REPORT OF THE NOVEMBER 2022 BSAI GROUNDFISH PLAN TEAM MEETING

STEVE BARBEAUX (CO-CHAIR), KALEI SHOTWELL (CO-CHAIR), CINDY TRIBUZIO (VICE-CHAIR). DIANA STRAM (COORDINATOR)

DECEMBER 5, 2022

BSAI PLAN TEAM MEETING OVERVIEW

- Dates: November 14-18

- Place: Hybrid - AFSC in Seattle/Virtual

- Leaders: Steve Barbeaux, Kalei Shotwell (co-chairs); Cindy Tribuzio (vice-chair); Diana Stram (coordinator)

- Participation:

  - **Caitlin Akselrud (AFSC RACE)**
  - Mary Furuness (NMFS AKRO)
  - Allan Hicks (IPHC)
  - Lisa Hillier (WDFW)
  - Kirstin Holsman (AFSC REFM)
  - Phil Joy (ADF&G)

  - Andy Kingham (AFSC FMA)
  - **Beth Matta (AFSC REFM)**
  - **Andy Seitz (UAF)**
  - **Michael Smith (AFSC REFM)**
  - **Jane Sullivan (AFSC)**
  - AFSC and AKRO staff and members of the public

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BERING SEA AND ALEUTIAN ISLANDS BIG PICTURE

- Assessments of 22 stocks/complexes (17 **full**, 5 partial; 1 "none")
  - Compared to 17 last year (8 full, 9 partial; 6 "none")

- Total of 37 models, including Tier 5/6 methods (same as last year):
  - 20 base models/methods (down 5 from last year)
  - 17 additional models/methods

- The Team agreed with authors' recommendations regarding preferred models/methods and harvest specifications in all but one stock (sharks)

- Reductions from maximum permissible ABC recommended in 5 stocks

- Of the 15 stocks/complexes in Tiers 1 or 3, only 2 are in sub-tier "b"

- No stocks/complexes were subjected to overfishing in 2021, and no Tier 1 or 3 stocks/complexes are overfished/approaching as of 2022
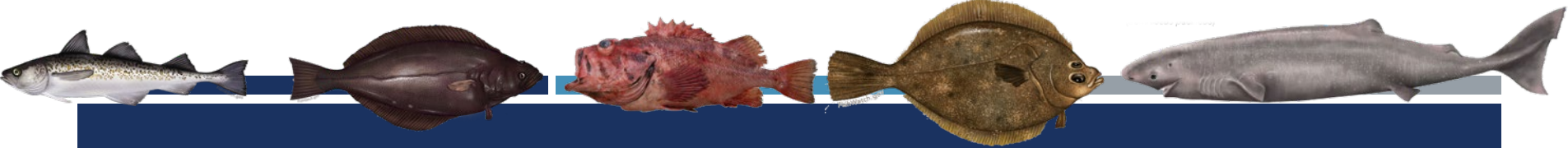
- 27 Team recommendations

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BERING SEA AND ALEUTIAN ISLANDS BIG PICTURE (TINY FONT)

Chapter	Assessment	Author	Tier	Type	Risk*	% Red.
1	Eastern Bering Sea pollock	Ianelli	1a	Full	2,2,1,1	**43%**
1B	Bogoslof Island Pollock	Ianelli	5	Full	1,1,1,NA	
1A	Aleutian Islands pollock	Barbeaux	3a	Full	1,1,1,1	
2	Eastern Bering Sea Pacific Cod	Barbeaux	**3b**	Full	1,1,1,1	
2A	Aleutian Islands Pacific cod	Spies	5	Full	1,2,2,1	
3	Sablefish	Goethel	3a	Full	1,1,1,1	
4	Yellowfin sole	Spies	1	Full	1,1,1,1	
5	Greenland Turbot	Bryan	3a	Full	2,2,1,1	**6%**
6	Arrowtooth flounder	Shotwell	3a	Full	1,1,1,1	
7	Kamchatka flounder	Bryan	3a	Full	2,1,1,1	
8	Northern Rock sole	McGilliard	1a	Full	3,1,1,1	**23%**
9	Flathead sole	Kapur	3a	Partial	NA	
10	Alaska plaice	Monnahan/Sullivan	3a	Partial	NA	
11	Other flatfish	NA	5	None	NA	
12	Pacific ocean perch	Spencer	3a	Full	2,1,1,1	
13	Northern rockfish	Spencer	3a	Partial	NA	
14	Blackspotted & rougheye rockfish	Spencer	**3b/5**	Full	3,2,1,2	**12%**
15	Shortraker rockfish	Shotwell	5	Full	1,1,1,1	
16	Other rockfish	Sullivan	5	Full	1,1,1,1	
17	Atka mackerel	Lowe	3	Full	2,1,2,1	
18	Skates	Ianelli/Tribuzio	3a/5	Partial	NA	
19	Sharks	Tribuzio	6	Full	3,2,1,1	**13%**
22	Octopus	Rodgveller/Lowe	6	Partial	NA	

* Assessment, Pop Dy., Environment, Fishery

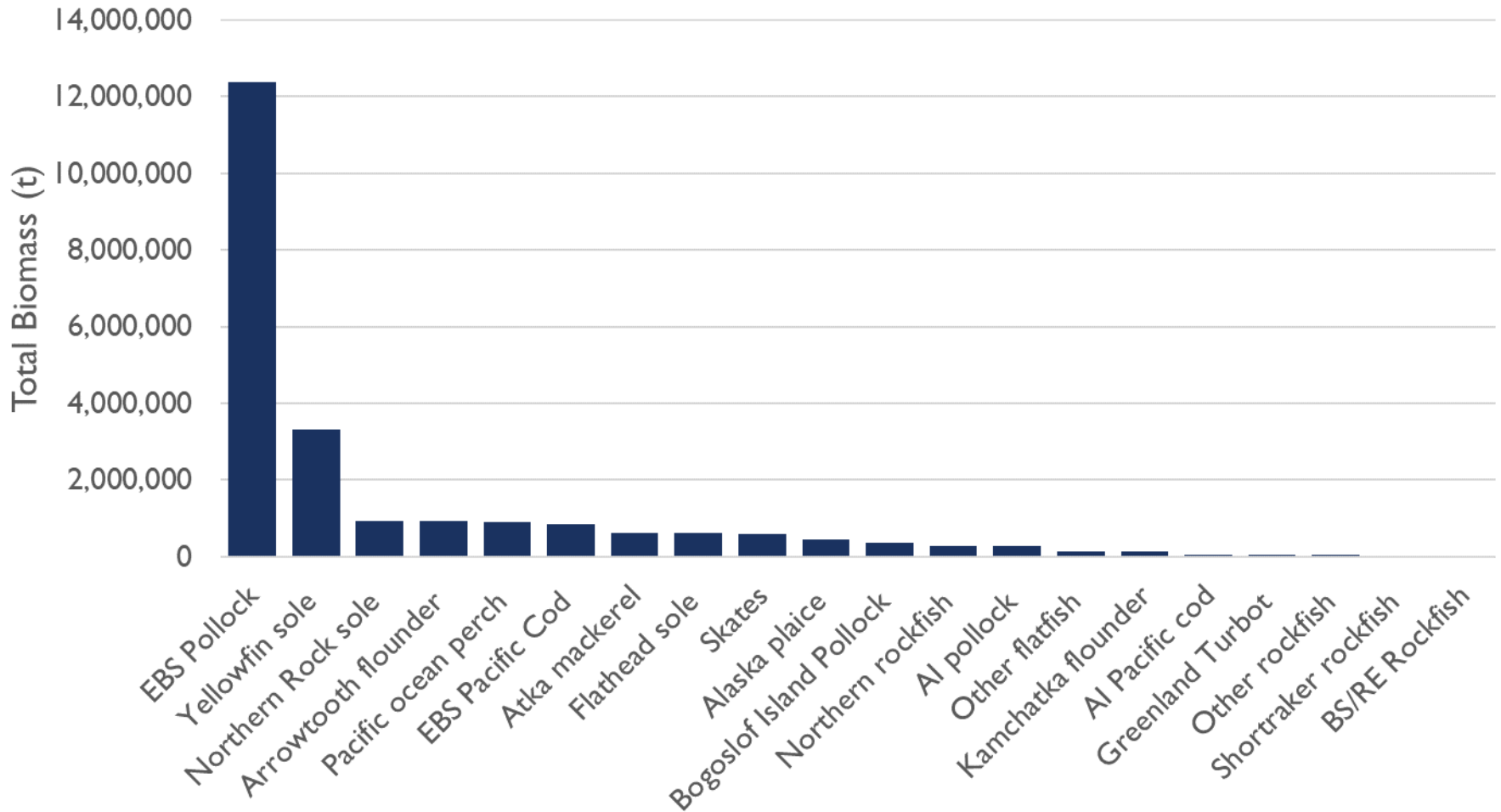# BERING SEA AND ALEUTIAN ISLANDS RISK TABLE AND REDUCTIONS

- All 5 recommendations for reduction from maximum permissible ABC were in response to elevated assessment concerns

- 4 of the 5 reductions were in agreement with recommendations from the authors

- 1 reduction was recommended as the author's choice of models was not accepted (shark) which elevated assessment concerns

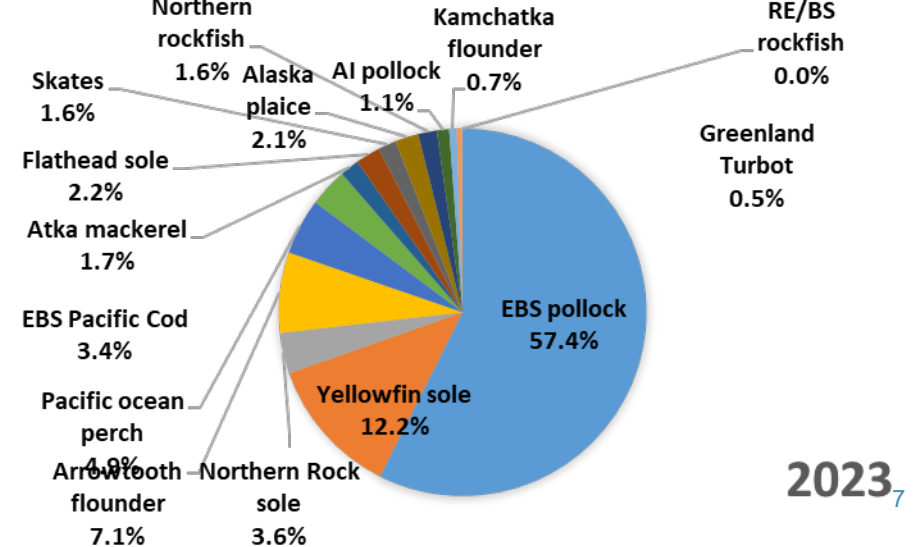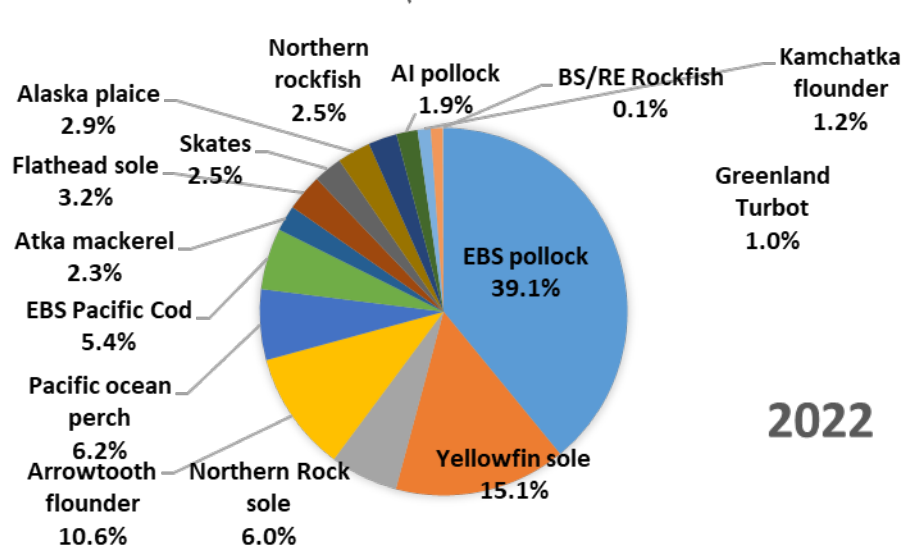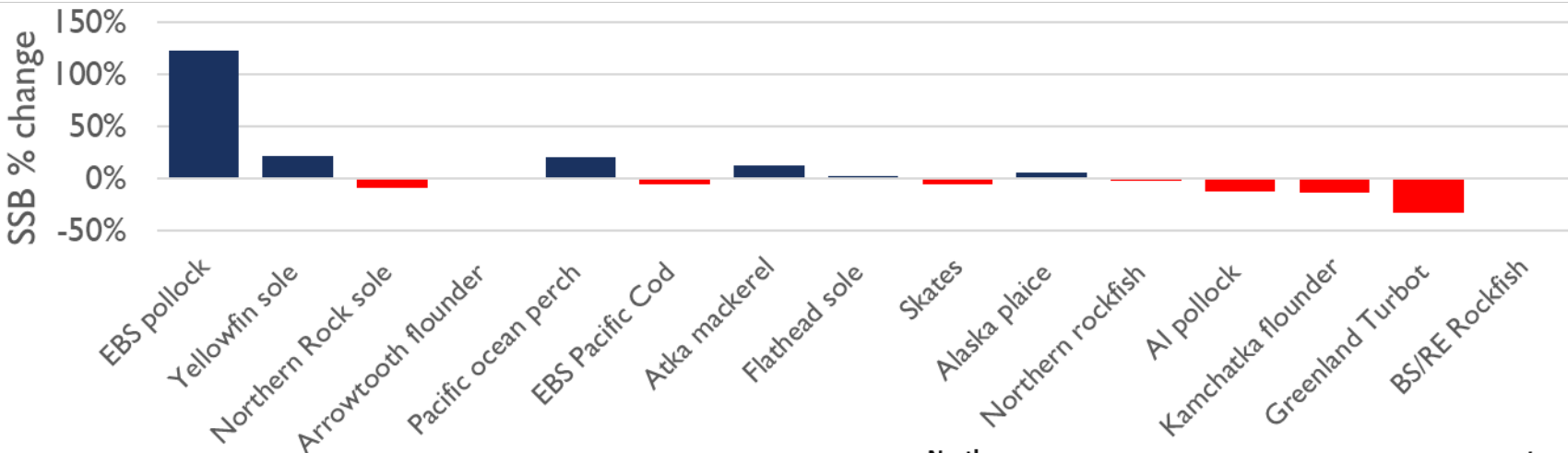**Risk Table Scoring (17 stocks)**

Legend:
- 1 Normal
- 2 Sustantially Increased
- 3 Major
- 4 Extreme

Categories: Assessment, Pop. Dy., Environment, Fishery
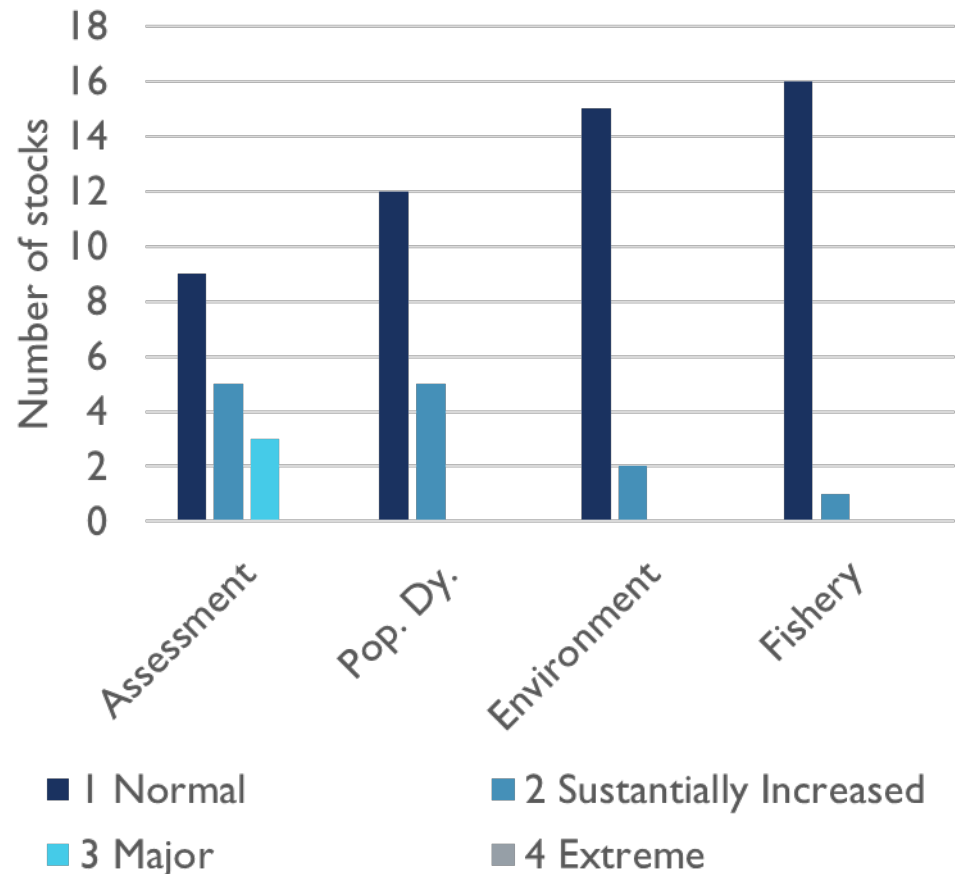
BERING SEA AND ALEUTIAN ISLANDS TOTAL BIOMASS (TIER 1, 3, AND 5)

BERING SEA AND ALEUTIAN ISLANDS SPAWNING BIOMASS (TIERS 1 AND 3)

2022

2023

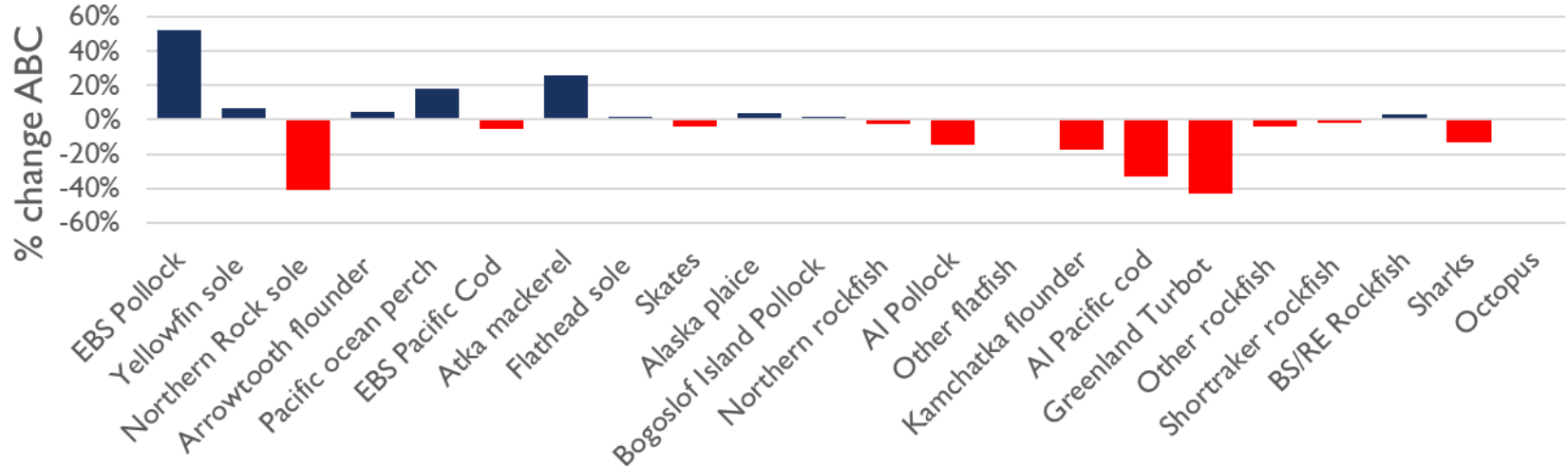# BERING SEA AND ALEUTIAN ISLANDS SPAWNING BIOMASS (TIERS 1 AND 3)

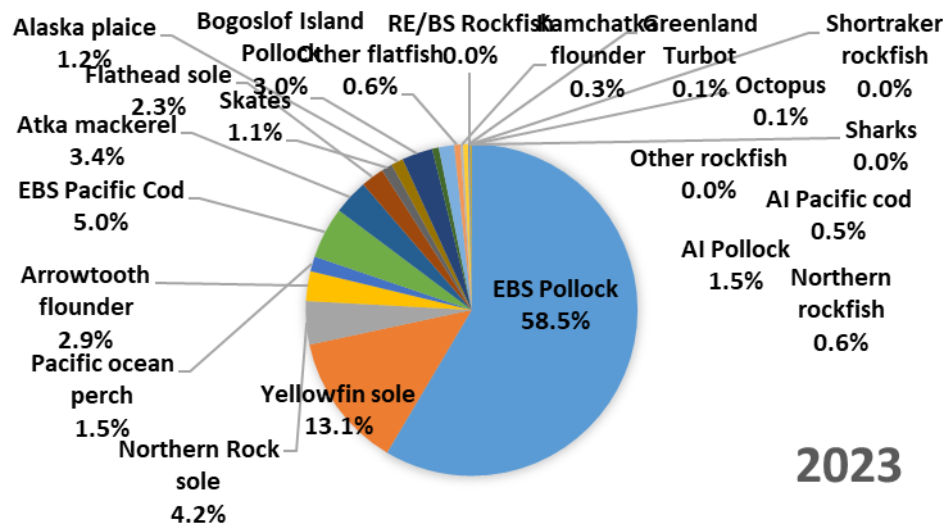# BERING SEA AND ALEUTIAN ISLANDS ALLOWABLE BIOLOGICAL CATCH (ABC)

Total 2023 ABC = 2,933,080 t
+23% from 2022

BERING SEA AND ALEUTIAN ISLANDS CHANGE IN 2023 ABC *PROJECTION*

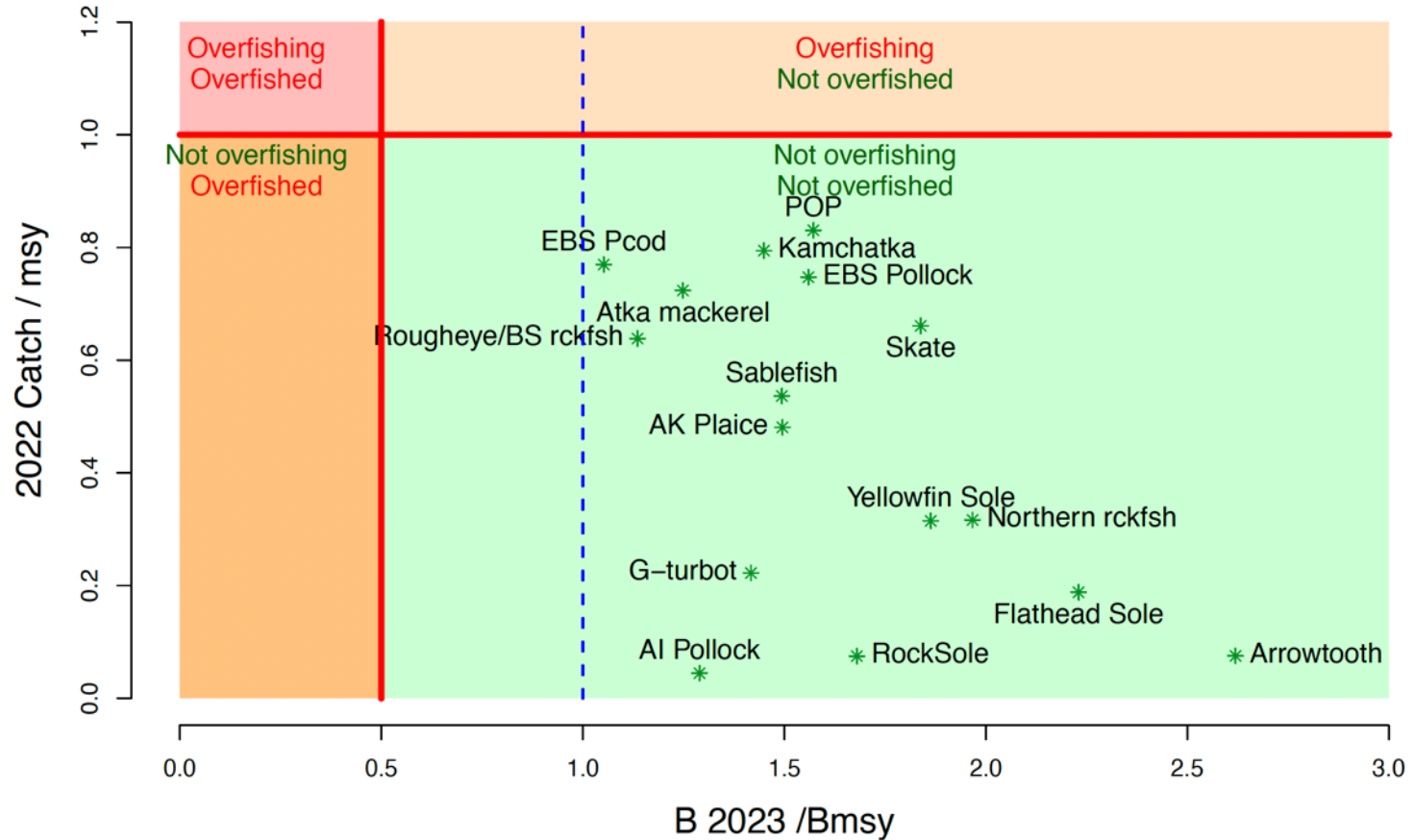# BERING SEA AND ALEUTIAN ISLANDS BIG PICTURE – STOCK STATUS

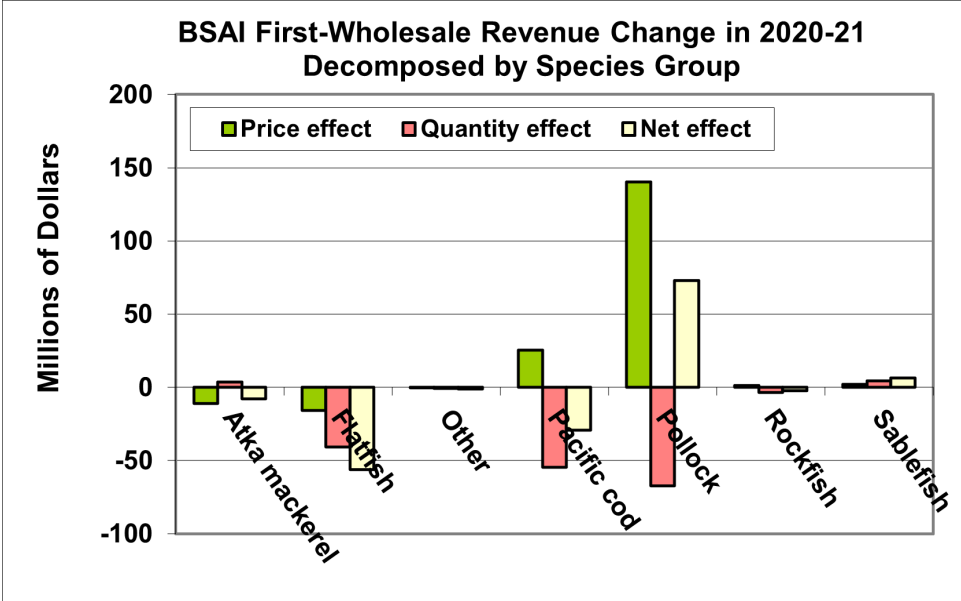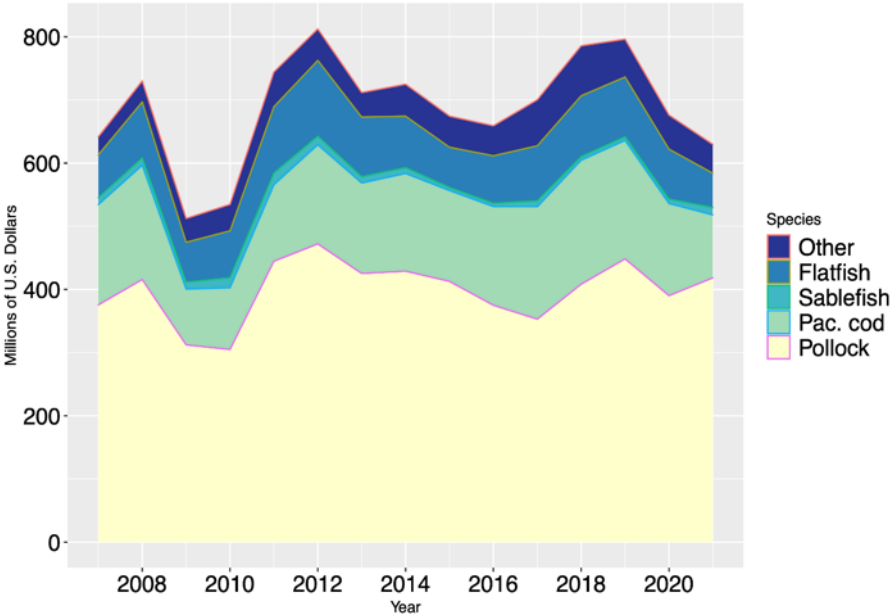Bering Sea and Aleutian Islands
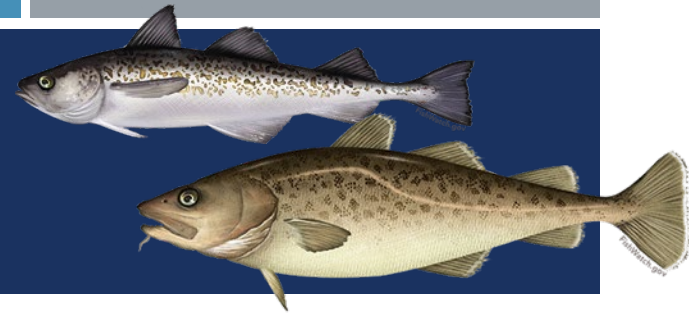
Bering Sea and Aleutian Islands

BERING SEA AND ALEUTIAN ISLANDS
BIG PICTURE – ECONOMICS

- Continued overall decrease in value of BSAI harvested species from 2020 to 2021

Real ex-vessel value

POLLOCK AND PACIFIC COD SUMMARY

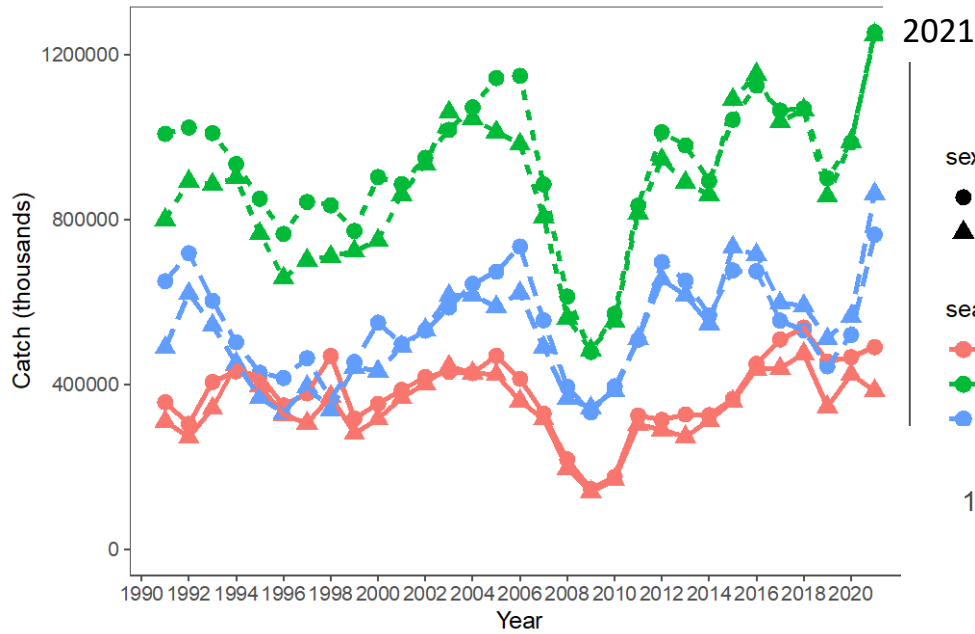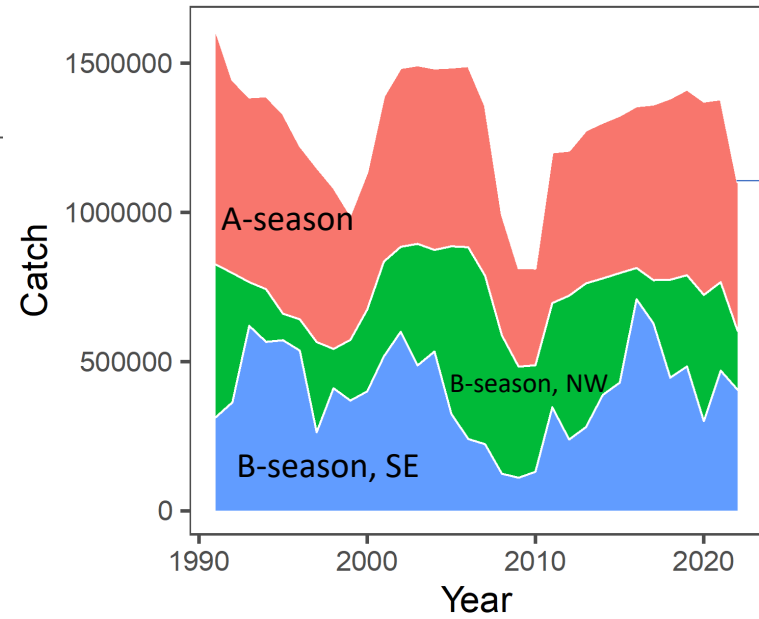| Stock	Tier	2023 ABC (t)	2023 OFL (t)	Change from 2022 ABC
EBS Pollock	1a	**1,688,000*(43%)**	3,381, 000	52%
AI pollock	3a	43,413	52,383	-14%
Bogoslof poll.	5	86,360	115,1460	1%
EBS Pacific cod	3b	144,834	172,495	-6%
AI Pacific cod	5	13,812	18,416	-33%

*xx% Reduced from maximum permissible ABC

CHAPTER 1
EBS WALLEYE POLLOCK

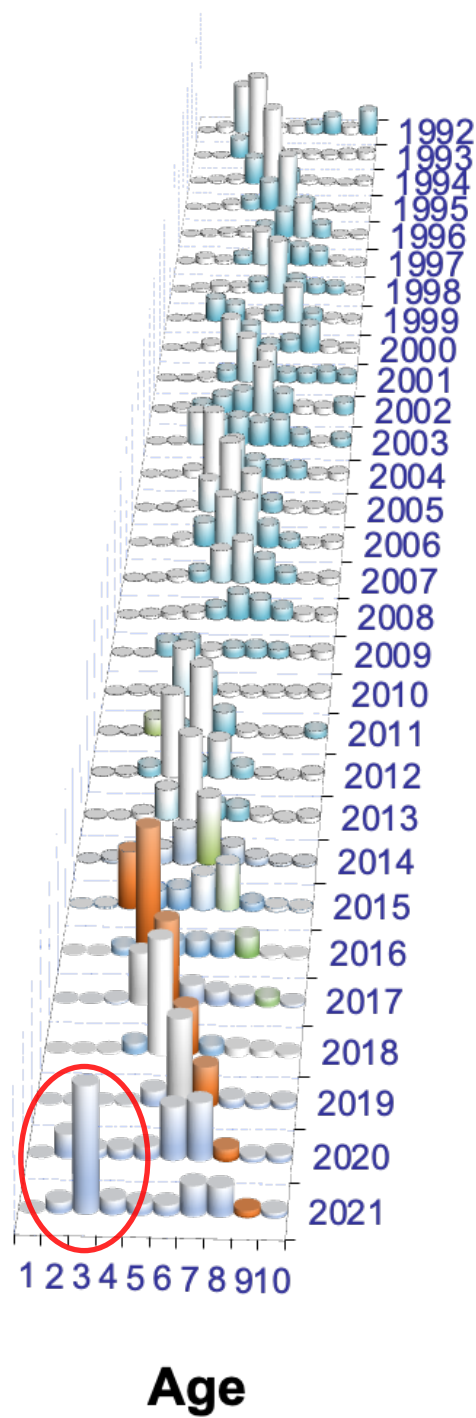- New model(s): yes; change from base: yes; risk table (2,2,1,1)

Fishery catches

Fishery
Catch-at-age
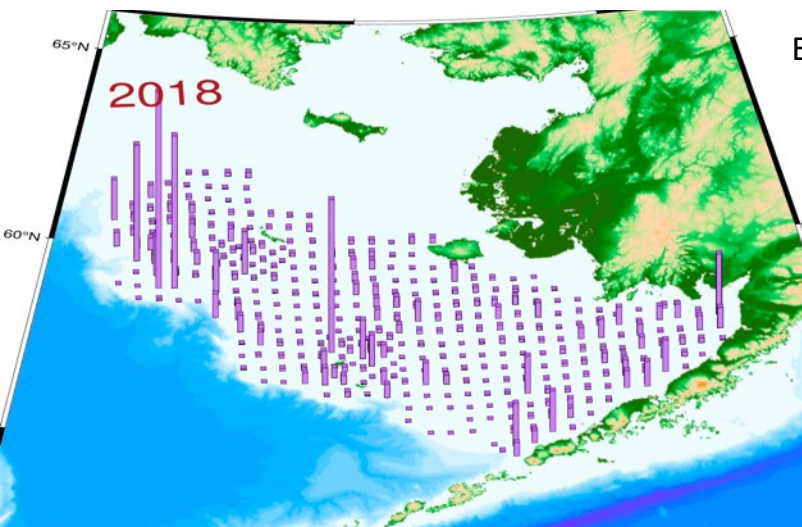
Eastern Bering Sea pollock
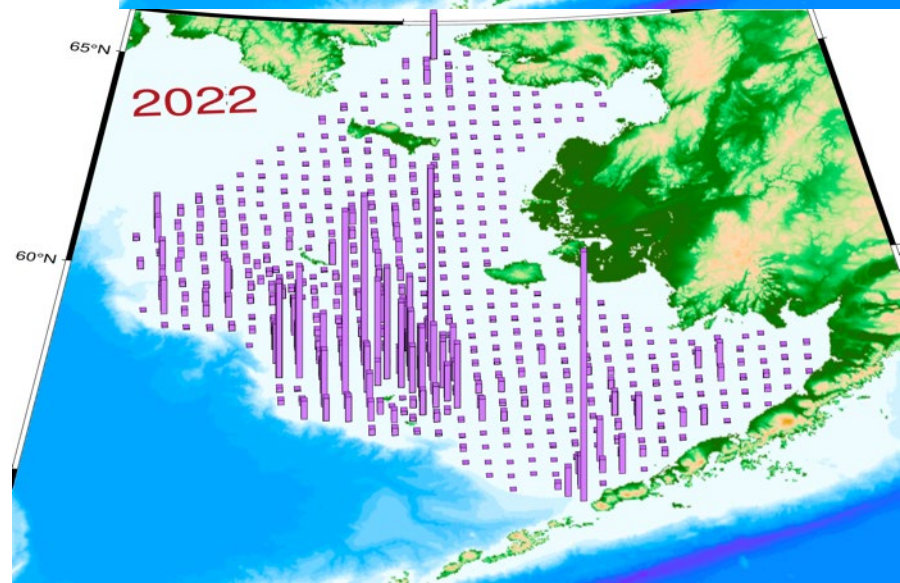

Age

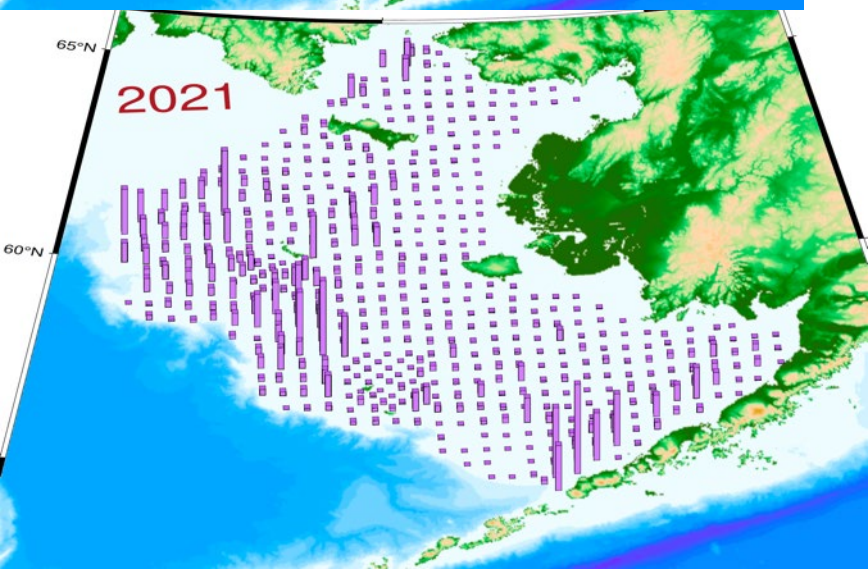# Survey work

FV *Vesteraalen*
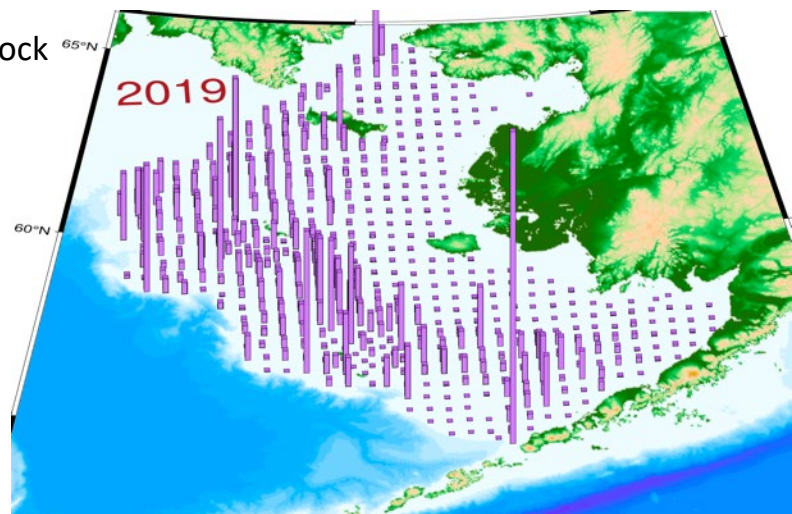2014-present
8th year

FV *Alaska Knight*
2010-present
11th year

Bottom-trawl survey stations: pollock densities

Eastern Bering Sea pollock

NMFS Bottom trawl survey index

Eastern Bering Sea pollock
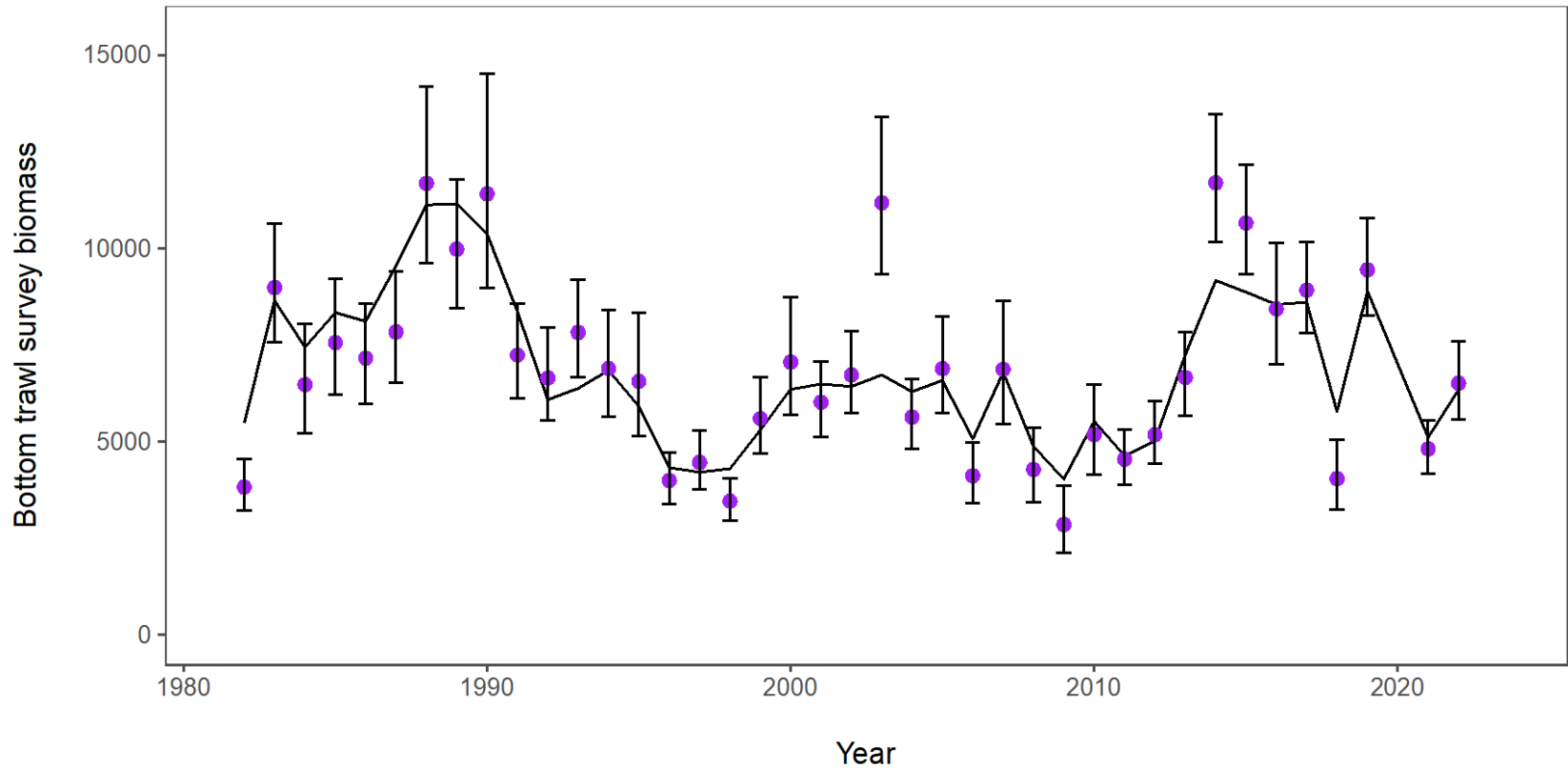
NMFS Bottom trawl survey Age composition

Eastern Bering Sea pollock
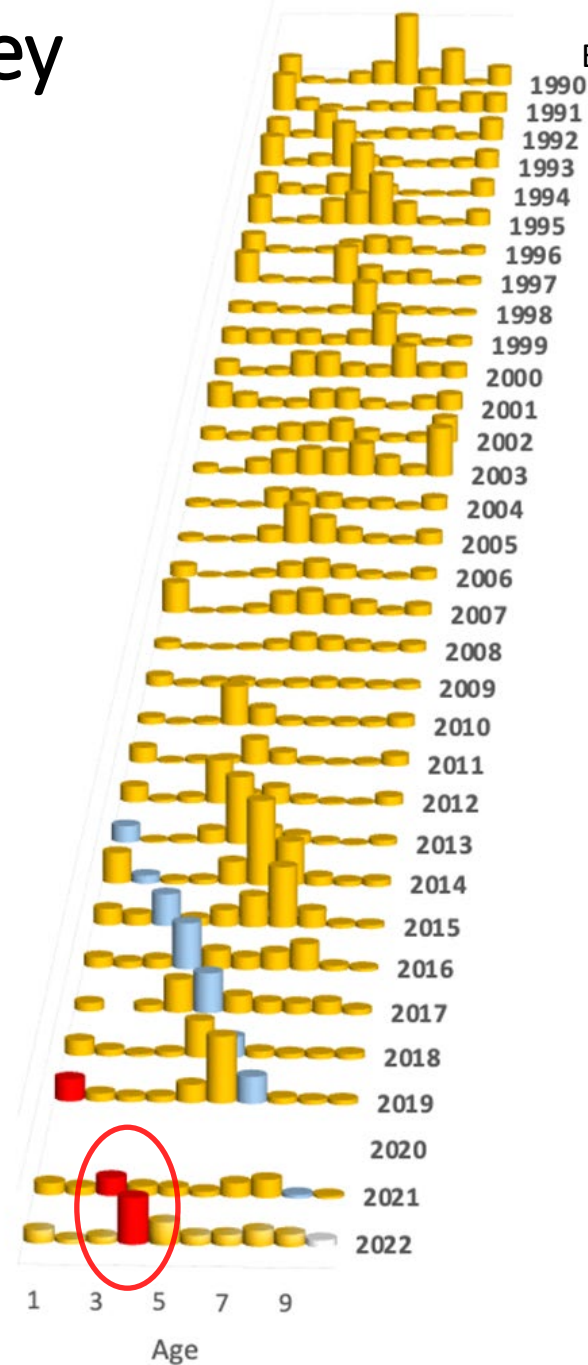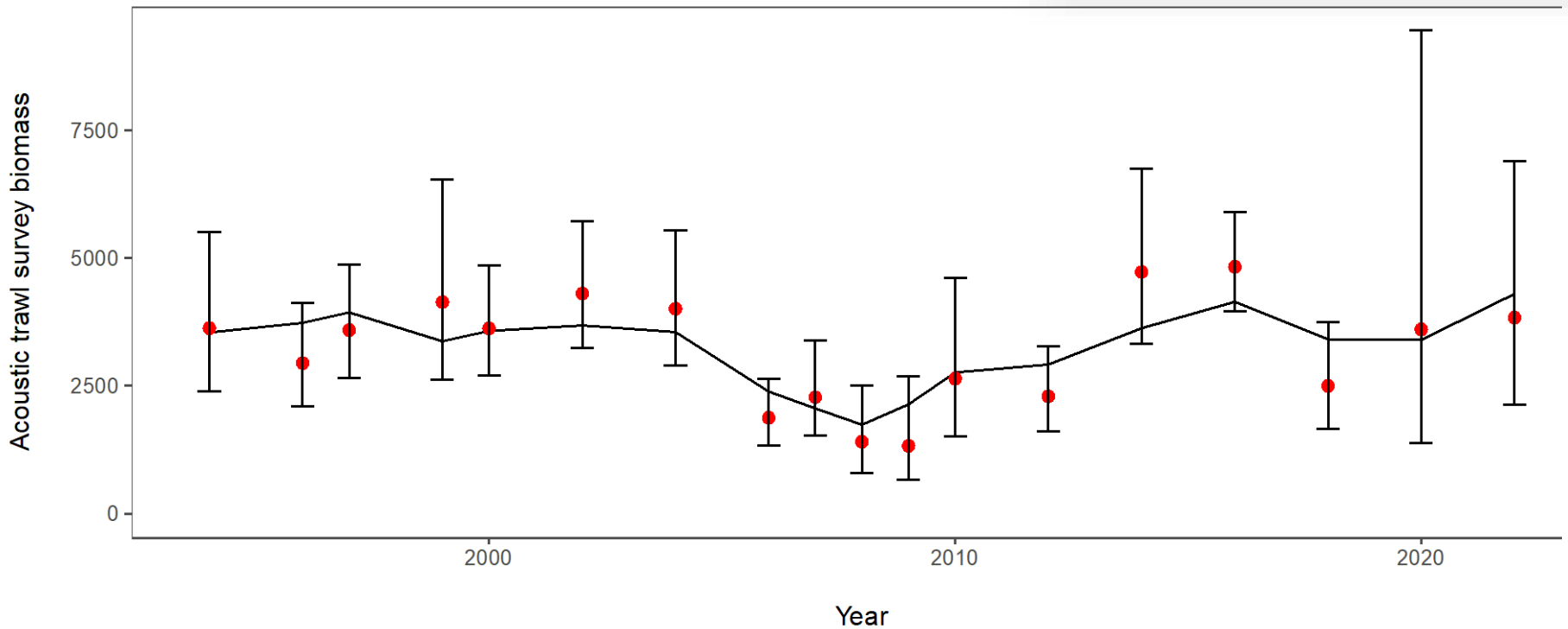
2,460 t/nmi^{-2}
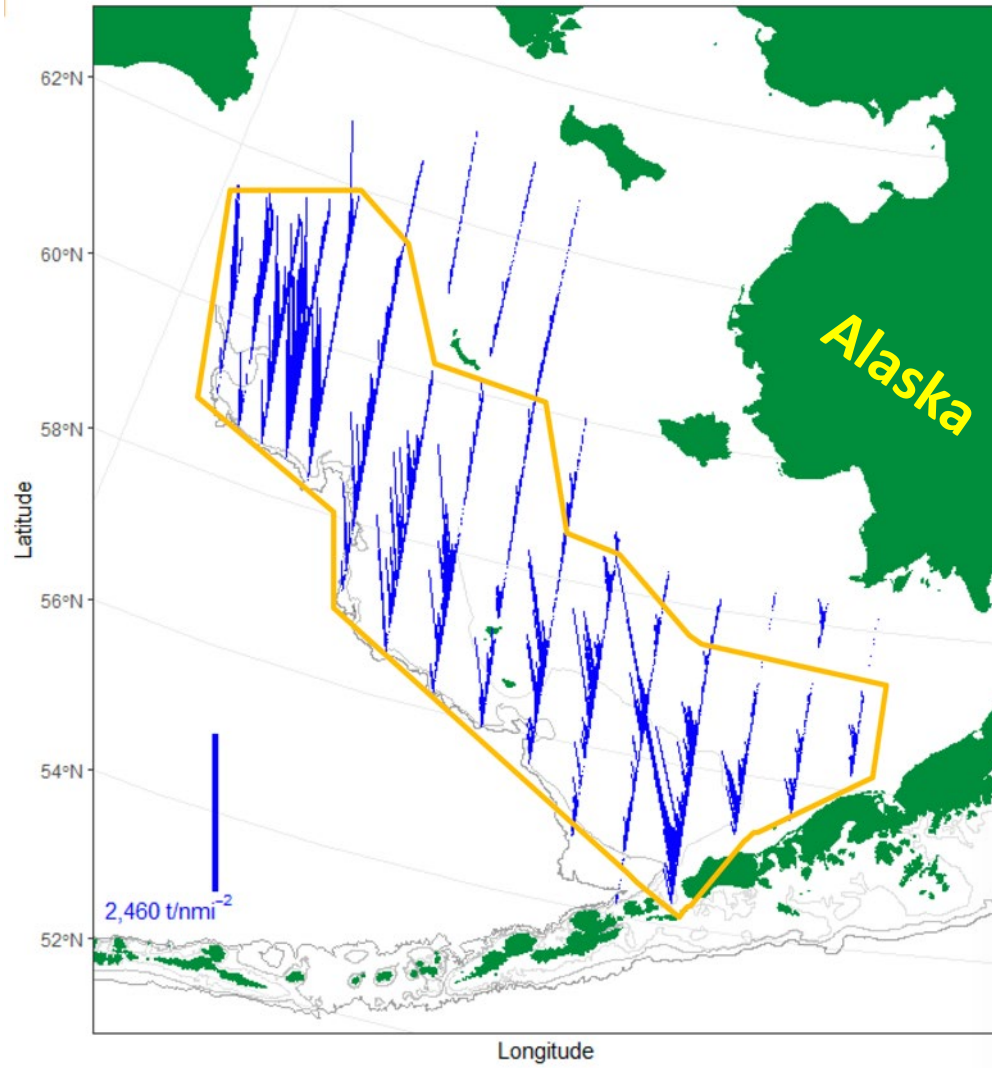
Acoustic-trawl survey index

NMFS Acoustic trawl survey
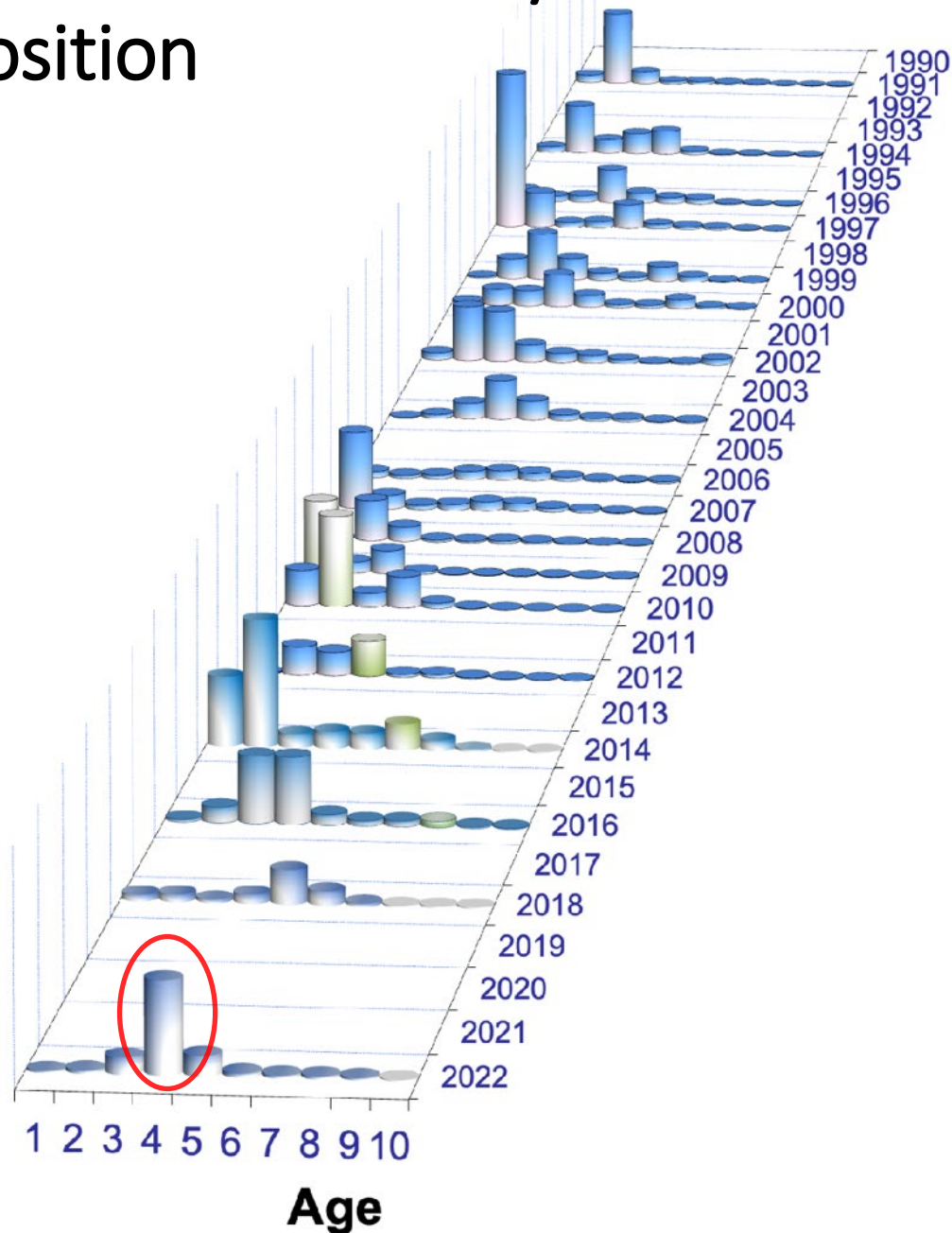# Age composition

Eastern Bering Sea pollock
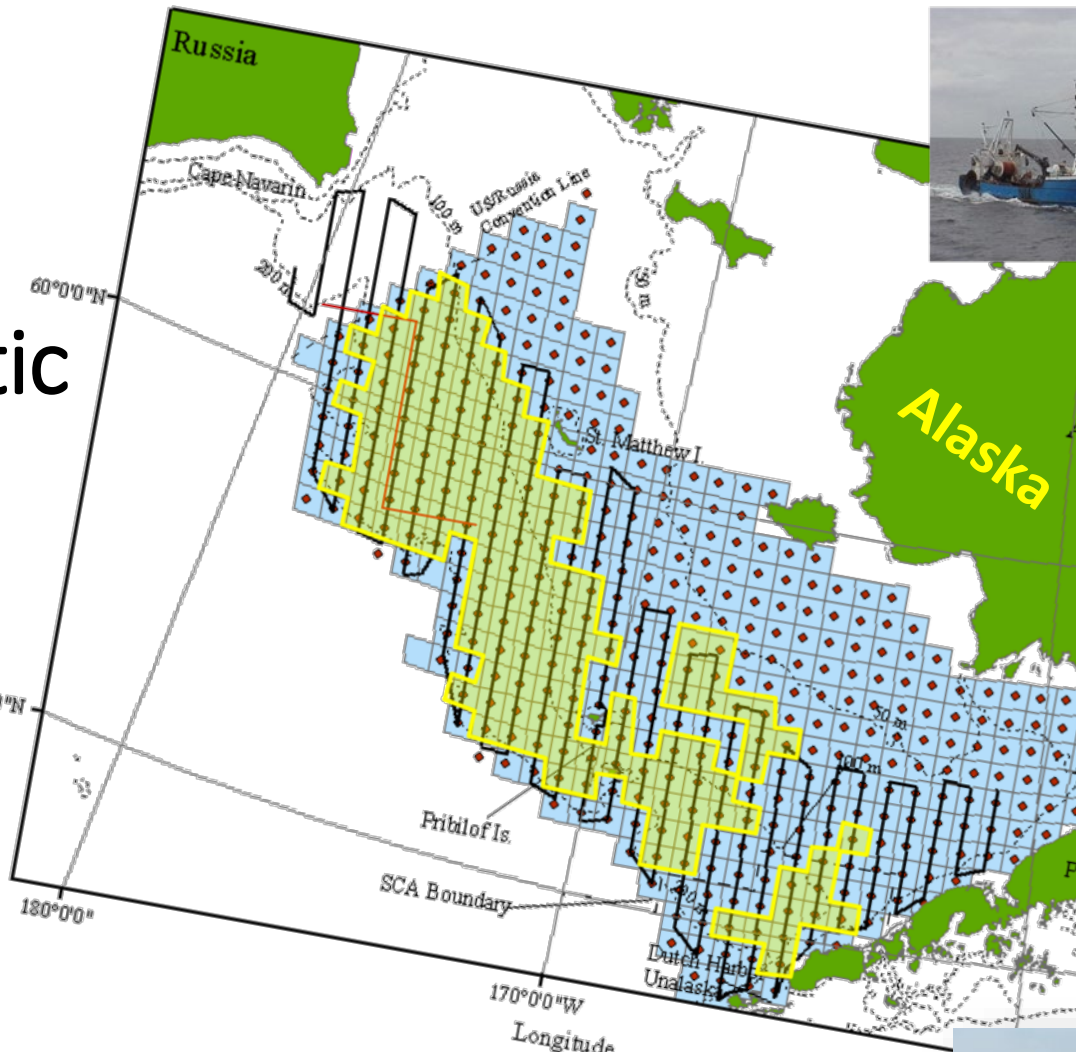
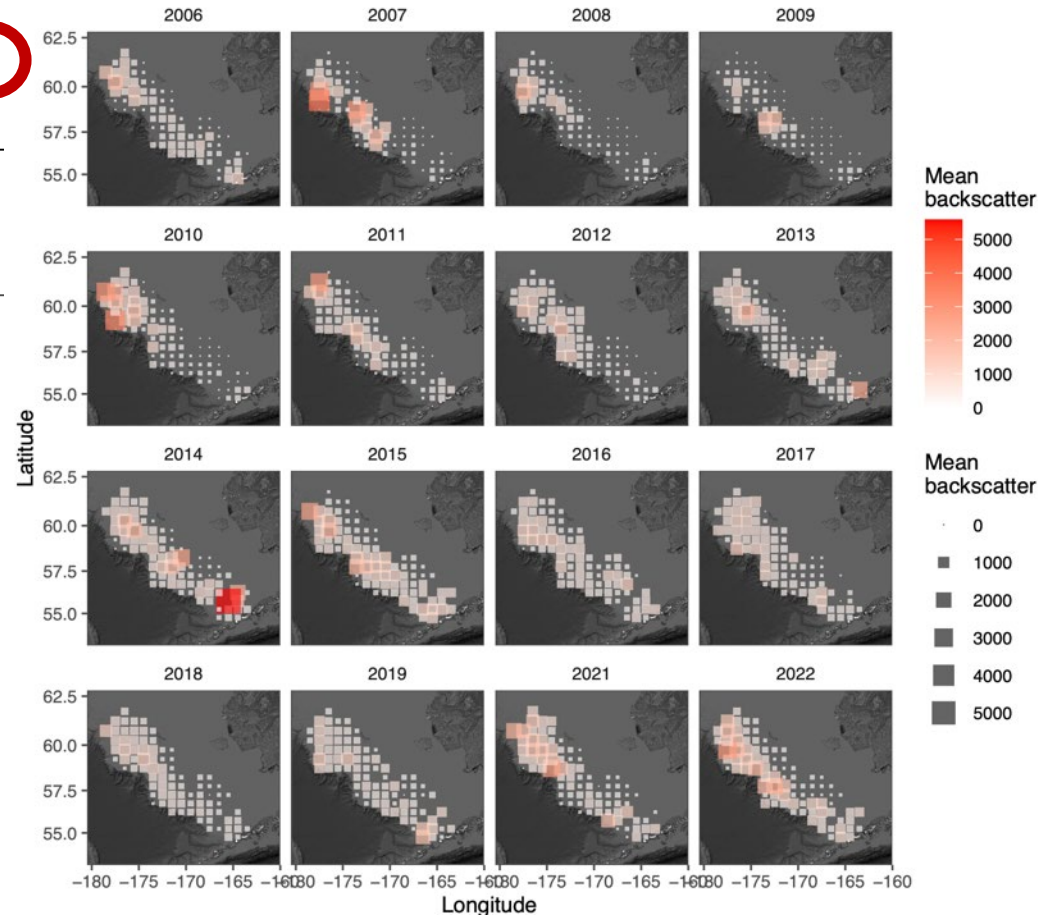Eastern Bering Sea pollock

Other acoustic data

Acoustic Vessels of Opportunity AVO Index
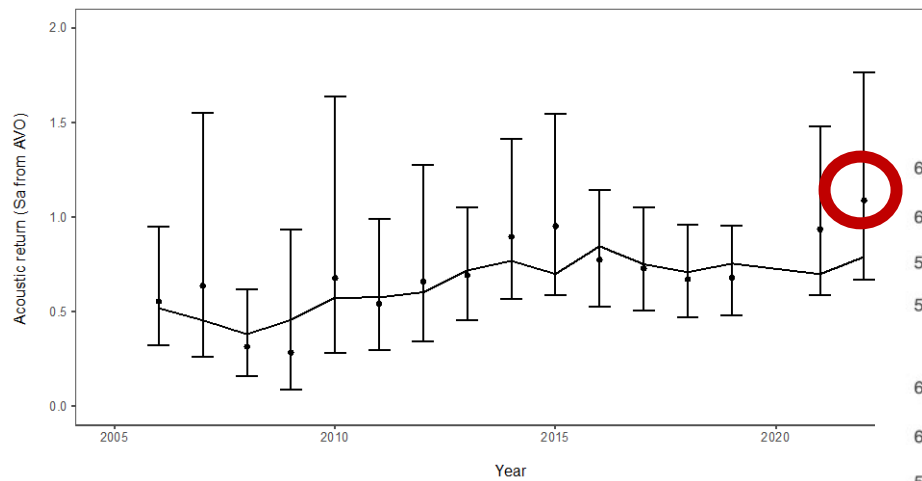
Incremental effect of new data
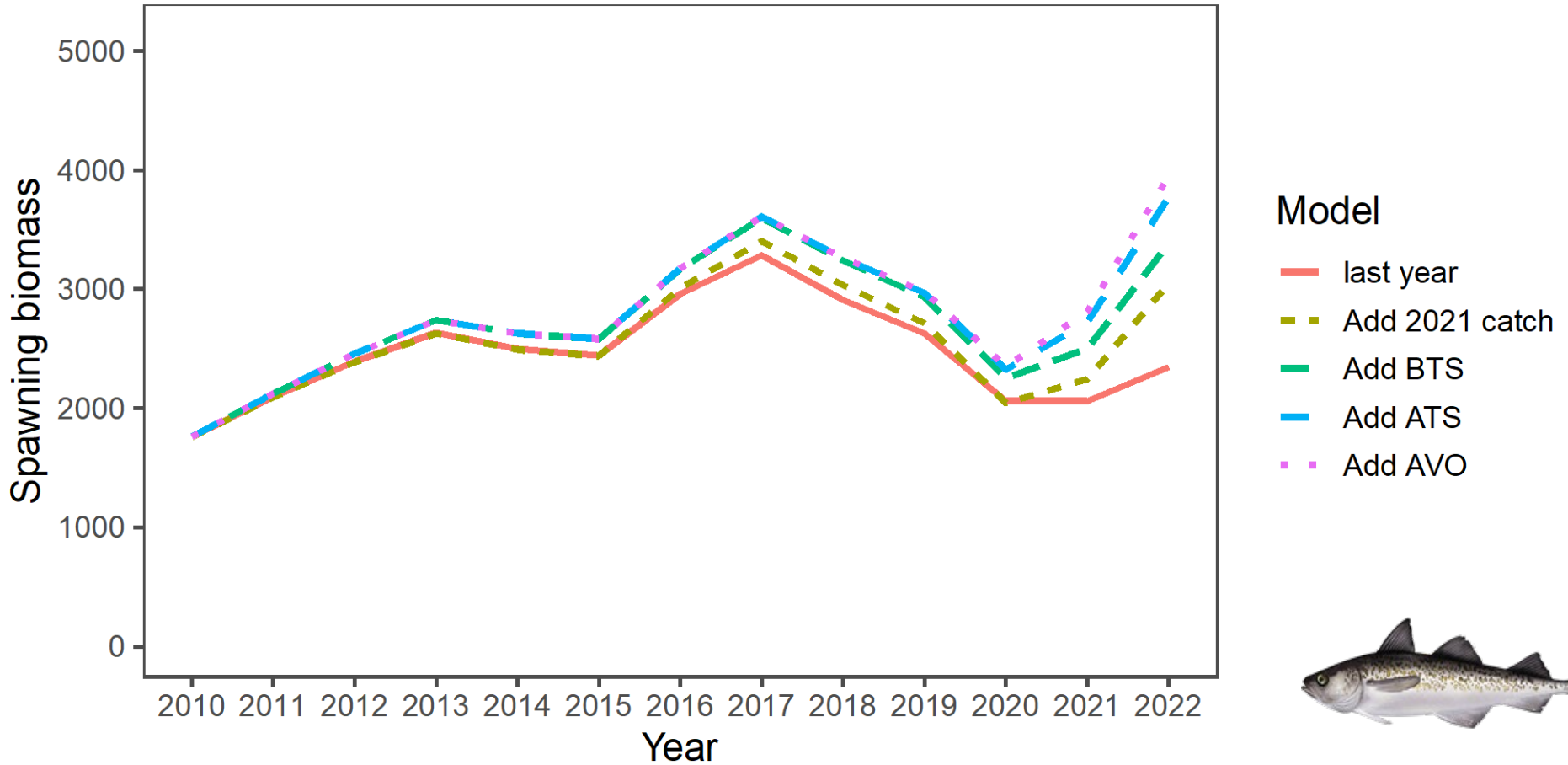
Recruitment estimates revised from last year
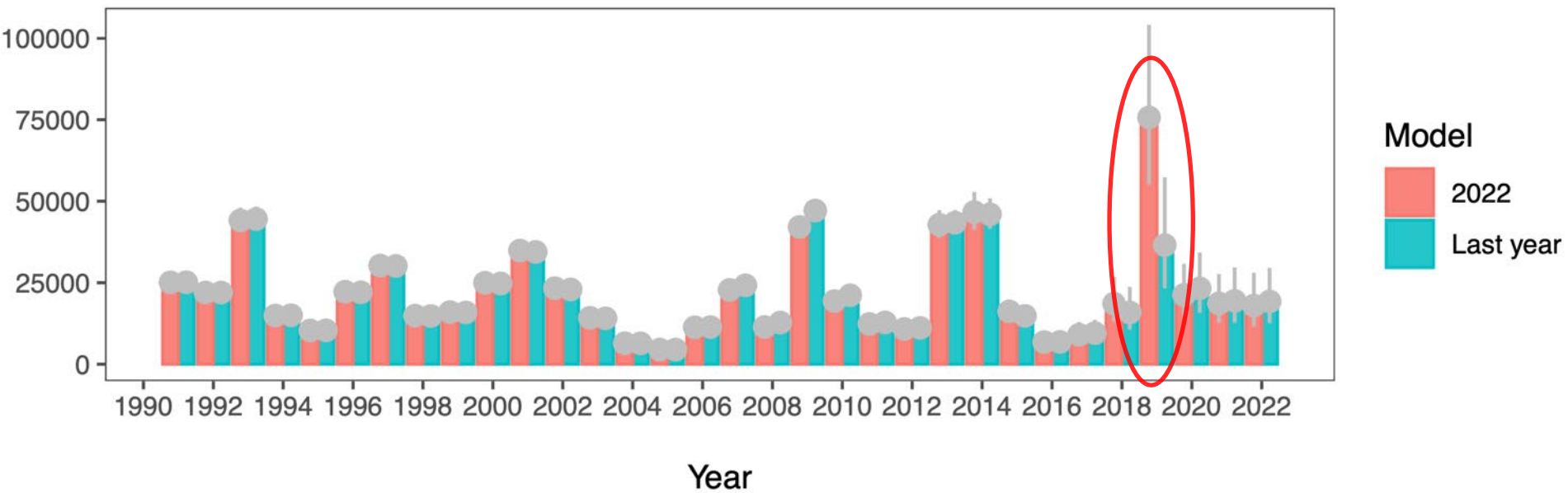
Eastern Bering Sea pollock

Spawning biomass

Recruitment

- New model(s): yes; change from base: yes; risk table (2,2,1,1)

- Team recommended two-part reduction from maximum permissible ABC
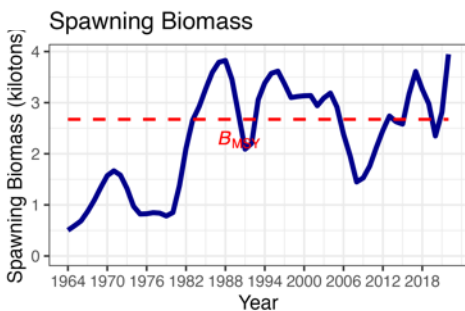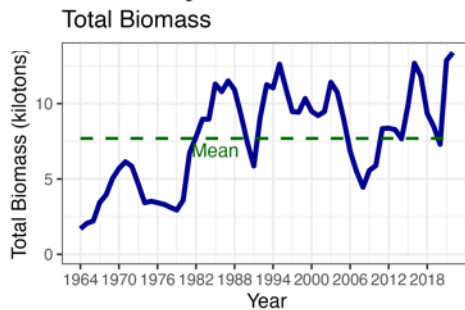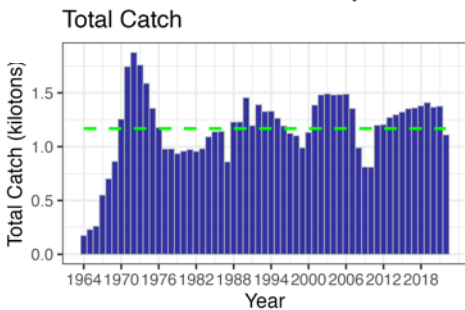
Quantity	Last asmt.	This asmt.	Change
M	0.3	0.3	0%
2022 Tier	1b		
2023 Tier	1b	1a	
2022 age+ biomass	6,839,000		81%
2023 age+ biomass	6,969,000	12,389,000	78%
2022 spawning biomass	1,881,000		122%
2023 spawning biomass	1,905,000	4,171,000	119%
B_0	5,575,000	6,653,000	16%
B_{msy}	2,220,000	2,674,000	20%
2023 F_{OFL}	0.392	0.491	25%
2023 F_{ABC}	0.314	0.365	16%
2022 OFL	1,469,000		130%
2023 OFL	1,704,000	3,381,000	98%
2022 ABC	1,111,000		52%
2023 ABC	1,289,000	1,688,000	31%

Total Catch

Total Biomass

Spawning Biomass

Age Recruitment

- New model(s): no; change from base: no; risk table (1,1,1,1)

Total Catch

Total Biomass

Spawning Biomass

Age Recruitment

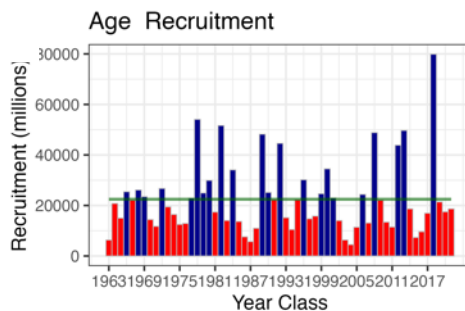| Quantity	Last asmt.	This asmt.	Change
M	0.21	0.21	0%
2022 Tier	3a		
2023 Tier	3a	3a	
2022 age+ biomass	308,525		-14%
2023 age+ biomass	330,375	264,173	-20%
2022 spawning biomass	89,516		-12%
2023 spawning biomass	87,650	78,628	-10%
B_0	185,475	174,218	-6%
2023 F_{OFL}	0.390	0.380	-3%
2023 F_{ABC}	0.313	0.305	-3%
2022 OFL	61,264		-14%
2023 OFL	61,379	52,383	-15%
2022 ABC	50,752		-14%
2023 ABC	50,825	43,413	-15%

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CHAPTER 1B
BOGOSLOF WALLEYE POLLOCK

- New model(s): no; change from base: no; risk table (1,1,1,NA)

- Tier 5 with M derived from age structured model and biomass from a random effects model

- Team agreed with author's recommendation

Quantity	Last asmt.	This asmt.	Change
M	0.3	0.313	4%
2022 tier	5		
2023 tier	5	5	
Biomass	378,262	367,880	-3%
2023 F_{OFL}	0.300	0.313	4%
2023 F_{ABC}	0.225	0.235	4%
2022 OFL	113,479		1%
2023 OFL	113,479	115,146	1%
2022 ABC	85,109		1%
2023 ABC	85,109	86,360	1%
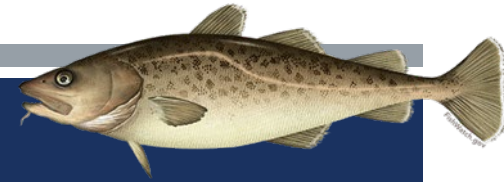
- New model(s): yes; change from base: yes; risk table (1,1,1,1)
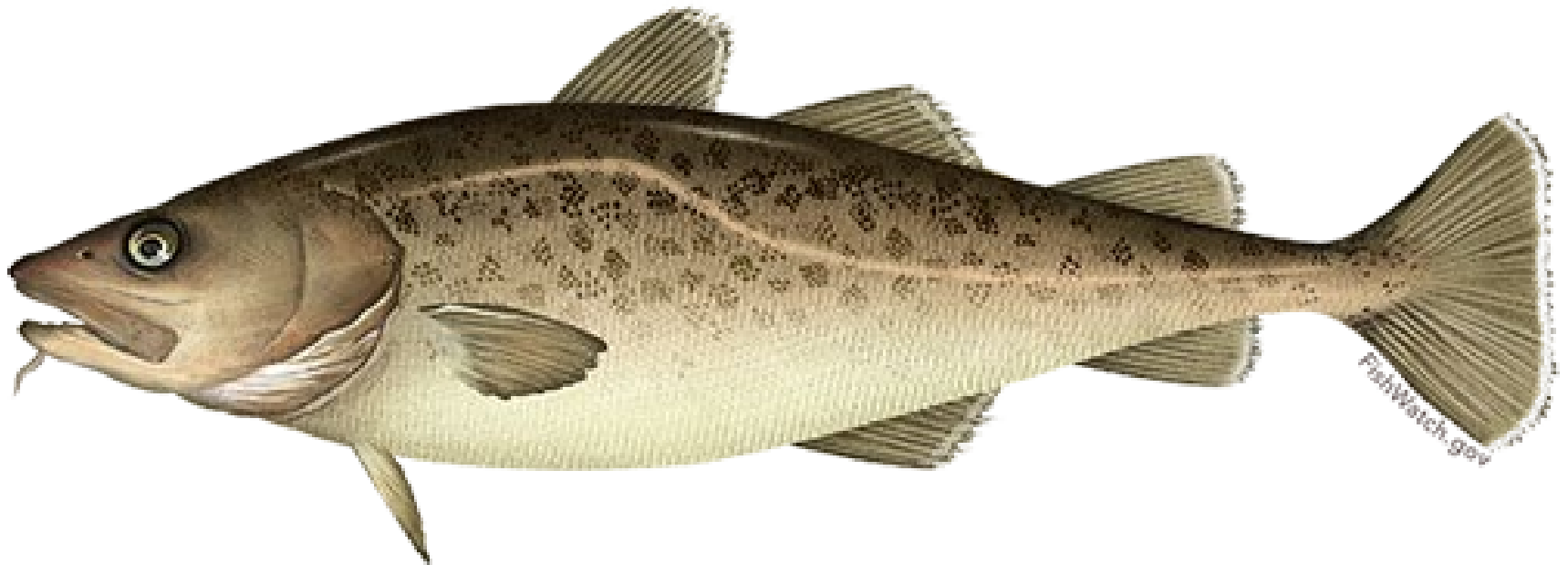
POP-UP SATELLITE ARCHIVAL TAGS PSAT
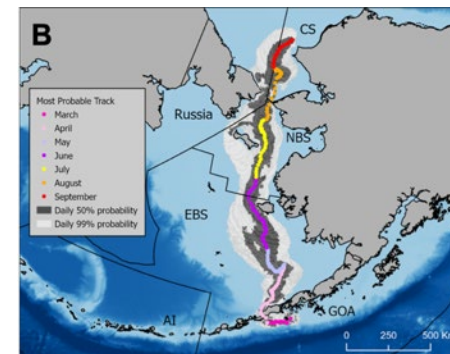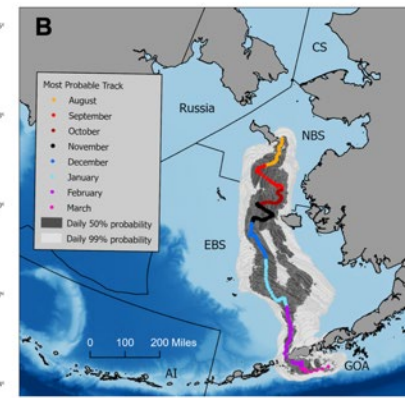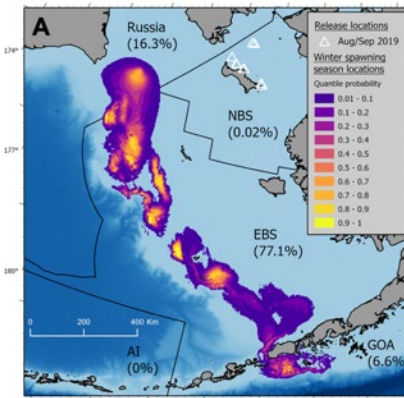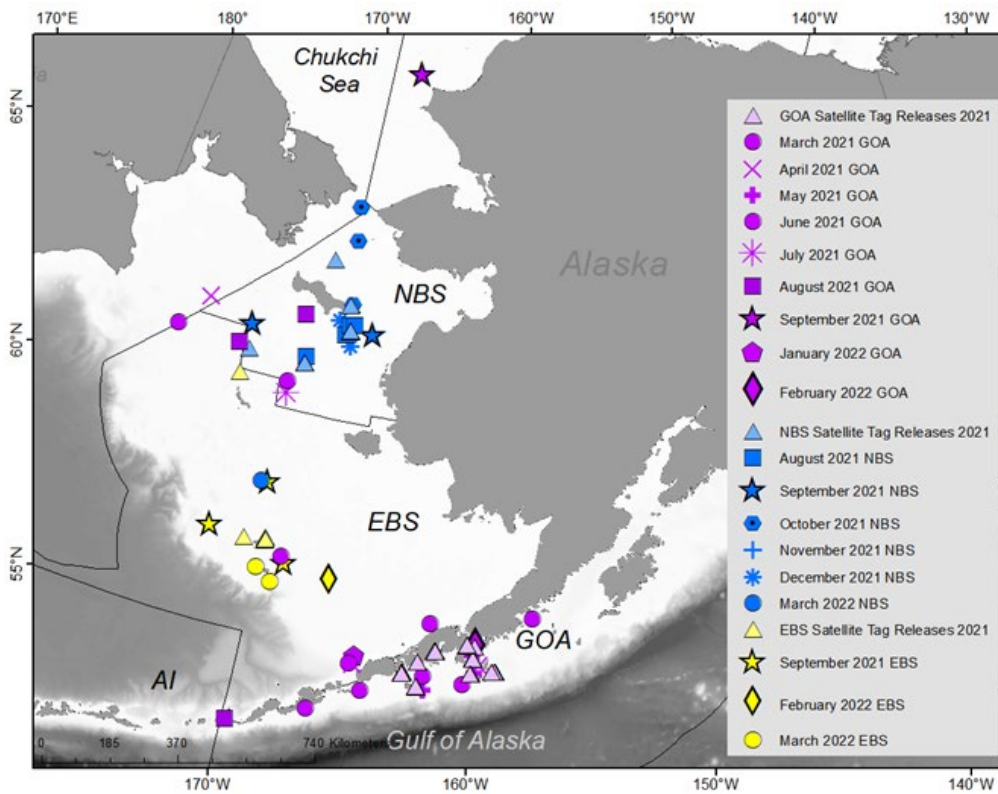
CATCH – FISHERY SECTOR

- Increase in catch from 2021 but lower than 10-year average

- Longline remains dominant

- Continued increasing trend in pot proportion and decreasing trend in trawl proportion
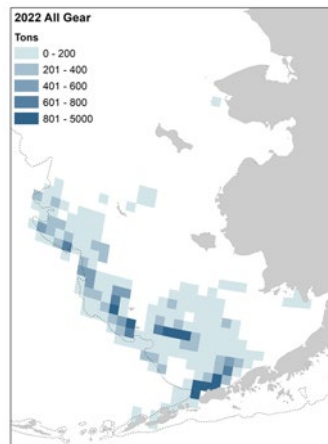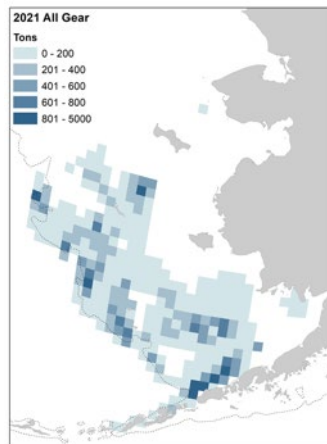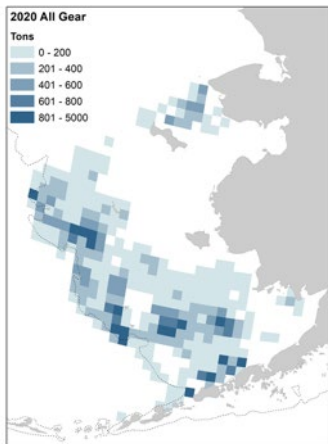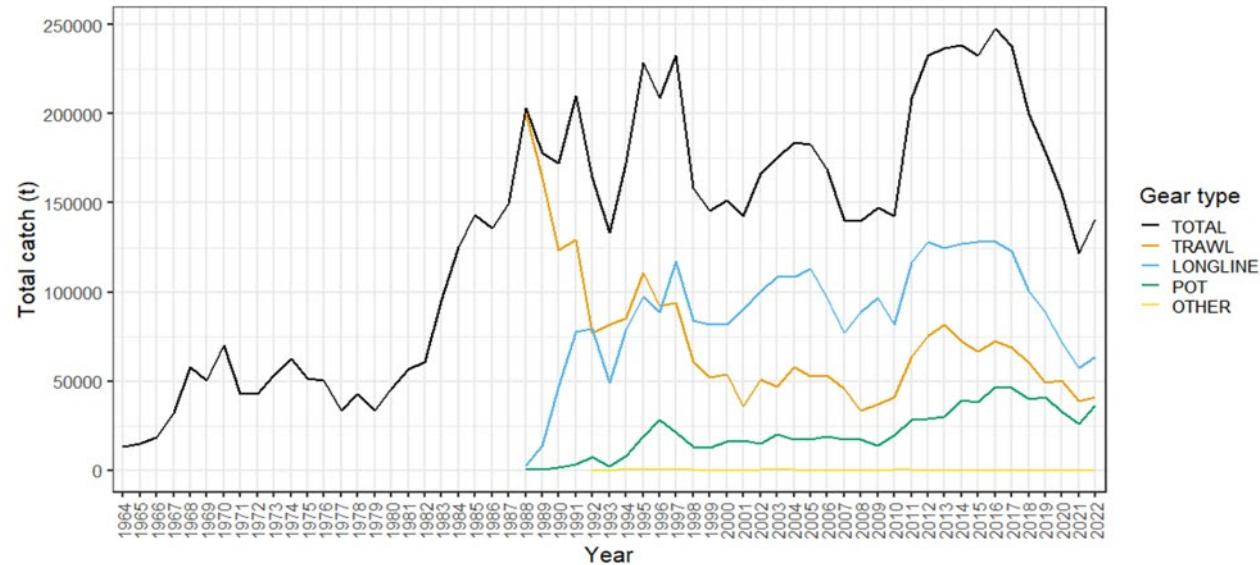
- Southwestward shift in center of gravity

- Low level of fishing in NBS

VAST CPUE INDEX – JAN.-FEB. LONGLINE FISHERY

- Difference in spatial extent resulted in overall inflation of index

- Trend remains the same with high correlation between indices

- 15% Increase in 2022 from 2021
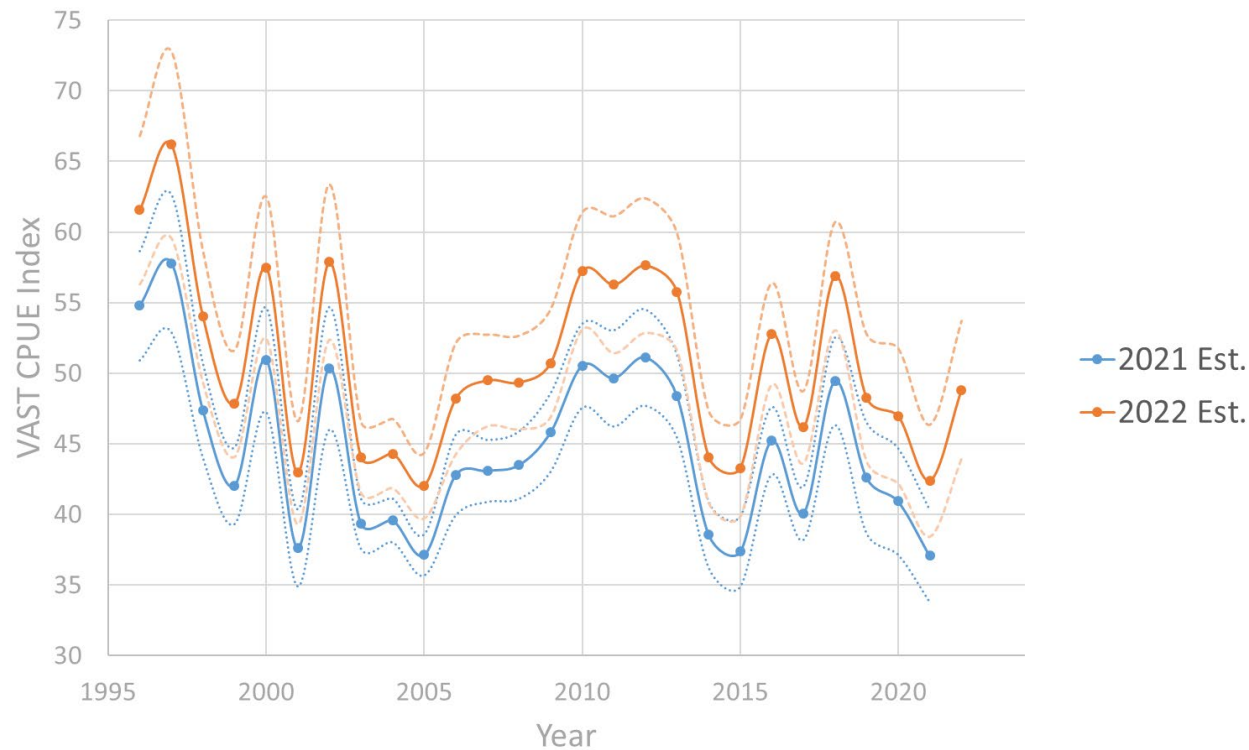
VAST SURVEY INDEX – BERING SEA SHELF BOTTOM TRAWL

- Southeastward shift in center of gravity
- Small changes in time series from previous years
- Overall drop in abundance (VAST -8.9% from 2021)
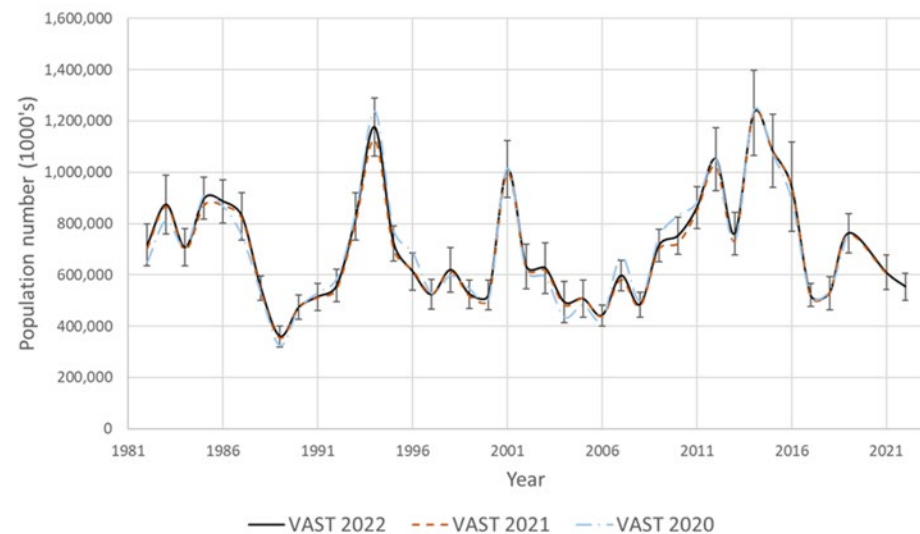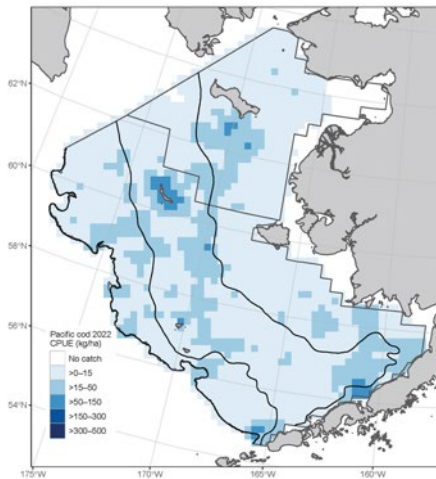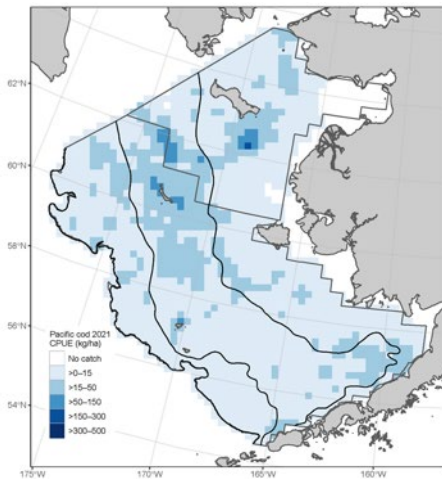
MODEL FITS

- Exploration of the four individual models and their fits can be found at the link provided

- Model fits and results were nearly identical between the Thompson and New Series models

- Largest difference was the fit to the age composition data with a degraded fit due to the removal of the post-2007 aging bias

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https://afsc-assessments.github.io/EBS_PCOD/2022_ASSESSMENT/NOVEMBER_MODELS/
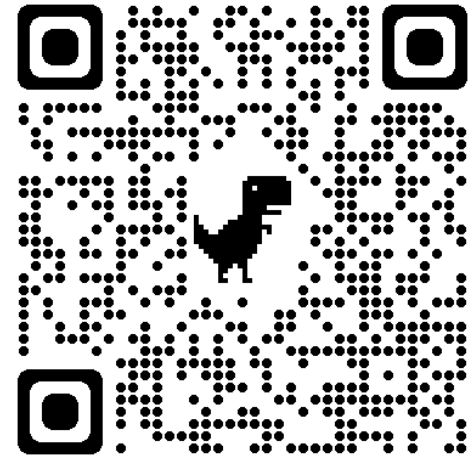
Total Spawning Stock Biomass

- Spawning biomass slightly higher in early part for Thompson Series
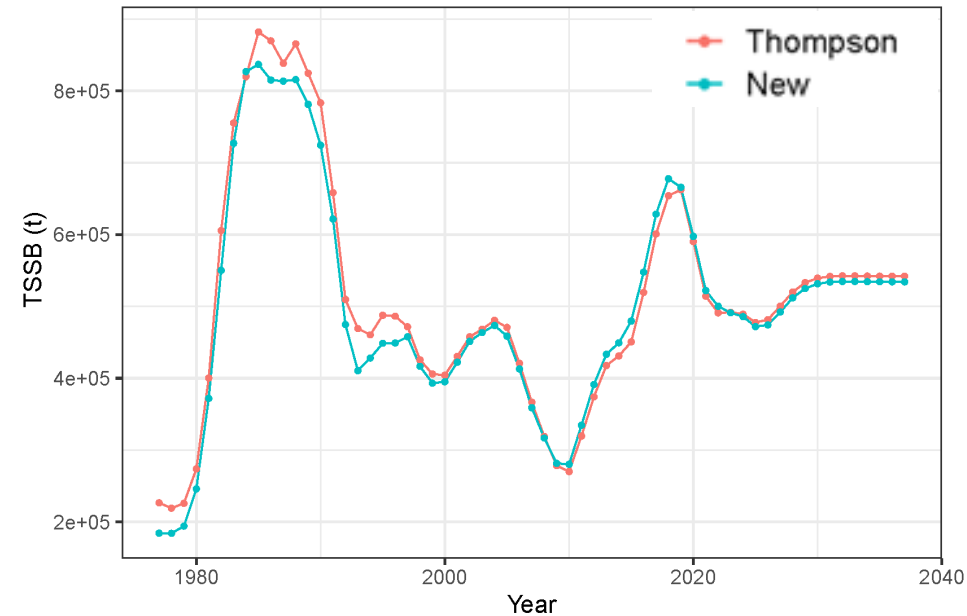
- Higher variability in fishing mortality in Thompson Series

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NEW SERIES RESULTS – FEMALE SPAWNING BIOMASS

- All four models show reduction from 2018 high point.

- Model 22.4 with CPUE index indicates higher SSB earlier in the time series and lower in most recent
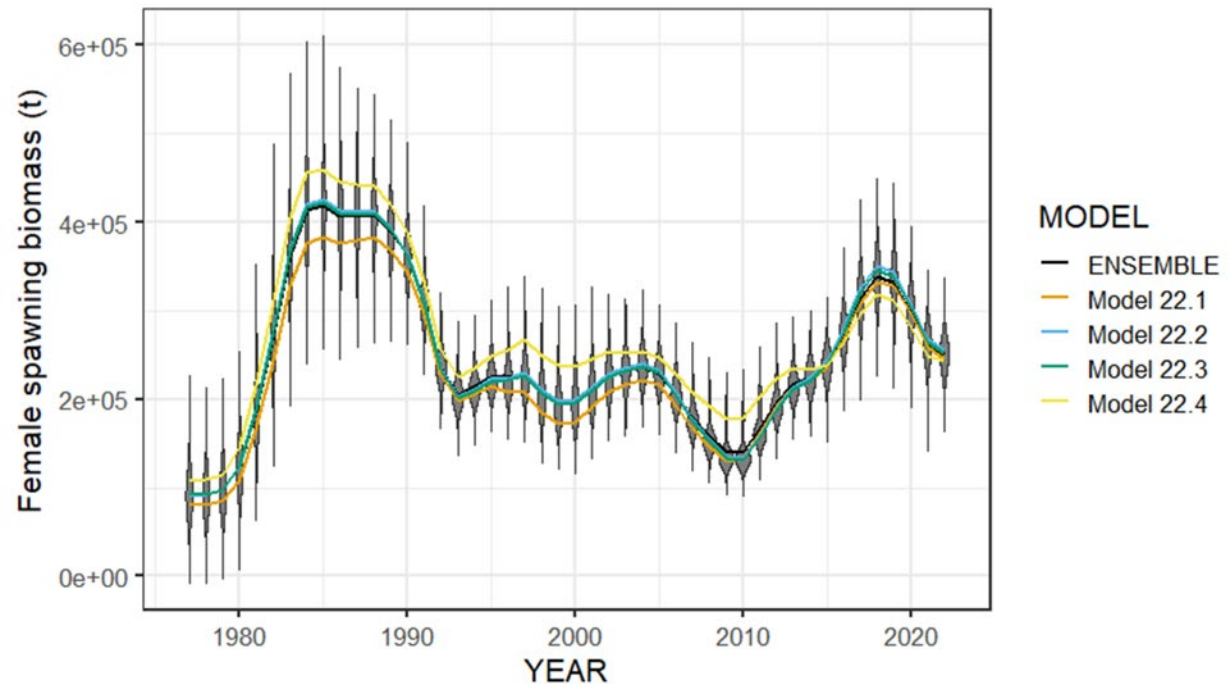
- New model(s): yes; change from base: yes; risk table (1,1,1,1)

- Team agreed with author's recommendation of using the New Series ensemble
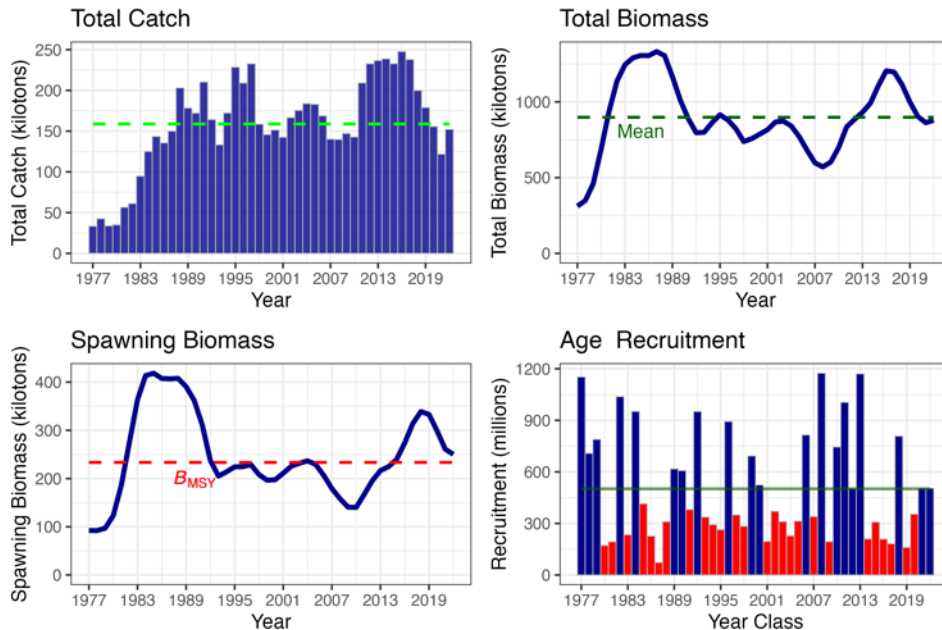
Quantity	Last asmt.	This asmt.	Change
M	0.34	0.34	0%
2022 Tier	3b		
2023 Tier	3b	3b	
2022 age+ biomass	879,978		-4%
2023 age+ biomass	848,615	844,578	-0.5%
2022 spawning biomass	259,789		-5%
2023 spawning biomass	254,585	245,594	-4%
B_0	686,761	668,477	-3%
2023 F_{OFL}	0.380	0.360	-5%
2023 F_{ABC}	0.310	0.290	-6%
2022 OFL	183,012		-6%
2023 OFL	180,909	172,495	-5%
2022 ABC	153,383		-6%
2023 ABC	151,709	144,834	-5%

Total Catch

Total Biomass

Spawning Biomass

Age Recruitment

CHAPTER 2A:
AI PACIFIC COD

- New model(s): yes; change from base: no; risk table (1,2,2,1)

- 2022 AI bottom trawl survey
  - -37% from 2018
  - lowest in time series
- Development of two new age-structured models
  - Not recommended for management by author due to positive retrospective bias
    - Lack of survey in 2020 and potential change in productivity in AI may be cause of bias

CHAPTER 2A:
AI PACIFIC COD

- New model(s): yes; change from base: no; risk table (1,2,2,1)

- 2022 AI bottom trawl survey

  - -37% from 2018

  - lowest in time series

- Development of two new age-structured models

  - Not recommended for management by author due to positive retrospective bias

    - Lack of survey in 2020 and potential change in productivity in AI may be cause of bias

CHAPTER 2A:
AI PACIFIC COD

- New model(s): yes; change from base: no; risk table (1,2,2,1)

- Team agreed with authors' recommendation of using Tier 5 random effects model
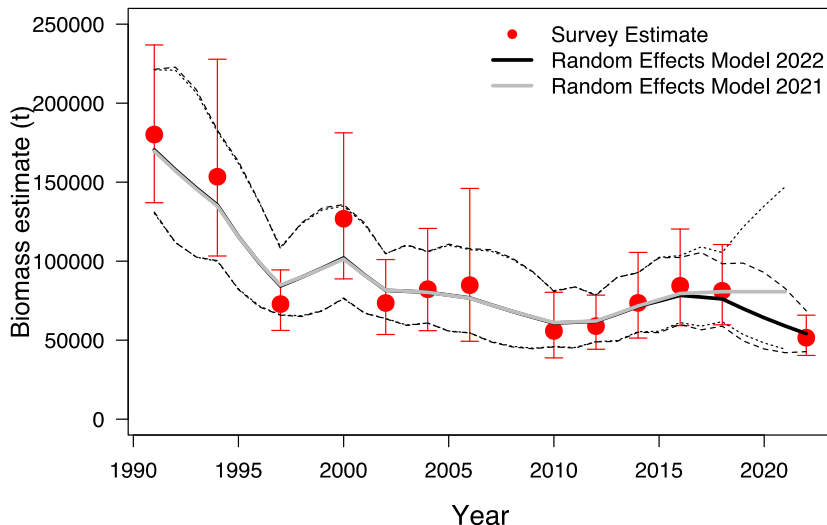
Quantity	Last asmt.	This asmt.	Change
M	0.34	0.34	0
2022 tier	5		
2023 tier	5	5	
Biomass	80,700	54,165	-49%
2023 F_{OFL}	0.340	0.340	0%
2023 F_{ABC}	0.255	0.255	0%
2022 OFL	27,400		-33%
2023 OFL	27,400	18,416	-33%
2022 ABC	20,600		-33%
2023 ABC	20,600	13,812	-33%

FLATFISH SUMMARY

Stock	Tier	2023 ABC (t)	2023 OFL (t)	Change from 2022 ABC
Yellowfin sole	1a	378,499	404,882	7%
Greenland turbot	3a	3,722*(6%)	4,645	-43%
Arrowtooth flounder	3a	83,852	98,787	4%
Kamchatka flounder	3a	7,579	8,946	-18%
Northern rock sole	1a	121,719*(23%)	166,034	-41%
Flathead sole (partial)	3a	65,244	79,256	2%
Alaska plaice (partial)	3a	33,946	40,823	4%
Other flatfish (none)	5	17,189	22,919	0%

*xx% Reduced from maximum permissible ABC
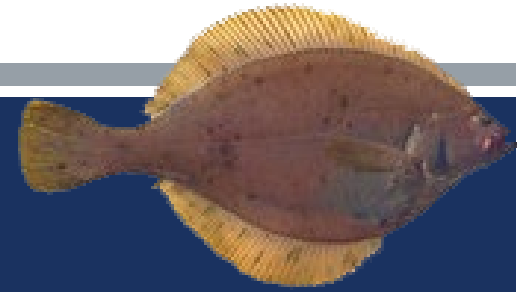
- New model(s): yes; change from base: yes; risk table (1,1,1,1)

  - Increase in survey biomass from 2021

  - Large 2017 year class

25% increase since 2021
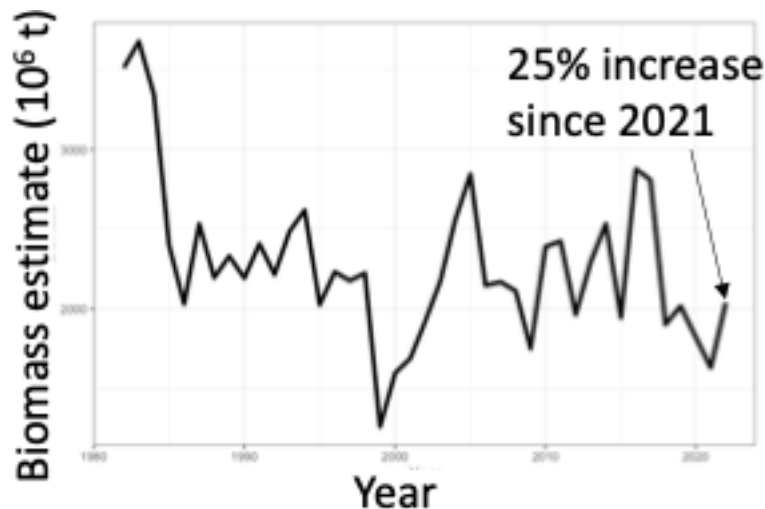
Survey age comps indicate very strong 2017 year class.

46
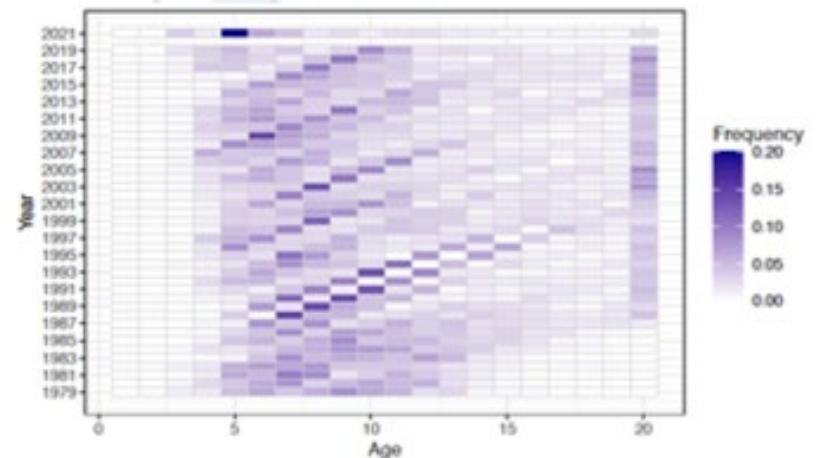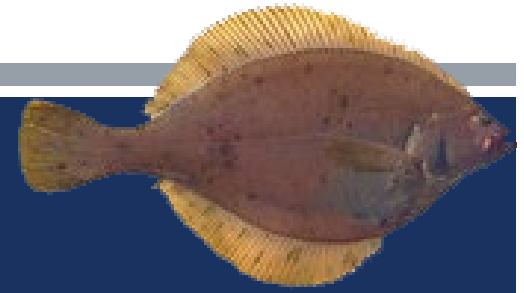
- New model(s): yes; change from base: yes; risk table (1,1,1,1)

- Sharp increase in total biomass

- Gradual projected increase in SSB

Total Catch
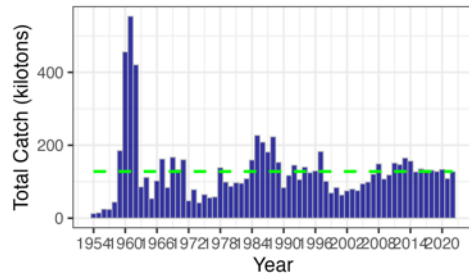
Total Biomass
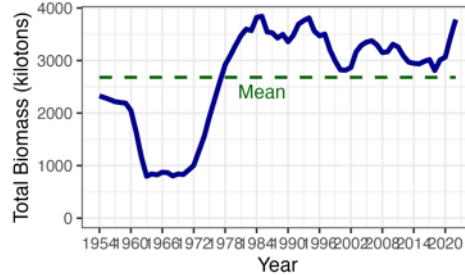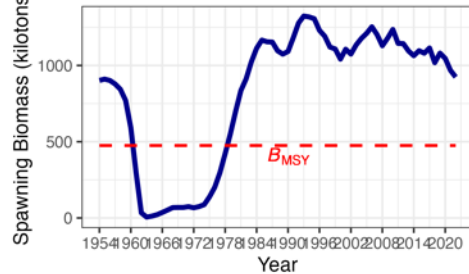
Spawning Biomass

Age Recruitment
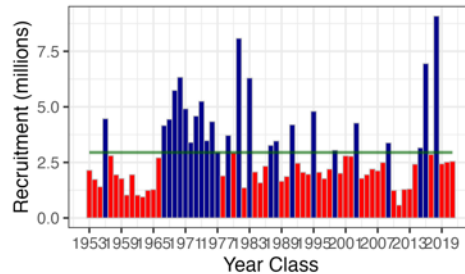
Quantity	Last asmt.	This asmt.	Change
M	0.12/0.135	0.12/0.125	
2022 Tier	1a		
2023 Tier	1a	1a	
2022 age+ biomass	2,479,370		34%
2023 age+ biomass	2,284,820	3,321,640	45%
2022 spawning biomass	857,101		3%
2023 spawning biomass	727,101	885,444	22%
B_0	1,489,190	1,407,000	-6%
B_{msy}	495,904	475,199	-4%
2023 F_{OFL}	0.152	0.122	-20%
2023 F_{ABC}	0.143	0.114	-20%
2022 OFL	377,071		7%
2023 OFL	347,483	404,882	17%
2022 ABC	354,014		7%
2023 ABC	326,235	378,499	16%

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CHAPTER 5
GREENLAND TURBOT

- New model(s): yes; change from base: yes; risk table (2,2,1,1)

- AFSC longline has been relatively flat in recent years with small decline in 2022

- EBS shelf survey biomass declined by 33% in 2021 and 26% in 2022

- Minor changes made in assessment model
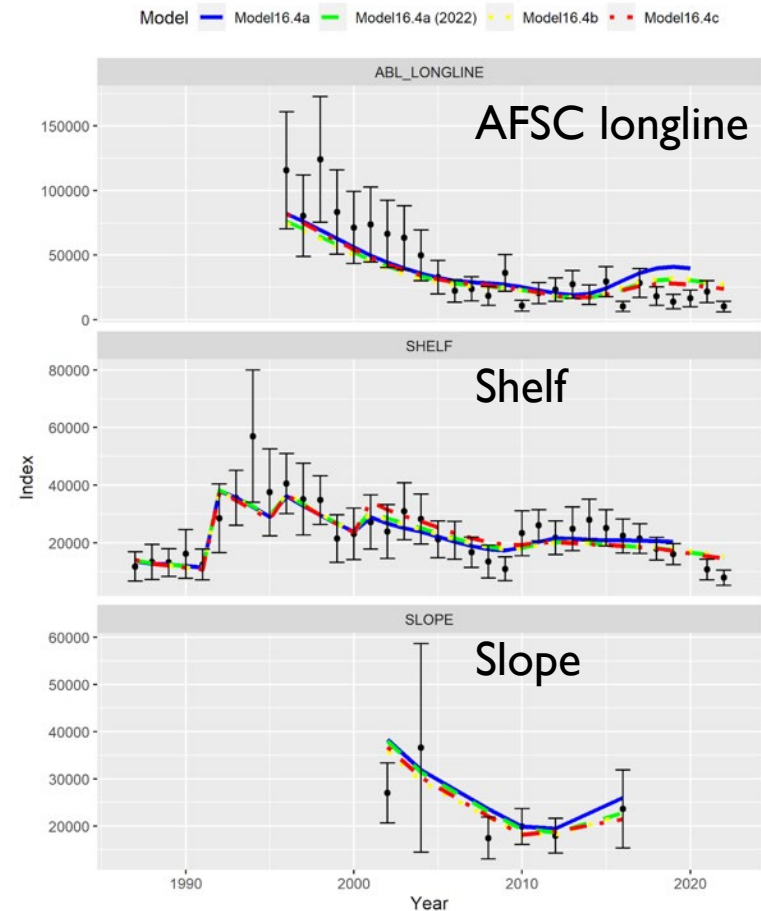
- New model(s): yes; change from base: yes; risk table (2,2,1,1)

- EBS shelf survey is an indicator for young Greenland turbot

- Less smaller, younger fish in recent years

- Longline fishery not actively fishing for GT - no length data in 2021 and 2022
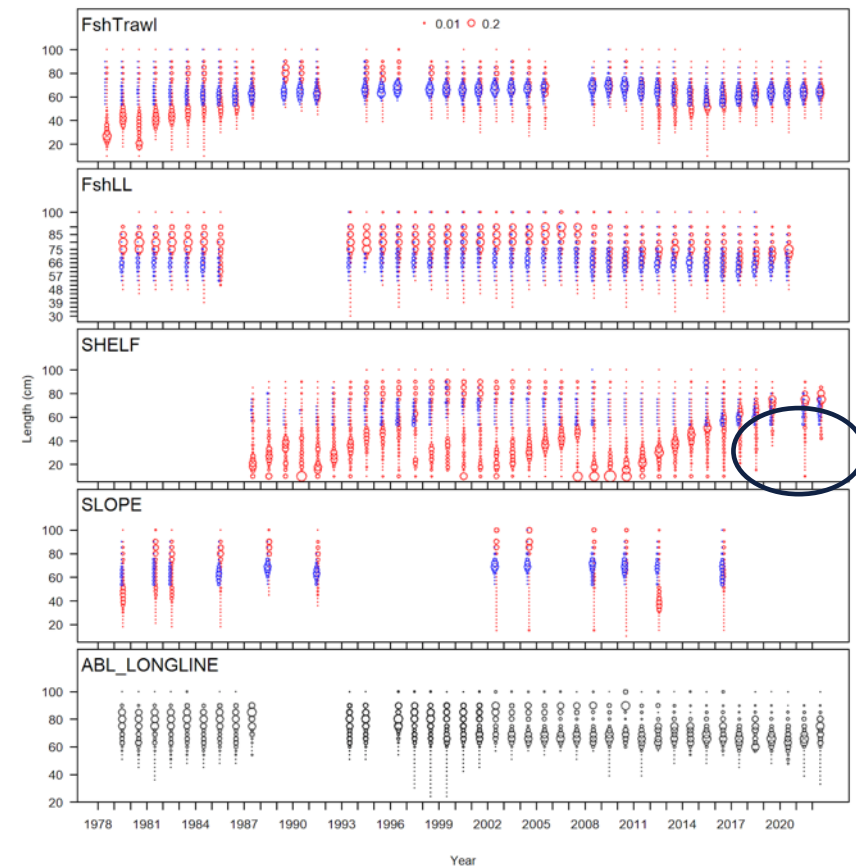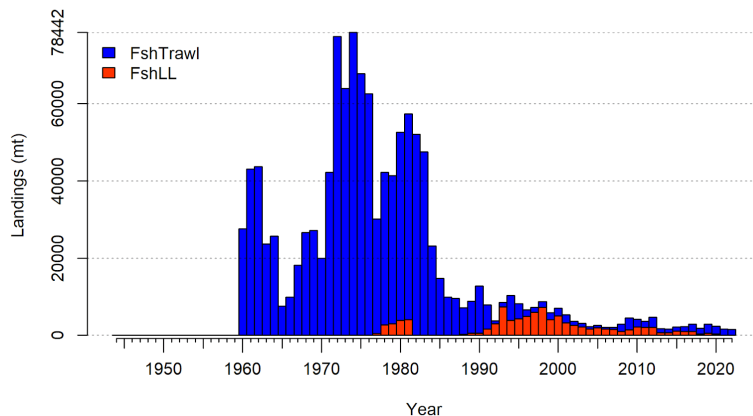
CHAPTER 5
GREENLAND TURBOT

- New model(s): yes; change from base: yes; risk table (2,2,1,1)

- Team recommended 6% reduction from maximum permissible ABC due to uncertainty on size at maturity
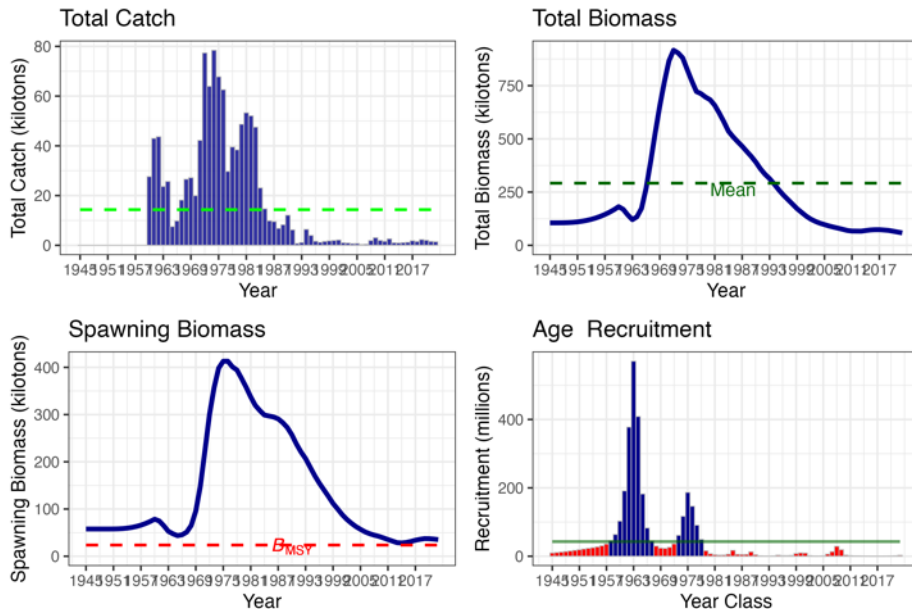
Quantity	Last asmt.	This asmt.	Change
M	0.112	0.112	0%
2022 Tier	3a		
2023 Tier	3a	3a	
2022 age+ biomass	84,341		-36%
2023 age+ biomass	80,404	53,907	-33%
2022 spawning biomass	50,361		-33%
2023 spawning biomass	47,376	33,554	-29%
B_0	89,054	67,647	-32%
2023 F_{OFL}	0.220	0.200	-9%
2023 F_{ABC}	0.180	0.170	-6%
2022 OFL	7,687		-40%
2023 OFL	6,698	4,645	-31%
2022 ABC	6,572		-43%
2023 ABC	5,724	3,722	-35%

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CHAPTER 6
ARROWTOOTH FLOUNDER

- New model(s): no; change from base: no; risk table (1,1,1,1)

- 2021 catch was 11% of ABC, in recent years has been ~10-15%

- 2022 EBS bottom trawl survey up 14% from 2021

- 2022 AI bottom trawl survey slightly down 3% from 2018

- Overall, surveys mixed, population levels are stable

Bottom trawl survey (BTS) biomass (t) by region
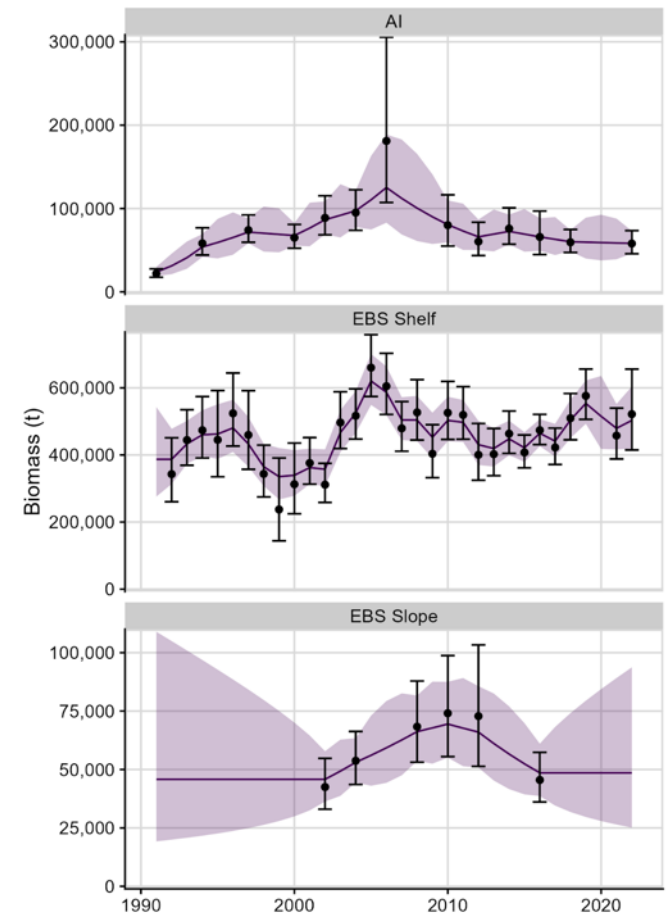
CHAPTER 6
ARROWTOOTH FLOUNDER

- New model(s): no; change from base: no; risk table (1,1,1,1)

- Team accepted authors recommended model

Total Catch
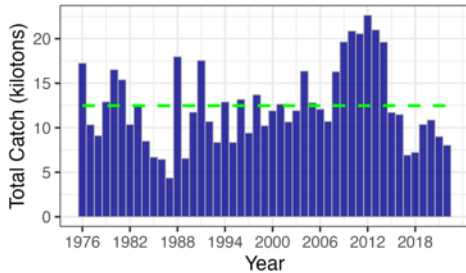
Total Biomass
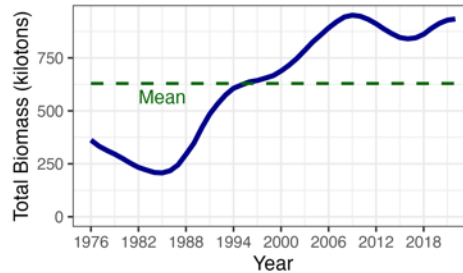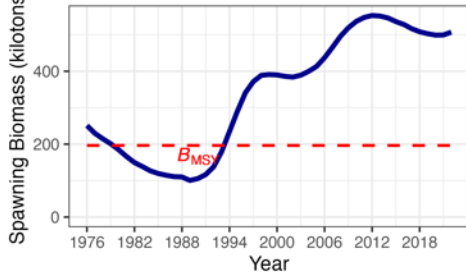
Spawning Biomass

Age Recruitment
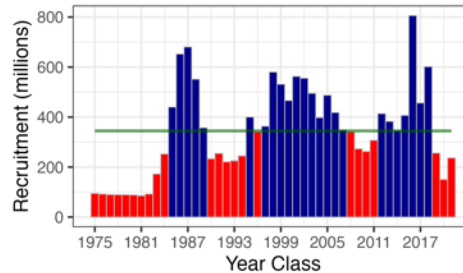
Quantity	Last asmt.	This asmt.	Change
M	0.2/0.35	0.2/0.35	0%
2022 Tier	3a		
2023 Tier	3a	3a	
2022 age+ biomass	921,690		1%
2023 age+ biomass	914,915	929,274	2%
2022 spawning biomass	509,672		1%
2023 spawning biomass	528,725	514,577	-3%
B_0	558,826	561,219	0%
2023 F_{OFL}	0.160	0.174	9%
2023 F_{ABC}	0.135	0.146	8%
2022 OFL	94,445		5%
2023 OFL	97,944	98,787	1%
2022 ABC	80,389		4%
2023 ABC	83,389	83,852	1%

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CHAPTER 7
KAMCHATKA FLOUNDER

- New model(s): no; change from base: no; risk table (2,1,1,1)

- EBS shelf survey declined by 26% in 2021 and 10% in 2022

- AI survey declined by 42% in 2022 from 2018

- Although improved over last year model continues to overestimate biomass
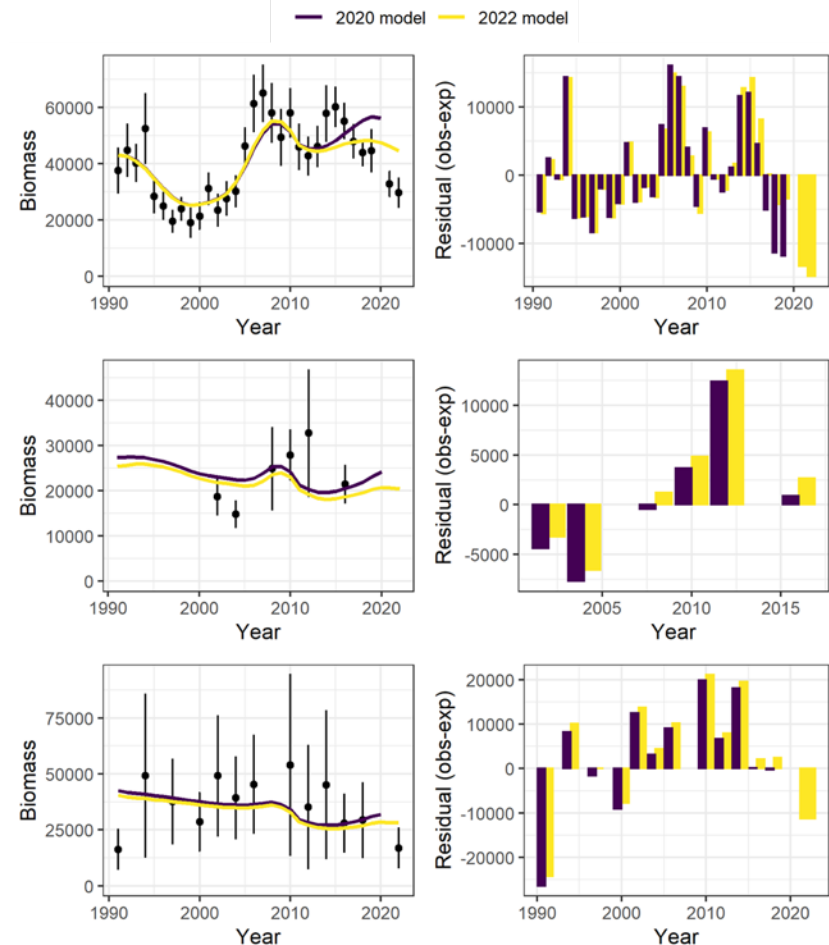
CHAPTER 7
KAMCHATKA FLOUNDER

- New model(s): no; change from base: no; risk table (2,1,1,1)

- Team agreed with author's recommendation

Total Catch

Total Biomass

Spawning Biomass

Age Recruitment
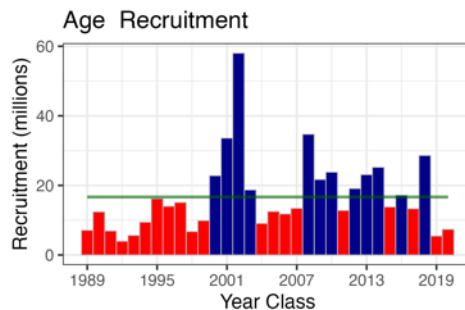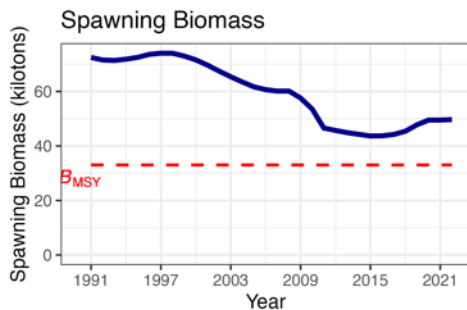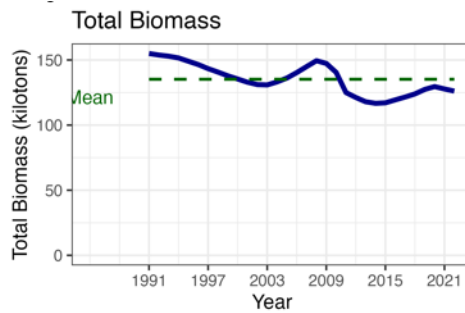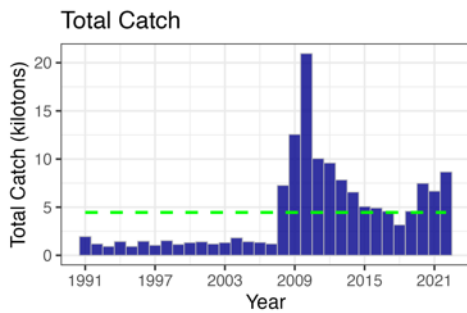
Quantity	Last asmt.	This asmt.	Change
M	0.11	0.11	0%
2022 Tier	3a		
2023 Tier	3a	3a	
2022 age+ biomass	143,983		-15%
2023 age+ biomass	142,762	121,977	-15%
2022 spawning biomass	55,701		-14%
2023 spawning biomass	57,082	47,877	-16%
B_0	101,376	94,370	-7%
2023 F_{OFL}	0.108	0.103	-5%
2023 F_{ABC}	0.090	0.086	-4%
2022 OFL	10,903		-18%
2023 OFL	11,115	8,946	-20%
2022 ABC	9,214		-18%
2023 ABC	9,393	7,579	-19%

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CHAPTER 8
NORTHERN ROCKSOLE

- New model(s): yes; change from base: no - but ; risk table (3,1,1,1)

- Declining biomass 2011 - 2019

- Seeing increases in recent years:
  - 6% increase in 2021
  - 25% increase in 2022

- Low catches in recent years
  - 16k t 2022; 40k t = 10 yr avg
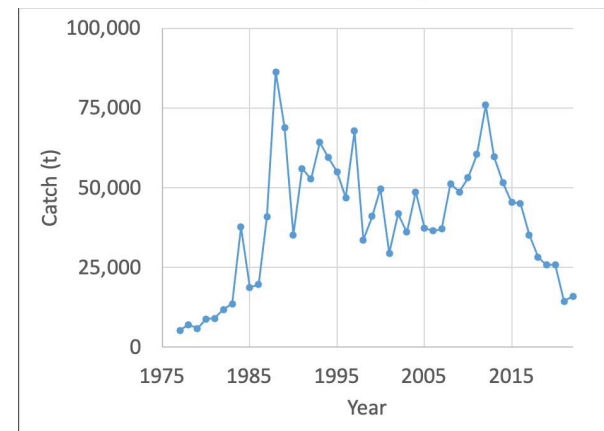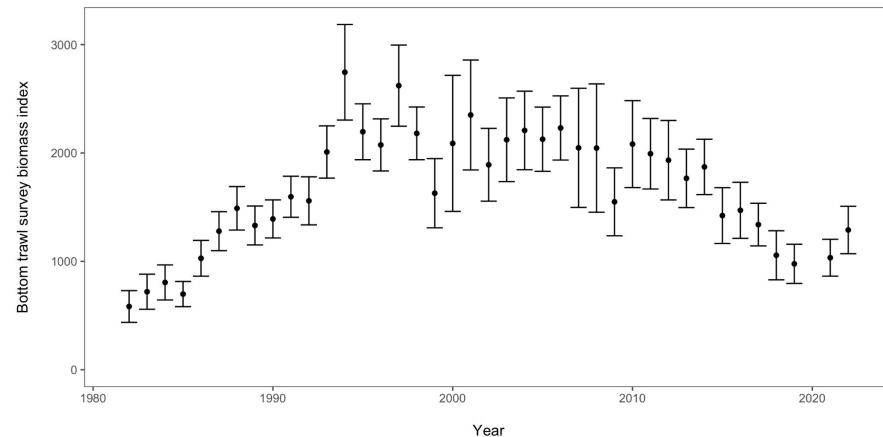
CHAPTER 8
NORTHERN ROCKSOLE

- Alternative sensitivity models provided in Appendices

- Alternative models provide improved fits to the survey indices

- Both models suggest much lower ABCs with OFLs below base model ABC.

- Author recommended reduction in maximum permissible ABC to reduce probability of exceeding the 'true' but unknown OFL
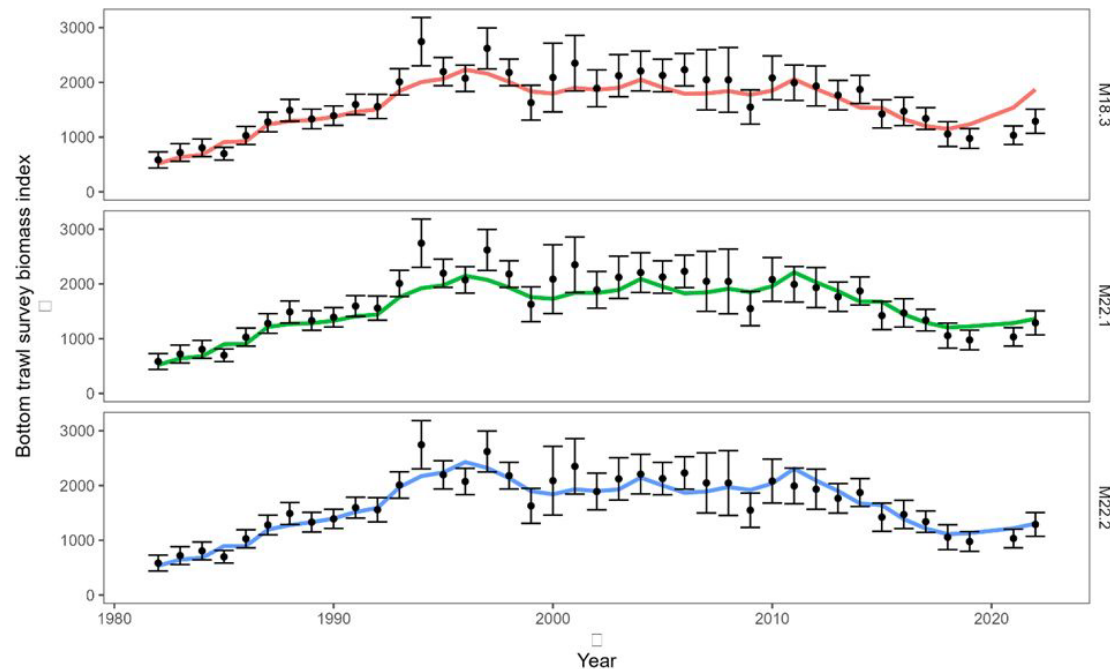
CHAPTER 8
NORTHERN ROCKSOLE

- New model(s): yes; change from base: no - but ; risk table (3,1,1,1)

- Team agreed with author in reducing the ABC to the lowest alternative OFL.
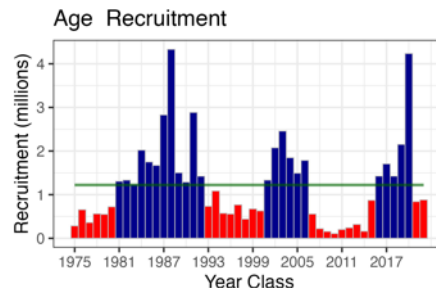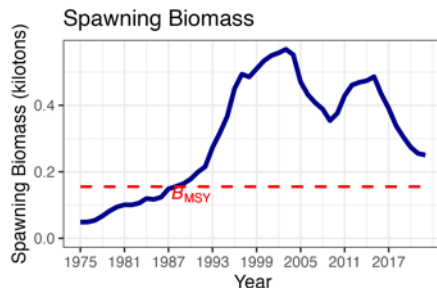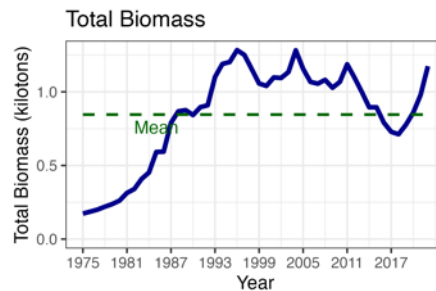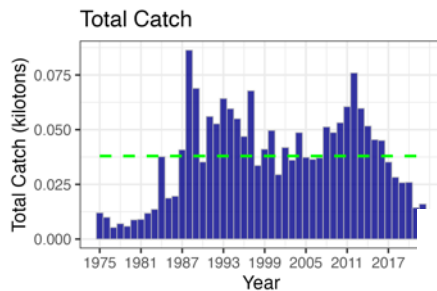
Quantity	Last asmt.	This asmt.	Change
M	0.15/0.17	0.15/0.19	0%
2022 Tier	1a		
2023 Tier	1a	1a	
2022 age+ biomass	1,363,592		-31%
2023 age+ biomass	1,787,395	941,359	-47%
2022 spawning biomass	287,600		-9%
2023 spawning biomass	320,399	260,887	-19%
B_0	476,820	447,795	-6%
B_{msy}	158,972	155,293	-2%
2023 F_{OFL}	0.157	0.152	-3%
2023 F_{ABC}	0.152	0.129	-15%
2022 OFL	214,084		-22%
2023 OFL	280,621	166,034	-41%
2022 ABC	206,896		-41%
2023 ABC	271,199	121,719	-55%

Total Catch

Total Biomass

Spawning Biomass

Age Recruitment

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ROCKFISH SUMMARY
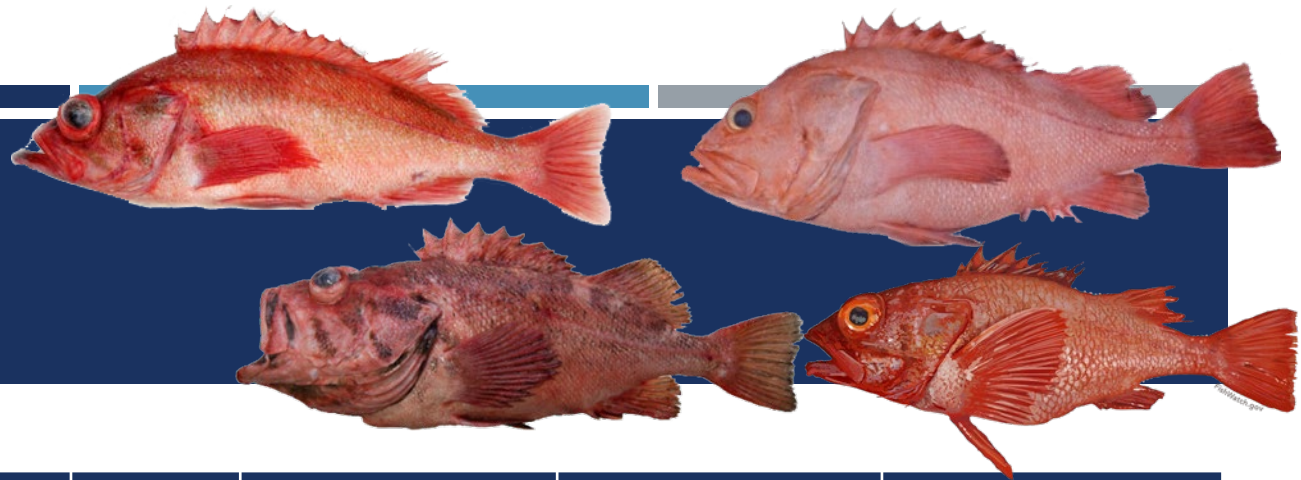
Stock	Tier	2023 ABC (t)	2023 OFL (t)	Change from 2022 ABC
Pacific ocean perch	3a	42,038	50,133	18%
Northern rockfish (Partial)	3a	18,687	22,776	-3%
Blackspotted/rougheye	**3b**/5	**525*****(12% AI)**	703	3%
Shortraker rockfish	5	530	706	-2%
Other rockfish	5	1,260	1,680	-4%

*xx% Reduced from maximum permissible ABC

- New model(s): yes; change from base: no; risk table (2,1,1,1)

- 2022 AI survey abundance estimate is largest on record (again)

- Still tension between survey biomass estimates and age/length composition data

  - Focus of discussion during 2022 CIE review, but no obvious answers

  - Alternative model explored using survey abundance instead of biomass did not improve model
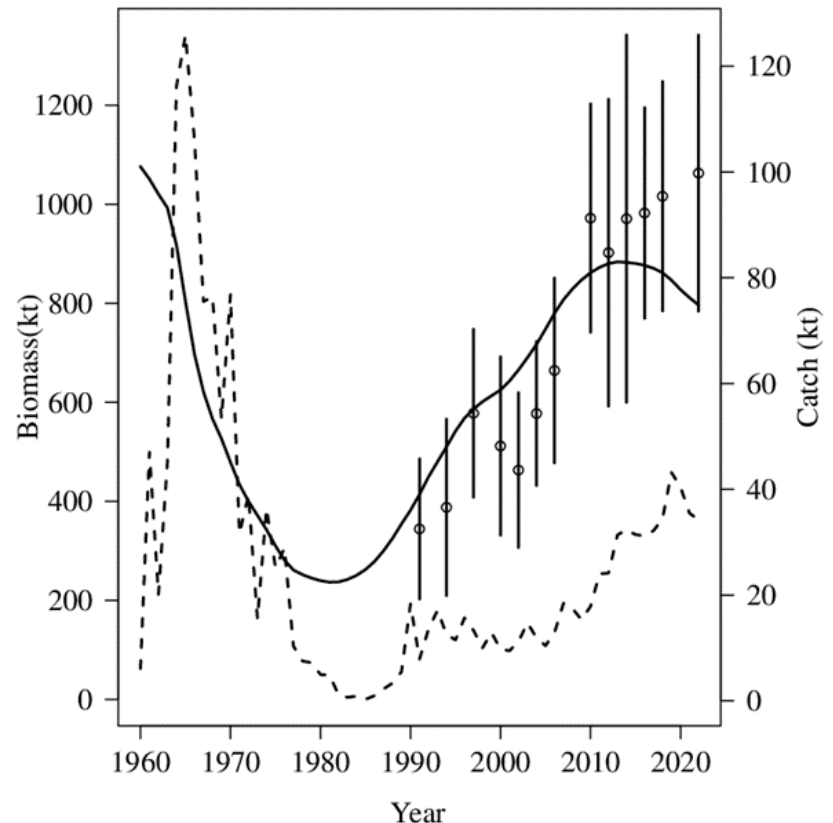
CHAPTER 12
PACIFIC OCEAN PERCH

- New model(s): yes; change from base: no; risk (2,1,1,1)

- Team agreed with author's recommended model

Quantity	Last asmt.	This asmt.	Change
M	0.056	0.056	0%
2022 Tier	3a		
2023 Tier	3a	3a	
2022 age+ biomass	738,710		20%
2023 age+ biomass	724,085	888,722	23%
2022 spawning biomass	299,232		20%
2023 spawning biomass	288,437	359,074	24%
B_0	584,747	652,626	10%
2023 F_{OFL}	0.089	0.089	0%
2023 F_{ABC}	0.073	0.074	1%
2022 OFL	42,605		18%
2023 OFL	40,977	50,133	22%
2022 ABC	35,688		18%
2023 ABC	34,322	42,038	22%

60
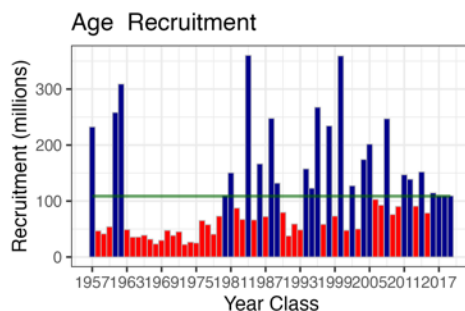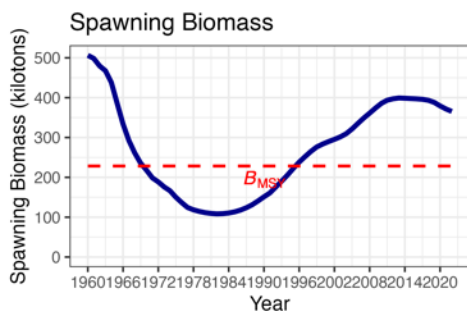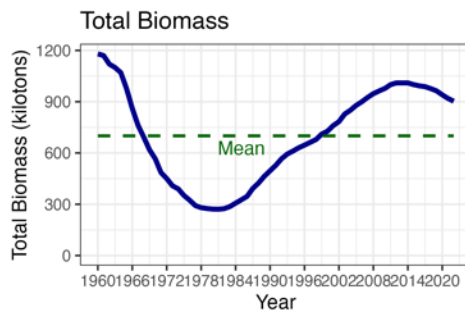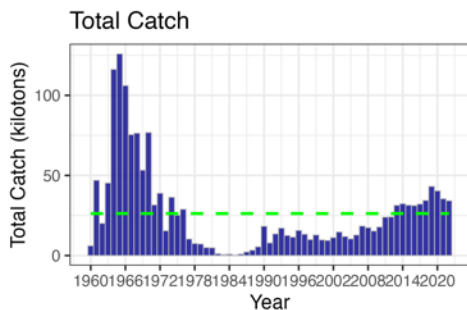
CHAPTER 14
BLACKSPOTTED & ROUGHEYE ROCKFISH

- Aleutian Islands and Bering Sea component split

  - Tier 3 model for Aleutian Islands section

  - Tier 5 RE model for Eastern Bering Sea section

- Issues of concern:

  - In AI model 2010 year class >6 times larger than the next largest cohort

  - Reduction from maximum permissible ABC

  - Spatial management concerns

- New model(s): yes; change from base: no - but; risk table (3,2,1,2)

- Stable or increasing recent trend in survey biomass, but high degree of uncertainty

- Decrease in recent catch

- New model(s): yes; change from base: no - but; risk table (3,2,1,2)

- New age/length composition data show continued recent catch of young/small fish (2019 – 2021 fishery ages, 2022 survey lengths)

AI survey
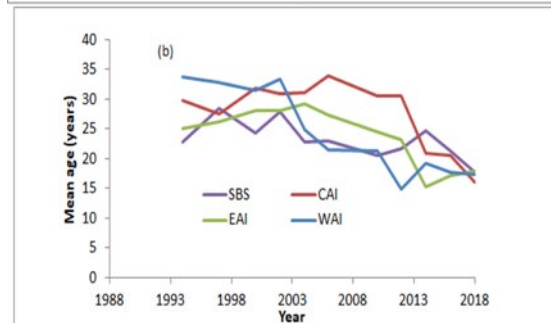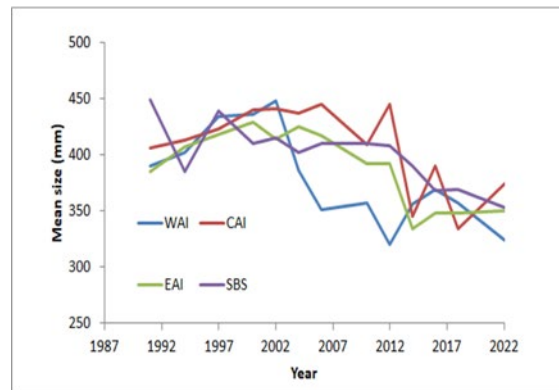
BSAI fishery
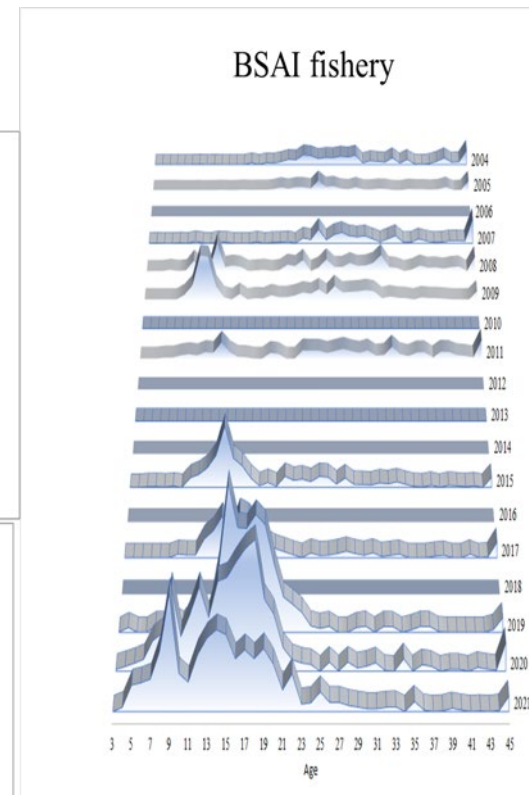
CHAPTER 14
AI BLACKSPOTTED & ROUGHEYE ROCKFISH

- The 2010 year class is 21.25 million (CV of 0.58), which is > 6 times the next largest year class

- This year class contributes 25% of the beginning year 2022 total biomass
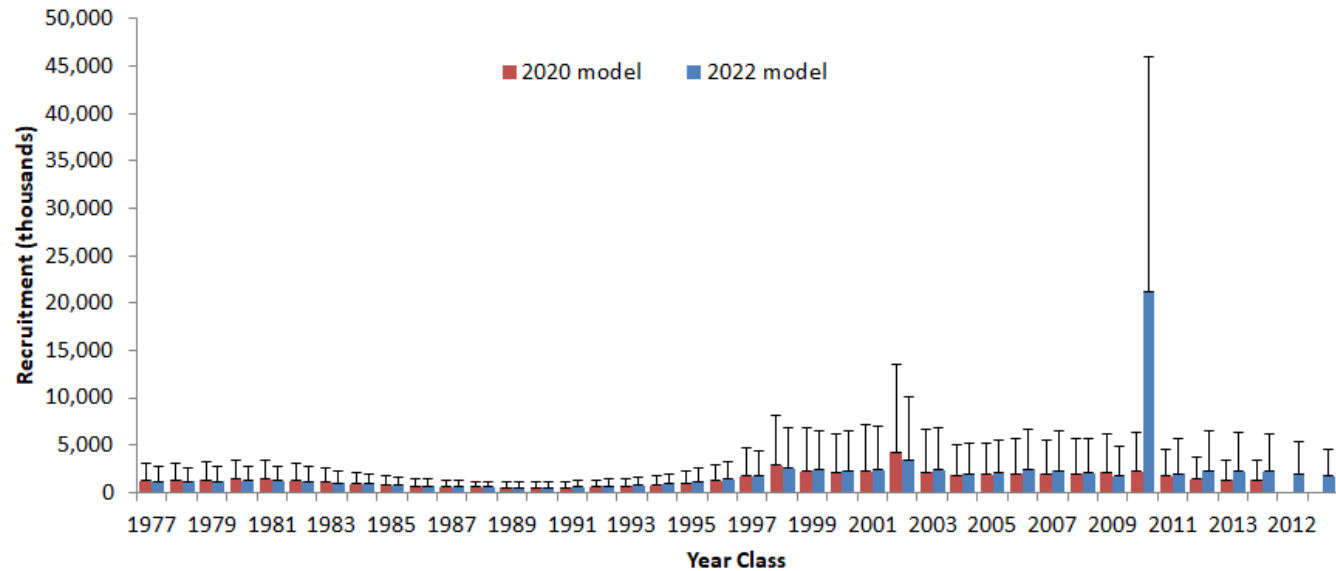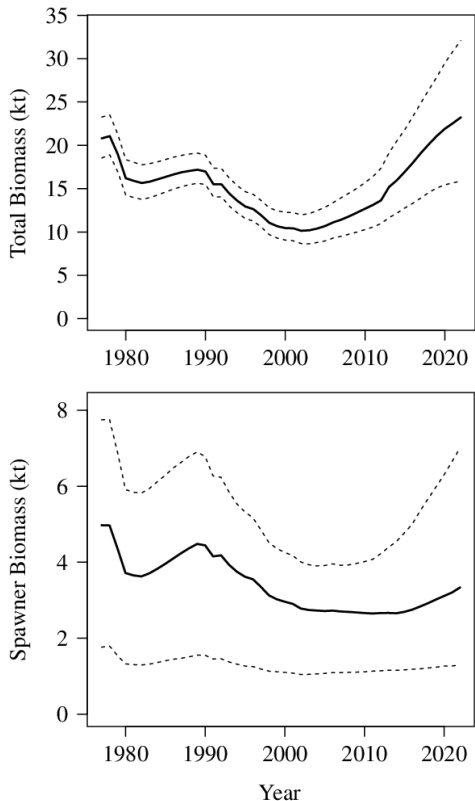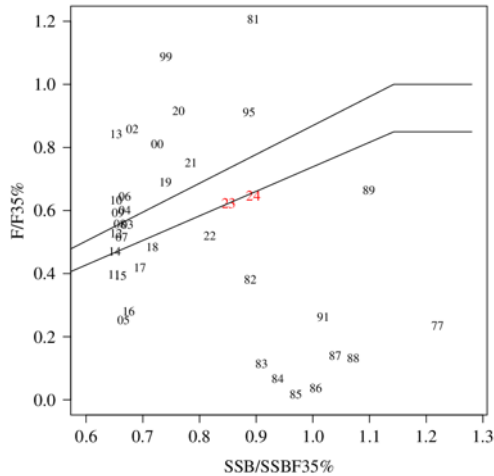
Unadjusted estimate of 2010 year class
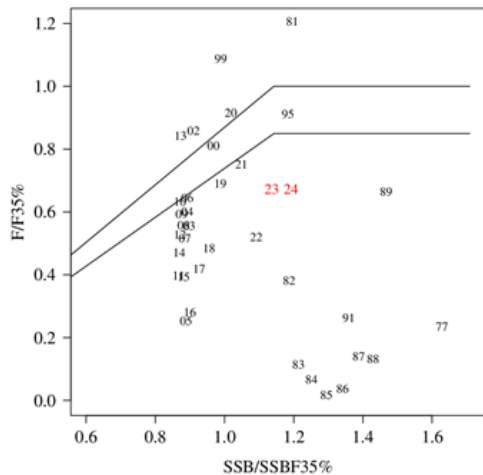
Adjust estimate of 2010 year class to next largest estimated recruitment (2002 Year class; 3.43 million)

- Fishery performance considerations: Level 2: Substantially increased concerns.

  - Fishery CPUE in the WAI subarea are larger than would be expected based on the spatial distribution of survey biomass estimates. Also, the WAI catches have consistently exceeded the MSSC, and these overages have increased over time. The catches in the WAI/CAI subarea have also exceeded the subarea ABC from 2019 – 2022, and the BSAI ABC in 2021.

WAI catches and "Maximum subarea species catch"
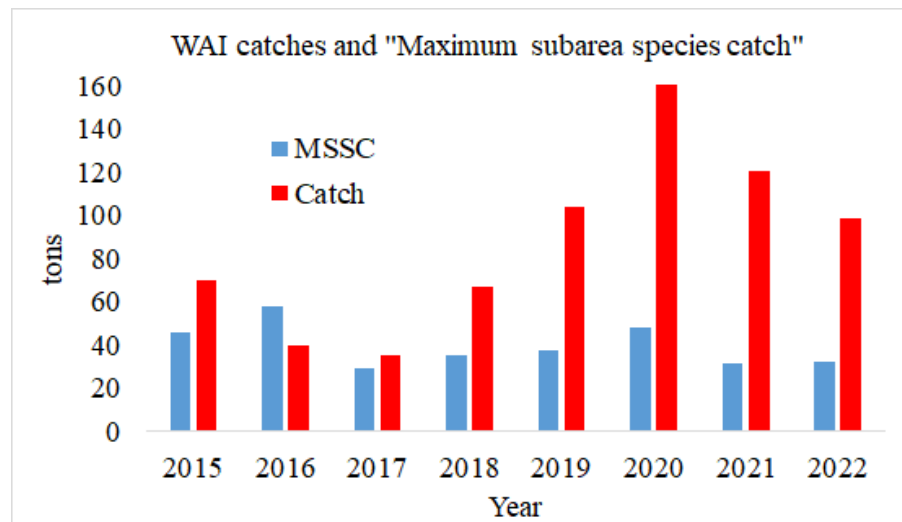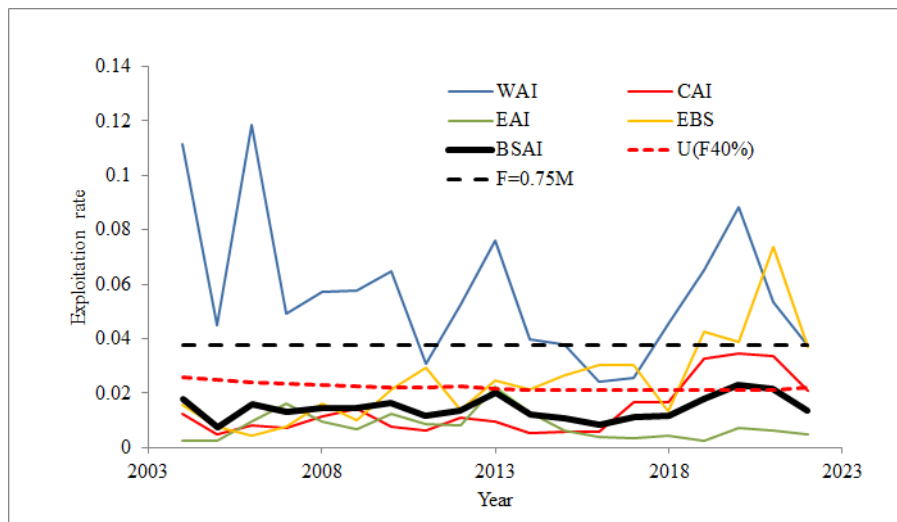
CHAPTER 14
AI BLACKSPOTTED & ROUGHEYE ROCKFISH

- New model(s): yes; change from base: no - but; risk table (3,2,1,2)

- Team accepted the authors' recommendation

  - Adjusted 2010 recruitment to 2002 value for calculating reference points.

  - Reduction from maximum permissible ABC to 2022 ABC to stabilize ABC until there is more certainty on the 2010 year class.

Total Catch

Total Biomass

Spawning Biomass

Age Recruitment

- New model(s): yes; change from base: no - but; risk table (3,2,1,2)

Aleutian Islands

Quantity	Last asmt.	This asmt.	Change
M	0.049	0.05	0%
2022 Tier	3b		
2023 Tier	3a	3b	
2022 age+ biomass	17,774		34%
2023 age+ biomass	17,862	23,856	34%
2022 spawning biomass	3,468		0%
2023 spawning biomass	3,568	3,471	-3%
B_0	8,811	8,733	-1%
2023 F_{OFL}	0.039	0.040	3%
2023 F_{ABC}	0.033	0.030	-9%
2022 OFL	531		18%
2023 OFL	548	626	14%
2022 ABC	453		3%
2023 ABC	467	467	0%

Bering sea

Quantity	Last asmt.	This asmt.	Change
M	0.049	0.05	2%
2022 tier	5		
2023 tier	5	5	
Biomass	1,371	1,544	11%
2023 F_{OFL}	0.049	0.050	2%
2023 F_{ABC}	0.037	0.037	0%
2022 OFL	67		15%
2023 OFL	67	77	15%
2022 ABC	50		16%
2023 ABC	50	58	16%

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CHAPTER 14
BLACKSPOTTED & ROUGHEYE ROCKFISH

Spatial apportionment
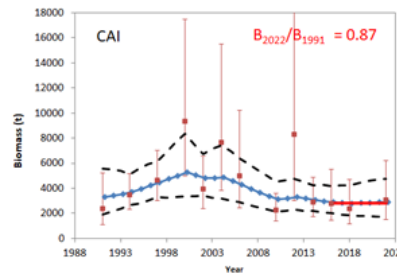
	Area				
	WAI	CAI	EAI	SBS	EBS slope
Smoothed biomass	1,671	2,887	8,282	534	1,010
percentage (within AI subarea)	13.0%	22.5%	64.5%		

MSSCs

	Area				
Year	WAI MSSC	CAI MSSC	WAI/CAI ABC	EAI/EBS ABC	Total ABC
2023	61	105	166	359	525
2024	67	115	182	388	570

CHAPTER 15
SHORTRAKER ROCKFISH

- New model(s): yes; change from base: yes; risk table (1,1,1,1)

- Model change:

  - REMA

  - Added NMFS longline survey abundance index for shortraker in the EBS slope (no trawl survey since 2016)

- 2021 Catch: 380 t

  - 70% of ABC

- 2022 Biomass: 23,547 t

  - 2% decrease from 2020

Bottom trawl survey (BTS) biomass (t) by region

Longline survey (LLS) relative population weights (RPW)

- New model(s): yes; change from base: yes; risk table (1,1,1,1)

- Team agreed with author's recommendations
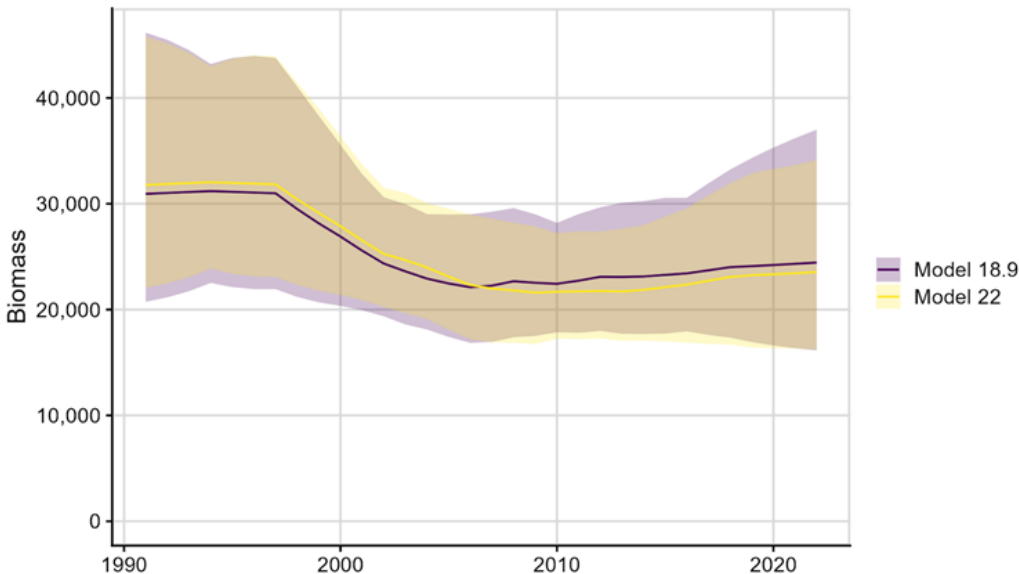
Quantity	Last asmt.	This asmt.	Change
M	0.03	0.03	0
2022 tier	5		
2023 tier	5	5	
Biomass	24,055	23,547	-2%
2023 F_{OFL}	0.030	0.030	0%
2023 F_{ABC}	0.023	0.023	0%
2022 OFL	722		-2%
2023 OFL	722	706	-2%
2022 ABC	541		-2%
2023 ABC	541	530	-2%

CHAPTER 16
OTHER ROCKFISH

- New model(s): yes; change from base: yes; risk table (1,1,1,1)

- SST: shortspine thornyhead (95% of complex)

- non-SST: dusky rockfish and ≥ 11 other species (5% of complex)

- Model change: Added NMFS longline survey abundance index for SST in the EBS slope (no trawl survey since 2016)

Quantity	Last asmt.	This asmt.	Change
M	0.03/0.09	0.03/0.09	0
2022 tier	5		
2023 tier	5	5	
Biomass	53,248	52,733	-1%
2023 F_{OFL}	0.03/0.09	0.03/0.09	0%
2023 F_{ABC}	0.0225/0.0675	0.0225/0.0675	0%
2022 OFL	1,751		-4%
2023 OFL	1,751	1,680	-4%
2022 ABC	1,313		-4%
2023 ABC	1,313	1,260	-4%

Exploitable biomass (t)

SST   non-SST

Catch (t)

SST   non-SST

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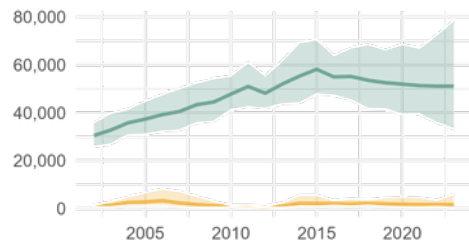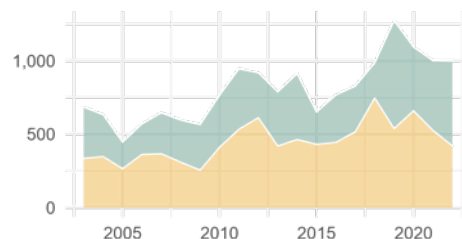
OTHER SUMMARY

Stock	Tier	2023 ABC (t)	2023 OFL (t)	Change from 2022 ABC
Atka mackerel	3a	98,588	118,787	26%
Skates (Partial)	3a/5	38,605	46,220	-4%
Sharks	6	**450*(13%)**	689	-13%
Octopus (Partial)	6	3,576	4,769	0%

*xx% Reduced from maximum permissible ABC

CHAPTER 17
ATKA MACKEREL

- New model(s): no; change from base: no; risk table (2,1,2,1)

- 89% increase in AI bottom trawl survey biomass

  - Increase across all AI regions
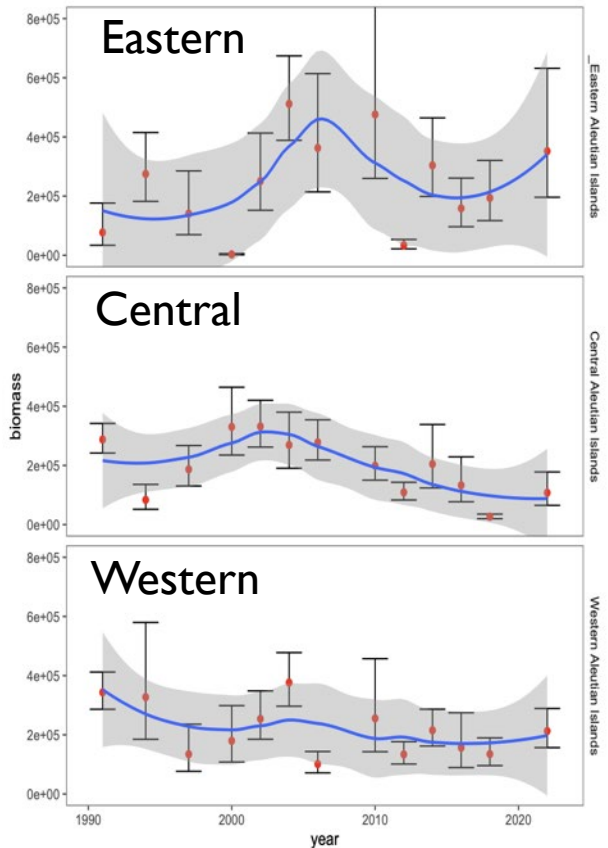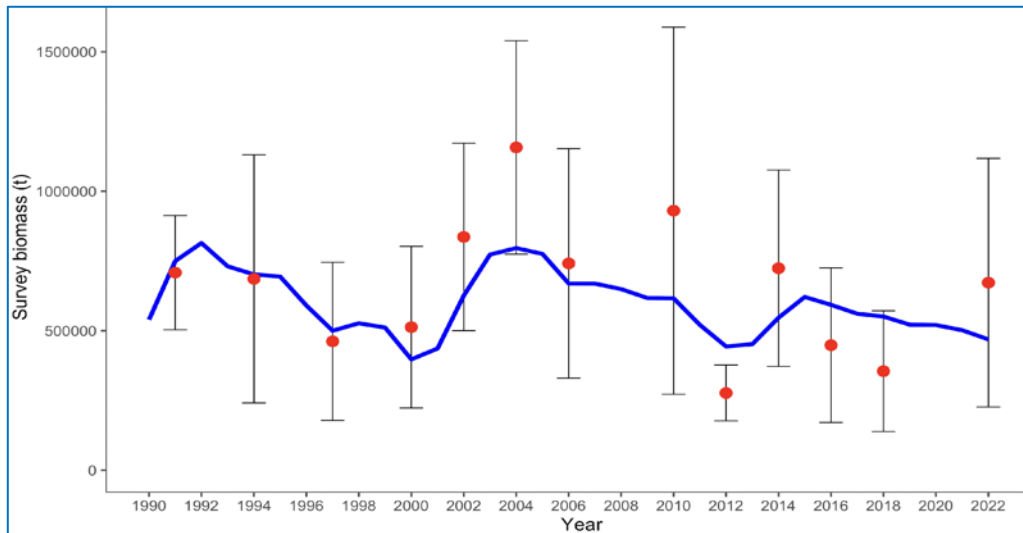
CHAPTER 17
ATKA MACKEREL

- New model(s): no; change from base: no; risk table (2,1,2,1)

- Team accepted the authors' recommendation

Quantity	Last asmt.	This asmt.	Change
M	0.3	0.3	0%
2022 Tier	3a		
2023 Tier	3a	3a	
2022 age+ biomass	554,490		11%
2023 age+ biomass	570,080	615,027	8%
2022 spawning biomass	109,360		12%
2023 spawning biomass	103,330	122,541	19%
B_0	278,670	280,456	1%
2023 F_{OFL}	0.650	0.760	17%
2023 F_{ABC}	0.540	0.610	13%
2022 OFL	91,870		29%
2023 OFL	84,440	118,787	41%
2022 ABC	78,510		26%
2023 ABC	71,990	98,588	37%

Total Catch

Total Biomass

Spawning Biomass

Age Recruitment
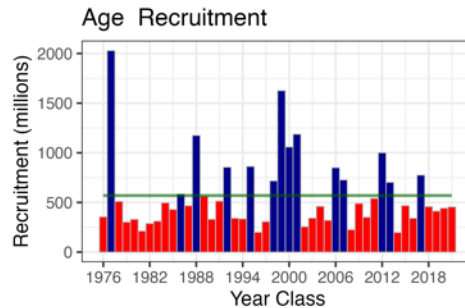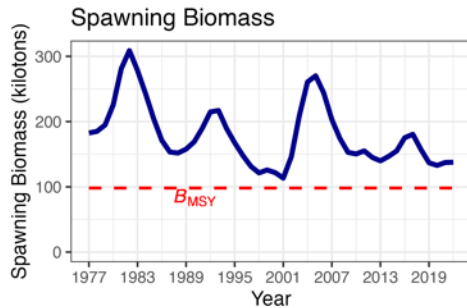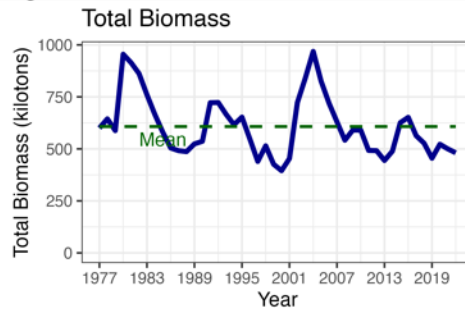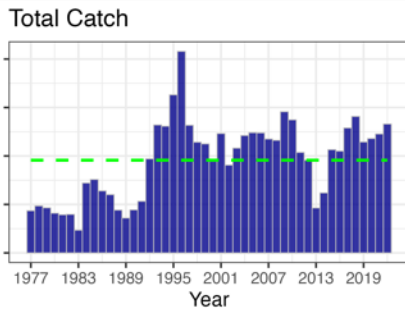
- Area apportionment based on a 4-survey weighted average.

CHAPTER 19 SHARKS

- New model(s): yes; change from base: no - but; risk table (3*,2,1,1)
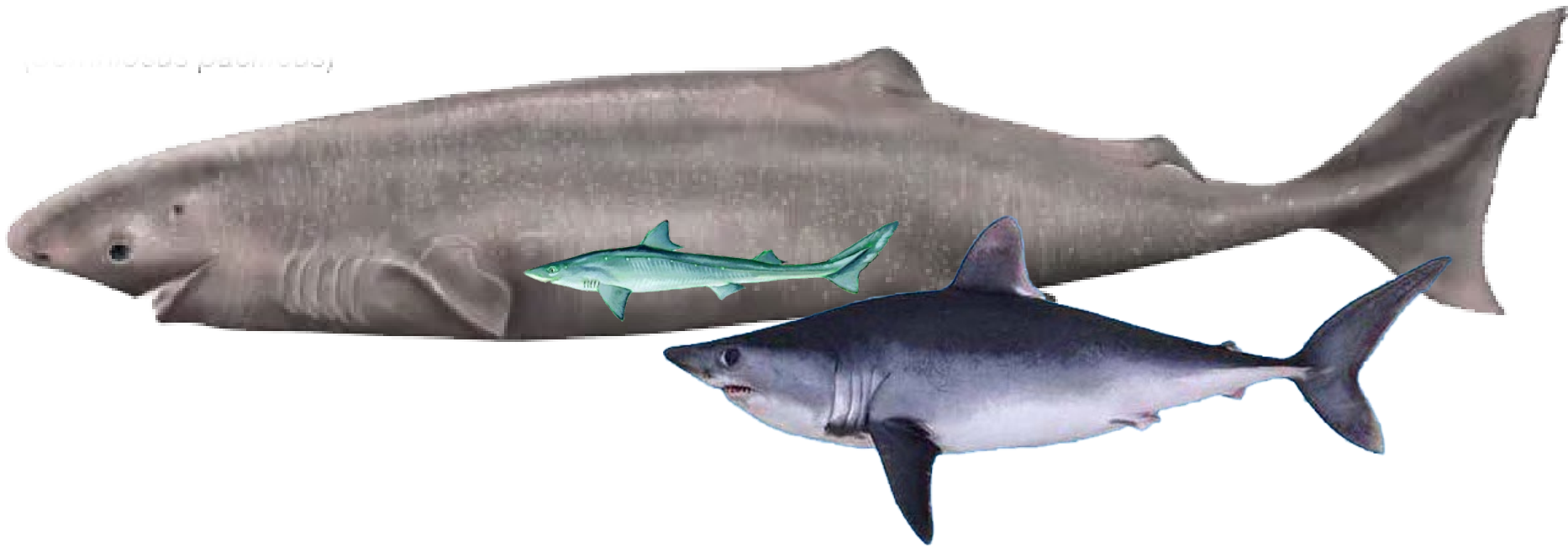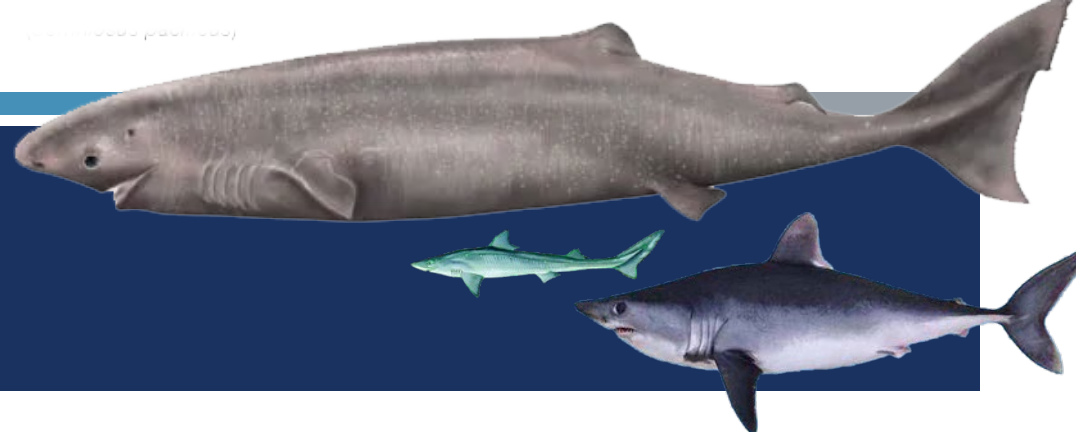
CHAPTER 19 SHARKS

- Combined SAFE document

- Separate FMP management advice

Two Primary Issues

1. Rare species with likely erroneous catch estimates

2. Improving assessment of Pacific sleeper shark

November 2022 Council Draft   *GOA Sharks*

19. Assessment of the Shark Stock Complex in the Bering Sea/Aleutian Islands and Gulf of Alaska

Cindy A. Tribuzio, Mary Elizabeth Matta, Katy B. Echave, Cara Rodgveller, Garrett Dunne and Keith Fuller

November 2022

EXECUTIVE SUMMARY

This document presents the assessment for the shark stock complex (Pacific spiny dogfish, Pacific sleeper shark, salmon shark and other/unidentified sharks) in both the Gulf of Alaska (GOA) and Bering Sea/Aleutian Islands (BSAI) Fishery Management Plan (FMP) areas. While advice remains separate by FMP, recent tagging and genetic studies suggest that the stocks are shared between these areas. We combined the assessments here to streamline the presentation of data that are in common (e.g., life history, data summaries, etc.) and to harmonize advice and management recommendations between regions.

BSAI

Complex Catch

Shark OFL

ABC
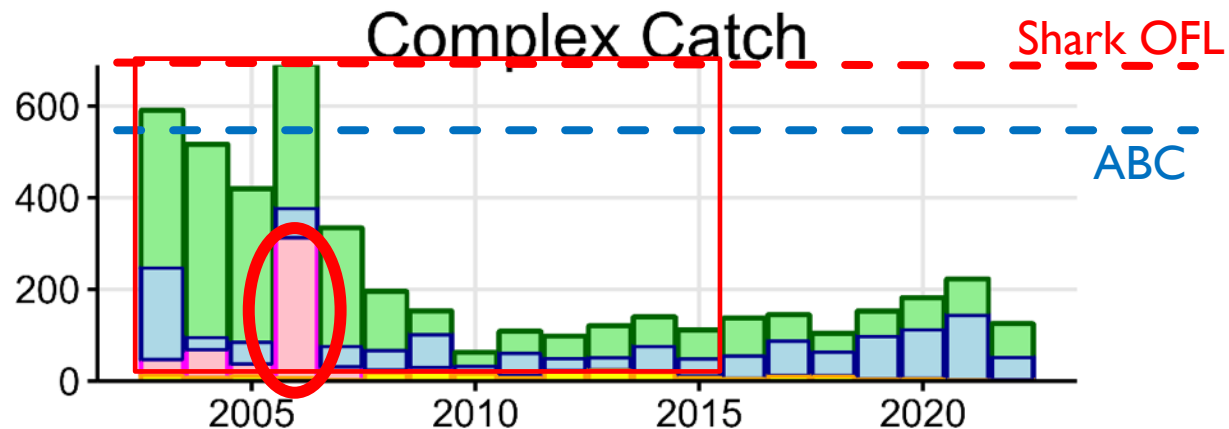
- Due to extrapolation procedure, rare hauls with "large" shark catches can extrapolate to likely erroneous catch estimates

- Proposed 90th percentile of time series to reduce impact of large extrapolations

- BSAI Other/Unid and spiny dogfish and GOA Other/Unid [78]

Only Reliable Catch Series (ORCS)

- Expert judgment used to qualitatively score attributes (Table 19.7)

- Flexible to additional attributes

- Robust to assumptions of stock status

- Allows for incorporation of uncertainty of input information

- Attribute score determines catch statistic and scalar appropriate to status

NOAA Technical Memorandum NMFS-SEFSC-616

CALCULATING ACCEPTABLE BIOLOGICAL CATCH FOR STOCKS THAT HAVE RELIABLE CATCH DATA ONLY

(Only Reliable Catch Stocks – ORCS)

Fisheries Research 193 (2017) 60–70

Contents lists available at ScienceDirect

Fisheries Research

journal homepage: www.elsevier.com/locate/fishres

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Full length article

The refined ORCS approach: A catch-based method for estimating stock status and catch limits for data-poor fish stocks

Christopher M. Free[a,*], Olaf P. Jensen[a], John Wiedenmann[b], Jonathan J. Deroba[c]

[a] Department of Marine and Coastal Sciences, Rutgers University, New Brunswick, NJ, USA
[b] Department of Ecology, Evolution, and Natural Resources, Rutgers University, New Brunswick, NJ, USA
[c] NOAA Fisheries, Northeast Fisheries Science Center, Woods Hole, MA, USA
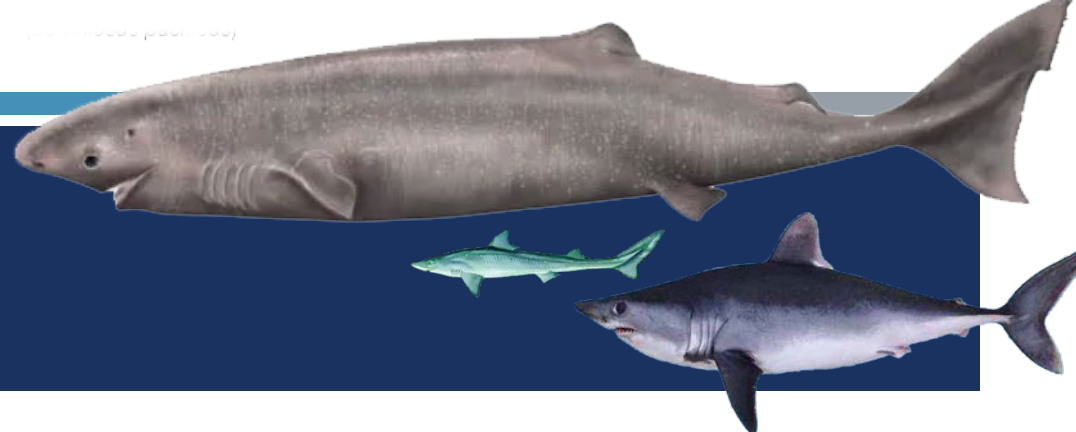
CHAPTER 19
SHARKS

- New model(s): yes; change from base: no - but; risk table (3*,2,1,1)

- The Team recommended the status-quo management approach (Tier 6) with a risk table reduction from maximum permissible ABC to accommodate for the high risk to the Pacific sleeper shark (PSS) component of the complex.

  - OFL = Tier 6 OFL

  - ABC = Tier 6 maxABC × 0.7 + ORCS PSS ABC

    - 0.7 was the proportion of Tier 6 maxABC that was not PSS

	OFL	MaxABC	ABC
BSAI Sharks	689 t	517 t	517×0.7+88 = 450 t

THANK YOU
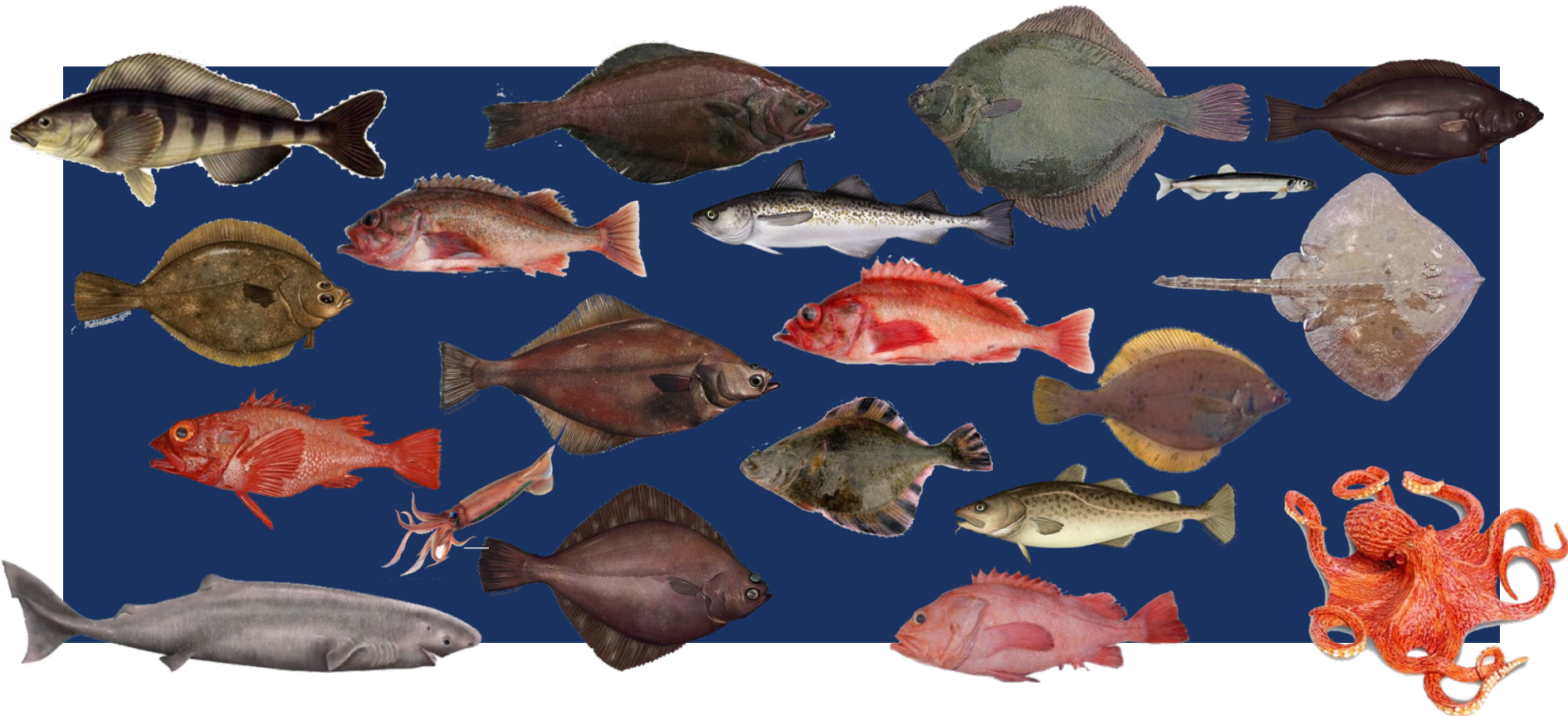
BSAI TEAM
ESR RECOMMENDATIONS

- **Bering Sea ESR**

  - The Team recommended that pH data be aligned with "survey replicated" dates and locations in the model to further skill evaluations.

  - The Team recommended continuation of display of NBS and EBS data separately and encouraged the addition of composite indices (i.e., EBS, NBS, and EBS+NBS). The Team encouraged authors to include EBS and NBS (where appropriate) as well as EBS+NBS combined for all indices when available, and for authors to clearly label each index domain to facilitate sub-regional assessments.

- **Combined AI and EBS ESR Discussion and recommendations**

  - The Team recommended collection of sablefish diets across groundfish survey regions in the next year(s) in order to help understand mechanisms for, and implications of, increasing abundance of sablefish in response to recent warm conditions.

  - The Team recommended adding the zooplankton time series back into the Report Card.

  - The Team recommended a short presentation next September to the Team to review the methods and tradeoffs in approaches.

  - The Team recommended continuing to identify a common baseline for index or indicator averages and in particular to work with the contributors and the ESR team to establish some guidance for fixed baselines (rather than annually adjusting means).

BSAI TEAM POLLOCK RECOMMENDATIONS

- **EBS Pollock**

  - The Team recommended that the EBS pollock stock be included in any working group developed to investigate appropriate means of dealing with irregular recruitment and alternative harvest control rules.

- **EBS Multi-species Model**

  - The Team recommended that the contributions of the CEATTLE model align with the timing of the risk table evaluation to inform those discussions in the future.

  - The Team also recommended that the methodologies described for providing climate advice be included in the climate change working group.

  - Finally, the Team recommended continued work to align the CEATTLE results with the single species models and to transfer to the Rceattle version when possible.

- **Aleutian Islands pollock**

  - The Team recommended reevaluation of the assessment considerations category risk table score in the next assessment.

BSAI TEAM PACIFIC COD RECOMMENDATIONS

- **Pacific cod - EBS Ecosystem and Socioeconomic Profile (ESP)**

  - The Team recommended the ESP team investigate options for cooperative research and communication with the fleet and observer program to collect Pacific cod stomachs in the fishery.

- **Pacific cod - EBS**

  - The Team recommended the authors explore the sensitivity of the terminal year fishery size composition data that have not been debriefed or may not be representative of a full year of data.

- **Pacific cod - Aleutian Islands**

  - The Team recommended the author continue to present the age-structured models shown this year for future consideration.

  - The Team recommended that this stock remain on an annual cycle and not be considered for reduction in assessment frequency when the Teams considers stock prioritization.

  - The Team recognized the importance of the survey to the assessment of this stock and recommended that an Aleutian Islands trawl survey be completed as part of its biennial schedule in 2024.

BSAI TEAM FLATFISH RECOMMENDATIONS

- **Yellowfin sole**
  - The Team recommended to include the recruitment retrospective analysis in the next full assessment.
  - The Team recommended a comparison of the EBS only and the combined EBS+NBS model-based estimates to determine if the inflation of the estimates was due to the VAST method or the addition of the NBS.

- **Greenland turbot**
  - The Team recommended a 6% reduction from maximum permissible ABC, based on the lower range determined by a sensitivity analysis of maturity.
  - The Team recommended the authors revise the interpolation method used to combine the BS and AI longline survey relative population numbers, either based on linear interpolation or new methods under development at the University of Alaska Fairbanks**.**

- **Kamchatka flounder**
  - The Team recommended examining a single length-based selectivity curve in the next assessment cycle. The Team recommended exploring the model sensitivity to the proportion of arrowtooth assigned to Kamchatka prior to 2008.

- **Northern rock sole**
  - The Team recommended the authors put Models 22.1 and 22.2 forward - with likelihood profiles and an evaluation of performance - as alternative models to the base model in the 2024 assessment cycle, to be presented in September 2024.

BSAI TEAM
ROCKFISH RECOMMENDATIONS

- **Blackspotted and rougheye rockfish**

  - The Team discussed the lack of larger fish in fishery composition data and recommended examining the NMFS and IPHC longline survey data to determine if larger fish may be in the population and not showing up in the fishery.

  - The Team also recommended looking at the rate of blackspotted/rougheye to Pacific ocean perch in the survey tows over the time series.

BSAI TEAM
OTHER FISHES RECOMMENDATIONS

- **Sharks**

  - The Team recommended the status-quo management approach with a risk table reduction from maximum permissible ABC to accommodate for the high risk to the Pacific sleeper shark component of the complex.

  - The Team recommended that the authors continue to explore the ORCS approach and to determine customization and weighting methods for the attribute table that are appropriate for the BSAI shark complex.

- **Octopus**

  - The Team recommended that the next author review the consumption model to determine if it is still relevant and applicable.