BSAI Plan Team report

NOAA FISHERIES
Alaska Fisheries Science Center

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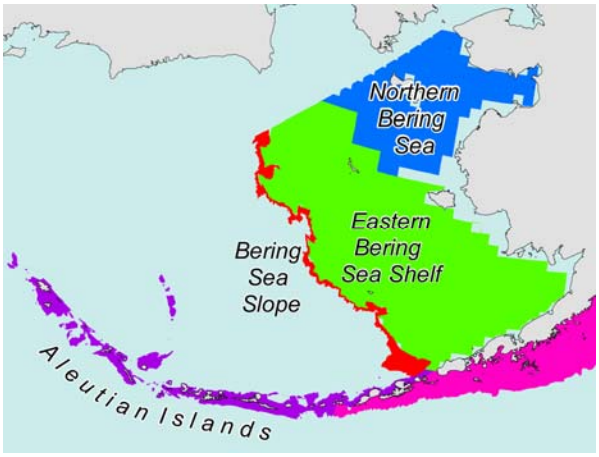
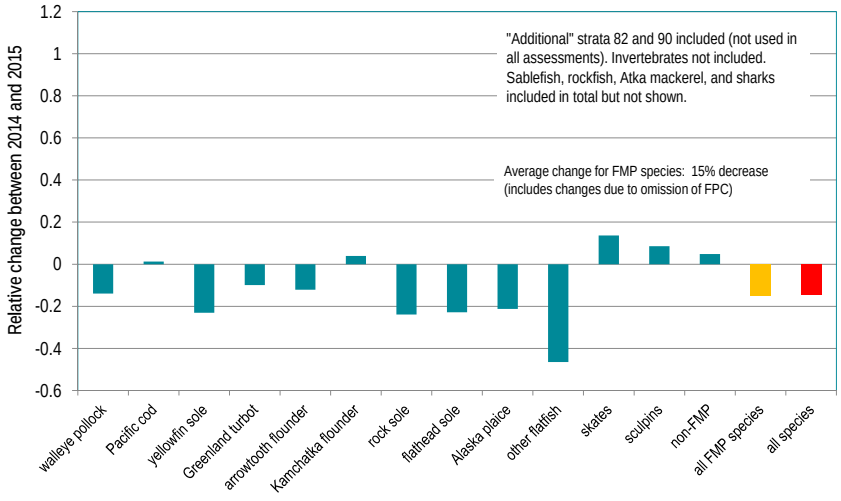
December 10, 2015

"Big picture" overview

BSAI bottom trawl survey areas



Change in EBS shelf survey, 2014-2015



"Off" year for EBS slope and AI surveys

- 13 assessments presented as partial updates
  - Arrowtooth flounder
  - Kamchatka flounder
  - Flathead sole
  - Alaska plaice
  - Pacific ocean perch
  - Northern rockfish
  - Blackspotted/rougheye
  - Shortraker rockfish
  - Other rockfish
  - Skates
  - Sculpins
  - Sharks
  - Octopus
- 2 scheduled for partial update, but presented as almost full updates
  - Other flatfish
  - Squid

Counts of models and model changes

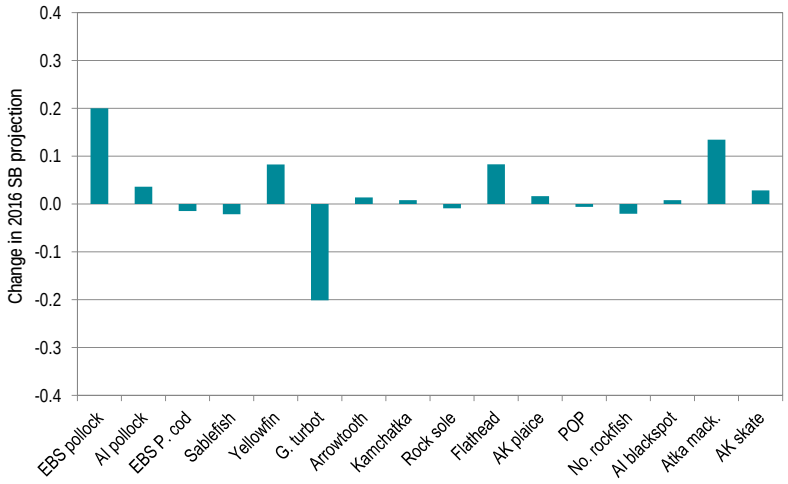
- 8 full assessments have no model changes

Ch.	Stock/complex	Tier	Models	Notes
1a	AI pollock	3b	2	
1b	Bogloslof pollock	5	1	
2	EBS Pacific cod	3a	2	
2a	AI Pacific cod	5	3	
3	Sablefish	3b	1	
8	Northern rock sole	1a	2	Authors recommend model change
11	Other flatfish	5	1	
17	Atka mackerel	3a	1	

- 4 full assessments have a model change (12 last year)

Ch.	Stock/complex	Tier	Models	Notes
1	EBS pollock	1a	1	New time-varying weight-at-age component
4	Yellowfin sole	1a	1	Weights at ages 11-20 smoothed
5	Greenland turbot	3b	4	Several changes from base model
21	Squid	6	???	10 alternative OFL/ABC calculation methods

Change in 2016 spawning biomass projection



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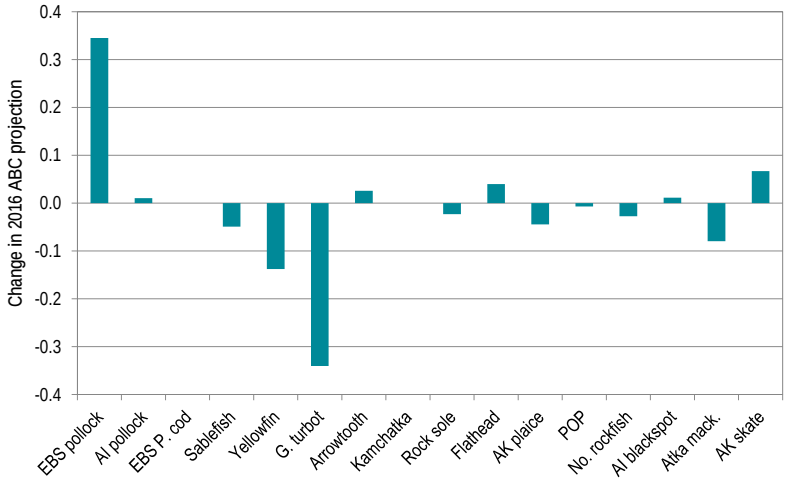
Change in 2016 ABC projection



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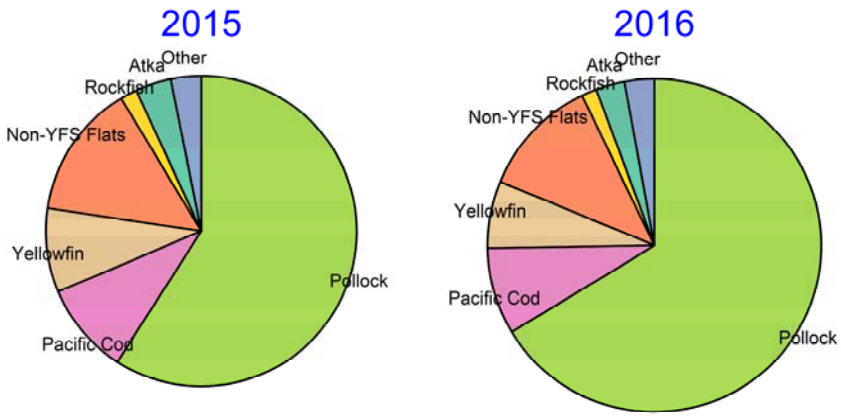
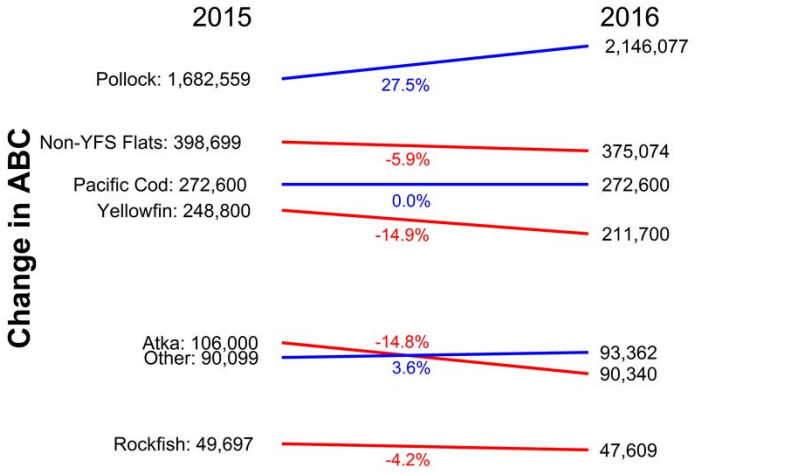
Changes in ABC by major species/groups



Total = 2.85 mmt

Total = 3.24 mmt

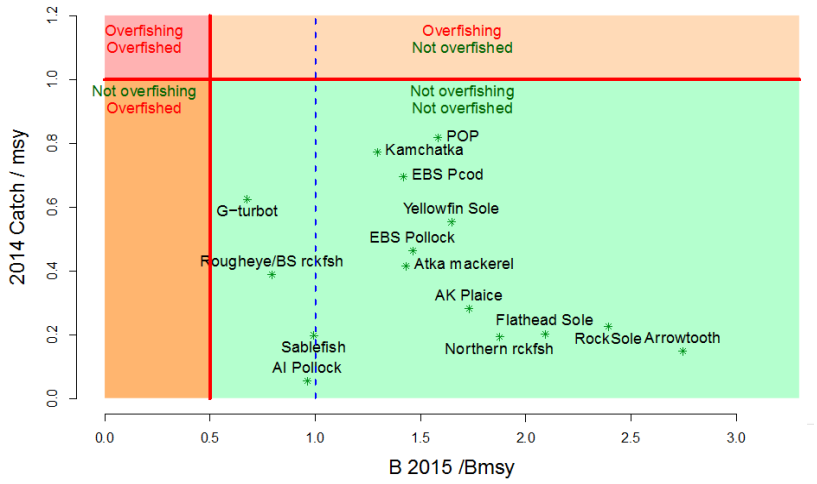
Another way of looking at changes in ABC



Total = 2.85 mmt

Total = 3.24 mmt

Quad plot (Tiers 1-3): 2014



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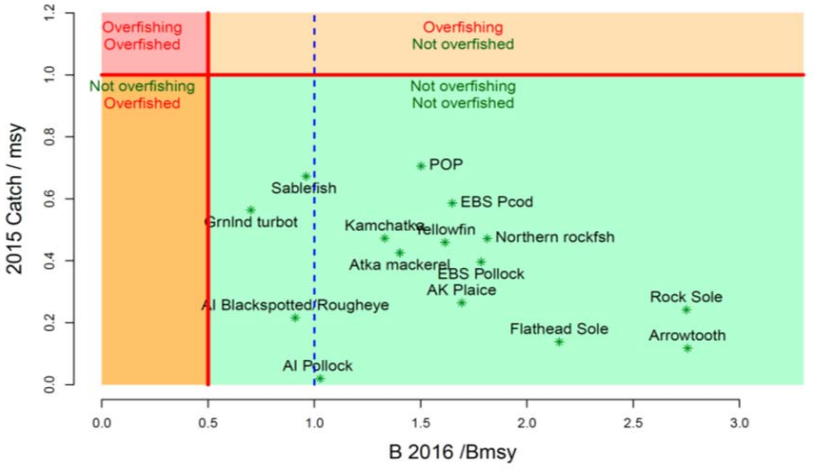
Quad plot (Tiers 1-3): 2015



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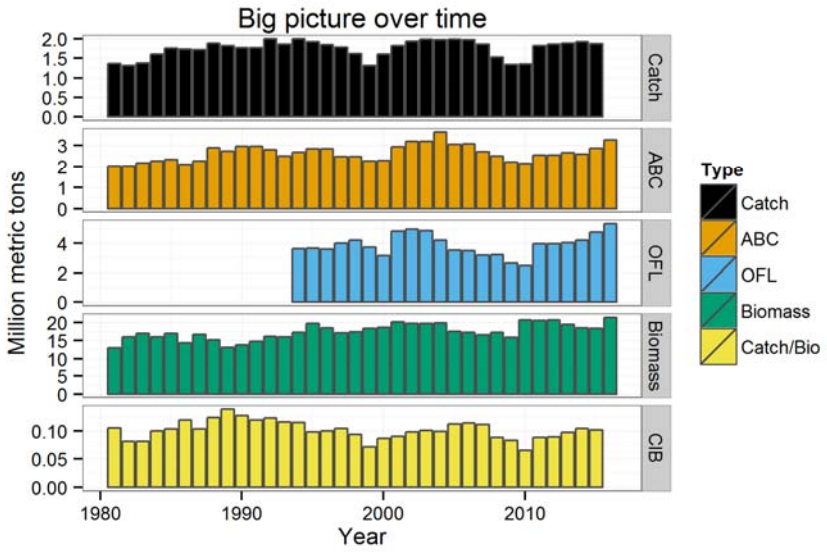


A few final "big picture" items

- Team agreed with authors' model recommendations in all cases except northern rock sole
- Team agreed with authors' ABC recommendations in all cases except EBS Pacific cod (2017 only) and northern rock sole
- ABC recommendations correspond to maximum permissible values in all cases except EBS pollock and EBS Pacific cod
- Of the 16 stocks/complexes in Tiers 1-3, none are in Tier 1b and only four (AI pollock, sablefish, Greenland turbot, and blackspotted/rougheye) are in Tier 3b
- No stocks/complexes were subjected to overfishing in 2014, and no stocks/complexes are overfished or approaching a condition of being overfished as of 2015
  - However, Greenland turbot was at $B_{18\%}$ in 2015
    - But projected to increase to $B_{25\%}$ in 2016

Chapter summaries (full updates)

Reference point comparisons (all chapters)

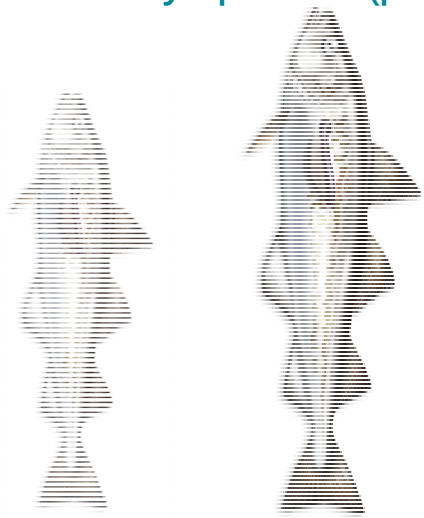
Quantity	Last year	This year	Change
M	0.10	0.10	0.00
2015 tier	3b	n/a	n/a
2016 tier	3b	3b	n/a
2015 age+ biomass	219,997	n/a	-0.07
2016 age+ biomass	227,042	204,796	-0.10
2015 spawning biomass	91,183	n/a	-0.05
2016 spawning biomass	88,345	86,471	-0.02
B100%	262,269	257,018	-0.02
B40%	104,908	102,807	-0.02
B35%	91,794	89,956	-0.02
2016 FOFL	0.091	0.093	0.02
2016 FABC	0.078	0.078	0.00
2015 OFL	16,128	n/a	-0.17
2016 OFL	14,658	13,397	-0.09
2015 ABC	13,657	n/a	-0.14
2016 ABC	12,406	11,795	-0.05

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

Where "quantity" is shaded, "change" represents the relative difference between *this year's value for 2016* and *last year's value for 2015*.

Chapter 1: EBS walleye pollock (p. 53)

- Thanks Jim!

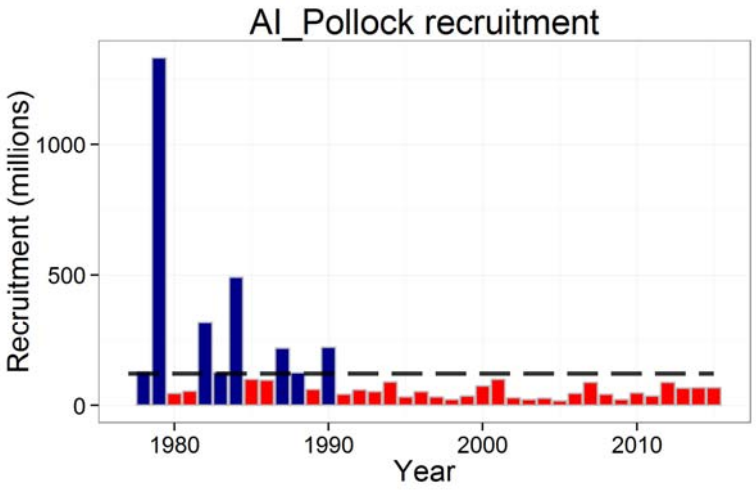


2015 ABC 2016 ABC

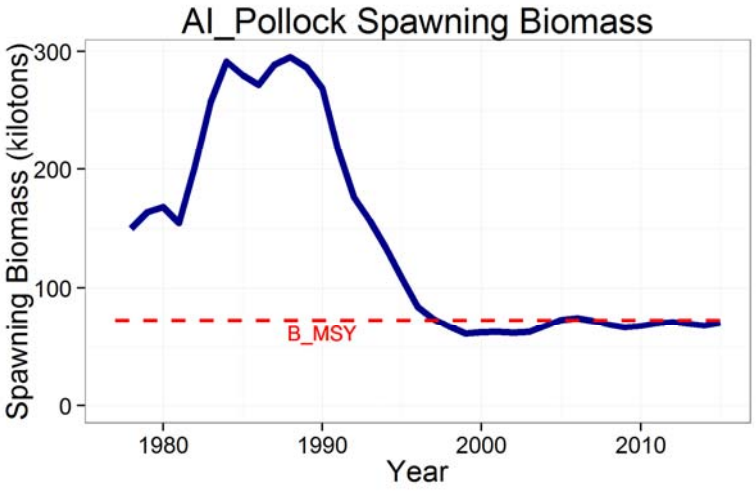
Chapter 1A: AI walleye pollock (p. 153)

- Two models presented; little difference in results
- Authors and Team recommend retaining last year's model
- Spawning biomass up from $B_{29\%}$ in 1999, due to very low F
- 2016 spawning biomass is 36% of $B_{100\%}$
- TAC will be set at 19,000 t

AI walleye Pollock, continued



AI walleye pollock, continued



AI walleye pollock, continued

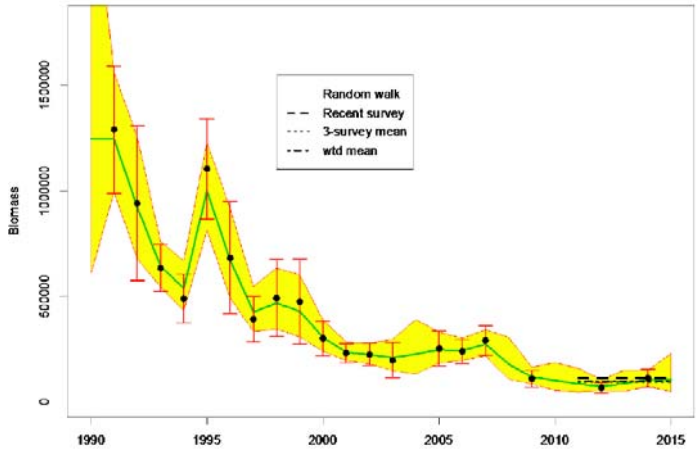
Quantity	Last year	This year	Change
M	0.18	0.18	0.00
2015 tier	3b	n/a	n/a
2016 tier	3b	3b	n/a
2015 age+ biomass	228,102	n/a	0.06
2016 age+ biomass	249,523	241,929	-0.03
2015 spawning biomass	70,012	n/a	0.06
2016 spawning biomass	71,772	74,377	0.04
B100%	207,606	206,962	0.00
B40%	83,042	82,785	0.00
B35%	72,662	72,437	0.00
2016 FOFL	0.33	0.34	0.03
2016 FABC	0.27	0.27	0.00
2015 OFL	36,005	n/a	0.09
2016 OFL	38,699	39,075	0.01
2015 ABC	29,659	n/a	0.09
2016 ABC	31,900	32,227	0.01

Chapter 1B: Bogoslof walleye pollock (p. 233)

- Major change is 50% increase in natural mortality rate (*M*)
- Previously, *M* had been set at a value of 0.2 for many years
- Age-structured modeling indicates that 0.3 is a better estimate
- Survey estimates from 2000-2014 were all lower than any estimate prior to 2000
- 2014 survey biomass was 18% of average for the time series

Bogoslof walleye pollock, continued

- Survey biomass



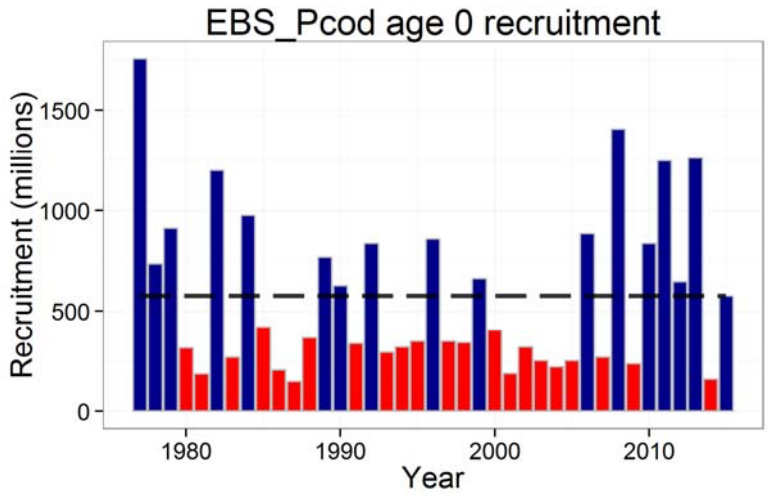
Bogoslof walleye pollock, continued

Quantity	Last year	This year	Change
M	0.20	0.30	0.50
2015 tier	5	n/a	n/a
2016 tier	5	5	n/a
Biomass	106,000	106,000	0.00
2016 FOFL	0.20	0.30	0.50
2016 FABC	0.15	0.225	0.50
2015 OFL	21,200	n/a	0.50
2016 OFL	21,200	31,800	0.50
2015 ABC	15,900	n/a	0.50
2016 ABC	15,900	23,850	0.50

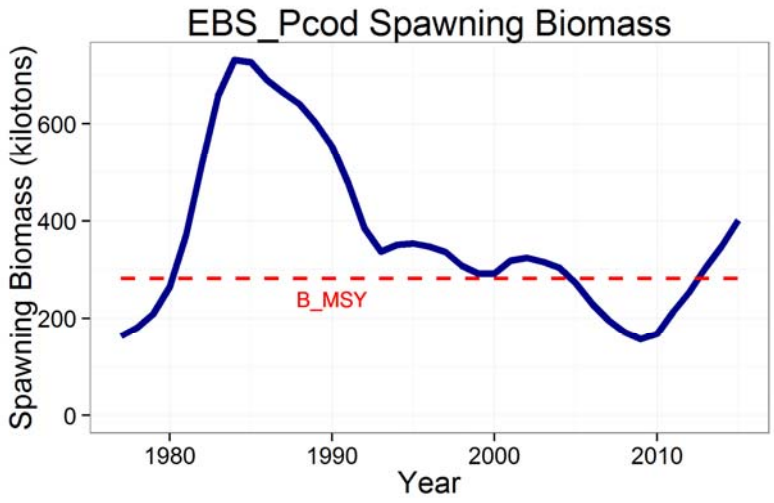
Chapter 2: EBS Pacific cod (p. 251)

- Same two models presented as in 2014 assessment
- Authors, Team recommend retaining the model that has been used since 2011 for one more year
- CIE review scheduled for 2016
  - Team expects review to result in significant changes
    - For example, a higher value for the catchability coefficient of the EBS shelf bottom trawl survey, which would tend to decrease estimated stock size, OFL, and ABC
- Spawning biomass increased by 156% between 2009 and 2015, projected to increase again in 2016
- 2016 spawning biomass is 58% of $B_{100\%}$
- Author, Team recommend rolling over 2014-2015 ABC

EBS Pacific cod. continued



EBS Pacific cod, continued



EBS Pacific cod, continued

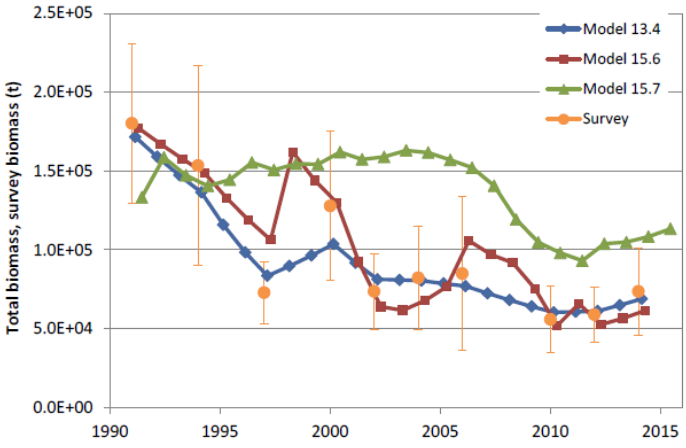
Quantity	Last year	This year	Change
M	0.34	0.34	0.00
2015 tier	3a	n/a	n/a
2016 tier	3a	3a	n/a
2015 age+ biomass	1,680,000	n/a	0.09
2016 age+ biomass	1,770,000	1,830,000	0.03
2015 spawning biomass	409,000	n/a	0.14
2016 spawning biomass	473,000	466,000	-0.01
B100%	824,000	806,000	-0.02
B40%	330,000	323,000	-0.02
B35%	288,000	282,000	-0.02
2016 FOFL	0.35	0.35	0.00
2016 FABC	0.25	0.22	-0.12
2015 OFL	346,000	n/a	0.13
2016 OFL	389,000	390,000	0.00
2015 ABC	255,000	n/a	0.00
2016 ABC	255,000	255,000	0.00

Chapter 2A: AI Pacific cod (p. 471)

- Three models presented
- Authors, Team recommend retaining the current Tier 5 model
- Like EBS Pacific cod, this assessment will undergo CIE review in 2016
- Survey biomass has trended downward since 1991
  - Although all 95% confidence intervals since 2002 overlap
- 2014 survey biomass is 75% of average for the time series
- Biomass apportionment (per SSL final rule):
  - "Harvest limit" for the WAI is computed by subtracting State GHL from AI ABC, then multiplying by proportion of biomass in WAI
  - Based on Model 13.4, 26.3% of biomass is in WAI

AI Pacific cod, continued

- Survey biomass (Models 13.4 and 15.6), total biomass (Model 15.7)



AI Pacific cod, continued

Quantity	Last year	This year	Change
M	0.34	0.34	0.00
2015 tier	5	n/a	n/a
2016 tier	5	5	n/a
Biomass	68,900	68,900	0.00
2016 FOFL	0.34	0.34	0.00
2016 FABC	0.26	0.26	0.00
2015 OFL	23,400	n/a	0.00
2016 OFL	23,400	23,400	0.00
2015 ABC	17,600	n/a	0.00
2016 ABC	17,600	17,600	0.00

Chapter 3: sablefish (p. 615)

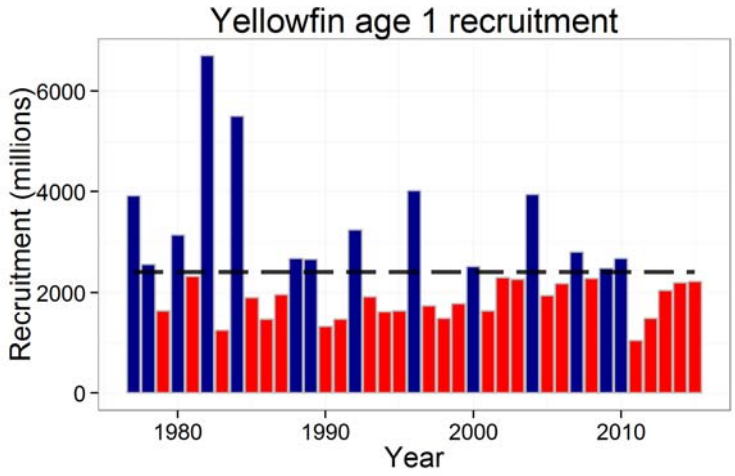
- Covered in GOA Team presentation

Quantity	Last year	This year	Change
M	0.10	0.10	0.00
2015 tier	3b	n/a	n/a
2016 tier	3b	3b	n/a
2015 age+ biomass	219,997	n/a	-0.07
2016 age+ biomass	227,042	204,796	-0.10
2015 spawning biomass	91,183	n/a	-0.05
2016 spawning biomass	88,345	86,471	-0.02
B100%	262,269	257,018	-0.02
B40%	104,908	102,807	-0.02
B35%	91,794	89,956	-0.02
2016 FOFL	0.091	0.093	0.02
2016 FABC	0.078	0.078	0.00
2015 OFL	16,128	n/a	-0.17
2016 OFL	14,658	13,397	-0.09
2015 ABC	13,657	n/a	-0.14
2016 ABC	12,406	11,795	-0.05

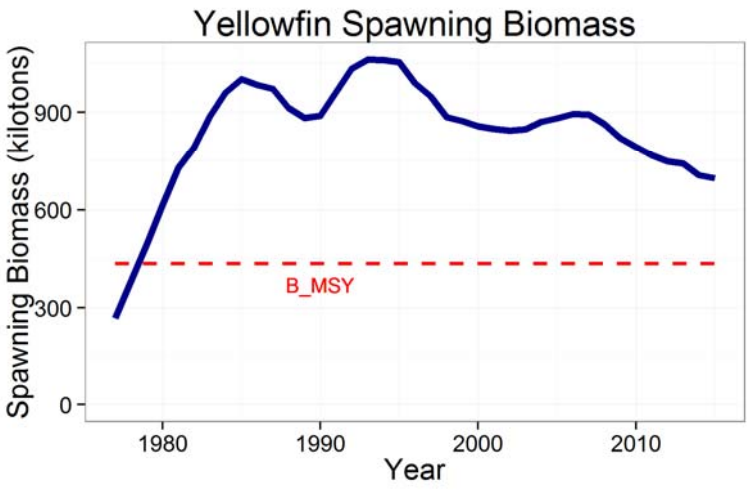
Chapter 4: yellowfin sole (p. 733)

- Straightforward update of the model that has been used for many years, except that weights at ages 11-20 were smoothed
- Spawning biomass has been declining since 2006, but is projected to be almost constant through 2017
- 2016 spawning biomass is 63% of B_0 and 161% of B_{MSY}

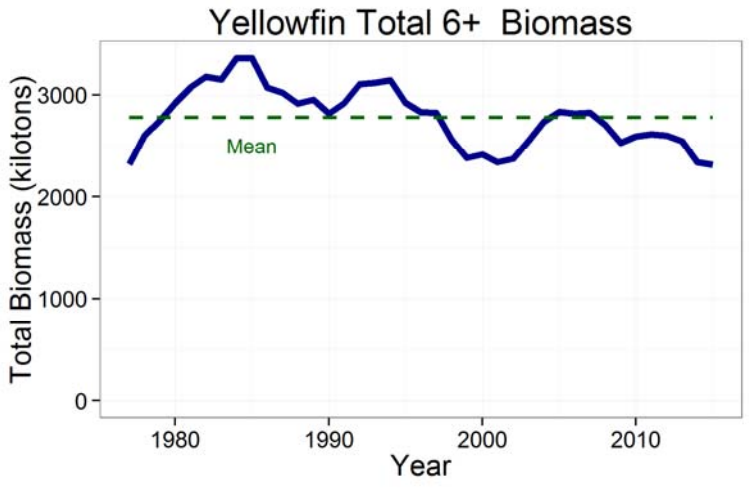
Yellowfin sole, continued



Yellowfin sole, continued



Yellowfin sole, continued



Yellowfin sole, continued

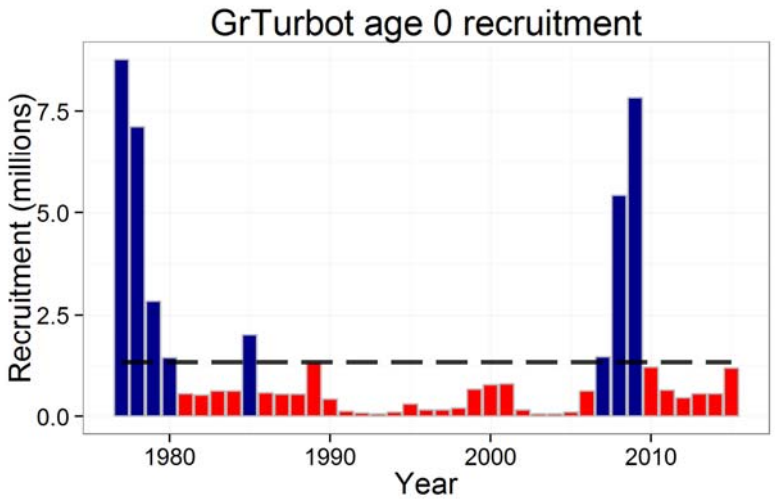
Quantity	Last year	This year	Change
M	0.12	0.12	0.00
2015 tier	1a	n/a	n/a
2016 tier	1a	1a	n/a
2015 age+ biomass	2,127,800	n/a	0.02
2016 age+ biomass	2,100,000	2,170,000	0.03
2015 spawning biomass	644,200	n/a	0.09
2016 spawning biomass	648,600	702,200	0.08
B0*	1,041,040	1,107,000	0.06
Bmsy	391,000	435,000	0.11
2016 FOFL	0.125	0.105	-0.16
2016 FABC	0.117	0.098	-0.16
2015 OFL	266,400	n/a	-0.14
2016 OFL	262,900	228,100	-0.13
2015 ABC	248,800	n/a	-0.15
2016 ABC	245,500	211,700	-0.14

*Last year's B0 value in SAFE chapter is wrong

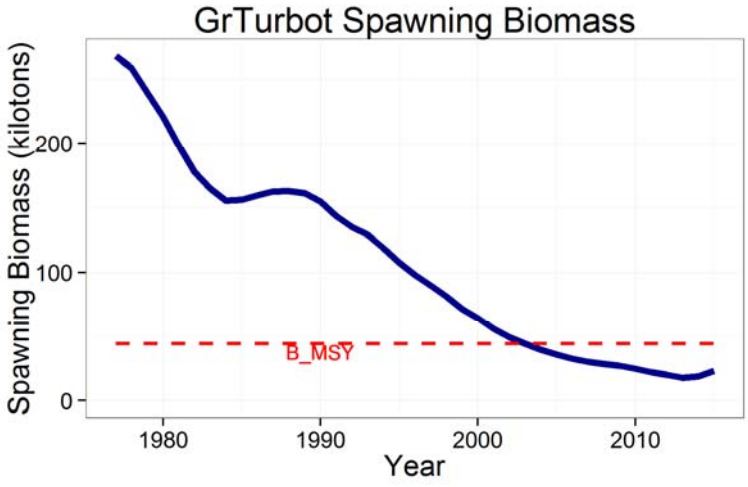
Chapter 5: Greenland turbot (p. 821)

- Four models presented
- The model recommended by the authors and Team weights the various data types more appropriately than last year's model, allows more flexibility in longline fishery selectivity, and does not add too many new parameters
- Spawning biomass declined near-continuously from 1977-2013, but has increased since 2013, with a further increase projected for 2016
- Spawning biomass was 18% of $B_{100\%}$ in 2015, is but projected to increase to 25% in 2016

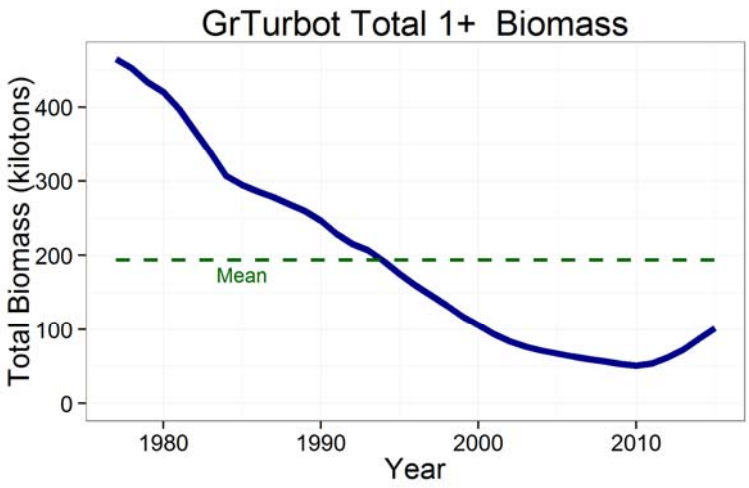
Greenland turbot, continued



Greenland turbot, continued



Greenland turbot, continued



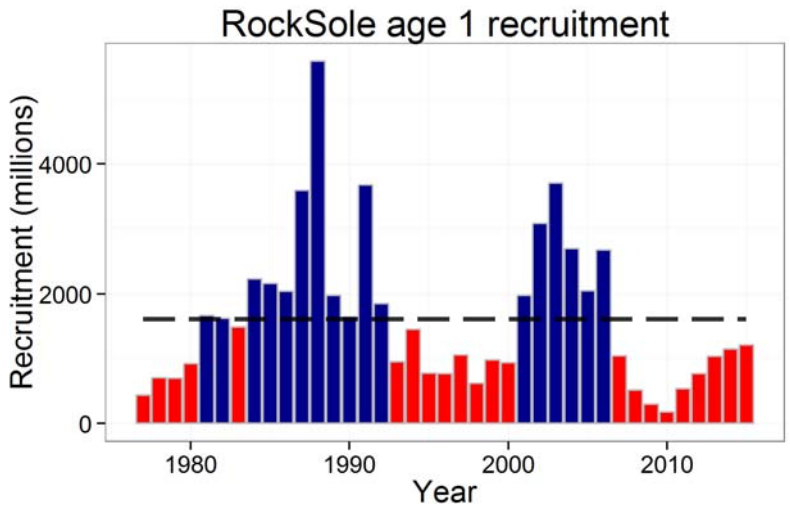
Greenland turbot, continued

Quantity	Last year	This year	Change
M	0.112	0.112	0.00
2015 tier	3b	n/a	n/a
2016 tier	3b	3b	n/a
2015 age+ biomass	122,298	n/a	-0.06
2016 age+ biomass	132,666	114,438	-0.14
2015 spawning biomass	30,853	n/a	0.01
2016 spawning biomass	38,848	31,028	-0.20
B100%	130,123	126,441	-0.03
B40%	52,049	50,577	-0.03
B35%	45,543	44,255	-0.03
2016 FOFL	0.18	0.1	-0.44
2016 FABC	0.15	0.08	-0.47
2015 OFL	3,903	n/a	0.07
2016 OFL	6,453	4,194	-0.35
2015 ABC	3,172	n/a	0.09
2016 ABC	5,248	3,462	-0.34

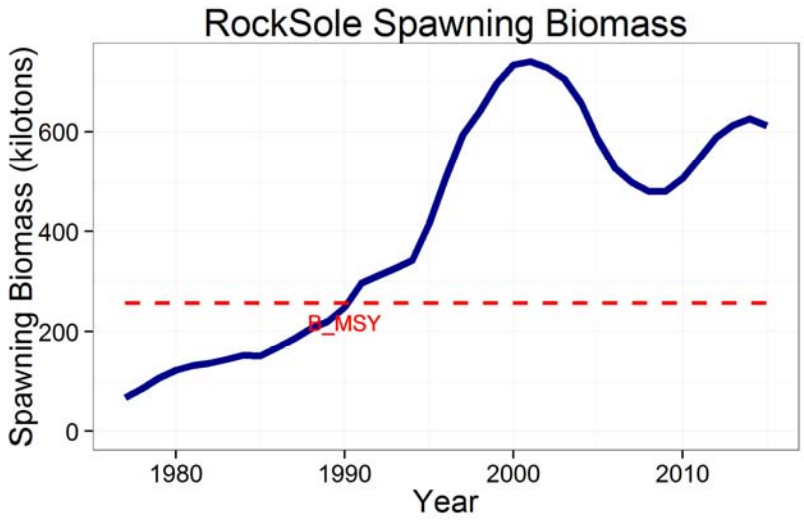
Chapter 8: northern rock sole (p. 957)

- Two models presented (plus six others with very partial results)
- Models differ by the value assumed for the catchability coefficient (Q)
  - Current model sets Q=1.5, alternative model sets Q=1.4
  - Author recommends alternative model, Team recommends current
    - Q has been set at 1.5 since 2008; no strong reason to change
- Spawning biomass reached all-time high in 2001, declined from 2001-2010, mostly increasing since then
- 2016 spawning biomass is 86% of B_0, 227% of B_{MSY}

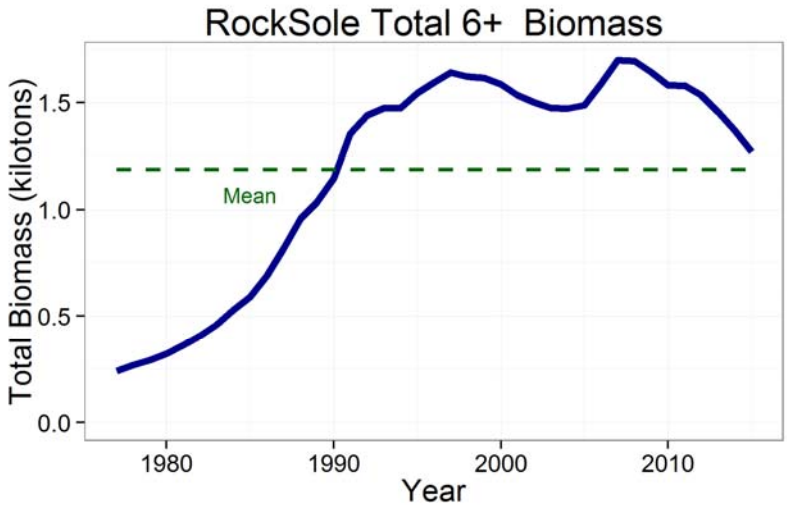
Northern rock sole, continued



Northern rock sole, continued



Northern rock sole, continued



Northern rock sole, continued

Quantity	Last year	This year*	Change
M	0.15	0.15	0.00
2015 tier	n/a	n/a	n/a
2016 tier	1a	1a	n/a
2015 age+ biomass	1,233,400	n/a	-0.12
2016 age+ biomass	1,118,700	1,085,200	-0.03
2015 spawning biomass	622,300	n/a	-0.06
2016 spawning biomass	589,800	584,400	-0.01
B0**	745,300	682,800	-0.08
Bmsy**	260,000	257,000	-0.01
2016 FOFL**	0.152	0.152	0.00
2016 FABC	0.143	0.148	0.03
2015 OFL	187,600	n/a	-0.12
2016 OFL	170,100	165,900	-0.02
2015 ABC	181,700	n/a	-0.11
2016 ABC	164,800	161,000	-0.02

*Authors' numbers differ due to choice of model

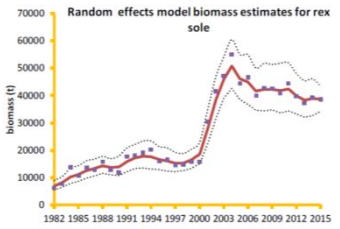
**Values for this year's reference points in chapter are wrong

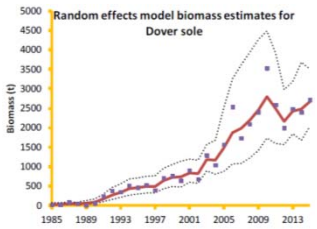
Chapter 11: other flatfish (p. 1047)

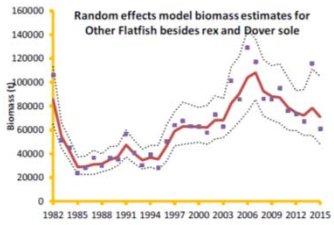
- Straightforward update of last year's Tier 5 model
- BSAI survey biomass peaked in 2010, has declined by 48% since
- 2015 BSAI biomass is still 13% above time series average

Other flatfish, continued

- Biomass of rex sole, Dover sole, and remainder of the complex







Other flatfish, continued

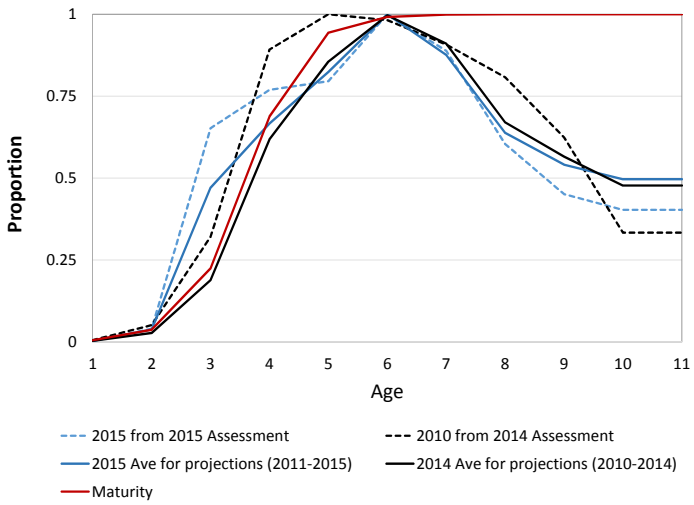
Quantity*	Last year	This year	Change
M	0.141	0.155	0.10
2015 tier	5	n/a	n/a
2016 tier	5	5	n/a
Biomass**	125,231	112,104	-0.10
2016 FOFL	0.141	0.155	0.10
2016 FABC	0.106	0.117	0.10
2015 OFL	17,700	n/a	-0.02
2016 OFL	17,700	17,414	-0.02
2015 ABC	13,250	n/a	-0.01
2016 ABC	13,250	13,061	-0.01

*Instantaneous rates are biomass-weighted averages
**RE model estimates (chapter lists survey estimates)

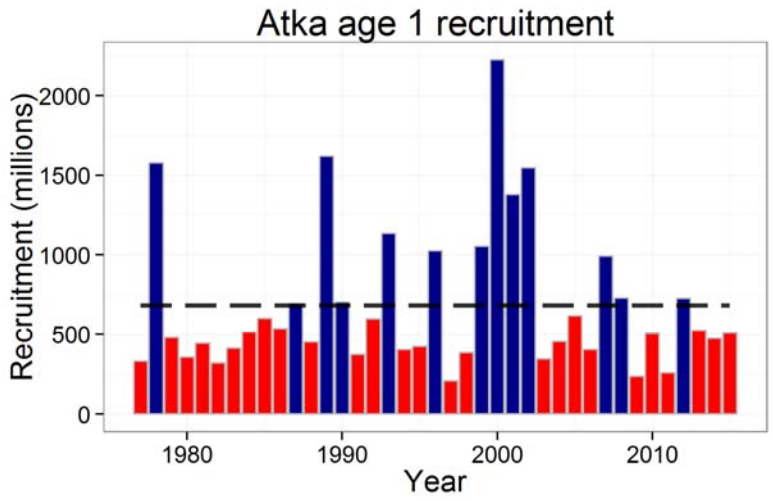
Chapter 17: Atka mackerel (p. 1089)

- Straightforward update of last year's model
- Addition of 2014 age composition caused significant shift in current fishery selectivity schedule relative to maturity schedule (next slide)
- Result is large decrease in F_{OFL} and F_{ABC}
  - Fishing mortality needs to decrease so fish have a chance to mature
- Spawning biomass reached all-time high in 2005, decreased by 55% through 2015
- 2016 spawning biomass is 49% of $B_{100\%}$

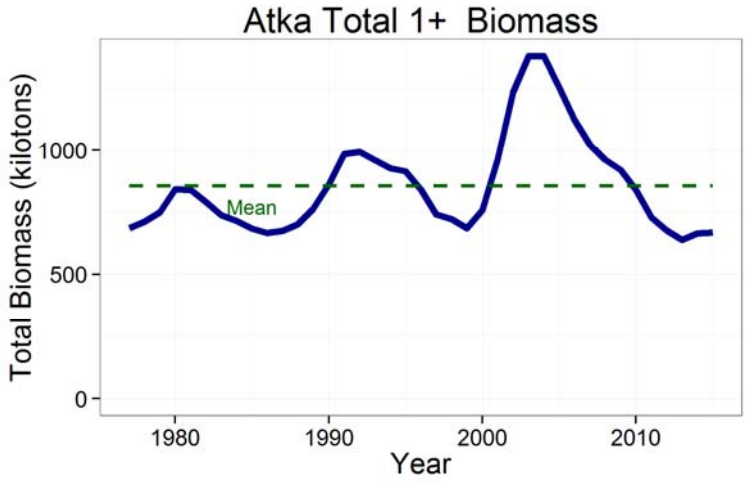
Atka mackerel, continued



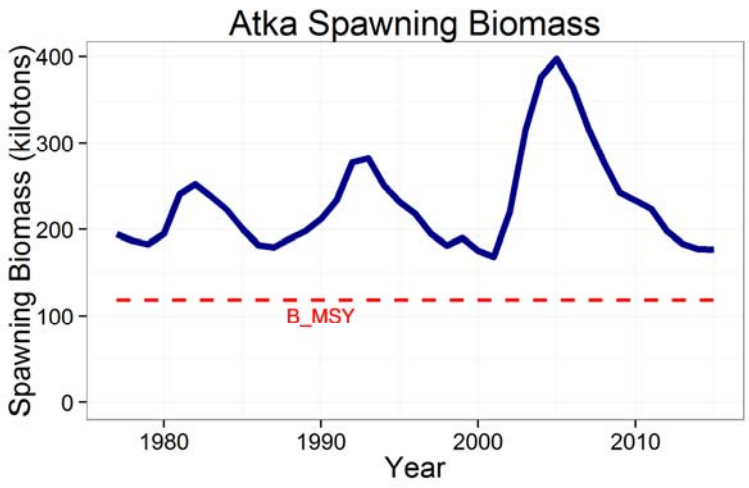
Atka mackerel, continued



Atka mackerel, continued



Atka mackerel, continued

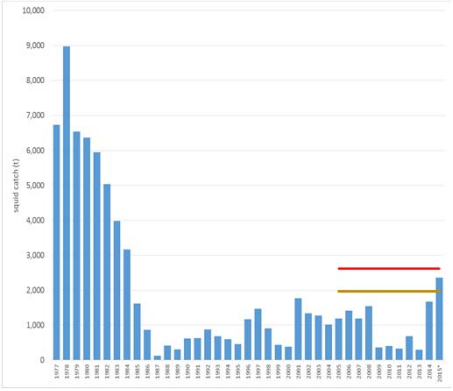


Atka mackerel, continued

Quantity	Last year	This year	Change
M	0.30	0.30	0.00
2015 tier	3a	n/a	n/a
2016 tier	3a	3a	n/a
2015 age+ biomass	694,421	n/a	-0.03
2016 age+ biomass	673,327	672,184	0.00
2015 spawning biomass	167,136	n/a	0.00
2016 spawning biomass	146,682	166,407	0.13
B100%	333,237	339,135	0.02
B40%	133,295	135,654	0.02
B35%	116,633	118,697	0.02
2016 FOFL	0.489	0.35	-0.28
2016 FABC	0.403	0.30	-0.26
2015 OFL	125,297	n/a	-0.16
2016 OFL	115,908	104,749	-0.10
2015 ABC	106,000	n/a	-0.15
2016 ABC	98,137	90,340	-0.08

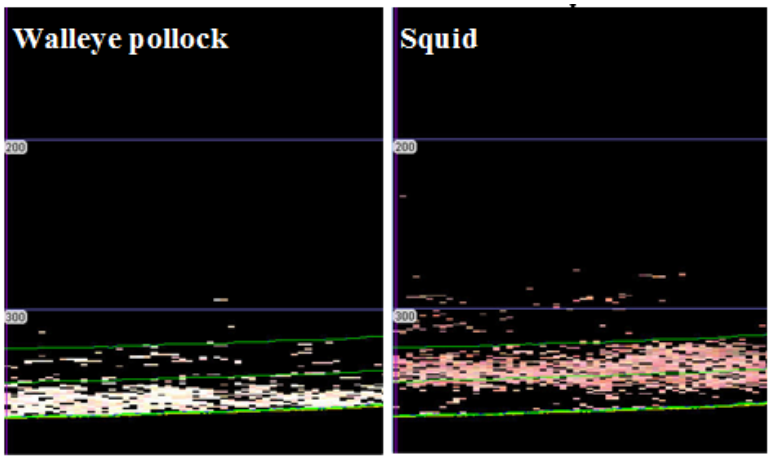
Chapter 21: squids (p. 1191)

- 10 new methods for calculating OFL (Table 6)
- Status quo: OFL = 2,624 t
- Authors, Team recommend setting OFL = ave. catch (1977-81) = 6,912 t

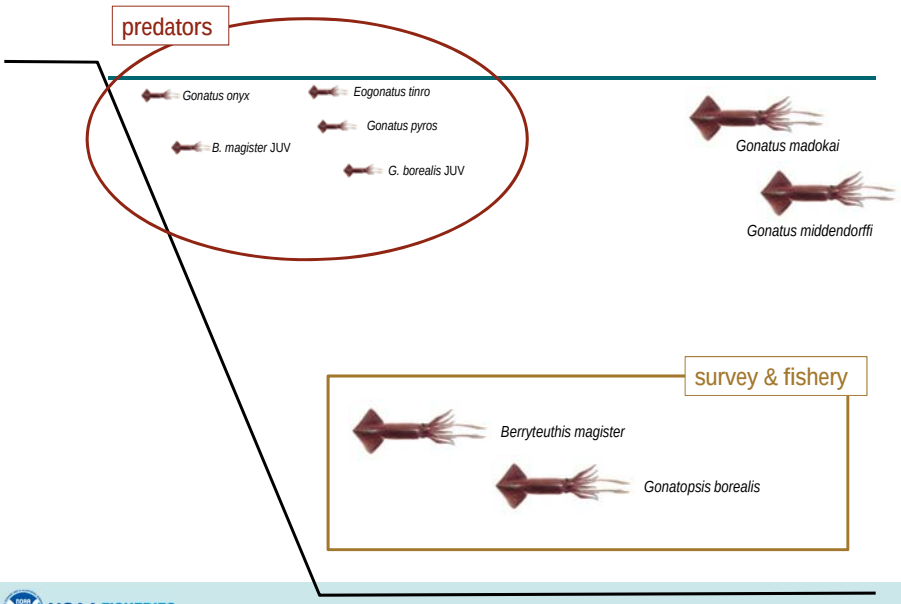


Squids, continued

- Example echogram showing off-bottom distribution (Figure 9)



squid complex: what do we mean by "squid"?



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Squids, continued

- Team believes that the decline following 1981 is due to reduction in effort (foreign fishery disappearing) rather than decline in biomass
- Team recommends that, in the next full assessment, the author examine historical data to verify that the decline in catch beginning in 1982 represents a decline in effort rather than a decline in biomass
- In 2016, Council will take up an analysis to move squids into the EC

Quantity	Last year	This year	Change
2015 tier	6	n/a	n/a
2016 tier	6	6	n/a
2015 OFL	2,624	n/a	1.63
2016 OFL	2,624	6,912	1.63
2015 ABC	1,970	n/a	1.63
2016 ABC	1,970	5,184	1.63

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Chapter summaries (partial updates)

Tier 3 partial updates

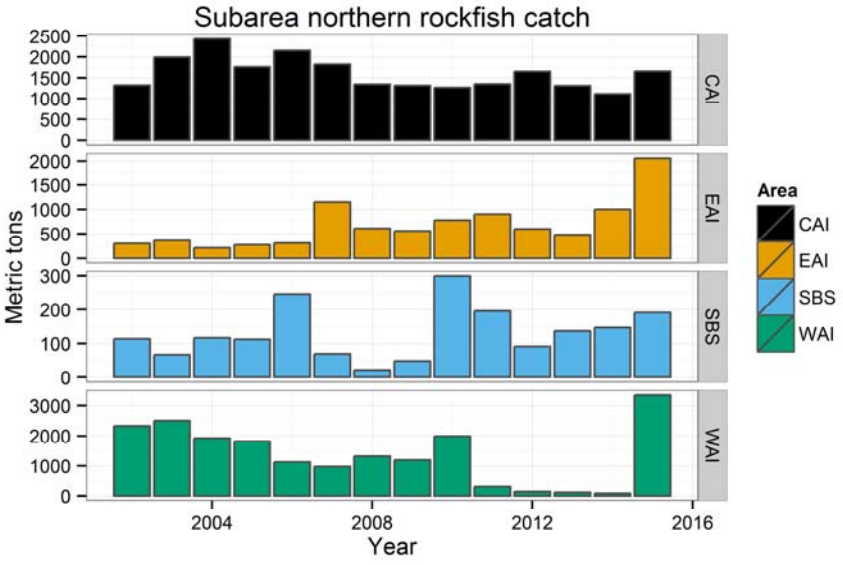
Quantity	Arrowtooth	Kamchatka	Flathead	Ak plaice	POP	No. rockfish	Al blackspot	Ak skate
M	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2015 age+ biomass	0.00	0.04	0.00	-0.01	-0.03	-0.02	0.05	0.00
2016 age+ biomass	0.00	0.01	0.00	0.01	-0.01	-0.02	0.00	0.06
2015 spawning biomass	0.00	0.03	0.03	-0.05	-0.05	-0.03	0.14	0.00
2016 spawning biomass	0.01	0.01	0.08	0.02	-0.01	-0.02	0.01	0.03
B100%	0.00	0.00	0.00	-0.07	0.00	0.00	0.00	0.00
B40%	0.00	0.00	0.00	-0.07	0.00	0.00	0.00	0.00
B35%	0.00	0.00	0.00	-0.07	0.00	0.00	0.00	0.00
2016 FOFL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2016 FABC	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.00
2015 OFL	0.00	0.06	0.00	-0.09	-0.05	-0.04	0.26	0.00
2016 OFL	0.03	0.01	0.04	-0.05	-0.01	-0.03	0.01	0.07
2015 ABC	0.00	0.06	0.00	-0.09	-0.05	-0.04	0.26	0.00
2016 ABC	0.03	0.00	0.04	-0.04	-0.01	-0.03	0.01	0.07

Tier 5 partial updates

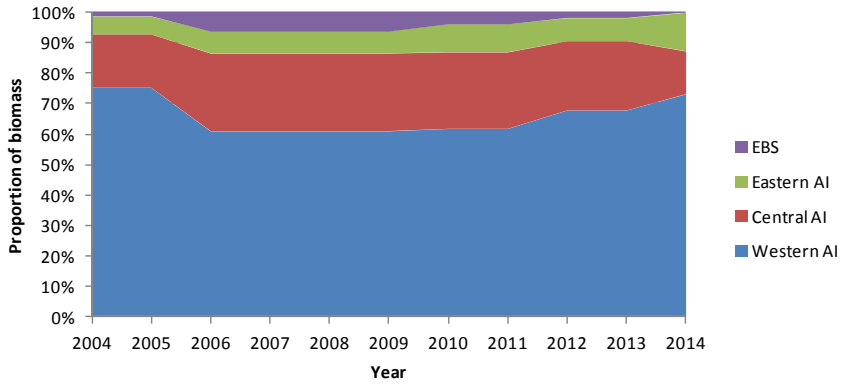
Quantity	EBS blackspot	Shortraker	O. rockfish	O. skates	Sculpins
M	0.00	0.00	0.00	0.00	0.00
Biomass	0.00	0.00	0.00	0.07	0.00
2016 FOFL	0.00	0.00	0.00	0.00	0.00
2016 FABC	0.00	0.00	0.00	0.00	0.00
2015 OFL	0.00	0.00	0.00	0.07	0.00
2016 OFL	0.00	0.00	0.00	0.07	0.00
2015 ABC	0.00	0.00	0.00	0.07	0.00
2016 ABC	0.00	0.00	0.00	0.07	0.00

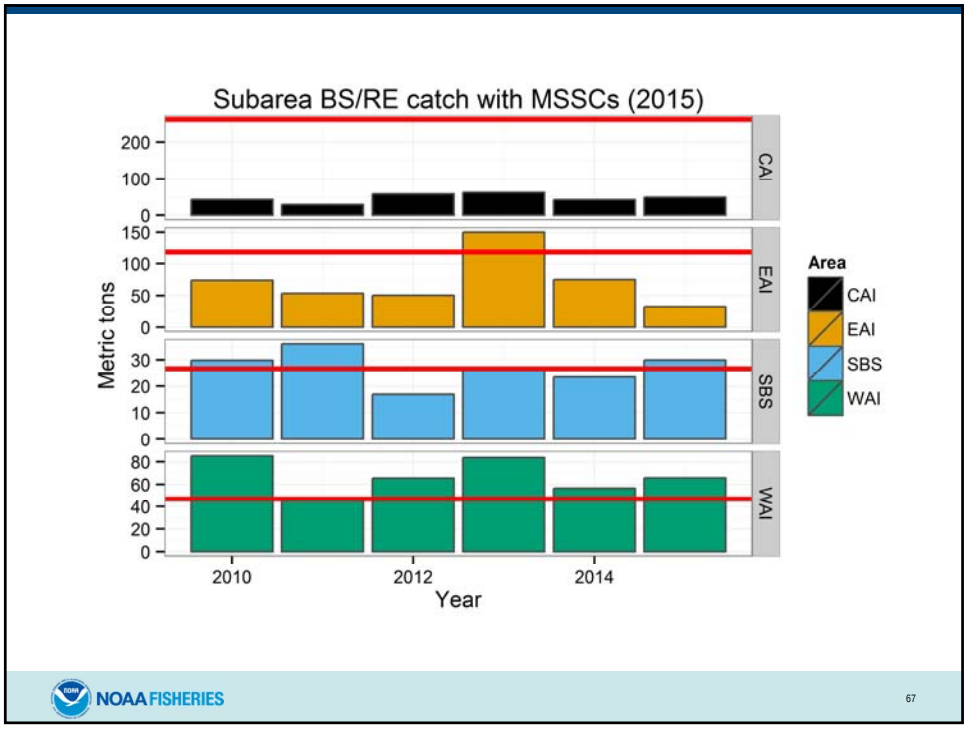
Notes on partial update stocks

- Northern rockfish catch for 2015 is about 3× recent average
  - Team recommends that authors examine catch data in August 2016
  - If it appears that the catch in the Eastern AI will be much higher than what would be expected under an area-specific ABC for 2016, the Team would ask the authors to present a stock structure template update at the September meeting
- Blackspotted/rougheye catch for 2015 (through November 28) of 66 t in the WAI represents a 20 t (43%) overage with respect to the maximum subarea species catch of 46 t
  - Team recommends that the 2016 MSSC in the WAI be set at a value of 58 t, as calculated in this year's assessment
  - If the MSSC is exceeded again next year, the Team anticipates evaluating alternative management tools for use in 2017 (e.g., subarea TACs, ABCs, or OFLs)



Spatial distribution of northern survey rockfish biomass




Subarea BS/RE catch with MSSCs (2015)
Metric tons
Year
CAI
EAI
SBS
WAI
Area
2010
2012
2014
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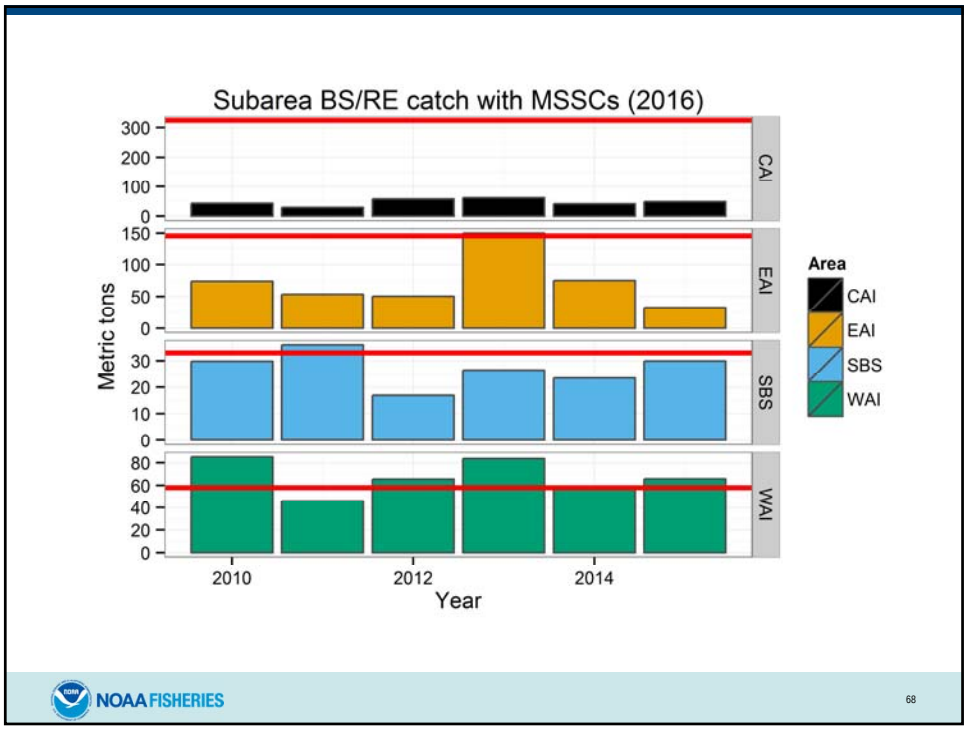
Subarea BS/RE catch with MSSCs (2016)
Metric tons
Year
CAI
EAI
SBS
WAI
Area
2010
2012
2014
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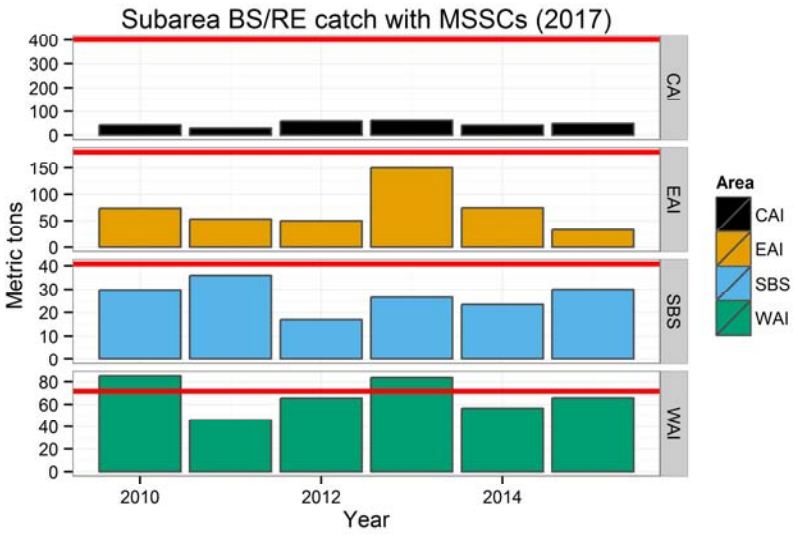

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Thank you!

Questions?

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Extra slides

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Chapter 1: EBS walleye pollock (p. 53)

- Straightforward update of the model that has been used for many years, except for the inclusion of a new method for projecting future weight at age
- Future weight at age is now based on cohort-specific growth patterns
- Spawning biomass increased by 114% between 2008 and 2015
- 2016 spawning biomass is 62% of B_0, 78% above B_{MSY}
- Authors, Team recommend using Tier 3 control rule to set 2016 ABC
  - Same procedure was used to set 2015 ABC
  - Not a change in Tier status (stock is still in Tier 1); just borrowing a control rule from a different Tier

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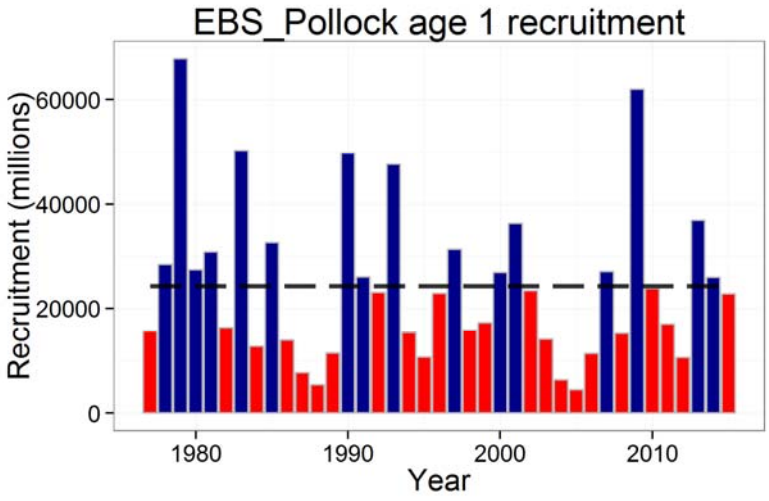
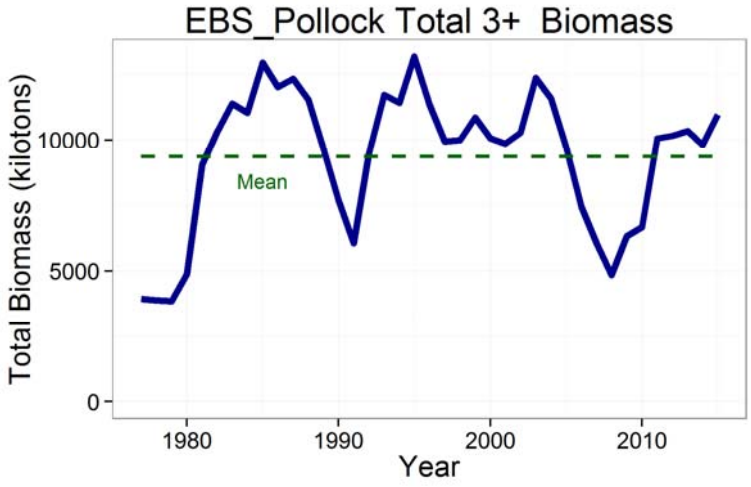
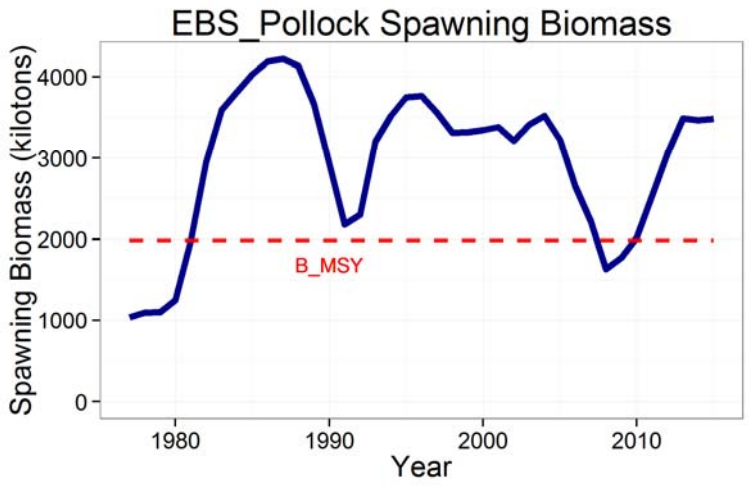
EBS walleye pollock, continued



EBS walleye pollock, continued



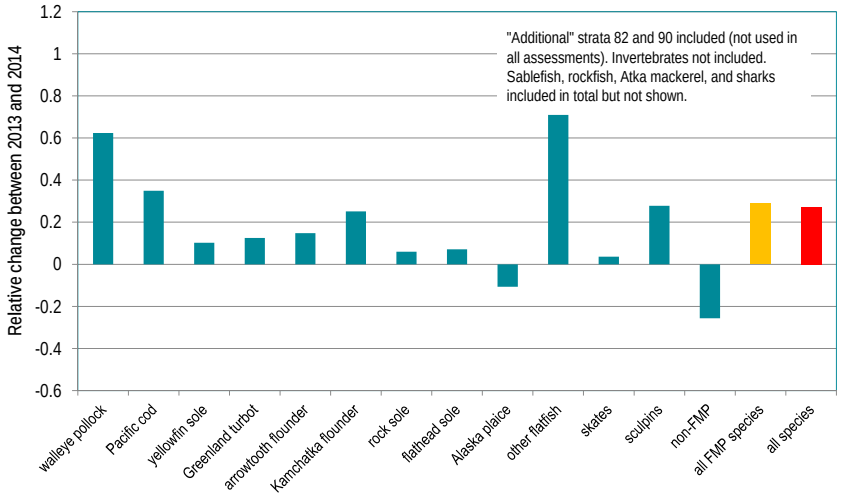
EBS walleye pollock, continued



EBS walleye pollock, continued

Quantity	Last year	This year	Change
M	0.30	0.30	0.00
2015 tier	1a	n/a	n/a
2016 tier	1a	1a	n/a
2015 age+ biomass	9,203,000	n/a	0.23
2016 age+ biomass	11,000,000	11,300,000	0.03
2015 spawning biomass	2,850,000	n/a	0.24
2016 spawning biomass	2,950,000	3,540,000	0.20
B0	5,162,000	5,676,000	0.10
Bmsy	1,948,000	1,984,000	0.02
2016 FOFL	0.587	0.514	-0.12
2016 FABC	0.512	0.401	-0.22
2015 OFL	3,330,000	n/a	0.17
2016 OFL	3,490,000	3,910,000	0.12
2015 ABC	1,637,000	n/a	0.28
2016 ABC	1,554,000	2,090,000	0.34

Change in EBS shelf survey, 2013-2014



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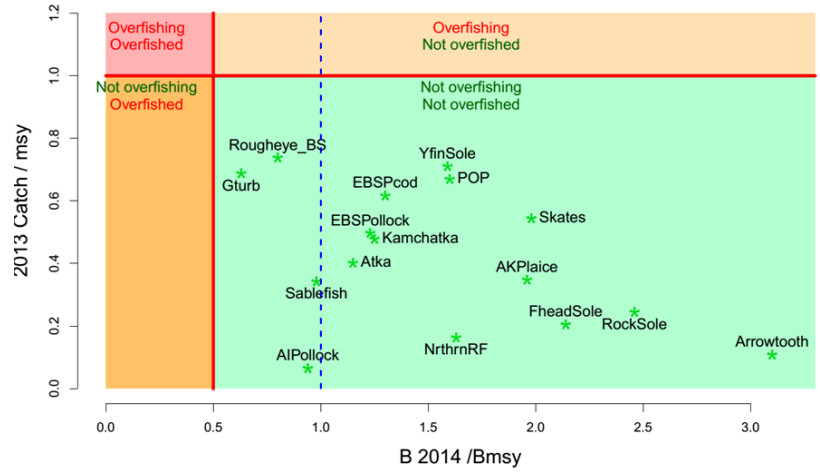
Quad plot (Tiers 1-3): 2013



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