



BSAI Atka Mackerel

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BSAI Atka Mackerel



★ Tier 3a ★

➤ Data and Model:

- ❑ 2015 fishery age composition data added
 - 2011 year class decreased 23% relative to last year's assessment
- ❑ 2016 survey biomass: ↓ 38%, decreases in all areas of the Aleutian Islands
- ❑ Sample sizes for fishery and survey age comp data rescaled (varied relative to # hauls)

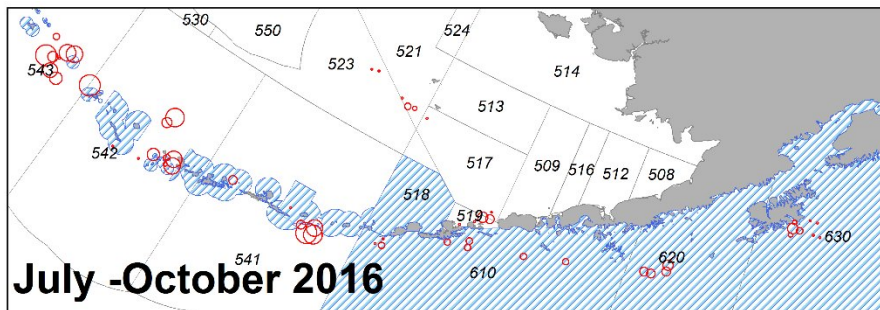
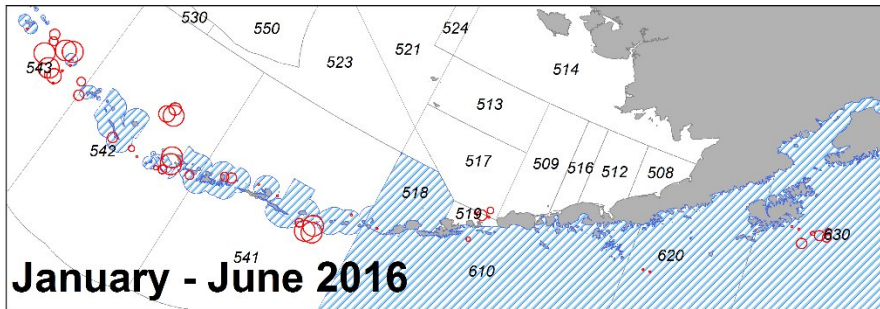
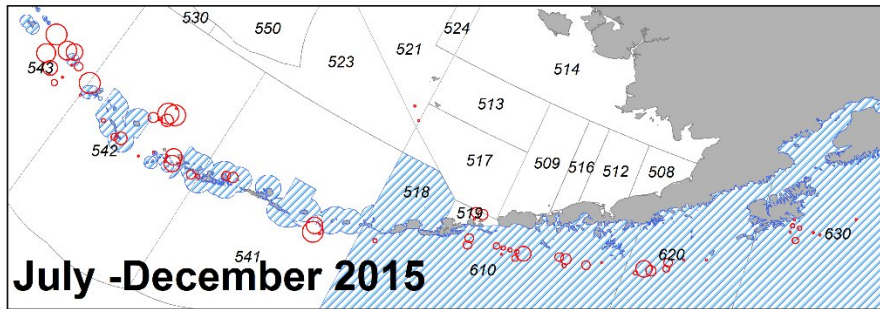
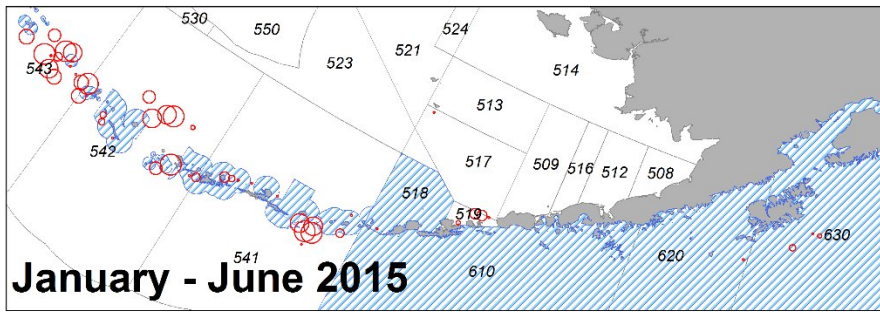
➤ Key Results

- ❑ $B_{100\%}$, $B_{40\%}$, and $B_{35\%}$ are 8% lower
- ❑ 2017 spawning biomass (145,300 t) 13% lower and is above $B_{40\%}$ ($B_{46\%}$), Tier 3a
- ❑ 2017 age 1+ biomass 11% lower to last year's projection for 2016
- ❑ 2017 projections:
 - Yield at $F_{40\%}$ down 3% from 2016 ABC but up 2% from proj. 2017 ABC
 - 2017 ABC = 87,200 t
 - 2017 OFL = 102,700 t

Changes in the Input Data



- Fishery catch data updated
- Total 2016 year end catch est. based on recent ave. catch after Oct 1, set equal 2016 TAC
- 2015 fishery age composition added
- 2016 survey biomass added
- The est. average selectivity for 2011-2015 used for projections (response to PT and SSC)
- Assume 62% of the BSAI-wide ABC to be taken under revised SSL RPAs; % applied to 2017 maxABC for 2018 projections



Observed catch (Tons)

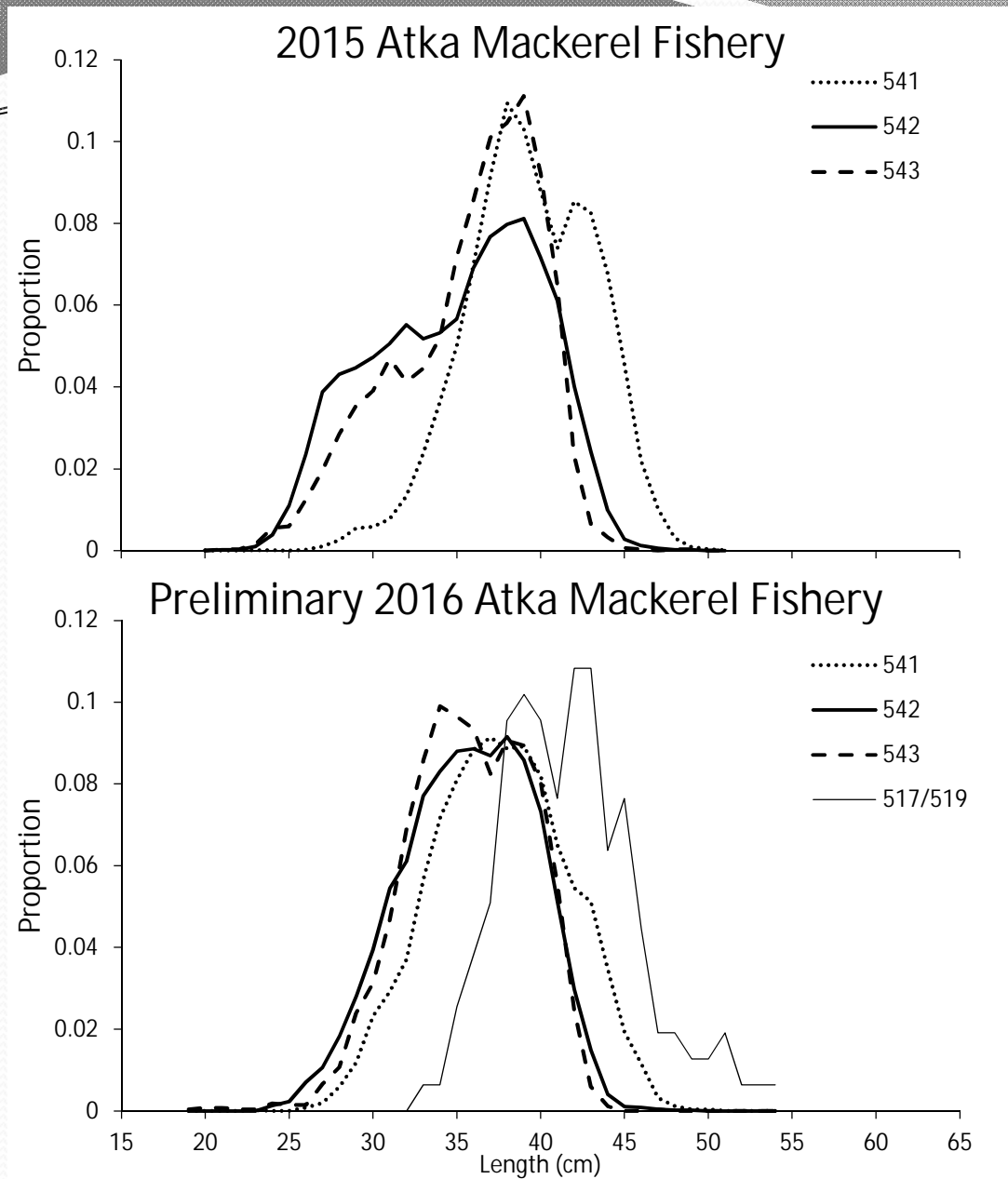
- 1 - 5
- 6 - 10
- 11 - 20
- 21 - 40
- 41 - 80
- 81 - 100
- 101 - 200
- 201 - 400
- 401 - 800
- > 800



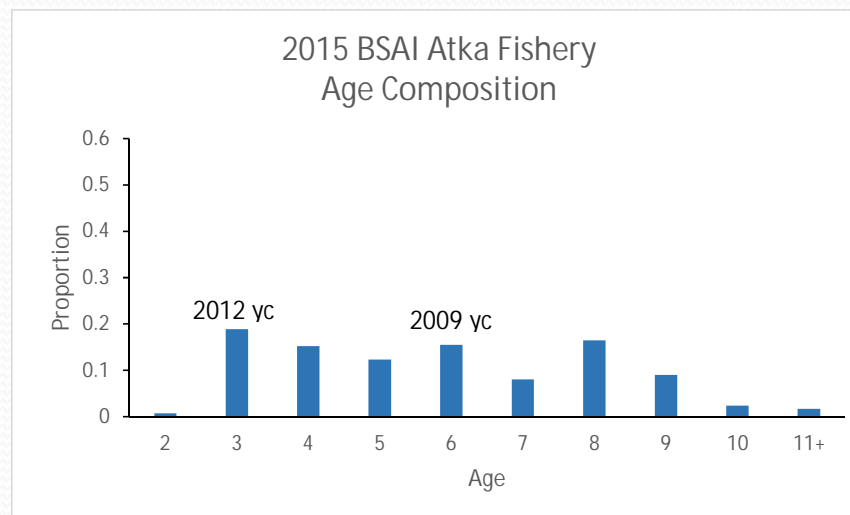
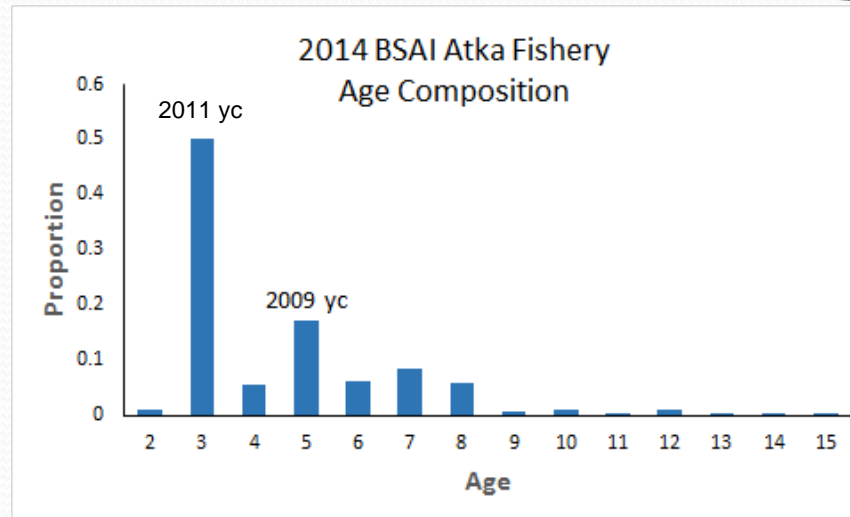
2015-2016 Atka mackerel fishery locations

Observed catch (Tons)

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



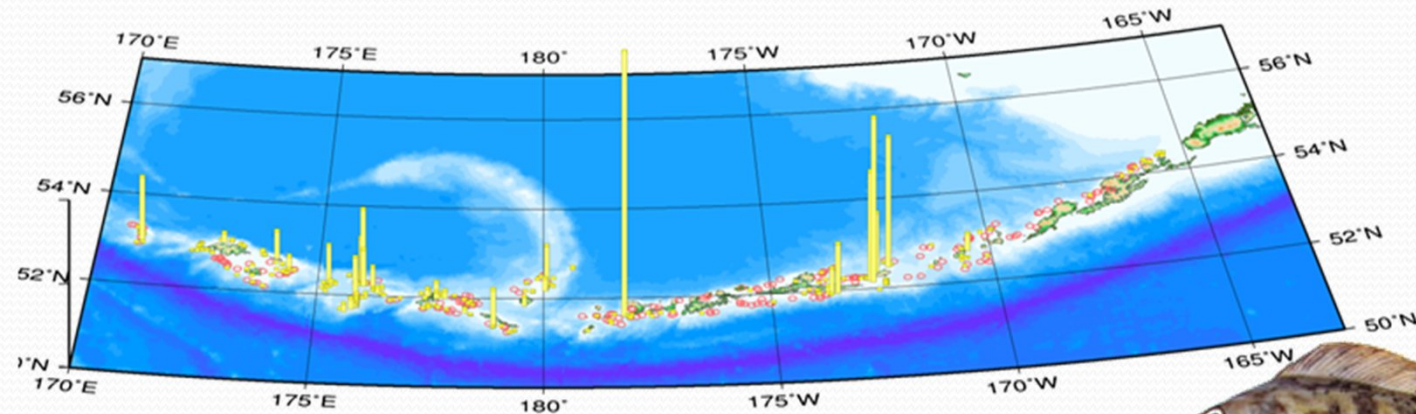
Atka mackerel fishery length-frequency data by area fished



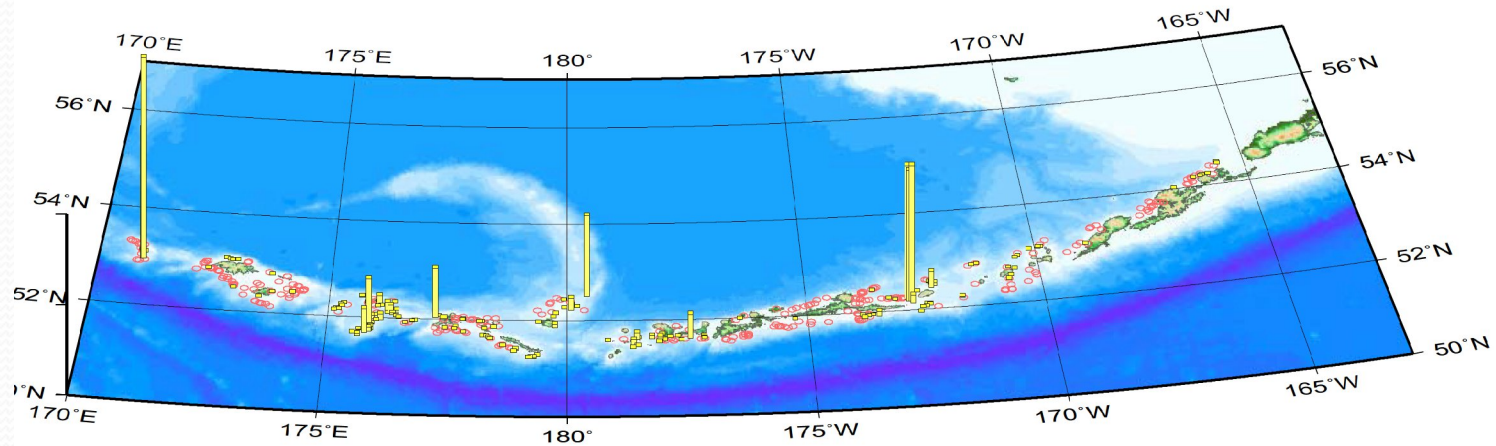
A total of 1,687 otoliths were aged; mean age from the 2015 fishery is 5.8 years

Bottom trawl survey CPUE distributions of Atka mackerel catches

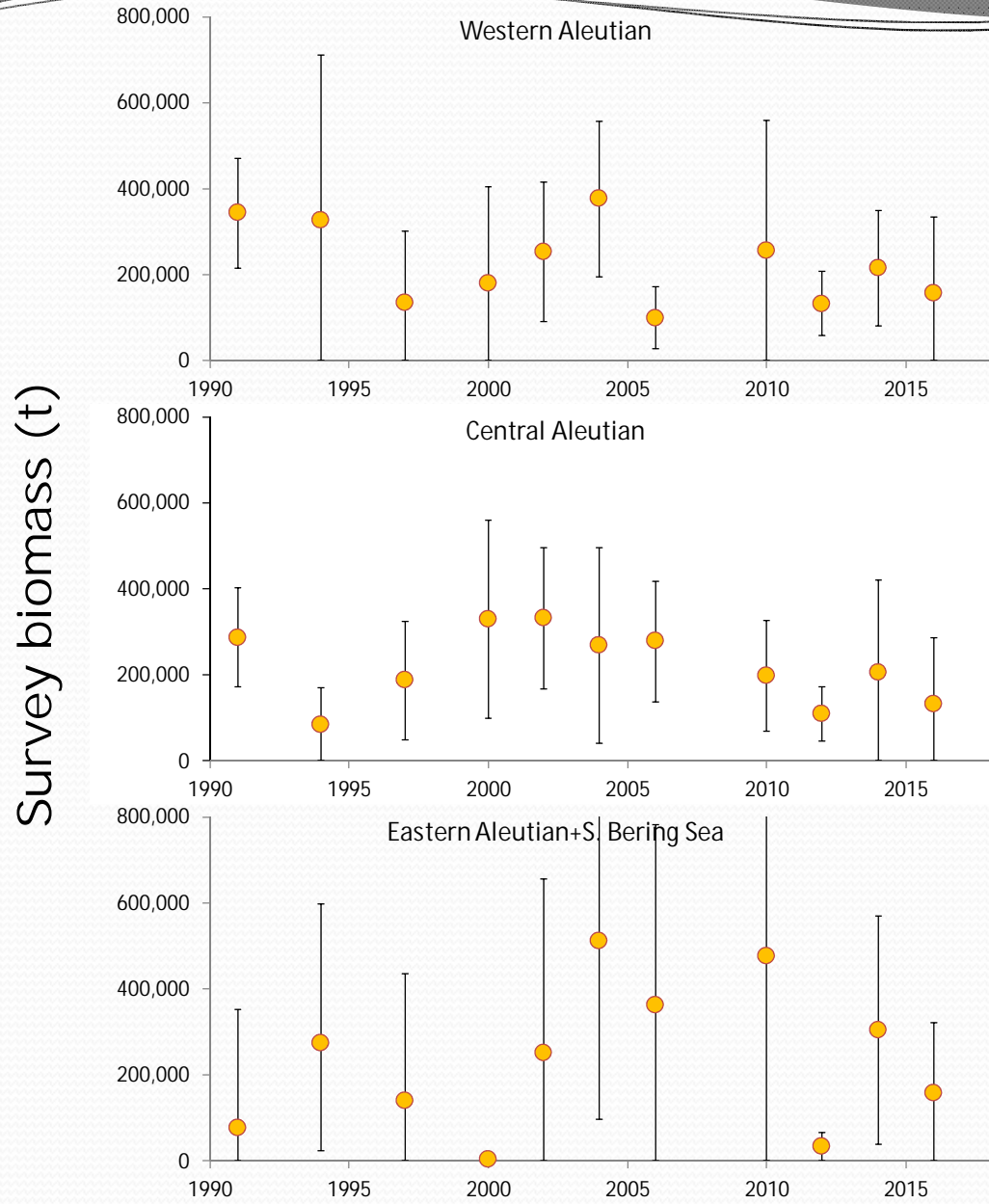
Atka Mackerel 2014



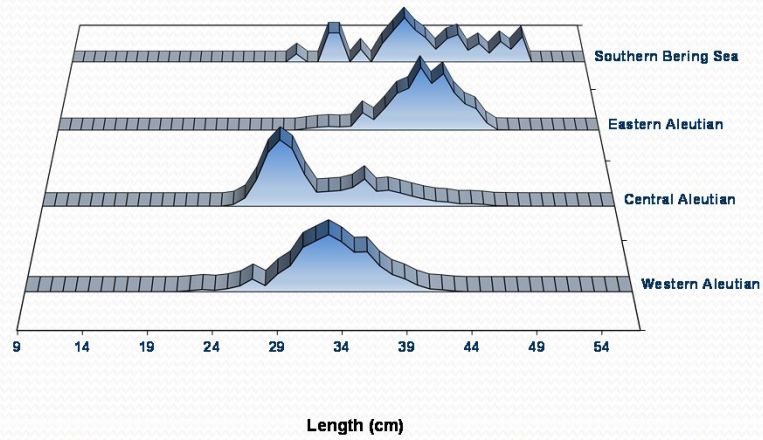
Atka Mackerel 2016



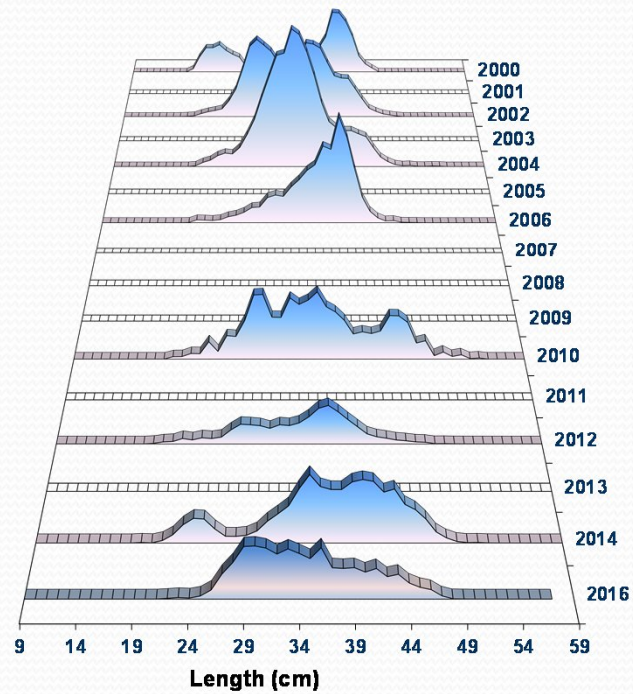
38% decrease, CV 31%

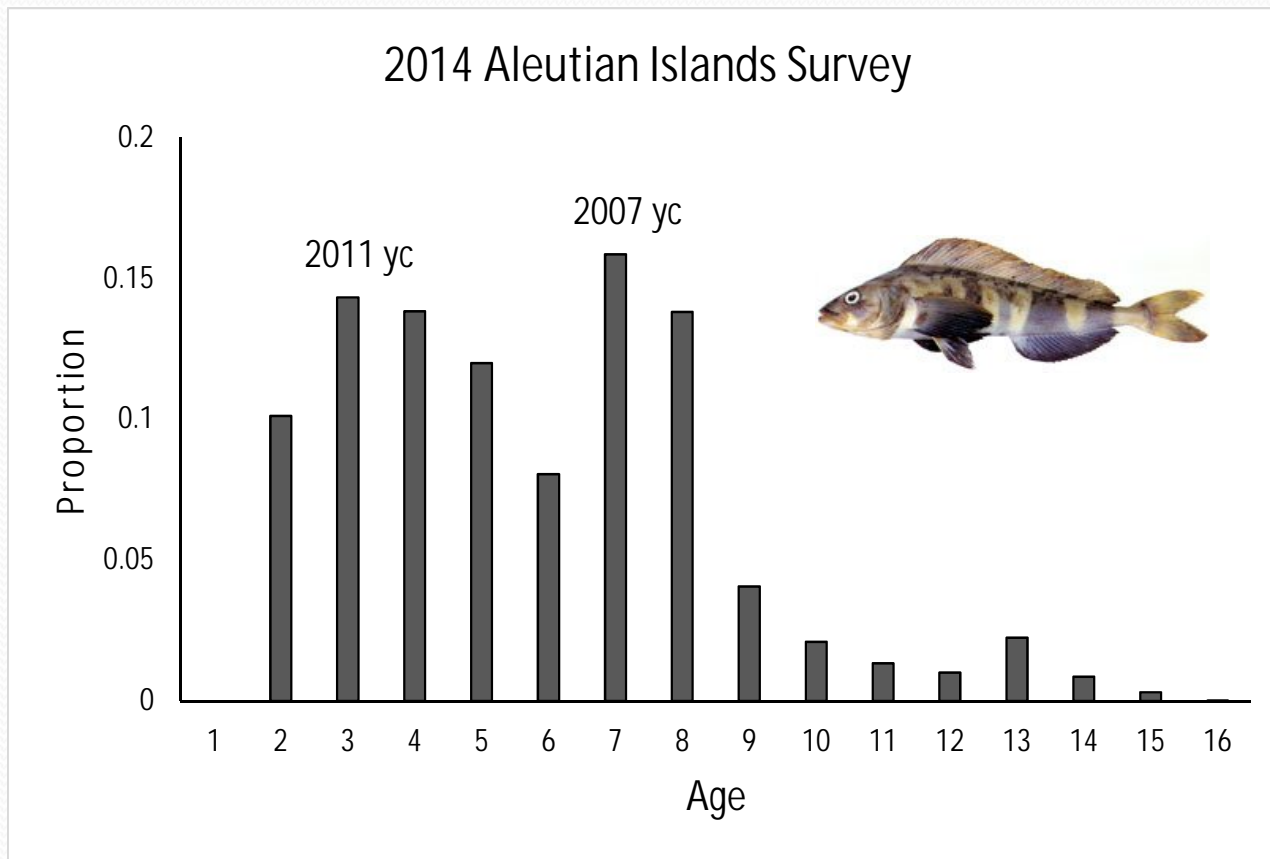


2016 Atka mackerel survey population at length by area

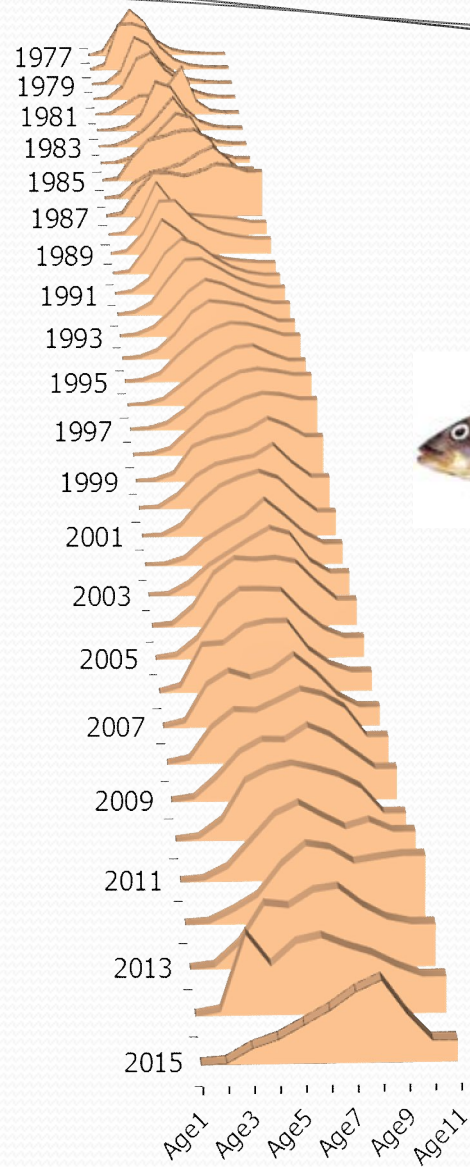


Atka mackerel survey population-at-length

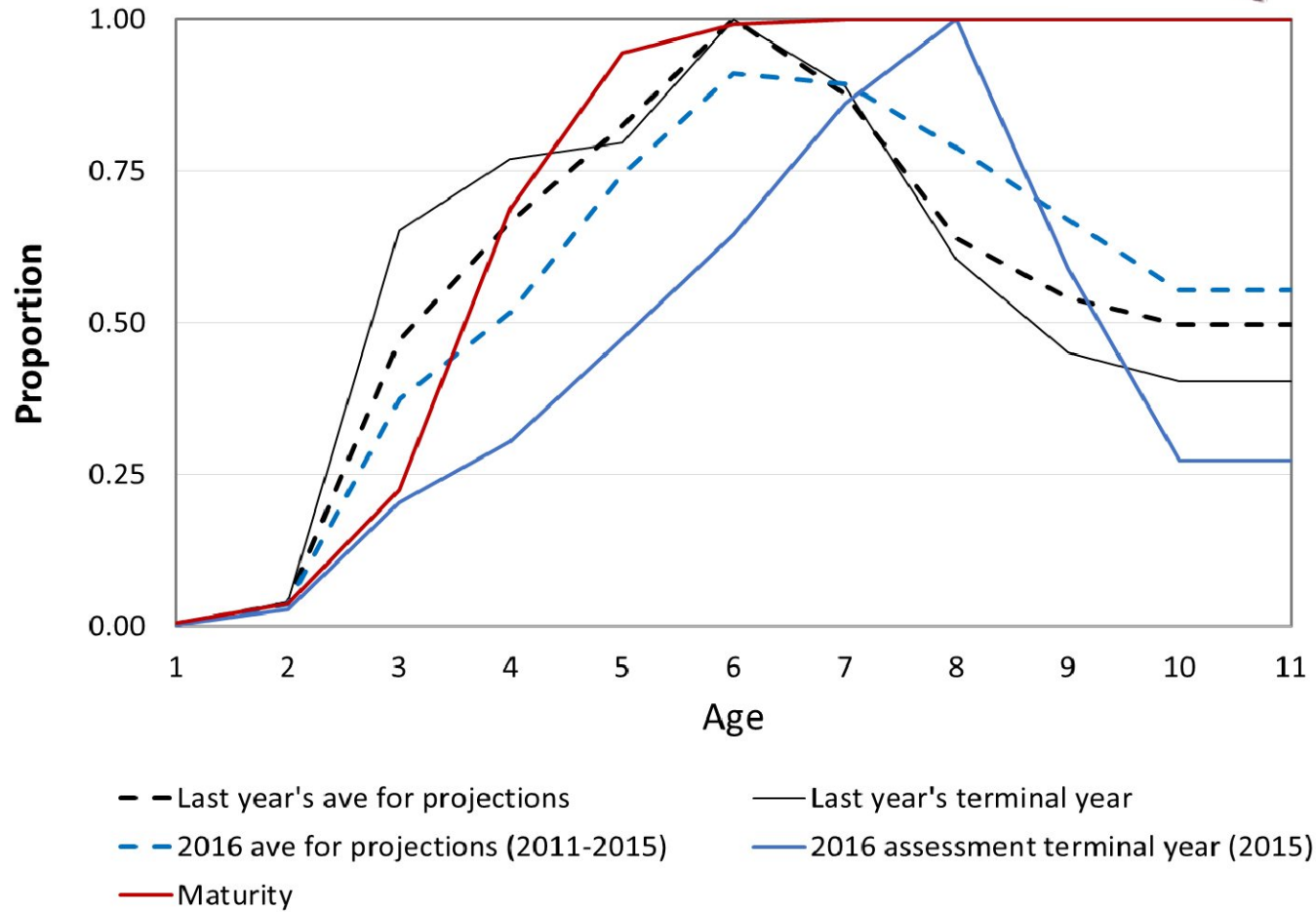
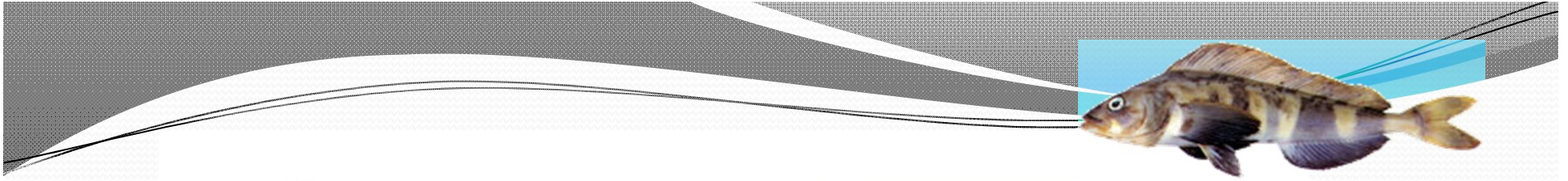




A total of 478 otoliths were aged; mean age from the 2014 survey is 5.8 years

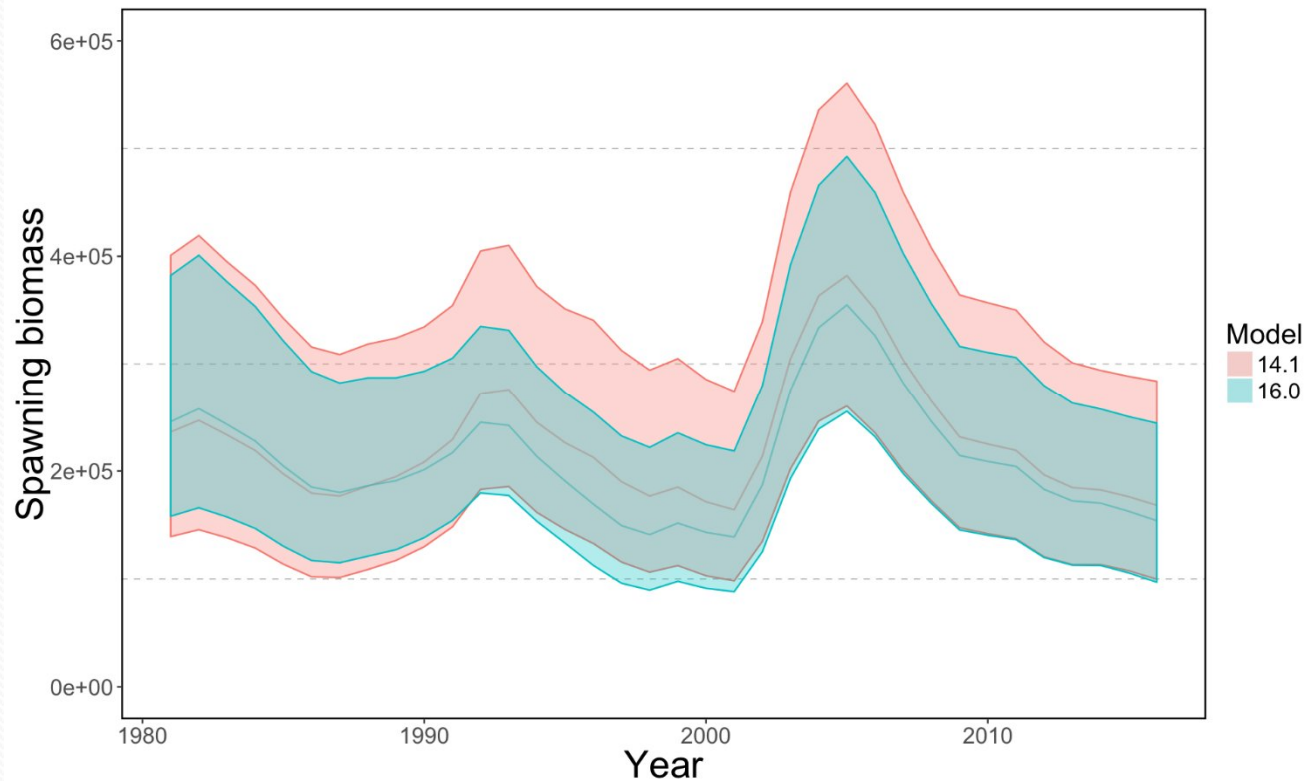


Fishery selectivity pattern from the BSAI Atka mackerel assessment model 16.0



Estimated fishery selectivity patterns in the current assessment with a) last year's average for projections, b) the 2016 assessment average selectivity used for projections (2011-2015), c) last year's assessment terminal year, and d) the 2016 assessment terminal year (2015) compared with the maturity-at-age estimates for BSAI Atka mackerel.

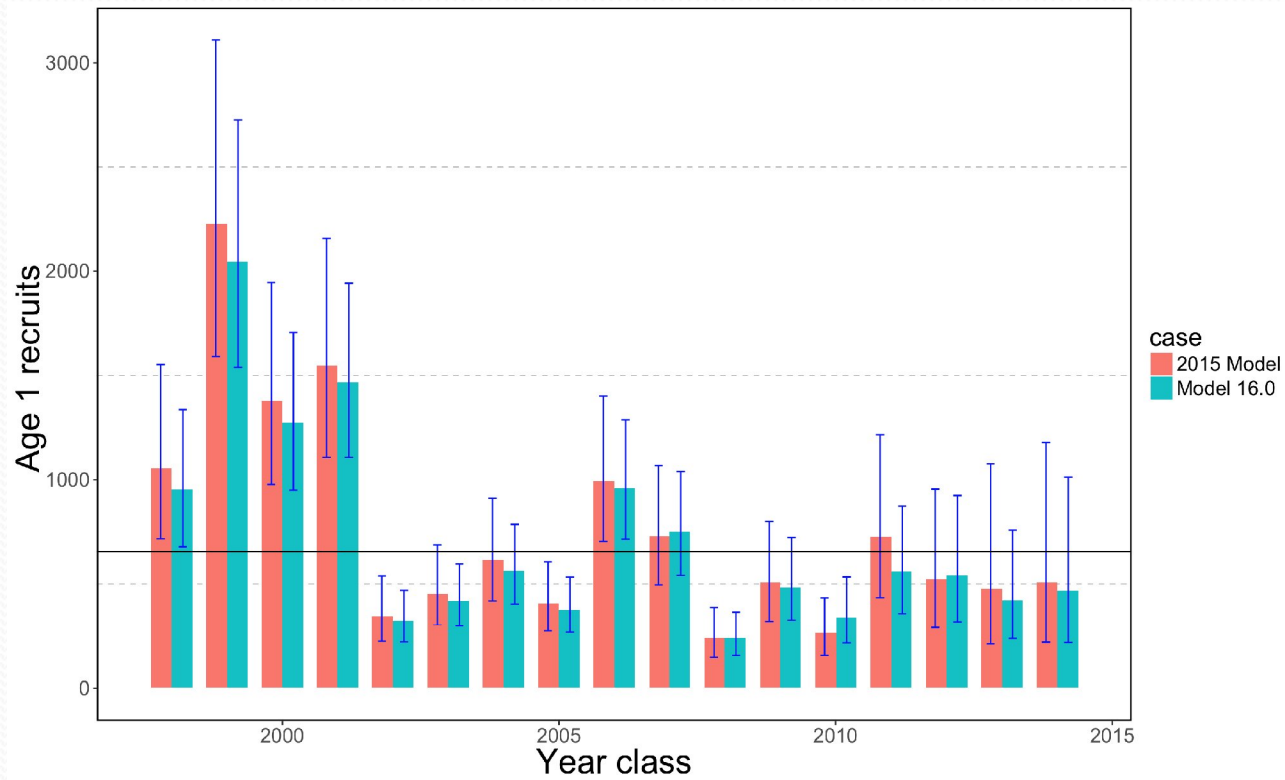
BSAI Atka Mackerel Female Spawning Biomass



Time series of estimated Aleutian Islands Atka mackerel spawning biomass with approximate 95% confidence bounds compared to last year's (2015 assessment) selected model



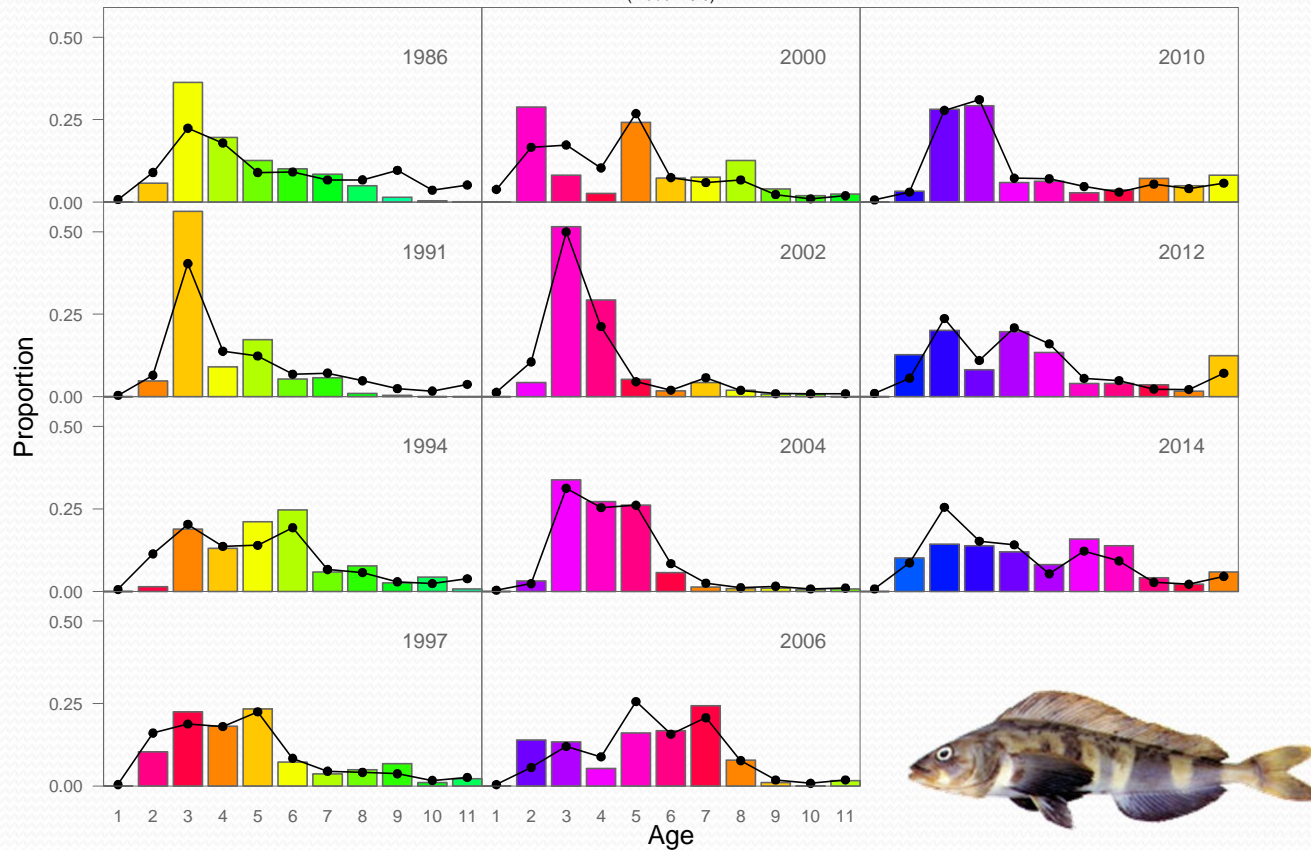
BSAI Atka Mackerel Recruitment (Millions)



Age 1 recruitment from the current assessment (2016) with the dashed line indicating average recruitment (638 million) over 1978-2014 year classes, and age 1 recruitment as estimated from the 2015 assessment

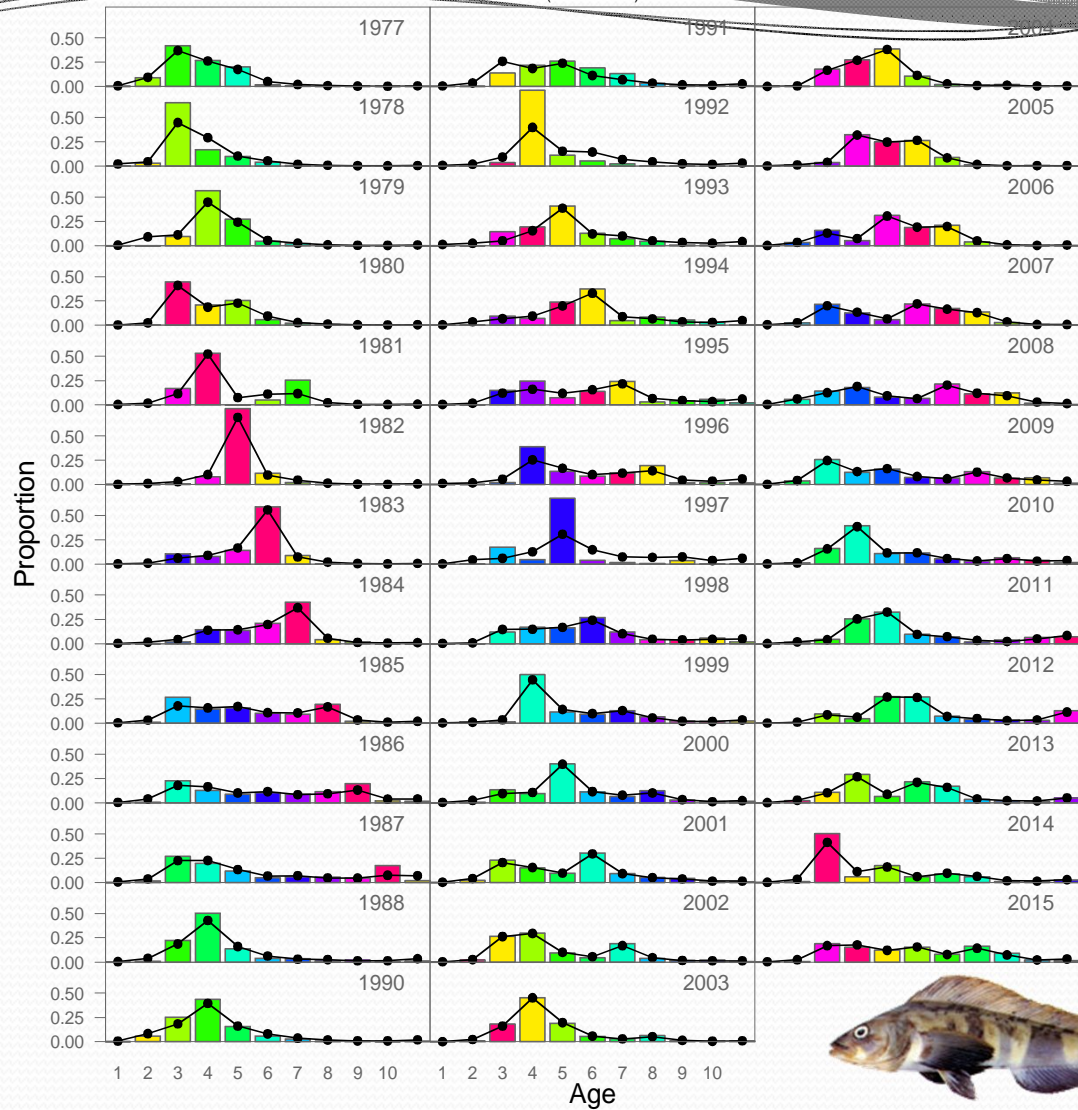
NMFS_Bottom_trawl index age composition data

(Model 16.0)

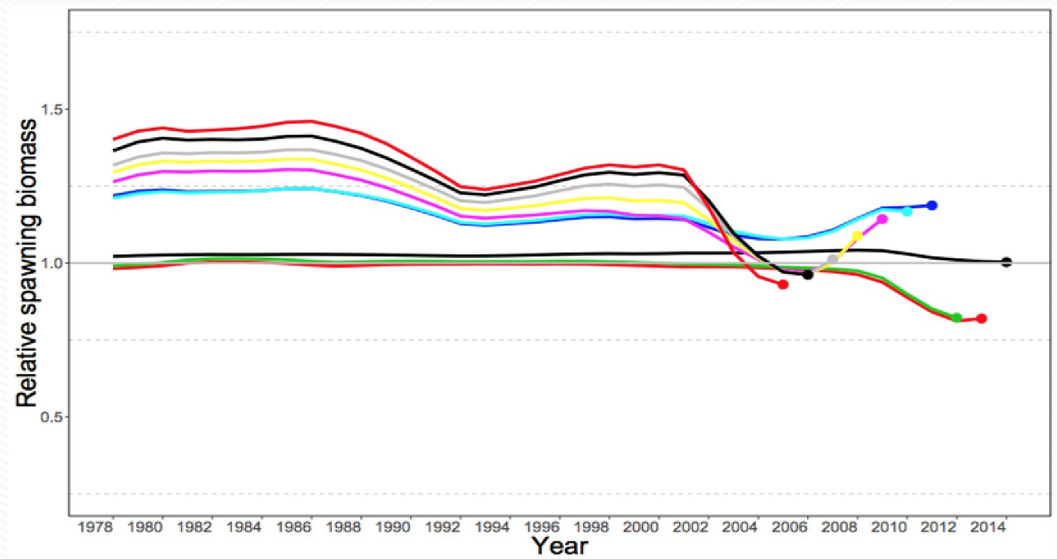
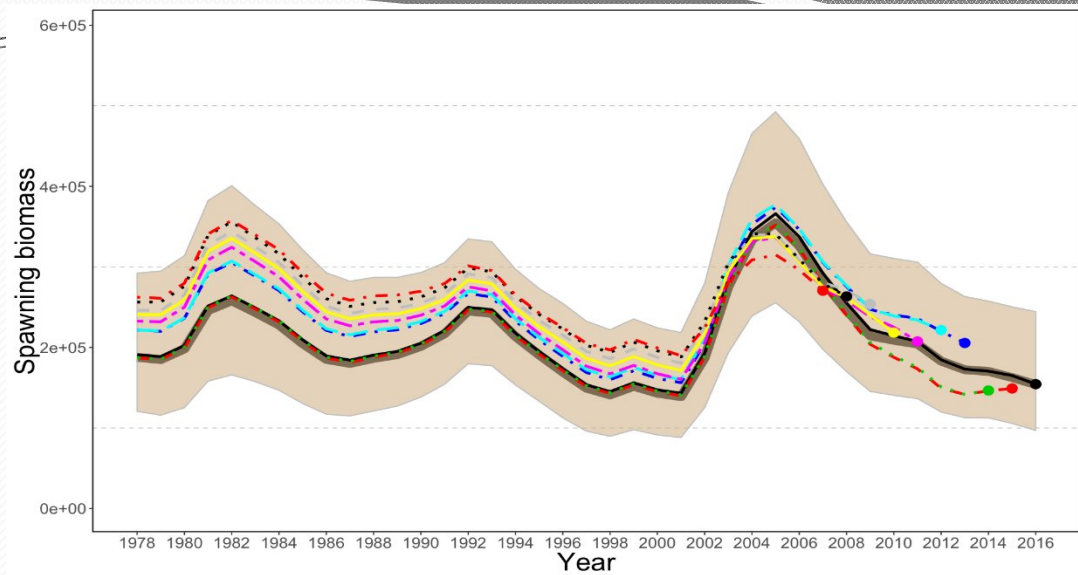


Observed and predicted **survey** proportions-at-age for BSAI Atka mackerel. Lines with “●” symbol are the model predictions and columns are the observed proportions at age

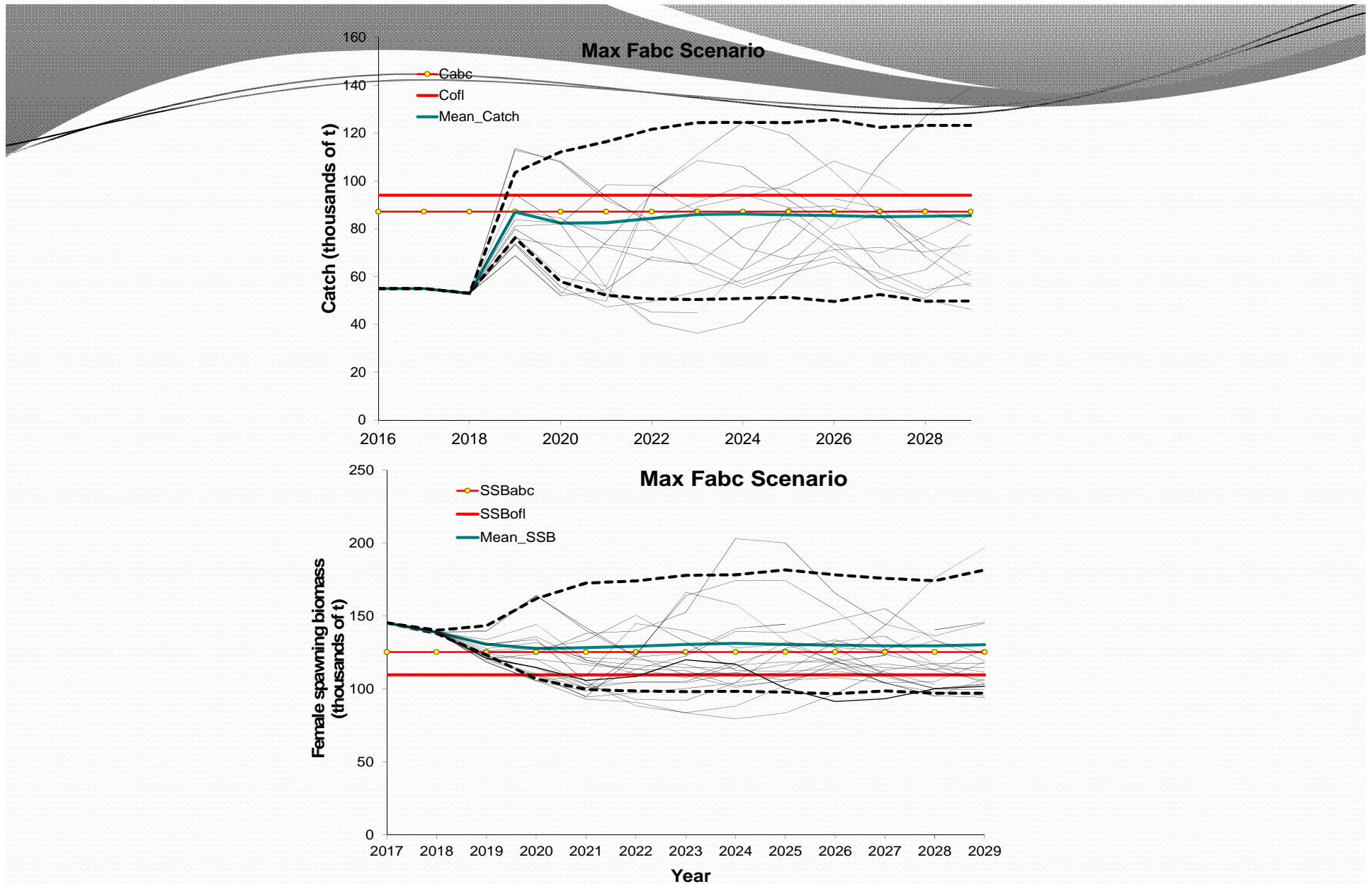
Atka_mackerel fishery age composition data (Model 16.0)



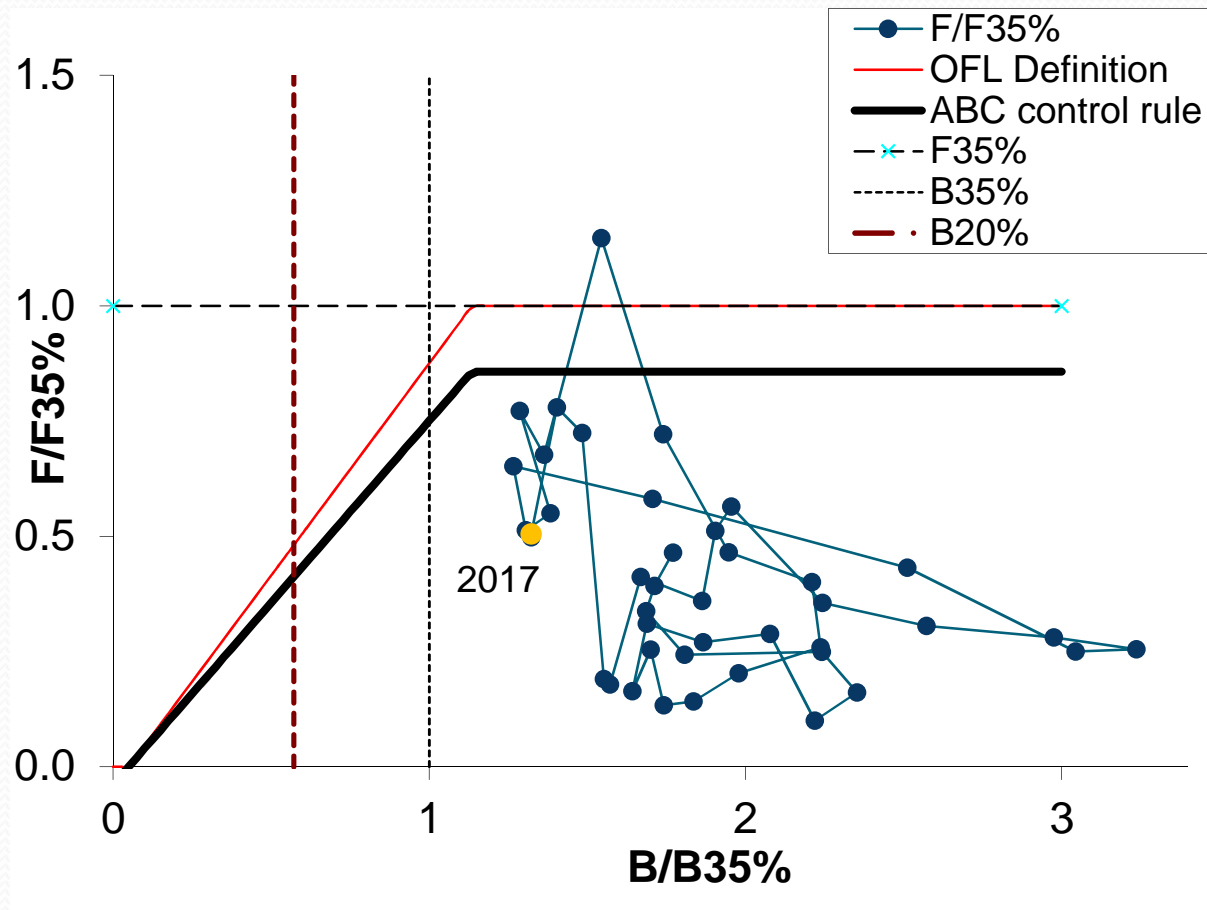
Observed and predicted Atka mackerel **fishery** proportions-at-age for BSAI Atka mackerel. Lines with “•” symbol are the model predictions and columns are the observed proportions at age (with colors corresponding to cohorts)



Retrospective plots showing the spawning biomass over time (top) and the relative difference (bottom) over 10 different “peels”



Projected Atka mackerel catch (assuming TAC taken in 2016 and reduced 2017 and 2018 catches; top) and spawning biomass (bottom) in thousands of metric tons under maximum permissible Tier 3a harvest specification



BSAI Atka mackerel spawning biomass relative to $B_{35\%}$ and fishing mortality relative to F_{OFL} (1977-2018)

BSAI Atka Mackerel

Overfishing Level and Maximum Permissible ABC

Catch assumptions:

- Total 2016 year end catch set equal to TAC (55,500 t) for ABC/OFL specification purposes
- For 2017 & 2018 assume that 62% of the BSAI-wide ABC would be taken
 - Due to revised SSL RPAs
 - Affects ABC and OFL values

Selectivity assumption:

- Estimated ave. selectivity for 2011-2013



BSAI Atka Mackerel



Quantity	As estimated or <i>specified last year for:</i>		As estimated or <i>recommended this year for:</i>	
	2016	2017	2017*	2018*
Tier	3a	3a	3a	3a
Projected total (age 1+) biomass	672,184	664,208	598,791	611,442
Projected Female spawning biomass				
Projected	166,407	147,496	145,258	138,791
<i>B</i> _{40%}	135,654	135,654	125,288	125,288
<i>B</i> _{35%}	118,697	118,697	109,627	109,627
<i>F</i> _{OFL}	0.35	0.35	0.40	0.40
<i>maxF</i> _{ABC}	0.30	0.30	0.34	0.34
<i>F</i> _{ABC}	0.30	0.30	0.34	0.34
OFL (t)	104,749 ¹	99,490	102,700 ¹	99,900 ¹
maxABC (t)	90,340 ¹	85,840	87,200 ¹	85,000 ¹
ABC (t)	90,340 ¹	85,840	87,200 ¹	85,000 ¹

*Projections are based on estimated total catch of 55,000 t and 53,000 t in place of maximum permissible ABC for 2017 and 2018, respectively.

¹These values were calculated assuming reduced catch levels under SSL RPAs.

BSAI Atka Mackerel Apportionment

	Survey Year				Wtd-4 Survey Average Apportionment	Random Effects Model
	2010	2012	2014	2016		
541 ¹	51.16%	12.34%	41.97%	35.39%	34.90%	40.01%
542	21.38%	39.41%	28.30%	29.69%	30.08%	34.78%
543	27.46%	48.25%	29.73%	34.92%	35.03%	25.20%
Weights	8	12	18	27		

¹Includes eastern Aleutian Islands and southern Bering Sea areas.

Apportionment of the recommended 2017 and 2018 ABCs based on RE model

	2017 (t)	2018 (t)
Eastern (541+S.BSea)	34,890	34,000
Central (542)	30,330	29,600
Western (543)	21,980	21,400
Total	87,200	85,000

