



BSAI Atka Mackerel

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BSAI Atka Mackerel

Model 16.0b



Changes in the Input Data

- Fishery catch data updated (2020, 2021=TAC)
- **2020** fishery age composition data added
 - **2012 year class** ↑ 4% (59% above ave.)
 - **2017 year class** ↑ 33% (\approx ave.)
- The est. average selectivity for **2016-2020** used for projections
- Assume 85% of the BSAI-wide ABC to be taken under revised SSL RPAs; % applied to 2022 (and 2023) maxABC for projections

BSAI Atka Mackerel



Key Results

□ Tier 3b

- $B_{100\%}$, $B_{40\%}$, and $B_{35\%} \approx$ last year's estimates
- 2022 spawning biomass (109,360 t) 1% higher, **below** $B_{40\%}$ ($B_{39\%}$), Tier 3b
- 2022 projections:

Yield at $F_{40\%adj} = 0.54$

2022 ABC = 78,510 t **2022 OFL = 91,870 t**

(7% higher than 2021 ABC & OFL)

Model 16.0b (last year's accepted model)



2020-2021

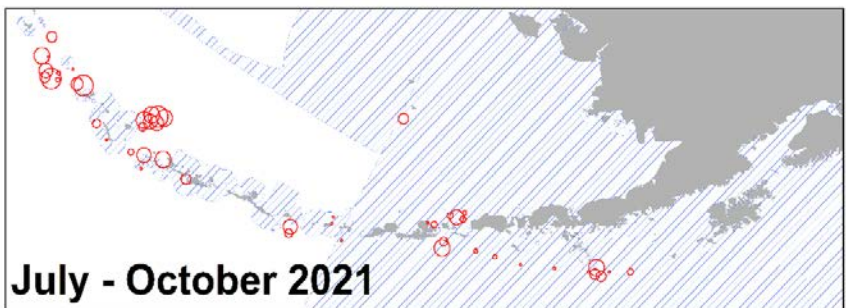
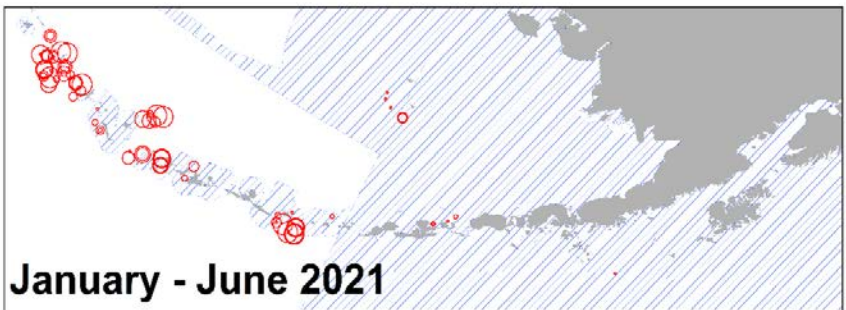
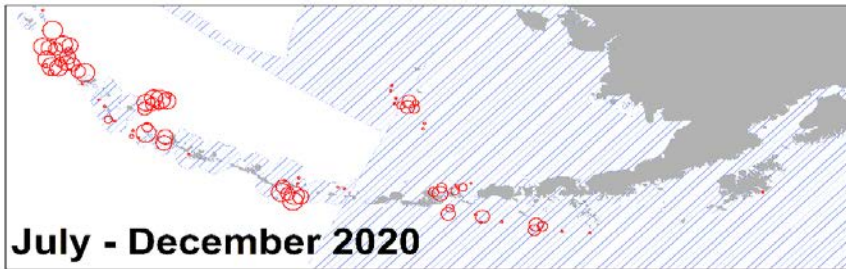
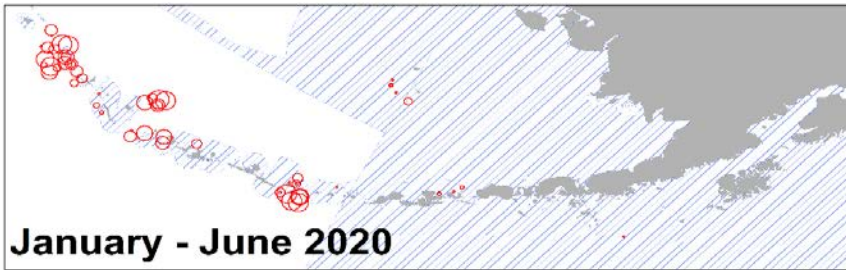
Atka mackerel fishery locations

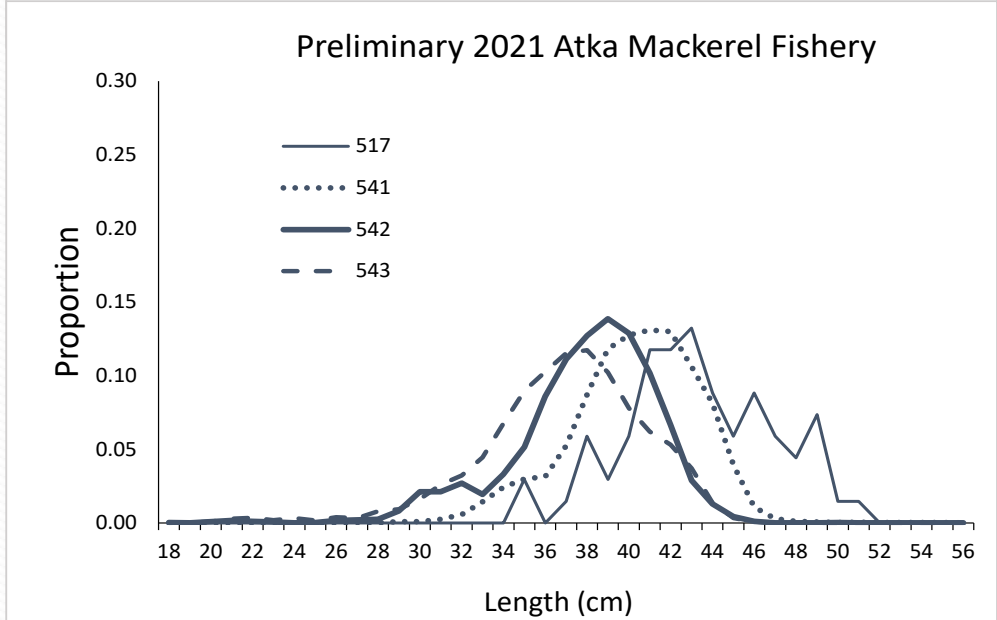
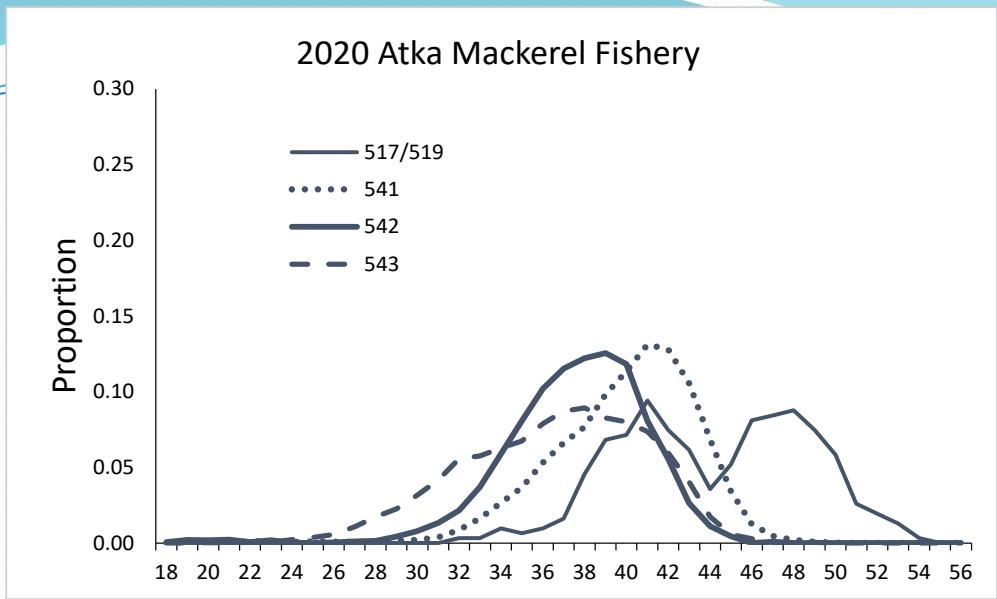
Observed catch (Tons)

- 1 - 5
- 6 - 10
- 11 - 20
- 21 - 40
- 41 - 80
- 81 - 100
- 101 - 200
- 201 - 400
- 401 - 800
- 801 - 3000

Observed catch (Tons)

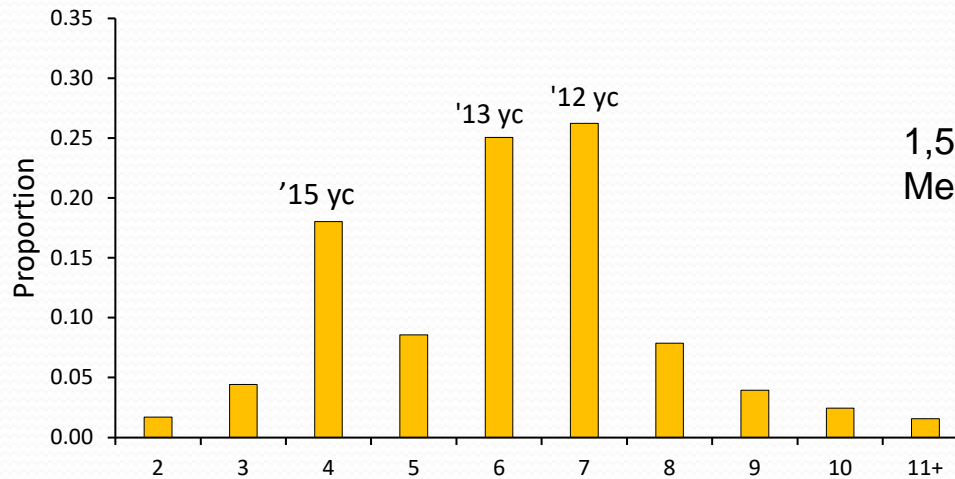
- 1 - 5
- 6 - 10
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- 201 - 400
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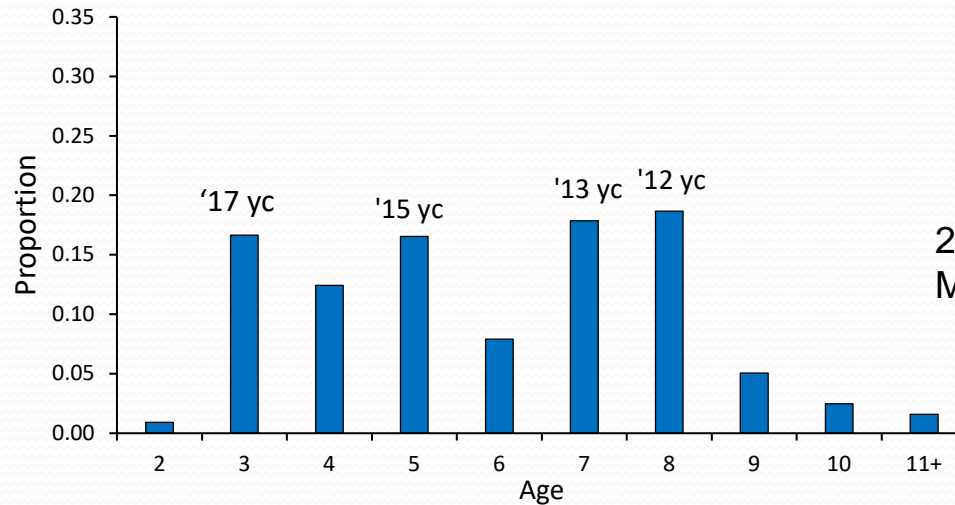


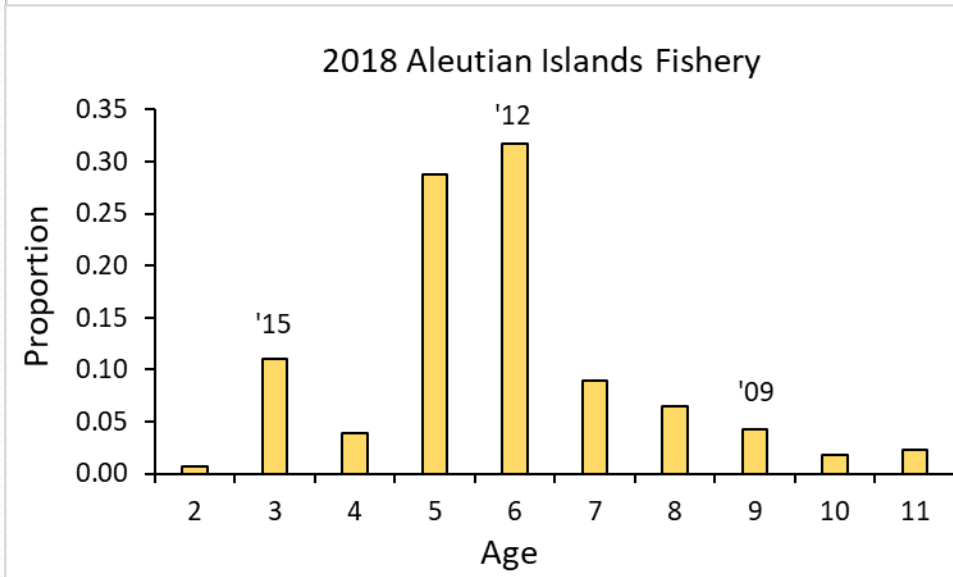
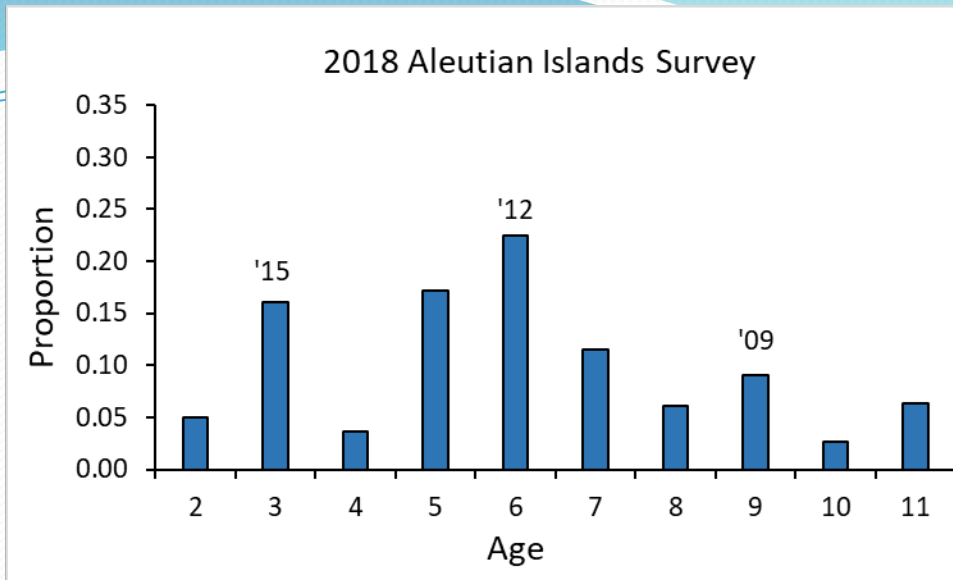
Atka mackerel fishery length-frequency data by area fished

2019 Aleution Islands Fishery



2020 Aleution Islands Fishery

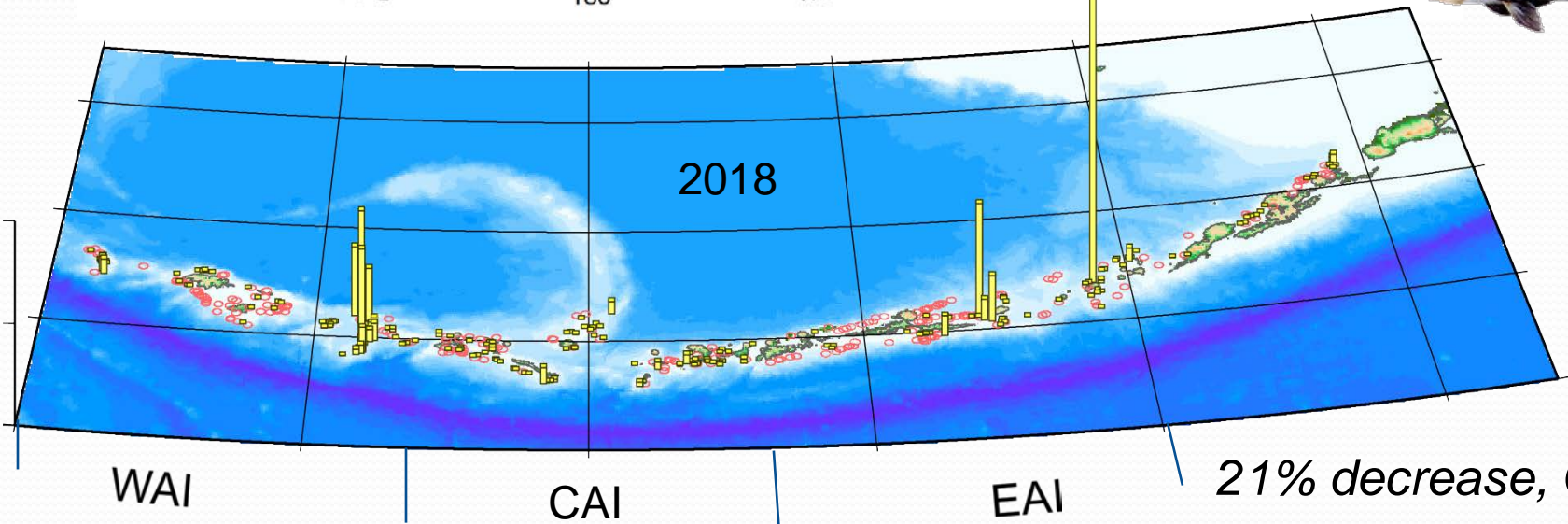
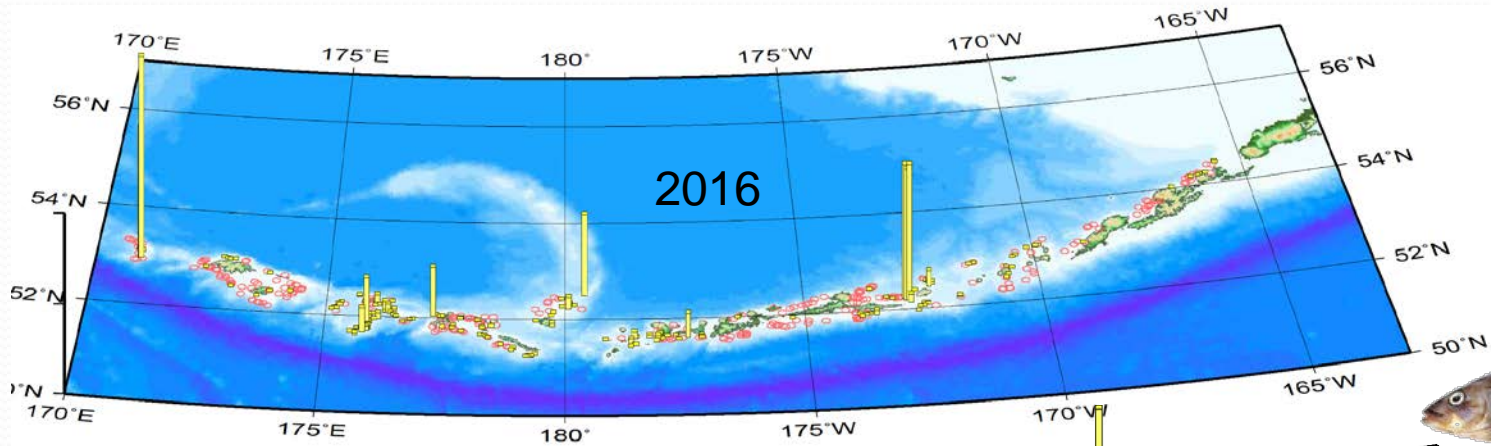




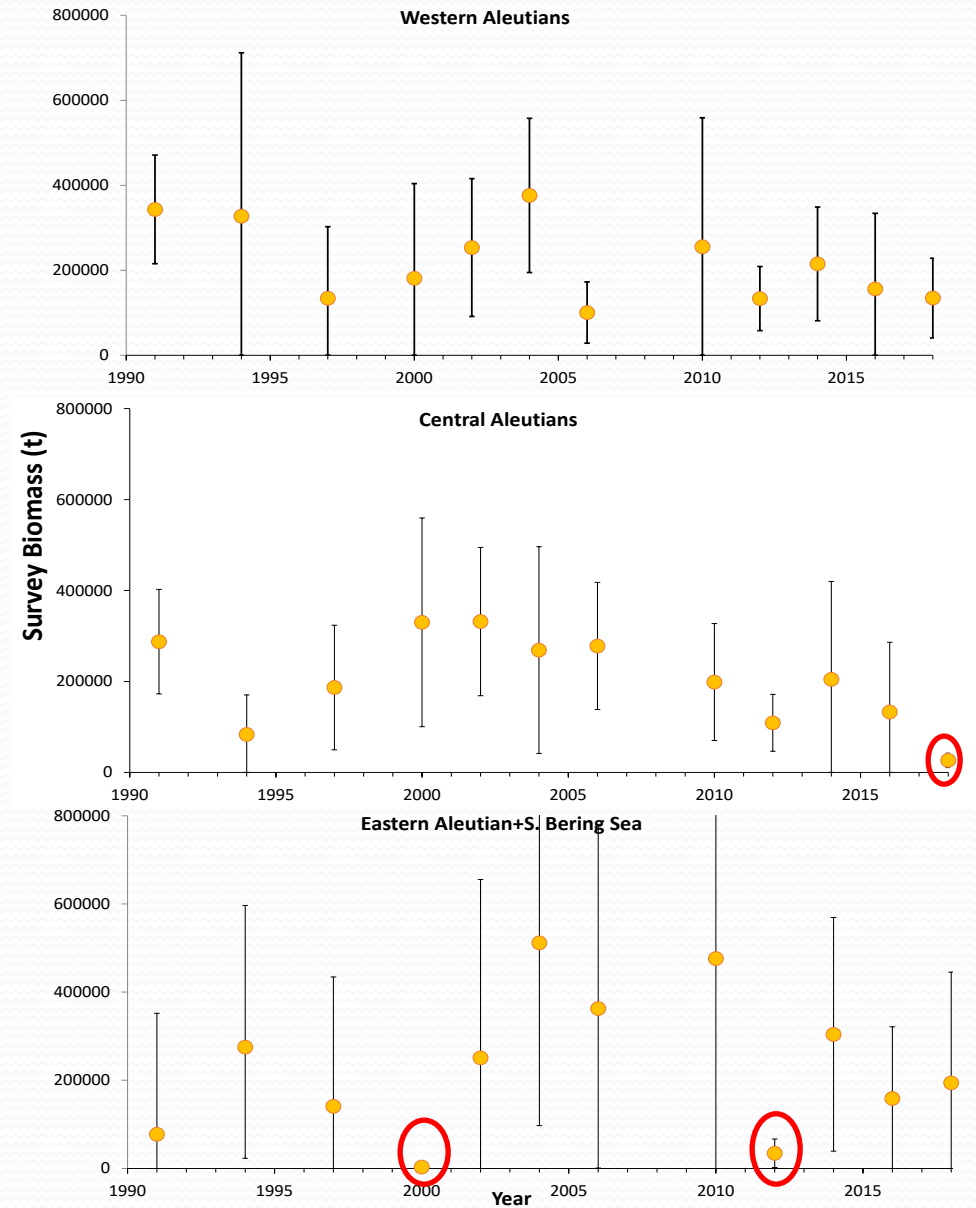
A total of 1,052 otoliths were aged from 2018 survey; mean age is 6 years

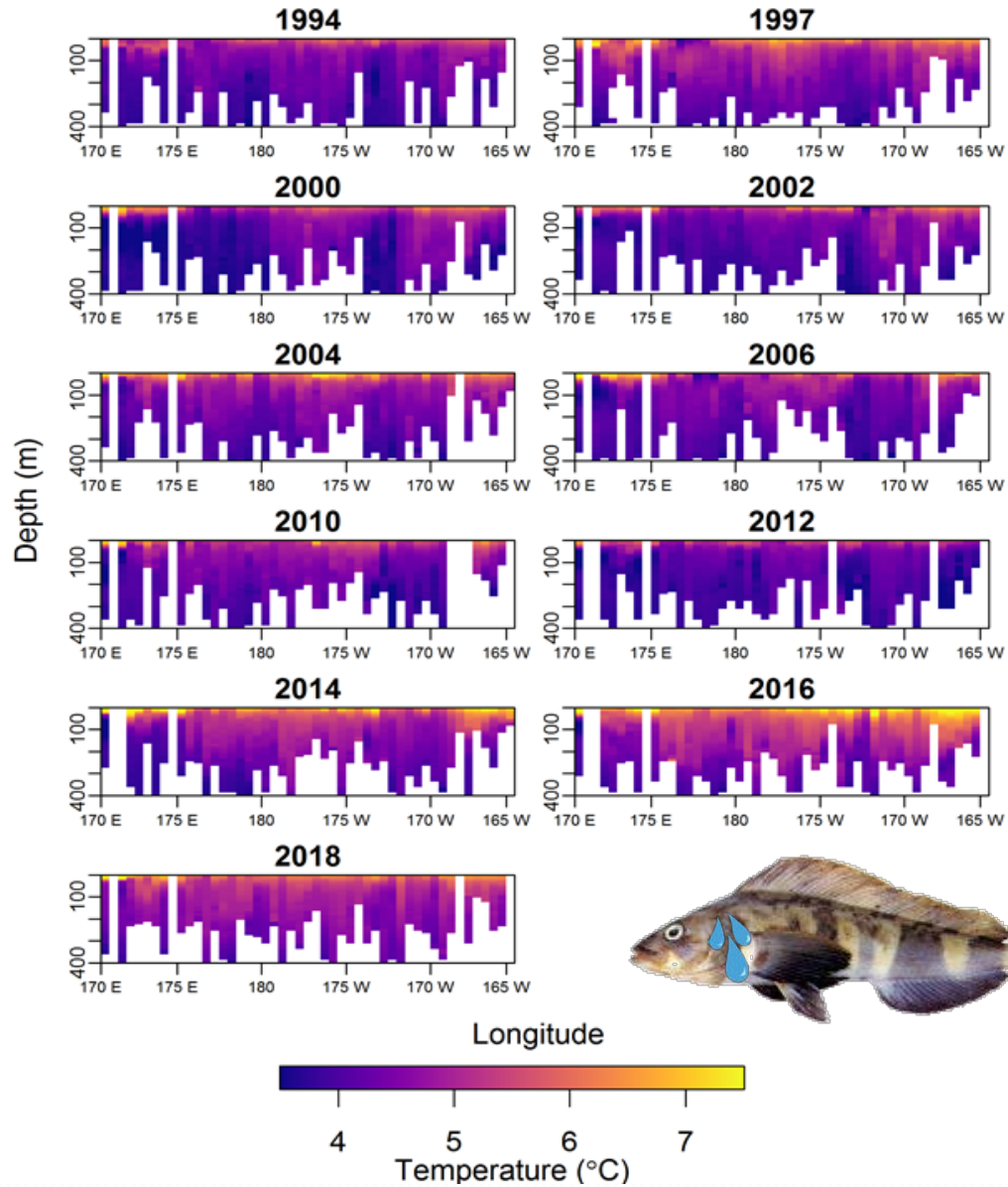
A total of 1,581 otoliths were aged from 2018 fishery; mean age is 5.8 years

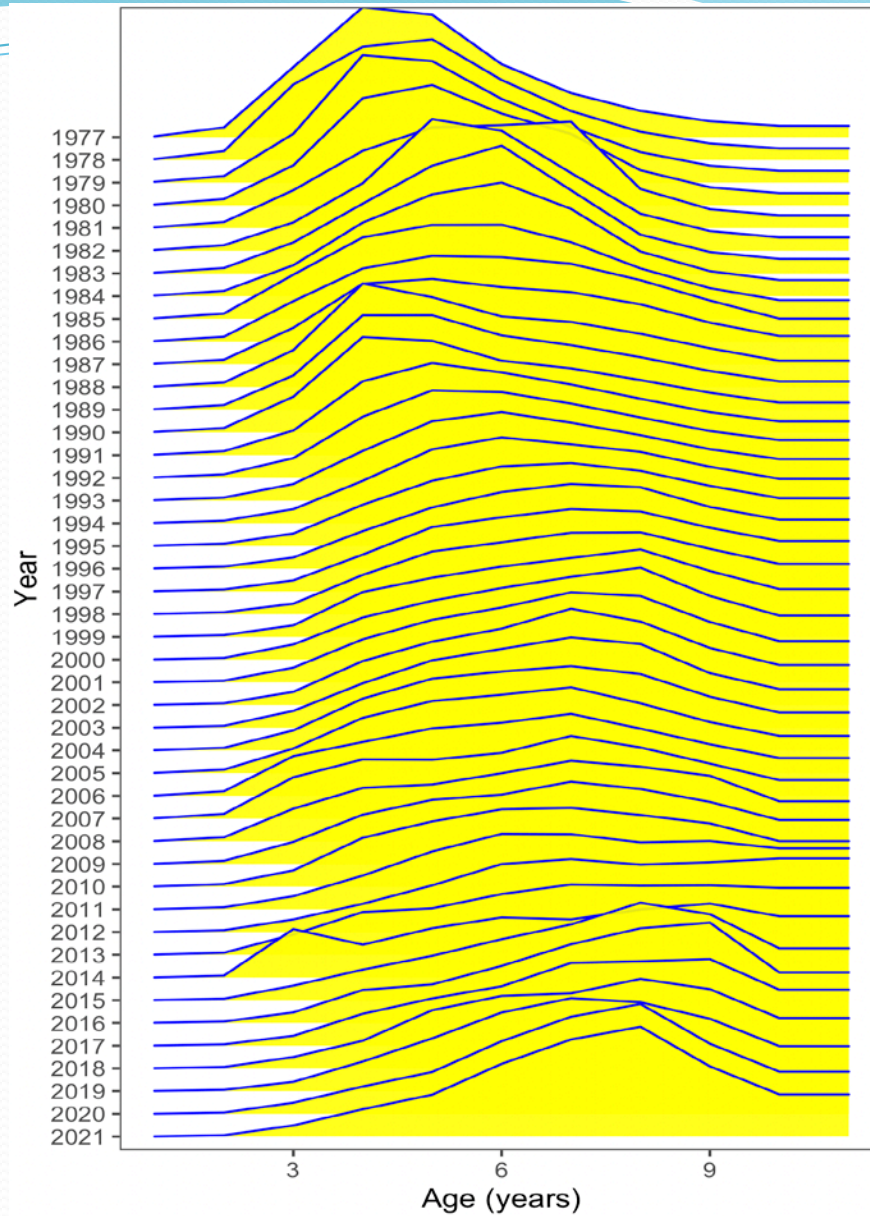
Bottom trawl survey CPUE distributions of Atka mackerel catches



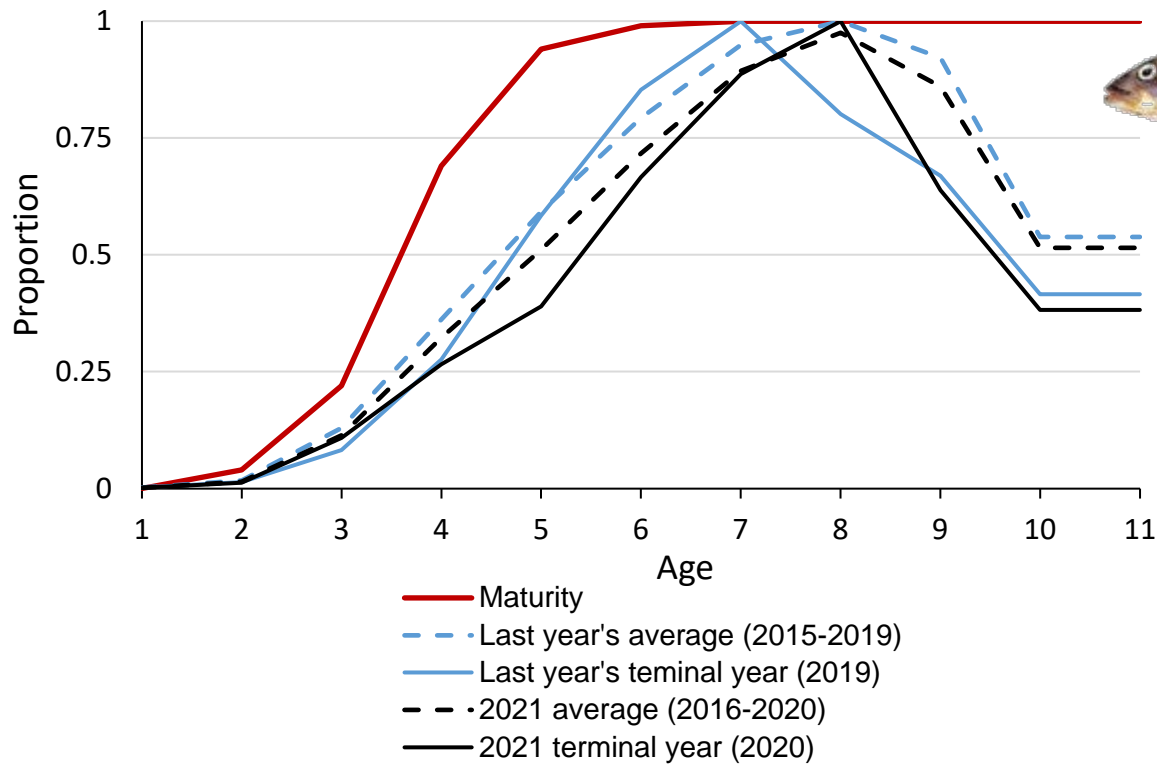
21% decrease, CV 30%





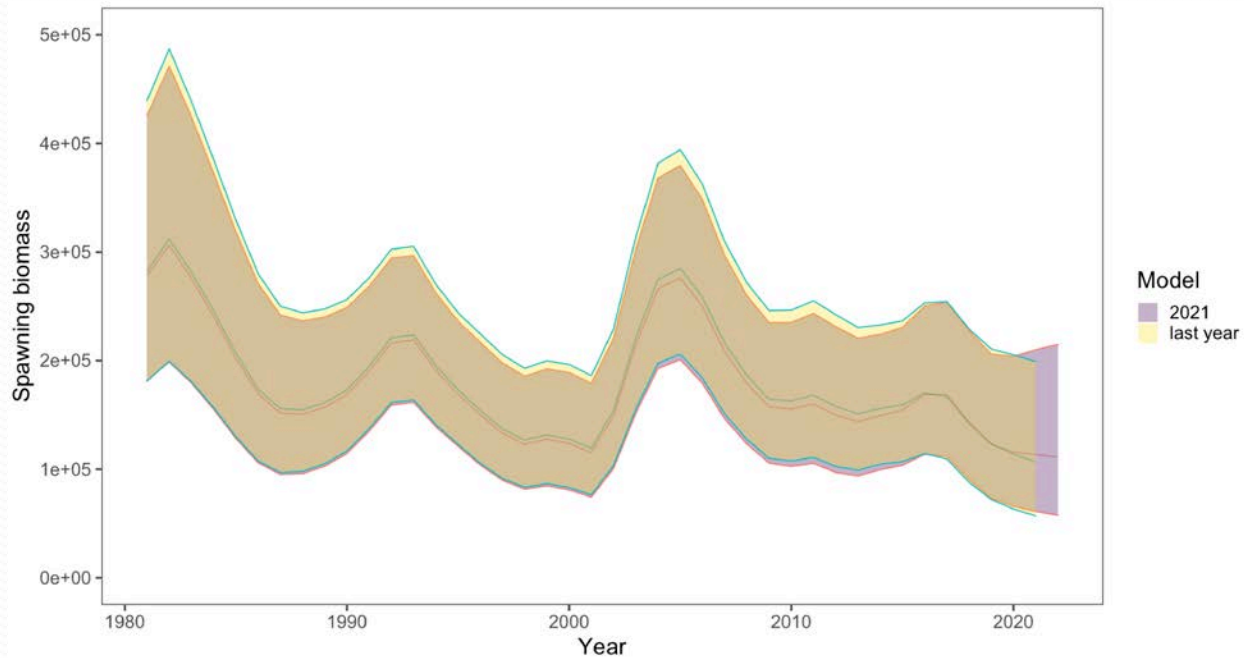


Fishery selectivity pattern from the BSAI Atka mackerel assessment Model 16.0b

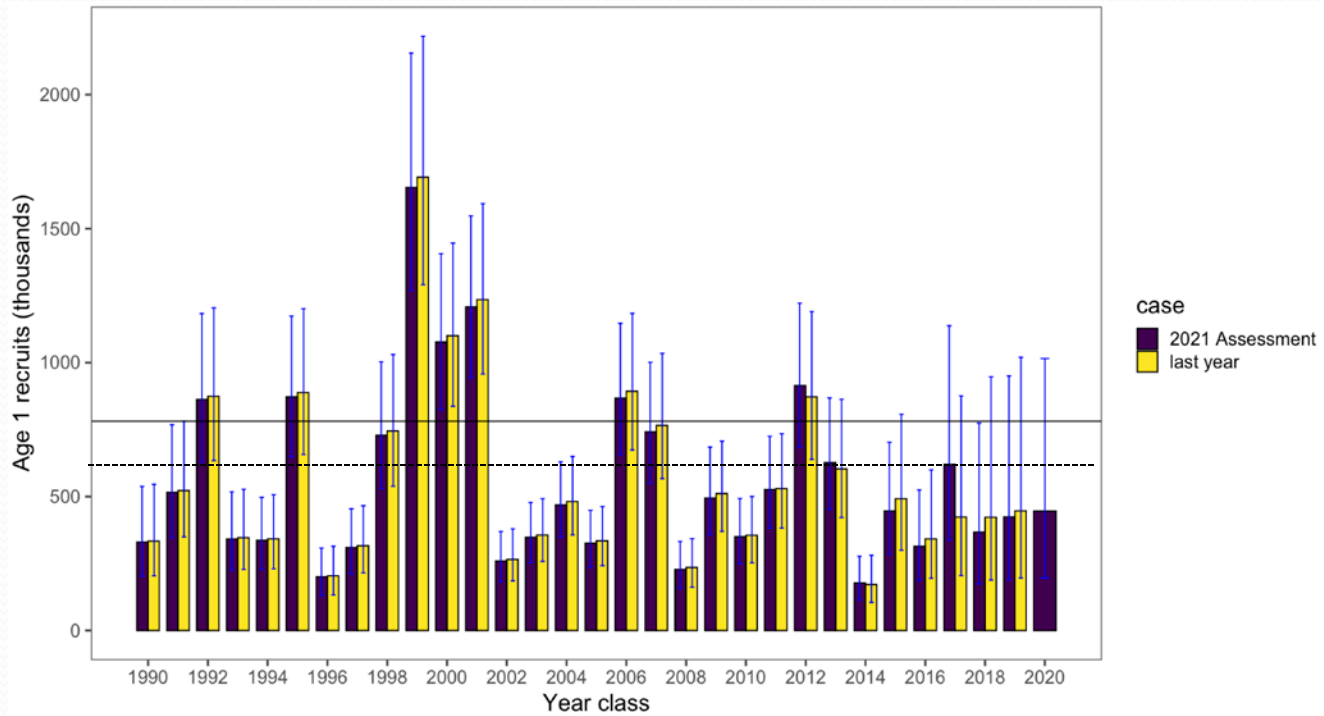


Estimated fishery selectivity patterns in the current assessment with:

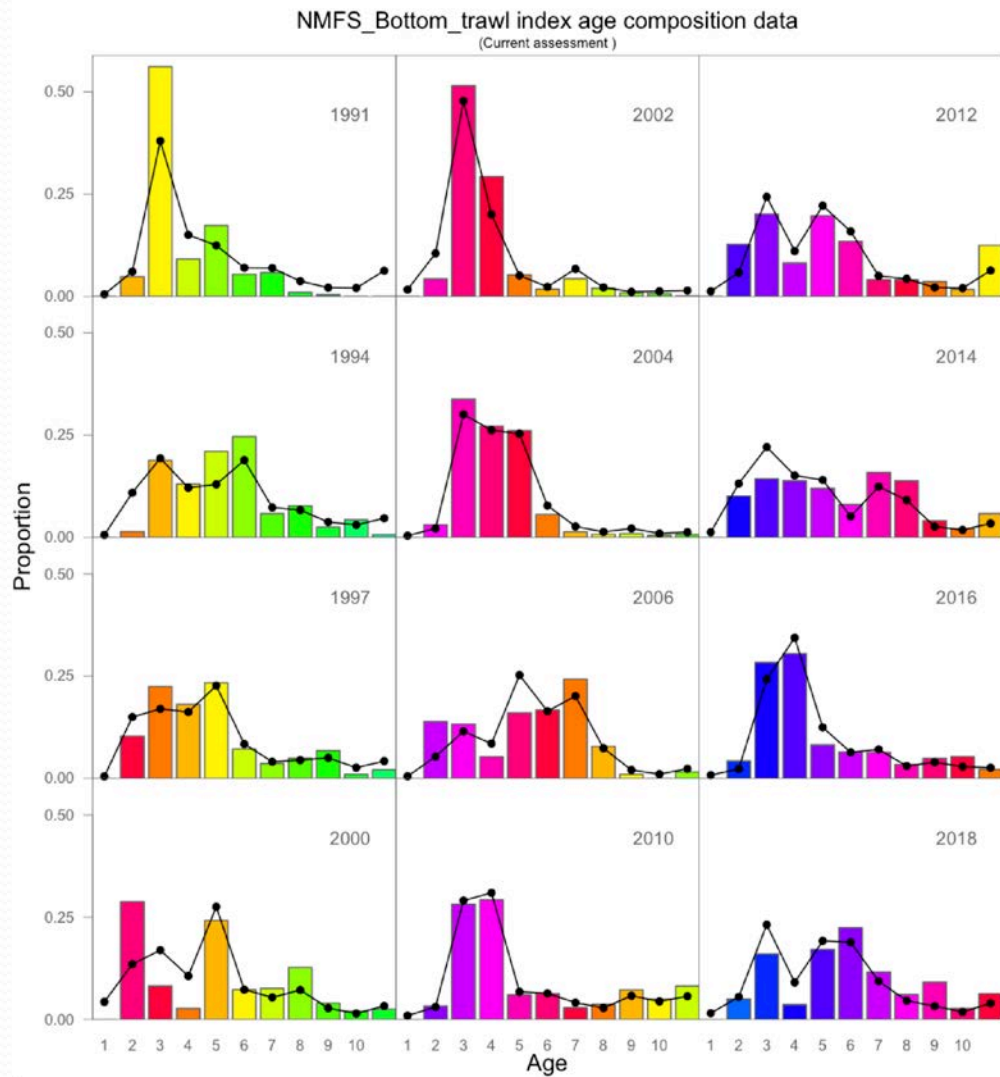
- last year's average for projections (2015-2019),
- the 2021 assessment average selectivity used for projections (2016-2020),
- last year's assessment terminal year (2019), and
- the 2021 assessment terminal year (2020) compared with the maturity-at-age estimates for BSAI Atka mackerel.



Time series of the current assessment (Model 16.0b) estimated Al Atka mackerel spawning biomass (t) with approximate 95% confidence bounds, compared to last year's Model 16.0b estimates (2020 assessment). Changes include 2020 fishery age composition data in the current assessment.



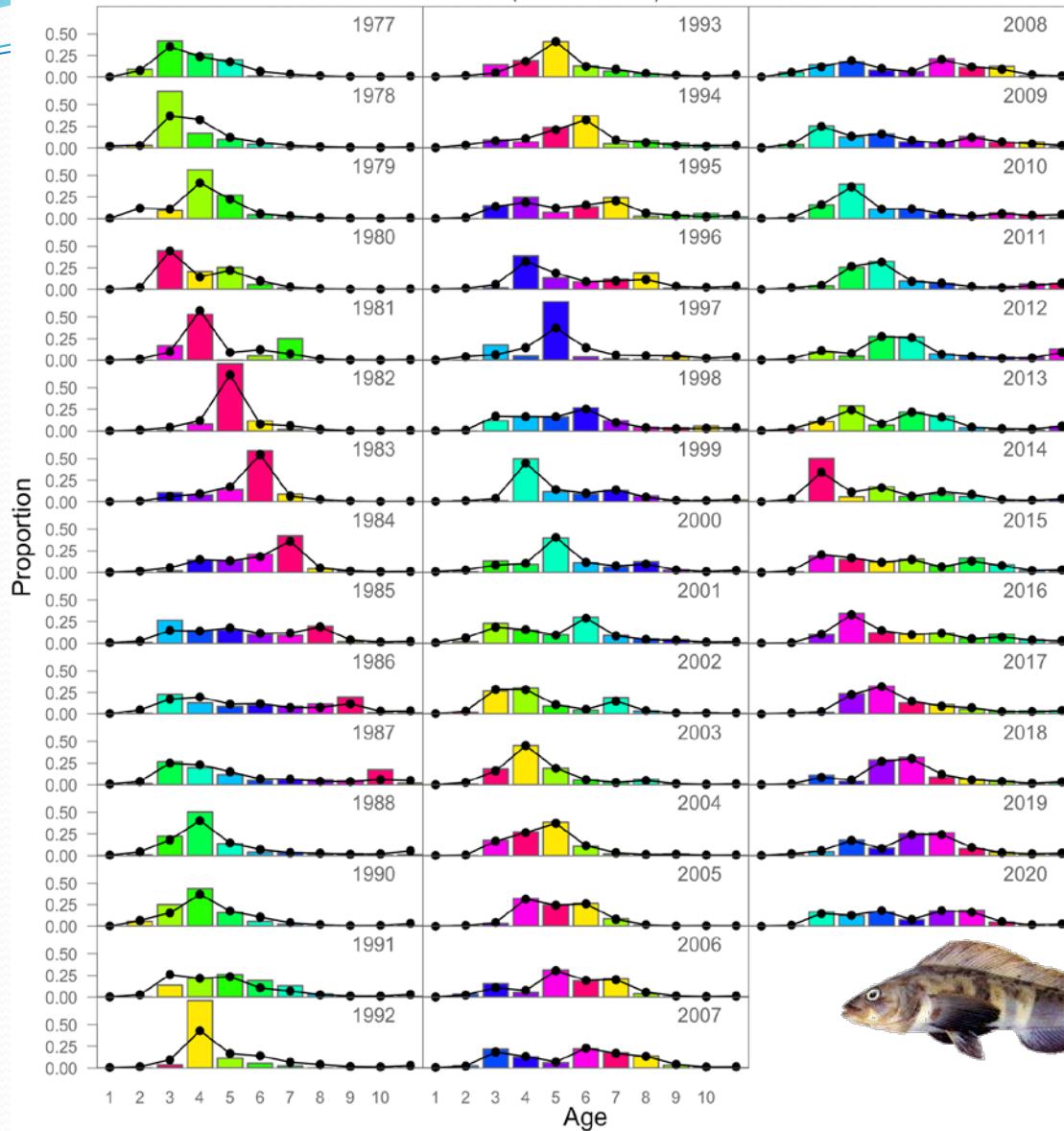
Age 1 recruitment from the current assessment (2021) with the dashed line indicating average recruitment (569 million) from the 1977-2019 year classes, and age 1 recruitment as estimated from the 2020 assessment



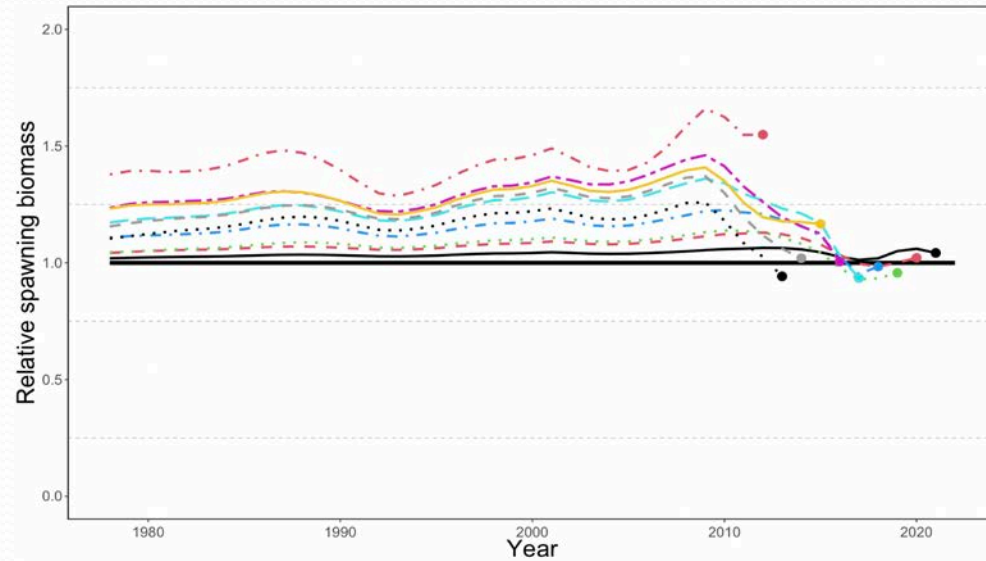
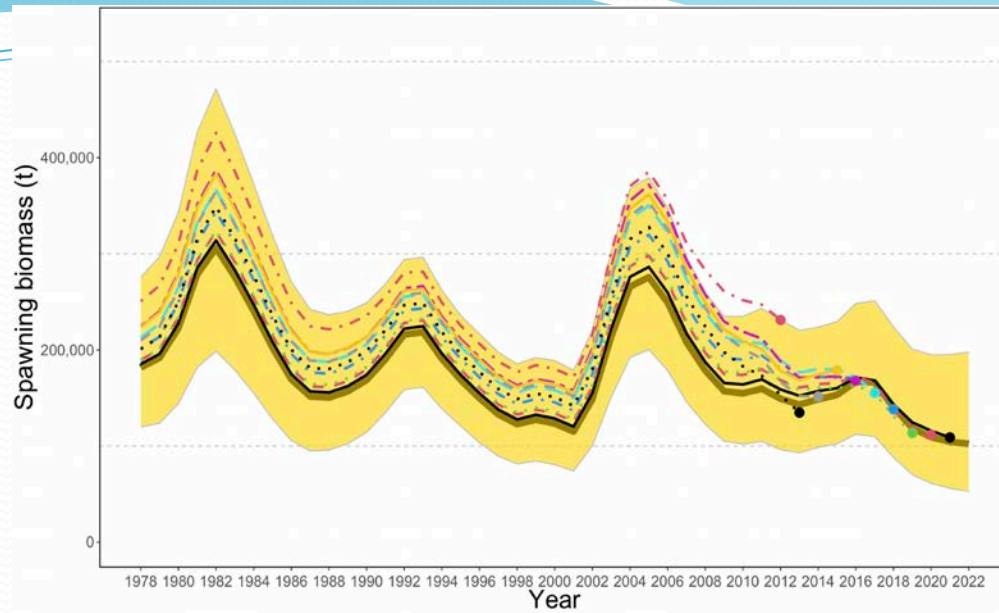
Observed and predicted **survey** proportions-at-age for BSAI Atka mackerel. Lines with “●” symbol are the model predictions and columns are the observed proportions at age

Atka_mackerel fishery age composition data

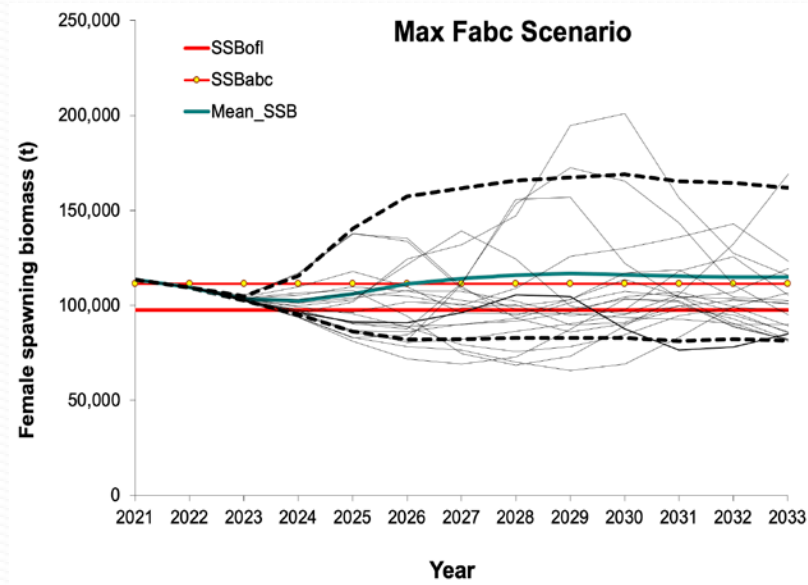
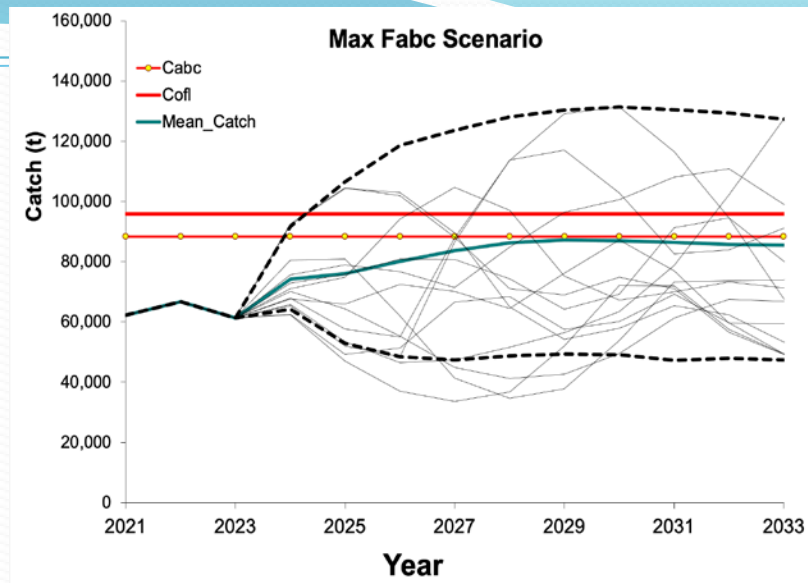
(Current assessment)



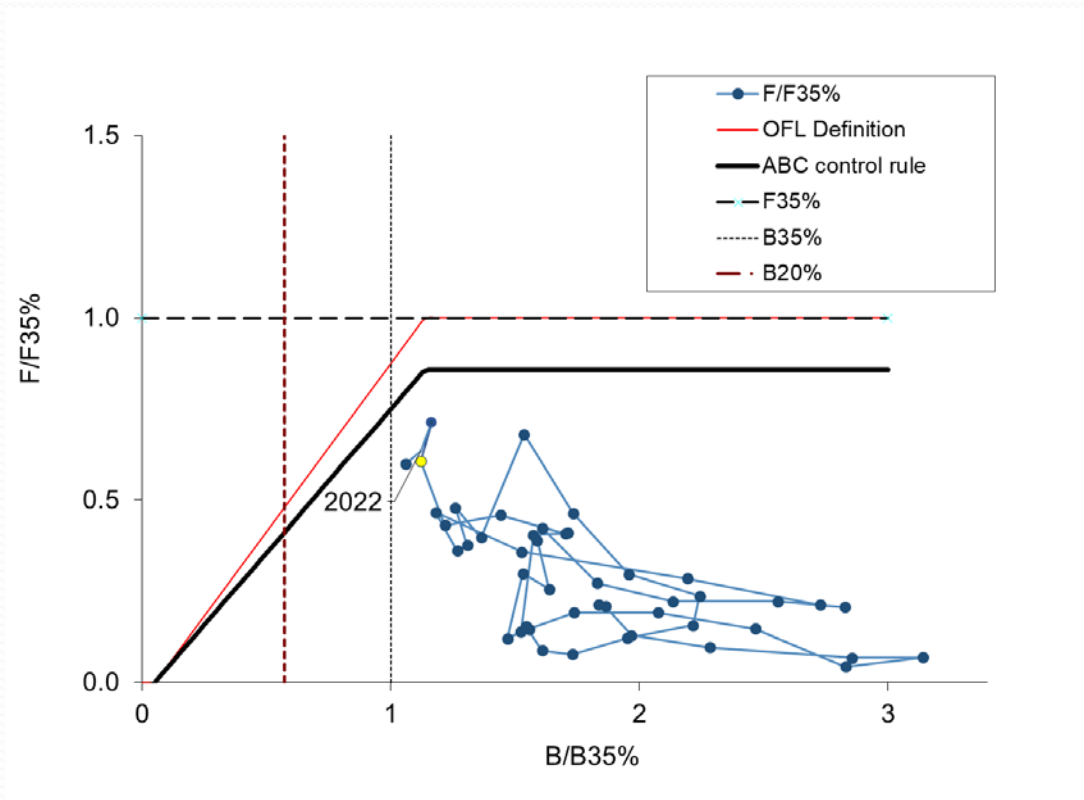
Observed and predicted Atka mackerel **fishery** proportions-at-age for BSAI Atka mackerel. Lines with “•” symbol are the model predictions and columns are the observed proportions at age (with colors corresponding to cohorts)



Retrospective plots showing the spawning biomass over time (top) and the relative difference (bottom) over 10 different “peels”. Mohn’s rho was 0.062.



Projected Atka mackerel catch (assuming TAC taken in 2021 and reduced 2022 and 2023 catches; top) and spawning biomass (bottom) in thousands of metric tons under maximum permissible harvest control rule specifications after 2023



BSAI Atka mackerel spawning biomass relative to $B_{35\%}$ and fishing mortality relative to F_{OFL} (1977-2023)

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Overfishing Level and Maximum Permissible ABC

Catch assumptions:

- Total 2021 year end catch set = to TAC (62,257 t) for ABC/OFL specification purposes
- For 2022 & 2023 assume that 85% of the BSAI-wide ABC would be taken
 - Due to revised SSL RPAs
 - Affects ABC and OFL values

Selectivity assumption for projections:

- Estimated ave. selectivity for 2016-2020



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Quantity	As estimated or <i>specified last year for:</i>		As estimated or <i>recommended this year</i> for:	
	2021	2022	2022*	2023*
Tier	3b	3b	3b	3b
Projected total (age 1+) biomass (t)	560,360	599,690	554,490	570,080
Projected Female spawning biomass	107,830	102,950	109,360	103,330
$B_{40\%}$	116,330	116,330	111,470	111,470
$B_{35\%}$	101,790	101,790	97,540	97,540
F_{OFL}	0.51	0.49	0.65	0.61
$maxF_{ABC}$	0.43	0.41	0.54	0.51
F_{ABC}	0.43	0.41	0.54	0.51
OFL (t)	85,580	79,660	91,870	84,440
maxABC (t)	73,590	68,220	78,510	71,990
ABC (t)	73,590	68,220	78,510	71,990

*Projections are based on estimated total catch of 66,740 t and 61,320 t in place of maximum permissible ABC for 2022 and 2023, respectively.

BSAI Atka Mackerel Apportionment

2018 Random Effects Model	
541 ¹	50%
542	10%
543	40%

¹Includes eastern Aleutian Islands and southern Bering Sea areas.

4-Survey Weighted Average (Recommended)

	Survey Year				2022 & 2023 Apportionment	2022 ABC	2023 ABC
	2012	2014	2016	2018			
541+SBS	12%	42%	35%	38%	0.35	27,260	25,000
542	39%	28%	30%	7%	0.21	16,880	15,470
543	48%	30%	35%	55%	0.44	34,370	31,520
Weights	8	12	18	27	1.00		
Total ABC						78,510	71,990



Should the ABC be reduced below the maximum permissible ABC?

<i>Assessment-related considerations</i>	<i>Population dynamics considerations</i>	<i>Environmental/ecosystem considerations</i>	<i>Fishery Performance considerations</i>
Level 1: Typical to moderately increased concerns	Level 1: Stock trends are typical for the stock; recent recruitment is within normal range.	Level 1: No apparent environmental/ecosystem concerns	Level 1: No apparent fishery/resource-use performance and/or behavior concerns

There are no changes to the risk table scores relative to last year, and the scores suggests that setting the ABC below the maximum permissible is not warranted.

Questions?



Thank you and best wishes Wayne!

