BSAI Plan Team report

Grant Thompson, co-chair
Steve Barbeaux, co-chair
Steve MacLean, coordinator

Alaska Fisheries
Science Center

December 2, 2019

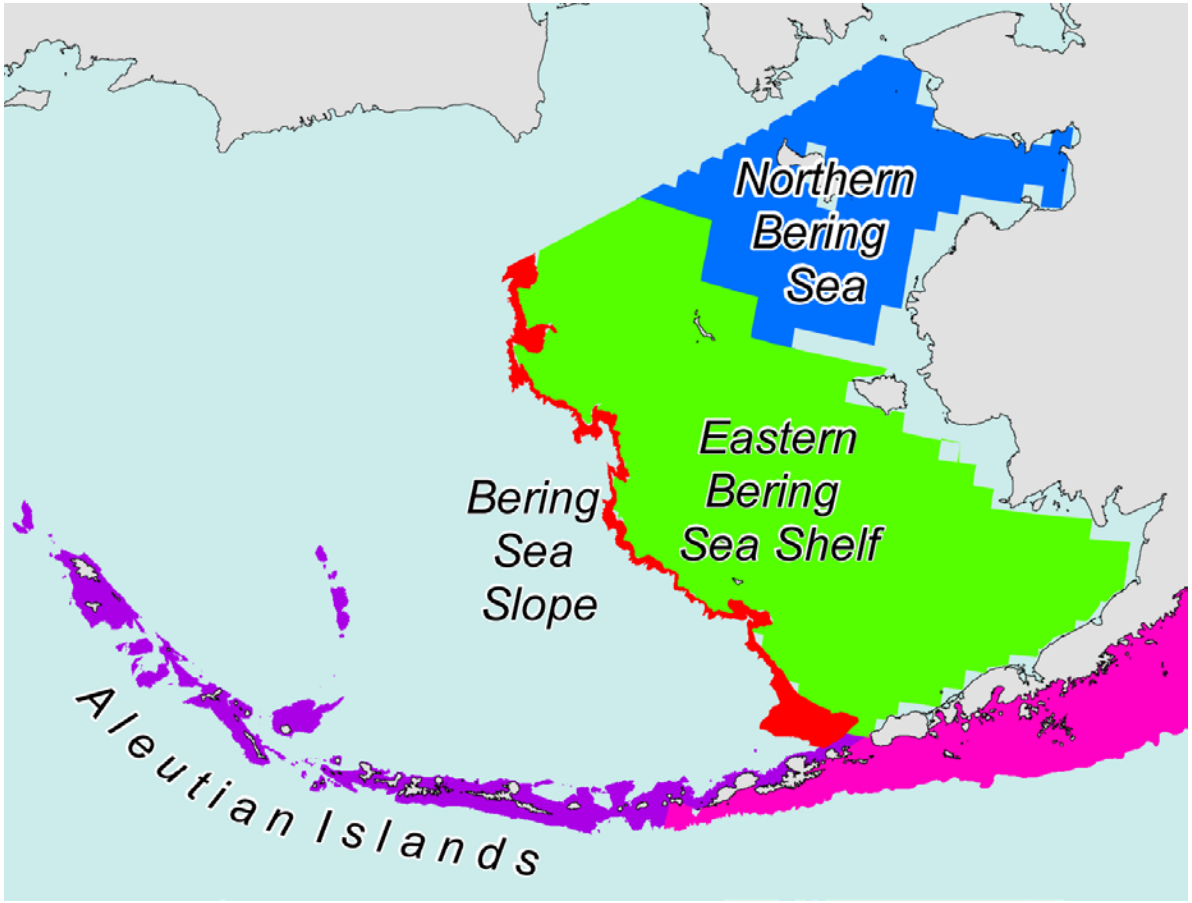
Team members

- Grant Thompson, co-chair (AFSC REFM)
- Steve Barbeaux, co-chair (AFSC REFM)
- Steve MacLean, coordinator (NPFMC)
- Mary Furuness (NMFS AKRO)
- Alan Haynie (AFSC REFM)
- Allan Hicks (IPHC)
- Lisa Hillier (WDFW)
- Kirstin Holsman (AFSC REFM)
- Andy Kingham (AFSC FMA)
- Brenda Norcross (UAF)
- Kalei Shotwell (AFSC ABL)
- Chris Siddon (ADF&G)
- Jane Sullivan (ADF&G)
- Cindy Tribuzio (AFSC ABL)

This information is distributed solely for the purpose of pre-dissemination peer review under applicable information quality guidelines.
It has not been formally disseminated by the National Marine Fisheries Service and should not be construed to represent any agency determination or policy.

“Big picture” overview

BSAI bottom trawl survey areas



This information is distributed solely for the purpose of pre-dissemination peer review under applicable information quality guidelines.
It has not been formally disseminated by the National Marine Fisheries Service and should not be construed to represent any agency determination or policy.

Changes in EBS shelf biomass, 2000-2019

- Species/complexes taken in at least 20% of hauls in all years
- Color gradients are row-specific

Species/complex	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Alaska plaice	-0.07	0.22	-0.22	0.09	0.04	0.06	0.26	-0.34	0.20	0.04	-0.06	0.04	0.12	-0.13	-0.11	-0.21	0.20	0.15	-0.15	-0.12
arrowtooth flounder	0.31	0.20	-0.17	0.59	0.04	0.28	-0.08	-0.21	0.10	-0.23	0.30	-0.01	-0.23	0.01	0.15	-0.12	0.16	-0.11	0.21	0.13
flathead sole	-0.04	0.32	0.07	-0.06	0.20	0.04	-0.03	-0.10	-0.04	-0.24	0.19	0.19	-0.34	0.28	0.07	-0.23	0.16	0.19	-0.11	0.23
Kamchatka flounder	0.12	0.45	-0.24	0.17	0.09	0.54	0.33	0.06	-0.11	-0.15	0.18	-0.21	-0.07	0.08	0.25	0.04	-0.08	-0.13	-0.08	0.02
northern rock sole	0.26	0.13	-0.20	0.12	0.04	-0.03	0.04	-0.08	0.00	-0.24	0.34	-0.04	-0.03	-0.09	0.06	-0.24	0.04	-0.09	-0.21	-0.07
Pacific cod	-0.13	0.54	-0.28	0.05	-0.08	0.11	-0.15	-0.17	-0.05	0.01	1.02	0.05	-0.02	-0.09	0.35	0.01	-0.11	-0.35	-0.21	0.02
walleye pollock	0.34	-0.18	0.18	0.69	-0.54	0.26	-0.37	0.42	-0.30	-0.25	0.64	-0.17	0.12	0.31	0.62	-0.14	-0.23	-0.02	-0.35	0.75
yellowfin sole	0.26	0.06	0.14	0.13	0.18	0.11	-0.24	0.01	-0.02	-0.17	0.36	0.01	-0.19	0.17	0.10	-0.23	0.48	-0.03	-0.32	0.06

This information is distributed solely for the purpose of pre-dissemination peer review under applicable information quality guidelines.
It has not been formally disseminated by the National Marine Fisheries Service and should not be construed to represent any agency determination or policy.

Changes in AI biomass, 1994-2018

- Species/complexes taken in at least 20% of hauls in all years
- Color gradients are row-specific
- Changes are expressed as discrete annual rates

Species/complex	1994	1997	2000	2002	2004	2006	2010	2012	2014	2016	2018
arrowtooth flounder	0.46	0.04	0.01	0.19	0.01	0.37	-0.17	-0.10	0.06	-0.08	-0.13
Atka mackerel	-0.04	-0.16	0.12	0.23	0.07	-0.09	0.03	-0.42	0.62	-0.21	-0.14
flathead sole	-0.01	0.05	-0.02	0.06	0.14	-0.10	0.13	-0.32	0.49	-0.33	0.11
Kamchatka flounder	0.41	-0.05	-0.10	0.28	-0.10	-0.03	0.10	-0.16	0.13	-0.24	-0.02
northern rock sole			-0.06	0.14	-0.06	0.27	-0.08	0.13	-0.17	-0.14	0.10
Northern rockfish	-0.26	0.00	0.33	-0.07	0.01	0.03	0.03	0.14	0.29	-0.27	-0.16
Pacific cod	-0.05	-0.22	0.20	-0.24	0.06	0.02	-0.10	0.03	0.12	0.07	-0.02
Pacific ocean perch	0.03	0.15	-0.04	-0.05	0.06	0.13	0.08	-0.01	0.01	0.00	0.00
walleye pollock	-0.17	0.06	0.04	0.29	-0.14	-0.15	0.10	-0.44	0.39	-0.01	0.41

This information is distributed solely for the purpose of pre-dissemination peer review under applicable information quality guidelines.
It has not been formally disseminated by the National Marine Fisheries Service and should not be construed to represent any agency determination or policy.

NBS biomass and changes, 2010-2019

- Species/complexes taken in at least 20% of hauls in all years
- Color scales are for the entire respective matrix
- Changes are expressed as discrete annual rates

	Biomass			Rate of change	
Species/complex	2010	2017	2019	2017	2019
Alaska plaice	302,976	324,080	321,571	0.01	0.00
flathead sole	12,355	20,860	18,989	0.08	-0.05
northern rock sole	21,256	53,956	99,040	0.14	0.35
other flatfish	19,154	39,963	31,549	0.11	-0.11
Pacific cod	29,124	283,615	364,982	0.38	0.13
skates	76,942	81,305	95,102	0.01	0.08
walleye pollock	21,141	1,316,012	1,167,099	0.80	-0.06
yellowfin sole	427,375	425,598	520,029	0.00	0.11

This information is distributed solely for the purpose of pre-dissemination peer review under applicable information quality guidelines.
It has not been formally disseminated by the National Marine Fisheries Service and should not be construed to represent any agency determination or policy.

Recommended models and specifications

- The Team agreed with the authors' recommendations regarding preferred models and harvest specifications for all assessments except yellowfin sole
- The Team's recommended model and harvest specifications for yellowfin sole is identified with a stand-alone paragraph and bold font in the respective section
- Recommended models and specifications for all other assessments are displayed in regular font, because:
  1. Special notation is not necessary, as it is generally understood that such recommendations will be made in each case
  2. The Team does not want to give the impression that authors need to respond to such recommendations in the next assessment

This information is distributed solely for the purpose of pre-dissemination peer review under applicable information quality guidelines.
It has not been formally disseminated by the National Marine Fisheries Service and should not be construed to represent any agency determination or policy.

Big picture (with big font)

- Assessment counts:
  - 8 full
  - 10 partial
  - 6 “none”
- Models:
  - Counts (not counting Tier 5 random effects models):
    - 16 base models (same number as last year)
    - 18 new models (down from 31 last year)
      - 11 of these are found in a single assessment
  - Changes:
    - 3 recommended by authors (EBS Pcod, YFS, northern rockfish)
    - 2 recommended by Team (EBS Pcod, ~~YFS~~, northern rockfish)

This information is distributed solely for the purpose of pre-dissemination peer review under applicable information quality guidelines.
It has not been formally disseminated by the National Marine Fisheries Service and should not be construed to represent any agency determination or policy.

Big picture (with small font)

Ch.	Assessment	Lead author	2019 tier	Type	Numbered models (or Tier 5)	2020 tier change?		Risk table	
						From 2019	From proj.	Level	% Red.
1	EBS pollock	Ianelli	1a	Full	**16.1 (base)**, 16.2	none	none	2	**43%**
1A	AI pollock	Barbeaux	3a	Partial	15.1 (base)	none	none	n/a	0
1B	Bogoslof pollock	Ianelli	5	None	n/a	n/a	n/a	n/a	n/a
2	EBS Pacific cod	Thompson	3a	Full	16.6i (base), 19.7-19.15, **weighted ensemble**, unweighted ensemble	**3a to 3b**	none	2	TBD
2A	AI Pacific cod	Thompson	5	Full	**Tier 5**, 19.0, 19.0a, 19.0b, 19.0c	none	none	2	TBD
3	Sablefish	Hanselman	3b	Full	16.5 (base)	**3b to 3a**	none	3	**57%**
4	Yellowfin sole	Spies	1a	Full	**18.1a (base)**, **18.2 (author)**	none	none	1	0
5	Greenland turbot	Bryan	3a	Partial	16.1b (base)	none	none	n/a	0
6	Arrowtooth flounder	Spies	3a	Partial	18.9 (base)	none	none	n/a	0
7	Kamchatka flounder	Bryan	3a	Partial	16.0a (base)	none	none	n/a	0
8	Northern rock sole	Wilderbuer	1a	Partial	15.1 (base)	none	none	n/a	0
9	Flathead sole	McGilliard	3a	Partial	18.2c (base)	none	none	n/a	0
10	Alaska plaice	Wilderbuer	3a	Full	11.1 (base)	none	none	1	0
11	Other flatfish	Wilderbuer	5	None	n/a	n/a	n/a	n/a	n/a
12	Pacific ocean perch	Spencer	3a	Partial	16.3a (base)	none	none	n/a	0
13	Northern rockfish	Spencer	3a	Full	16.1 (base), **16.1a**	none	none	2	0
14	Blackspot/rougheye	Spencer	3b/5	Partial	18.1 (base)	none	none	n/a	0
15	Shortraker rockfish	Spies	5	None	n/a	n/a	n/a	n/a	0
16	Other rockfish	Spies	5	None	n/a	n/a	n/a	n/a	0
17	Atka mackerel	Lowe	3b	Full	16.0b (base)	none	none	1	0
18	Skates	Ormseth	3a/5	Partial	14.2 (base)	none	none	n/a	0
19	Sculpins	Spies	5	Partial	Tier 5	none	none	n/a	0
20	Sharks	Tribuzio	6	None	n/a	n/a	n/a	n/a	0
21	Octopus	Ormseth	6	None	n/a	n/a	n/a	n/a	0
22	Forage species	Ormseth	n/a	Report	n/a	n/a	n/a	n/a	n/a

This information is distributed solely for the purpose of pre-dissemination peer review under applicable information quality guidelines.
It has not been formally disseminated by the National Marine Fisheries Service and should not be construed to represent any agency determination or policy.

Reference point comparisons (all chapters)

Quantity	Last asmt.	This asmt.	Change
M	0.100	0.105	0.05
2019 tier	3b	n/a	↑
2020 tier	3a	3a	none
2019 age+ biomass	488,273	n/a	0.44
2020 age+ biomass	513,502	704,683	0.37
2019 spawning biomass	96,687	n/a	0.17
2020 spawning biomass	129,204	113,368	-0.12
B100%	291,845	264,940	-0.09
B40%	116,738	105,976	-0.09
B35%	102,146	92,729	-0.09
2020 FOFL	0.117	0.121	0.03
2020 FABC	0.051	0.044	-0.14
2019 OFL	32,798	n/a	0.54
2020 OFL	45,220	50,481	0.12
2019 ABC	15,068	n/a	0.25
2020 ABC	20,144	18,763	-0.07

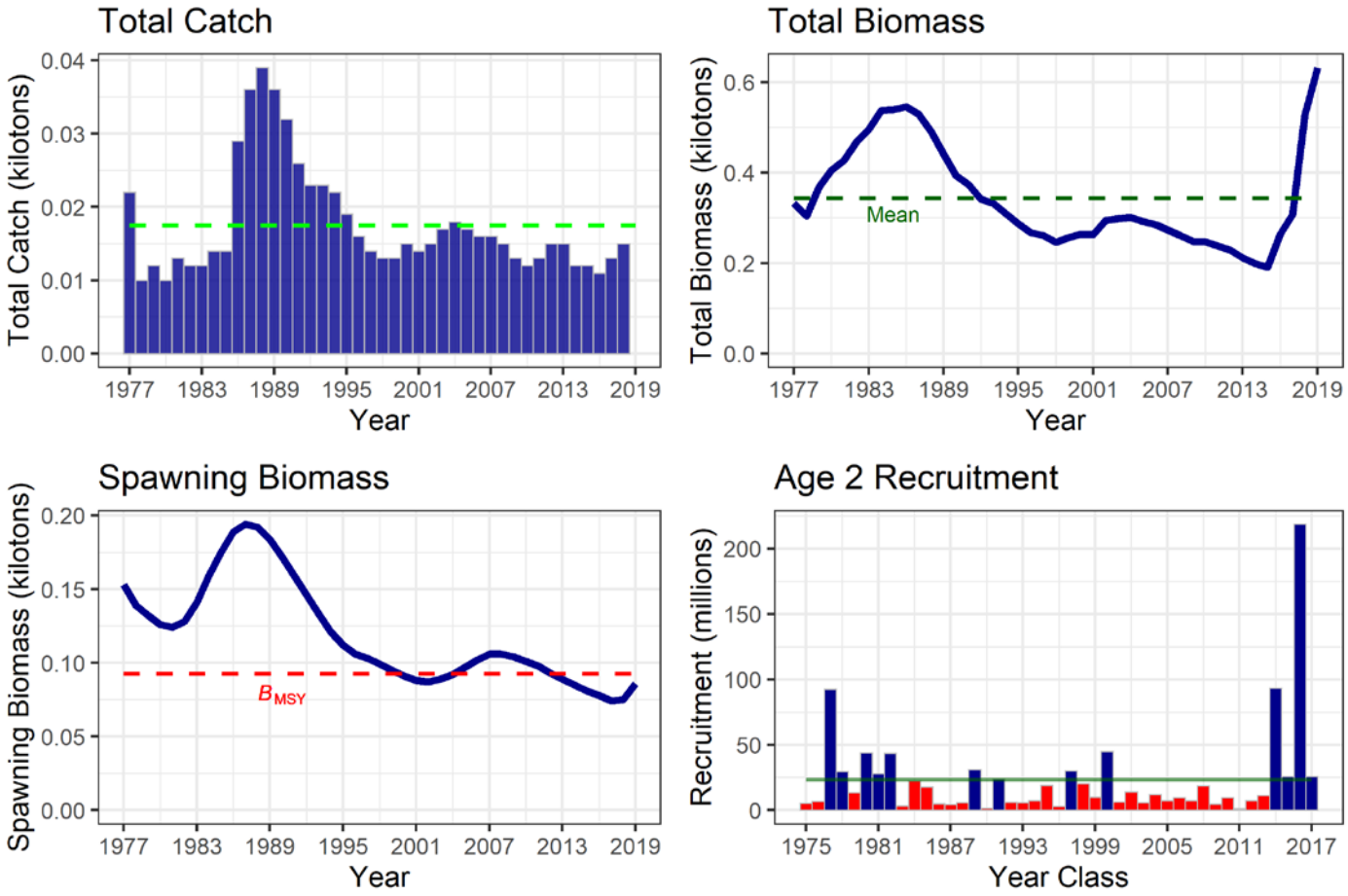
Except where "quantity" is shaded, "change" represents the relative difference between *this assessment's value* and *last assessment's value* for the same quantity.

Where "quantity" is shaded, "change" represents the relative difference between *this assessment's value for 2020* and *last assessment's value for 2019*.

This information is distributed solely for the purpose of pre-dissemination peer review under applicable information quality guidelines.
It has not been formally disseminated by the National Marine Fisheries Service and should not be construed to represent any agency determination or policy.

Graphs for Tiers 1-3 full assessments

- Courtesy of Steve Barbeaux and Jim Ianelli (thank you!)



This information is distributed solely for the purpose of pre-dissemination peer review under applicable information quality guidelines.
It has not been formally disseminated by the National Marine Fisheries Service and should not be construed to represent any agency determination or policy.

Changes in reference points (Tier 1)

Quantity	*EBS pollock*	*Yellowfin*	*Rock sole*
M	0.00	0.00	0.00
2019 age+ biomass	-0.06	0.00	0.29
2020 age+ biomass	0.05	0.02	0.07
2019 spawning biomass	-0.10	0.01	-0.09
2020 spawning biomass	0.02	0.04	0.13
B0	-0.02	0.02	0.00
Bmsy	-0.06	0.01	0.00
2020 FOFL	-0.18	-0.01	0.00
2020 FABC	0.18	-0.01	0.00
2019 OFL	0.09	-0.01	0.29
2020 OFL	0.39	0.01	0.07
2019 ABC	-0.05	-0.01	0.29
2020 ABC	0.14	0.01	0.07

This information is distributed solely for the purpose of pre-dissemination peer review under applicable information quality guidelines.
It has not been formally disseminated by the National Marine Fisheries Service and should not be construed to represent any agency determination or policy.

Changes in reference points (Tier 3)

Quantity	*AI pollock*	*EBS P. cod*	*Sablefish*	*G. turbot*	*Arrowtooth*	*Kamchatka*	*Flathead*	*AK plaice*	*POP*	*No. rockfish*	*AI blackspot.*	*Atka mack.*	*AK skate*
M	0.00	0.03	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.00	0.00
2019 age+ biomass	0.06	-0.09	0.44	0.00	0.00	0.05	0.02	0.07	-0.03	0.02	0.05	0.04	-0.02
2020 age+ biomass	0.00	0.10	0.37	0.07	-0.04	0.02	0.00	0.09	-0.01	0.03	0.00	0.00	0.02
2019 spawning biomass	0.03	-0.11	0.17	0.05	0.00	0.06	0.01	-0.08	-0.04	0.07	0.14	0.03	0.02
2020 spawning biomass	0.00	0.05	-0.12	0.08	0.02	0.02	-0.01	0.00	-0.01	0.09	0.00	0.07	0.03
B100%	0.00	0.01	-0.09	0.00	0.00	0.00	0.00	0.05	0.00	-0.03	0.00	0.03	0.00
B40%	0.00	0.01	-0.09	0.00	0.00	0.00	0.00	0.05	0.00	-0.03	0.00	0.03	0.00
B35%	0.00	0.01	-0.09	0.00	0.00	0.00	0.00	0.05	0.00	-0.03	0.00	0.03	0.00
2020 FOFL	0.00	0.17	0.03	0.00	0.00	0.00	0.00	0.01	0.00	-0.06	0.00	-0.09	0.00
2020 FABC	0.00	0.17	-0.14	0.00	0.00	0.00	0.00	0.01	0.00	-0.06	0.00	-0.07	0.00
2019 OFL	0.04	-0.14	0.54	0.00	0.01	0.05	0.02	-0.06	-0.03	0.27	0.29	0.03	-0.03
2020 OFL	0.00	0.01	0.12	0.08	0.00	0.02	0.00	-0.01	-0.01	0.30	-0.01	0.11	0.02
2019 ABC	0.04	-0.14	0.25	0.00	0.01	0.05	0.02	-0.06	-0.03	0.28	0.29	0.02	-0.03
2020 ABC	0.00	0.14	-0.07	0.08	0.00	0.02	0.00	-0.01	-0.01	0.31	-0.01	0.11	0.02

This information is distributed solely for the purpose of pre-dissemination peer review under applicable information quality guidelines.
It has not been formally disseminated by the National Marine Fisheries Service and should not be construed to represent any agency determination or policy.

Changes in reference points (Tier 5)

Quantity	*Bog. pollock*	*AI P. cod*	*O. flatfish*	*Shortraker*	*O. rockfish*	*EBS blackspot.*	*O. skates*	*Sculpins*
M	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2019 tier	none	none	none	none	none	none	none	none
2020 tier	none	none	none	none	none	none	none	none
Biomass	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.27
2020 FOFL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2020 FABC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2019 OFL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.27
2020 OFL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.27
2019 ABC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.27
2020 ABC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.27

This information is distributed solely for the purpose of pre-dissemination peer review under applicable information quality guidelines.
It has not been formally disseminated by the National Marine Fisheries Service and should not be construed to represent any agency determination or policy.

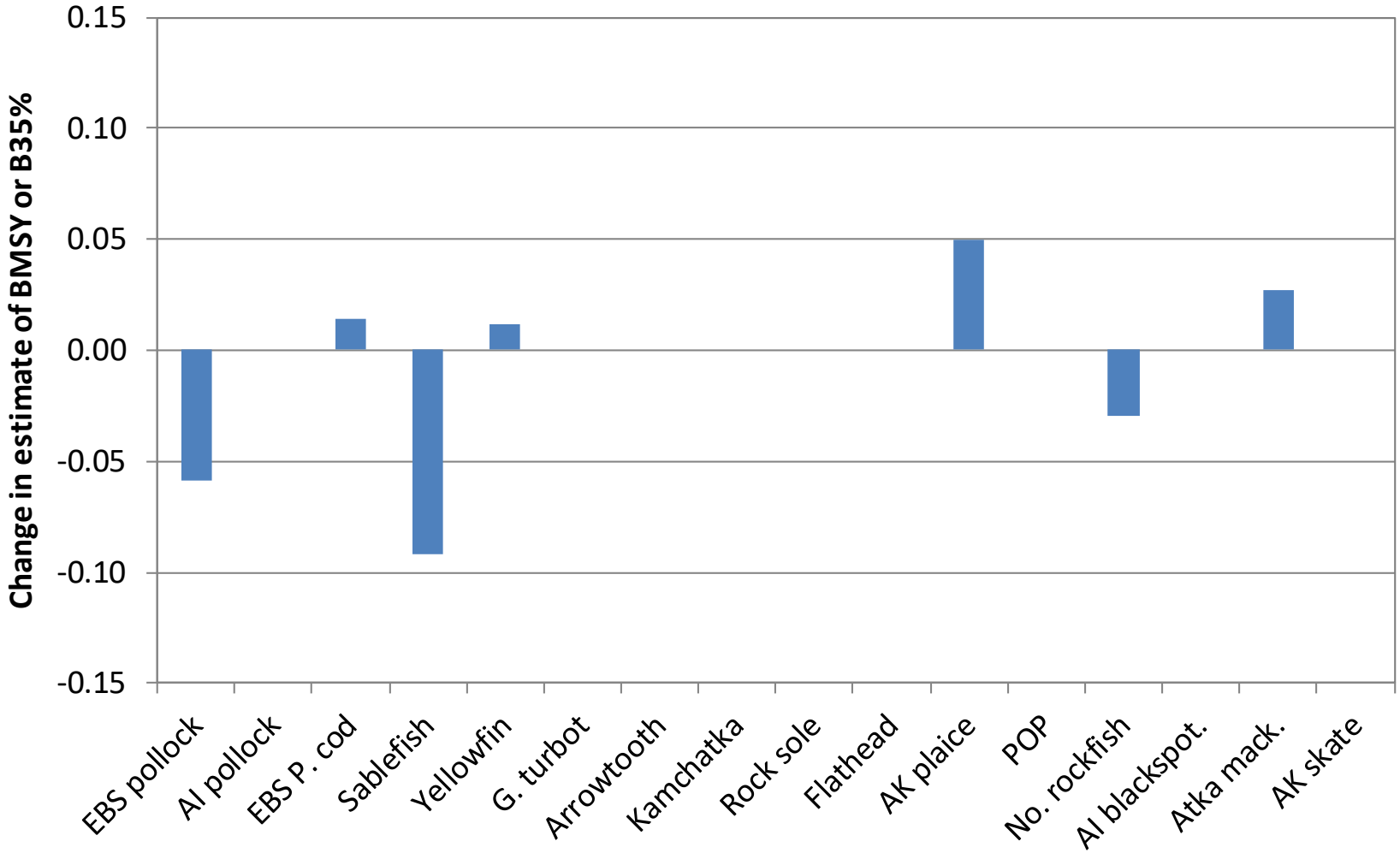
Changes in reference points (Tier 6)

Quantity	*Sharks*	*Octopus*
2018 OFL	0.00	0.00
2019 OFL	0.00	0.00
2018 ABC	0.00	0.00
2019 ABC	0.00	0.00

- Note that squid has been moved to the “ecosystem component”

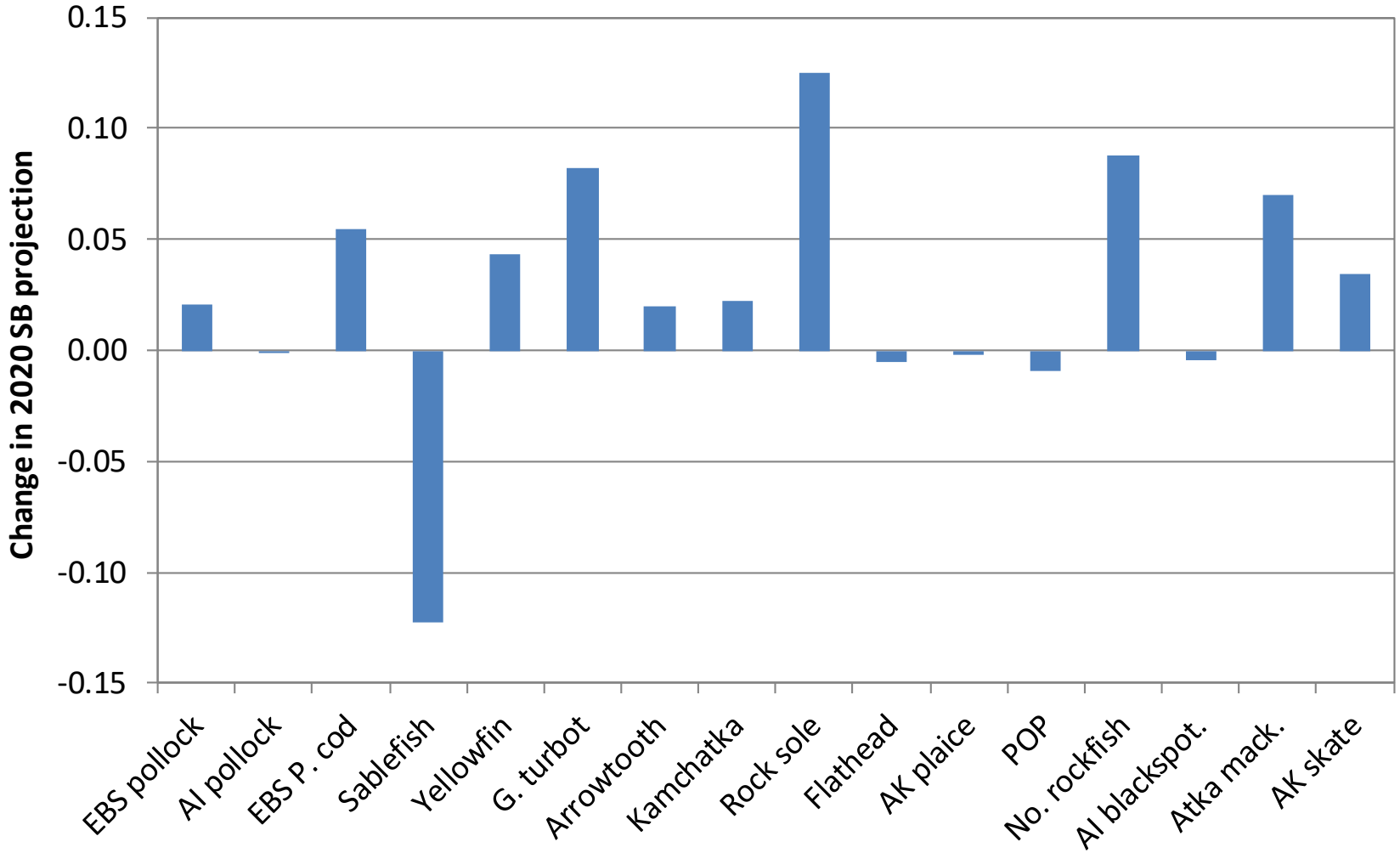
This information is distributed solely for the purpose of pre-dissemination peer review under applicable information quality guidelines.
It has not been formally disseminated by the National Marine Fisheries Service and should not be construed to represent any agency determination or policy.

Change in estimate of B_{MSY} or $B_{35\%}$



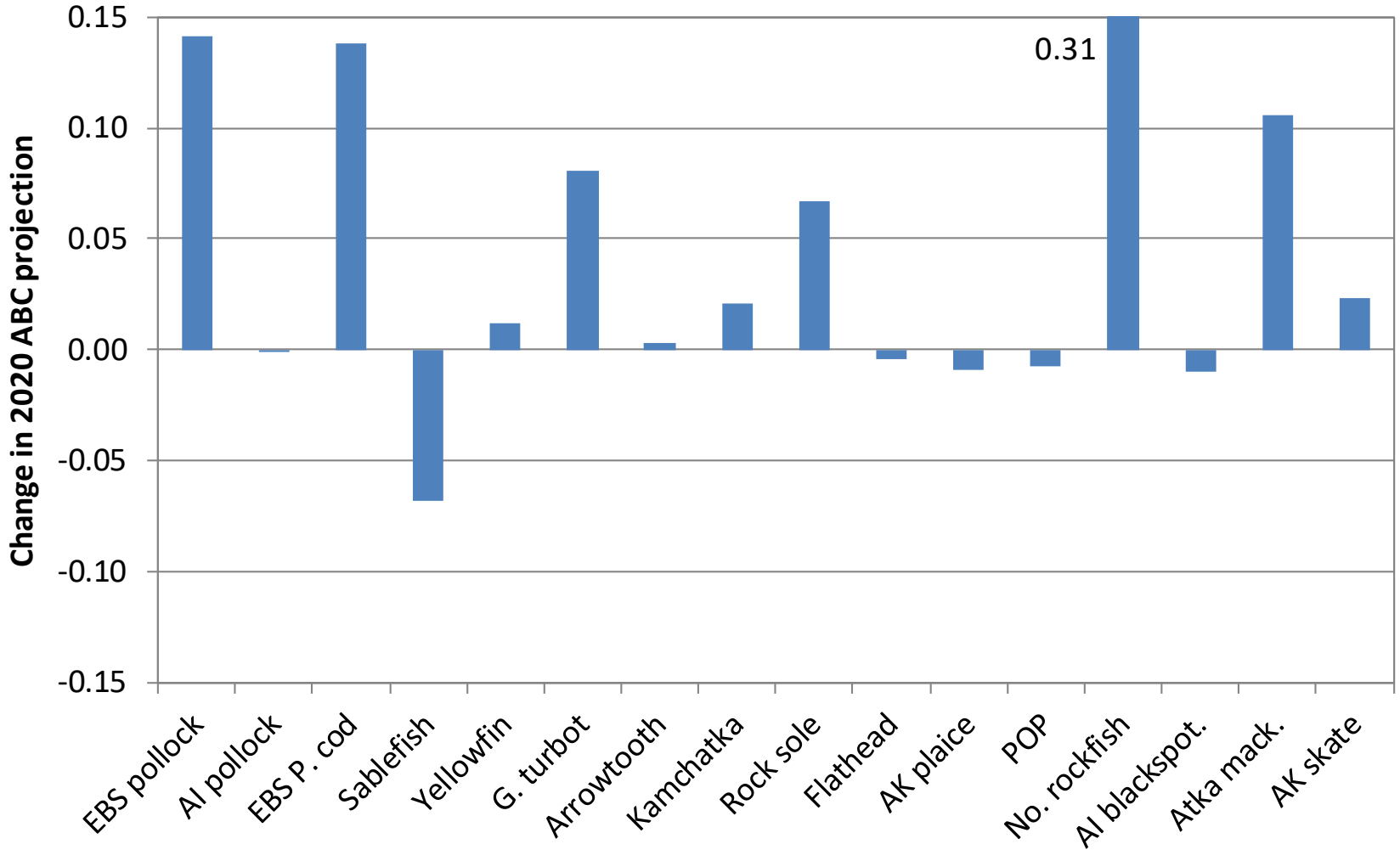
This information is distributed solely for the purpose of pre-dissemination peer review under applicable information quality guidelines.
It has not been formally disseminated by the National Marine Fisheries Service and should not be construed to represent any agency determination or policy.

Change in 2020 spawning biomass *projection*



This information is distributed solely for the purpose of pre-dissemination peer review under applicable information quality guidelines.
It has not been formally disseminated by the National Marine Fisheries Service and should not be construed to represent any agency determination or policy.

Change in 2020 ABC *projection*



This information is distributed solely for the purpose of pre-dissemination peer review under applicable information quality guidelines.
It has not been formally disseminated by the National Marine Fisheries Service and should not be construed to represent any agency determination or policy.

Typical summary format for full assessments

- New data, if any (updated catch data omitted for brevity)
- Model changes/alternatives, if any
- Stock status and trend
  - Recruitment strengths (Tiers 1-3 only)
  - Spawning or survey biomass trend (Tiers 1-5 only)
  - 2019 biomass relative to B_0 or $B_{100\%}$ (Tiers 1-3 only)
- Mohn's ρ (Tiers 1-3 only)
- Risk level
- Some representative figures from the assessment
- For stocks with separate presentations by the author, skip the above
- Team recommendations (with discussion), if any
- Four-panel time series figures (Tiers 1-3 only), color scale summary
- See SAFE Intro for 2021 specs and area allocations

This information is distributed solely for the purpose of pre-dissemination peer review under applicable information quality guidelines.
It has not been formally disseminated by the National Marine Fisheries Service and should not be construed to represent any agency determination or policy.

Typical summary format for other assessments

- Partial assessments:
  - Team recommendations (with discussion), if any
  - Catch/biomass time series figures
  - Color scale summary of reference points and changes
- “None” assessments:
  - Color scale summary of reference points (zero changes in all cases)

This information is distributed solely for the purpose of pre-dissemination peer review under applicable information quality guidelines.
It has not been formally disseminated by the National Marine Fisheries Service and should not be construed to represent any agency determination or policy.

A few final “big picture” items

- Of the 16 stocks/complexes in Tiers 1 or 3, only 3 (EBS Pacific cod, AI blackspotted/rougheye, and Atka mackerel) are in sub-tier “b”
- No stocks/complexes were subjected to overfishing in 2018, and no Tier 1 or 3 stocks/complexes are overfished or approaching a condition of being overfished as of 2019

This information is distributed solely for the purpose of pre-dissemination peer review under applicable information quality guidelines.
It has not been formally disseminated by the National Marine Fisheries Service and should not be construed to represent any agency determination or policy.

General Team recommendations

Special commendations

- The Team extended special commendations to outgoing Team member Brenda Norcross for her many years of faithful service and to retiring authors Tom Wilderbuer and Dan Nichol for their many years of contributing flatfish assessments to the SAFE reports
  - Brenda joined the Team in 1994
  - Tom started authoring flatfish assessments in 1990
  - Dan started coauthoring flatfish assessments in 1998

This information is distributed solely for the purpose of pre-dissemination peer review under applicable information quality guidelines.
It has not been formally disseminated by the National Marine Fisheries Service and should not be construed to represent any agency determination or policy.

EBS Ecosystem Status Report

- See separate presentation by Elizabeth Siddon
- The Team discussed other potential indicators of interest including indicators of harmful algal blooms, indicators of changes in benthic productivity, carrying capacity, and benthic-pelagic coupling in the NBS (e.g., walrus could be an indicator)
- The Team recommended that authors continue to pursue indicators of benthic productivity and benthic-pelagic coupling for the NBS

This information is distributed solely for the purpose of pre-dissemination peer review under applicable information quality guidelines.
It has not been formally disseminated by the National Marine Fisheries Service and should not be construed to represent any agency determination or policy.

Chapter summaries

Chapter 1: EBS walleye pollock (full)

- Switch to author's presentation (Team comments will follow)

This information is distributed solely for the purpose of pre-dissemination peer review under applicable information quality guidelines.
It has not been formally disseminated by the National Marine Fisheries Service and should not be construed to represent any agency determination or policy.

EBS walleye pollock, continued

- Both the base model (16.1) and the VAST model (16.2) appear to perform well
- Recent surveys have confirmed the presence of a large pollock biomass in the NBS
- Given the Team's decision to use VAST data in the EBS Pacific cod assessment, there was interest in doing the same for this assessment
- However, unlike the Pacific cod case, genetic work on the relationship between the EBS and NBS fish has yet to be provided
- Anticipating that genetic results will be forthcoming in the next year, the Team decided to stay with the base model (16.1) for another year
- Another NBS survey is scheduled for next year, and data on cross-boundary movements of pollock will also be available from the moorings that have recently been deployed

This information is distributed solely for the purpose of pre-dissemination peer review under applicable information quality guidelines.
It has not been formally disseminated by the National Marine Fisheries Service and should not be construed to represent any agency determination or policy.

EBS walleye pollock, continued

- As in previous years, the author is recommending a substantial reduction from maxABC
- He prefers keeping biomass well above B_{MSY}, as experience has shown that a successful fishery can be sustained when this condition is maintained
- Tables 48 and 49 in the SAFE chapter list several metrics and results that could be used to inform an ABC recommendation
- Ultimately, the author recommended setting ABC at the maxABC value associated with Tier 3, as has been the practice since the 2014 assessment cycle, the stock's Tier 1 status notwithstanding
- The Team discussed the Tier 3 option, as it has for the last many years, and ultimately agreed with the author's recommendation

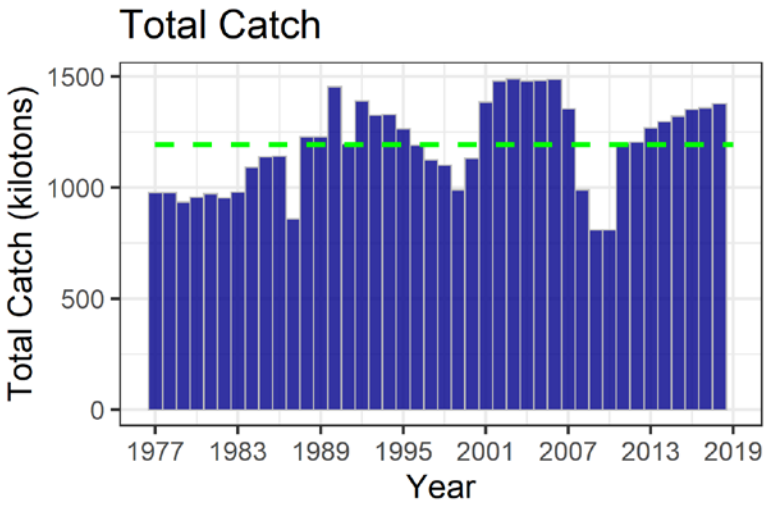
This information is distributed solely for the purpose of pre-dissemination peer review under applicable information quality guidelines.
It has not been formally disseminated by the National Marine Fisheries Service and should not be construed to represent any agency determination or policy.

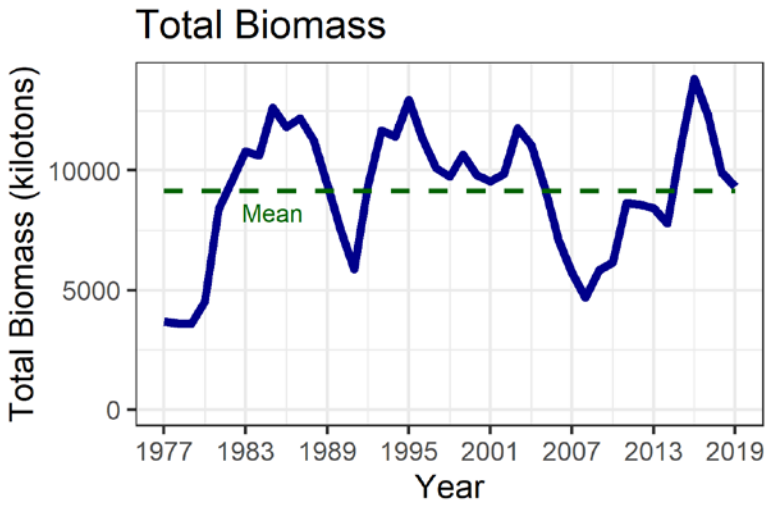
EBS walleye pollock, continued

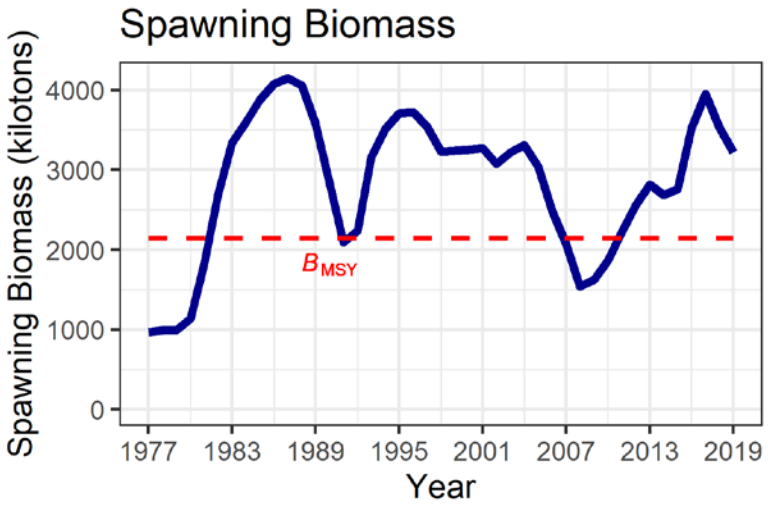
- Recommendations for next year's assessment:
  - For next year's assessment, the Team recommended revisiting any variances in the model that are simply assumed rather than estimated, noting the potential for tuning those variances so as to set SDNR=1, and also acknowledging that, at the authors' discretion, it may be advantageous to consider re-estimating the constraint on time-variability in survey selectivity simultaneously
  - The Team also commended the authors for developing the new index of spatial effort concentration, and recommended continued development of such metrics

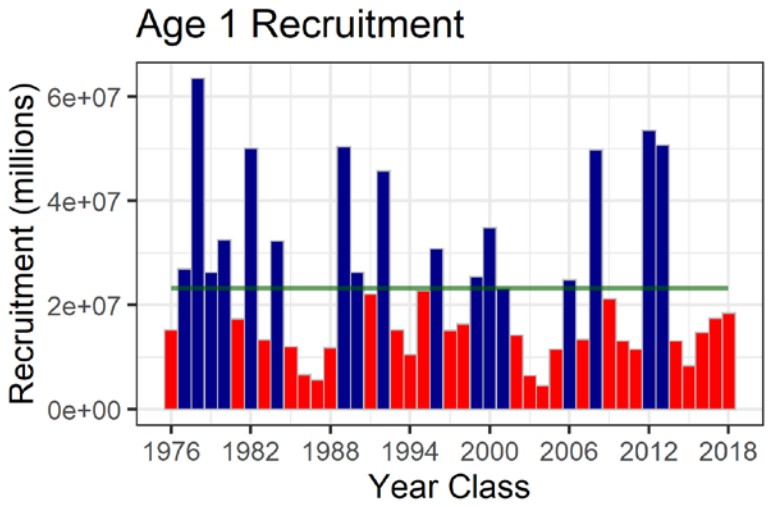
This information is distributed solely for the purpose of pre-dissemination peer review under applicable information quality guidelines.
It has not been formally disseminated by the National Marine Fisheries Service and should not be construed to represent any agency determination or policy.

EBS walleye pollock, continued









This information is distributed solely for the purpose of pre-dissemination peer review under applicable information quality guidelines.
It has not been formally disseminated by the National Marine Fisheries Service and should not be construed to represent any agency determination or policy.

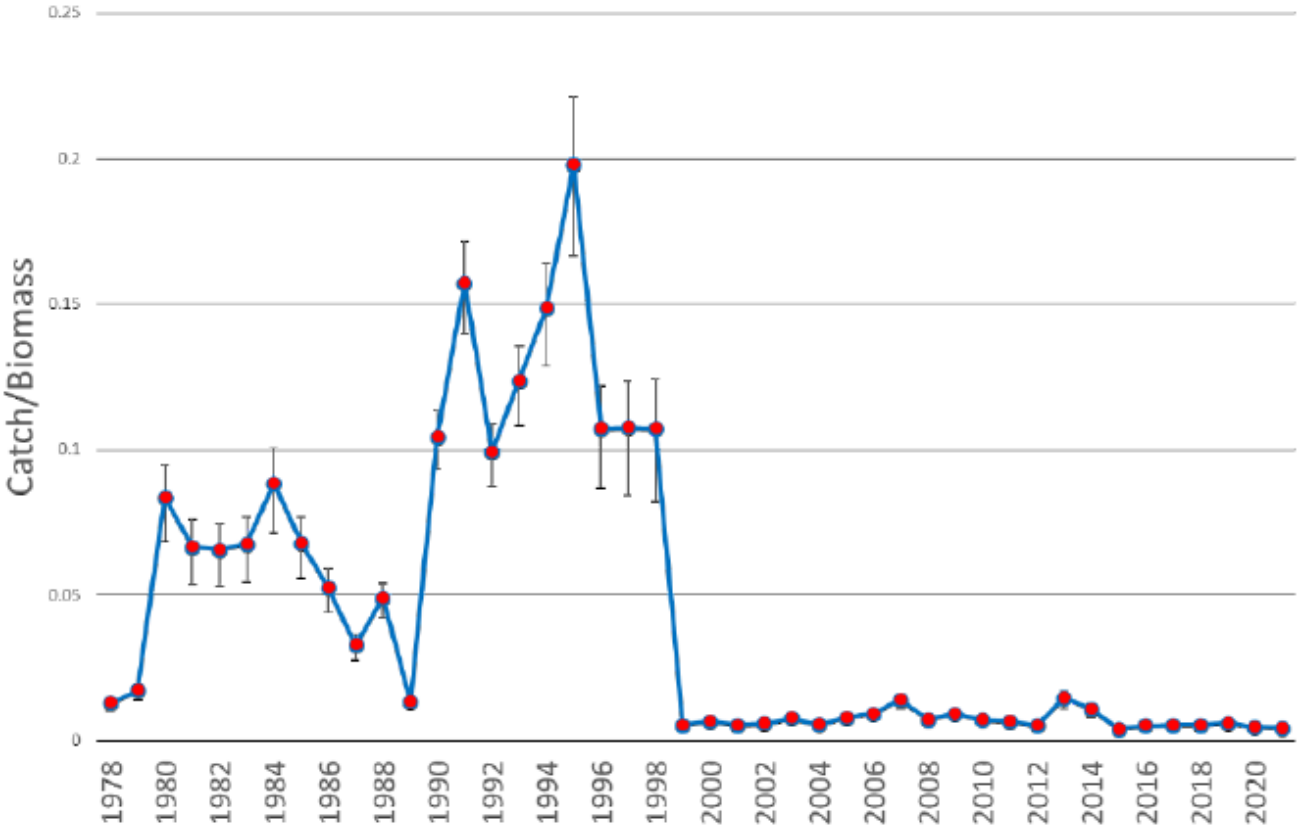
EBS walleye pollock, continued

Quantity	Last asmt.	This asmt.	Change
M	0.30	0.30	0.00
2019 tier	1a	n/a	none
2020 tier	1a	1a	none
2019 age+ biomass	9,110,000	n/a	-0.06
2020 age+ biomass	8,156,000	8,580,000	0.05
2019 spawning biomass	3,107,000	n/a	-0.10
2020 spawning biomass	2,725,000	2,781,000	0.02
B0	5,866,000	5,748,000	-0.02
Bmsy	2,280,000	2,147,000	-0.06
2020 FOFL	0.645	0.528	-0.18
2020 FABC	0.375	0.442	0.18
2019 OFL	3,913,000	n/a	0.09
2020 OFL	3,082,000	4,273,000	0.39
2019 ABC	2,163,000	n/a	-0.05
2020 ABC	1,792,000	2,045,000	0.14

This information is distributed solely for the purpose of pre-dissemination peer review under applicable information quality guidelines.
It has not been formally disseminated by the National Marine Fisheries Service and should not be construed to represent any agency determination or policy.

Chapter 1A: AI walleye pollock (partial)

- Recommendations: none
- Catch/biomass time series



This information is distributed solely for the purpose of pre-dissemination peer review under applicable information quality guidelines.
It has not been formally disseminated by the National Marine Fisheries Service and should not be construed to represent any agency determination or policy.

AI walleye pollock, continued

Quantity	Last asmt.	This asmt.	Change
M	0.20	0.20	0.00
2019 tier	3a	n/a	none
2020 tier	3a	3a	none
2019 age+ biomass	319,892	n/a	0.06
2020 age+ biomass	340,680	340,680	0.00
2019 spawning biomass	95,253	n/a	0.03
2020 spawning biomass	98,182	98,172	0.00
B100%	203,279	203,279	0.00
B40%	81,312	81,312	0.00
B35%	71,147	71,147	0.00
2020 FOFL	0.415	0.415	0.00
2020 FABC	0.331	0.331	0.00
2019 OFL	64,240	n/a	0.04
2020 OFL	66,981	66,973	0.00
2019 ABC	52,887	n/a	0.04
2020 ABC	55,125	55,120	0.00

This information is distributed solely for the purpose of pre-dissemination peer review under applicable information quality guidelines.
It has not been formally disseminated by the National Marine Fisheries Service and should not be construed to represent any agency determination or policy.

Chapter 1B: Bogoslof walleye pollock (none)

Quantity	Last asmt.	This asmt.	Change
M	0.30	0.30	0.00
2019 tier	5	n/a	none
2020 tier	5	5	none
Biomass	610,267	610,267	0.00
2020 FOFL	0.300	0.300	0.00
2020 FABC	0.225	0.225	0.00
2019 OFL	183,080	n/a	0.00
2020 OFL	183,080	183,080	0.00
2019 ABC	137,310	n/a	0.00
2020 ABC	137,310	137,310	0.00

This information is distributed solely for the purpose of pre-dissemination peer review under applicable information quality guidelines.
It has not been formally disseminated by the National Marine Fisheries Service and should not be construed to represent any agency determination or policy.

Chapter 2: EBS Pacific cod (full)

- Switch to author's presentation (Team comments will follow)

This information is distributed solely for the purpose of pre-dissemination peer review under applicable information quality guidelines.
It has not been formally disseminated by the National Marine Fisheries Service and should not be construed to represent any agency determination or policy.

EBS Pacific cod, continued

- Some discussion points:
  - Mohn's ρ may be a misleading statistic because it can be affected by a sudden loss of data in a sparse time-series (e.g., NBS)
    - However, using survey estimates for every year, as estimated from the VAST model, alleviates this concern
  - Ageing bias was estimated to change in 2008 in the complex models, but it is not certain whether this is due to a change in ageing bias or a change in growth that is not modeled
  - Condition factors in both the 2019 EBS and NBS surveys were above average
    - However, it was not certain if the NBS analysis included all data or just data from the NBS
  - (continued on next slide)

This information is distributed solely for the purpose of pre-dissemination peer review under applicable information quality guidelines.
It has not been formally disseminated by the National Marine Fisheries Service and should not be construed to represent any agency determination or policy.

EBS Pacific cod, continued

- Some discussion points, continued:
  - Removing the fishery age compositions solved the retrospective patterns, but the Team was not certain if there were trade-offs or effects from not using these data
    - Fishery age compositions have not been included in the assessment for years, but *a priori* there is no reason that they should not be useful
  - All three levels of model complexity should be retained because there are some important differences between each type
    - For example, even though the basic and simple models are largely similar, the basic models are the only ones that assume asymptotic selectivity for the fishery
    - There was also concern that the complex model could be overfitting the data
  - (continued on next slide)

This information is distributed solely for the purpose of pre-dissemination peer review under applicable information quality guidelines.
It has not been formally disseminated by the National Marine Fisheries Service and should not be construed to represent any agency determination or policy.

EBS Pacific cod, continued

- Some discussion points, continued:
  - The determination of weights for the models was clear, transparent, reflected the Team and SSC priorities, and is a good framework to start from
    - The Team was interested in further thinking about the weighting process and would like to re-evaluate the emphasis factors, the criteria, and the process in the future
    - If an ensemble is developed for other species, this process would be useful (with different criteria and emphasis factors)

This information is distributed solely for the purpose of pre-dissemination peer review under applicable information quality guidelines.
It has not been formally disseminated by the National Marine Fisheries Service and should not be construed to represent any agency determination or policy.

EBS Pacific cod, continued

- Should all three hypotheses be retained?
  - Hypothesis #1 is the most unlikely, but is worth retaining because it:
    - is the legacy model
    - is important to understand the EBS-only dynamics
    - can help determine the synergy between the EBS and NBS
    - had acceptable retrospective patterns
    - may be necessary if NBS surveys are discontinued
  - Hypothesis #2 was deemed likely given the observations of Pacific cod in the NBS, evidence of no genetic difference, and the presence of age-1 fish throughout the EBS and NBS
  - Hypothesis #3 is useful because it admits that dynamics in the NBS may be different than in the EBS
    - However, the models presented did not capture this possibility and spatial models would be worth investigating

This information is distributed solely for the purpose of pre-dissemination peer review under applicable information quality guidelines.
It has not been formally disseminated by the National Marine Fisheries Service and should not be construed to represent any agency determination or policy.

EBS Pacific cod, continued

- Use of VAST survey estimates:
  - The Team supported the use of the VAST survey estimates with the cold-pool covariate and bias correction
  - Recognizing that many papers have been published that investigated the performance of VAST, the Team still had some concerns and would like to see cross-validation analyses done to determine the efficacy of predicting missing data, which may be a task for someone or a team other than the assessment authors
  - It was noted that the VAST model predicts indices for years where the NBS data are not available, and that these years will have a larger variance, and thus lower weight in the model fitting

This information is distributed solely for the purpose of pre-dissemination peer review under applicable information quality guidelines.
It has not been formally disseminated by the National Marine Fisheries Service and should not be construed to represent any agency determination or policy.

EBS Pacific cod, continued

- Public comment included concern for an unprecedented ensemble approach and lack of complete understanding as to why an ensemble is better than a single model
  - There was concern that the ensemble approach avoids choosing a best model, even though the weighting shows a strong single model
  - The Team explained that this accounts for structural uncertainty, should stabilize advice in the future, and the Team and SSC have been working towards this for many years
- With the amount of structural uncertainty in Pacific cod assessment models, the ensemble approach is warranted
- It is likely that the weightings of the models will change in the future as new data describing new patterns become available
- Additionally, the number of models in the ensemble can likely be reduced as more information supporting or not supporting the three hypotheses is gained

This information is distributed solely for the purpose of pre-dissemination peer review under applicable information quality guidelines.
It has not been formally disseminated by the National Marine Fisheries Service and should not be construed to represent any agency determination or policy.

EBS Pacific cod, continued

- Additional public comment was heard regarding catch rates for Pcod in various fisheries, which were generally seen as good
- Some fisheries not targeting Pcod (e.g., the A80 fleet) had difficulty avoiding Pcod, which seemed to be distributed throughout the EBS
- With a more widespread distribution than in previous years, Pcod are becoming a choke species for some fisheries, even using all available measures to limit the bycatch of Pcod
- For target fisheries, the CPUE has been increasing and a large portion of the catch occurs in NBS, noting that catch-rates north of 62 degrees latitude were very good
- Public comment noted that FLC vessels often do not fish in areas where CPUE is greatest in order to avoid market issues such as parasites
- Overall, catch is shifting throughout the Bering Sea and Pcod are becoming more prevalent in some non-target fisheries

This information is distributed solely for the purpose of pre-dissemination peer review under applicable information quality guidelines.
It has not been formally disseminated by the National Marine Fisheries Service and should not be construed to represent any agency determination or policy.

EBS Pacific cod, continued

- Some Team concerns related to the risk table:
  - The ecosystem is obviously affecting Pcod and could possibly be resulting in a change in productivity that affects carrying capacity
  - Movement and subsequent mortality outside of the U.S. EEZ could possibly elevate the risk to the stock
    - An AFSC post-doc is currently working on movement and mortality outside of the U.S. EEZ
  - Observations such as the movement of the stock and fishery to the NBS could be seen as an adverse condition, but the assessment is able to account for that movement and mortality
  - Public comment suggested that there is inconsistency among stocks on how the risk tables have been implemented
  - It may be useful separate review of models from ABC reductions
- The Team agreed with the authors not to suggest a specific reduction

This information is distributed solely for the purpose of pre-dissemination peer review under applicable information quality guidelines.
It has not been formally disseminated by the National Marine Fisheries Service and should not be construed to represent any agency determination or policy.

EBS Pacific cod, continued

- Recommendations for next year's assessment:
  - The Team appreciated the hard work and thorough investigation that the authors put into the assessment
  - The Team supported continued research into the abundance and mortality of Pacific cod outside of U.S. waters for inclusion in the stock assessment
  - The Team recommended using spatio-temporal models for survey data (i.e., VAST with a cold pool covariate and bias correction) and also recommended that the survey team investigate the efficacy of VAST estimates using methods such as cross-validation
  - (continued on next slide)

This information is distributed solely for the purpose of pre-dissemination peer review under applicable information quality guidelines.
It has not been formally disseminated by the National Marine Fisheries Service and should not be construed to represent any agency determination or policy.

EBS Pacific cod, continued

- Recommendations for next year's assessment, continued:
  - The Team recommended the 3x3 factorial design for defining models in the ensemble and feels that the current 9 models should be used for management advice. H1 is the hypothesis under which the assessment has historically operated, and it is useful to carry forward that legacy and retain the historic EBS only assessment. H3 is useful because it allows for a single stock with different dynamics in the 2 areas. Although the 3 models for H3 did not perform particularly well, this hypothesis is useful and the Team supports further development of models under this hypothesis that may incorporate spatial processes such as migration and differences in growth, for example. All 3 hypotheses and levels of complexity incorporate features that are of interest and useful for explaining structural uncertainty, but it would be useful to investigate reducing the number of models, such as eliminating 1 of the hypotheses or 1 of the levels of complexity.
- (continued on next slide)

This information is distributed solely for the purpose of pre-dissemination peer review under applicable information quality guidelines.
It has not been formally disseminated by the National Marine Fisheries Service and should not be construed to represent any agency determination or policy.

EBS Pacific cod, continued

- Recommendations for next year's assessment, continued:
  - The Team recommended that advice be based on the weighted ensemble of all nine models as stated by the assessment authors
    - The weightings give the majority of the weight to Hypothesis #2 and little weight to the other hypotheses, which are useful to retain at the moment
  - The Team recommended retaining all models in the ensemble for this assessment, but to simplify and reduce workload, only report models that are above a cutoff of 1% weight to represent the base model in the next assessment
    - This would include five models for comparison next year
  - The Team recommended that discussions on the procedure for weighting models in an ensemble continue in the future and be included as a Joint Team agenda item in September 2020
- (continued on next slide)

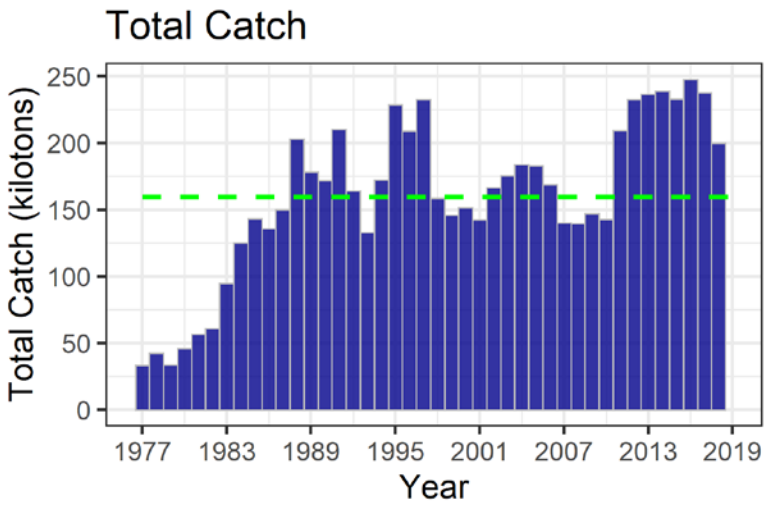
This information is distributed solely for the purpose of pre-dissemination peer review under applicable information quality guidelines.
It has not been formally disseminated by the National Marine Fisheries Service and should not be construed to represent any agency determination or policy.

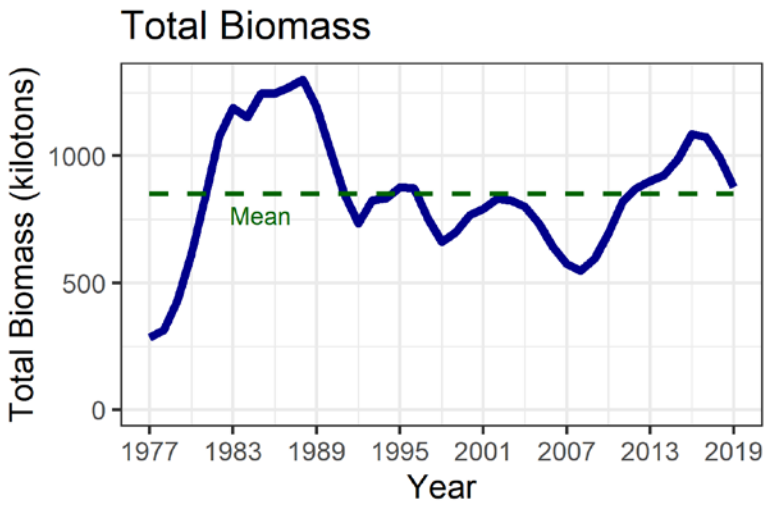
EBS Pacific cod, continued

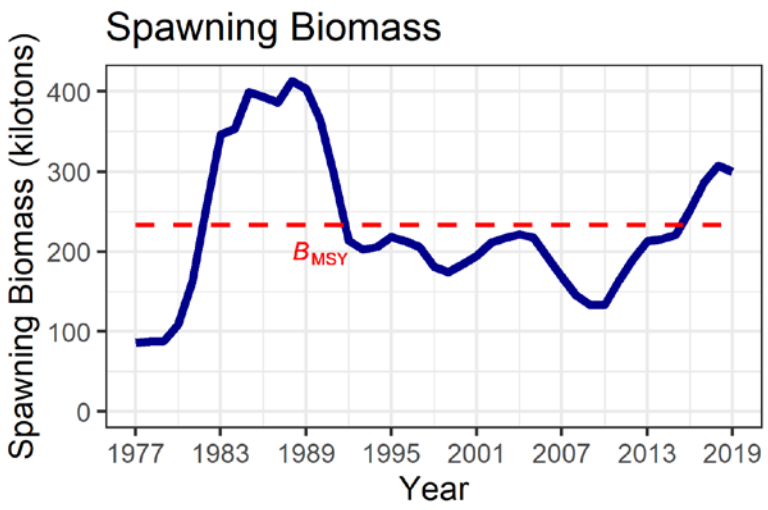
- Recommendations for next year's assessment, continued:
  - The Team recommended organizing the environmental/ecosystem considerations content of the risk table to those items that are associated with the stock and those that are not (working with ESP and ESR editors may help with this)
  - The Team recommended a continued investigation into whether a change in growth contributed to the ageing bias fit for 2008 and onward in the complex models as ageing bias and growth may be confounded
  - The Team recommended continued research into the inclusion of fishery age compositions in the models

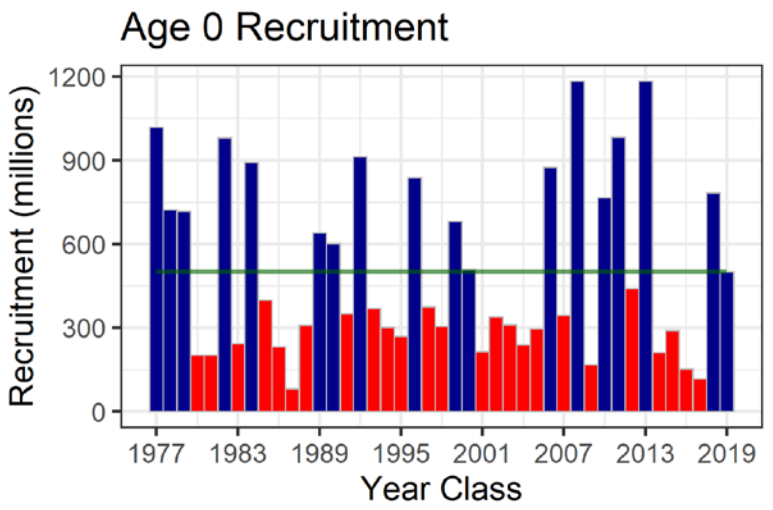
This information is distributed solely for the purpose of pre-dissemination peer review under applicable information quality guidelines.
It has not been formally disseminated by the National Marine Fisheries Service and should not be construed to represent any agency determination or policy.

EBS Pacific cod, continued









This information is distributed solely for the purpose of pre-dissemination peer review under applicable information quality guidelines.
It has not been formally disseminated by the National Marine Fisheries Service and should not be construed to represent any agency determination or policy.

EBS Pacific cod, continued

Quantity	Last asmt.	This asmt.	Change
M	0.34	0.35	0.03
2019 tier	3a	n/a	↓
2020 tier	3b	3b	none
2019 age+ biomass	824,000	n/a	-0.09
2020 age+ biomass	683,000	751,708	0.10
2019 spawning biomass	290,000	n/a	-0.11
2020 spawning biomass	246,000	259,509	0.05
B100%	658,000	666,506	0.01
B40%	263,000	266,602	0.01
B35%	230,000	233,277	0.01
2020 FOFL	0.35	0.41	0.17
2020 FABC	0.29	0.34	0.17
2019 OFL	216,000	n/a	-0.14
2020 OFL*	183,000	185,650	0.01
2019 ABC	181,000	n/a	-0.14
2020 ABC	137,000	155,873	0.14

* 2020 OFL from last year's accepted model was 164,000

This information is distributed solely for the purpose of pre-dissemination peer review under applicable information quality guidelines.
It has not been formally disseminated by the National Marine Fisheries Service and should not be construed to represent any agency determination or policy.

Chapter 2A: AI Pacific cod (full)

- New data:
  - For the standard Tier 5 random effects model: none
  - For the new age-structured models (Appendix 2A.4):
    - Catch biomass from 1990-2019
    - Fishery sizecomps from 1990-2019
    - AI bottom trawl survey biomass and agecomps from 1991-2018
- Model changes/alternatives:
  - Standard Tier 5 random effects model (base model)
  - Four age-structured models
    - Model 19.0: M=0.34, observer-based maturity curve
    - Model 19.0a: same as 19.0, but with M=0.40
    - Model 19.0b: same as 19.0, but with Stark maturity curve
    - Model 19.0c: same as 19.0, but with no fishery length likelihood

This information is distributed solely for the purpose of pre-dissemination peer review under applicable information quality guidelines.
It has not been formally disseminated by the National Marine Fisheries Service and should not be construed to represent any agency determination or policy.

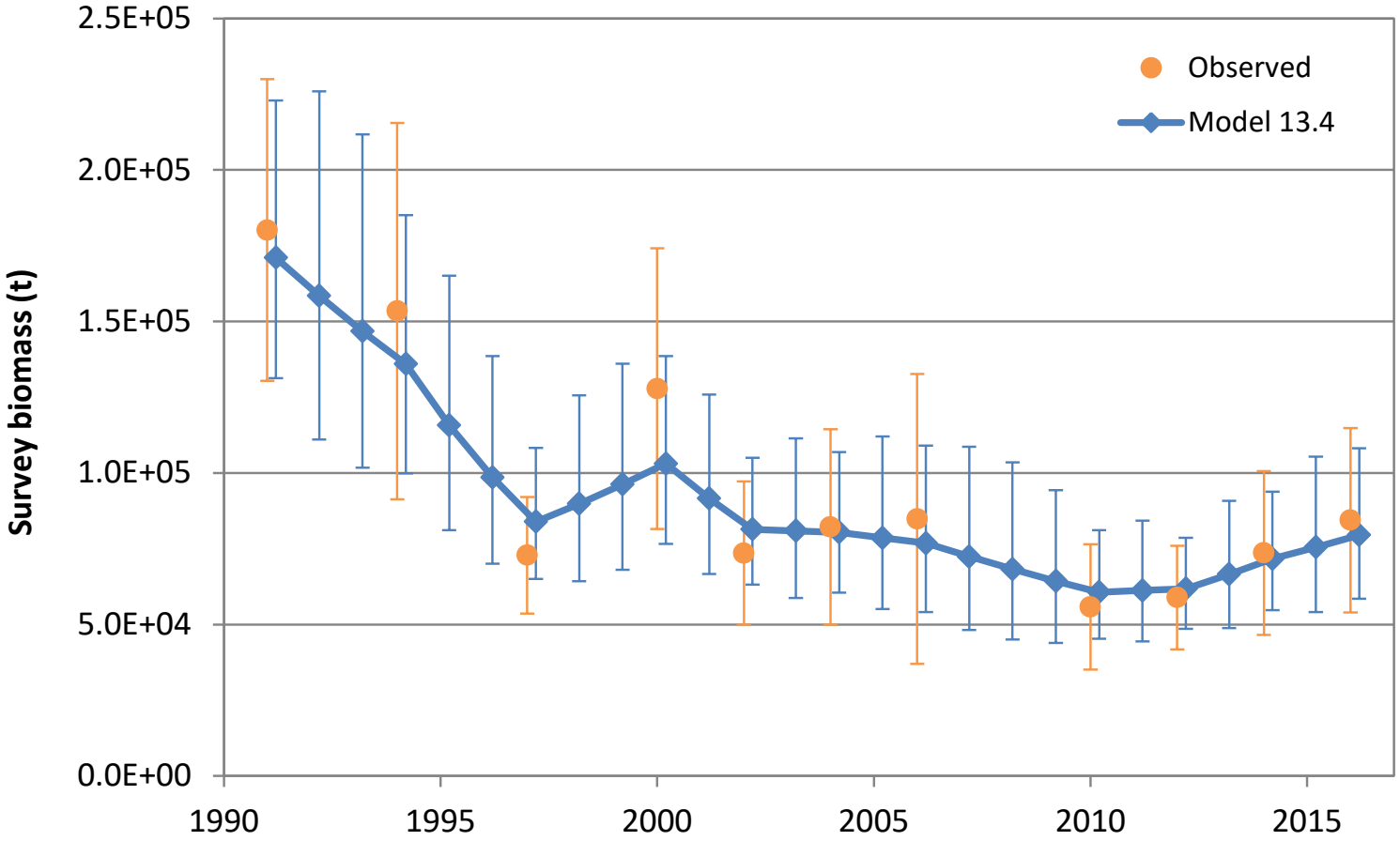
Chapter 2A: AI Pacific cod (full)

- Stock status and trend:
  - Tier 5 RE model estimates that survey biomass has increased continuously since the all-time low observed in 2010
    - 2018 estimate is 32% higher than 2010 estimate
    - 2018 estimate is 11% lower than time series average
- Risk level: max(1,1,2,1)=2; ABC reduction deferred to SSC

This information is distributed solely for the purpose of pre-dissemination peer review under applicable information quality guidelines.
It has not been formally disseminated by the National Marine Fisheries Service and should not be construed to represent any agency determination or policy.

AI Pacific cod, continued

- Survey biomass



This information is distributed solely for the purpose of pre-dissemination peer review under applicable information quality guidelines.
It has not been formally disseminated by the National Marine Fisheries Service and should not be construed to represent any agency determination or policy.

AI Pacific cod, continued

- Biomass apportionment
  - "Harvest limit" for the WAI is computed by subtracting State GHL from AI ABC, then multiplying by proportion of biomass in WAI
  - Proportion "determined by the annual stock assessment process"
  - Based on 2018 estimate from RE model, proportion = 15.7%
    - Down from 25.6% estimated in 2016-2017 assessments
  - Maximum GHL percentage increasing from 31% to 35% in 2020
    - But capped at min(ABC×0.35, 6804 t) = 6804 t
  - Recommended 2020 ABC is 20,600 t, implying a 2020 WAI harvest limit of (20,600 t – 6804 t) × 0.157 = 2,166 t
    - 2019 WAI catch through 11/23 = 1,343 t

This information is distributed solely for the purpose of pre-dissemination peer review under applicable information quality guidelines.
It has not been formally disseminated by the National Marine Fisheries Service and should not be construed to represent any agency determination or policy.

AI Pacific cod, continued

- Structure of the new age-structured models:
  - One fishery, one gear type, one season per year
  - Single-sex model with 1:1 male:female ratio
  - Logistic age-based selectivity for both the fishery and survey
  - External estimation of a single growth curve (von Bertalanffy)
  - An ageing error matrix for ages 1 through 10+
  - All parameters constant over time except for recruitment and F
  - Internal estimation of F, catchability, and selectivity parameters
  - Recruitment estimated as a mean with lognormal deviations
  - Natural mortality estimated outside the model

This information is distributed solely for the purpose of pre-dissemination peer review under applicable information quality guidelines.
It has not been formally disseminated by the National Marine Fisheries Service and should not be construed to represent any agency determination or policy.

AI Pacific cod, continued

- Ingrid Spies presented the age-structured models in Appendix 2A.4
- Discussion of the new models:
  - Two maturity curves were considered:
    - Observer scans
      - Pro: large sample size (n=2098) from the relevant area (AI)
      - Con: visual scans can be misleading
    - Stark (2007)
      - Pro: published histological study
      - Con: small sample size (n=129) from another area (Unimak)
  - The Team supported the authors' recommendation that the observer data are more representative, but look forward to verifying the visual samples with histological studies
  - (continued on next slide)

This information is distributed solely for the purpose of pre-dissemination peer review under applicable information quality guidelines.
It has not been formally disseminated by the National Marine Fisheries Service and should not be construed to represent any agency determination or policy.

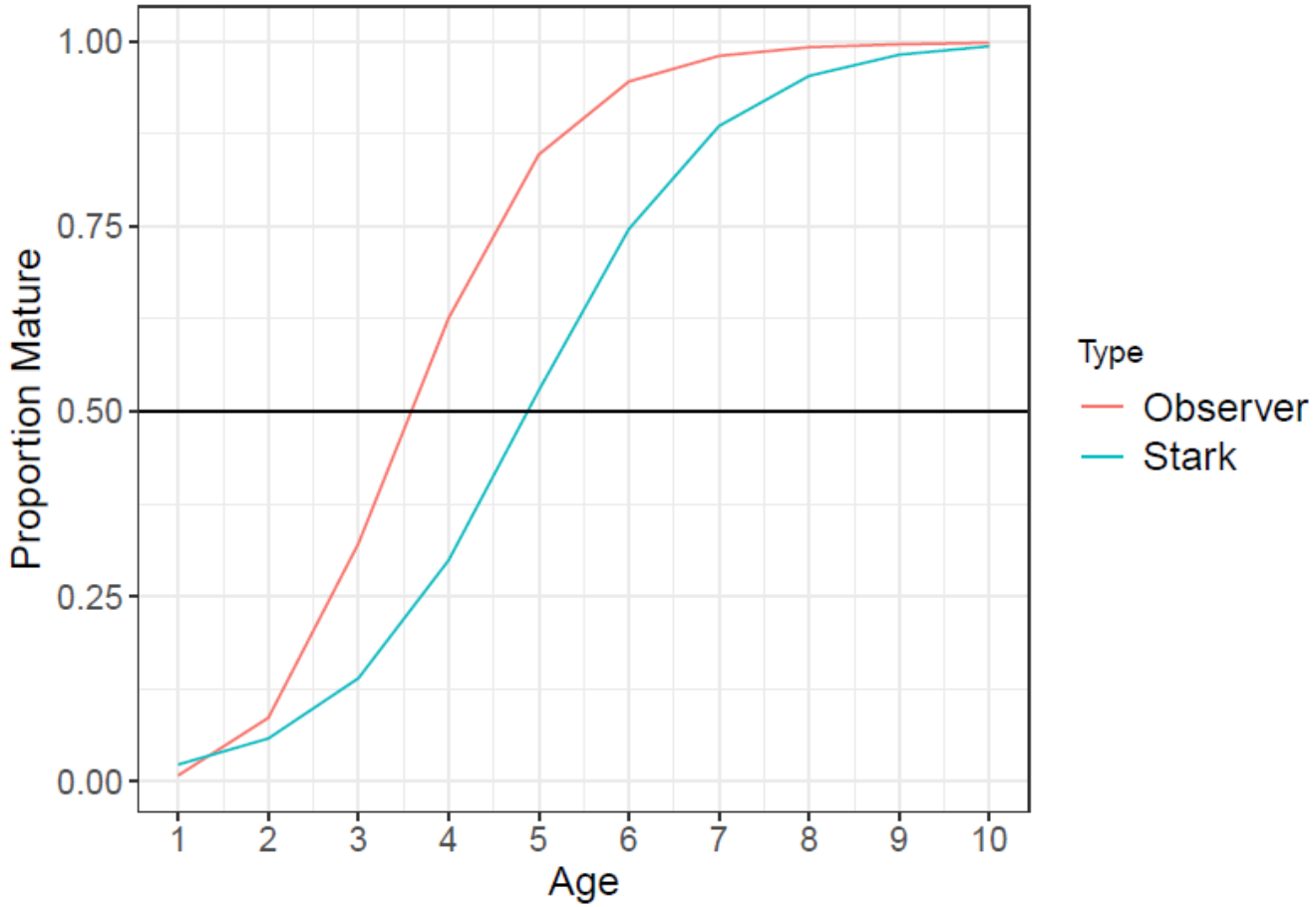
AI Pacific cod, continued

- Discussion of the new models, continued:
  - Retrospective analysis showed a large departure on the 10th peel
  - The estimated growth curve when corrected for observed lengths in the population did not fit the observed length-at-age data
- Authors' reasons for staying with Tier 5 for this cycle:
  - This is an "off" year for the survey, so there may be an expectation of no major changes
  - Staying would provide an opportunity to catch any problems with the new models and allow reviewers to become familiar with them
  - None of the 2020 ABCs from the age-structured models are below the Tier 5 value, so staying imposes little risk to the stock
  - As the assessment was being developed, there did not appear to be sufficient time to create a guidelines-compliant Appendix 2A.4

This information is distributed solely for the purpose of pre-dissemination peer review under applicable information quality guidelines.
It has not been formally disseminated by the National Marine Fisheries Service and should not be construed to represent any agency determination or policy.

AI Pacific cod, continued

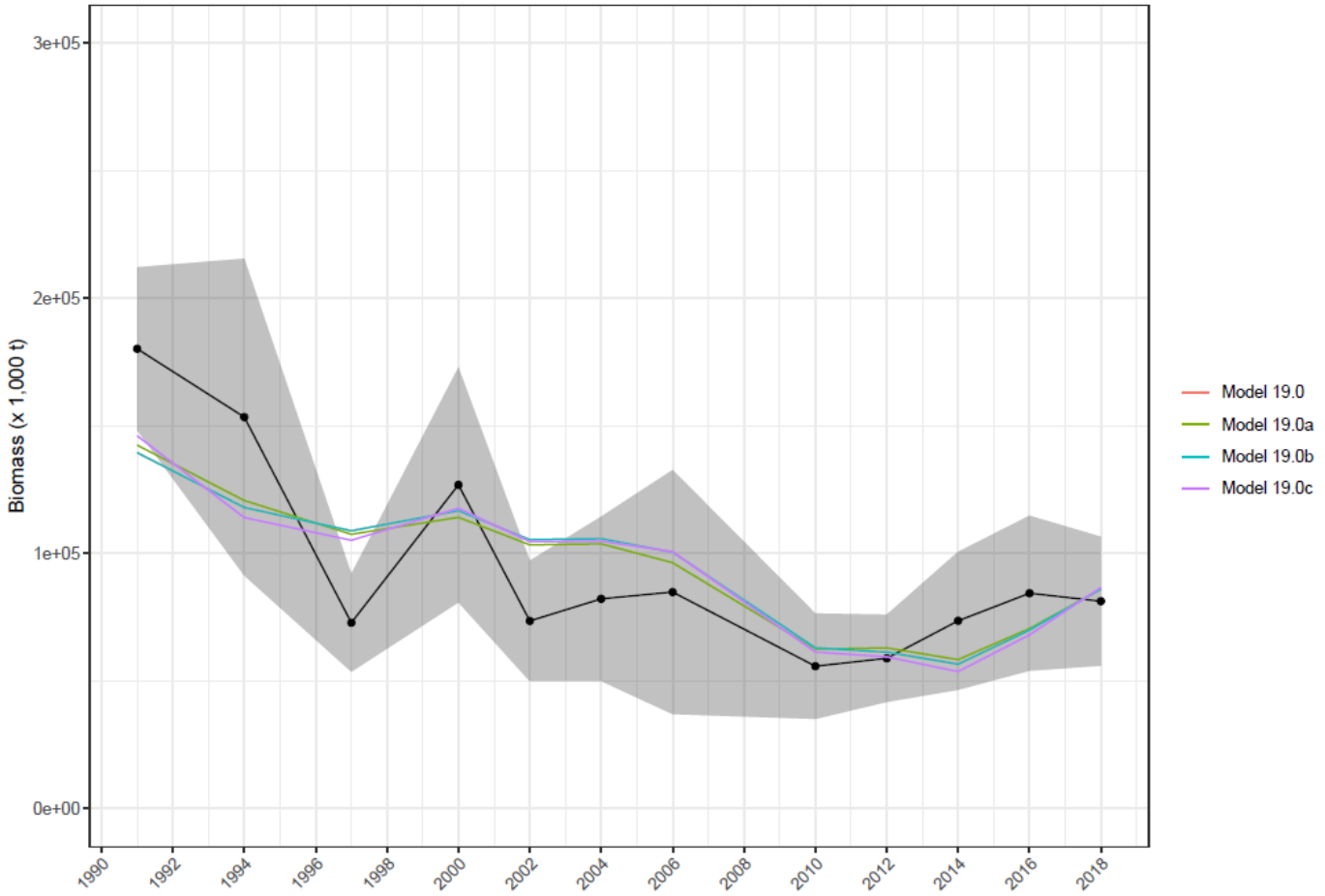
- Maturity curves



This information is distributed solely for the purpose of pre-dissemination peer review under applicable information quality guidelines.
It has not been formally disseminated by the National Marine Fisheries Service and should not be construed to represent any agency determination or policy.

AI Pacific cod, continued

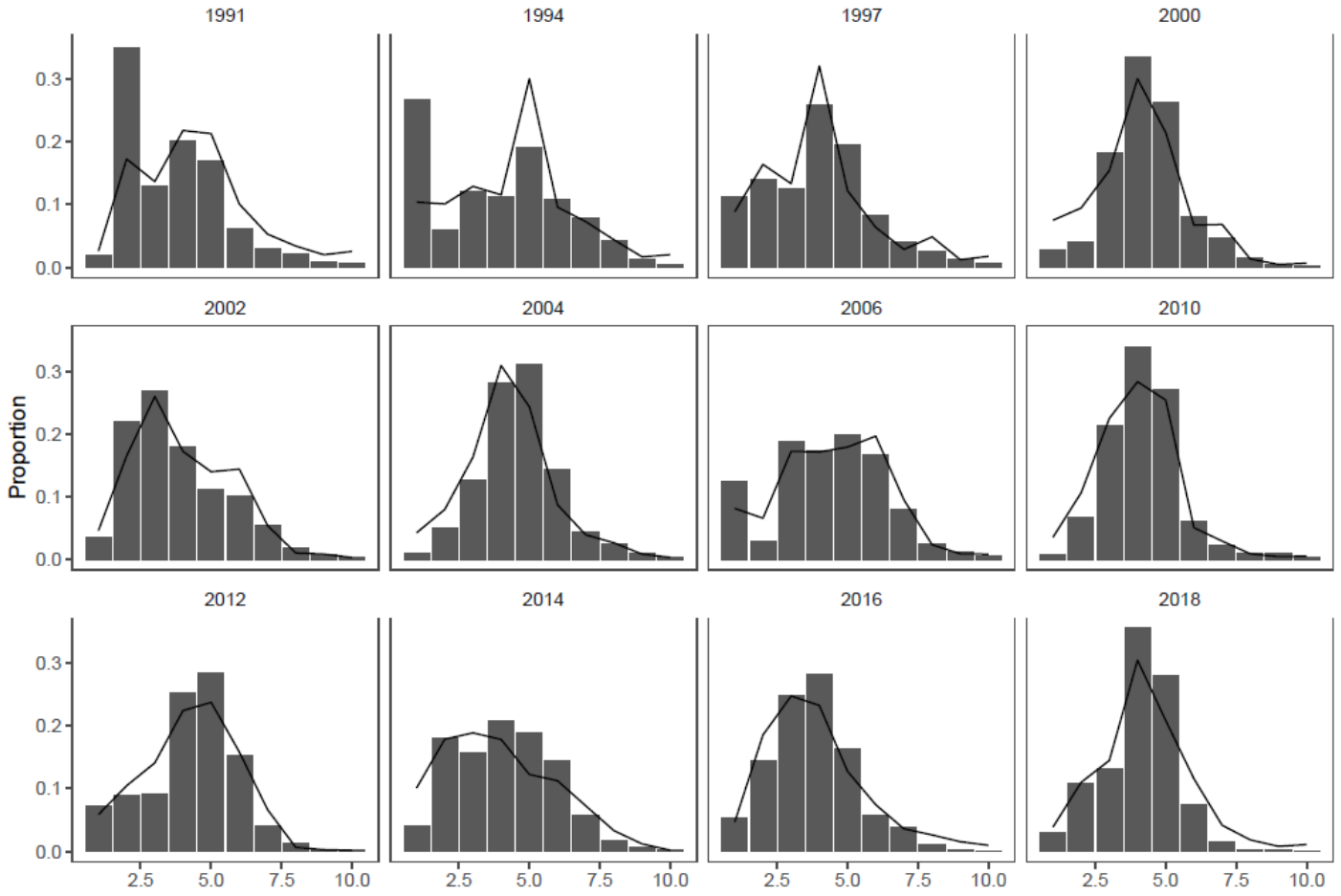
- Survey biomass data and model fits



This information is distributed solely for the purpose of pre-dissemination peer review under applicable information quality guidelines.
It has not been formally disseminated by the National Marine Fisheries Service and should not be construed to represent any agency determination or policy.

AI Pacific cod, continued

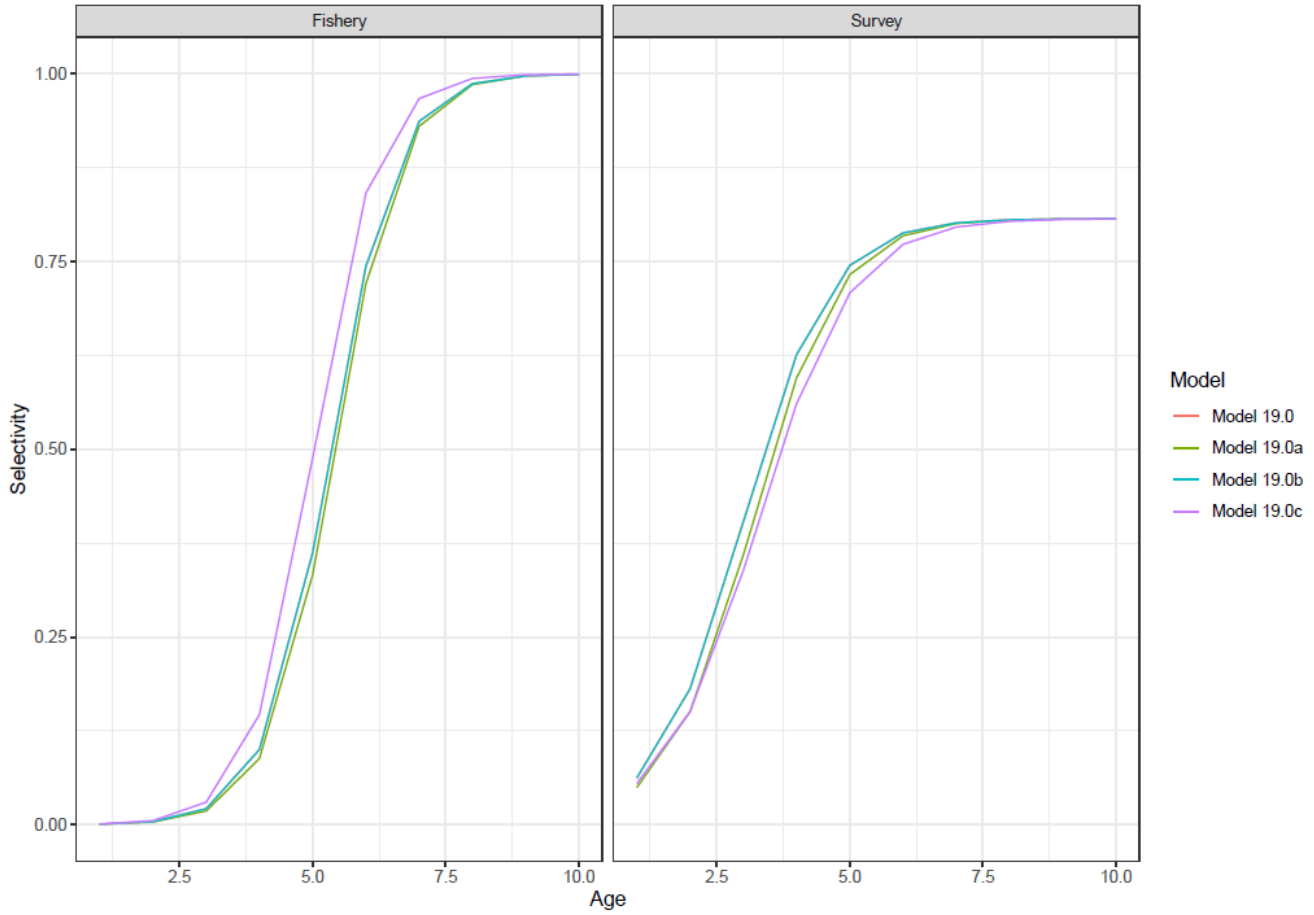
- Agecomp fits (Model 19.0)



This information is distributed solely for the purpose of pre-dissemination peer review under applicable information quality guidelines.
It has not been formally disseminated by the National Marine Fisheries Service and should not be construed to represent any agency determination or policy.

AI Pacific cod, continued

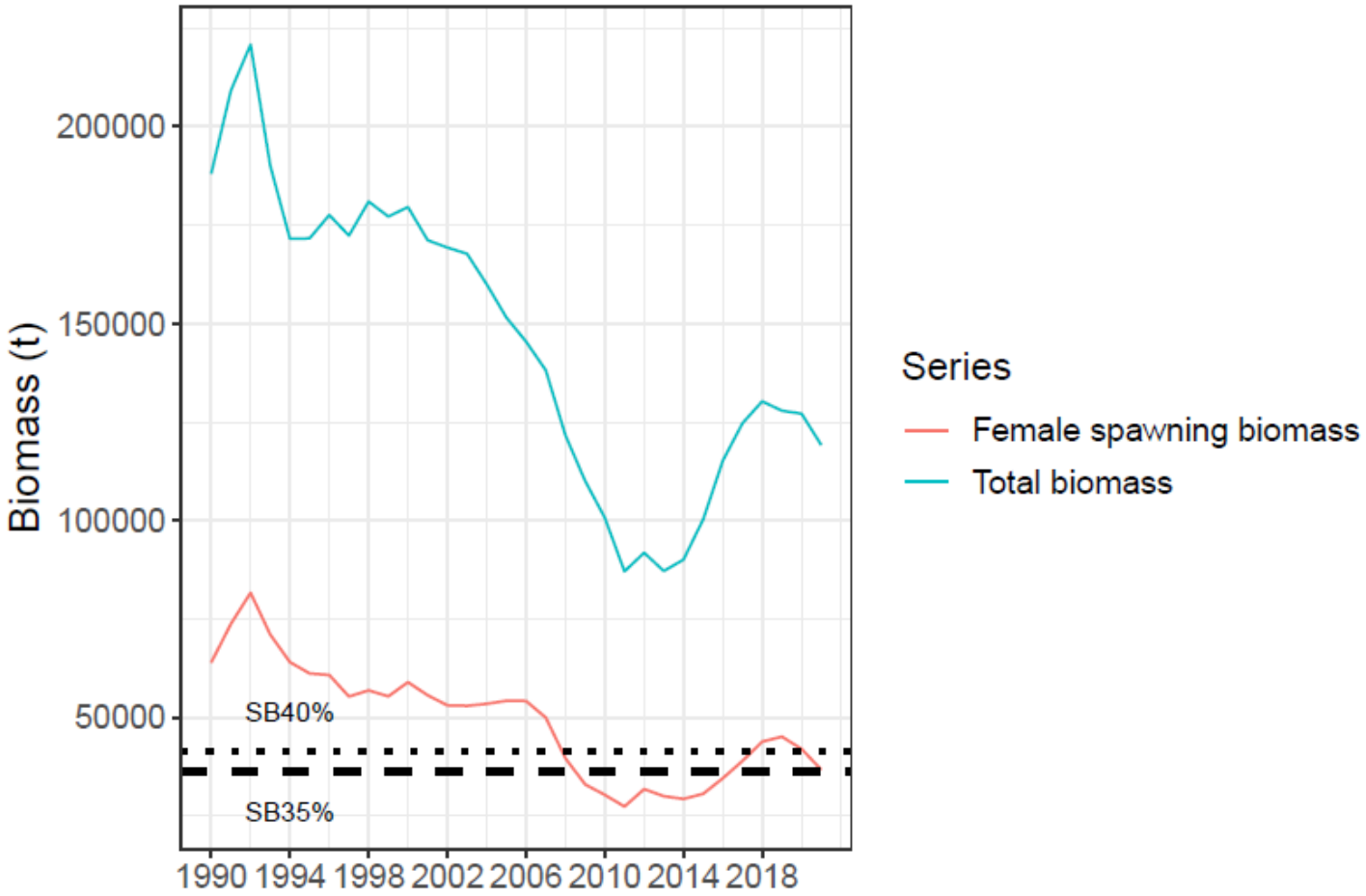
- Selectivity x catchability



This information is distributed solely for the purpose of pre-dissemination peer review under applicable information quality guidelines.
It has not been formally disseminated by the National Marine Fisheries Service and should not be construed to represent any agency determination or policy.

AI Pacific cod, continued

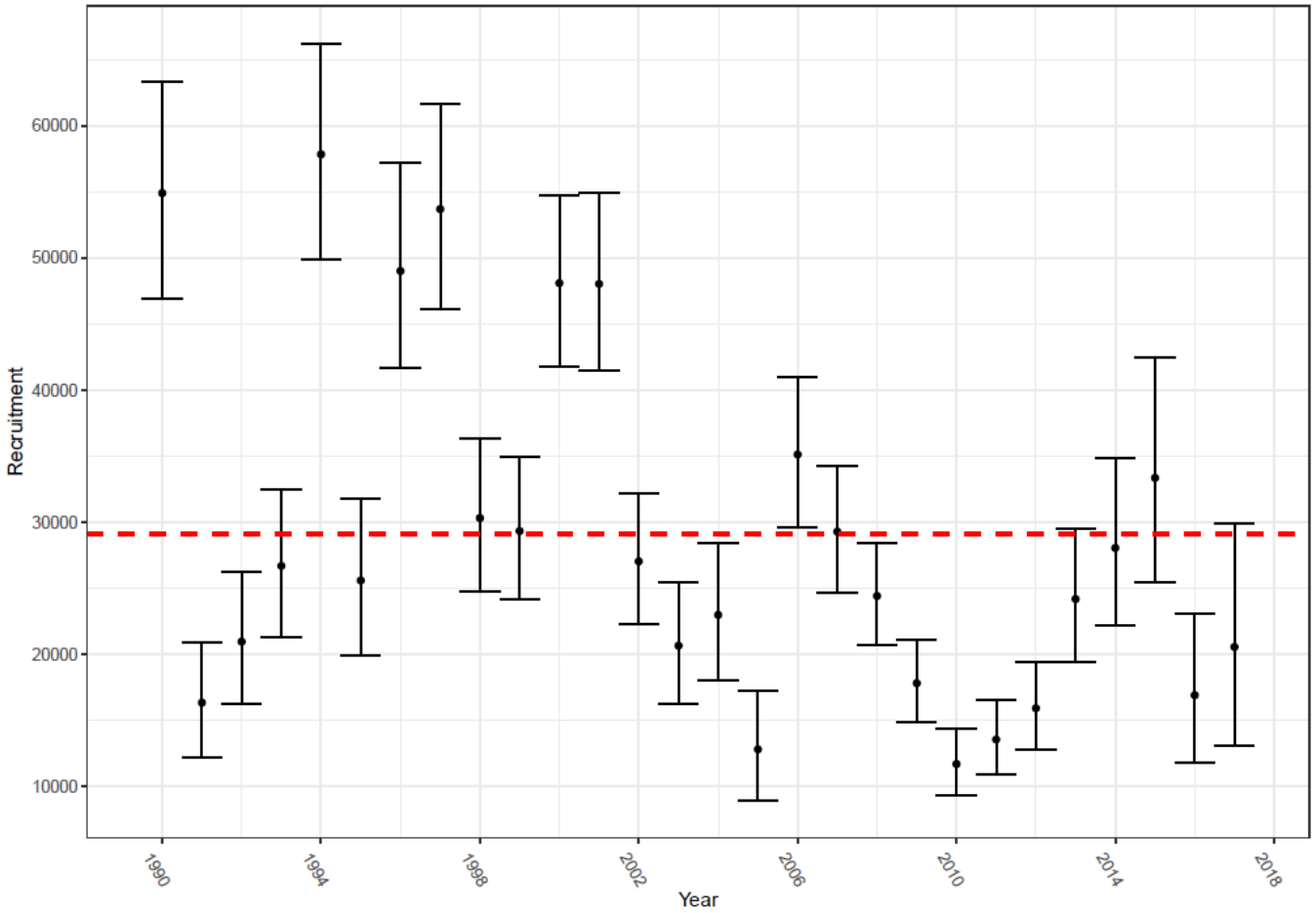
- Model 19.0 estimated biomass time series



This information is distributed solely for the purpose of pre-dissemination peer review under applicable information quality guidelines.
It has not been formally disseminated by the National Marine Fisheries Service and should not be construed to represent any agency determination or policy.

AI Pacific cod, continued

- Model 19.0 estimates of age 1 recruitment, with 95% credible intervals



This information is distributed solely for the purpose of pre-dissemination peer review under applicable information quality guidelines.
It has not been formally disseminated by the National Marine Fisheries Service and should not be construed to represent any agency determination or policy.

AI Pacific cod, continued

- Executive Summary tables for the age-structured models

Quantity	Model 19.0a M=0.40 2020	Model 19.0a M=0.40 2021	Model 19.0 Base 2020	Model 19.0 Base 2021
M (natural mortality rate)	0.40	0.40	0.34	0.34
Tier	3b	3b	3b	3b
Projected total (age 1+) biomass (t)	152,919	133,219	127,146 t	119,180 t
Projected female spawning biomass (t)	47,907	37,065	42,009 t	36,743 t
$B_{100\%}$	99,221	99,221	103,330 t	103,330 t
$B_{40\%}$	39,688	39,688	41,332 t	41,332 t
$B_{35\%}$	34,727	34,727	36,165 t	36,165 t
F_{OFL}	1.155	1.155	0.787	0.787
$maxF_{ABC}$	0.863	0.863	0.605	0.605
F_{ABC}	0.863	0.863	0.605	0.605
OFL	47,159	32,143	33,008 t	25,419 t
$maxABC$	38,482	26,278	26,957 t	20,781 t
ABC	38,482	26,278	26,957 t	20,781 t

Quantity	Model 19.0b Stark maturity 2020	Model 19.0b Stark maturity 2021	Model 19.0c No fish lengths 2020	Model 19.0c No fish lengths 2021
M (natural mortality rate)	0.34	0.34	0.34	0.34
Tier	3b	3b	3b	3b
Projected total (age 1+) biomass (t)	127,152	125,482	116,010 t	115,421 t
Projected female spawning biomass (t)	42,009	32,647	42,009 t	35,341 t
$B_{100\%}$	91,688	91,688	101,934 t	101,934 t
$B_{40\%}$	36,675	36,675	40,773 t	40,773 t
$B_{35\%}$	32,091	32,091	35,677 t	35,677 t
F_{OFL}	0.609	0.609	0.651	0.651
$maxF_{ABC}$	0.483	0.483	0.511	0.511
F_{ABC}	0.483	0.483	0.511	0.511
OFL	25,458	22,825	24,942 t	22,344 t
$maxABC$	21,134	18,926	20,591 t	18,404 t
ABC	21,134	18,926	20,591 t	18,404 t

This information is distributed solely for the purpose of pre-dissemination peer review under applicable information quality guidelines.
It has not been formally disseminated by the National Marine Fisheries Service and should not be construed to represent any agency determination or policy.

AI Pacific cod, continued

- Discussion:
  - VAST is not ready for use with survey data from the AI because it does not properly account for the presence of islands
  - The fishery performance was affected by a set aside in January, which is before the peak of the AI fishery when Pacific cod begin to school, thus making them more difficult to catch
    - This will likely not happen in the future with Amendment 113 being vacated in 2019

This information is distributed solely for the purpose of pre-dissemination peer review under applicable information quality guidelines.
It has not been formally disseminated by the National Marine Fisheries Service and should not be construed to represent any agency determination or policy.

AI Pacific cod, continued

- Recommendations for next year's assessment:
  - The Team recommended one potential solution of using a three-parameter Richards growth curve, which with its increased flexibility may better model Pacific cod growth
  - The online tool to estimate natural mortality (http://barefootecologist.com.au/shiny_m.html) provided an estimate of 0.36. The Team noted that this tool uses multiple estimators, some of which are similar, and recommended that it would be useful to receive more information on the different components used and how they are related.
  - The Team recommended that model runs with both maturity curves be reported in the future until an appropriate curve can be identified
  - The Team agreed with the authors' recommendation of an overall risk level of 2 and recommended that the SSC determine if a reduction is necessary

This information is distributed solely for the purpose of pre-dissemination peer review under applicable information quality guidelines.
It has not been formally disseminated by the National Marine Fisheries Service and should not be construed to represent any agency determination or policy.

AI Pacific cod, continued

Quantity	Last asmt.	This asmt.	Change
M	0.34	0.34	0.00
2019 tier	5	n/a	none
2020 tier	5	5	none
Biomass	80,700	80,700	0.00
2020 FOFL	0.34	0.34	0.00
2020 FABC	0.255	0.255	0.00
2019 OFL	27,400	n/a	0.00
2020 OFL	27,400	27,400	0.00
2019 ABC	20,600	n/a	0.00
2020 ABC	20,600	20,600	0.00

This information is distributed solely for the purpose of pre-dissemination peer review under applicable information quality guidelines.
It has not been formally disseminated by the National Marine Fisheries Service and should not be construed to represent any agency determination or policy.

Chapter 3: sablefish (full)

- Covered in Joint Team presentation

Quantity	Last asmt.	This asmt.	Change
M	0.100	0.105	0.05
2019 tier	3b	n/a	↑
2020 tier	3a	3a	none
2019 age+ biomass	488,273	n/a	0.44
2020 age+ biomass	513,502	704,683	0.37
2019 spawning biomass	96,687	n/a	0.17
2020 spawning biomass	129,204	113,368	-0.12
B100%	291,845	264,940	-0.09
B40%	116,738	105,976	-0.09
B35%	102,146	92,729	-0.09
2020 FOFL	0.117	0.121	0.03
2020 FABC	0.051	0.044	-0.14
2019 OFL	32,798	n/a	0.54
2020 OFL	45,220	50,481	0.12
2019 ABC	15,068	n/a	0.25
2020 ABC	20,144	18,763	-0.07

This information is distributed solely for the purpose of pre-dissemination peer review under applicable information quality guidelines.
It has not been formally disseminated by the National Marine Fisheries Service and should not be construed to represent any agency determination or policy.

Chapter 4: yellowfin sole (full)

- New data:
  - Fishery and survey agecomps for 2018
  - EBS shelf survey biomass estimate for 2019, up 6% from 2018
- Model changes/alternatives:
  - Model 18.1 is the base model
  - Model 18.1a is the base model with incremented data
  - Model 18.2 fixes female M=0.12, but estimates male M=0.135
  - Authors recommend Model 18.2, Team recommends Model 18.1a

This information is distributed solely for the purpose of pre-dissemination peer review under applicable information quality guidelines.
It has not been formally disseminated by the National Marine Fisheries Service and should not be construed to represent any agency determination or policy.

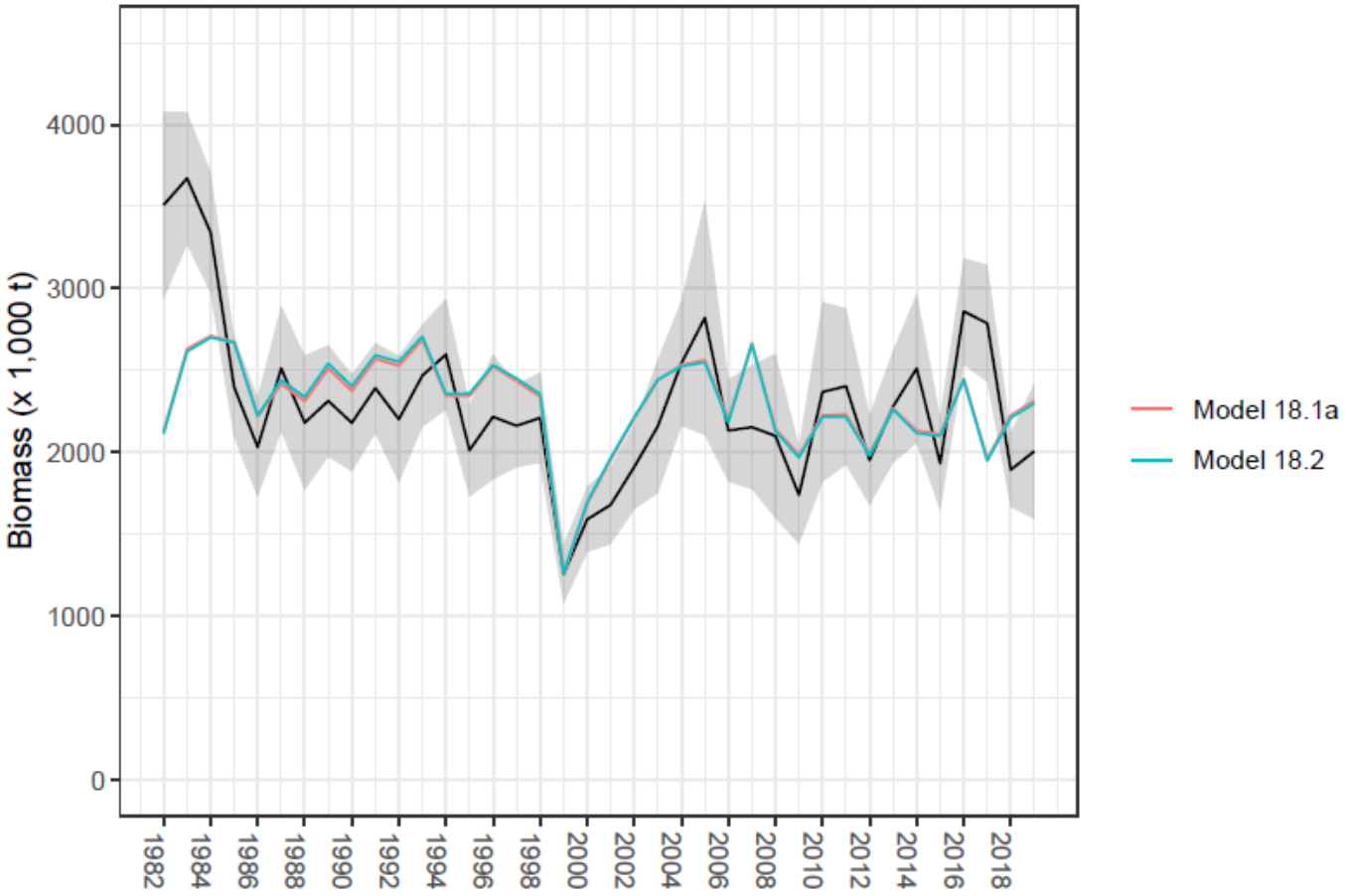
Yellowfin sole, continued

- Stock status and trend:
  - 2003, 2009, and 2014 cohorts are 47%, 43%, and 52% above ave.
  - Spawning biomass has declined almost continuously since 2007
  - 2020 spawning biomass is 69% of B_0 and 86% above B_{MSY}
- Mohn's $\rho = -0.22$ (Model 18.2; Model 18.1 had $\rho = 0.12$ last year)
- Risk level: max(1,1,1,1)=1; no ABC reduction

This information is distributed solely for the purpose of pre-dissemination peer review under applicable information quality guidelines.
It has not been formally disseminated by the National Marine Fisheries Service and should not be construed to represent any agency determination or policy.

Yellowfin sole, continued

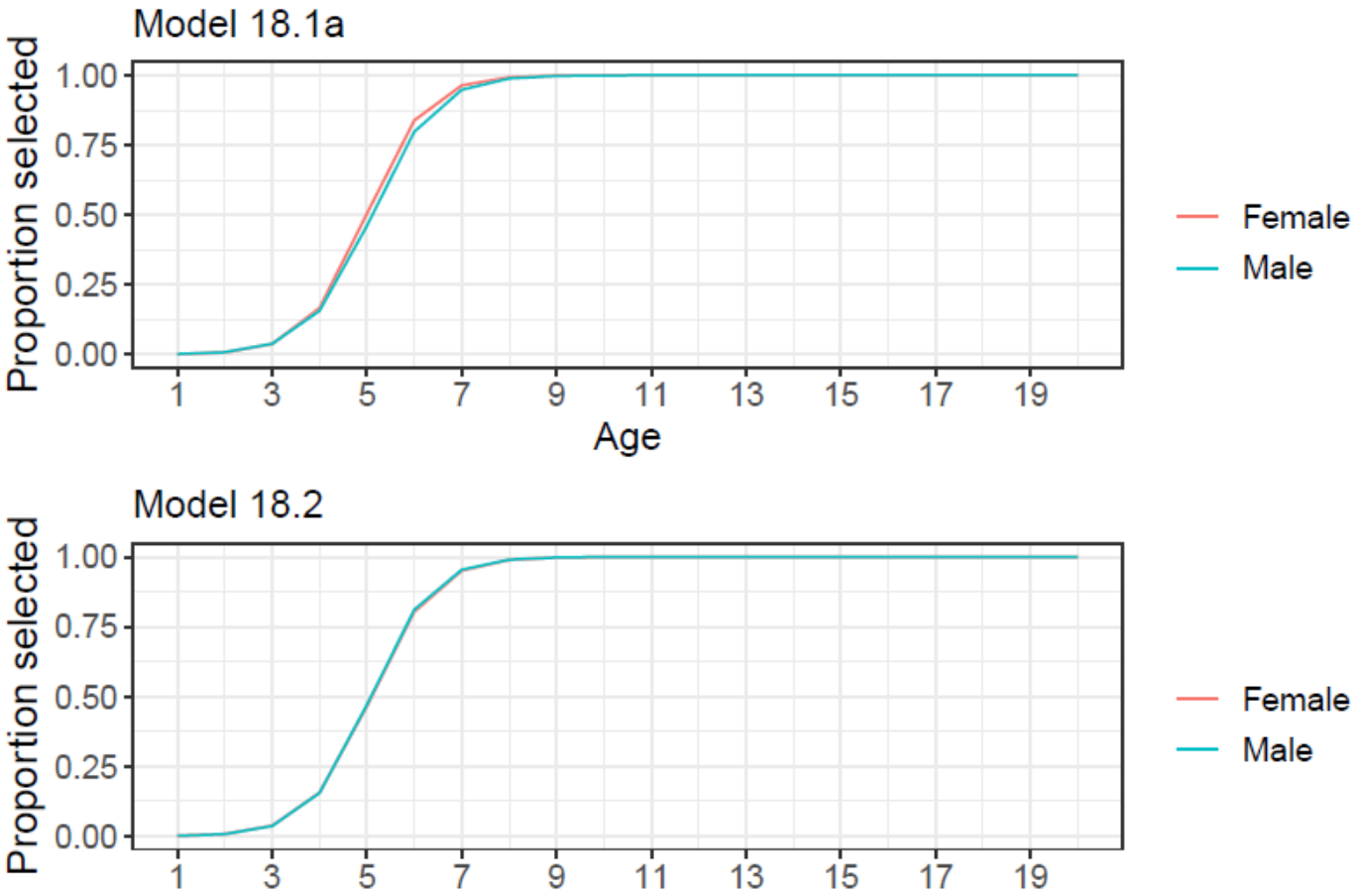
- Model fits to survey biomass



This information is distributed solely for the purpose of pre-dissemination peer review under applicable information quality guidelines.
It has not been formally disseminated by the National Marine Fisheries Service and should not be construed to represent any agency determination or policy.

Yellowfin sole, continued

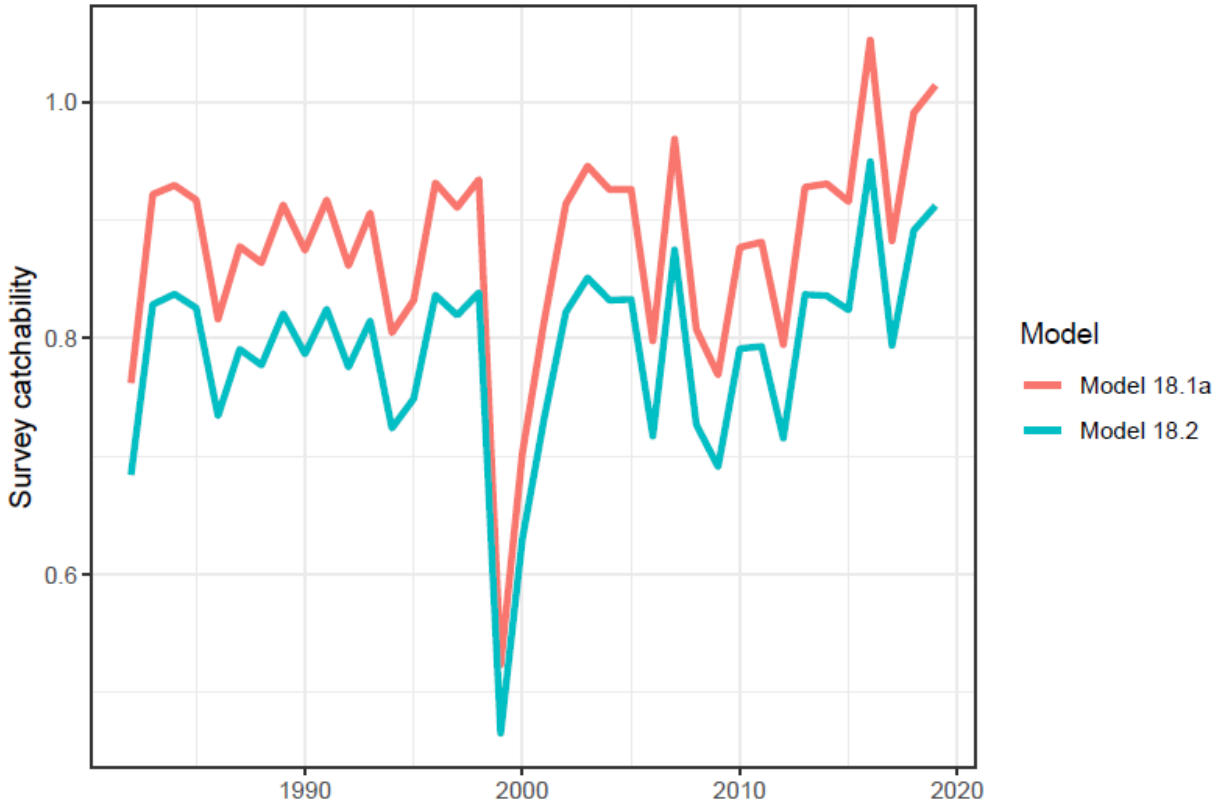
- Survey selectivity as estimated by the two models



This information is distributed solely for the purpose of pre-dissemination peer review under applicable information quality guidelines.
It has not been formally disseminated by the National Marine Fisheries Service and should not be construed to represent any agency determination or policy.

Yellowfin sole, continued

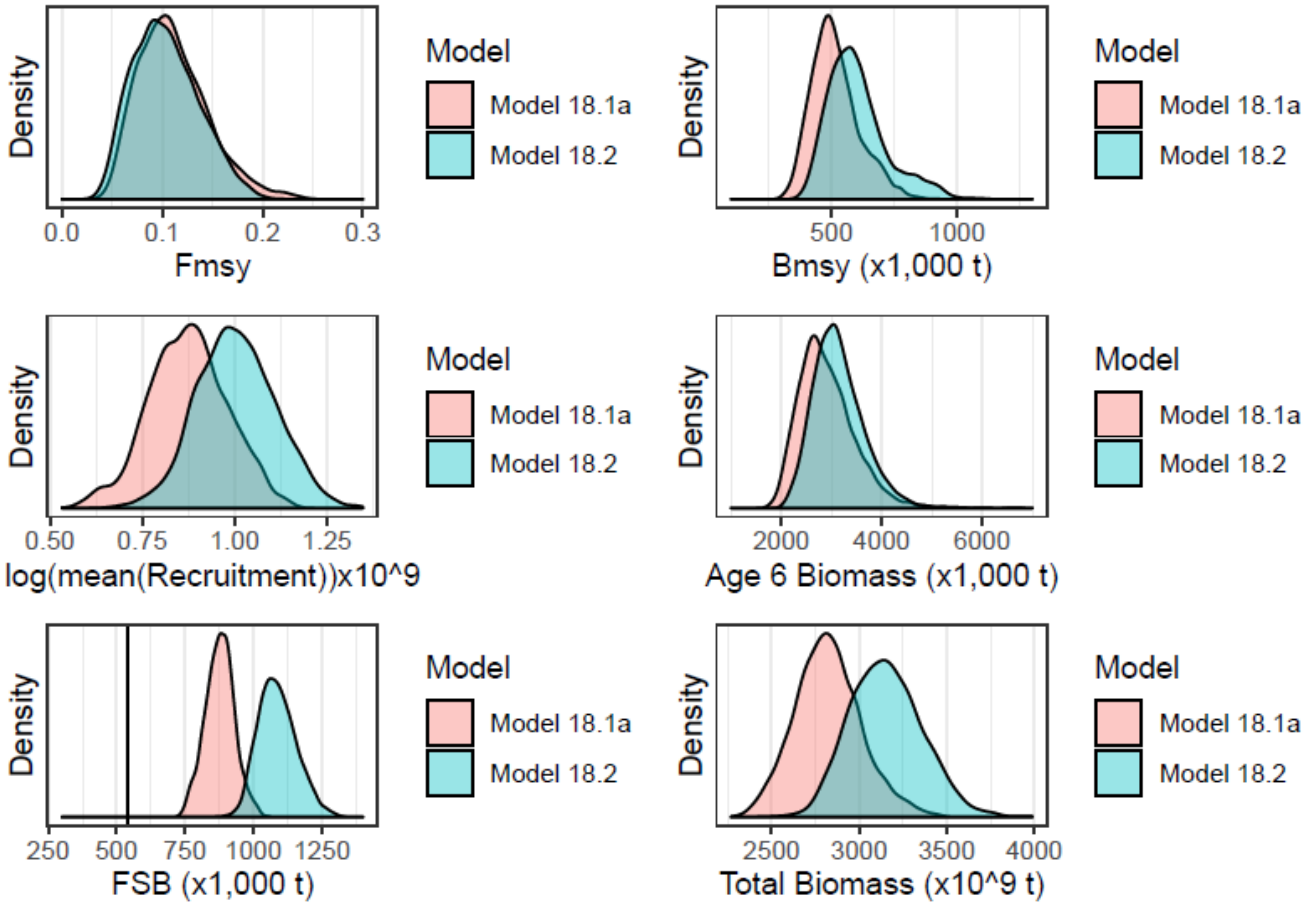
- Survey catchability as estimated by the two models
- (A function of temperature, survey start date, and interaction)



This information is distributed solely for the purpose of pre-dissemination peer review under applicable information quality guidelines.
It has not been formally disseminated by the National Marine Fisheries Service and should not be construed to represent any agency determination or policy.

Yellowfin sole, continued

- MCMC posterior distributions of various quantities



This information is distributed solely for the purpose of pre-dissemination peer review under applicable information quality guidelines.
It has not been formally disseminated by the National Marine Fisheries Service and should not be construed to represent any agency determination or policy.

Yellowfin sole, continued

- Public comment suggested that, despite the continued high biomass of the stock, fishing in the last few years has been poorer than previously
  - Fishers were said to be trawling longer for less catch
- Warmer bottom temperatures may have had an impact on distribution
- The availability of the stock to the bottom trawl survey, timing of the survey in relation to the stock spatial distribution, and how these might have changed in recent years due to warm nearshore waters were considered
- The surveys of the NBS, including the 2010 survey, encountered some yellowfin sole, about 300 kt in 2010 and 500 kt in 2019

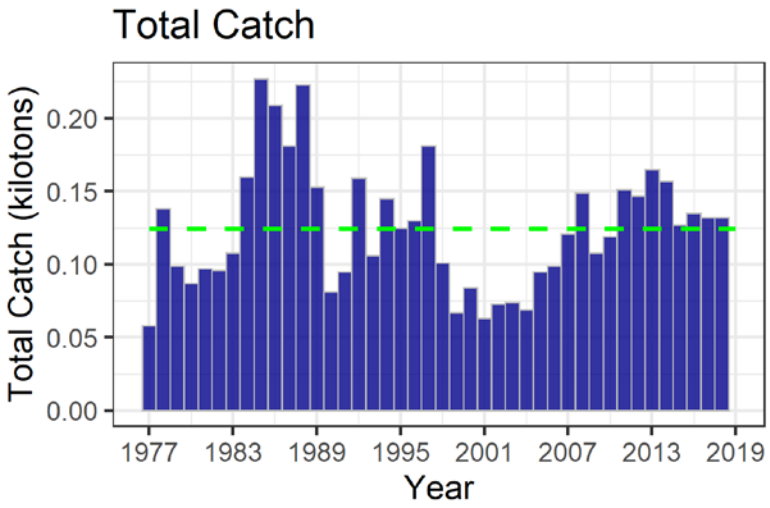
This information is distributed solely for the purpose of pre-dissemination peer review under applicable information quality guidelines.
It has not been formally disseminated by the National Marine Fisheries Service and should not be construed to represent any agency determination or policy.

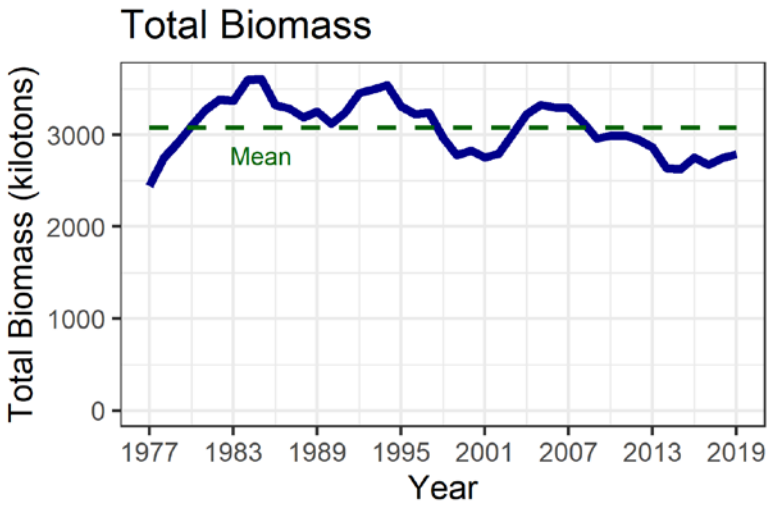
Yellowfin sole, continued

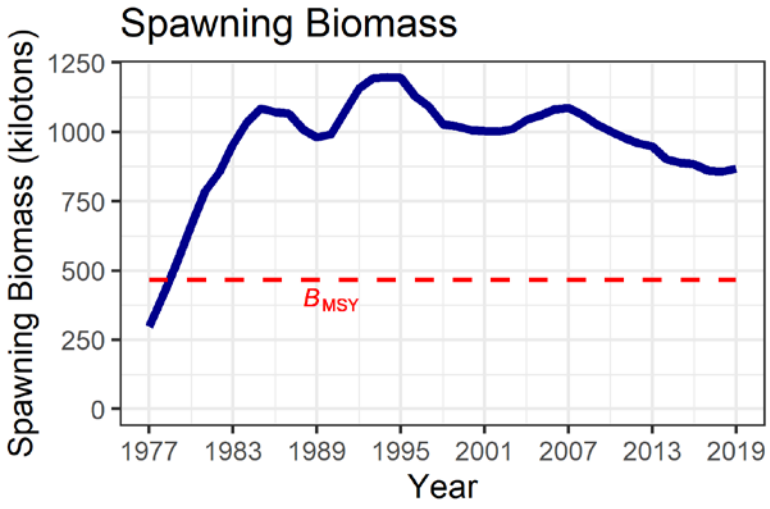
- Recommendations:
  - Although Model 18.2 was the authors' preferred model and appeared to provide a better fit to the data, the Team recommended using Model 18.1a for management in 2020, as Model 18.2 had not received thorough review and there are no conservation or other concerns indicating that a switch to Model 18.2 is necessary this year
  - The Team commended the author on her work on Model 18.2 and the Team recommended this model be presented for consideration in next year's cycle

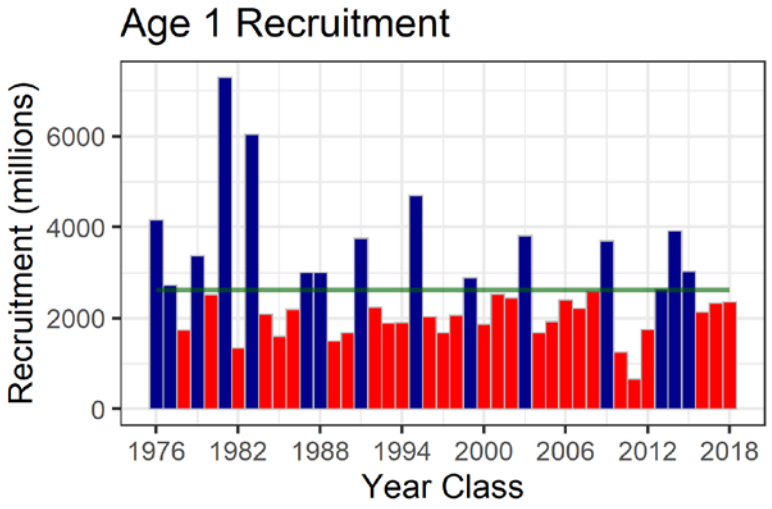
This information is distributed solely for the purpose of pre-dissemination peer review under applicable information quality guidelines.
It has not been formally disseminated by the National Marine Fisheries Service and should not be construed to represent any agency determination or policy.

Yellowfin sole, continued









This information is distributed solely for the purpose of pre-dissemination peer review under applicable information quality guidelines.
It has not been formally disseminated by the National Marine Fisheries Service and should not be construed to represent any agency determination or policy.

Yellowfin sole, continued

Quantity	Last asmt.	This asmt.	Change
M	0.12	0.12	0.00
2019 tier	1a	n/a	none
2020 tier	1a	1a	none
2019 age+ biomass	2,462,400	n/a	0.00
2020 age+ biomass	2,411,700	2,461,850	0.02
2019 spawning biomass	850,600	n/a	0.01
2020 spawning biomass	821,500	857,187	0.04
B0	1,245,400	1,245,400	0.00
Bmsy	460,800	460,800	0.00
2020 FOFL	0.118	0.117	-0.01
2020 FABC	0.107	0.106	-0.01
2019 OFL	290,000	n/a	-0.01
2020 OFL	284,000	287,307	0.01
2019 ABC	263,200	n/a	-0.01
2020 ABC	257,800	260,918	0.01

This information is distributed solely for the purpose of pre-dissemination peer review under applicable information quality guidelines.
It has not been formally disseminated by the National Marine Fisheries Service and should not be construed to represent any agency determination or policy.

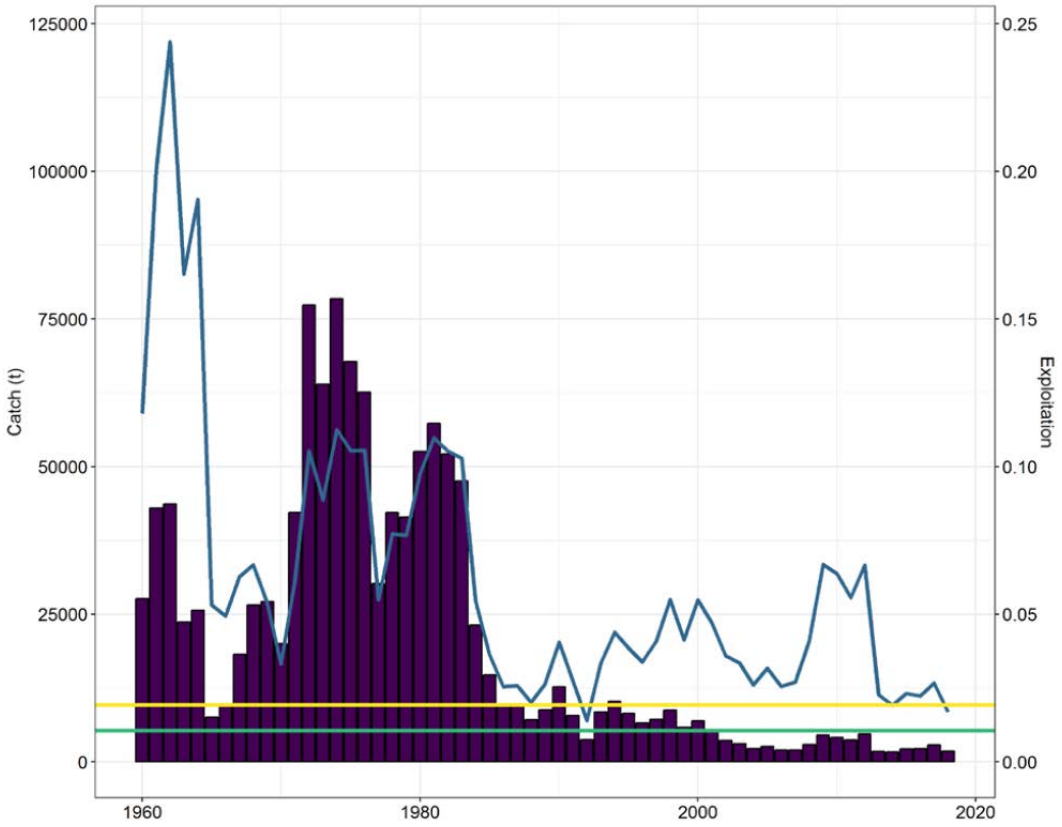
Chapter 5: Greenland turbot (partial)

- The general stock trend is continuing downward, and the survey abundance estimate is the lowest in the time-series
- One concern about the stock is the continued lack of recruitment, and uncertainty for new recruitment, given current warming trends
- An industry member noted that they are concerned about the continued lack of recruitment and what that means for them going forward
- The Team noted that it may be helpful to quantify the value of the slope survey to this assessment
- The author noted that there is already an ad hoc group working to quantify the impact of this survey to the stock assessment
- The Team recommended that the authors report on efforts to quantify impacts to this assessment of the loss of the slope survey at the September 2020 meeting

This information is distributed solely for the purpose of pre-dissemination peer review under applicable information quality guidelines.
It has not been formally disseminated by the National Marine Fisheries Service and should not be construed to represent any agency determination or policy.

Greenland turbot, continued

- Catch (bars) and catch/biomass (blue line) time series
  - Yellow line = 2019 ABC, green line = 2019 TAC



This information is distributed solely for the purpose of pre-dissemination peer review under applicable information quality guidelines.
It has not been formally disseminated by the National Marine Fisheries Service and should not be construed to represent any agency determination or policy.

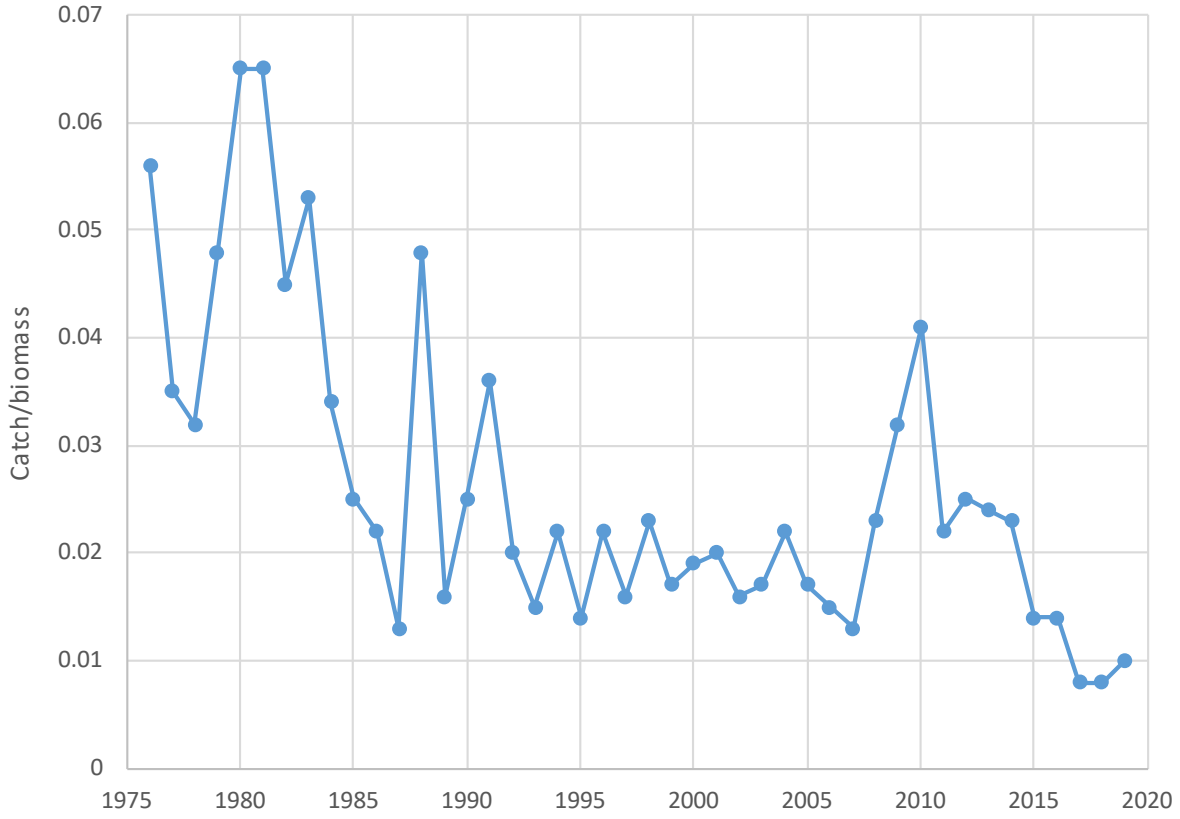
Greenland turbot, continued

Quantity	Last asmt.	This asmt.	Change
M	0.112	0.112	0.00
2019 tier	3a	n/a	none
2020 tier	3a	3a	none
2019 age+ biomass	105,930	n/a	0.00
2020 age+ biomass	98,876	106,101	0.07
2019 spawning biomass	54,244	n/a	0.05
2020 spawning biomass	52,743	57,094	0.08
B100%	90,534	90,534	0.00
B40%	36,213	36,213	0.00
B35%	31,687	31,687	0.00
2020 FOFL	0.21	0.21	0.00
2020 FABC	0.18	0.18	0.00
2019 OFL	11,362	n/a	0.00
2020 OFL	10,476	11,319	0.08
2019 ABC	9,658	n/a	0.00
2020 ABC	8,908	9,625	0.08

This information is distributed solely for the purpose of pre-dissemination peer review under applicable information quality guidelines.
It has not been formally disseminated by the National Marine Fisheries Service and should not be construed to represent any agency determination or policy.

Chapter 6: arrowtooth flounder (partial)

- Recommendations: none
- Catch/biomass time series



This information is distributed solely for the purpose of pre-dissemination peer review under applicable information quality guidelines.
It has not been formally disseminated by the National Marine Fisheries Service and should not be construed to represent any agency determination or policy.

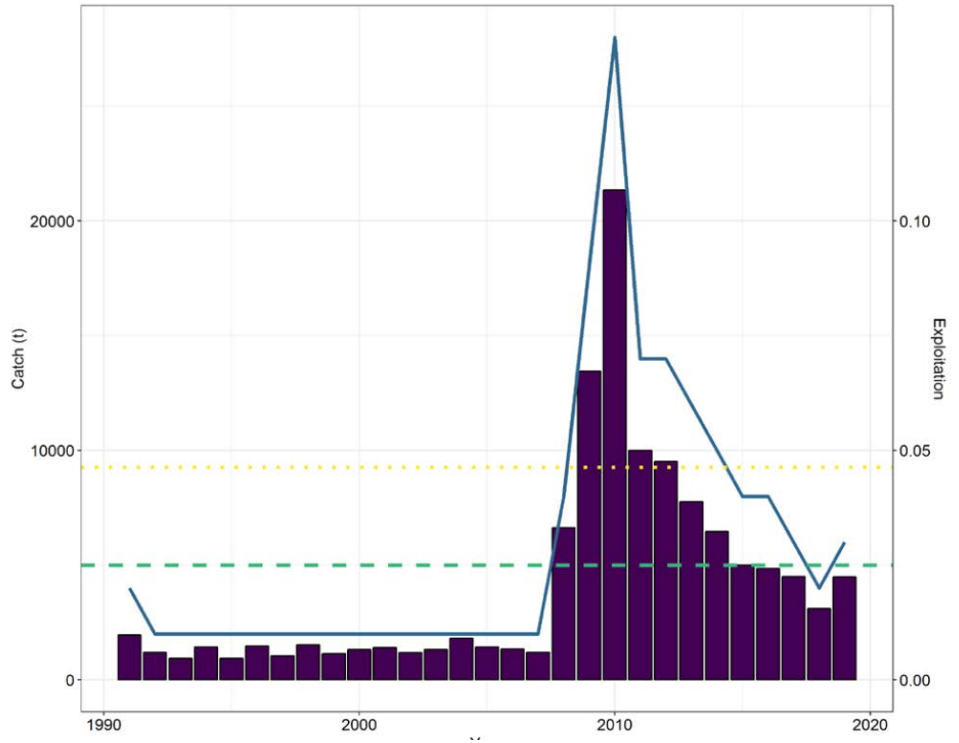
Arrowtooth flounder, continued

Quantity	Last asmt.	This asmt.	Change
M	0.35/0.20	0.35/0.20	0.00
2019 tier	3a	n/a	none
2020 tier	3a	3a	none
2019 age+ biomass	892,591	n/a	0.00
2020 age+ biomass	932,024	891,959	-0.04
2019 spawning biomass	482,174	n/a	0.00
2020 spawning biomass	472,507	481,845	0.02
B100%	606,237	606,237	0.00
B40%	242,495	242,495	0.00
B35%	212,183	212,183	0.00
2020 FOFL	0.161	0.161	0.00
2020 FABC	0.136	0.136	0.00
2019 OFL	82,939	n/a	0.01
2020 OFL	83,814	84,057	0.00
2019 ABC	70,673	n/a	0.01
2020 ABC	71,411	71,618	0.00

This information is distributed solely for the purpose of pre-dissemination peer review under applicable information quality guidelines.
It has not been formally disseminated by the National Marine Fisheries Service and should not be construed to represent any agency determination or policy.

Chapter 7: Kamchatka flounder (partial)

- Recommendations: none
- Catch (bars) and catch/biomass (blue line) time series
  - Yellow line = 2019 ABC, green line = 2019 TAC



This information is distributed solely for the purpose of pre-dissemination peer review under applicable information quality guidelines.
It has not been formally disseminated by the National Marine Fisheries Service and should not be construed to represent any agency determination or policy.

Kamchatka flounder, continued

Quantity	Last asmt.	This asmt.	Change
M	0.11	0.11	0.00
2019 tier	3a	n/a	none
2020 tier	3a	3a	none
2019 age+ biomass	155,251	n/a	0.05
2020 age+ biomass*	160,178	162,709	0.02
2019 spawning biomass	54,779	n/a	0.06
2020 spawning biomass	56,675	57,948	0.02
B100%	107,673	107,673	0.00
B40%	43,069	43,069	0.00
B35%	37,685	37,685	0.00
2020 FOFL	0.108	0.108	0.00
2020 FABC	0.090	0.090	0.00
2019 OFL	10,965	n/a	0.05
2020 OFL	11,260	11,495	0.02
2019 ABC	9,260	n/a	0.05
2020 ABC	9,509	9,708	0.02

*Last year's published value of 156,450 has been corrected

This information is distributed solely for the purpose of pre-dissemination peer review under applicable information quality guidelines.
It has not been formally disseminated by the National Marine Fisheries Service and should not be construed to represent any agency determination or policy.

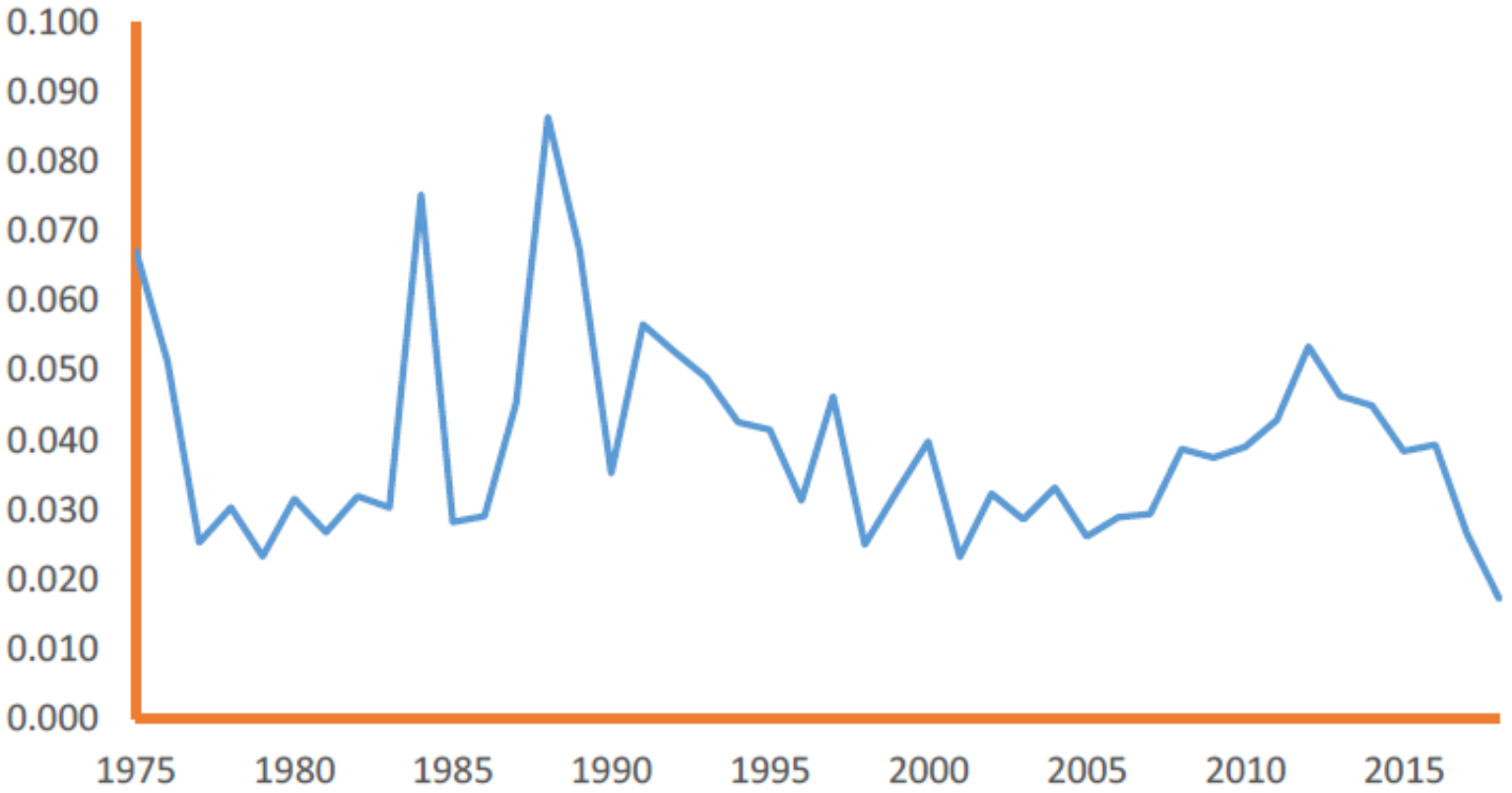
Chapter 8: northern rock sole (partial)

- 2020 age+ biomass, ABC, and OFL are all up 29% from 2019, due to entry of the 2014 cohort (estimated to be more than 2x ave. last year)
- The fishery developed much more slowly in 2019 than in previous years
- Public comment:
  - Avoidance of Pacific cod has affected the distribution of the fishery
  - Information regarding spatial overlap of various groundfish species, including Pacific halibut, would be useful
  - Species distributional maps in GIS layers would also be useful
- The stock's geographic distribution has moved northward since 2010
- It was hypothesized that the recent warm trend may have changed the spatial distribution of Pcod and rock sole, resulting in increased overlap
- The Team recommended that the Bering Sea survey group conduct a spatial analysis looking specifically at the spatial overlap of this species (and other commercially important flatfish species) with Pacific cod

This information is distributed solely for the purpose of pre-dissemination peer review under applicable information quality guidelines.
It has not been formally disseminated by the National Marine Fisheries Service and should not be construed to represent any agency determination or policy.

Northern rock sole, continued

- Catch/biomass time series



This information is distributed solely for the purpose of pre-dissemination peer review under applicable information quality guidelines.
It has not been formally disseminated by the National Marine Fisheries Service and should not be construed to represent any agency determination or policy.

Northern rock sole, continued

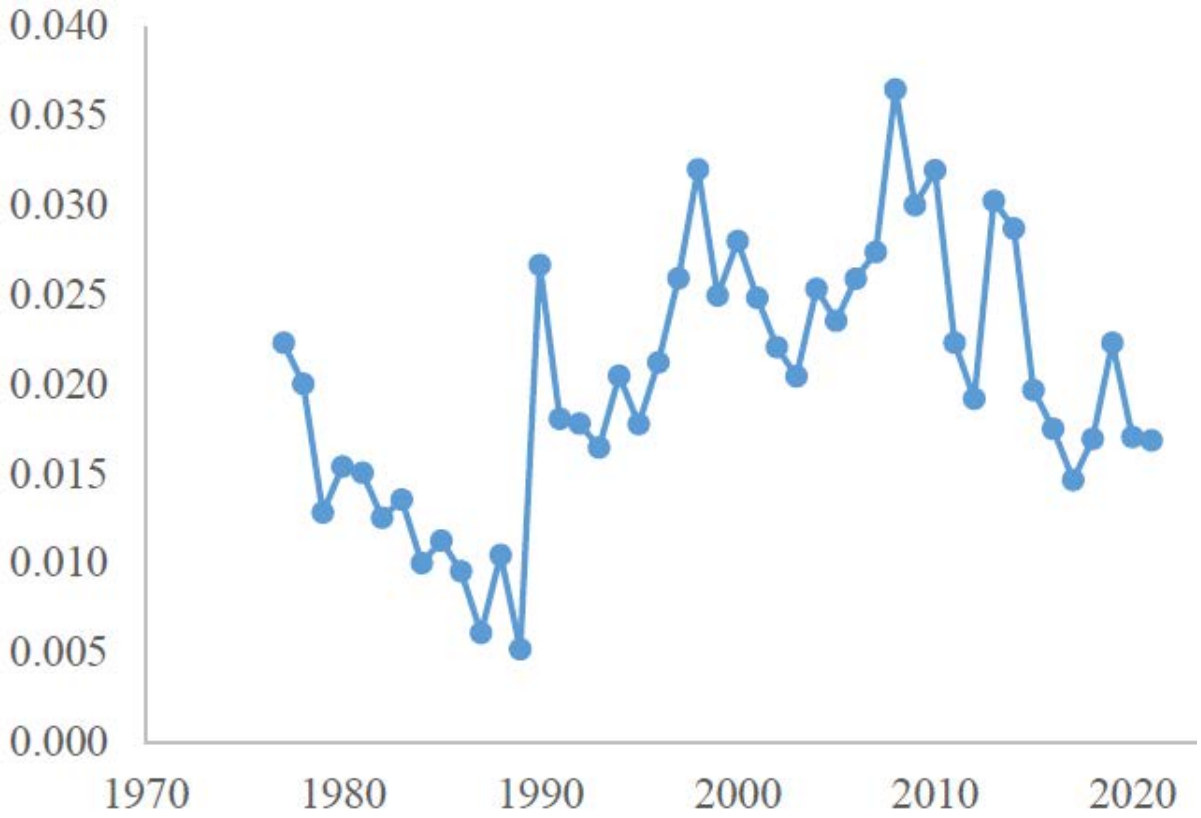
Quantity	Last asmt.	This asmt.	Change
M	0.15	0.15	0.00
2019 tier	1a	n/a	none
2020 tier	1a	1a	none
2019 age+ biomass	828,000	n/a	0.29
2020 age+ biomass	1,001,400	1,068,000	0.07
2019 spawn. Biomass	417,800	n/a	-0.09
2020 spawning bio.*	338,300	380,600	0.13
B0	515,680	515,680	0.00
Bmsy	186,000	186,000	0.00
2020 FOFL	0.147	0.147	0.00
2020 FABC	0.144	0.144	0.00
2019 OFL	122,000	n/a	0.29
2020 OFL*	147,500	157,300	0.07
2019 ABC	118,900	n/a	0.29
2020 ABC*	143,700	153,300	0.07

*Last year's published values are "corrected" in chapter

This information is distributed solely for the purpose of pre-dissemination peer review under applicable information quality guidelines.
It has not been formally disseminated by the National Marine Fisheries Service and should not be construed to represent any agency determination or policy.

Chapter 9: flathead sole (partial)

- Recommendations: none
- Catch/biomass time series



This information is distributed solely for the purpose of pre-dissemination peer review under applicable information quality guidelines.
It has not been formally disseminated by the National Marine Fisheries Service and should not be construed to represent any agency determination or policy.

Flathead sole, continued

Quantity	Last asmt.	This asmt.	Change
M	0.20	0.20	0.00
2019 tier	3a	n/a	none
2020 tier	3a	3a	none
2019 age+ biomass	673,718	n/a	0.02
2020 age+ biomass	686,431	684,768	0.00
2019 spawning biomass	153,203	n/a	0.01
2020 spawning biomass	155,032	154,195	-0.01
B100%	212,060	212,060	0.00
B40%	84,824	84,824	0.00
B35%	74,221	74,221	0.00
2020 FOFL	0.47	0.47	0.00
2020 FABC	0.38	0.38	0.00
2019 OFL	80,918	n/a	0.02
2020 OFL	83,190	82,810	0.00
2019 ABC	66,625	n/a	0.02
2020 ABC	68,448	68,134	0.00

This information is distributed solely for the purpose of pre-dissemination peer review under applicable information quality guidelines.
It has not been formally disseminated by the National Marine Fisheries Service and should not be construed to represent any agency determination or policy.

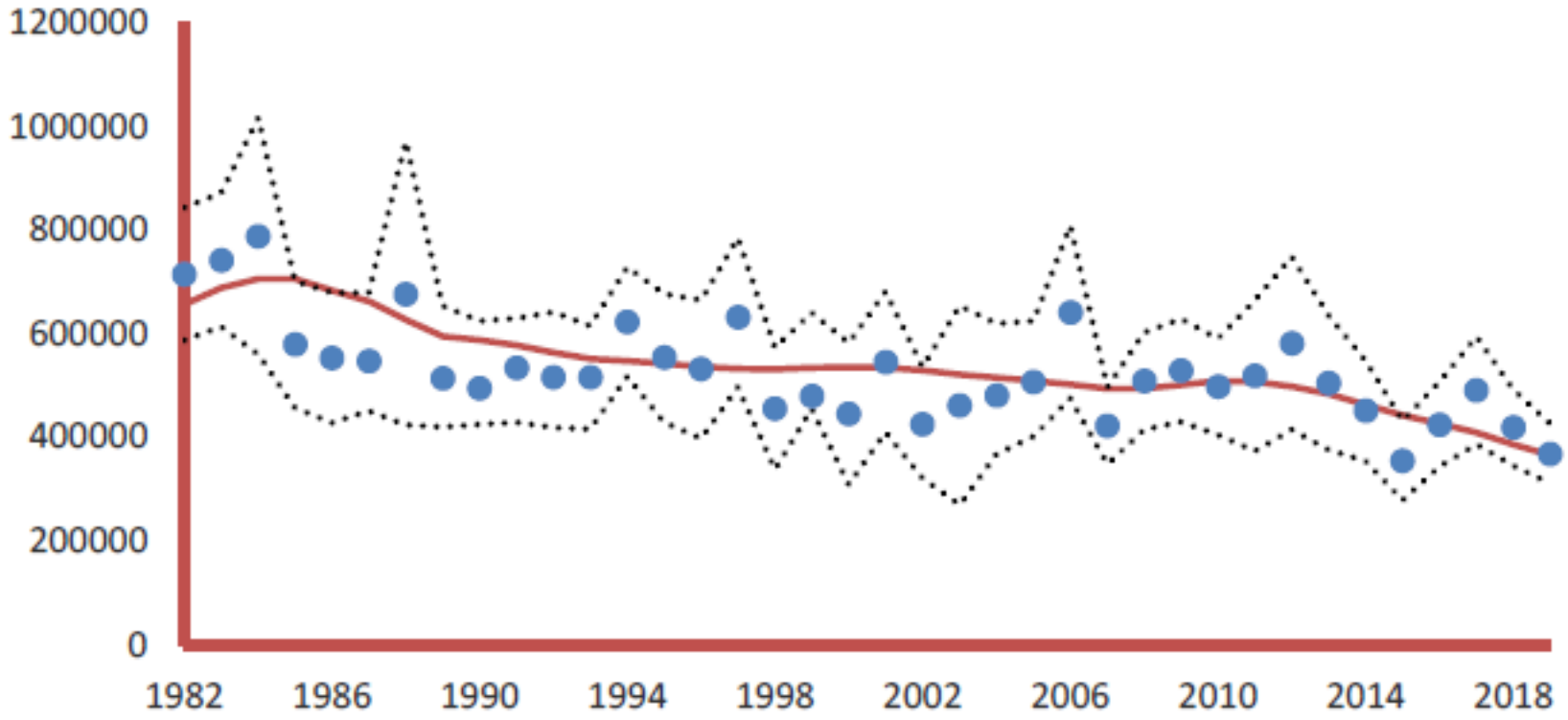
Chapter 10: Alaska plaice (full)

- New data:
  - 2018 and 2019 EBS shelf survey biomass down 15% and 12% from 2017 and 2018, respectively
  - 2017 and 2018 survey and fishery agecomps
- Model changes/alternatives: none
- Stock status and trend:
  - 2001, 2002, 2014, and 2016 cohorts are 66%, 94%, 85%, and 108% above average
    - However, 1994-2000 and 2003-2013 cohorts were all below ave.
  - Spawning biomass has been declining since 2013
  - 2020 spawning biomass is 51% of $B_{100\%}$
- Mohn's $\rho = -0.02$
- Risk level: max(1,1,1,1)=1; no ABC reduction

This information is distributed solely for the purpose of pre-dissemination peer review under applicable information quality guidelines.
It has not been formally disseminated by the National Marine Fisheries Service and should not be construed to represent any agency determination or policy.

Alaska plaice, continued

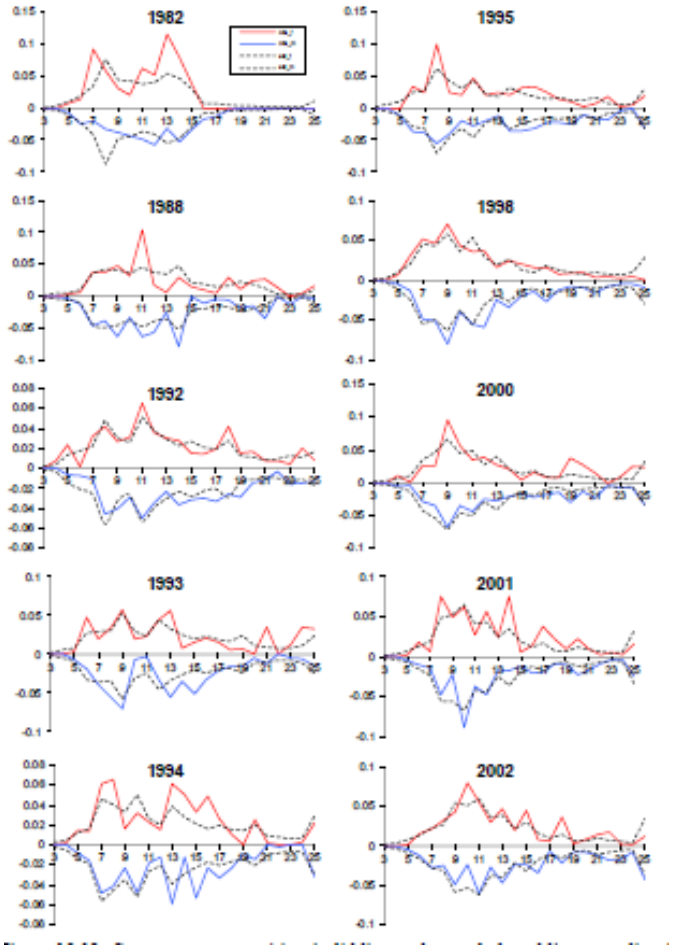
- Fit to survey



This information is distributed solely for the purpose of pre-dissemination peer review under applicable information quality guidelines.
It has not been formally disseminated by the National Marine Fisheries Service and should not be construed to represent any agency determination or policy.

Alaska plaice, continued

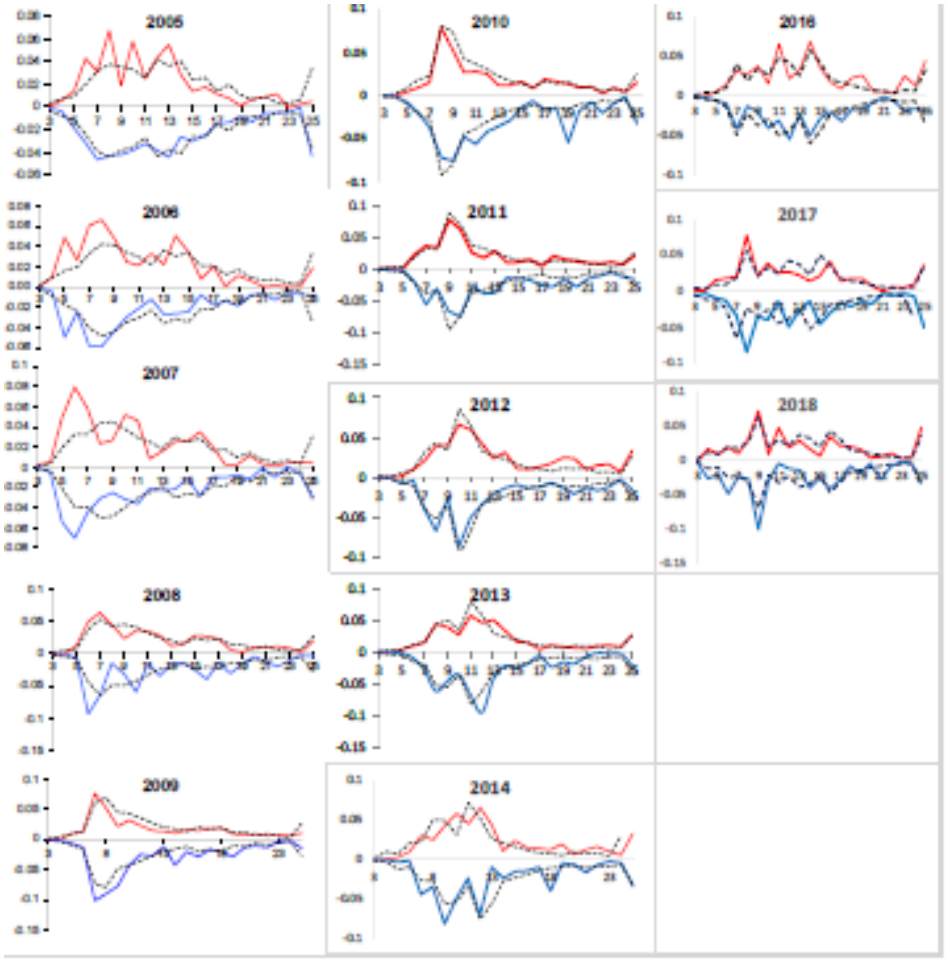
- Fit to survey agecomps (solid=observed, dotted = estimated



This information is distributed solely for the purpose of pre-dissemination peer review under applicable information quality guidelines.
It has not been formally disseminated by the National Marine Fisheries Service and should not be construed to represent any agency determination or policy.

Alaska plaice, continued

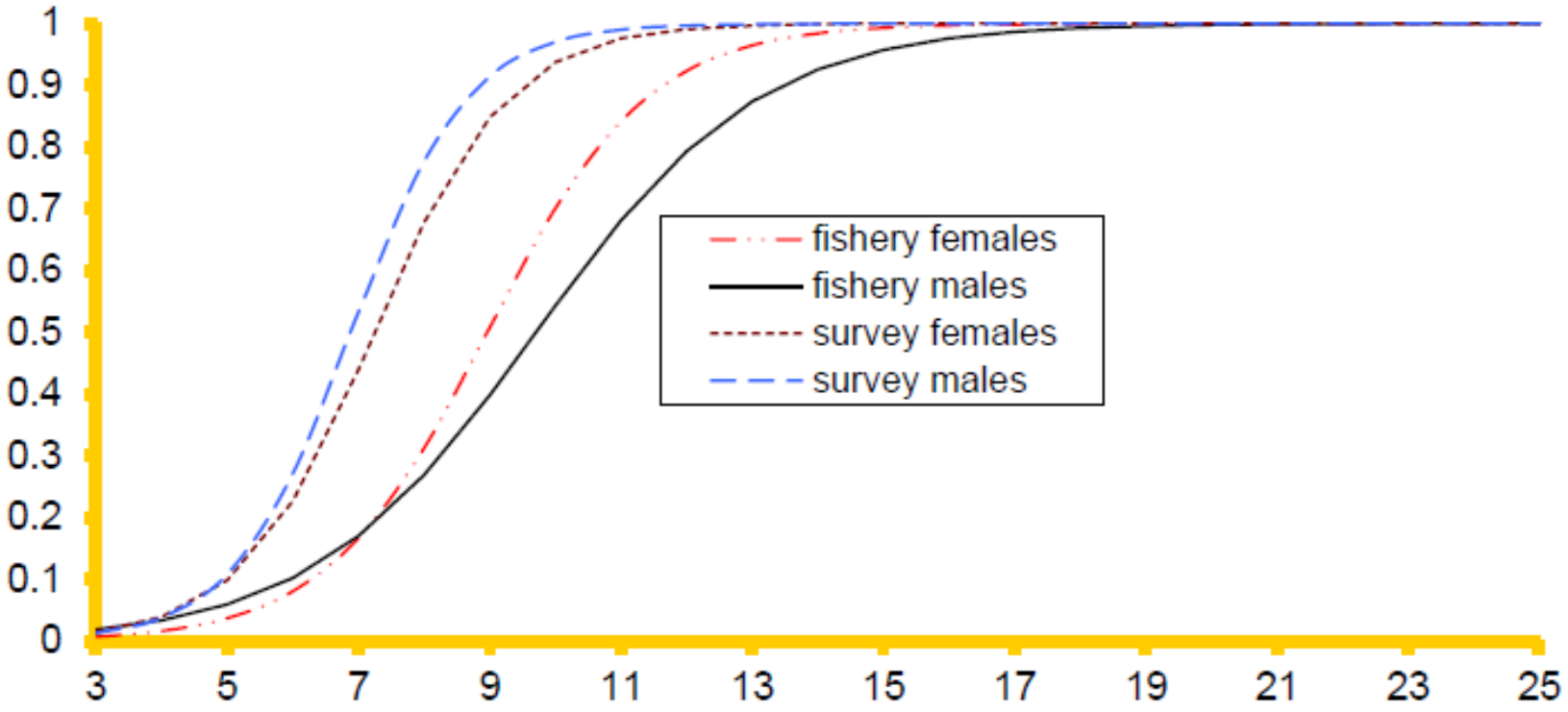
- Fit to survey agecomps, continued



This information is distributed solely for the purpose of pre-dissemination peer review under applicable information quality guidelines.
It has not been formally disseminated by the National Marine Fisheries Service and should not be construed to represent any agency determination or policy.

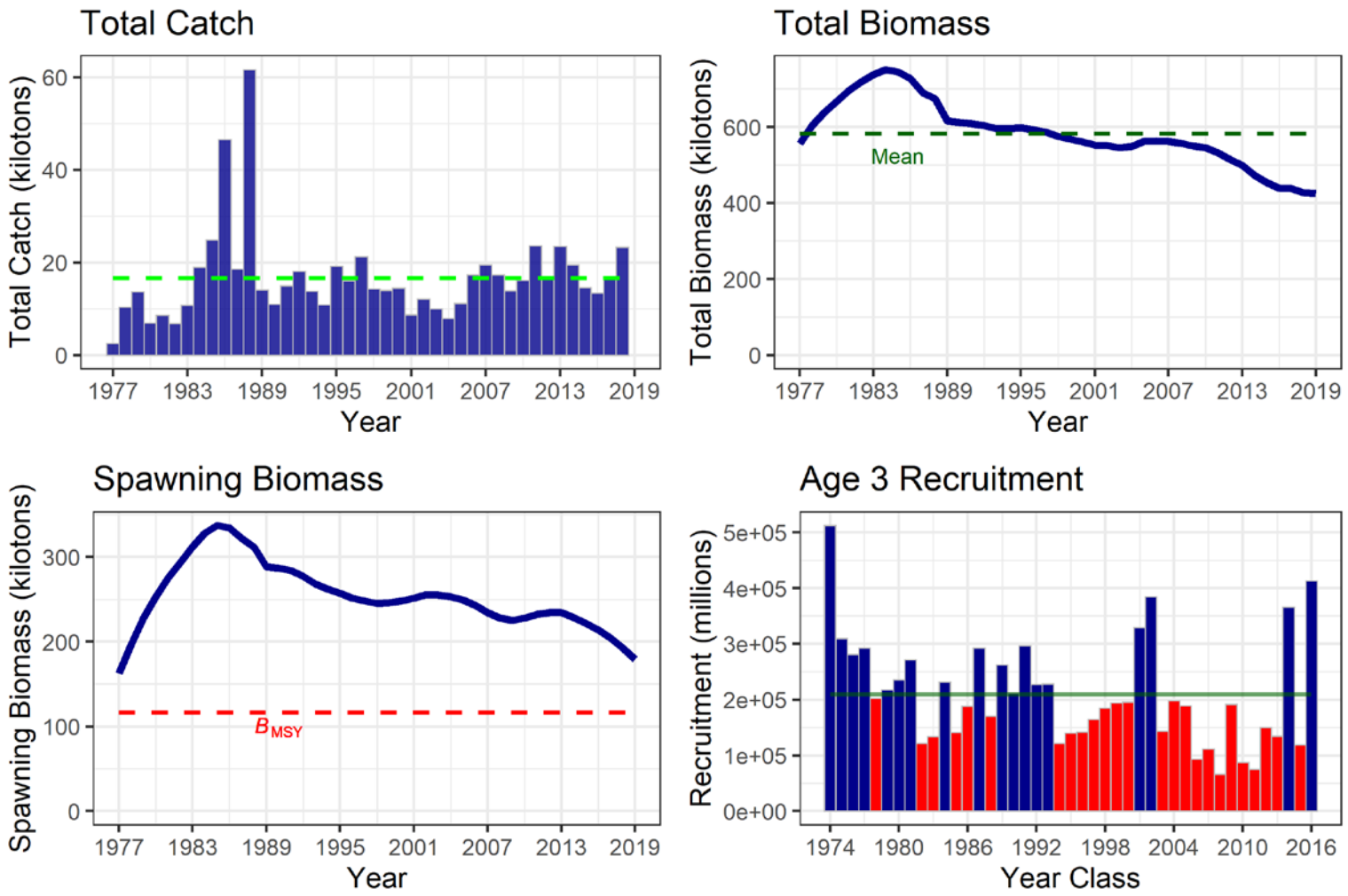
Alaska plaice, continued

- Selectivity



This information is distributed solely for the purpose of pre-dissemination peer review under applicable information quality guidelines.
It has not been formally disseminated by the National Marine Fisheries Service and should not be construed to represent any agency determination or policy.

Alaska plaice, continued



This information is distributed solely for the purpose of pre-dissemination peer review under applicable information quality guidelines.
It has not been formally disseminated by the National Marine Fisheries Service and should not be construed to represent any agency determination or policy.

Alaska plaice, continued

Quantity	Last asmt.	This asmt.	Change
M	0.13	0.13	0.00
2019 tier	3a	n/a	none
2020 tier	3a	3a	none
2019 age+ biomass	400,700	n/a	0.07
2020 age+ biomass	394,700	428,800	0.09
2019 spawning biomass	186,100	n/a	-0.08
2020 spawning biomass	171,100	170,800	0.00
B100%	317,360	333,300	0.05
B40%	126,900	133,300	0.05
B35%	111,100	116,600	0.05
2020 FOFL	0.149	0.150	0.01
2020 FABC	0.124	0.125	0.01
2019 OFL	39,880	n/a	-0.06
2020 OFL	37,860	37,600	-0.01
2019 ABC	33,600	n/a	-0.06
2020 ABC	31,900	31,600	-0.01

This information is distributed solely for the purpose of pre-dissemination peer review under applicable information quality guidelines.
It has not been formally disseminated by the National Marine Fisheries Service and should not be construed to represent any agency determination or policy.

Chapter 11: other flatfish (none)

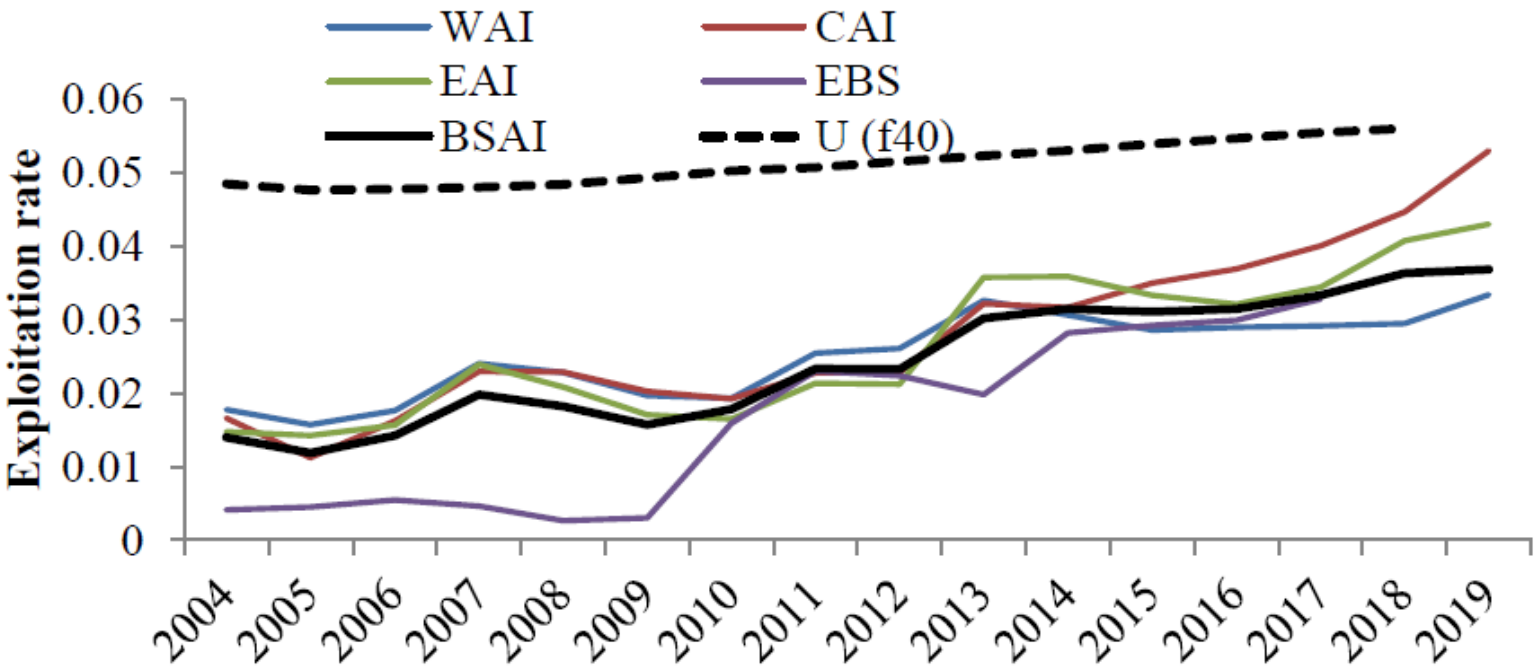
Quantity*	Last asmt.	This asmt.	Change
M	0.154	0.154	0.00
2019 tier	5	n/a	none
2020 tier	5	5	none
Biomass	141,325	141,325	0.00
2020 FOFL	0.154	0.154	0.00
2020 FABC	0.116	0.116	0.00
2019 OFL	21,824	n/a	0.00
2020 OFL	21,824	21,824	0.00
2019 ABC	16,368	n/a	0.00
2020 ABC	16,368	16,368	0.00

*Instantaneous rates are biomass-weighted averages

This information is distributed solely for the purpose of pre-dissemination peer review under applicable information quality guidelines.
It has not been formally disseminated by the National Marine Fisheries Service and should not be construed to represent any agency determination or policy.

Chapter 12: Pacific ocean perch (partial)

- Recommendations: none
- Catch/biomass time series



This information is distributed solely for the purpose of pre-dissemination peer review under applicable information quality guidelines.
It has not been formally disseminated by the National Marine Fisheries Service and should not be construed to represent any agency determination or policy.

Pacific ocean perch, continued

Quantity	Last asmt.	This asmt.	Change
M	0.056	0.056	0.00
2019 tier	3a	n/a	none
2020 tier	3a	3a	none
2019 age+ biomass	934,293	n/a	-0.03
2020 age+ biomass	914,577	908,529	-0.01
2019 spawning biomass	399,024	n/a	-0.04
2020 spawning biomass	386,835	383,178	-0.01
B100%	645,738	645,738	0.00
B40%	258,295	258,295	0.00
B35%	226,008	226,008	0.00
2020 FOFL	0.095	0.095	0.00
2020 FABC	0.079	0.079	0.00
2019 OFL	61,067	n/a	-0.03
2020 OFL	59,396	58,956	-0.01
2019 ABC	50,594	n/a	-0.03
2020 ABC	49,211	48,846	-0.01

This information is distributed solely for the purpose of pre-dissemination peer review under applicable information quality guidelines.
It has not been formally disseminated by the National Marine Fisheries Service and should not be construed to represent any agency determination or policy.

Chapter 13: northern rockfish (full)

- New data:
  - 2018 AI survey biomass, down 16% from 2016
  - 2016 and 2018 AI survey age compositions
  - 2015 and 2017 fishery age compositions
  - 2016 and 2018 fishery length composition data
  - The fishery and survey age compositions were recomputed by applying subarea (i.e., not global) age-length keys to subarea length compositions, due to spatial differences in size at age
  - Weight-at age-curves were computed for the fishery and population (each were computed as an average of subarea weights at age)

This information is distributed solely for the purpose of pre-dissemination peer review under applicable information quality guidelines.
It has not been formally disseminated by the National Marine Fisheries Service and should not be construed to represent any agency determination or policy.

Northern rockfish, continued

- Model changes/alternatives:
  - Model 16.1 (base model)
  - Model 16.1a
    - When Model 16.1 was run with the revised data, selectivity was much less than unity for all but the oldest ages, so a constraint was added, forcing age 15 selectivity to be near unity
  - Authors and Team recommend Model 16.1a, because the selectivity curves for Model 16.1 are no longer plausible

This information is distributed solely for the purpose of pre-dissemination peer review under applicable information quality guidelines.
It has not been formally disseminated by the National Marine Fisheries Service and should not be construed to represent any agency determination or policy.

Northern rockfish, continued

- Stock status and trend:
  - 1995-1997 and 2005 cohorts all >160% of average
    - 1995 and 2005 cohorts are >250% of average
    - However, all cohorts after 2005 are below average
  - Spawning biomass increased almost continuously from 47 kt in 1977 to 125 kt in 2014, decreasing since
  - 2020 spawning biomass is 70% of $B_{100\%}$
- Mohn's $\rho = -0.14$

This information is distributed solely for the purpose of pre-dissemination peer review under applicable information quality guidelines.
It has not been formally disseminated by the National Marine Fisheries Service and should not be construed to represent any agency determination or policy.

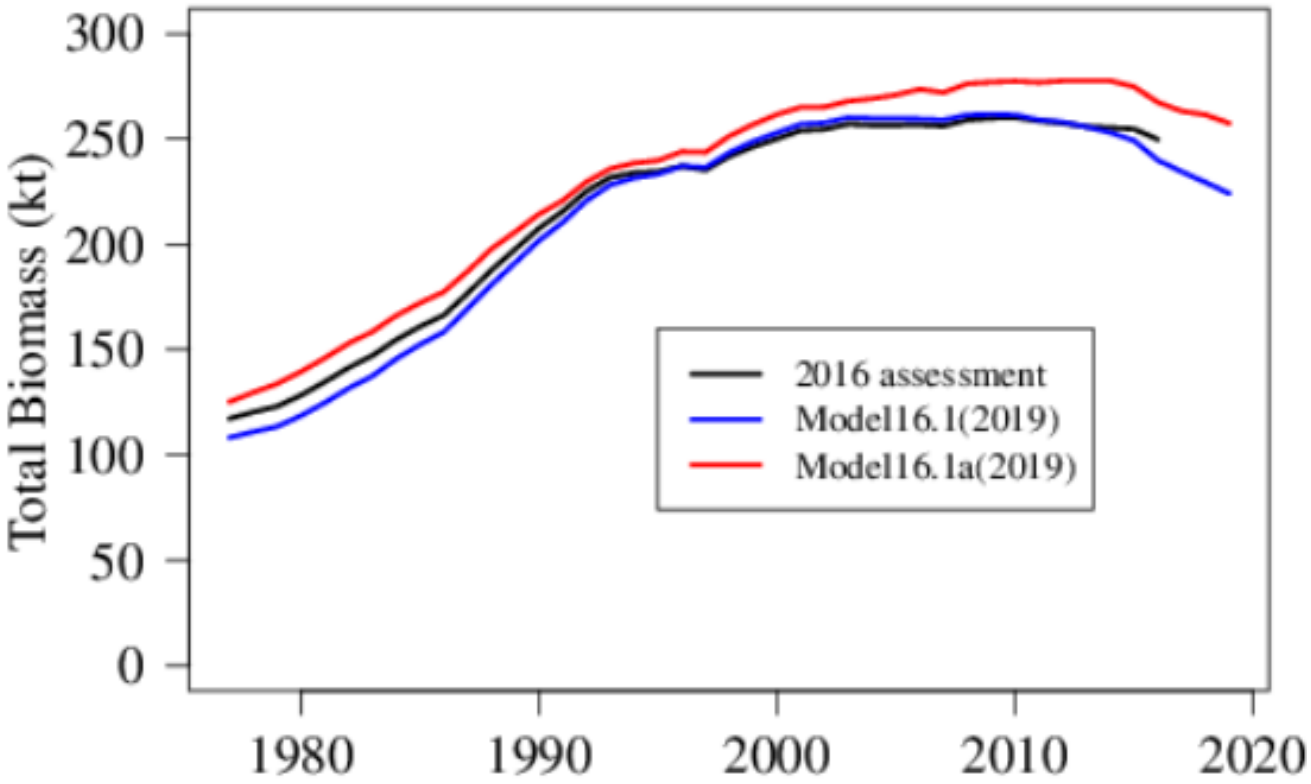
Northern rockfish, continued

- Risk level: max(2,1,2,1)=2; no ABC reduction
  - Author was concerned that key parameters for the model are strongly constrained by priors and there is a large negative retrospective bias
  - Fish condition for has been declining notably since 2010, perhaps due to a lack of forage fish in the system
  - However, since stock biomass is high and fishing rates are low, a reduction from maxABC was not recommended despite the increased level of concern
  - The Team discussed the usefulness of the risk table in articulating author concerns, but perhaps ABC reductions should be left to the discretion of the author/Team/SSC
  - The Team also noted that it would be easy to be inconsistent with other stocks and not weigh in on a reduction in cases where catch is typically below ABC (because it would have no practical impact)

This information is distributed solely for the purpose of pre-dissemination peer review under applicable information quality guidelines.
It has not been formally disseminated by the National Marine Fisheries Service and should not be construed to represent any agency determination or policy.

Northern rockfish, continued

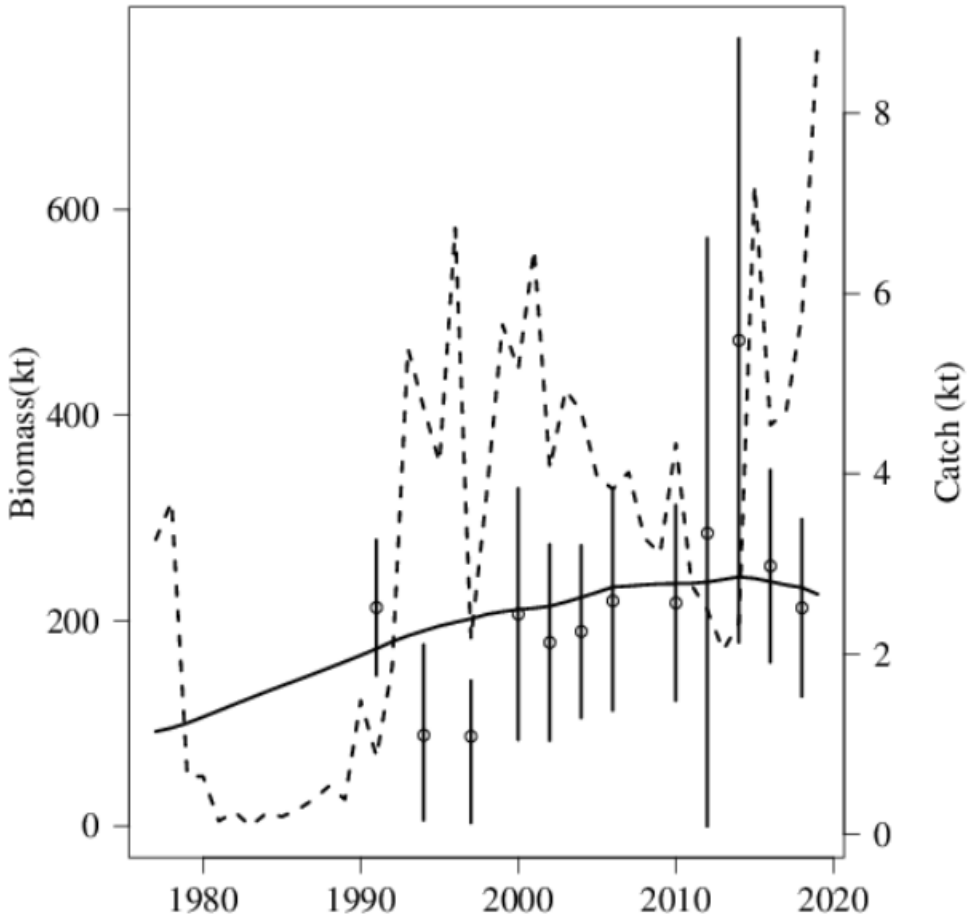
- Total biomass time series



This information is distributed solely for the purpose of pre-dissemination peer review under applicable information quality guidelines.
It has not been formally disseminated by the National Marine Fisheries Service and should not be construed to represent any agency determination or policy.

Northern rockfish, continued

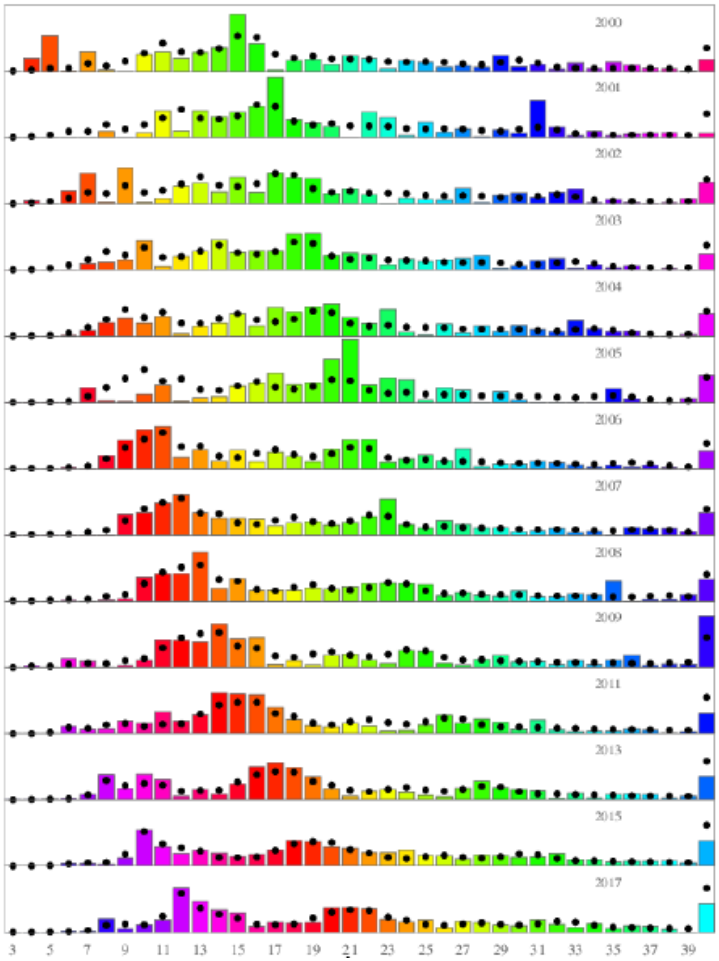
- Catch and Model 16.1a fit to survey biomass



This information is distributed solely for the purpose of pre-dissemination peer review under applicable information quality guidelines.
It has not been formally disseminated by the National Marine Fisheries Service and should not be construed to represent any agency determination or policy.

Northern rockfish, continued

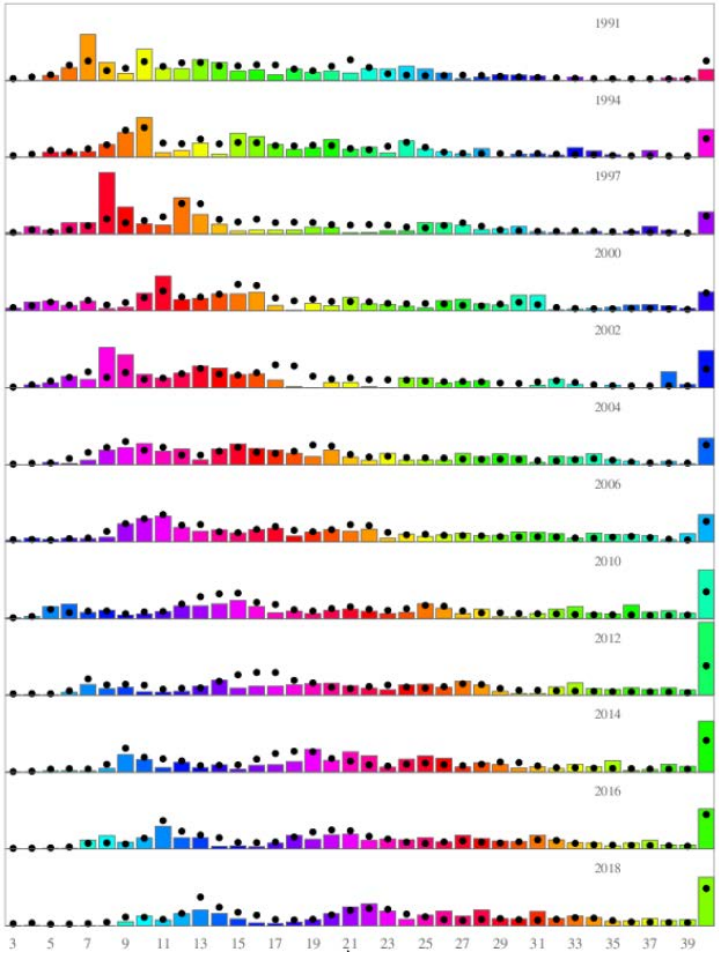
- Model 16.1a fit to fishery agecomp data



This information is distributed solely for the purpose of pre-dissemination peer review under applicable information quality guidelines.
It has not been formally disseminated by the National Marine Fisheries Service and should not be construed to represent any agency determination or policy.

Northern rockfish, continued

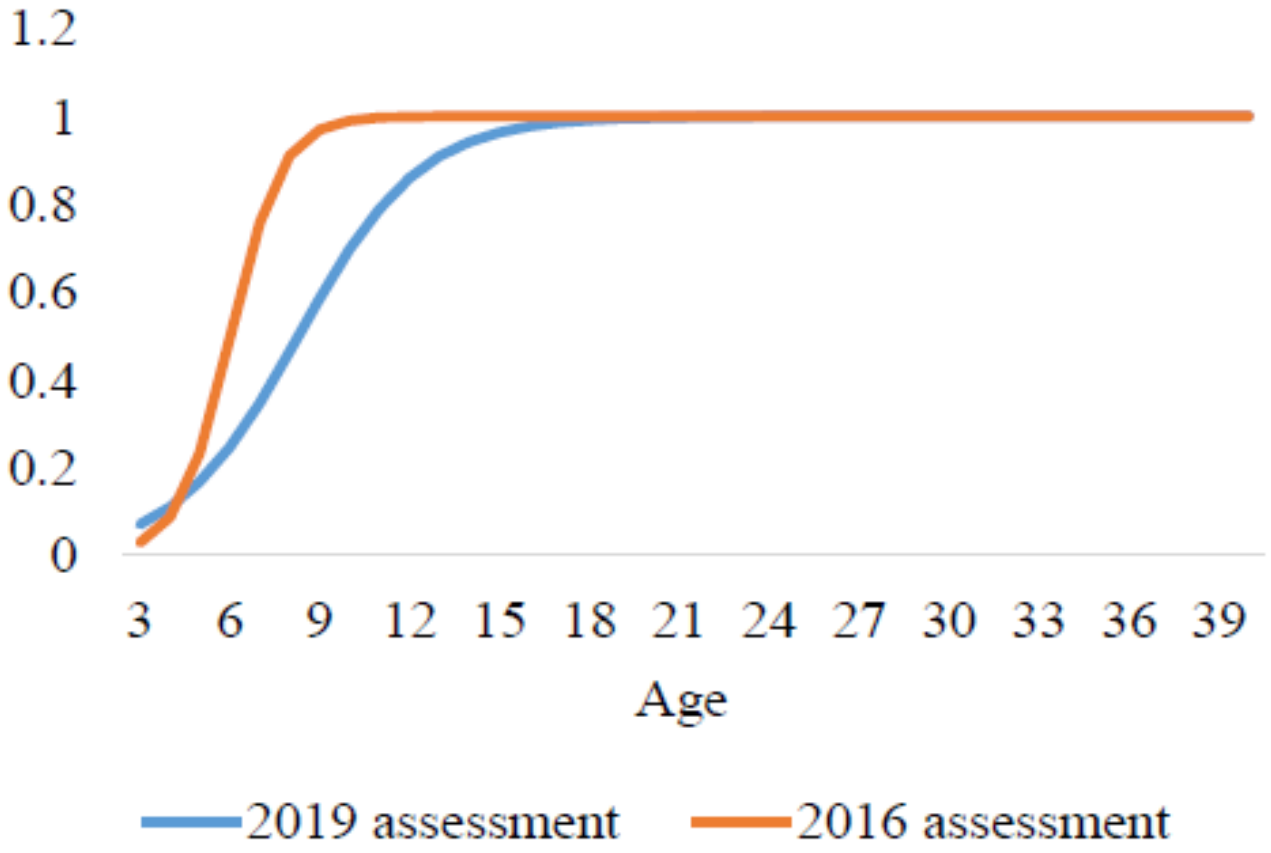
- Model 16.1a fit to survey agecomp data



This information is distributed solely for the purpose of pre-dissemination peer review under applicable information quality guidelines.
It has not been formally disseminated by the National Marine Fisheries Service and should not be construed to represent any agency determination or policy.

Northern rockfish, continued

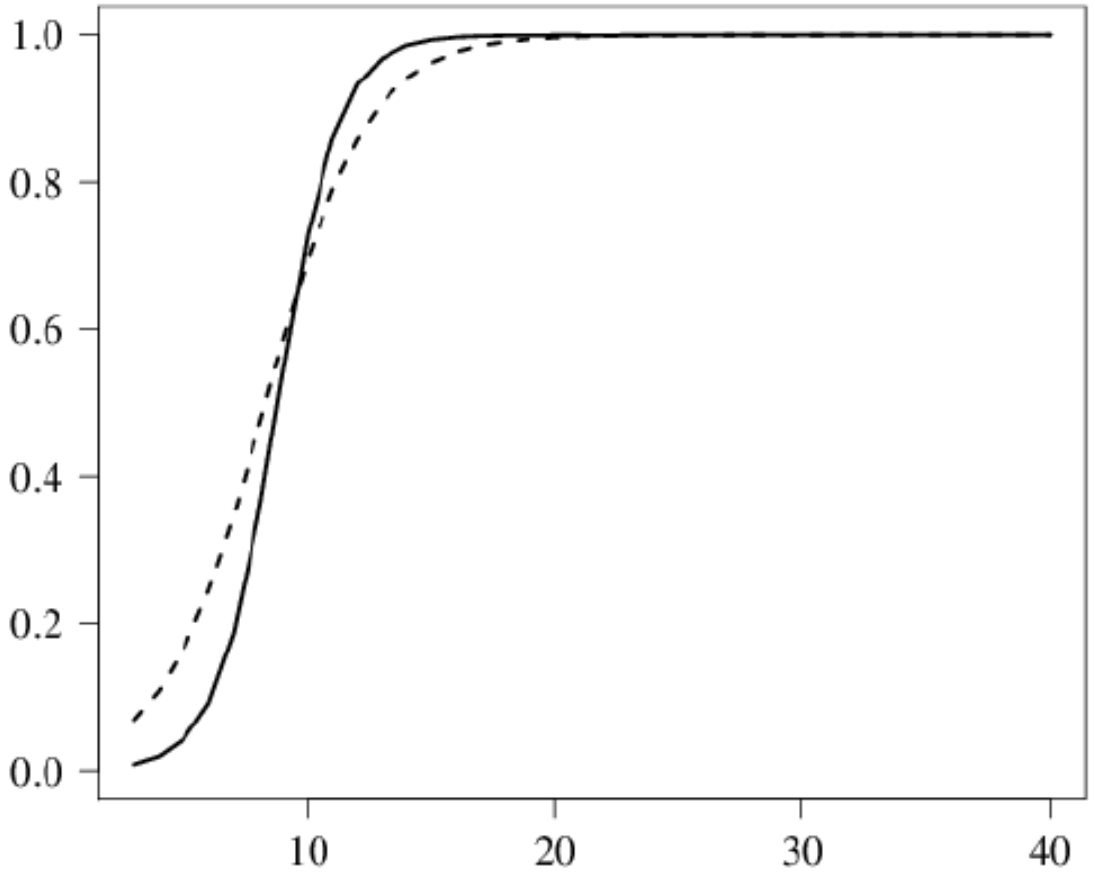
- Survey selectivity (comparison between assessments)



This information is distributed solely for the purpose of pre-dissemination peer review under applicable information quality guidelines.
It has not been formally disseminated by the National Marine Fisheries Service and should not be construed to represent any agency determination or policy.

Northern rockfish, continued

- Fishery (solid line) and survey (dashed line) selectivity



This information is distributed solely for the purpose of pre-dissemination peer review under applicable information quality guidelines.
It has not been formally disseminated by the National Marine Fisheries Service and should not be construed to represent any agency determination or policy.

Northern rockfish, continued

- The author discussed a notable increase in tows that have targeted northern rockfish (as defined from observed hauls) in the most recent years, but a member of the public suggested that the increase in the number of tows may have increased due to rules for the A80 fleet
- Team members discussed the importance of considering the timing of implementing management regulations when examining fishery shifts
- The author discussed decreases in length at age from east to west that were reflected in weight at age
- Recent catch (i.e., from 2015-2018) is obtained primarily from the WAI and CAI in relatively equal proportions, although from 2011-2014 the WAI catch was reduced due to the closure of the Atka mackerel fishery
- In the survey, the majority of the biomass is found in the WAI

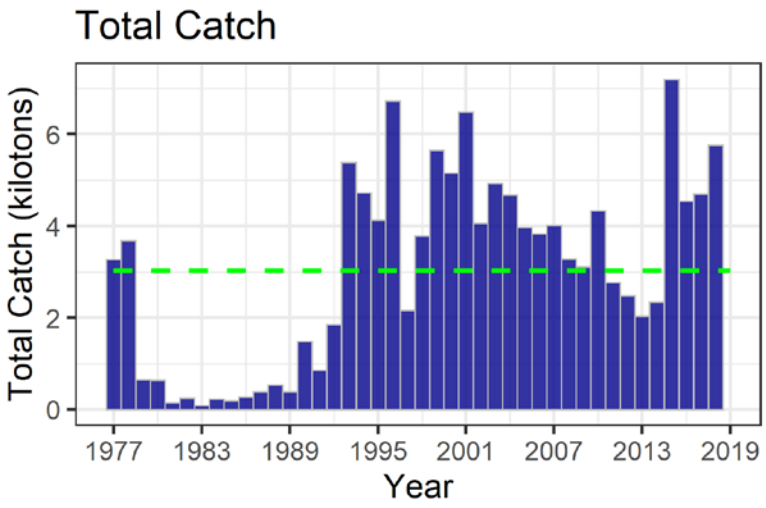
This information is distributed solely for the purpose of pre-dissemination peer review under applicable information quality guidelines.
It has not been formally disseminated by the National Marine Fisheries Service and should not be construed to represent any agency determination or policy.

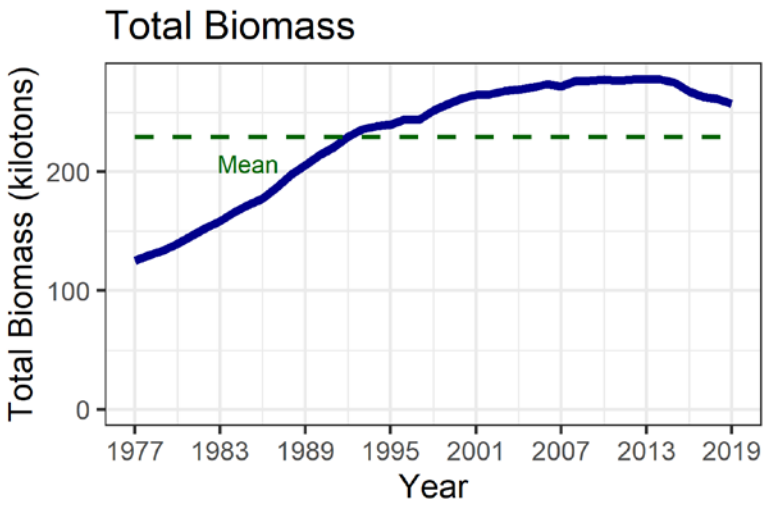
Northern rockfish, continued

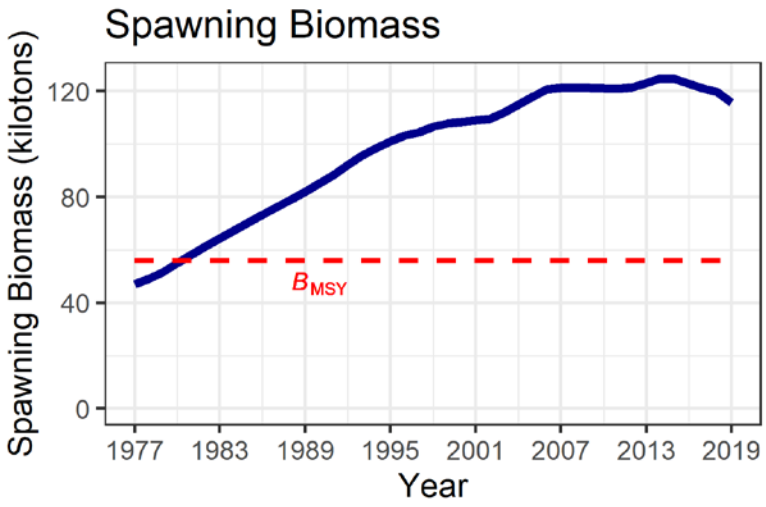
- The Team recommended addressing the issues concerning the restrictive priors on key parameters in the model and exploring alternatives for estimating survey selectivity
- The Team recommended exploring global age-length keys that weight by population size between areas

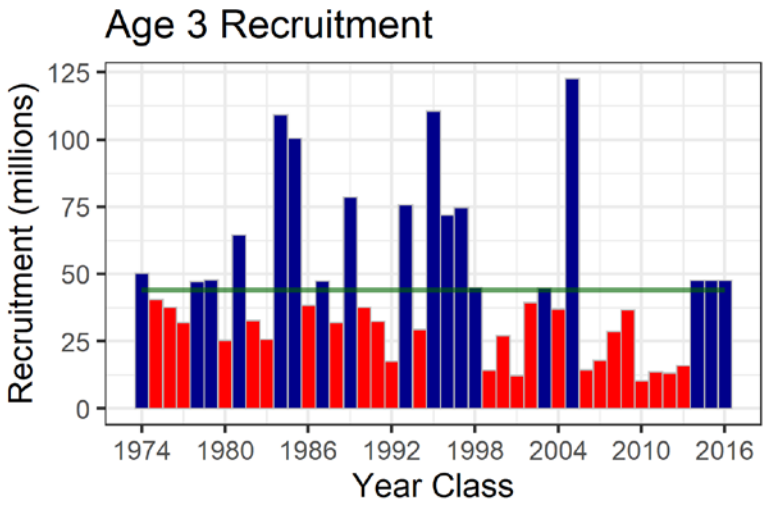
This information is distributed solely for the purpose of pre-dissemination peer review under applicable information quality guidelines.
It has not been formally disseminated by the National Marine Fisheries Service and should not be construed to represent any agency determination or policy.

Northern rockfish, continued









This information is distributed solely for the purpose of pre-dissemination peer review under applicable information quality guidelines.
It has not been formally disseminated by the National Marine Fisheries Service and should not be construed to represent any agency determination or policy.

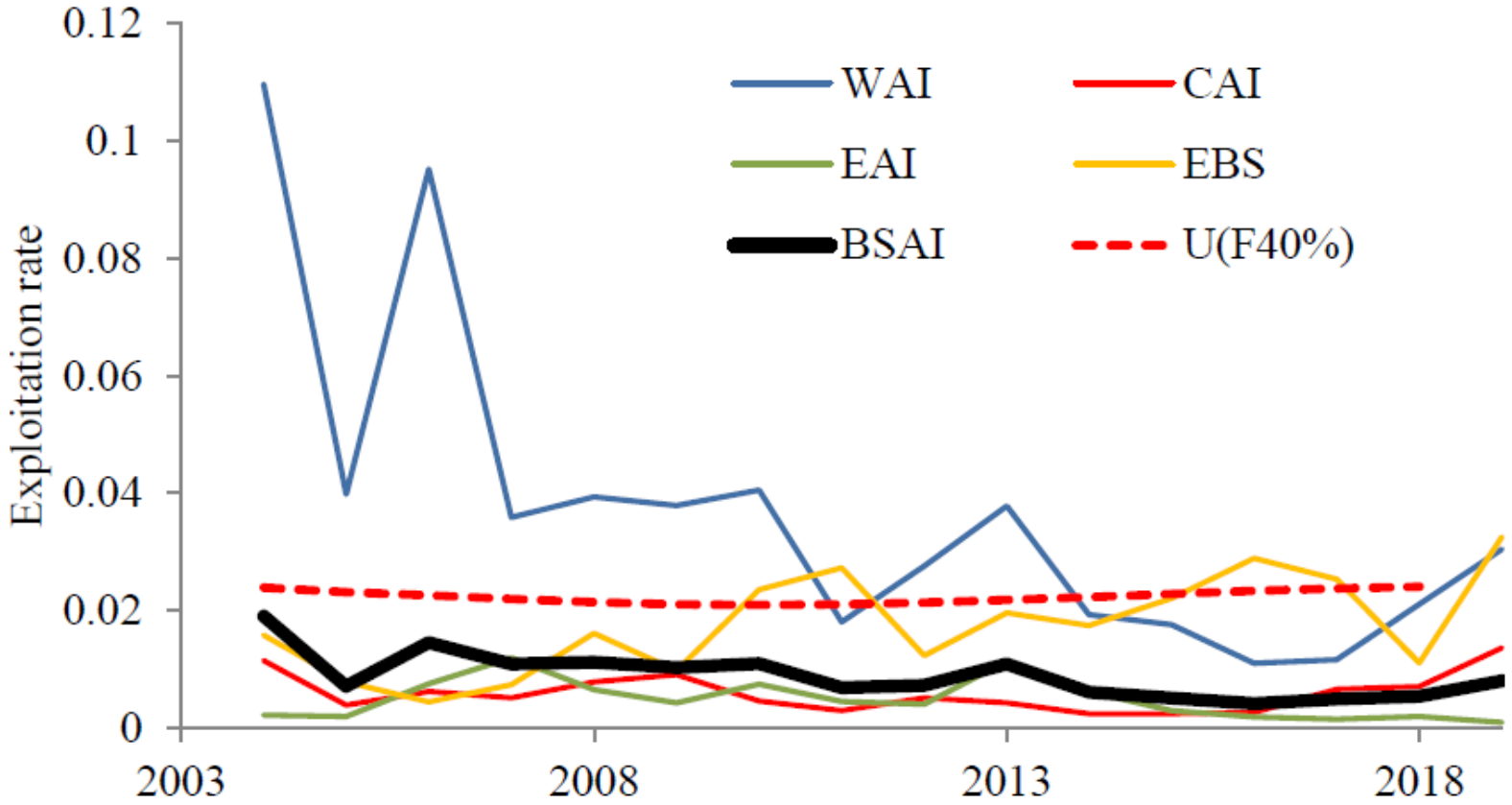
Northern rockfish, continued

Quantity	Last asmt.	This asmt.	Change
M	0.046	0.048	0.04
2019 tier	3a	n/a	none
2020 tier	3a	3a	none
2019 age+ biomass	244,196	n/a	0.02
2020 age+ biomass	242,426	250,235	0.03
2019 spawning biomass	104,201	n/a	0.07
2020 spawning biomass	102,480	111,476	0.09
B100%	164,674	159,850	-0.03
B40%	65,870	63,940	-0.03
B35%	57,636	55,947	-0.03
2020 FOFL	0.080	0.075	-0.06
2020 FABC	0.065	0.061	-0.06
2019 OFL	15,507	n/a	0.27
2020 OFL	15,180	19,751	0.30
2019 ABC	12,664	n/a	0.28
2020 ABC	12,396	16,243	0.31

This information is distributed solely for the purpose of pre-dissemination peer review under applicable information quality guidelines.
It has not been formally disseminated by the National Marine Fisheries Service and should not be construed to represent any agency determination or policy.

Chapter 14: blackspotted/rougheye (partial)

- Recommendations: none
- Catch/biomass time series



This information is distributed solely for the purpose of pre-dissemination peer review under applicable information quality guidelines.
It has not been formally disseminated by the National Marine Fisheries Service and should not be construed to represent any agency determination or policy.

Blackspotted/rougheye, continued

Quantity **(AI portion)**	Last asmt	This asmt	Change
M	0.032	0.032	0.00
2019 tier	3b	n/a	none
2020 tier	3b	3b	none
2019 age+ biomass	46,482	n/a	0.05
2020 age+ biomass	49,141	49,005	0.00
2019 spawning biomass	8,980	n/a	0.14
2020 spawning biomass	10,260	10,213	0.00
B100%	29,287	29,287	0.00
B40%	11,715	11,715	0.00
B35%	10,250	10,250	0.00
2020 FOFL	0.042	0.042	0.00
2020 FABC	0.034	0.034	0.00
2019 OFL	632	n/a	0.29
2020 OFL	824	817	-0.01
2019 ABC*	522	n/a	0.29
2020 ABC	682	675	-0.01

* Note that the WAI MSSC was exceeded again in 2019

This information is distributed solely for the purpose of pre-dissemination peer review under applicable information quality guidelines.
It has not been formally disseminated by the National Marine Fisheries Service and should not be construed to represent any agency determination or policy.

Blackspotted/rougheye, continued

Quantity **(EBS portion)**	Last asmt.	This asmt.	Change
M	0.032	0.032	0.00
2019 tier	5	n/a	none
2020 tier	5	5	none
Biomass	1,371	1,371	0.00
2020 FOFL	0.032	0.032	0.00
2020 FABC	0.024	0.024	0.00
2019 OFL	44	n/a	0.00
2020 OFL	44	44	0.00
2019 ABC	33	n/a	0.00
2020 ABC	33	33	0.00

This information is distributed solely for the purpose of pre-dissemination peer review under applicable information quality guidelines.
It has not been formally disseminated by the National Marine Fisheries Service and should not be construed to represent any agency determination or policy.

Chapter 15: shortraker rockfish (none)

Quantity	Last asmt.	This asmt.	Change
M	0.030	0.030	0.00
2019 tier	5	n/a	none
2020 tier	5	5	none
Biomass	24,055	24,055	0.00
2020 FOFL	0.030	0.030	0.00
2020 FABC	0.0225	0.0225	0.00
2019 OFL	722	n/a	0.00
2020 OFL	722	722	0.00
2019 ABC	541	n/a	0.00
2020 ABC	541	541	0.00

This information is distributed solely for the purpose of pre-dissemination peer review under applicable information quality guidelines.
It has not been formally disseminated by the National Marine Fisheries Service and should not be construed to represent any agency determination or policy.

Chapter 16: other rockfish (none)

Quantity*	Last asmt.	This asmt.	Change
M	0.034	0.034	0.00
2019 tier	5	n/a	none
2020 tier	5	5	none
Biomass	53,290	53,290	0.00
2020 FOFL	0.034	0.034	0.00
2020 FABC	0.025	0.025	0.00
2019 OFL	1,793	n/a	0.00
2020 OFL	1,793	1,793	0.00
2019 ABC	1,344	n/a	0.00
2020 ABC	1,344	1,344	0.00

*Instantaneous rates are biomass-weighted averages

This information is distributed solely for the purpose of pre-dissemination peer review under applicable information quality guidelines.
It has not been formally disseminated by the National Marine Fisheries Service and should not be construed to represent any agency determination or policy.

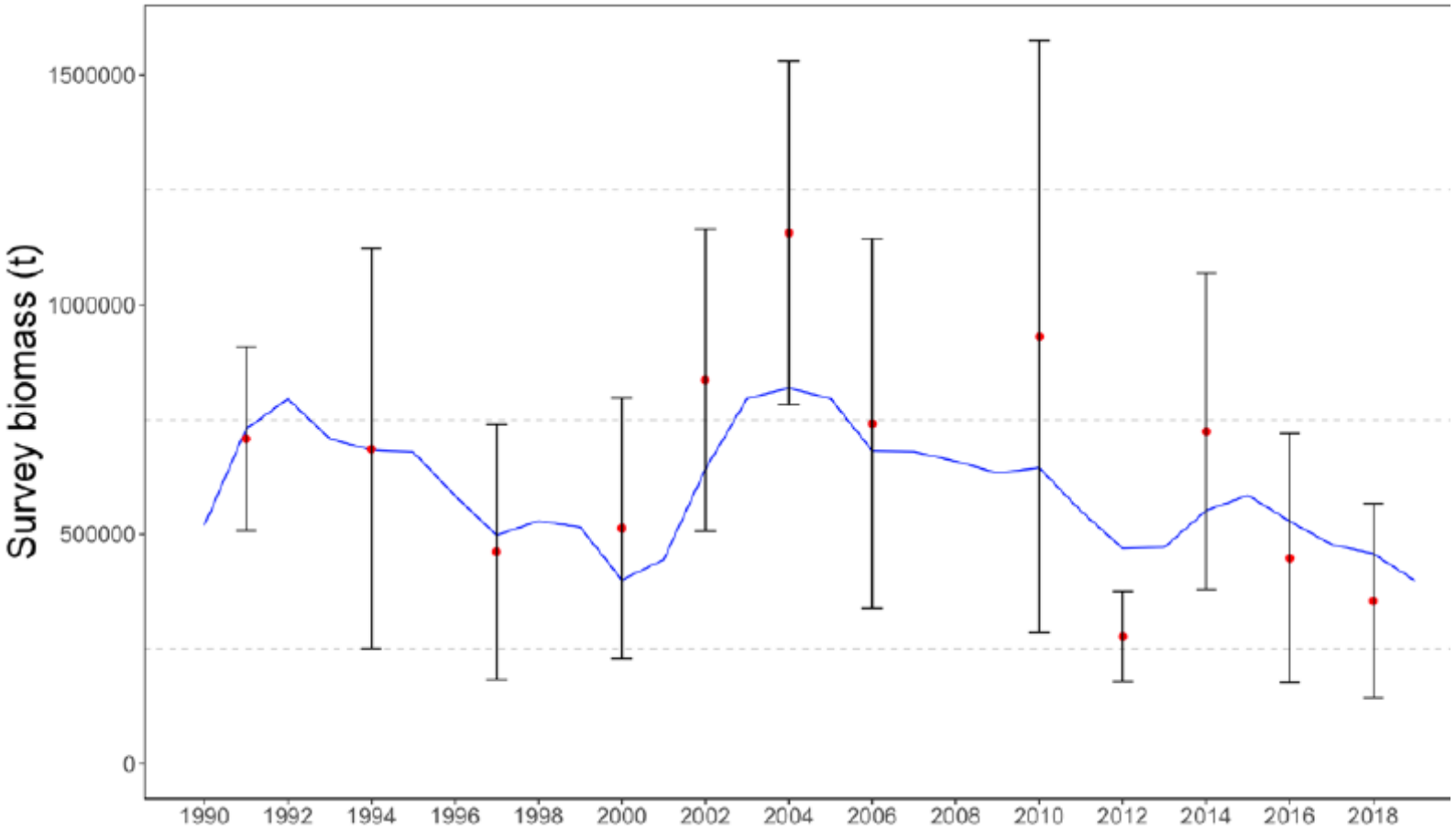
Chapter 17: Atka mackerel (full)

- New data:
  - 2018 fishery agecomp
  - 2018 AI survey agecomp
- Model alternatives:
  - Model 16.0b: base model (introduced in 2017)
- Stock status and trend:
  - 2006, 2007, and 2012 cohorts are 56%, 34%, and 39% above ave.
  - However, these cohorts do not compensate for the below-average cohorts from all other years since 2001
  - 2005 spawning biomass was highest since 1982; 2019 is lowest ever
  - 2020 spawning biomass is 38% of $B_{100\%}$
- Mohn's $\rho = 0.08$
- Risk level: max(1,1,1,1)=1; no ABC reduction

This information is distributed solely for the purpose of pre-dissemination peer review under applicable information quality guidelines.
It has not been formally disseminated by the National Marine Fisheries Service and should not be construed to represent any agency determination or policy.

Atka mackerel, continued

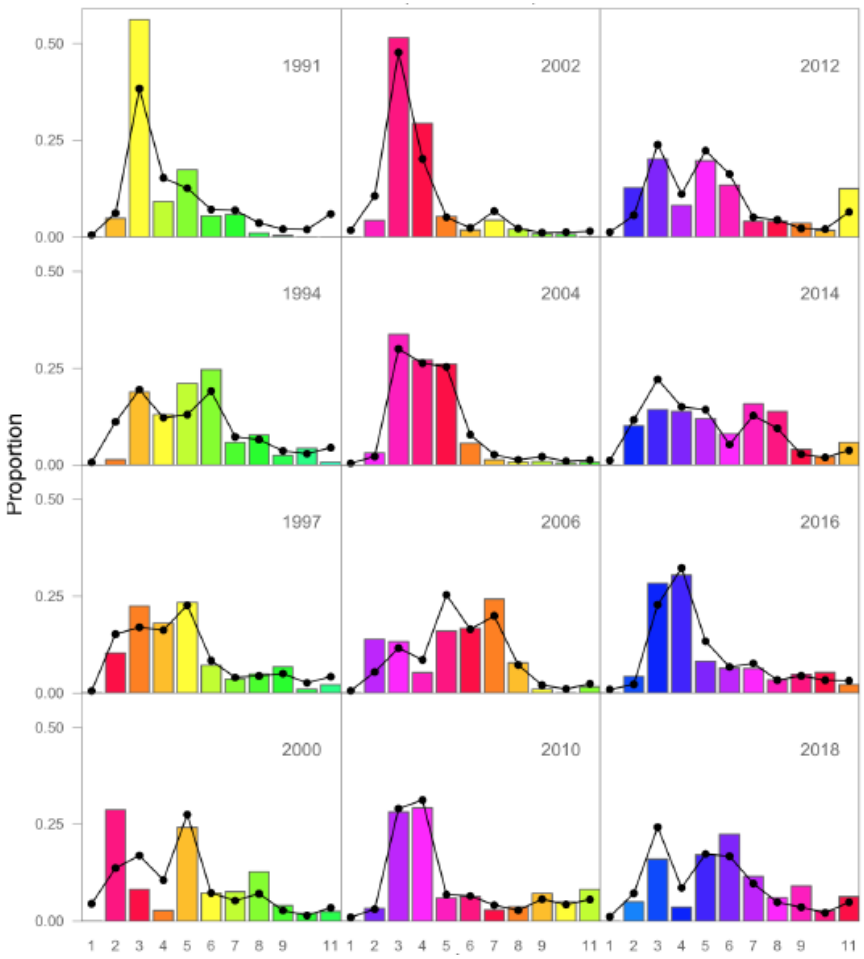
- Fit to survey biomass



This information is distributed solely for the purpose of pre-dissemination peer review under applicable information quality guidelines.
It has not been formally disseminated by the National Marine Fisheries Service and should not be construed to represent any agency determination or policy.

Atka mackerel, continued

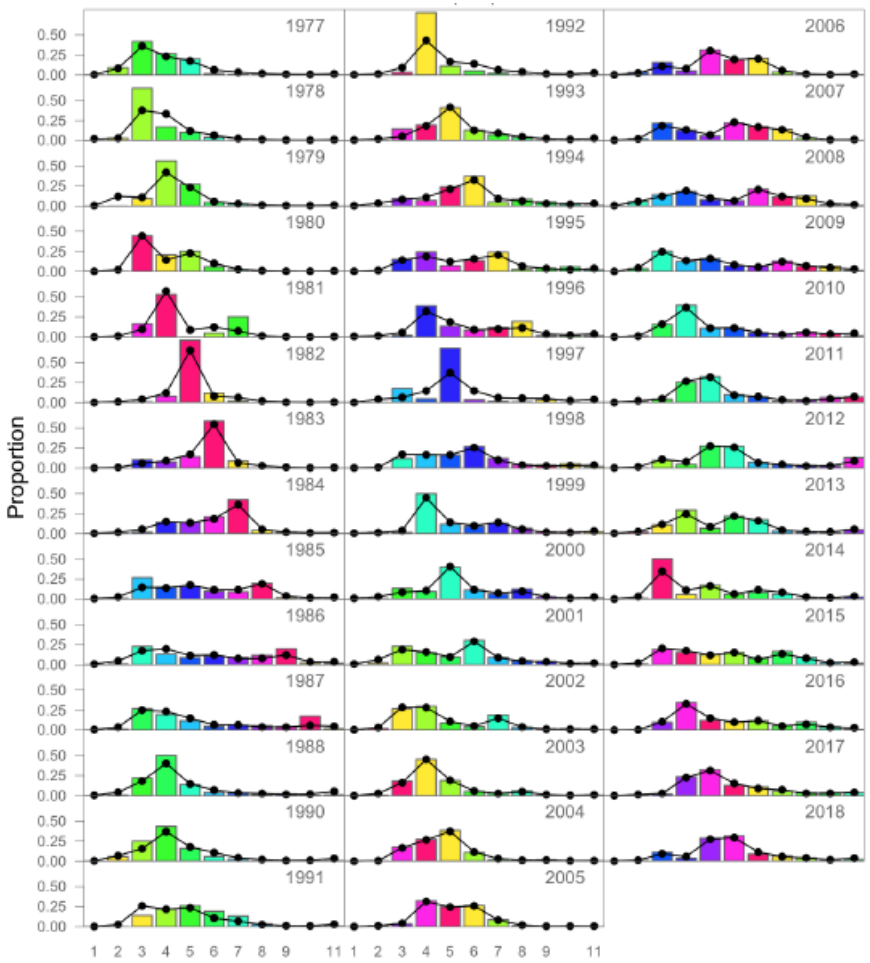
- Fit to survey agecomp data



This information is distributed solely for the purpose of pre-dissemination peer review under applicable information quality guidelines.
It has not been formally disseminated by the National Marine Fisheries Service and should not be construed to represent any agency determination or policy.

Atka mackerel, continued

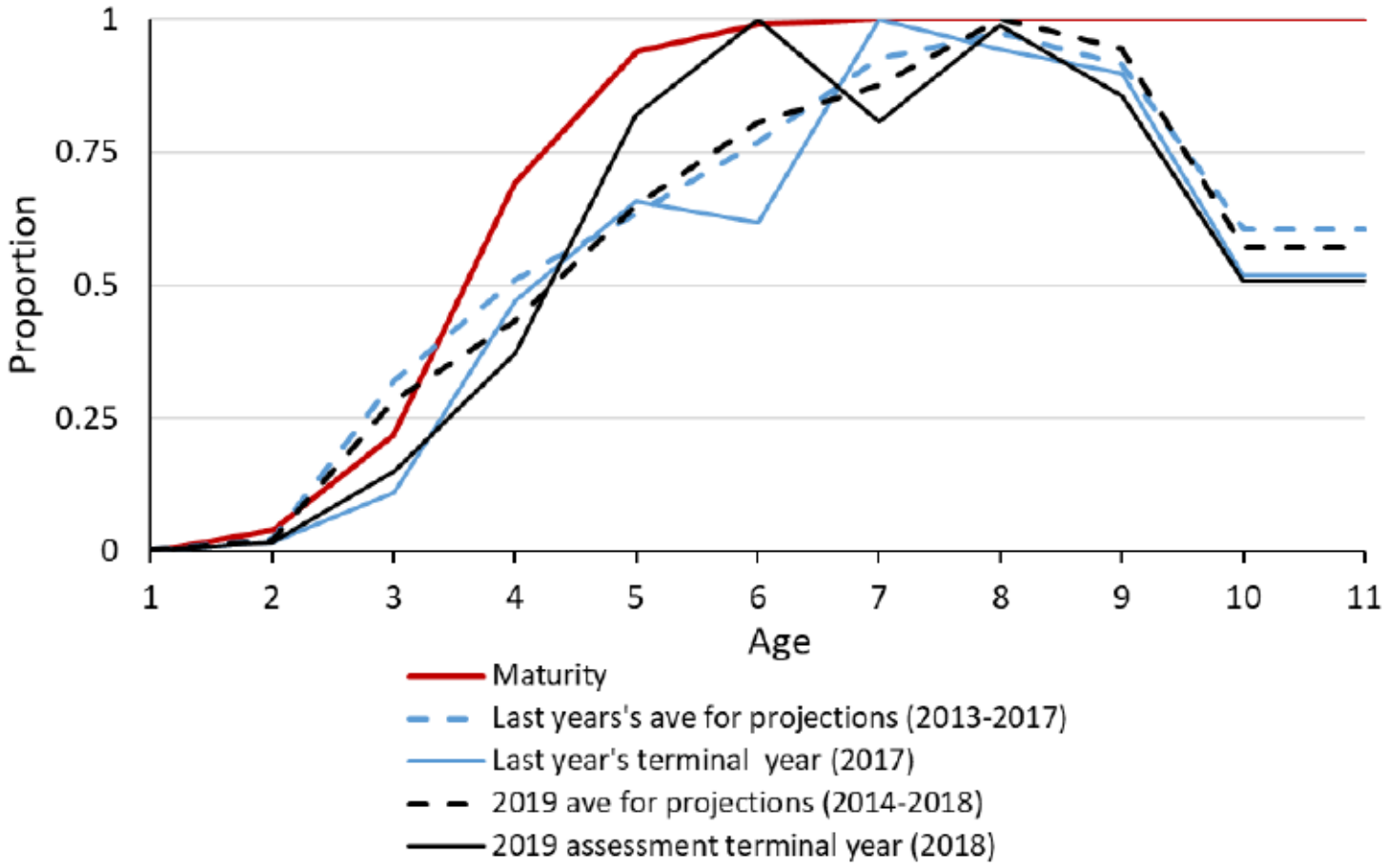
- Fit to fishery agecomp data



This information is distributed solely for the purpose of pre-dissemination peer review under applicable information quality guidelines.
It has not been formally disseminated by the National Marine Fisheries Service and should not be construed to represent any agency determination or policy.

Atka mackerel, continued

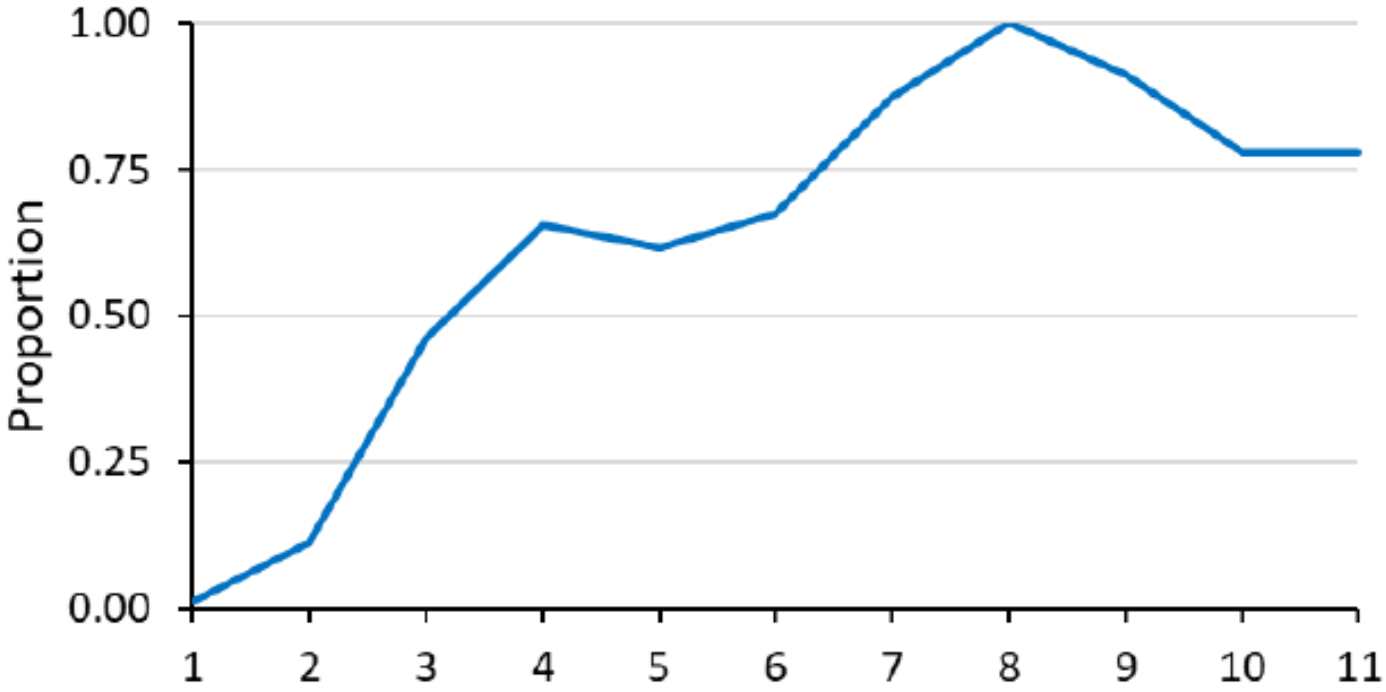
- Maturity and fishery selectivity (last year's and this year's)



This information is distributed solely for the purpose of pre-dissemination peer review under applicable information quality guidelines.
It has not been formally disseminated by the National Marine Fisheries Service and should not be construed to represent any agency determination or policy.

Atka mackerel, continued

- Survey selectivity



This information is distributed solely for the purpose of pre-dissemination peer review under applicable information quality guidelines.
It has not been formally disseminated by the National Marine Fisheries Service and should not be construed to represent any agency determination or policy.

Atka mackerel, continued

- The Team concurred with the authors and recommended the use of the most recent 4-survey weighted average for area apportionment
- Due to the low survey estimates in 2018 in area 542 there was a large shift in apportionments to area 543 and a small increase in 541 but a substantial decrease in area 542
- The reason for the lack of Atka mackerel in area 542 in the survey is unknown as there was no change in CPUE in the fishery
- Although the SSC recommended presentation of an alternate apportionment method which included the blending of the bottom trawl survey estimates with fishery CPUE in a random effects model, this method was not deemed appropriate for use this year by the authors or the Team as there were continued questions on appropriate weighting and validation of the fishery CPUE index
- The Team reiterated its concern regarding the use of fishery CPUE for apportionment without further evaluation

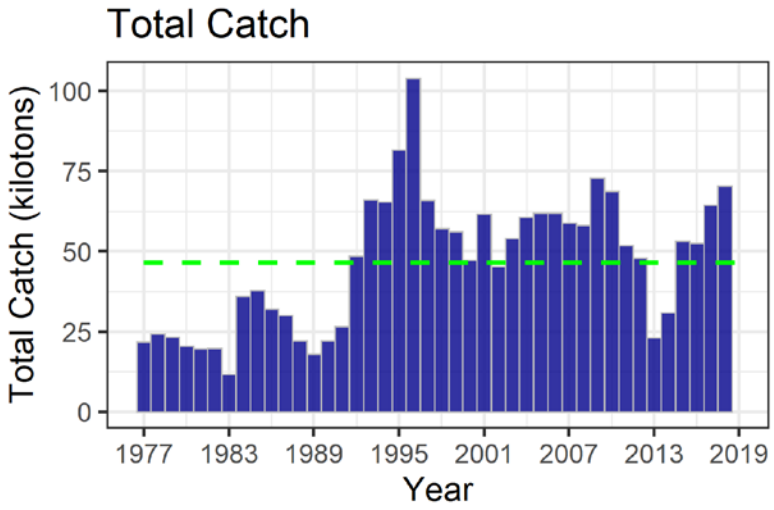
This information is distributed solely for the purpose of pre-dissemination peer review under applicable information quality guidelines.
It has not been formally disseminated by the National Marine Fisheries Service and should not be construed to represent any agency determination or policy.

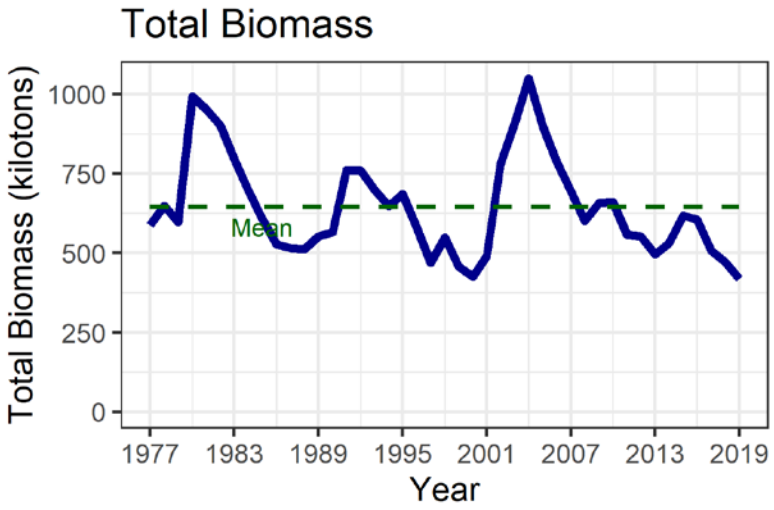
Atka mackerel, continued

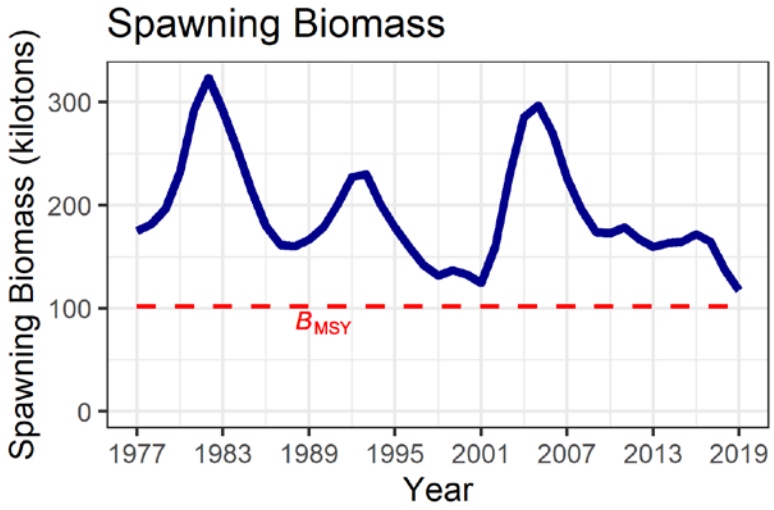
- The Team discussed the high variability observed in the area-specific survey biomass estimates, with particular emphasis on the 2018 and 2012 surveys where area estimates declined substantially
- It was noted that the assessment model appropriately weights region-wide survey index values; the main concern has been in area apportionment
- Although the authors have evaluated some environmental covariates that could not be shown to correlate with these declines, an ESP may be able to identify possible additional environmental covariates to evaluate
- Improved bathymetry maps of the AI have been produced by Mark Zimmerman and should be consulted
- Commercial fishing vessels collect and store data on bathymetry and may be a potential source for added data on habitat
- The Team recommended that an Ecosystem and Socioeconomic Profile (ESP) be developed for this stock in 2020

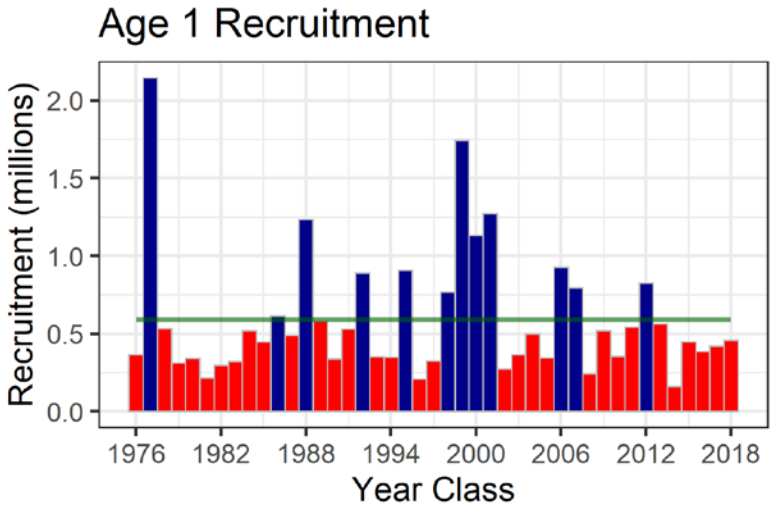
This information is distributed solely for the purpose of pre-dissemination peer review under applicable information quality guidelines.
It has not been formally disseminated by the National Marine Fisheries Service and should not be construed to represent any agency determination or policy.

Atka mackerel, continued









This information is distributed solely for the purpose of pre-dissemination peer review under applicable information quality guidelines.
It has not been formally disseminated by the National Marine Fisheries Service and should not be construed to represent any agency determination or policy.

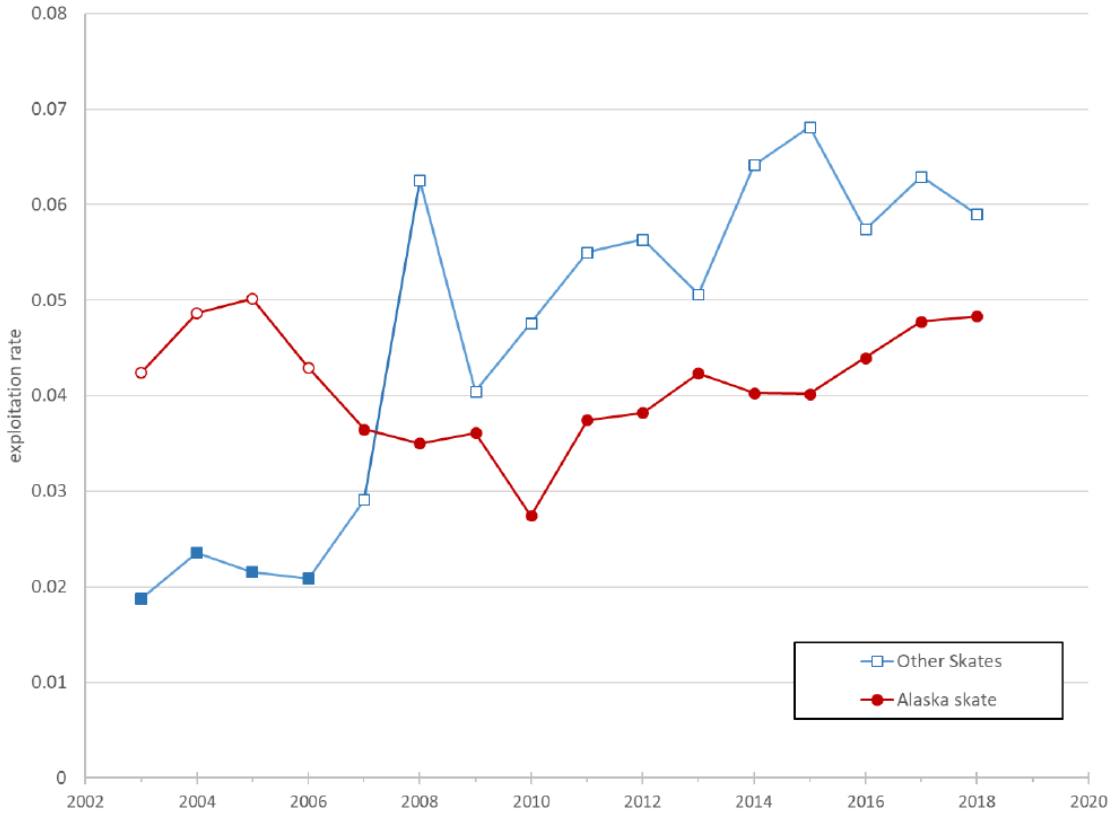
Atka mackerel, continued

Quantity	Last asmt.	This asmt.	Change
M	0.30	0.30	0.00
2019 tier	3b	n/a	none
2020 tier	3b	3b	none
2019 age+ biomass	498,320	n/a	0.04
2020 age+ biomass	514,400	515,890	0.00
2019 spawning biomass	106,800	n/a	0.03
2020 spawning biomass	102,700	109,900	0.07
B100%	283,780	291,780	0.03
B40%	113,510	116,600	0.03
B35%	99,320	102,020	0.03
2020 FOFL	0.53	0.48	-0.09
2020 FABC	0.44	0.41	-0.07
2019 OFL	79,200	n/a	0.03
2020 OFL	73,400	81,200	0.11
2019 ABC	68,500	n/a	0.02
2020 ABC	63,400	70,100	0.11

This information is distributed solely for the purpose of pre-dissemination peer review under applicable information quality guidelines.
It has not been formally disseminated by the National Marine Fisheries Service and should not be construed to represent any agency determination or policy.

Chapter 18: skates (partial)

- Recommendations: none
- Catch/biomass time series



This information is distributed solely for the purpose of pre-dissemination peer review under applicable information quality guidelines.
It has not been formally disseminated by the National Marine Fisheries Service and should not be construed to represent any agency determination or policy.

Skates, continued

Quantity **(Alaska skate)**	Last asmt.	This asmt.	Change
M	0.13	0.13	0.00
2019 tier	3a	n/a	none
2020 tier	3a	3a	none
2019 age+ biomass	504,551	n/a	-0.02
2020 age+ biomass	481,653	491,974	0.02
2019 spawning biomass	115,957	n/a	0.02
2020 spawning biomass	114,010	117,973	0.03
B100%	177,761	177,761	0.00
B40%	71,105	71,105	0.00
B35%	62,217	62,217	0.00
2020 FOFL	0.094	0.094	0.00
2020 FABC	0.081	0.081	0.00
2019 OFL	39,173	n/a	-0.03
2020 OFL	36,965	37,813	0.02
2019 ABC	33,730	n/a	-0.03
2020 ABC	31,829	32,559	0.02

This information is distributed solely for the purpose of pre-dissemination peer review under applicable information quality guidelines.
It has not been formally disseminated by the National Marine Fisheries Service and should not be construed to represent any agency determination or policy.

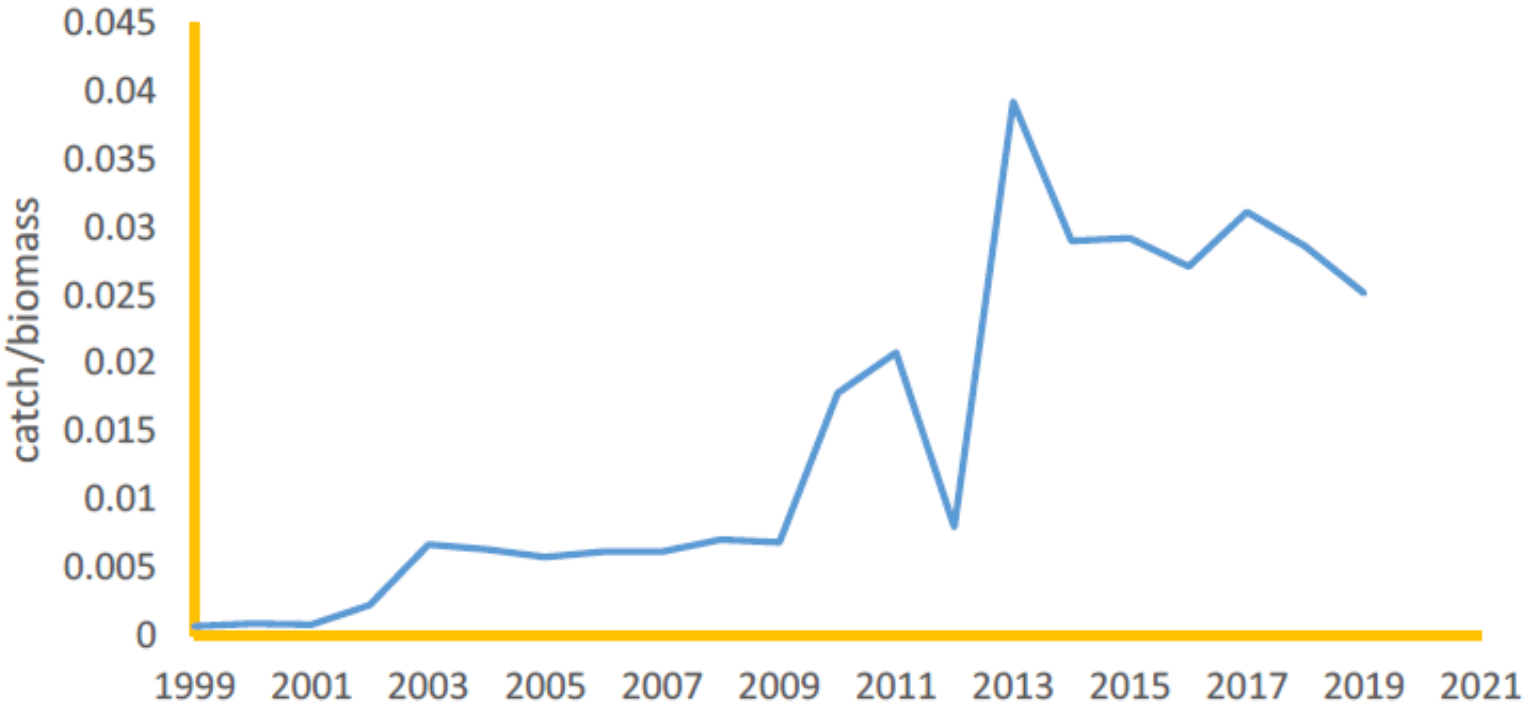
Skates, continued

Quantity **(other skates)**	Last asmt.	This asmt.	Change
M	0.10	0.10	0.00
2019 tier	5	n/a	none
2020 tier	5	5	none
Biomass	119,787	119,787	0.00
2020 FOFL	0.10	0.10	0.00
2020 FABC	0.075	0.075	0.00
2019 OFL	11,979	n/a	0.00
2020 OFL	11,979	11,979	0.00
2019 ABC	8,984	n/a	0.00
2020 ABC	8,984	8,984	0.00

This information is distributed solely for the purpose of pre-dissemination peer review under applicable information quality guidelines.
It has not been formally disseminated by the National Marine Fisheries Service and should not be construed to represent any agency determination or policy.

Chapter 19: sculpins (partial)

- Recommendations: none
- Catch/biomass time series



This information is distributed solely for the purpose of pre-dissemination peer review under applicable information quality guidelines.
It has not been formally disseminated by the National Marine Fisheries Service and should not be construed to represent any agency determination or policy.

Sculpins, continued

- Tier 5 random effects model was re-run with 2018 AI survey data and 2019 EBS shelf survey data

Quantity*	Last asmt.	This asmt.	Change
M	0.282	0.282	0.00
2019 tier	5	n/a	none
2020 tier	5	5	none
Biomass	188,656	240,487	0.27
2020 FOFL	0.282	0.282	0.00
2020 FABC	0.212	0.211	0.00
2019 OFL	53,201	n/a	0.27
2020 OFL	53,201	67,817	0.27
2019 ABC	39,995	n/a	0.27
2020 ABC	39,995	50,863	0.27

*Instantaneous rates are biomass-weighted averages

This information is distributed solely for the purpose of pre-dissemination peer review under applicable information quality guidelines.
It has not been formally disseminated by the National Marine Fisheries Service and should not be construed to represent any agency determination or policy.

Chapter 20: sharks (none)

Quantity	Last asmt.	This asmt.	Change
2019 tier	6	n/a	none
2020 tier	6	6	none
2019 OFL	689	n/a	0.00
2020 OFL	689	689	0.00
2019 ABC	517	n/a	0.00
2020 ABC	517	517	0.00

This information is distributed solely for the purpose of pre-dissemination peer review under applicable information quality guidelines.
It has not been formally disseminated by the National Marine Fisheries Service and should not be construed to represent any agency determination or policy.

Chapter 21: octopus (none)

Quantity	Last asmt.	This asmt.	Change
2019 tier	6	n/a	none
2020 tier	6	6	none
2019 OFL	4,769	n/a	0.00
2020 OFL	4,769	4,769	0.00
2019 ABC	3,576	n/a	0.00
2020 ABC	3,576	3,576	0.00

This information is distributed solely for the purpose of pre-dissemination peer review under applicable information quality guidelines.
It has not been formally disseminated by the National Marine Fisheries Service and should not be construed to represent any agency determination or policy.

Forage species (biennial report)

- Trends in forage species were evaluated using estimated biomass and frequency of occurrence (FO) from Bering Sea bottom trawl surveys
- Overall trends were corroborated with other surveys conducted in the same areas (e.g., the NBS surface trawl survey)
- Capelin and arctic cod have almost disappeared from the bottom trawl survey, while rainbow smelt have expanded offshore in the NBS
- In order to verify FO trends, patterns in abundance, and spatial distribution, the Team recommended that the author investigate survey gear and timing consistency between the 2010, 2018, and 2019 surveys in the NBS to evaluate survey data comparability, as survey variability and changes in coverage of Bering Sea surface and bottom trawl surveys have occurred over time
- The Team recommended that species-specific information from the ESR and the ESP be included in the reports for those species, even if it appears in two separate documents

This information is distributed solely for the purpose of pre-dissemination peer review under applicable information quality guidelines.
It has not been formally disseminated by the National Marine Fisheries Service and should not be construed to represent any agency determination or policy.

Forage species, continued

- Information for this report is primarily from observer data, but the pollock trawl catcher vessel fleet is moving to 100% electronic monitoring, which may have implications for the quality of bycatch data
- The Team looks forward to seeing the EFP report that addresses forage species monitoring and retention, and requests that it be attached or linked to the next forage species report
- Squid landings in 2019 were the highest since 1981, and Team discussion focused on whether the fleet encountered more squid because it was actively trying to avoid other species, or if the increase in bycatch was due to the lack of defined catch limits as squid were newly switched to be an ecosystem component complex
- The Team remains uncertain about the reasons for increased bycatch in 2019 and is unsure if the increase is population related or due to the first year of the implementation of squids as an ecosystem component

This information is distributed solely for the purpose of pre-dissemination peer review under applicable information quality guidelines.
It has not been formally disseminated by the National Marine Fisheries Service and should not be construed to represent any agency determination or policy.

Forage species, continued

- There was also discussion by the Team about the proposal in front of the Council to allow the processing and selling of squid despite its inclusion as an ecosystem component
- Although the Team recognized that this was likely not currently a conservation concern for the complex, the Team remains concerned that this sets a precedent for allowing ecosystem component species to be commercially processed and sold
- A concern was also voiced about the need to have a clear path for reinstating this species under the FMP if management or conservation concerns arise with any future expansion in harvesting and marketing

This information is distributed solely for the purpose of pre-dissemination peer review under applicable information quality guidelines.
It has not been formally disseminated by the National Marine Fisheries Service and should not be construed to represent any agency determination or policy.

Forage species, continued

- The Team discussed the herring savings area closures and the potential mis-specificity of their application and locations. The Team noted that a review of the herring savings areas would be a good candidate for a case study for ecosystem management in the new Fishery Ecosystem Plan Climate Action module on Evaluating Climate Change Effects in the Bering Sea.

This information is distributed solely for the purpose of pre-dissemination peer review under applicable information quality guidelines.
It has not been formally disseminated by the National Marine Fisheries Service and should not be construed to represent any agency determination or policy.