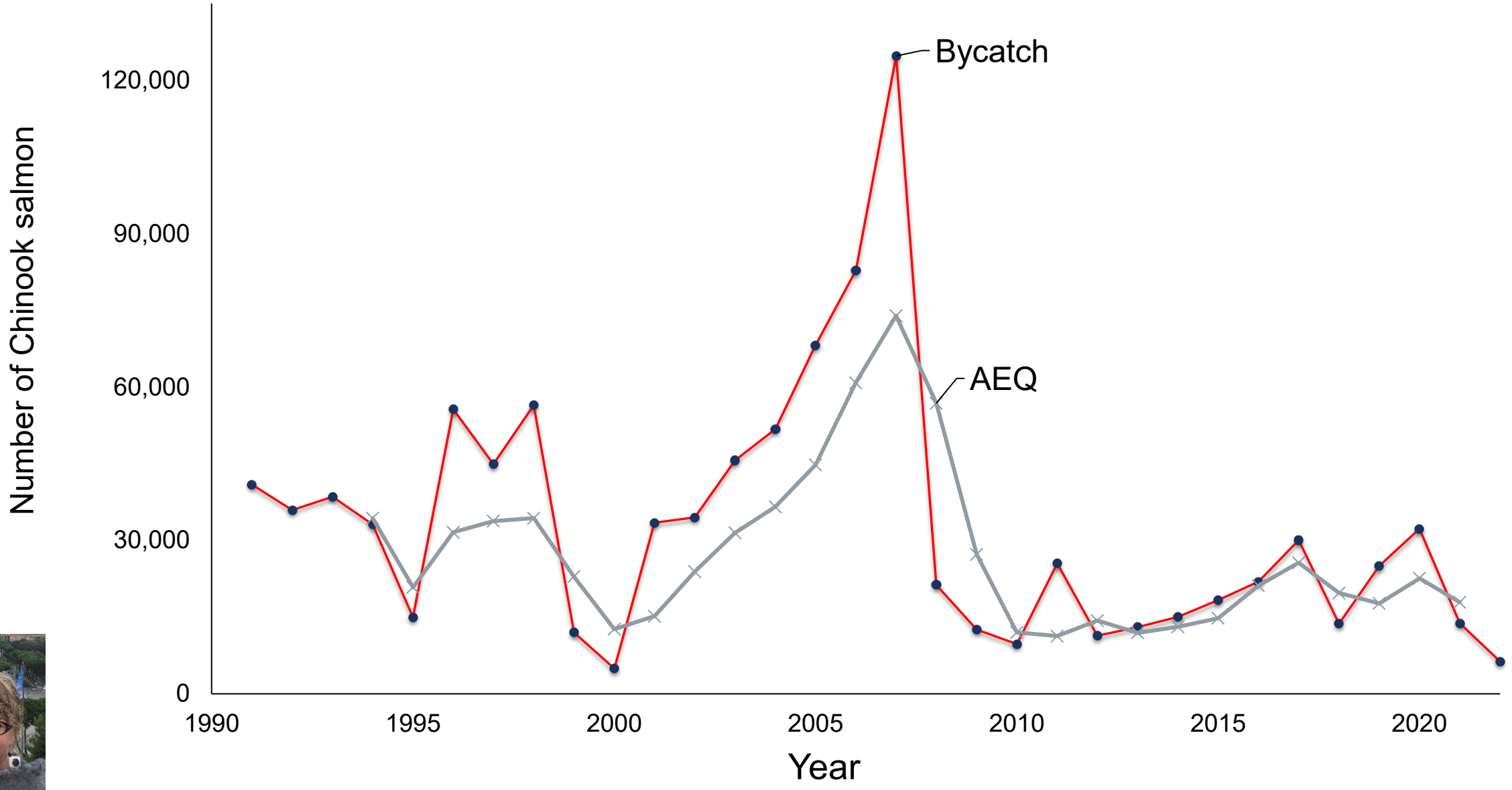
Notes: Pie chart displays the genetic stock reporting groups as a proportion of the total Chinook salmon bycatch in the 2022 Bering Sea pollock fishery.

Spatial distribution of the Chinook bycatch



Notes: Circles represent the amount of total bycatch in each ADF&G groundfish statistical area (smaller grey boxes embedded within larger Federal reporting areas).

Bering Sea Chinook Salmon: Bycatch vs AEQ



Estimated Chinook salmon AEQ mortality (numbers of fish) due to PSC in the AFA pollock fishery, 2001-2021 for Coastal western Alaska (includes middle Yukon; top panel) and for the Upper Yukon (bottom) stock groupings.

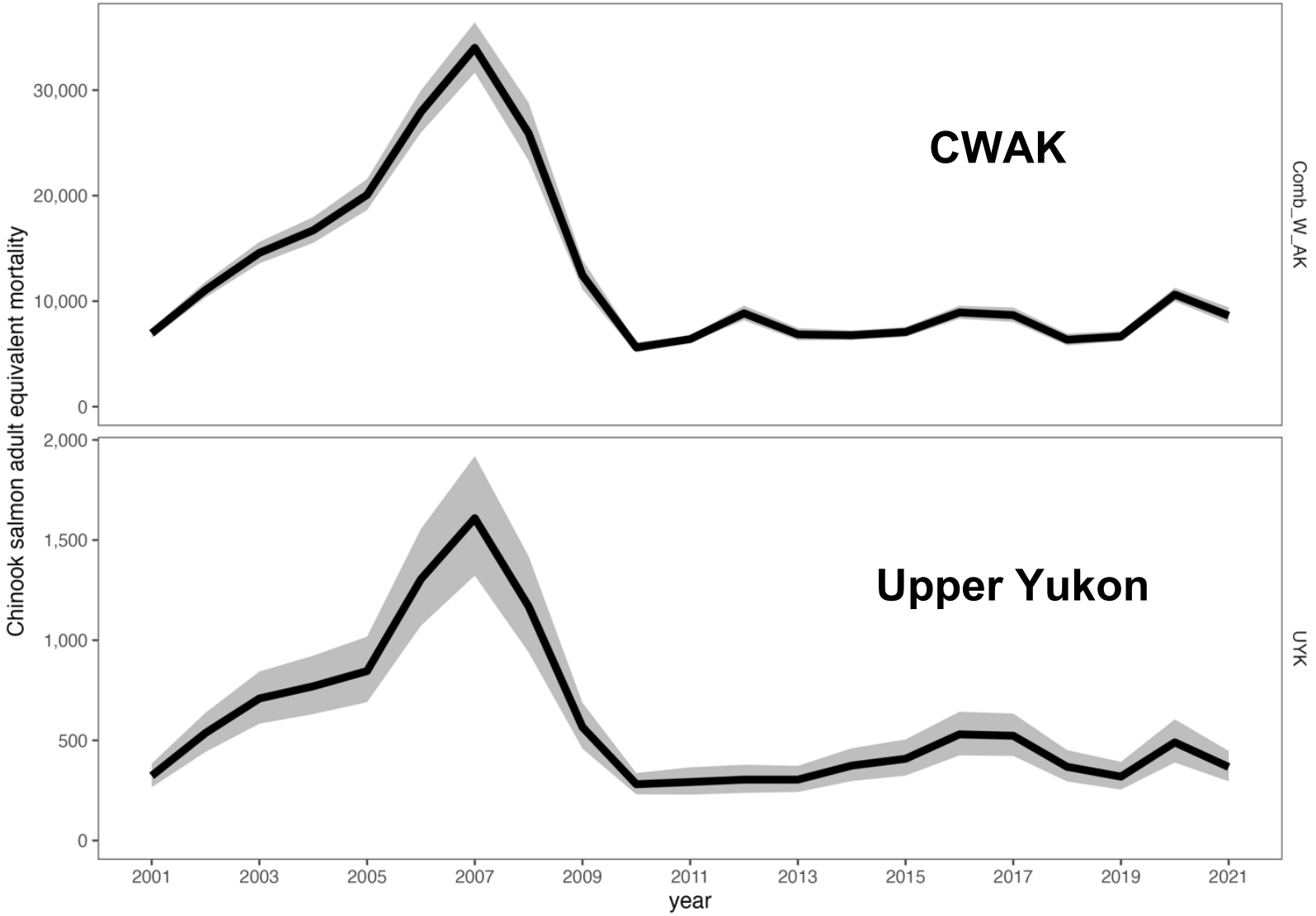
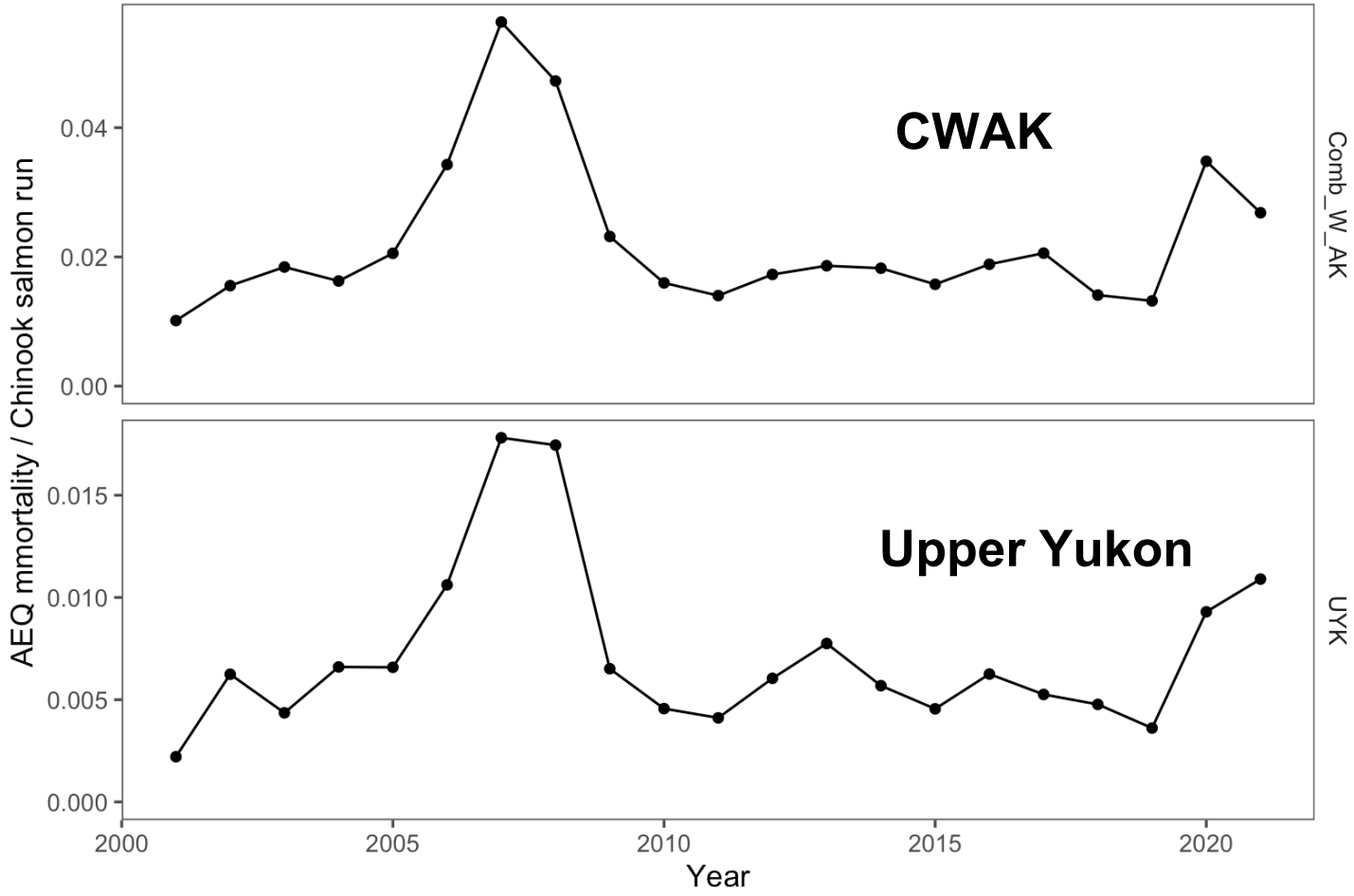


Figure 6-23 page 152

Estimated Chinook salmon AEQ mortality impact %s (ratio of AEQ over run-strength estimates) due to PSC in the AFA pollock fishery, 2001-2021 for Coastal western Alaska (includes middle Yukon; top panel) and for the Upper Yukon (bottom) stock groupings[70]



Year	CWAK PSC mortality rate	Upper Yukon PSC mortality rate
2011	1.40%	0.42%
2012	1.72%	0.61%
2013	1.85%	0.78%
2014	1.81%	0.58%
2015	1.57%	0.46%
2016	1.88%	0.63%
2017	2.04%	0.53%
2018	1.41%	0.48%
2019	1.32%	0.37%
2020	3.40%	0.94%
2021	2.64%	1.10%
Mean	1.91%	0.63%

Chinook Salmon Under Alternatives 2 and 3

Cumulative Chinook avoided under a cap of 200,000 chum and 4 sector apportionments (2011-2022)

If a 200,000 chum PSC limit had been in place 2011-2022:		Sum of B Season Chinook Avoided (#)	Reduction as % of B Season Total	Reduction as % of Annual Total
3-year avg. sector apportionment	**Total**	**32,874**	**39.3%**	**14.5%**
	CDQ	1,441	42.2%	9.6%
	CP	11,277	59.4%	15.6%
	Mothership	3,235	47.8%	21.1%
	Inshore	16,921	31.0%	13.7%
5-year avg. sector apportionment	**Total**	**36,778**	**43.9%**	**16.3%**
	CDQ	1,168	34.2%	7.8%
	CP	11,055	58.2%	15.3%
	Mothership	3,140	46.4%	20.5%
	Inshore	21,415	39.2%	17.3%
Pro-rata sector apportionment	**Total**	**36,835**	**44.0%**	**16.3%**
	CDQ	1,168	34.2%	7.8%
	CP	11,055	58.2%	15.3%
	Mothership	3,235	47.8%	21.1%
	Inshore	21,377	39.2%	17.3%
AFA sector apportionment	**Total**	**54,182**	**64.7%**	**23.9%**
	CDQ	705	20.7%	4.7%
	CP	9,511	50.1%	13.2%
	Mothership	3,553	52.5%	23.1%
	Inshore	40,413	74.1%	32.6%

Table 6-48, Page 226

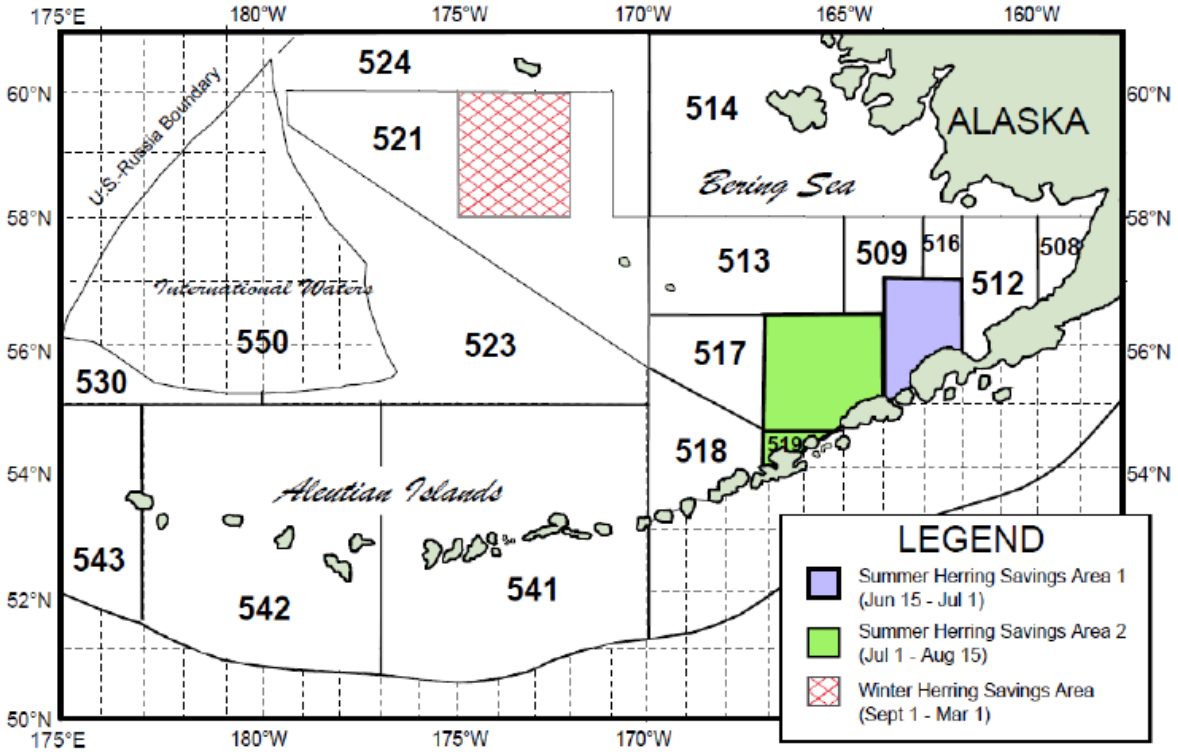
Chinook salmon PSC avoided and % reduction under a 200,000 chum salmon PSC limit and Sector apportionment of Option 3, Suboption 1 (3-year average)

Sector	Year	Week-end date	Status Quo B Season Chinook Bycatch (#)	Potential Number of Chinook Salmon Avoided in B Season	Number of Chinook Salmon Avoided as % of B Season Total	Number of Chinook Salmon Avoided as % of Annual Total
CDQ	Total		3,413	1,441	42.2%	9.6%
	2011		334		0.0%	0.0%
	2012		5		0.0%	0.0%
	2013		48		0.0%	0.0%
	2014		36		0.0%	0.0%
	2015		250		0.0%	0.0%
	2016	8/6/2016	352	273	77.6%	17.1%
	2017	7/8/2017	388	224	57.7%	8.9%
	2018	6/30/2018	358	300	83.8%	23.2%
	2019	9/21/2019	719	408	56.7%	17.1%
	2020		557		0.0%	0.0%
	2021	7/17/2021	329	236	71.7%	20.1%
	2022		37		0.0%	0.0%
CP	Total		18,989	11,277	59.4%	15.6%
	2011	10/29/2011	1,652	31	1.9%	0.9%
	2012		92		0.0%	0.0%
	2013		448		0.0%	0.0%
	2014	9/6/2014	567	252	44.4%	5.6%
	2015		2,374		0.0%	0.0%
	2016	8/6/2016	2,403	2,005	83.4%	22.6%
	2017	7/22/2017	1,475	809	54.8%	7.8%
	2018	7/7/2018	1,259	1,064	84.5%	22.8%
	2019	8/31/2019	3,127	2,680	85.7%	26.0%
	2020	9/5/2020	4,151	3,599	86.7%	31.6%
	2021	7/31/2021	1,187	775	65.3%	16.5%
	2022	8/20/2022	254	62	24.4%	3.5%

Sector	Year	Week-end date	Status Quo B Season Chinook Bycatch (#)	Potential Number of Chinook Salmon Avoided in B Season	Number of Chinook Salmon Avoided as % of B Season Total	Number of Chinook Salmon Avoided as % of Annual Total
Mothership	Total		6,774	3,235	47.8%	21.1%
	2011	9/17/2011	2,426	2,332	96.1%	80.8%
	2012		49		0.0%	0.0%
	2013		48		0.0%	0.0%
	2014		180		0.0%	0.0%
	2015		559		0.0%	0.0%
	2016	8/13/2016	366	233	63.7%	16.1%
	2017		476		0.0%	0.0%
	2018	9/1/2018	364	103	28.3%	13.9%
	2019	8/31/2019	538	392	72.9%	26.8%
	2020	10/31/2020	1,472		0.0%	0.0%
	2021	7/31/2021	222	141	63.5%	15.3%
	2022	8/13/2022	74	34	45.9%	10.7%
Inshore	Total		54,569	16,921	31.0%	13.7%
	2011		13,951		0.0%	0.0%
	2012		3,433		0.0%	0.0%
	2013		4,255		0.0%	0.0%
	2014	9/6/2014	2,718	907	33.4%	9.9%
	2015	8/29/2015	2,848	1,519	53.3%	14.3%
	2016	9/10/2016	1,987	897	45.1%	8.9%
	2017	8/5/2017	6,134	2,851	46.5%	18.8%
	2018	9/1/2018	3,215	773	24.0%	11.0%
	2019	9/7/2019	4,863	1,257	25.8%	11.6%
	2020	9/5/2020	7,807	6,726	86.2%	42.4%
	2021	7/31/2021	2,571	1,839	71.5%	26.4%
	2022	8/20/2022	787	152	19.3%	4.0%

Table 6-49, page 225

Herring Under the Status Quo

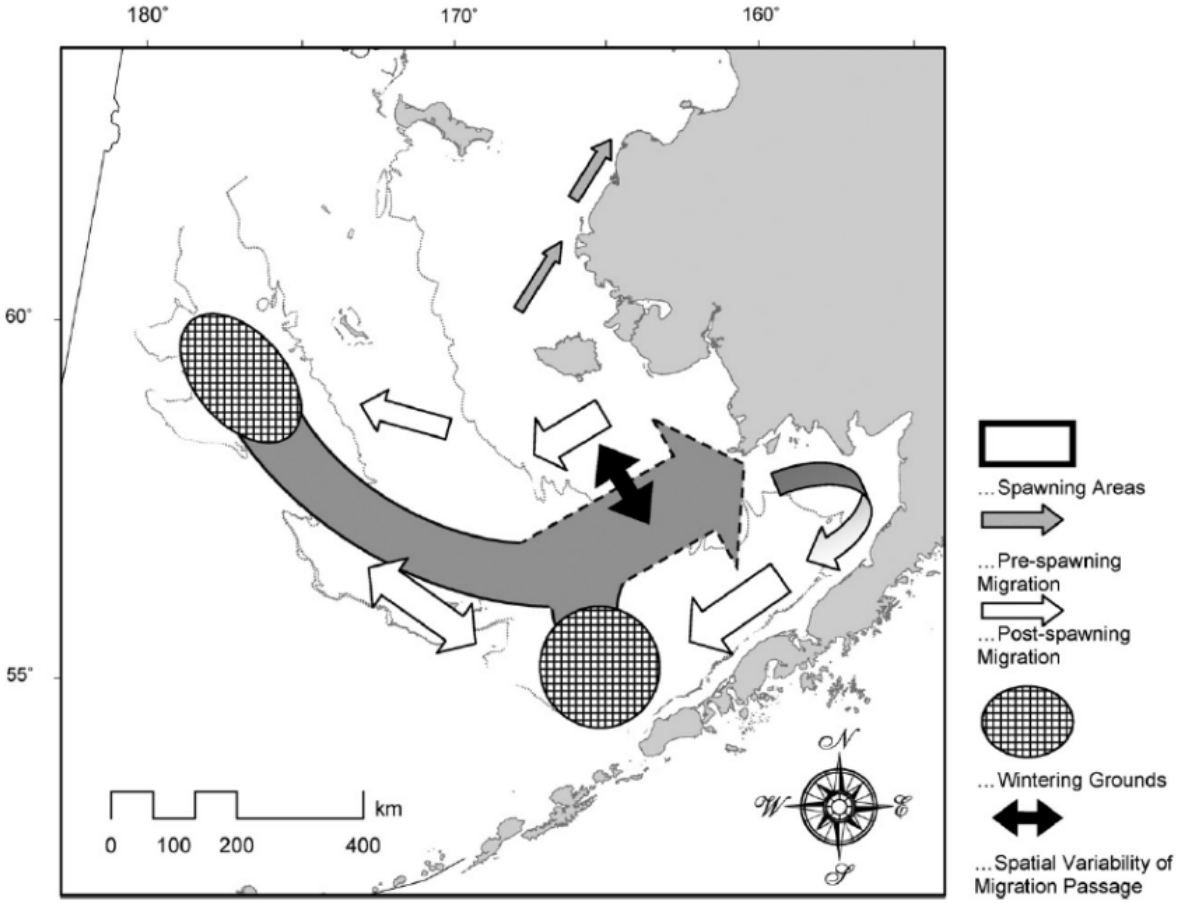


Herring Savings areas and timing

Winter HSA	Sep 1-Mar 1
Summer HSA1	Jun15-Jul1
Summer HSA2	Jul1-Aug15

Figures 6-27 and 6-28 pages 154-156

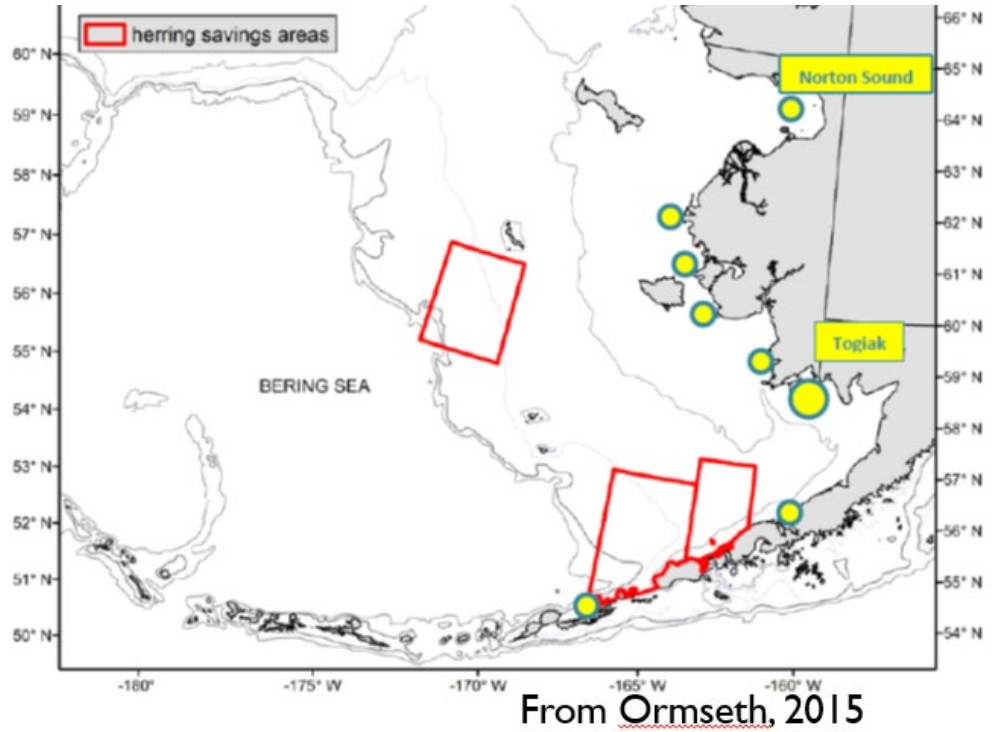
Hypothesized Herring Migration Routes
(from Tojo et al 2007)



Herring spawning populations

Major Herring Fisheries in the Bering Sea

Spawning area	2016	2017	2018	2019	2020	2021	2022	2023	2024
Norton Sound	48,794	31,007	31,007	31,007	31,007	31,007	31,007	31,007	31,007
Cape Romanzof	4,366	4,678	4,678	3,300	3,300	3,300	3,300	3,300	3,300
Nunivak Island	140	3,540	3,540	4,464	4,464	4,464	4,464	4,464	4,464
Nelson Island	27,422	4,785	4,785	4,916	4,916	4,916	4,916	4,916	4,917
Cape Avinof	9,456	3,126	3,126	1,890	1,890	1,890	1,890	1,890	1,890
Goodnews Bay	8,263	4,724	4,724	4,724	4,724	4,724	4,724	4,724	4,724
Security Cove	8,540	4,781	4,781	4,762	4,762	4,762	4,762	4,762	4,762
Togiak	147,185	142,453	124,062	197,355	195,793	214,768	324,350	286,853	195,984
Port Moller/ Port Heiden	8,932	2,184	2,268	2,291	2,350	2,449	2,463	2,463	2,463
Total	263,098	201,278	182,971	254,709	253,207	272,281	381,876	344,379	253,511



From Ormseth, 2015

PSC limit =1% of annual estimated overall biomass in Bering Sea

Herring PSC limit apportioned to fishery categories

- Apportioned to fishery categories in specifications process annually
- Pollock Pelagic target accrues highest amount of herring annually

Herring (includes CDQ fisheries)

Trawl Gear

Seasons	Account	Units	Total Catch	Limit	Remaining	% Taken
	Pacific Cod	MT	1	18	17	5%
	Pollock Pelagic	MT	3,059	3,066	7	100%
	Pollock, Atka Mackerel, Other Species	MT	28	41	13	68%
	Rock Sole, Flathead Sole, Other Flatfish	MT	135	99	-36	136%
	Rockfish	MT	2	10	8	21%
	Turbot, Arrowtooth, Kamchatka, Sablefish	MT	0	10	10	5%
	Yellowfin Sole	MT	86	200	114	43%
Total:			**3,312**	**3,444**	**132**	**96%**

Table 6-16, page 157

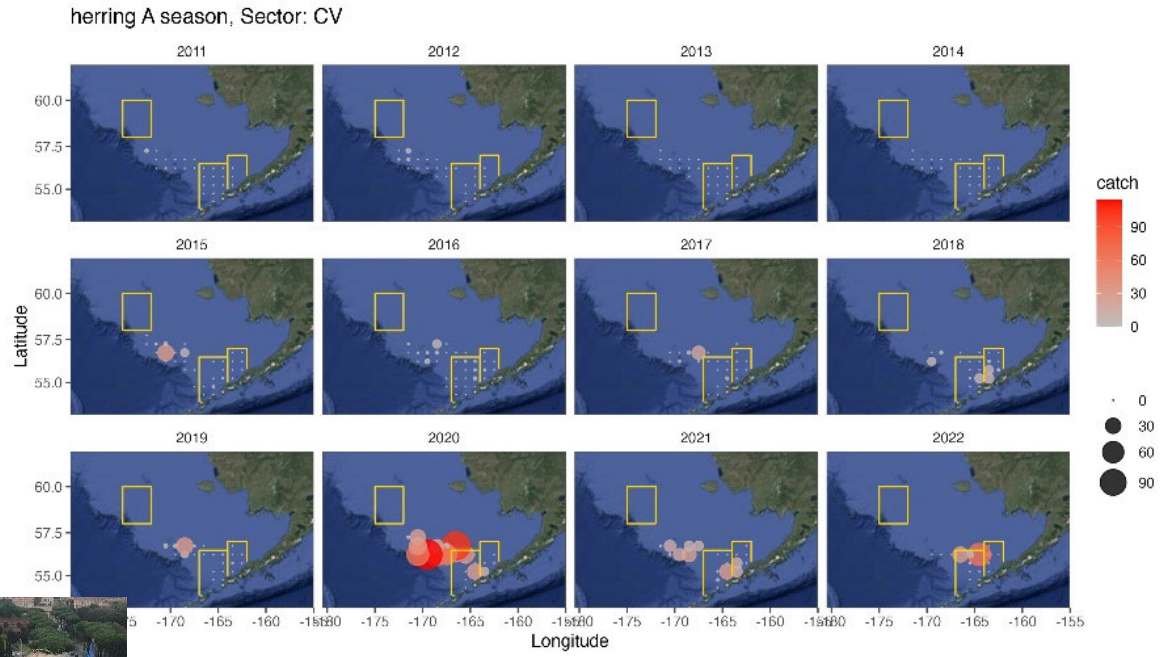
Herring PSC differs by sector and season

Herring PSC in the AFA pollock fishery by season and sector 2011-2023

	CP			M			S			CDQ			all sectors
Year	A	B	Total	A	B	Total	A	B	Total	A	B	Total	Total
2011	0	124	124	0	3	3	1	236	238	0	12	12	**377**
2012	122	400	522	0	117	117	3	1,608	1,611	5	103	108	**2,358**
2013	0	763	763	0	4	4	0	191	191	0	1	1	**959**
2014	0	7	7	0	3	3	0	136	136	0	14	14	**159**
2015	358	5	364	9	5	13	45	1,059	1,104	4	1	5	**1,487**
2016	362	47	409	137	14	151	71	654	725	7	139	147	**1,431**
2017	206	27	233	29	25	54	21	646	668	5	3	8	**963**
2018	23	18	42	1	6	7	41	381	422	1	2	3	**473**
2019	160	4	164	0	12	12	45	866	911	5	9	13	**1,100**
2020	1,414	97	1,511	444	36	480	901	822	1,724	139	7	146	**3,861**
2021	131	5	137	51	129	180	384	970	1,354	28	8	36	**1,707**
2022	35	126	161	106	149	255	300	974	1,274	2	12	13	**1,703**
2023	111	256	366	150	632	783	149	1,736	1,885	2	39	41	**3,075**

Table 6-18, page 162

Figure 6-31 Herring PSC (t) by pollock CV sector by A season (upper panel) and B season (lower panel) with HSAs. (2011-2022), Black dots are to show magnitude of catch (in red).



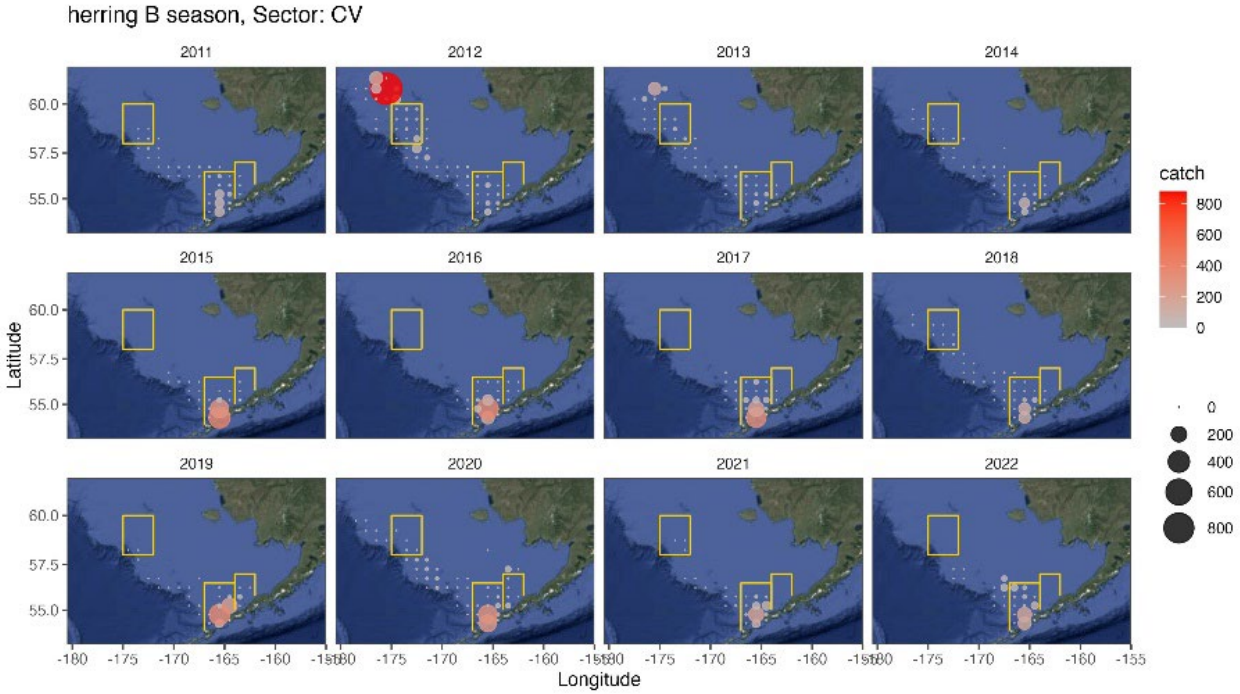
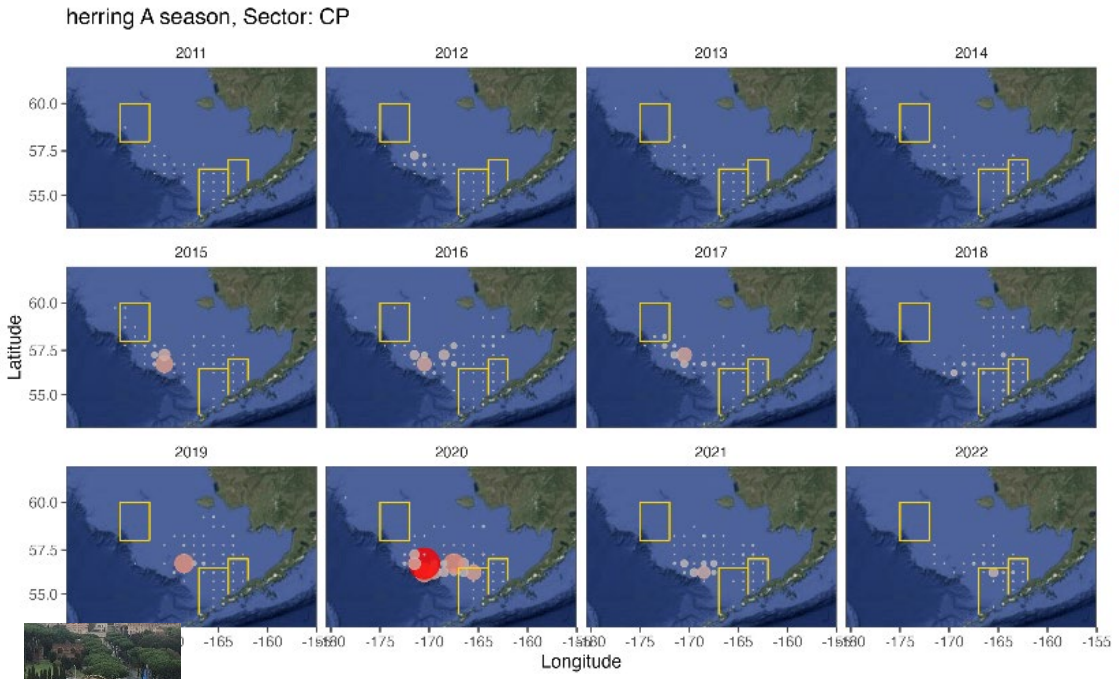


Figure 6-31, page 160

Figure 6-32 Herring PSC (t) by pollock CP sector by A season (upper panel) and B season (lower panel) with HSAs. (2011-2022). Black dots are to show magnitude of catch (in red).



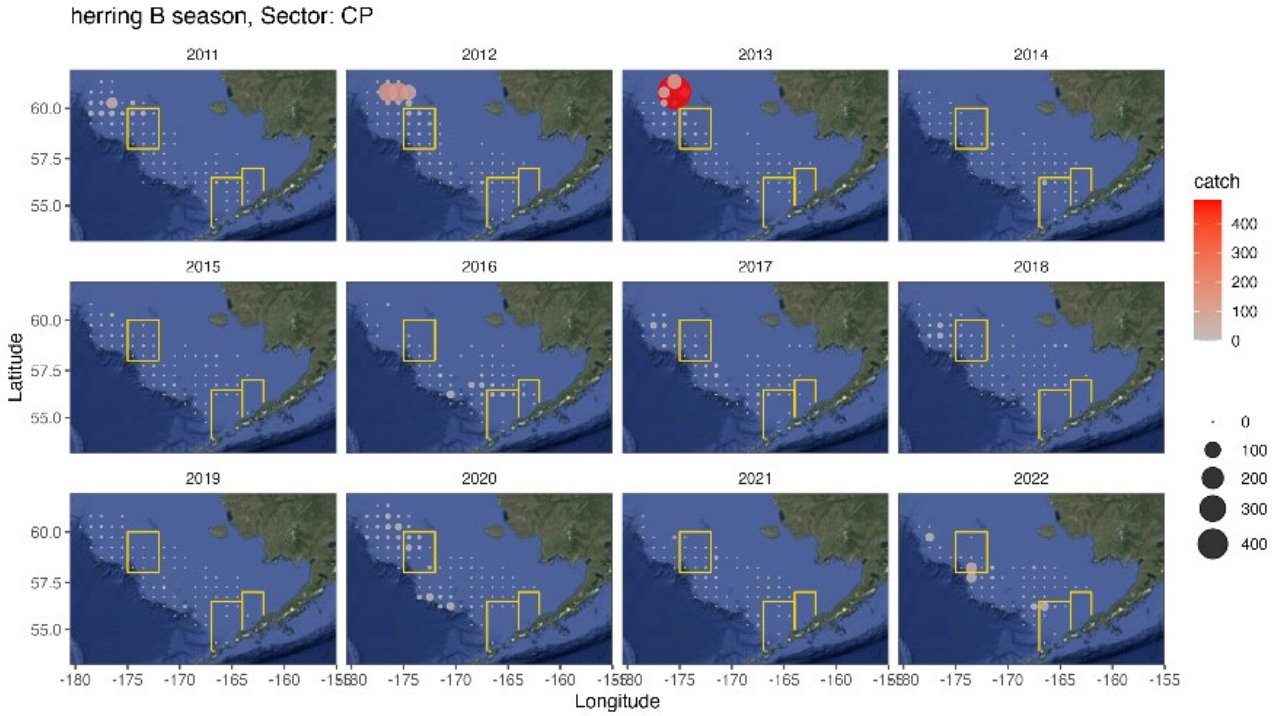


Figure 6-32, page 161

Pollock pelagic herring PSC limit and catch 2011-2023

Year	Herring PSC (mt)	PSC limit (mt)	% of limit
2011	346	1,737	19.90%
2012	2,167	1,600	135.41%
2013	959	2,165	44.29%
2014	151	1,776	8.52%
2015	1,386	2,242	61.82%
2016	1,425	2,151	66.23%
2017	956	1,800	53.09%
2018	307	1,662	18.49%
2019	1,080	2,313	46.69%
2020	3,720	2,299	161.82%
2021	1,698	2,472	69.00%
2022	1,678	3,400	49.00%
2023	3,059	3,066	99.77%

Table 6-17, page 158

Herring Under Alternatives 2 and 3

Table 6-50 Week-end date, herring bycatch, herring avoided and % of total reduction in herring PSC cumulatively (2011-2022) with sector allocation (Option 3, suboption 1): cap 200,000

Sector	Year	Week-end date	Status Quo B Season Herring Bycatch (mt)	Potential Herring Bycatch Avoided in B Season (mt)	Amount of Herring Bycatch Avoided (mt) as % of B Season Total	Amount of Herring Bycatch Avoided (mt) as % of Annual Total
CDQ	Total		311	3	0.96%	0.59%
	2011		12		0.00%	0.00%
	2012		103		0.00%	0.00%
	2013		1		0.00%	0.00%
	2014		14		0.00%	0.00%
	2015		1		0.00%	0.00%
	2016	8/6/2016	139	0	0.05%	0.05%
	2017	7/8/2017	3	1	41.53%	17.75%
	2018	6/30/2018	2	0	13.80%	10.30%
	2019	9/21/2019	9	0	0.39%	0.25%
	2020		7		0.00%	0.00%
	2021	7/17/2021	8	1	14.06%	3.07%
	2022		12		0.00%	0.00%
CP	Total		1,623	164	10.13%	3.71%
	2011	10/29/2011	124	0	0.00%	0.00%
	2012		400		0.00%	0.00%
	2013		763		0.00%	0.00%
	2014	9/6/2014	7	0	2.38%	2.37%
	2015		5		0.00%	0.00%
	2016	8/6/2016	47	14	29.84%	3.40%
	2017	7/22/2017	27	18	68.36%	7.85%
	2018	7/7/2018	18	2	9.18%	4.03%
	2019	8/31/2019	4	2	50.46%	1.17%
	2020	9/5/2020	97	35	36.58%	2.35%
	2021	7/31/2021	5	4	67.65%	2.68%
	2022	8/20/2022	126	89	70.92%	55.50%

Sector	Year	Week-end date	Status Quo B Season Herring Bycatch (mt)	Potential Herring Bycatch Avoided in B Season (mt)	Amount of Herring Bycatch Avoided (mt) as % of B Season Total	Amount of Herring Bycatch Avoided (mt) as % of Annual Total
Mothership	Total		503	82	16.37%	6.43%
	2011	9/17/2011	3	0	1.51%	1.44%
	2012		117		0.00%	0.00%
	2013		4		0.00%	0.00%
	2014		3		0.00%	0.00%
	2015		5		0.00%	0.00%
	2016	8/13/2016	14	0	2.87%	0.26%
	2017		25		0.00%	0.00%
	2018	9/1/2018	6	1	18.80%	16.50%
	2019	8/31/2019	12	11	91.58%	90.69%
	2020	10/31/2020	36		0.00%	0.00%
	2021	7/31/2021	129	70	53.90%	38.68%
	2022	8/13/2022	149	0	0.10%	0.06%
Inshore	Total		8,544	475	5.56%	4.58%
	2011		236		0.00%	0.00%
	2012		1,608		0.00%	0.00%
	2013		191		0.00%	0.00%
	2014	9/6/2014	136	0	0.00%	0.00%
	2015	8/29/2015	1,059	23	2.15%	2.06%
	2016	9/10/2016	654	0	0.01%	0.01%
	2017	8/5/2017	646	63	9.78%	9.47%
	2018	9/1/2018	381	0	0.02%	0.01%
	2019	9/7/2019	866	93	10.74%	10.21%
	2020	9/5/2020	822	35	4.25%	2.03%
	2021	7/31/2021	970	246	25.34%	18.15%
	2022	8/20/2022	974	15	1.54%	1.18%

Table 6-50 page 228

PSC Trade-offs

Summary of impacts

	Apport. Suboption	WAK Chum	Total Chum	Pollock Forgone	Chinook	Herring
200,000	1) 3-yr avg	144,893	852,347	1,783,255	32,874	725
	2) 5-yr avg	147,243	994,447	1,907,248	36,778	890
	3) pro-rata	147,270	866,573	1,889,098	36,835	873
	4) AFA	188,786	1,092,360	2,235,419	54,182	1,216
	Apport. Suboption	WAK Chum	Total Chum	Pollock Forgone	Chinook	Herring
300,000	1) 3-yr avg	60,669	474,719	1,071,457	17,841	488
	2) 5-yr avg	62,127	479,507	1,052,203	15,847	365
	3) pro-rata	62,017	478,110	1,037,812	15,814	365
	4) AFA	75,897	460,807	952,571	19,626	550
	Apport. Suboption	WAK Chum	Total Chum	Pollock Forgone	Chinook	Herring
450,000	1) 3-yr avg	30,821	171,870	527,984	6,891	303
	2) 5-yr avg	29,205	153,079	471,574	4,383	302
	3) pro-rata	30,155	157,469	474,701	4,465	302
	4) AFA	16,483	172,531	418,368	6,595	336
	Apport. Suboption	WAK Chum	Total Chum	Pollock Forgone	Chinook	Herring
550,000	1) 3-yr avg	24,805	124,335	274,502	2,317	30
	2) 5-yr avg	16,145	95,095	359,623	2,800	246
	3) pro-rata	16,159	95,295	370,537	2,872	256
	4) AFA	5,689	28,736	204,635	2,172	280

Table 6-51, page 229

Bycatch rate Chinook and chum over two time frames (pre- and post A91)

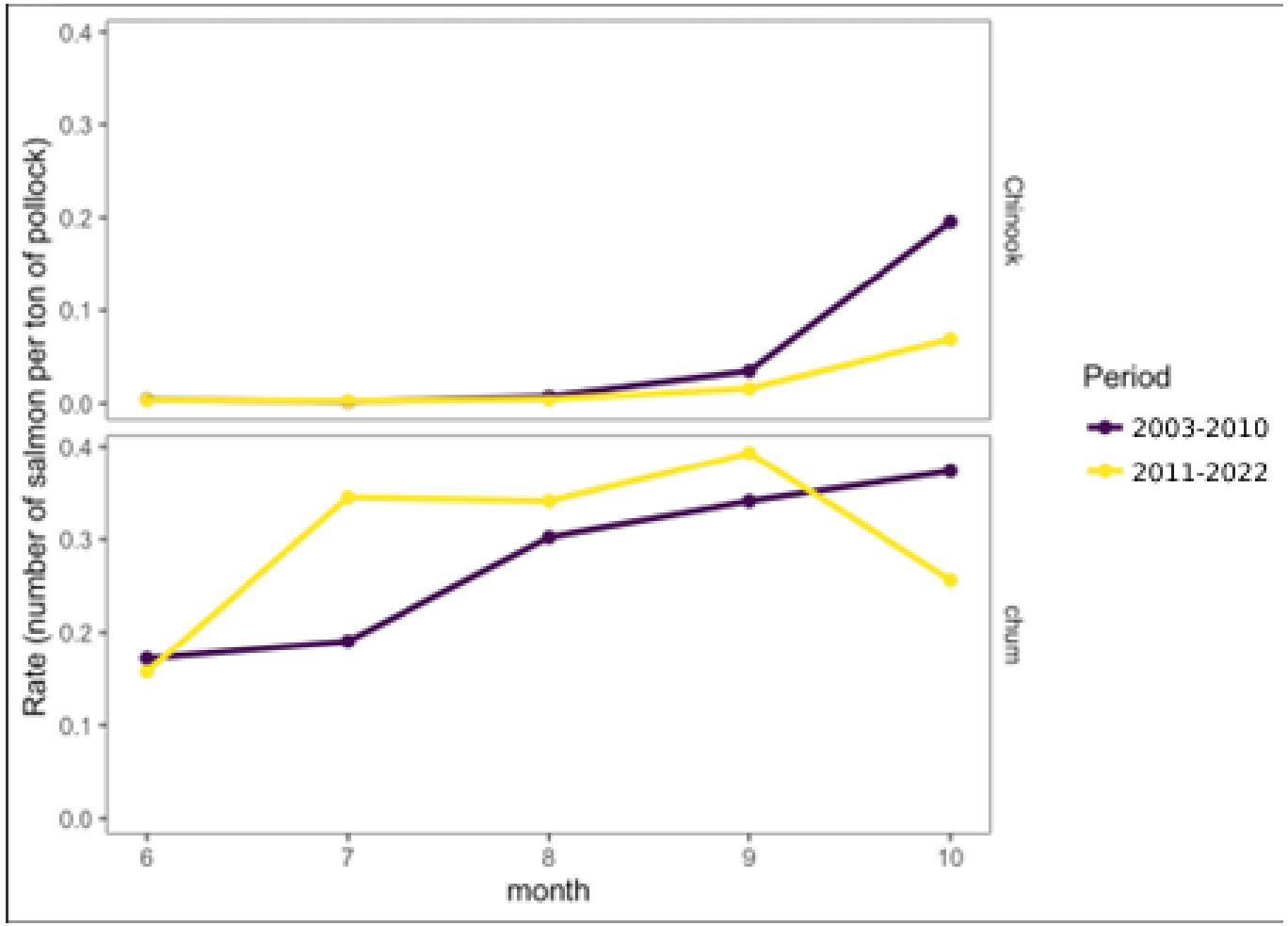


Figure 6-39, page 230

Monthly rates of Chinook and chum bycatch pre and post A91 (and east and west of 170)

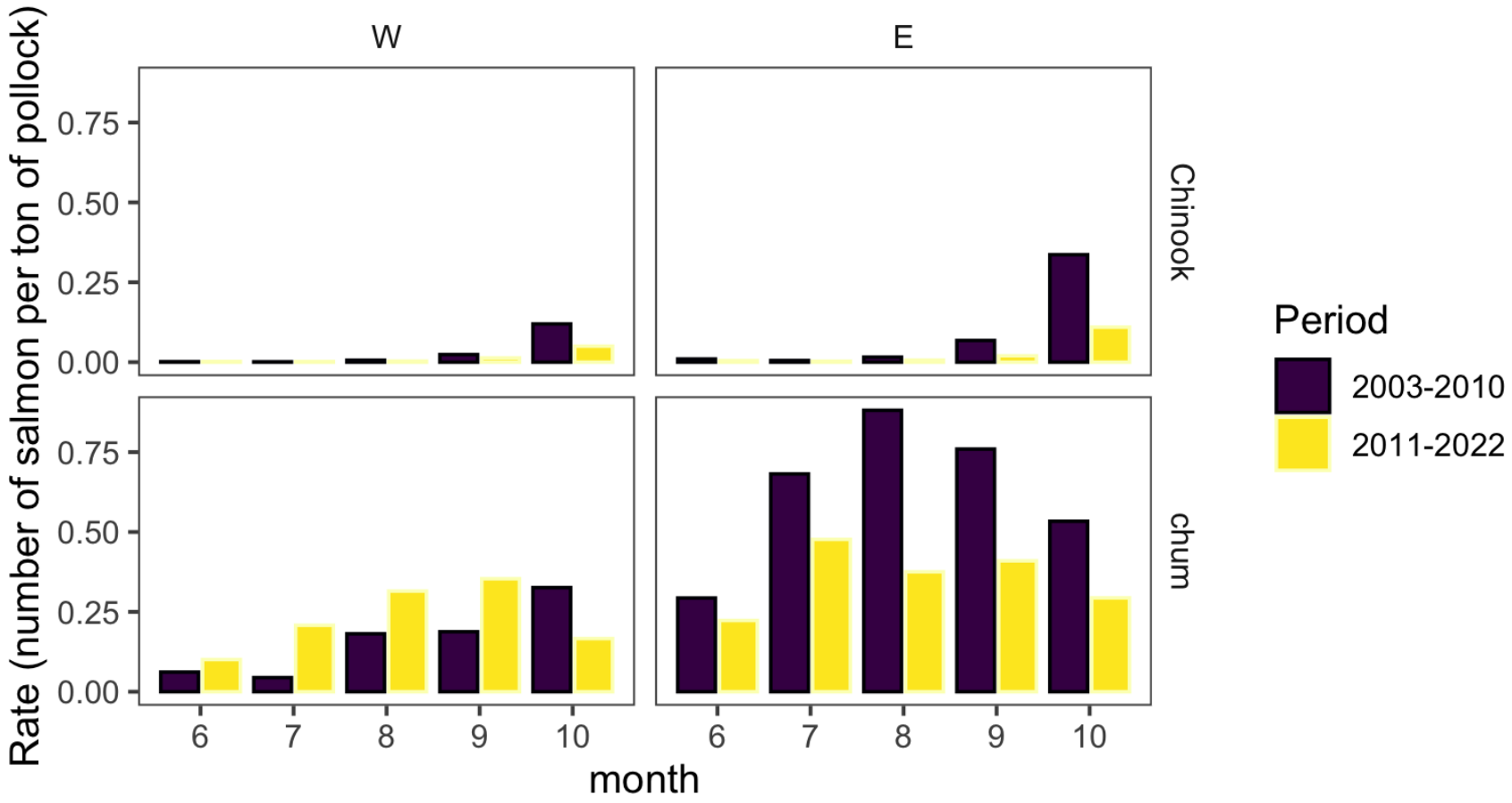


Figure 6-40 page 231

Table 6-52 page 234

Alternative	Measure	Chinook PSC	Chum PSC	WAK Chum PSC	Flexibility for Pollock Fishing
2	Overall chum PSC limit	↑ If B season extends ↔↑ Depending on fleet movement ↓ If sector or fishery is closed	↓ But degree of reduction depends on fishing behavior and the value selected for the overall limit	↔ Expect fleet to target areas with low chum bycatch rates ↓ If sector or fishery is closed or when combined with other incentives	↔ Would anticipate flexibility at higher overall PSC limit values ↓ Flexibility decreases at lower PSC limit values
3	WAK chum threshold (must be combined with Alt 2)	Would anticipate being similar to Alternative 2. Alternative 3 would not require pollock fishing to cease inseason but rather the fishery could operate under a lower overall limit in the future.			
4	Optimize avoidance in shelf edge fishing grounds	↔	↔↓	↔↓	↔
	Bi-weekly closure area consideration	↔	↔↓	↔↓	↔
	Required use of excluder device for duration of B season	↔	↔↓	↔	↔
	Required RHS closure for all vessels regardless of performance when rates are high	↔	↓	↔↓	↔↓

Alternative	Measure	Chinook PSC	Chum PSC	WAK Chum PSC	Flexibility for Pollock Fishing
2	Overall chum PSC limit	↑ If B season extends ↔↑ Depending on fleet movement ↓ If sector or fishery is closed	↓ But degree of reduction depends on fishing behavior and the value selected for the overall limit	↔ Expect fleet to target areas with low chum bycatch rates ↓ If sector or fishery is closed or when combined with other incentives	↔ Would anticipate flexibility at higher overall PSC limit values ↓ Flexibility decreases at lower PSC limit values
3	WAK chum threshold (must be combined with Alt 2)	Would anticipate being similar to Alternative 2. Alternative 3 would not require pollock fishing to cease inseason but rather the fishery could operate under a lower overall limit in the future.			

Table 6-52 page 234


Dutch Harbor, ASMI Industry and Partner Use

STAFF ASSESSMENT OF IPA PROPOSALS UNDER ALTERNATIVE 4

Current and Potential Future Approaches

- Staff provided input to the Council at the February 2024 meeting that a full impact analysis could not be provided by April 2024
  - A policy choice before the Council at this time is to finalize Alternative 4
- Used a qualitative approach that describes each provision and compares it to the status quo elements of the RHS program
  - Further information could be provided depending on how the alternative is structured
  - Analytical challenges: dynamic area closures, active communication with pollock harvesters is a key component, assumptions and data access

Common Features of the IPA Proposals

- Primary strategy for chum salmon bycatch avoidance is fleet movement
  - Potential measures considered within the context of each sector's operational dynamics
- Considered whether the provisions would minimize chum salmon and WAK chum bycatch with minimum impacts to pollock CPUE
- Considered reducing Base Rate floors by 25% and 50%
- Considered proportion of WAK to non-WAK chum
- Bycatch avoidance measures in fishing grounds areas rather than genetic cluster areas

Section 6.3.1, pg. 270

Fishing Grounds and Cluster Areas

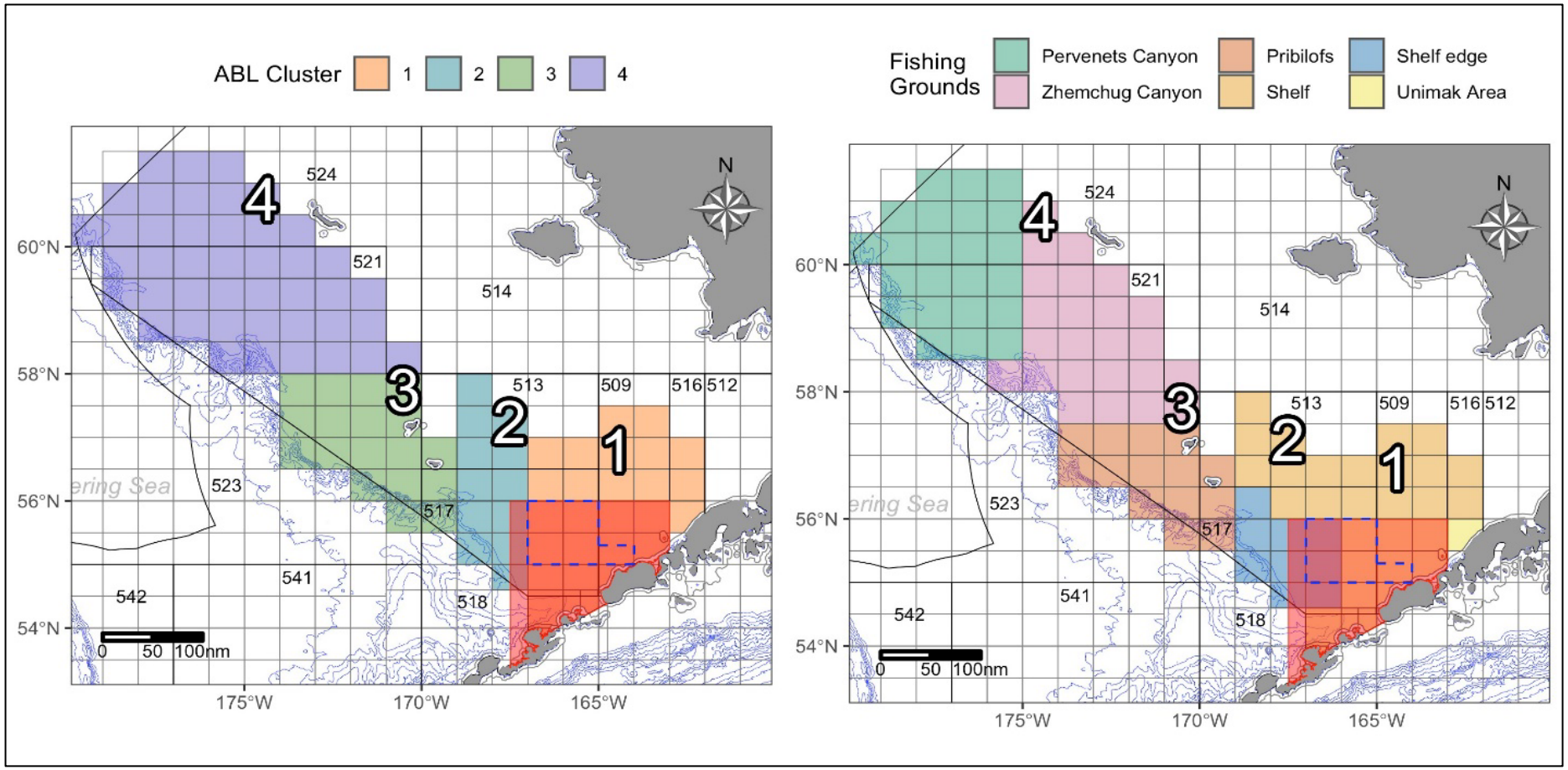


Figure 6-43 Comparison of Auke Bay Labs (ABL) genetic cluster areas to fishing grounds areas for genetic analysis

Section 6.3.1, pg. 270

Summary of Provisions in the CV Proposal

Proposed Provision	Related Measure Under Current Program	Potential Benefits of Provisions
Weekly use of latest chum genetics, bycatch rate, and CPUE information to assess stat areas historical WAK and non-WAK chum proportions	Genetic information used to inform stair-stepped Base Rate floor and size of closure areas east and west of 168	More timely use of genetic information and genetic information applied at finer spatial scale
Stat area close to all vessels when area rate is 3 times the weekly bycatch rate	ADF&G stat area eligible for RHS closure when area rate is above calculated Base Rate; not applicable to all vessels	Reduce potential for bycatch spikes; known areas of high bycatch are closed to all vessels
Information from weekend fishing evaluated on Monday for potential closure	RHS closures issued weekly (Friday to Friday); Above average vessels (Tier 1) permitted to fish in the closure area	More timely assessment of bycatch and catch data with applied management action; may not necessarily result in a greater number of closures but more vessels (Tier 1) excluded
Move along rules for inshore CV and mothership CV fleets	No move along rule incorporated into Inshore SSIP or MSSIP in current program	More timely assessment of bycatch and catch data; would potentially reduce number of closures as managers and vessels are more responsive to conditions on the fishing grounds

Section 6.3.2, pg. 271

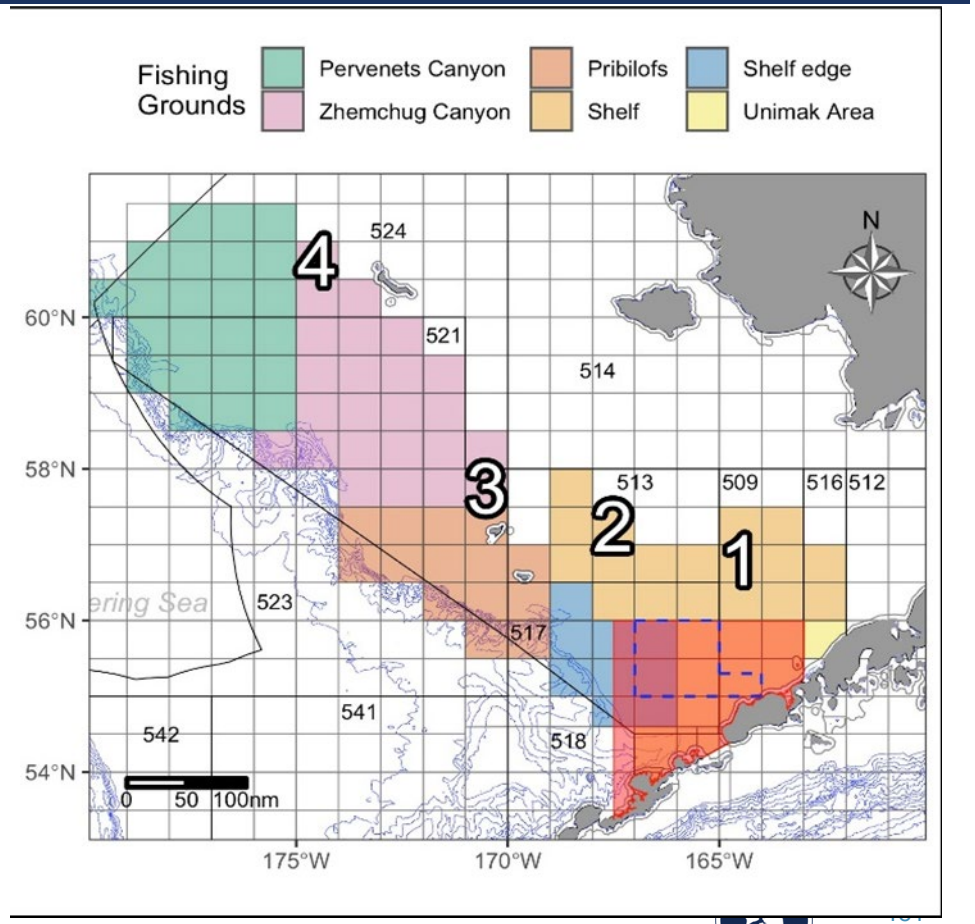
Summary of Provisions in the CP Proposal

Proposed Provision	Related Measure Under Current Program	Potential Benefits of Provisions
Weekly use of latest chum genetics, bycatch rate, and CPUE information to optimize prioritization of closures	Genetic information used to inform stair-stepped Base Rate floor and size of closure areas east and west of 168	More timely use of genetic information and genetic information applied at finer spatial scale
Closure applies to all vessels when weekly stat area bycatch rates are very high	Closures apply when stat area rate is greater than 5 chum per mt of pollock *(2022 amendment)*	Reduce potential for bycatch spikes; known areas of high bycatch are closed to all vessels
Outlier provisions	If a vessel is identified as a poor performer for two consecutive B seasons, it is prohibited from fishing in closure areas for the season *(2022 amendment)*	Vessel-level incentive to keep bycatch low year after year
Bi-weekly assessment of closure areas	Tuesday-Friday, Friday-Tuesday closures *(2022 amendment)*	More timely assessment of bycatch and catch data with applied management action; potential to reduce spikes in bycatch
Use of excluder device for full B season	Excluder devices required September 1 – end of B season	Potentially greater chum escapement from pollock nets
Weekly bycatch reports to Western and Interior Alaska salmon users	Third-party receives reports	Increased transparency and public communication on performance

Section 6.3.2, pg. 272

Summary Takeaways from Proposals

- Provisions put forward in both proposals would likely result in some additional level of chum salmon and WAK chum salmon avoidance relative to the status quo program
- Primary changes to status quo program include assessing closures for their likelihood of WAK chum salmon (shelf edge), changes in the frequency of data evaluation (faster)
- Measures aim to minimize the potential for high bycatch spikes (move along rule, bi-weekly data evaluation)




Dutch Harbor, ASMI Industry and Partner Use

Points for Consideration and Next Steps

Summary of Council Action

1. The Council may modify or refine its alternatives at this time
2. The Council may determine if/how it would like to move this action forward
    1. Schedule additional review of this analysis
    2. Recommend the preliminary DEIS be revised based on input at this meeting and released for publication by NMFS as a DEIS
        1. The Council may choose to identify a Preliminary Preferred Alternative

Questions?

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Thank you to contributors!