Science, Service, Stewardship

Overview of the 2013 BSAI Groundfish SAFE Report

BSAI Groundfish Plan Team
- Mike Sigler, co-chair
- Grant Thompson, co-chair
- Jane DiCosimo, coordinator

NOAA FISHERIES SERVICE

Ecosystem and Economic Information

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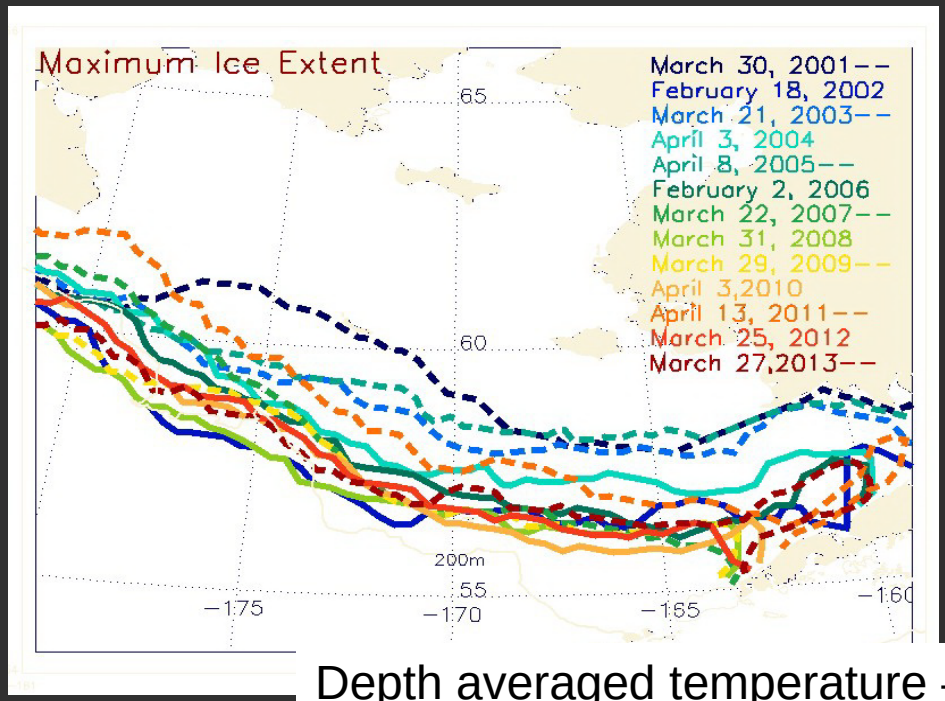
Eastern Bering Sea Climate – FOCI (Overland et al.)

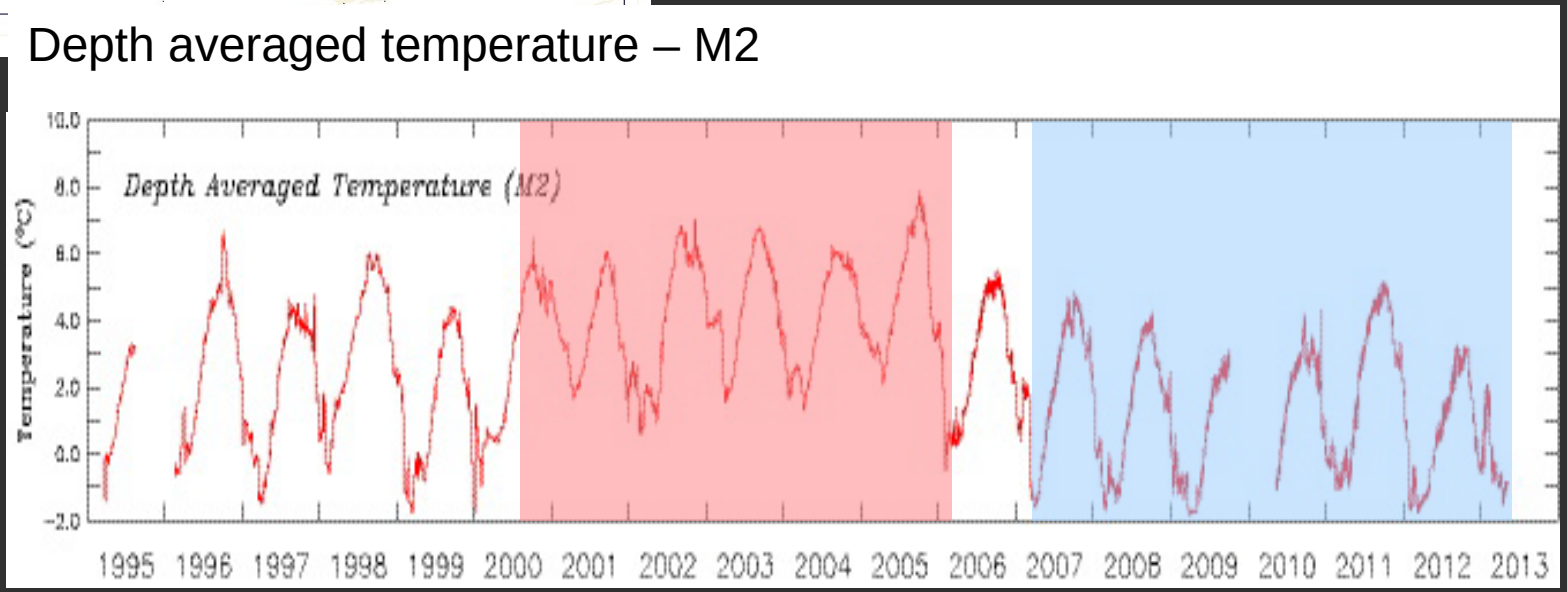


2013: another cold year

Summer: near normal conditions

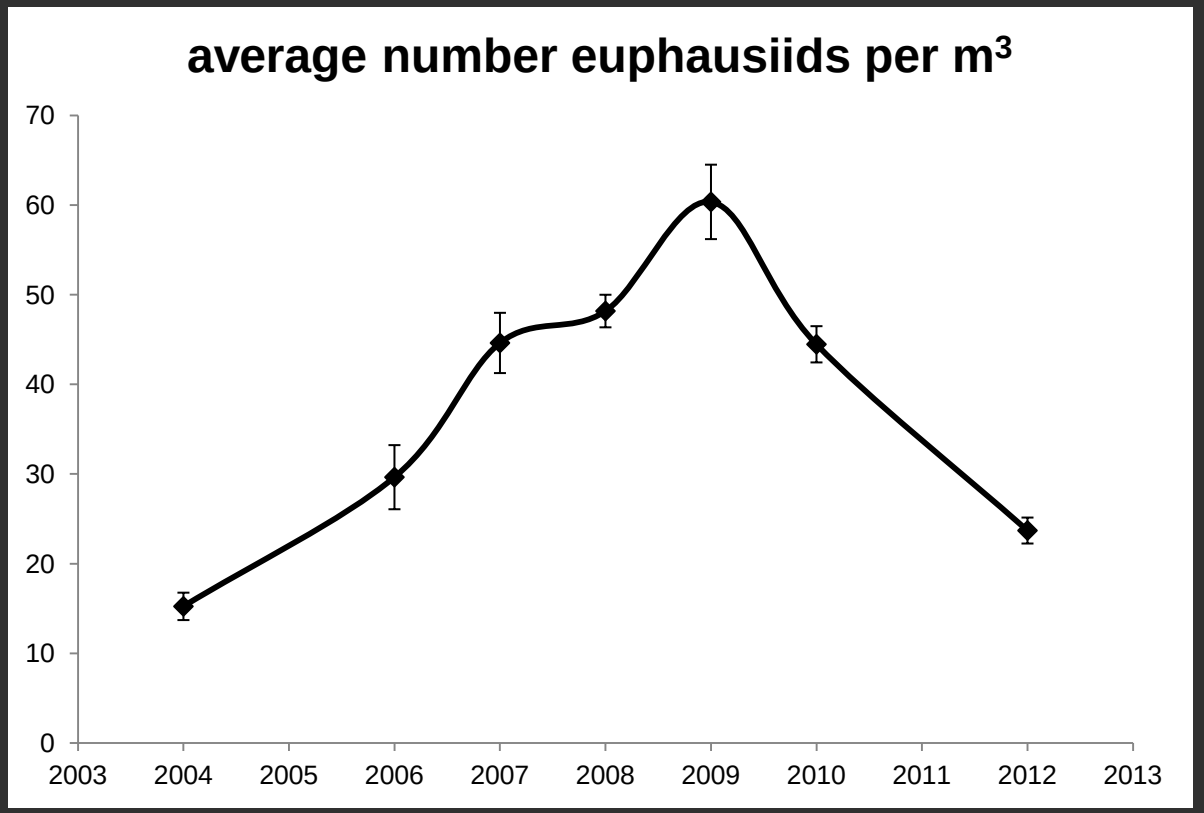
Extensive sea ice (except Bristol Bay) due to steady northeast winds (due to high spring SLP)

Depth averaged temperature – M2

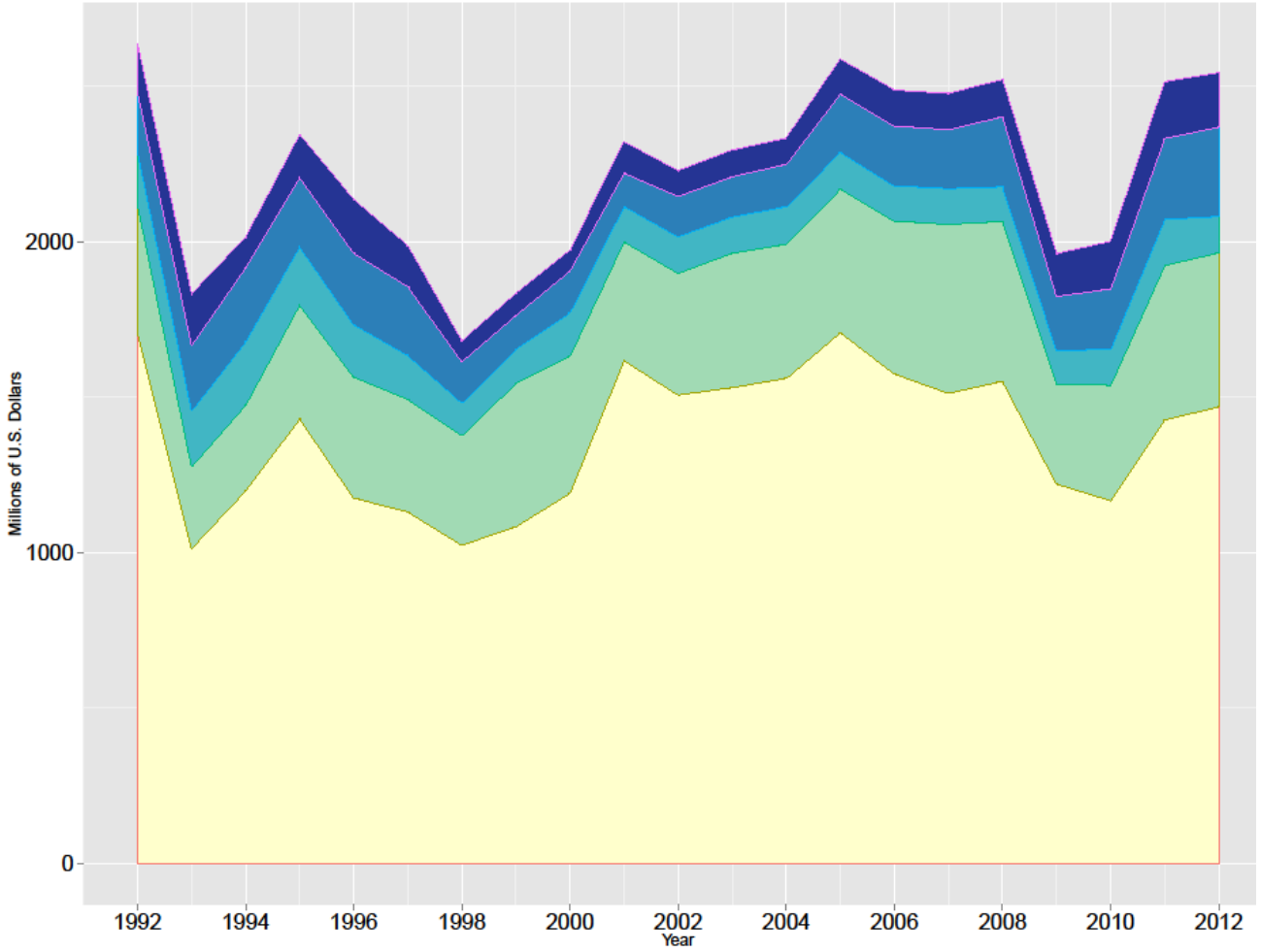


EBS Euphausiids (Ressler et al.)

- Acoustically-determined
- Euphausiid abundance is better predicted by water temperature during summer than pollock abundance (Ressler et al., in prep)



First-Wholesale Market Value



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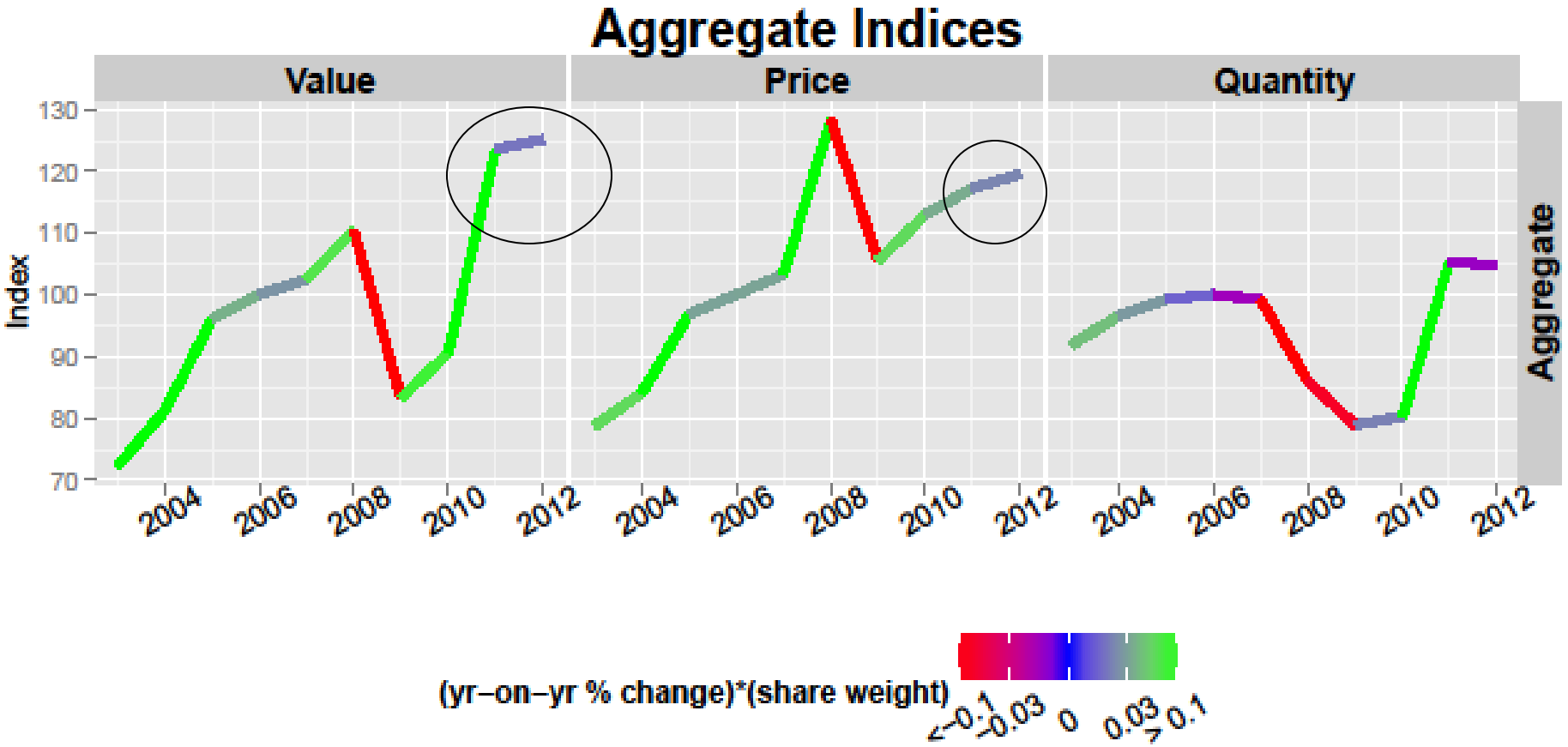
BSAI At-Sea Wholesale Market: Aggregate Economic Indices



Stock Assessments

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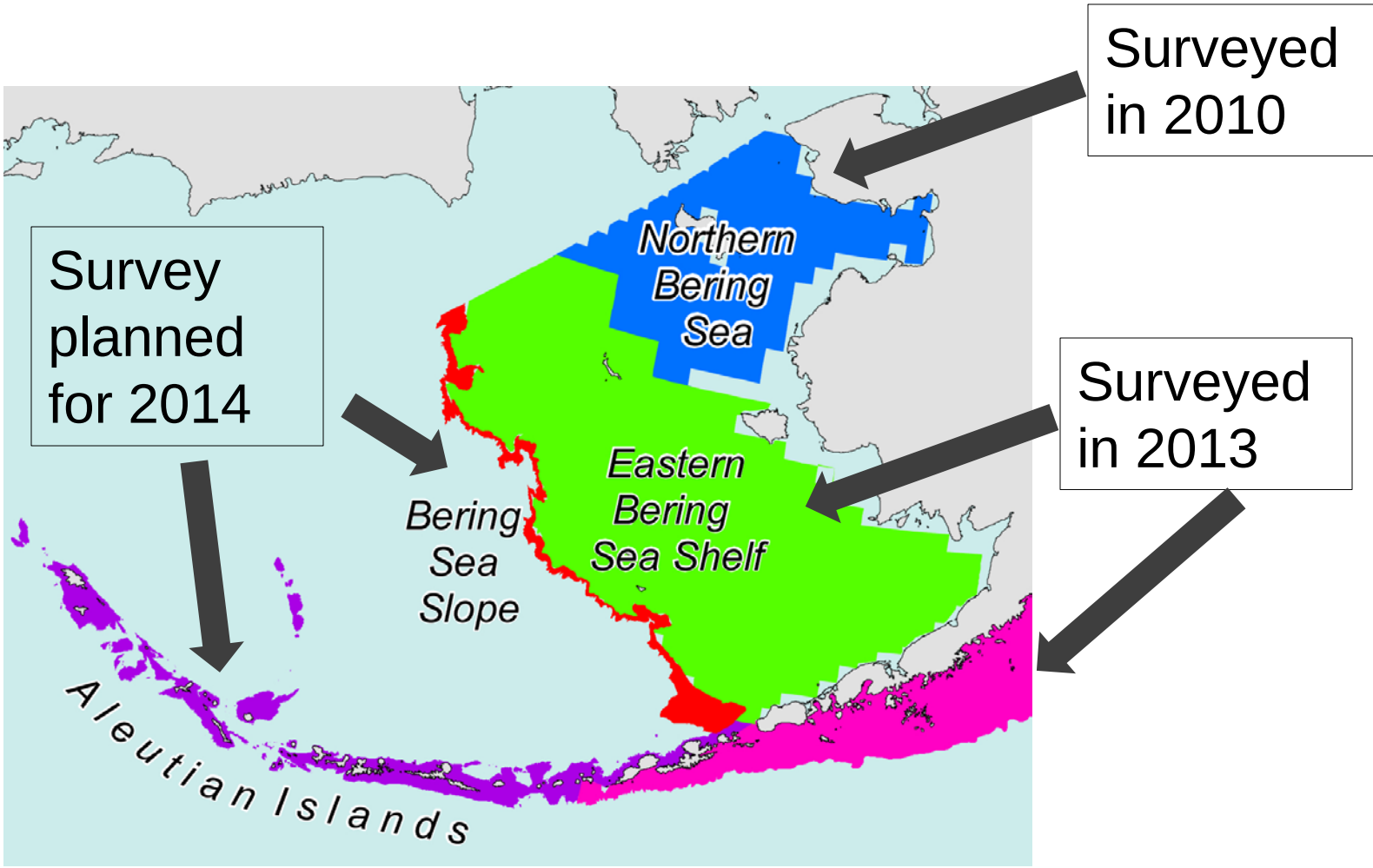
Bottom trawl survey areas



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“Abbreviated” full assessments

- Key prey species of Steller sea lions:
  - Walleye pollock (EBS, AI, Bogoslof)
  - Pacific cod (EBS, AI)
  - Atka mackerel (BSAI)
- Stocks with possible conservation concerns:
  - Greenland turbot
- Because authors willing to go above and beyond:
  - Yellowfin sole
  - Other flatfish

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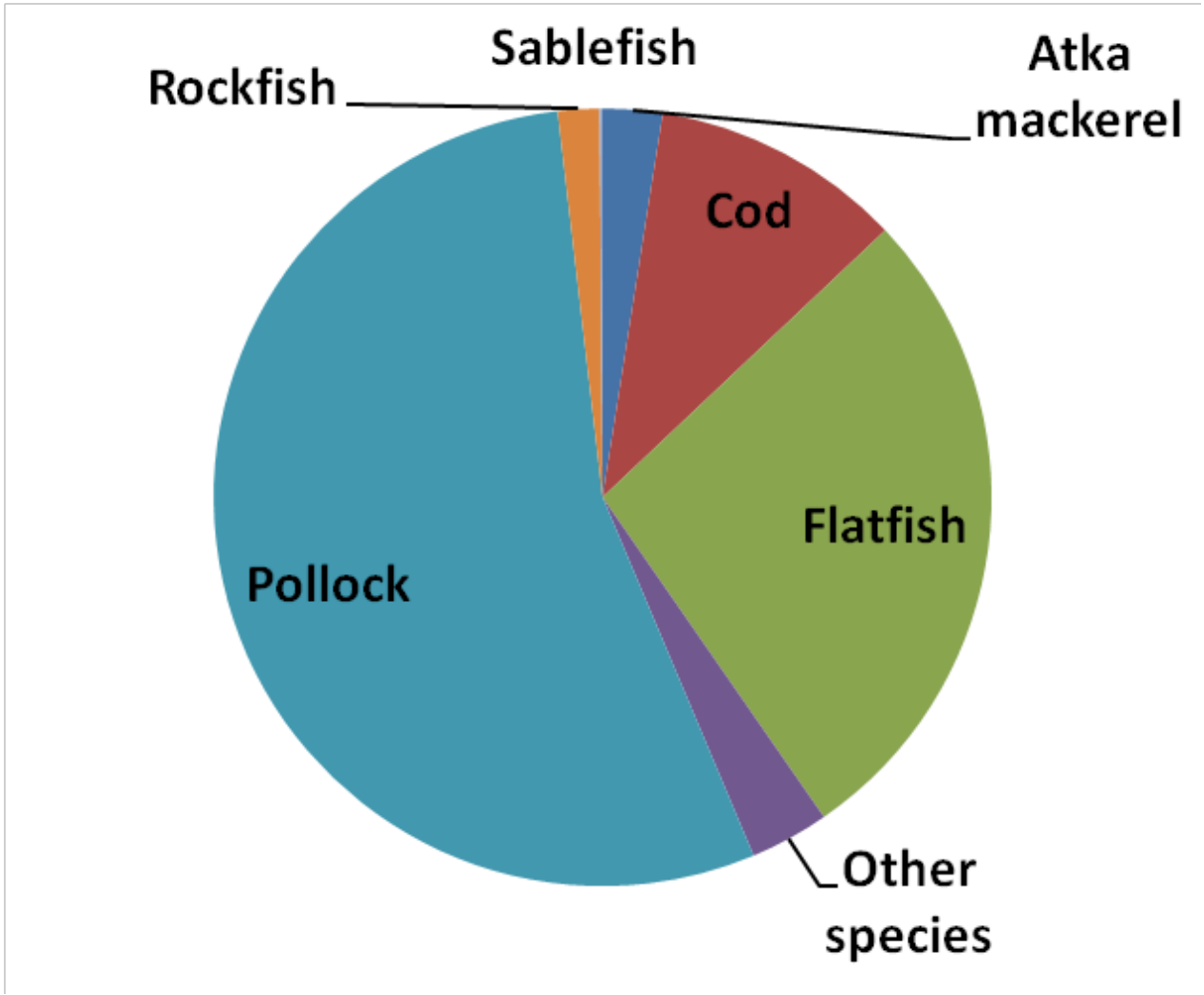
Recommended 2014 ABC



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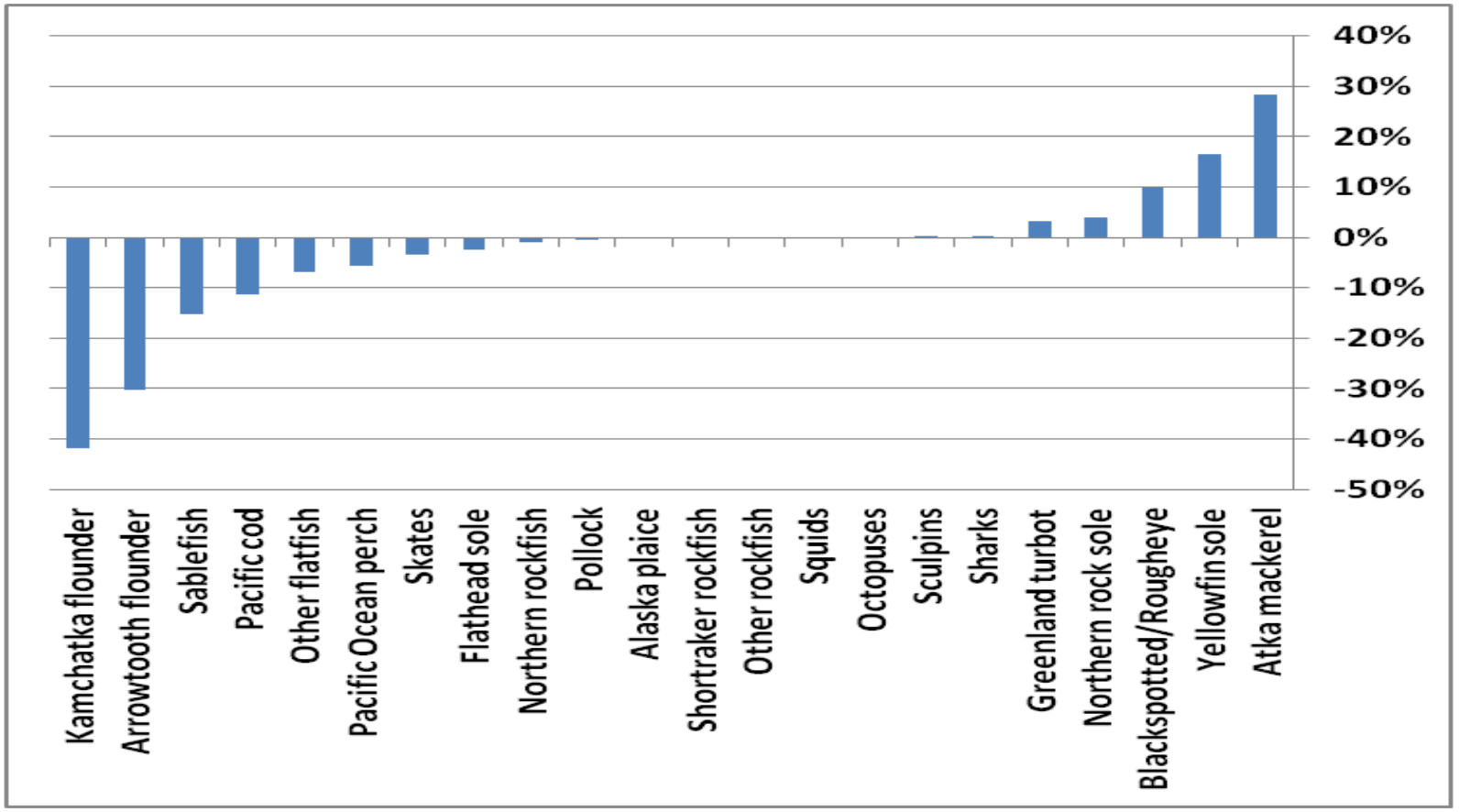
Percent change in ABC (2014 vs. 2013)



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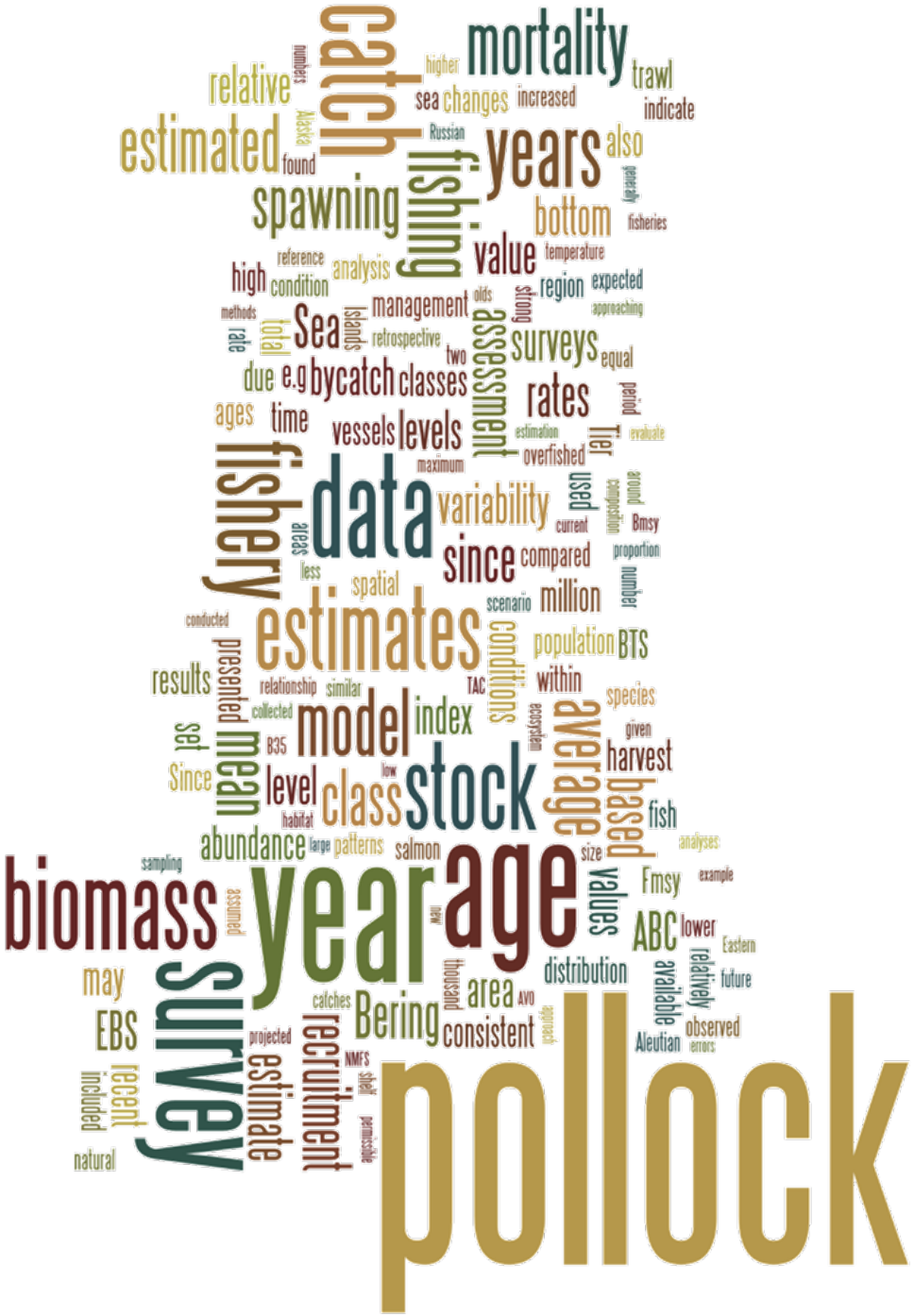


Eastern Bering Sea pollock stock assessment

James Ianelli
Steve Barbeaux
Stan Kotwicki
Taina Honkalehto
Neal Williamson
Kerim Aydin

Alaska Fisheries Science Center
NMFS/NOAA

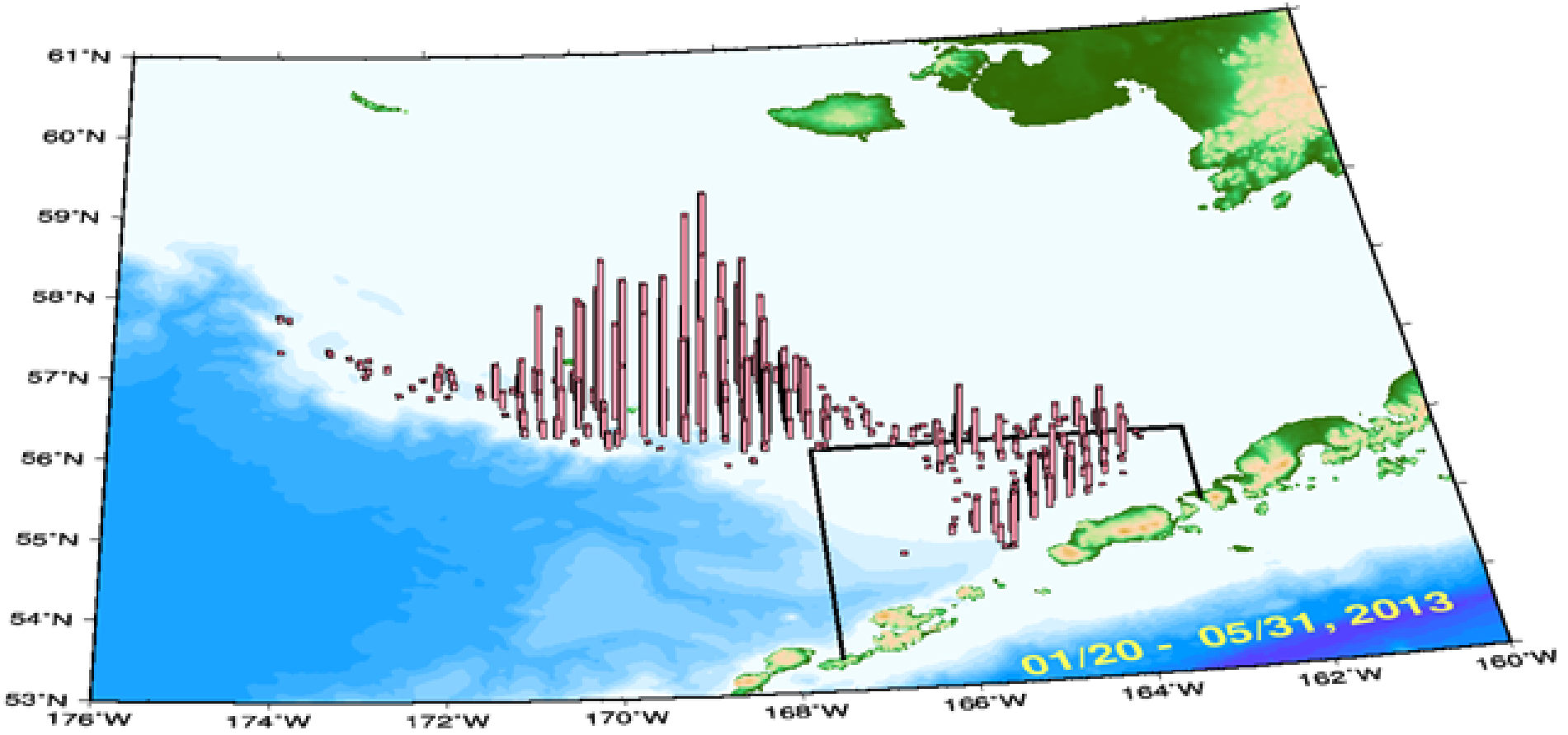
December 2013

Eastern Bering Sea pollock fishery

Winter conditions…

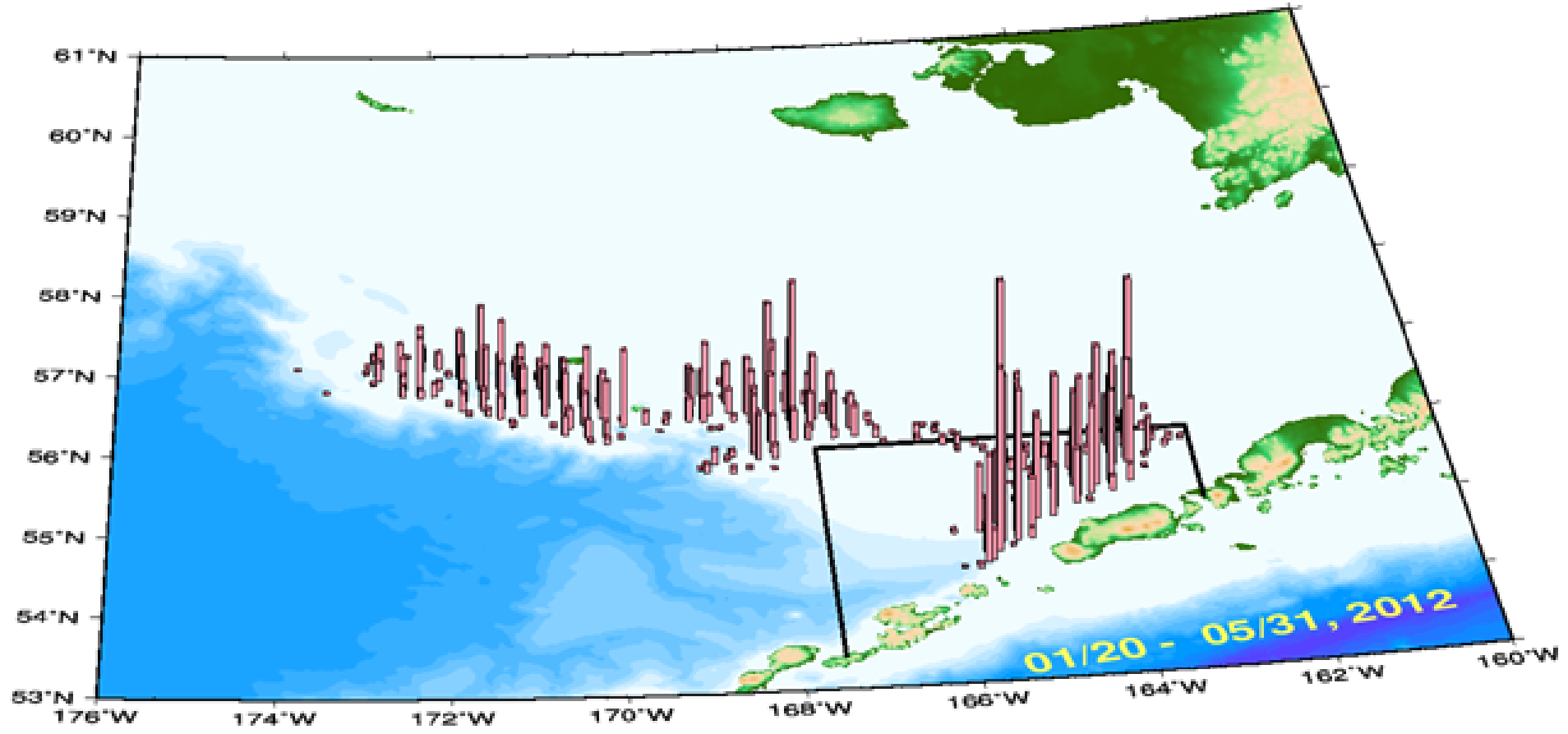
Winter 2013 fishery

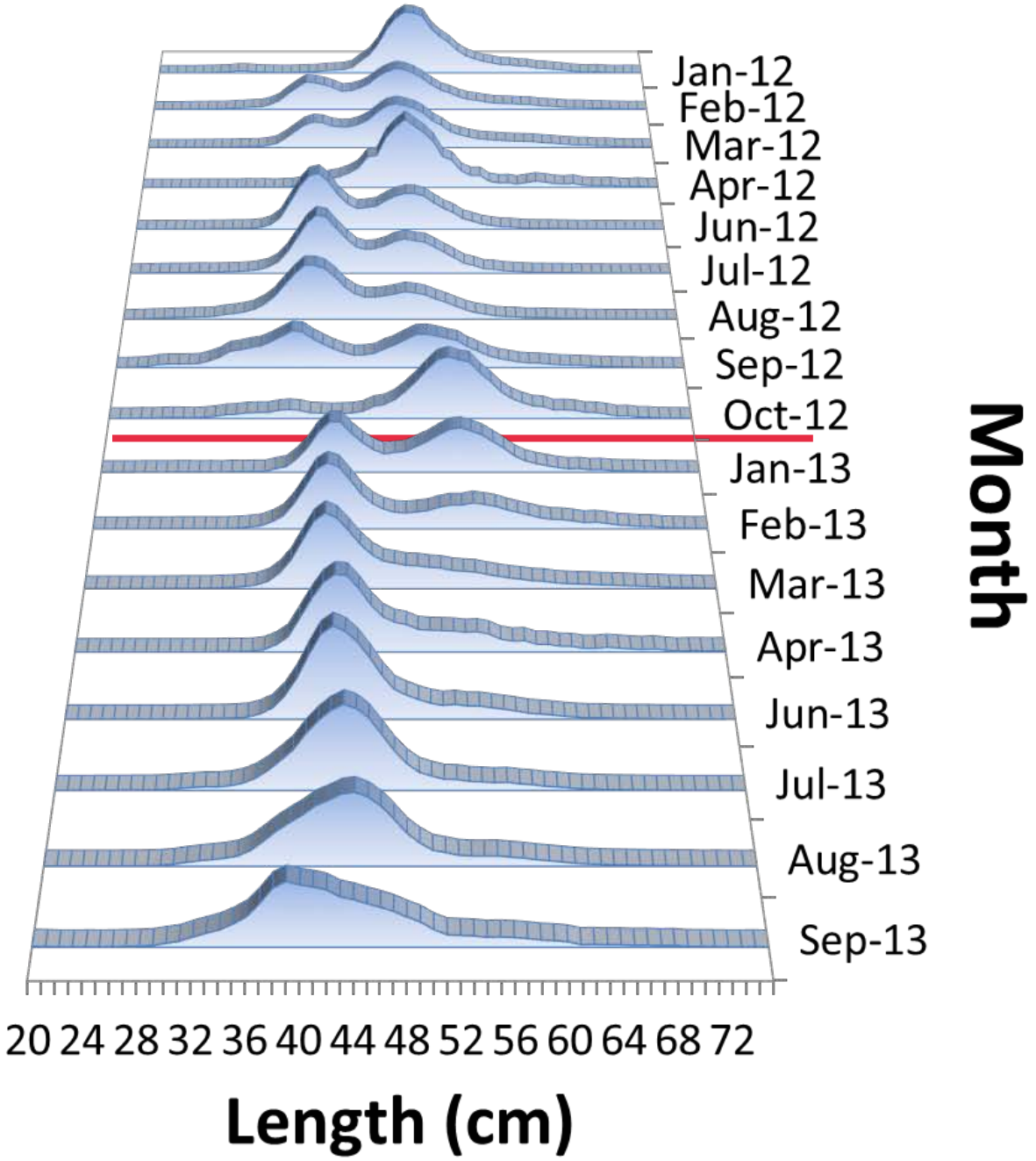
Eastern Bering Sea (EBS)



Winter 2012 fishery

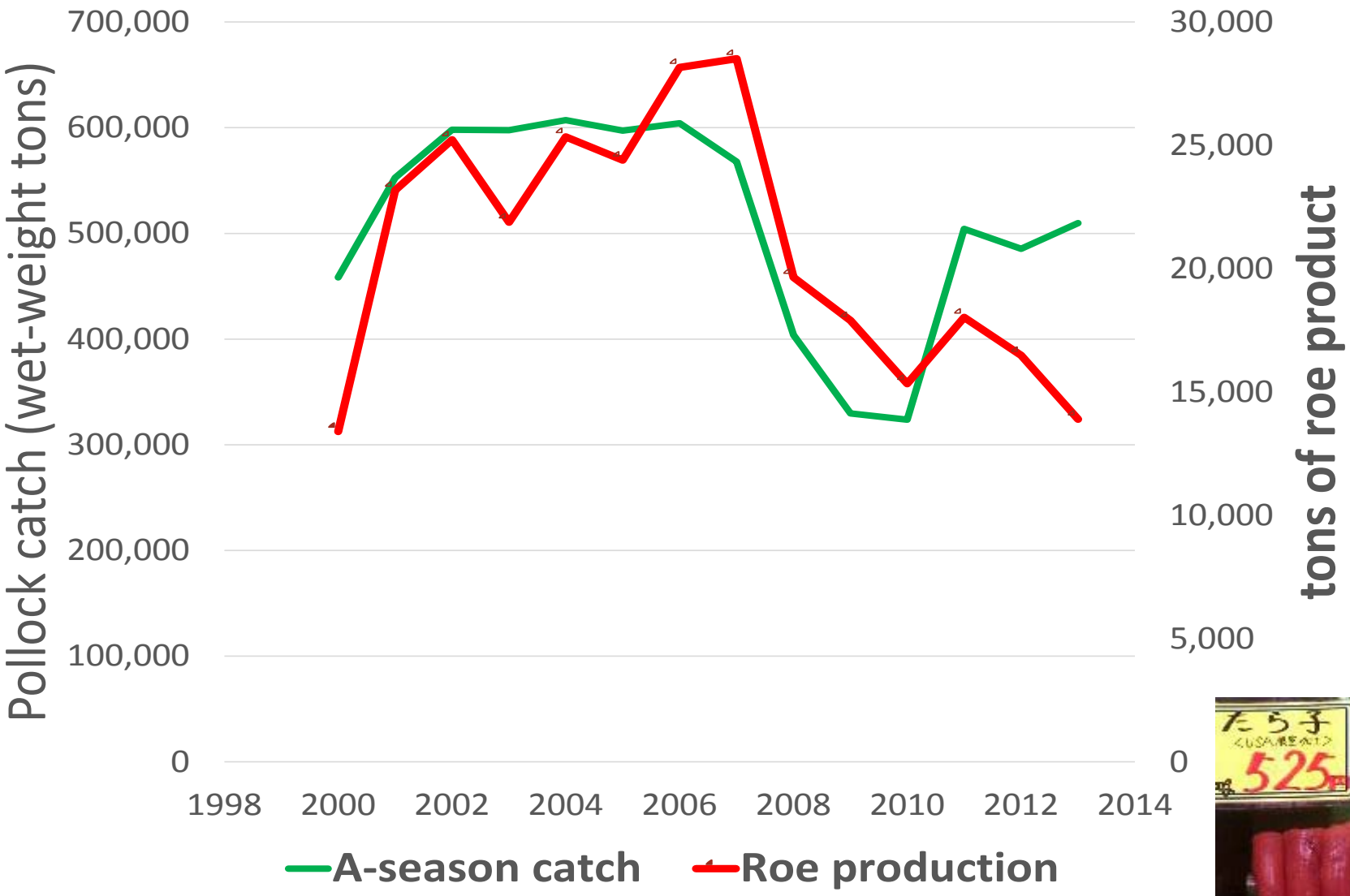
Eastern Bering Sea (EBS)



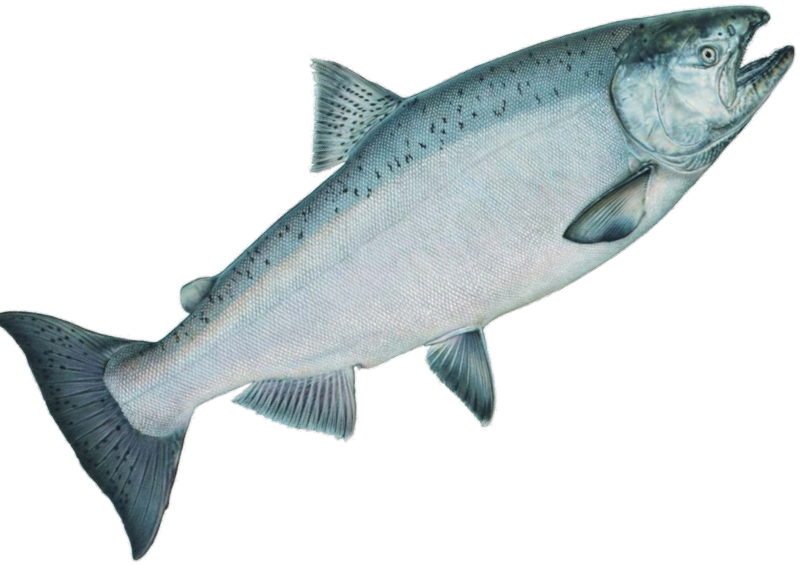


Pollock size composition in the 2012-2013 fishery

Fishing: A-season



Is it salmon avoidance?



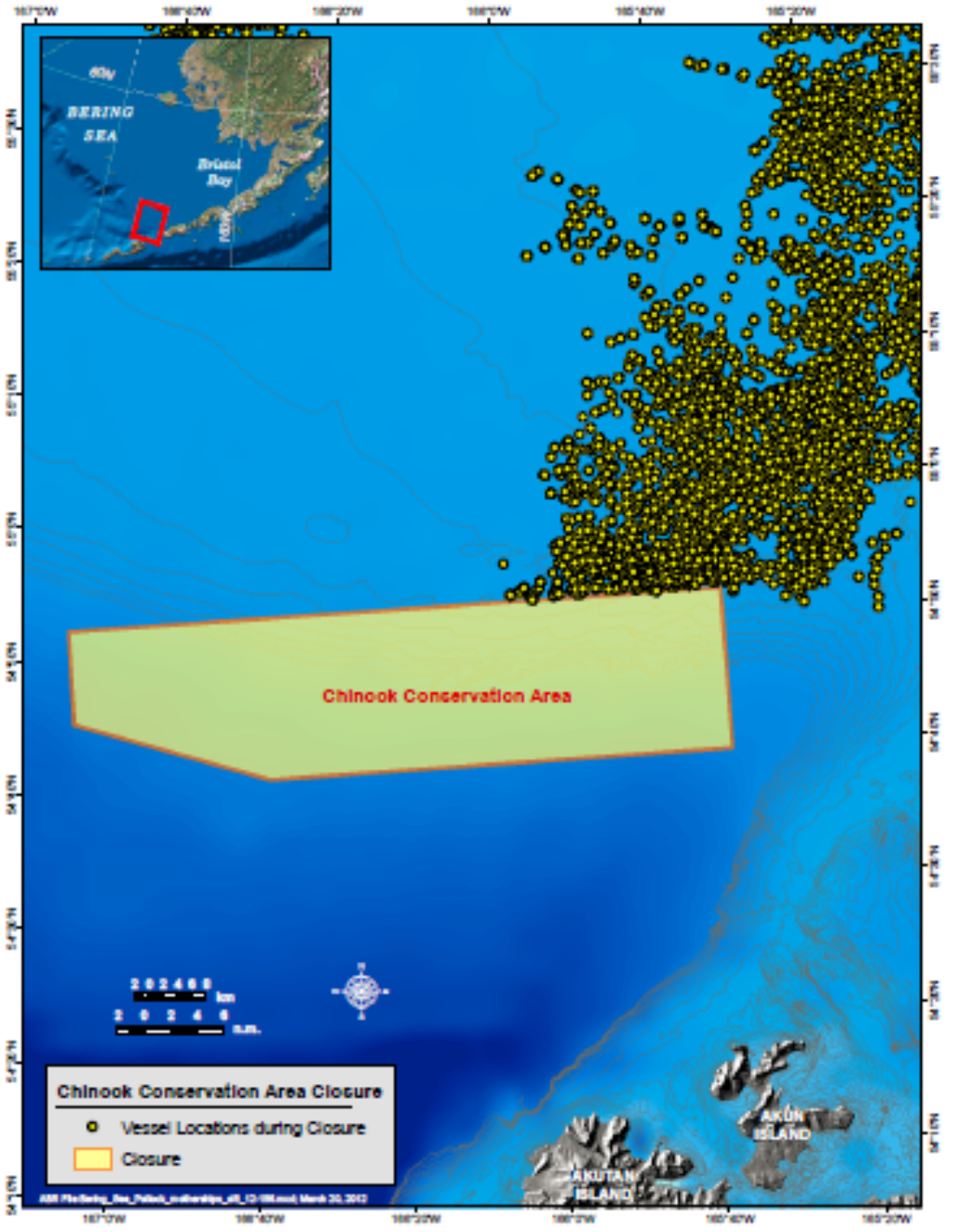


Figure 1: Chinook Salmon Conservation Area

EBS pollock fishery

mean weight at age

Anomalies relative to mean

	3	4	5	6	7	8	9	10	11	12
1991	0.797542	0.932106	0.933721	0.941156	0.953671	0.870433	0.876361	0.898722	0.834146	0.860472
1992	1.105505	0.912331	0.991514	0.922184	0.915766	0.964972	0.895247	0.976858	0.915082	0.883095
1993	1.374046	1.193818	1.00836	0.999809	1.045609	1.023965	1.041983	0.980982	1.043142	1.076522
1994	1.095898	1.263646	1.121412	0.965873	0.793419	0.99103	1.212693	1.052911	0.992777	0.985515
1995	1.04296	0.976888	1.120793	1.091922	0.962404	0.954656	1.066566	1.067232	1.047748	1.040824
1996	0.895106	0.833957	1.044129	1.022614	1.063769	0.931379	0.889611	0.869562	1.040724	1.041158
1997	0.898728	0.908523	0.850569	0.960428	0.998874	1.051421	0.947826	0.988864	1.046079	1.024669
1998	1.032123	1.144645	0.96296	0.806707	0.875619	1.01511	1.025485	0.991481	0.959544	0.985202
1999	1.111867	0.978252	0.98004	0.907591	0.817061	0.884644	0.905395	1.01504	0.895376	0.984319
2000	0.976192	1.020381	0.967506	0.947178	0.879658	0.790101	0.846302	0.812305	0.940416	0.916032
2001	0.898806	0.967521	1.028028	1.018798	1.08254	0.976829	0.92496	0.907154	0.984248	1.009376
2002	1.056893	0.98992	1.028347	1.029794	1.021233	1.005176	0.972635	0.874238	0.964216	0.994542
2003	1.345367	1.072039	0.998305	0.993598	0.969221	0.936827	0.945265	0.976874	0.8999	0.852975
2004	1.121469	1.130618	0.982951	0.996635	1.00118	0.911454	0.893618	0.962689	0.859458	0.819607
2005	0.979762	0.987411	0.981346	0.956439	0.989188	0.931083	0.925857	0.872841	0.939838	0.912249
2006	0.846866	0.872728	0.927572	0.975833	0.960827	0.940298	0.919437	0.898538	0.903786	0.892331
2007	0.939784	0.992351	0.98599	1.011852	1.079138	1.083285	1.041705	1.018215	0.985212	1.054427
2008	0.913728	1.014666	1.001448	0.999673	1.011271	1.022688	0.970327	0.960646	0.970861	0.976696
2009	0.958512	1.06758	1.054886	1.154744	1.14678	1.131612	1.225777	1.185544	1.212979	1.138758
2010	1.051678	0.952489	1.022153	1.18526	1.244698	1.232029	1.169203	1.27246	1.196637	1.282749
2011	0.805081	0.989787	1.02262	1.044642	1.093709	1.199252	1.164999	1.202153	1.170464	1.122574
2012	0.752085	0.798345	0.985351	1.06727	1.094363	1.151755	1.138749	1.21469	1.197367	1.145906

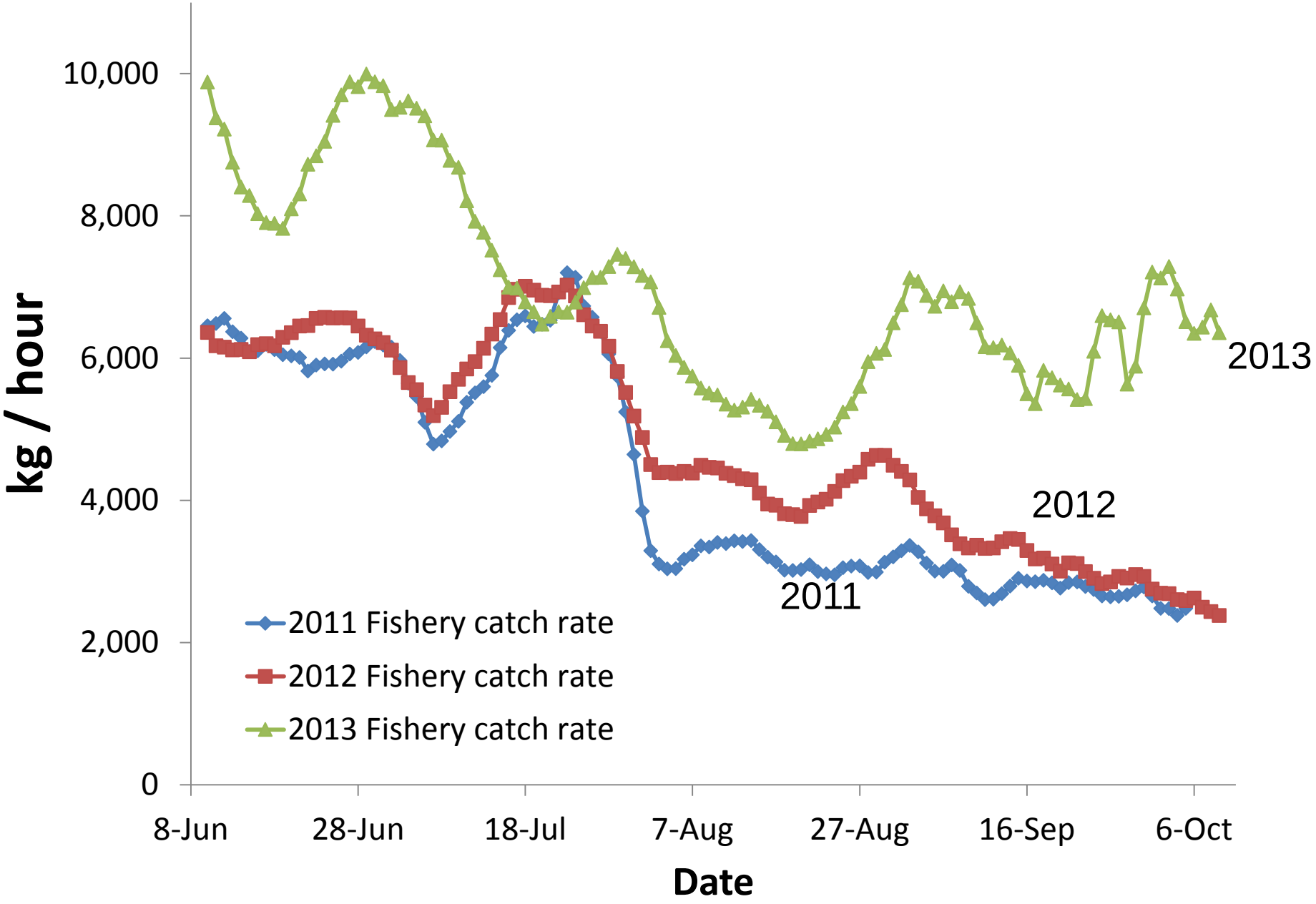
Eastern Bering Sea

pollock

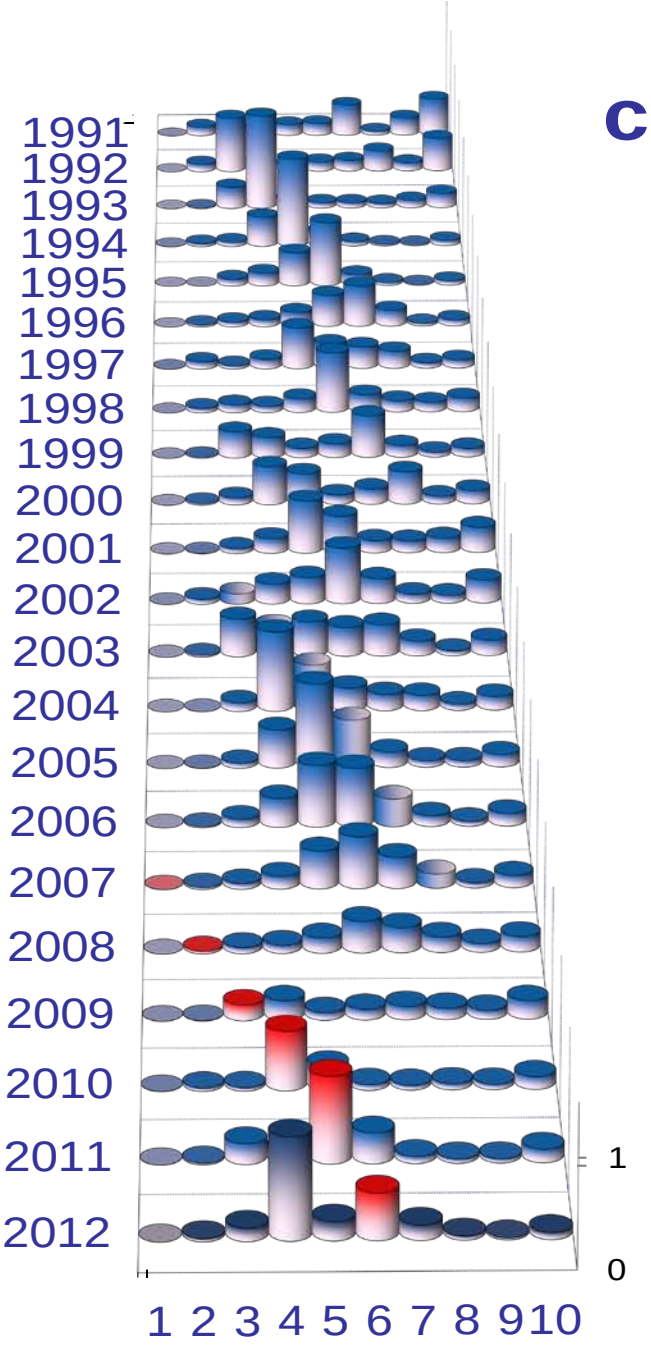
fishery

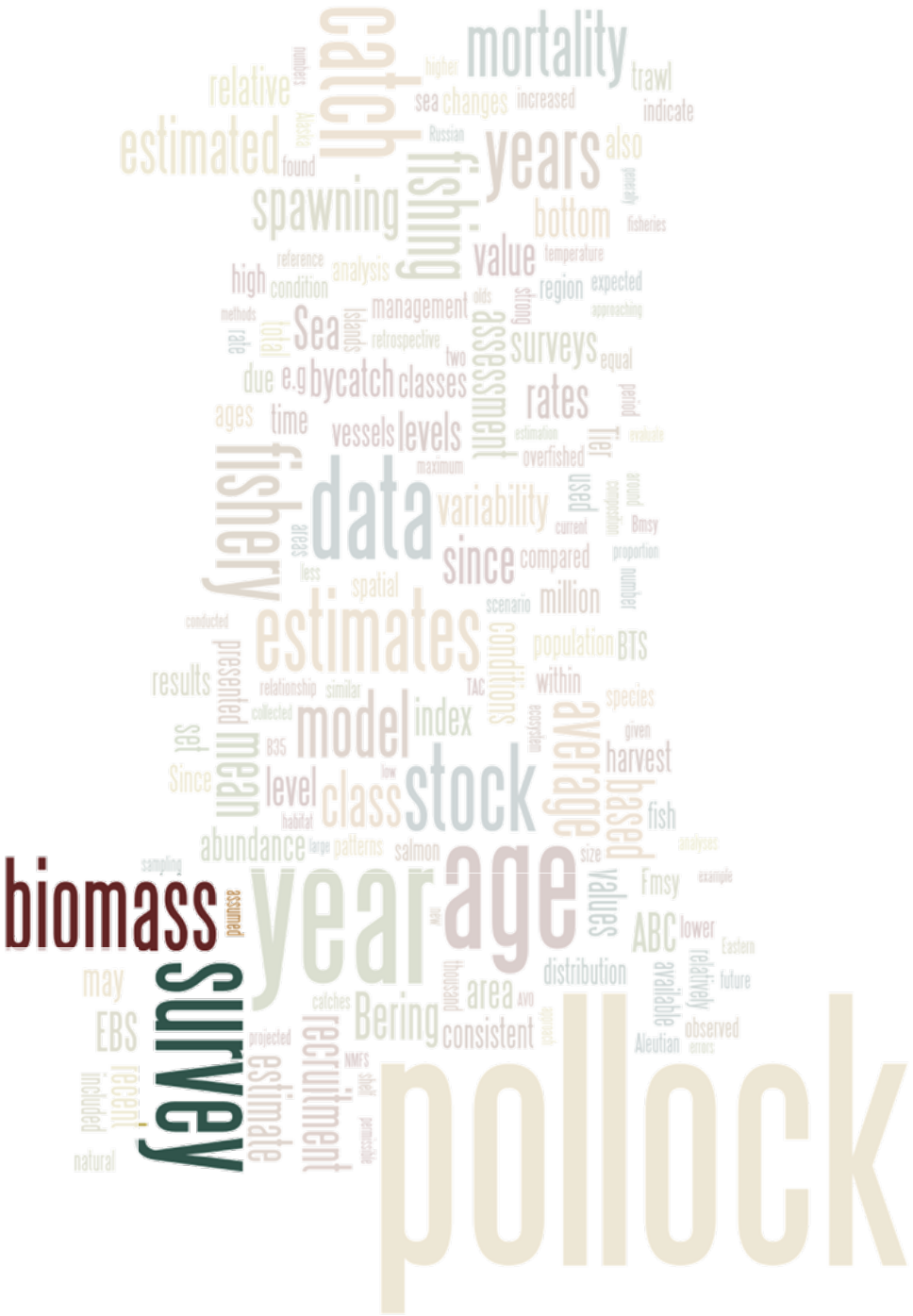
Summer-fall...

Fishery catch rate (EBS pollock)



Fishery catch-at-age





Eastern

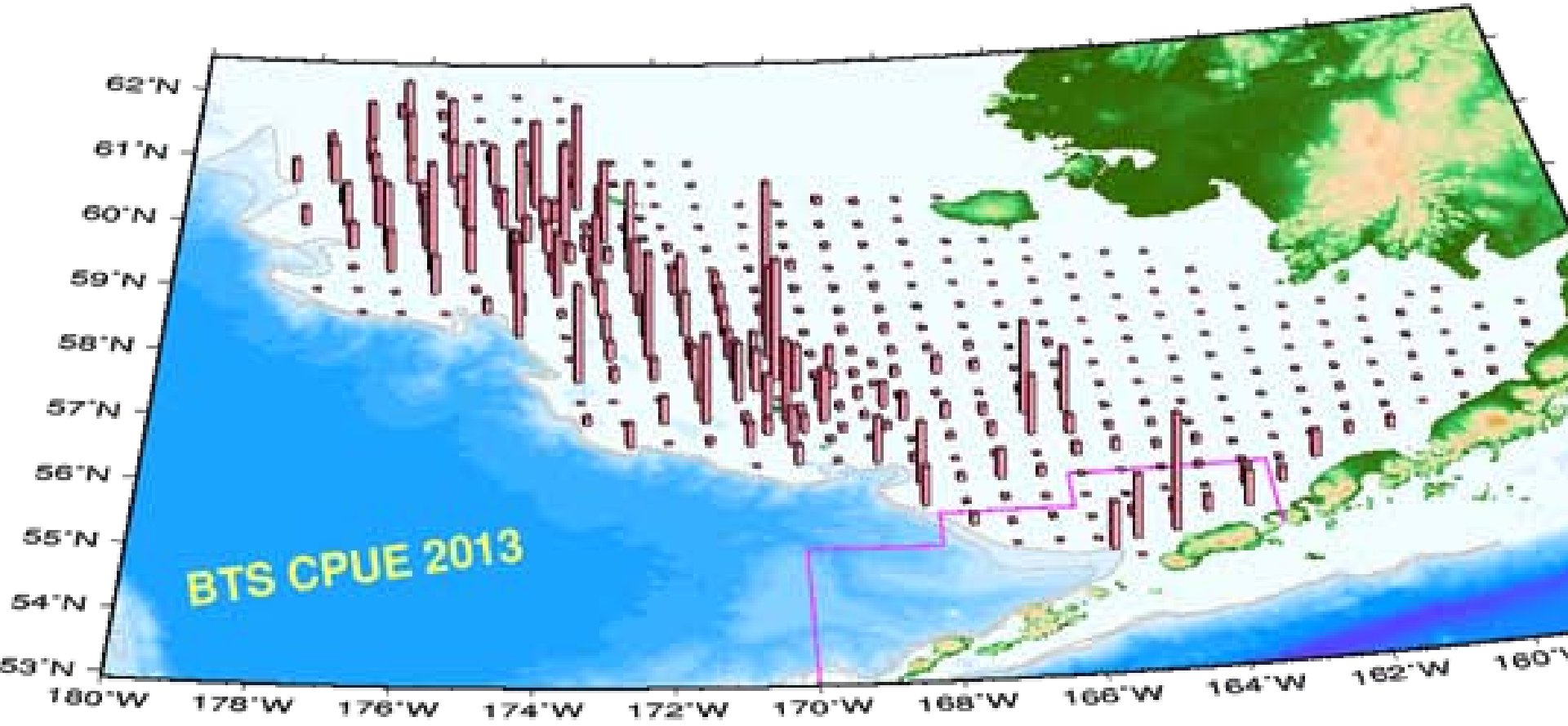
Bering Sea

pollock

surveys

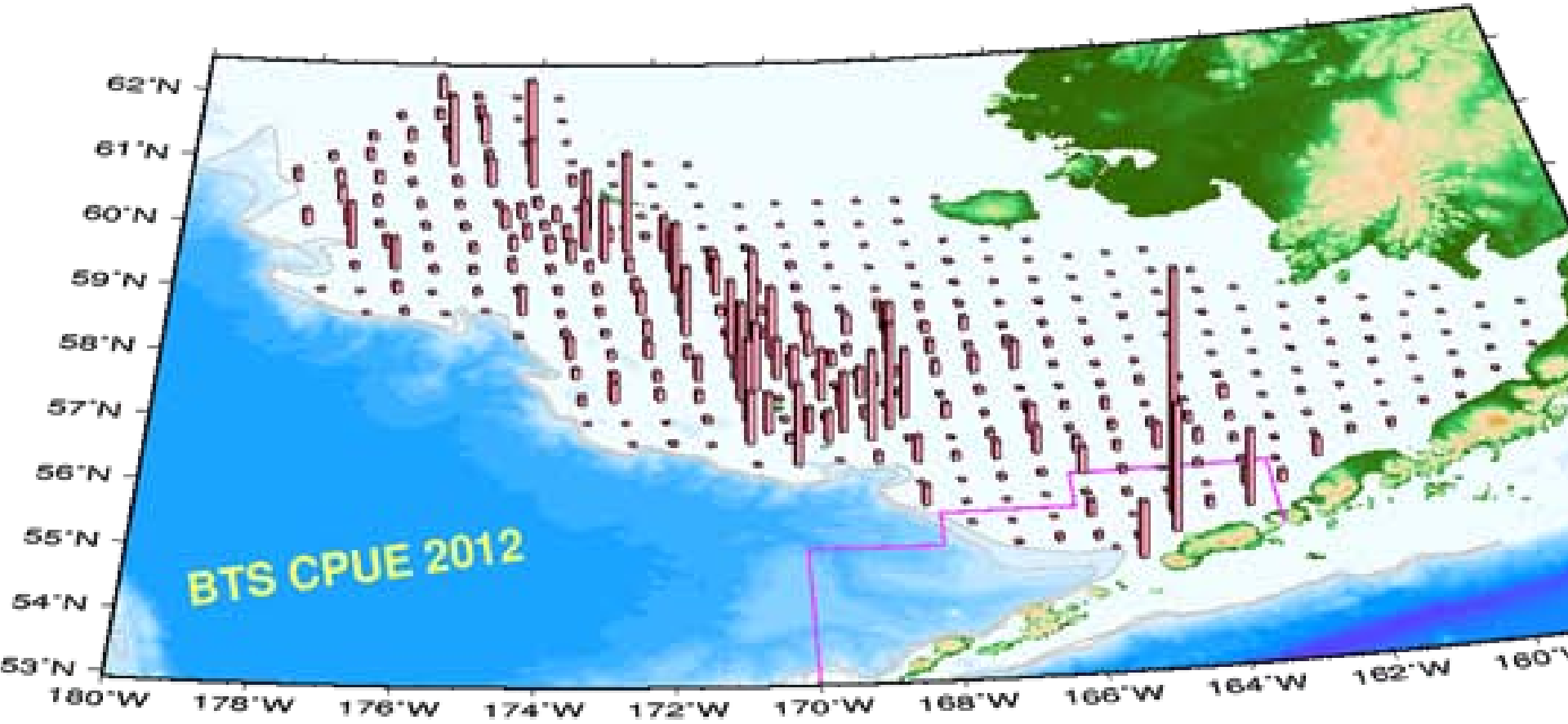
2013 Bottom-trawl survey

Pollock biomass estimate: 4,575 kt



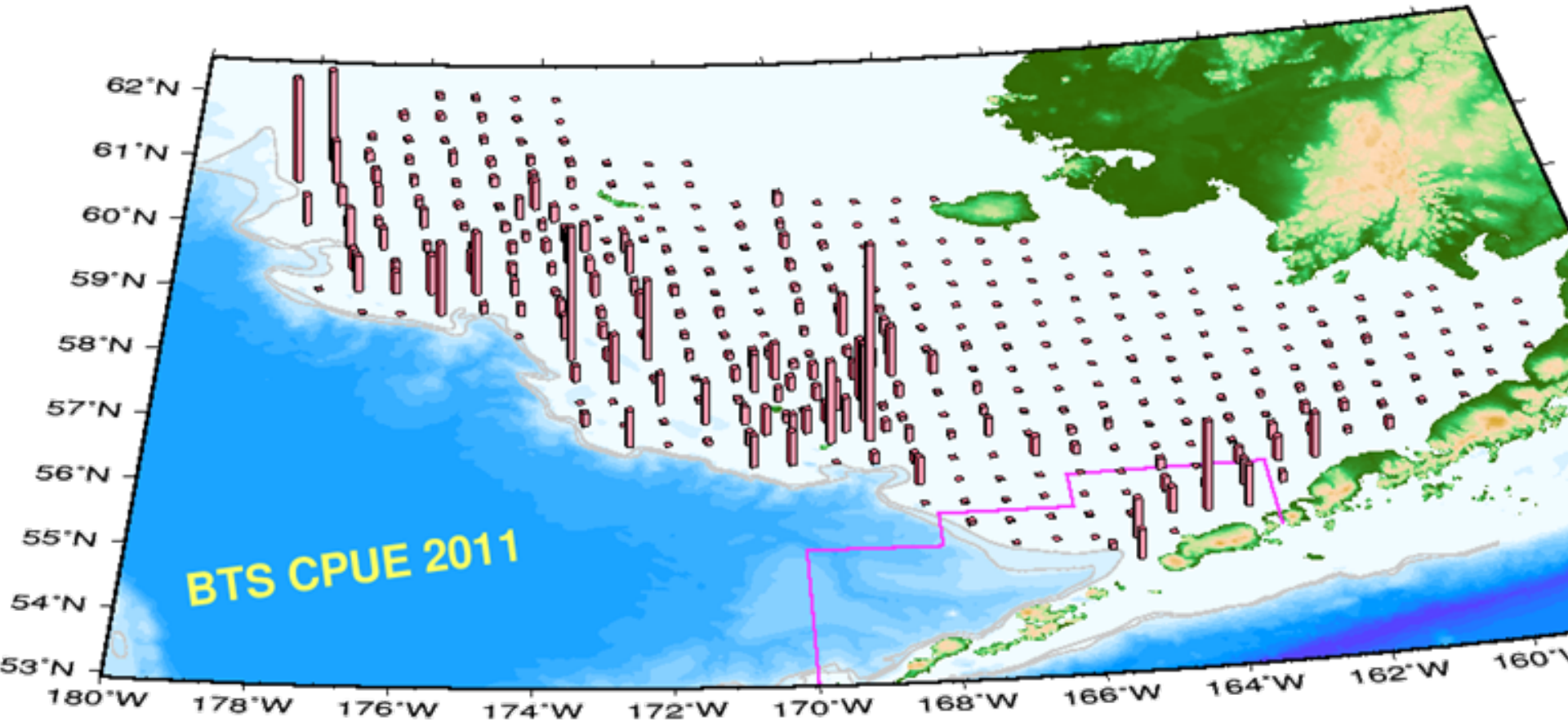
2012 Bottom-trawl survey

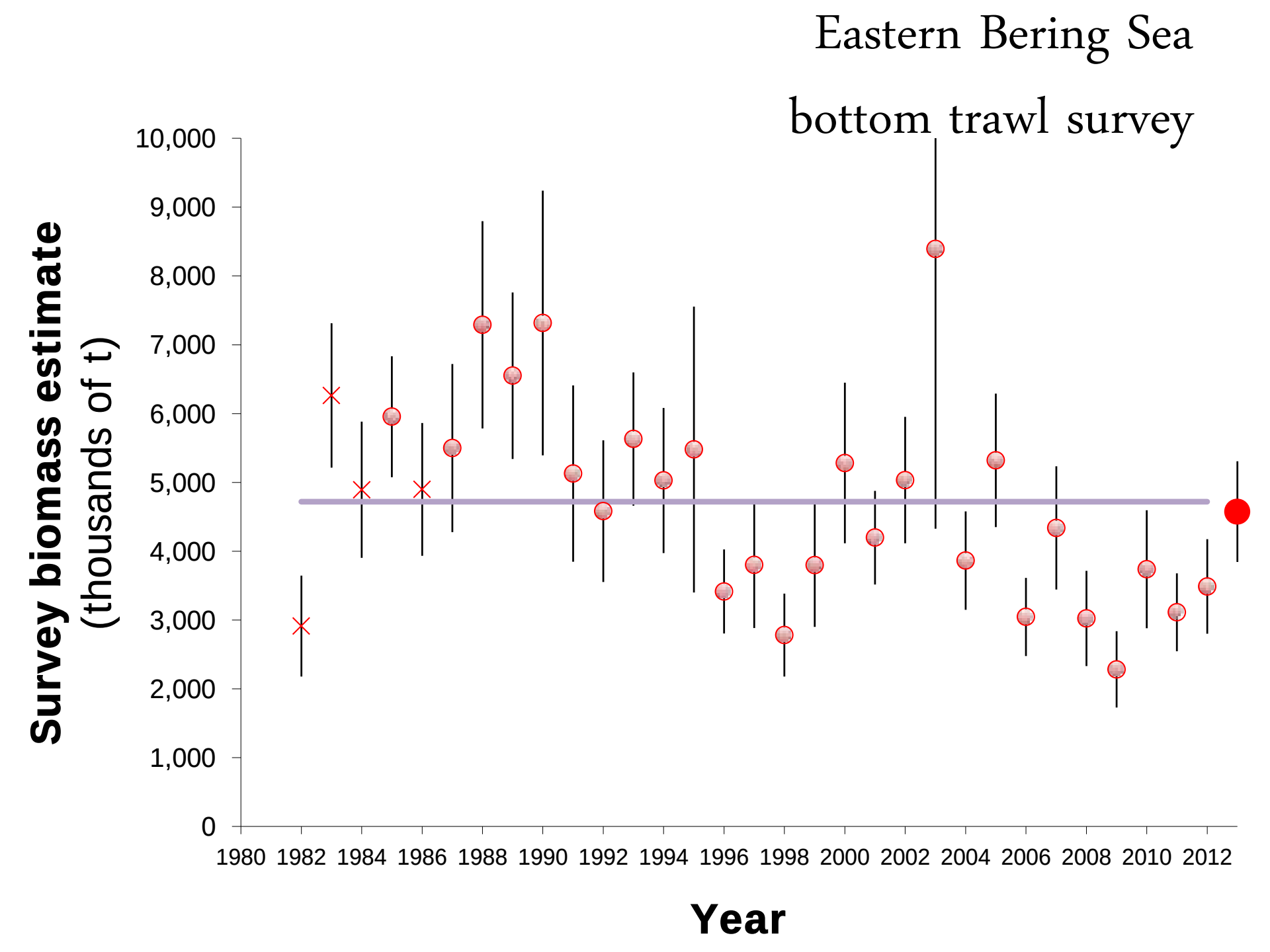
Pollock biomass estimate: 3,487 kt



2011 Bottom-trawl survey

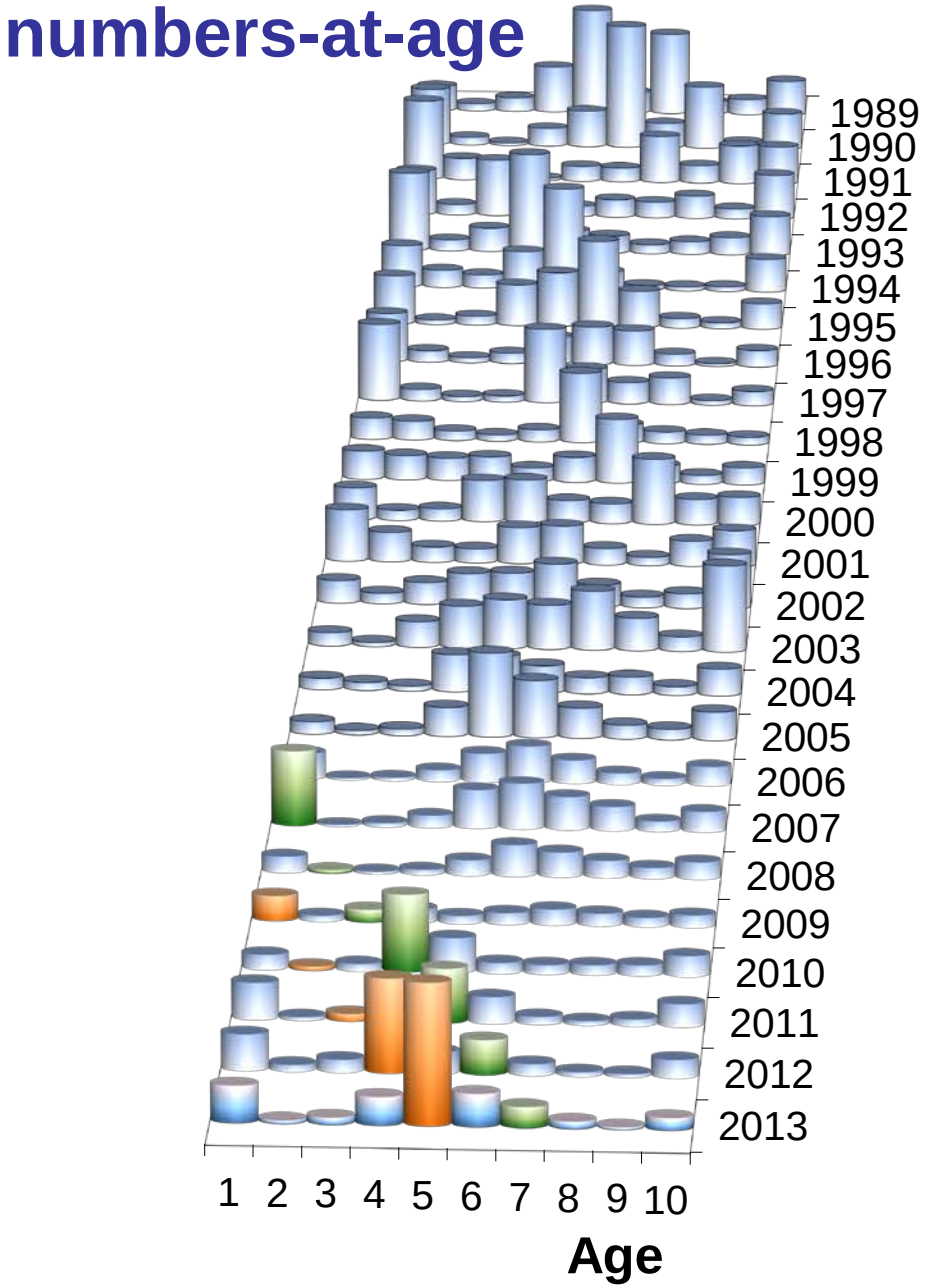
Pollock biomass estimate: 3,112 kt




Eastern Bering Sea
bottom trawl survey
Survey biomass estimate
(thousands of t)
10,000
9,000
8,000
7,000
6,000
5,000
4,000
3,000
2,000
1,000
0
1980
1982
1984
1986
1988
1990
1992
1994
1996
1998
2000
2002
2004
2006
2008
2010
2012
Year

Eastern Bering Sea

bottom trawl survey



In 2013,

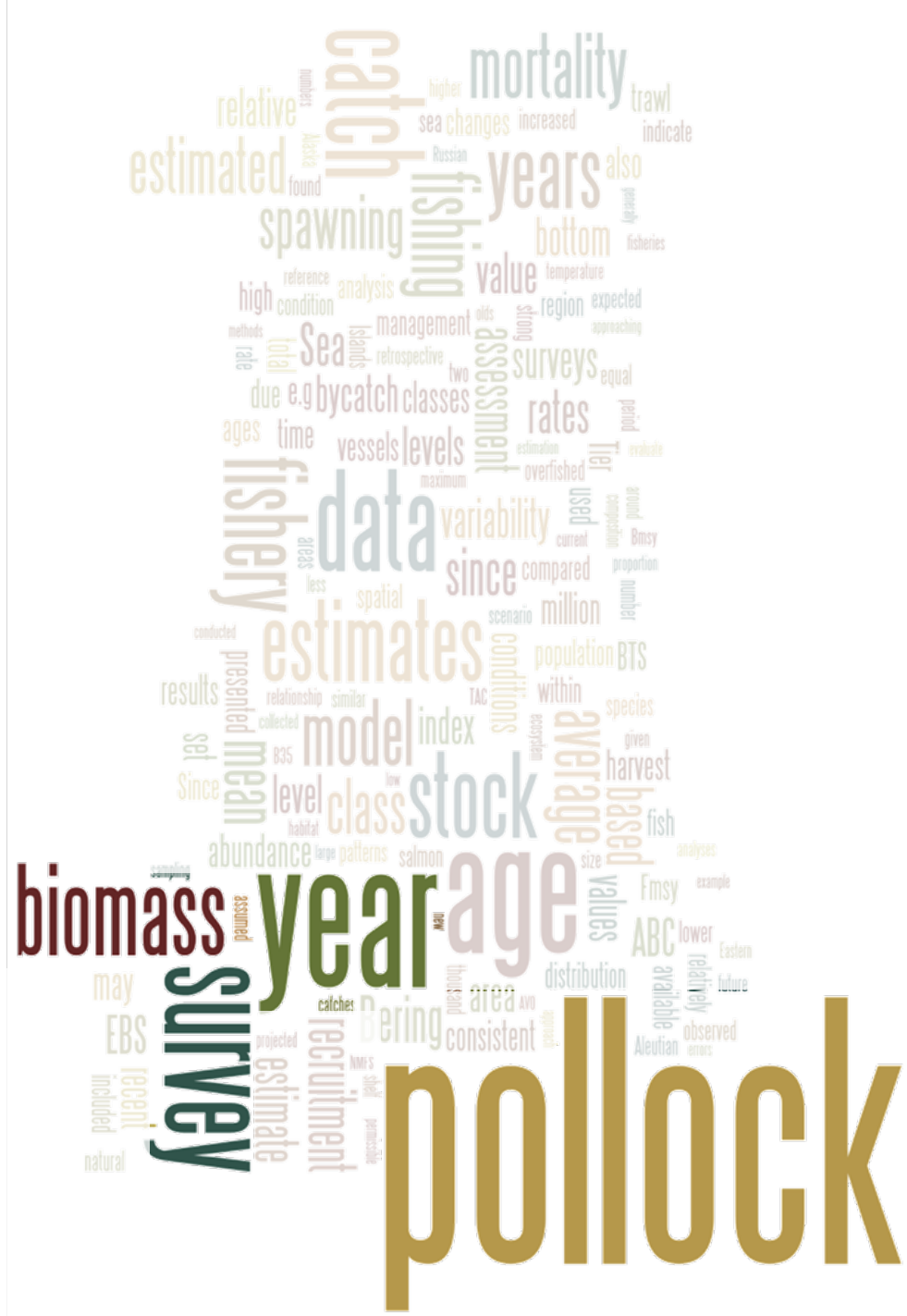
5-year olds

highest survey

abundance

on record

since 1987



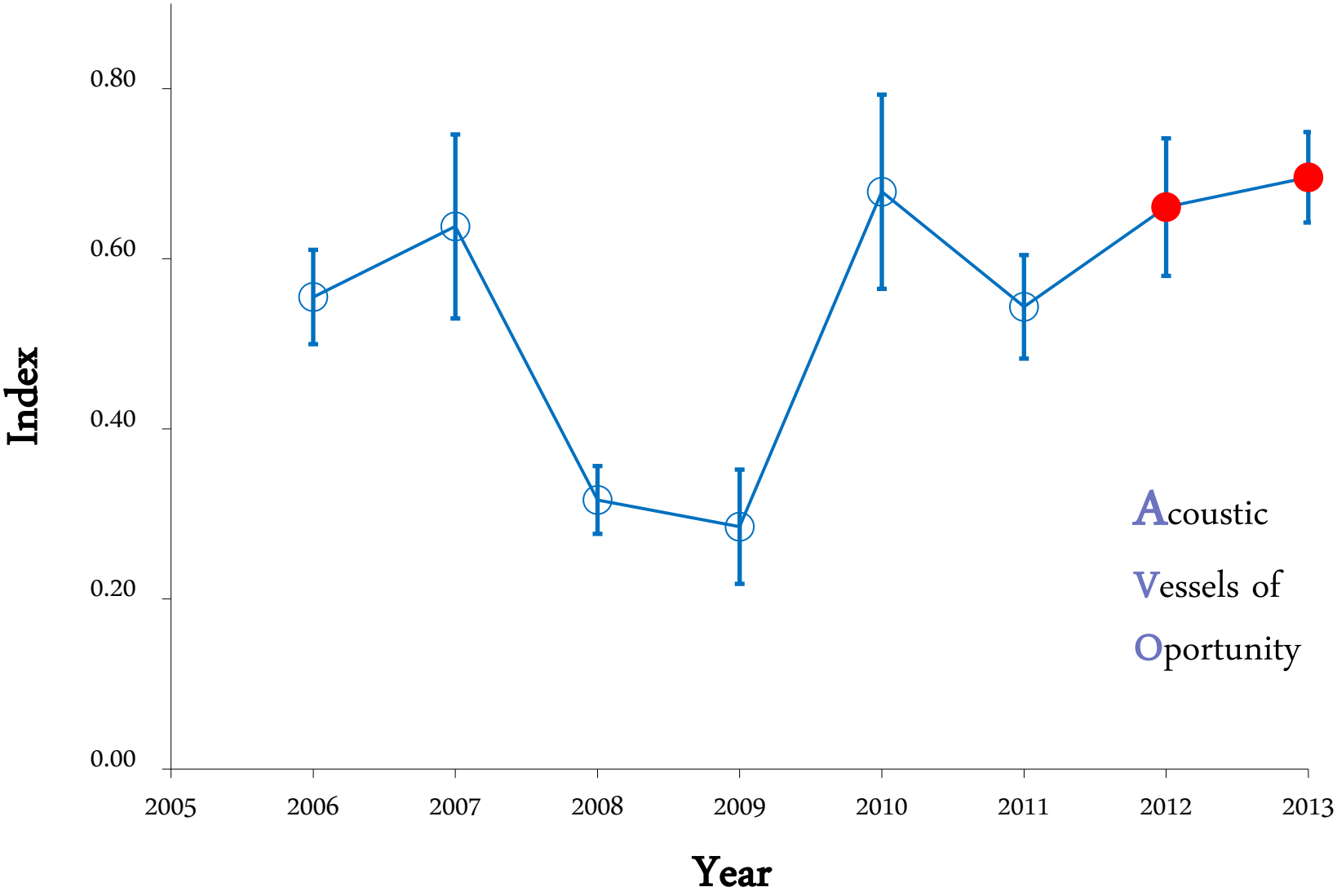
Acoustic

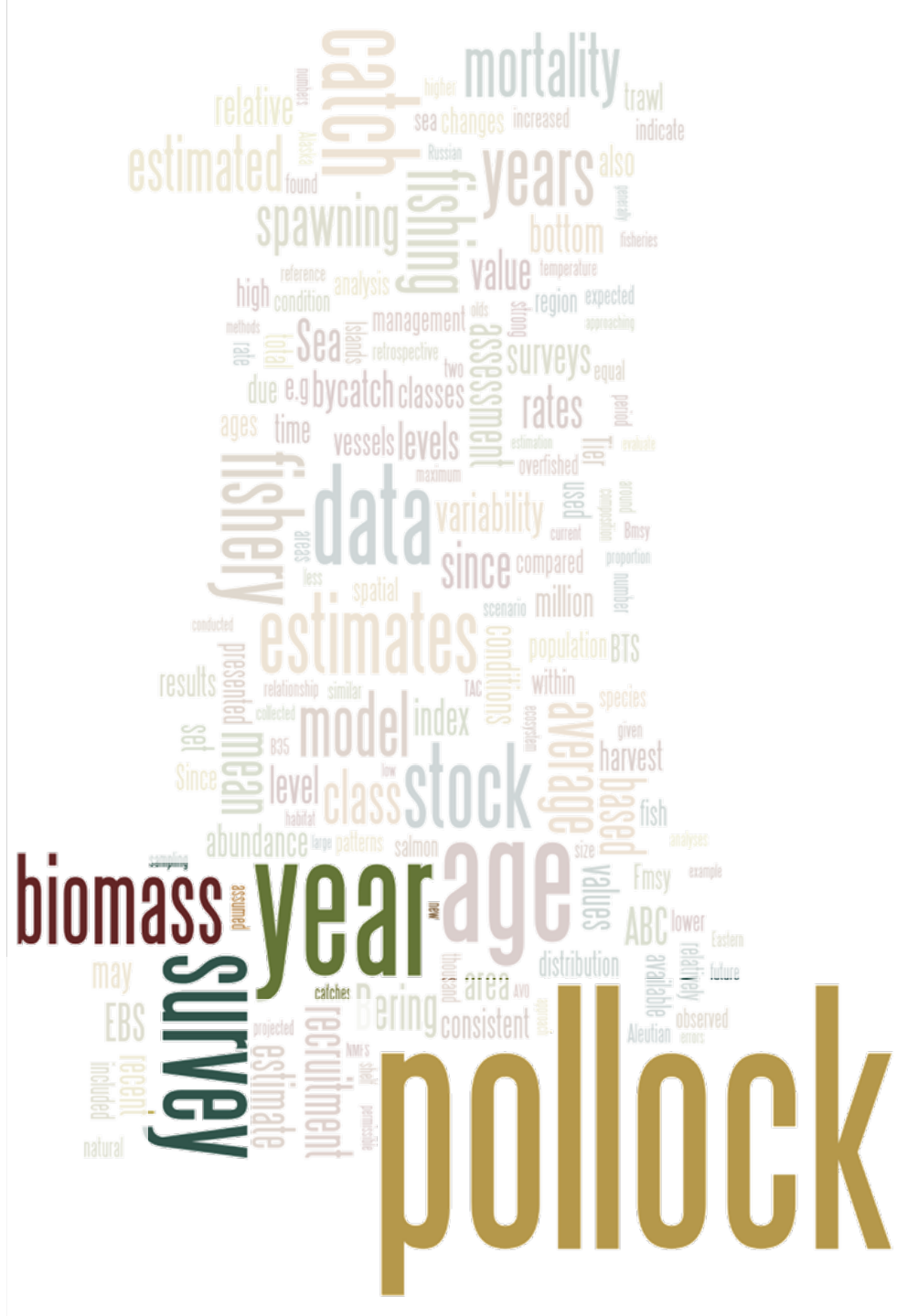
Vessels of

Oportunity

Mid-water acoustic survey

Opportunistic index updated for 2012 and 2013





Bottom trawl

Survey

Efficiency

Bottom trawl

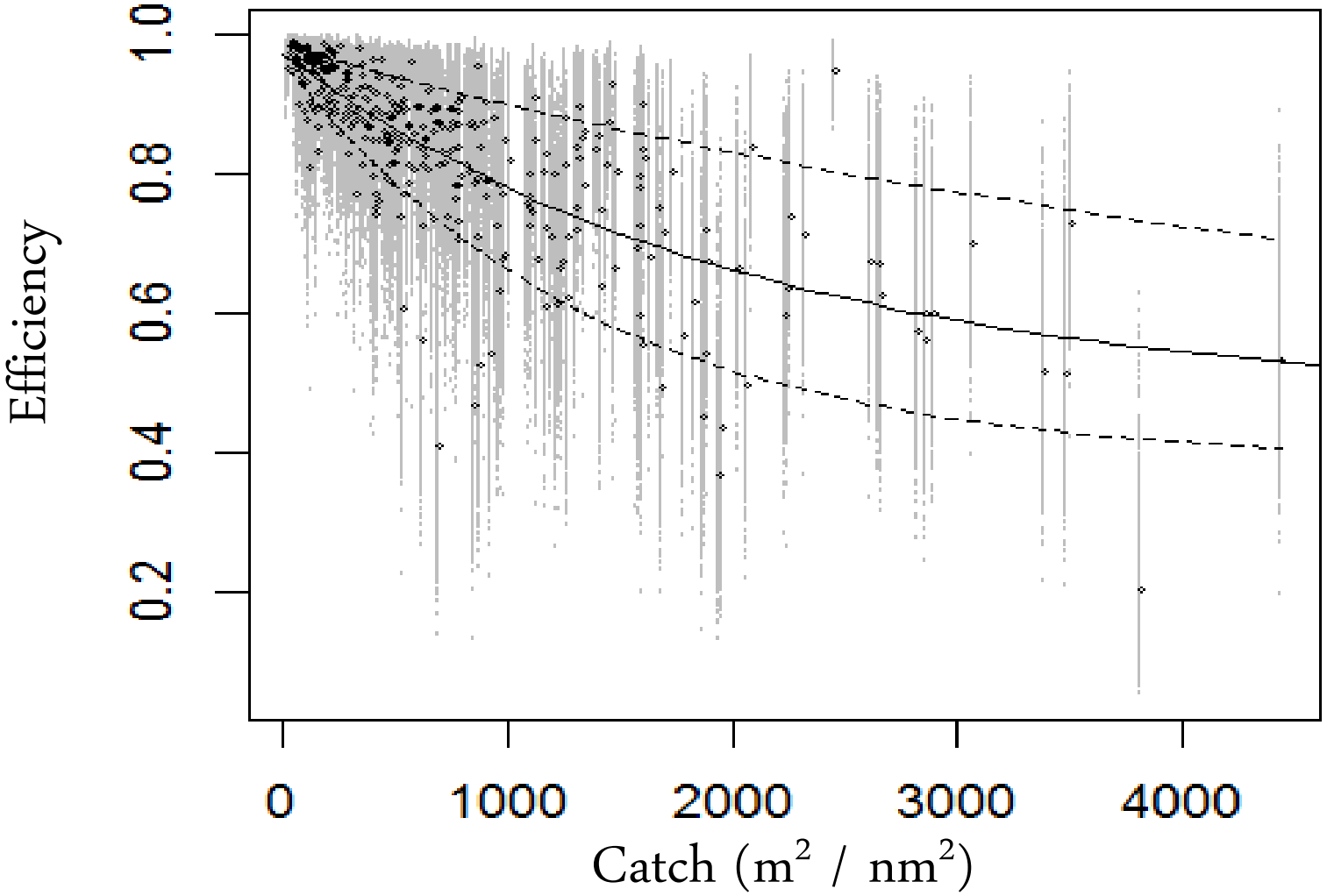
Survey

Efficiency

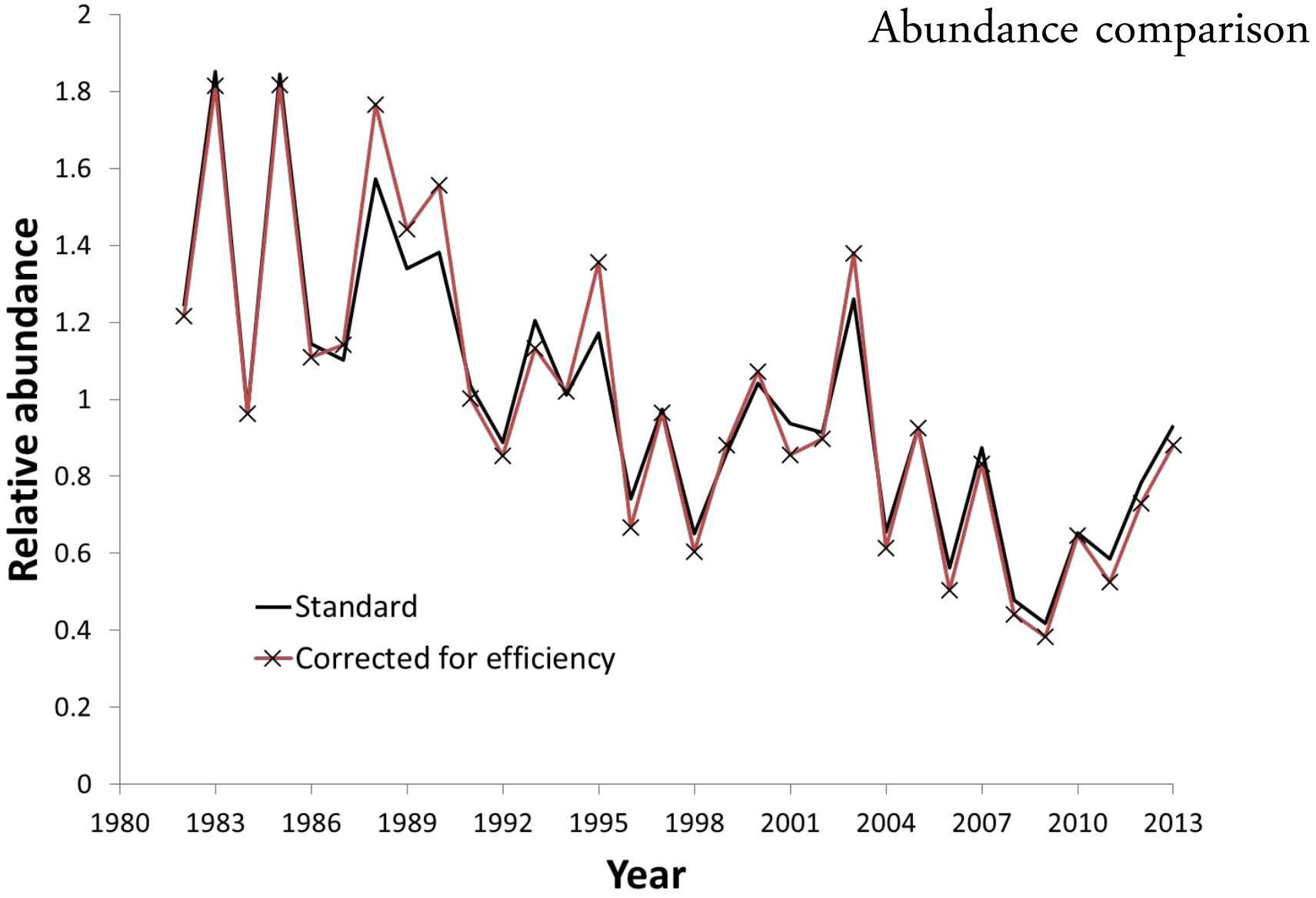
- Evaluation and formulation conducted by Stan Kotwicki

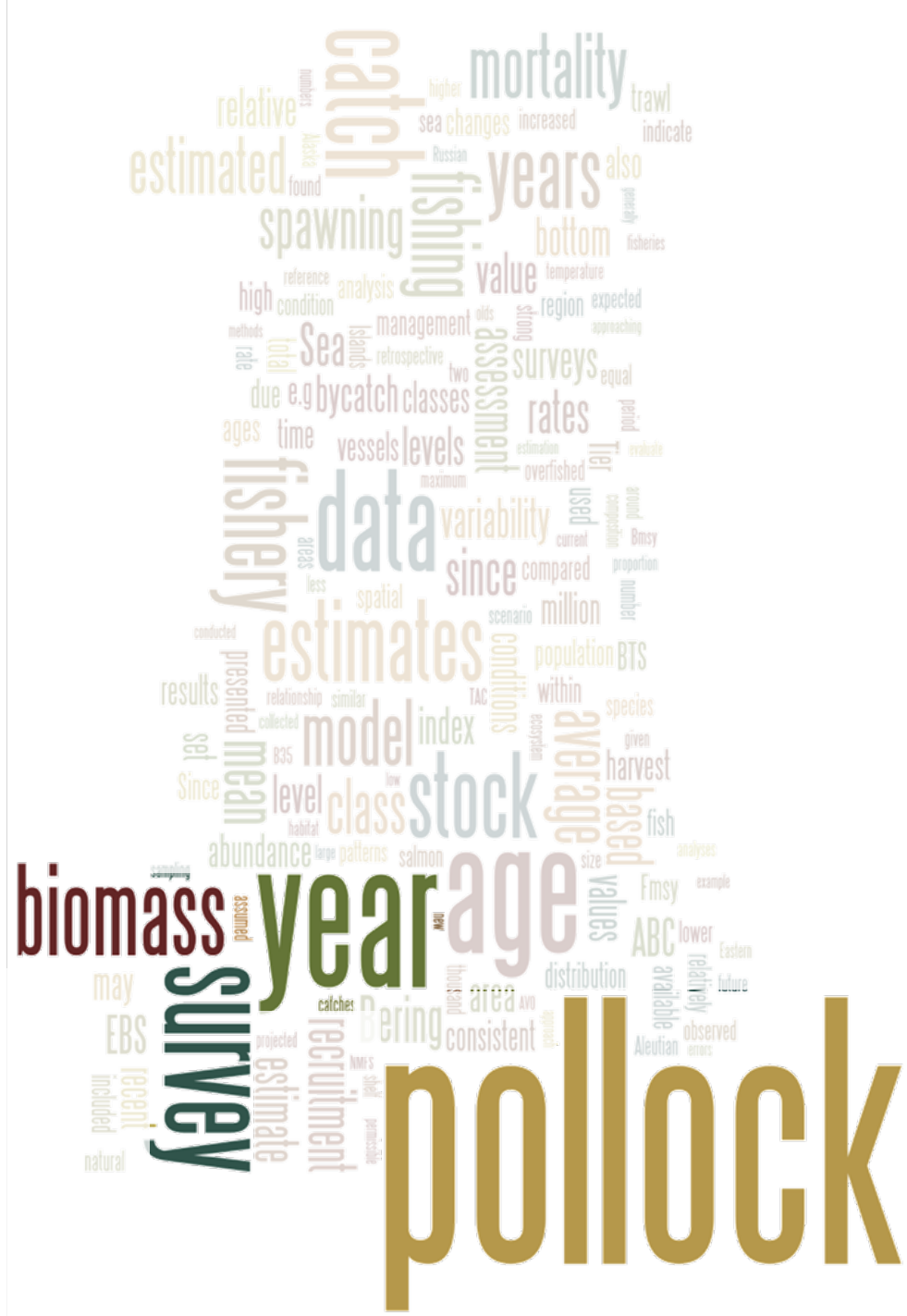
- Provides revised indices
  - With covariance matrices
  - Allows for an alternative approach to assessment model fitting

Survey bottom-trawl efficiency



Survey bottom-trawl efficiency





EBS pollock

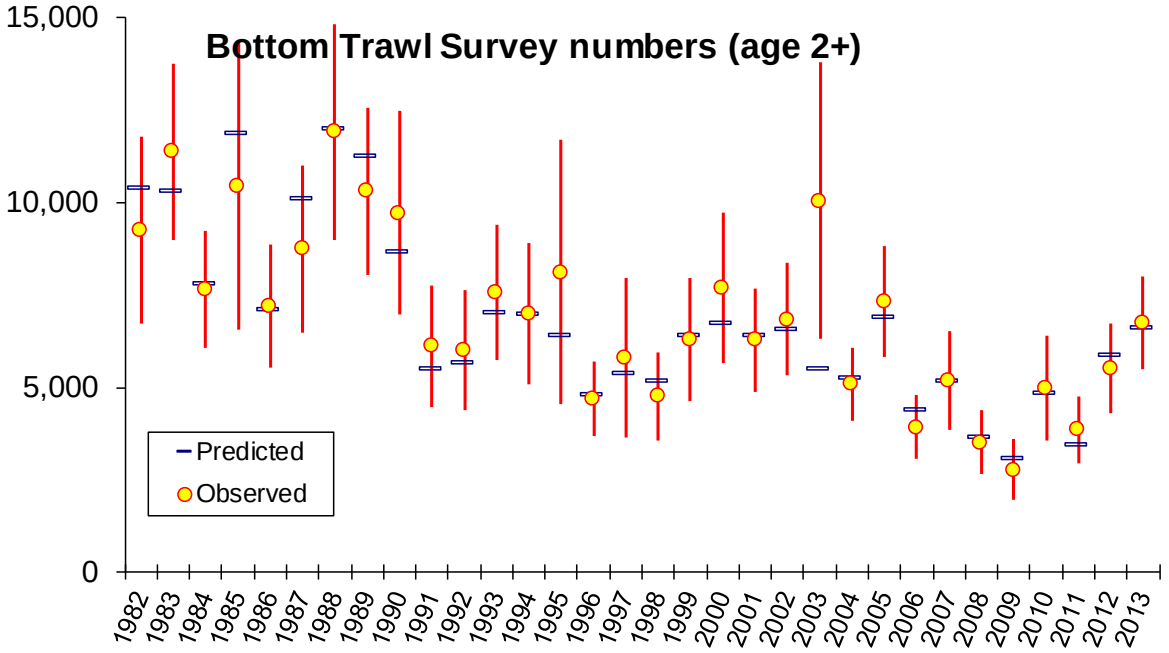
Assessment

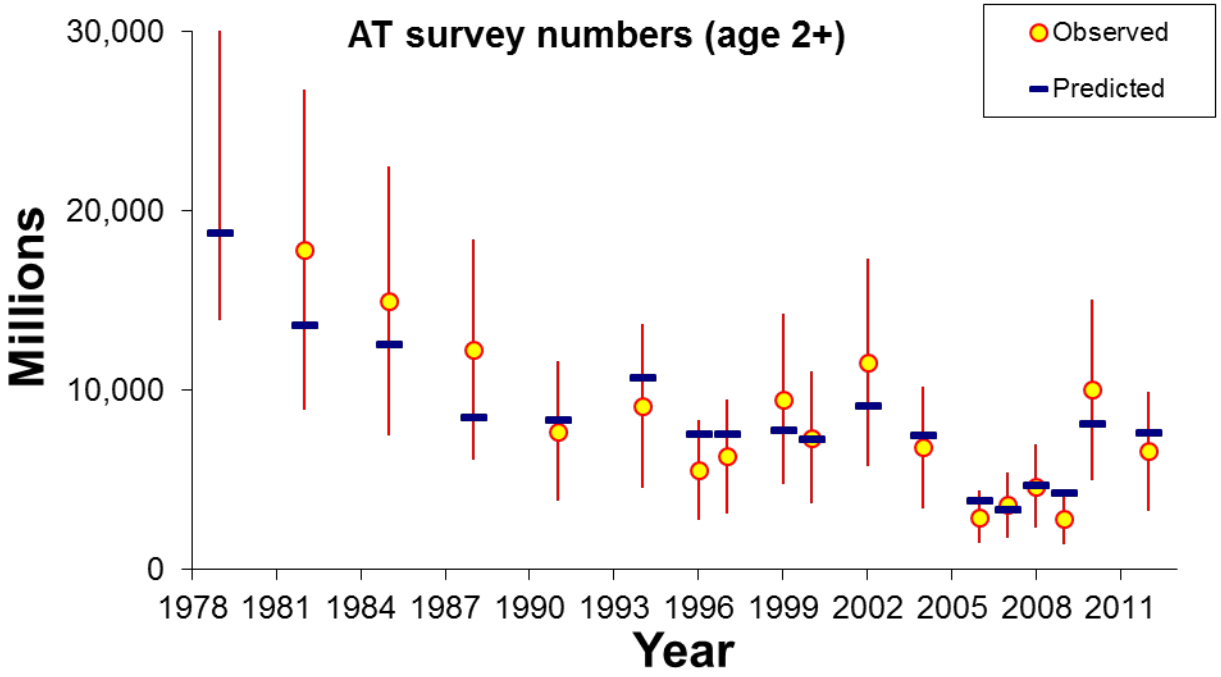
Results

EBS pollock

Assessment

Results





EBS pollock

Assessment

Results

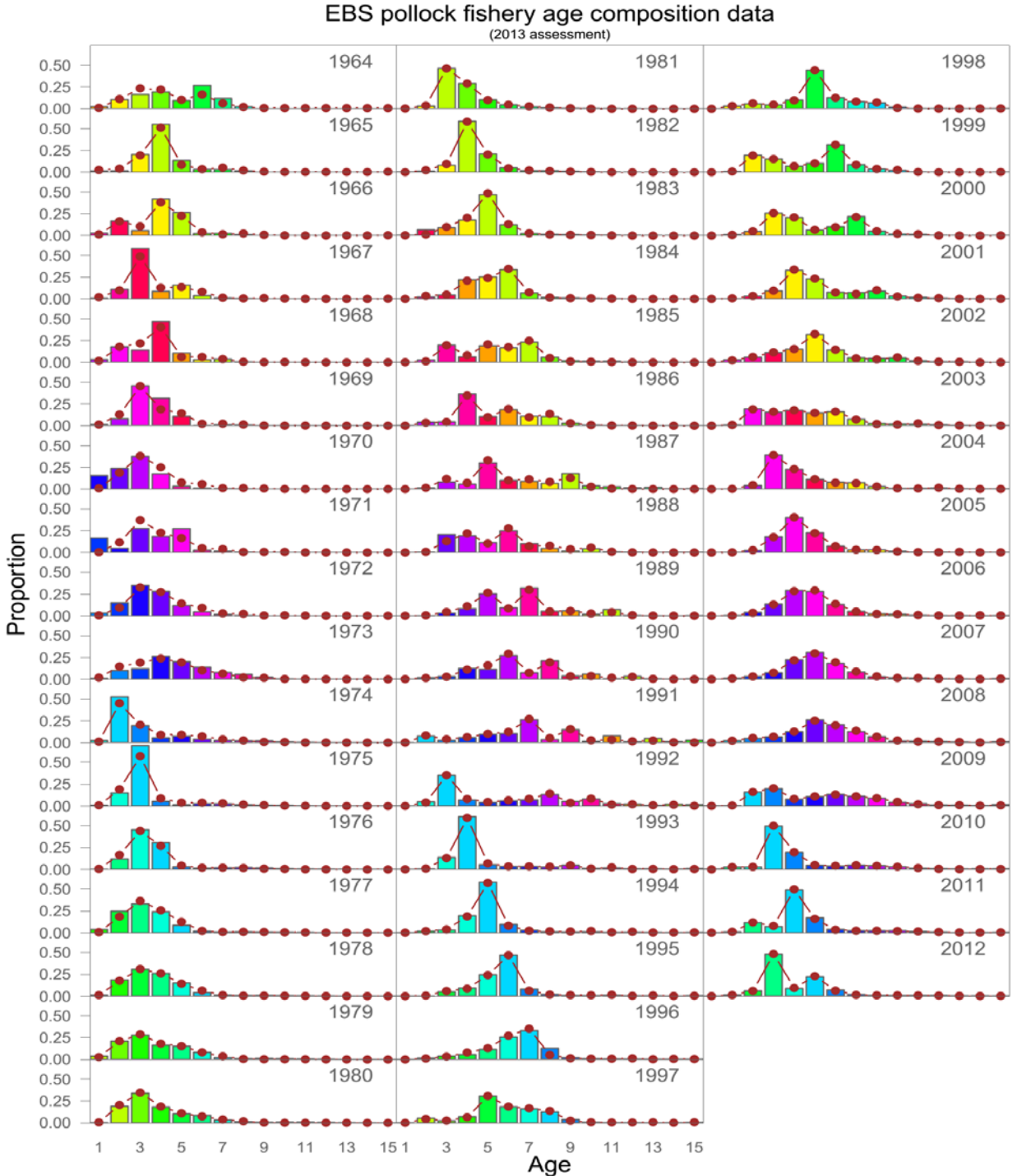
Bering Sea

pollock

fishery

age data and

fits



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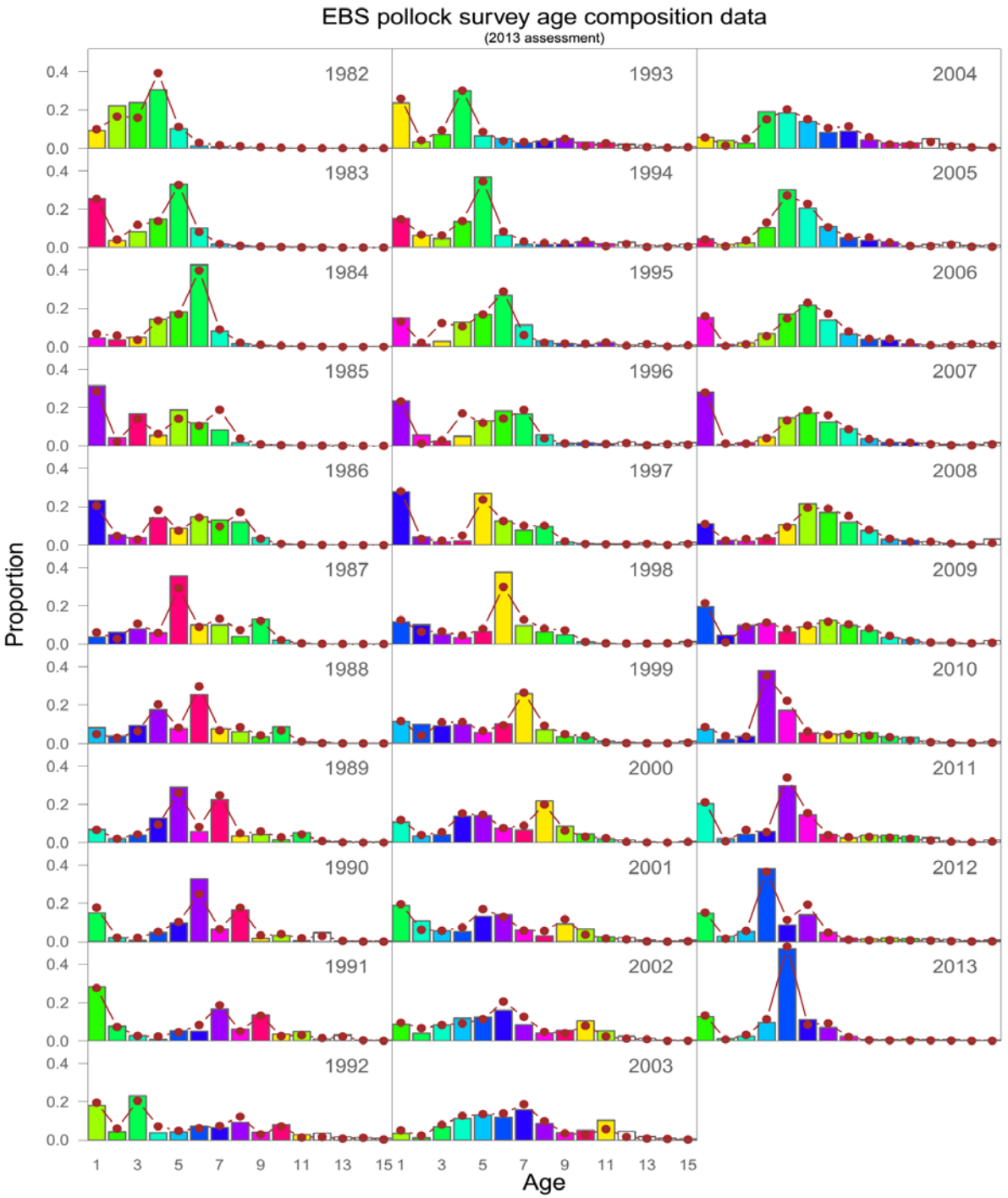


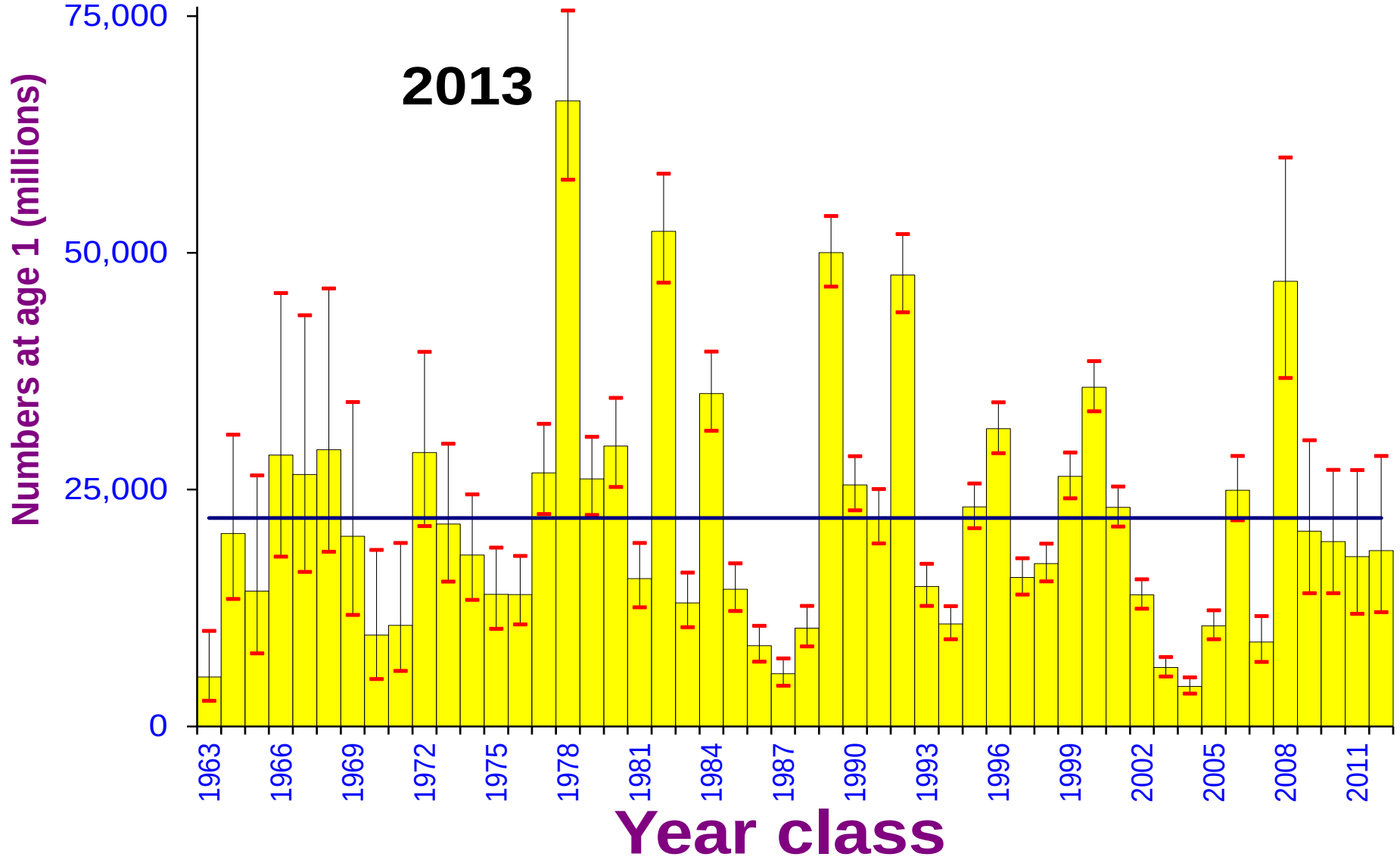
EBS pollock

Assessment

Results

EBS pollock

recruitment estimates

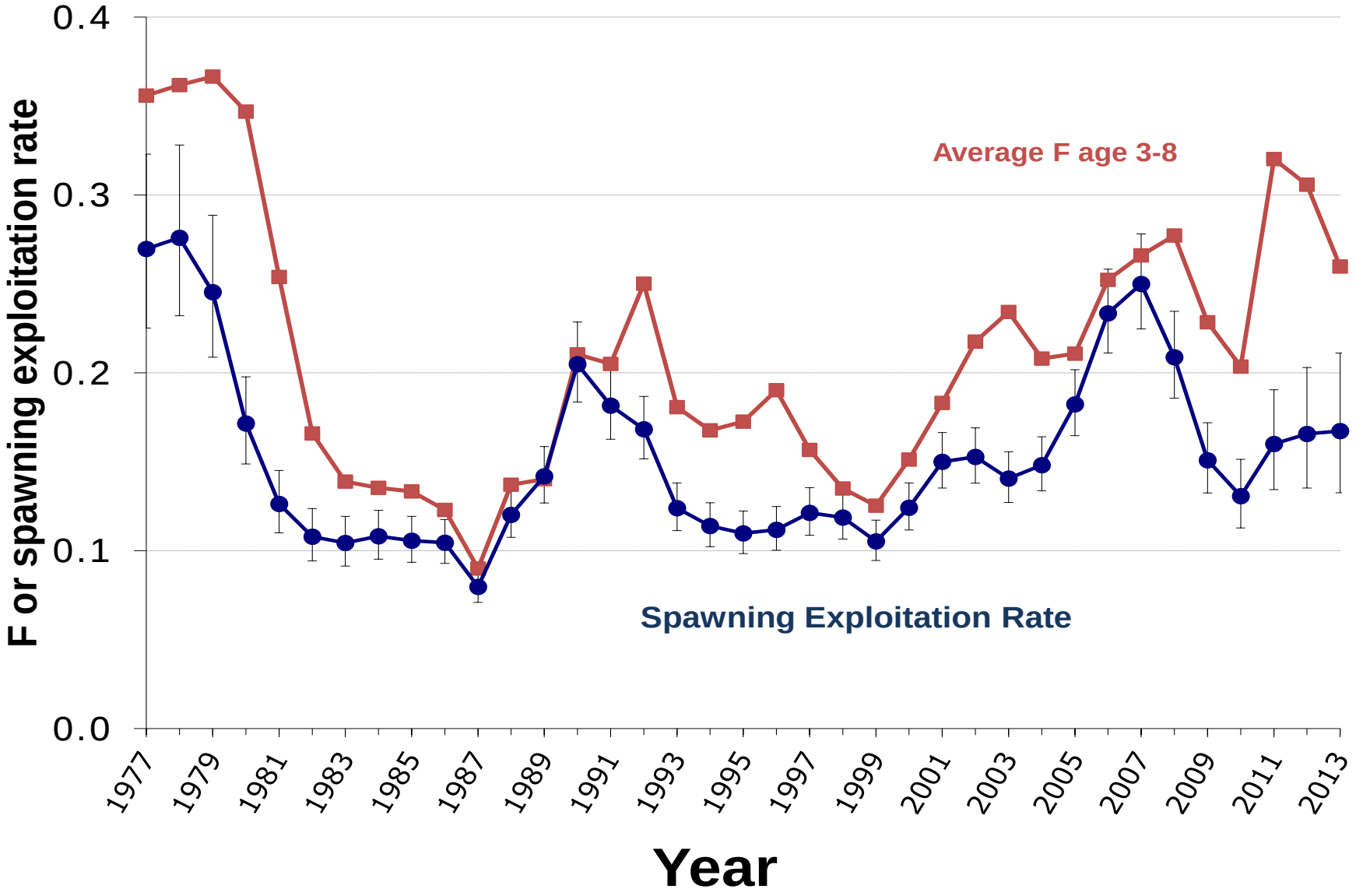


EBS pollock

Assessment

Results

Fishing mortality rates

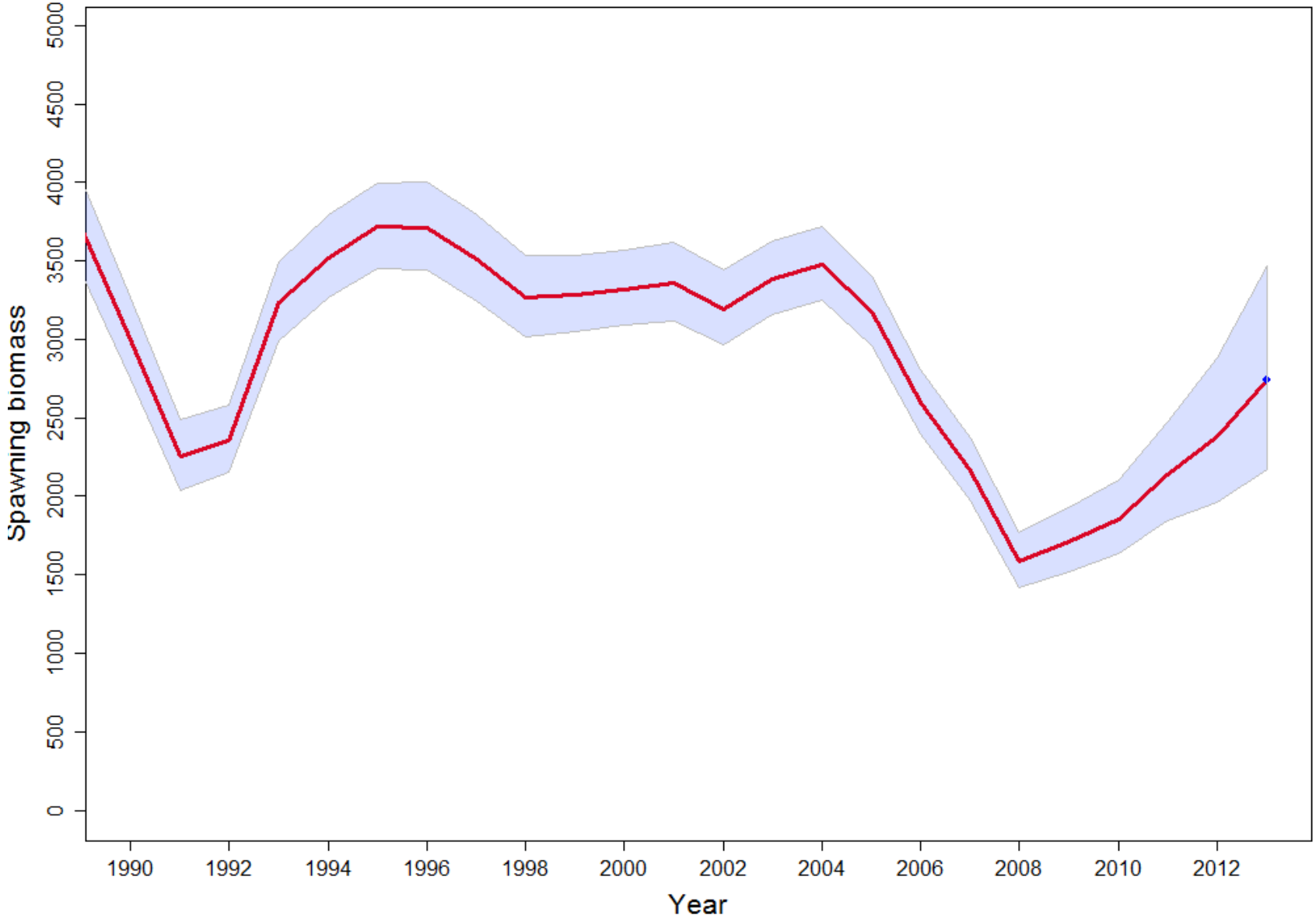


EBS pollock

Assessment

Results

Retrospective

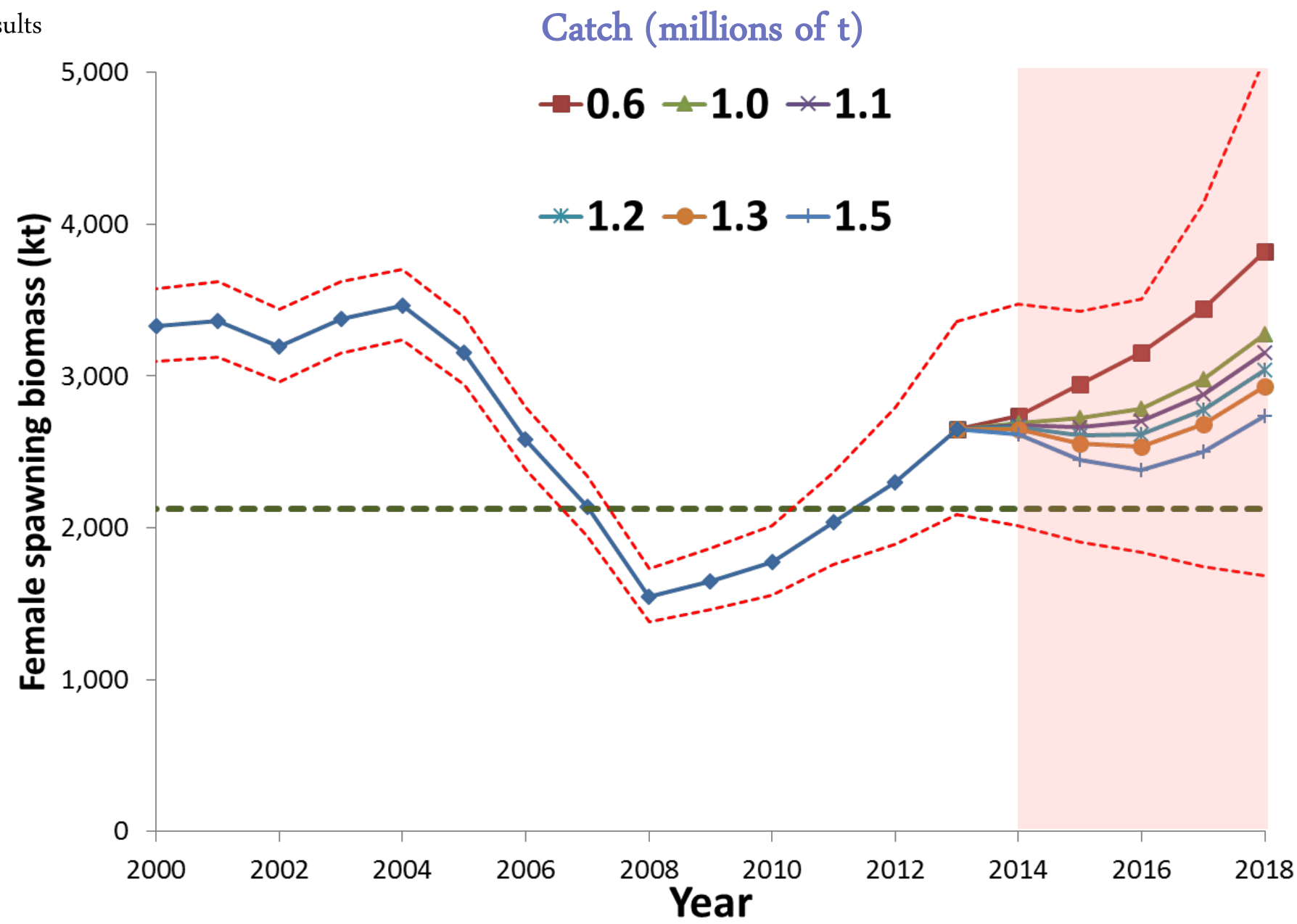


EBS pollock

Assessment

Results

Spawning biomass outlook

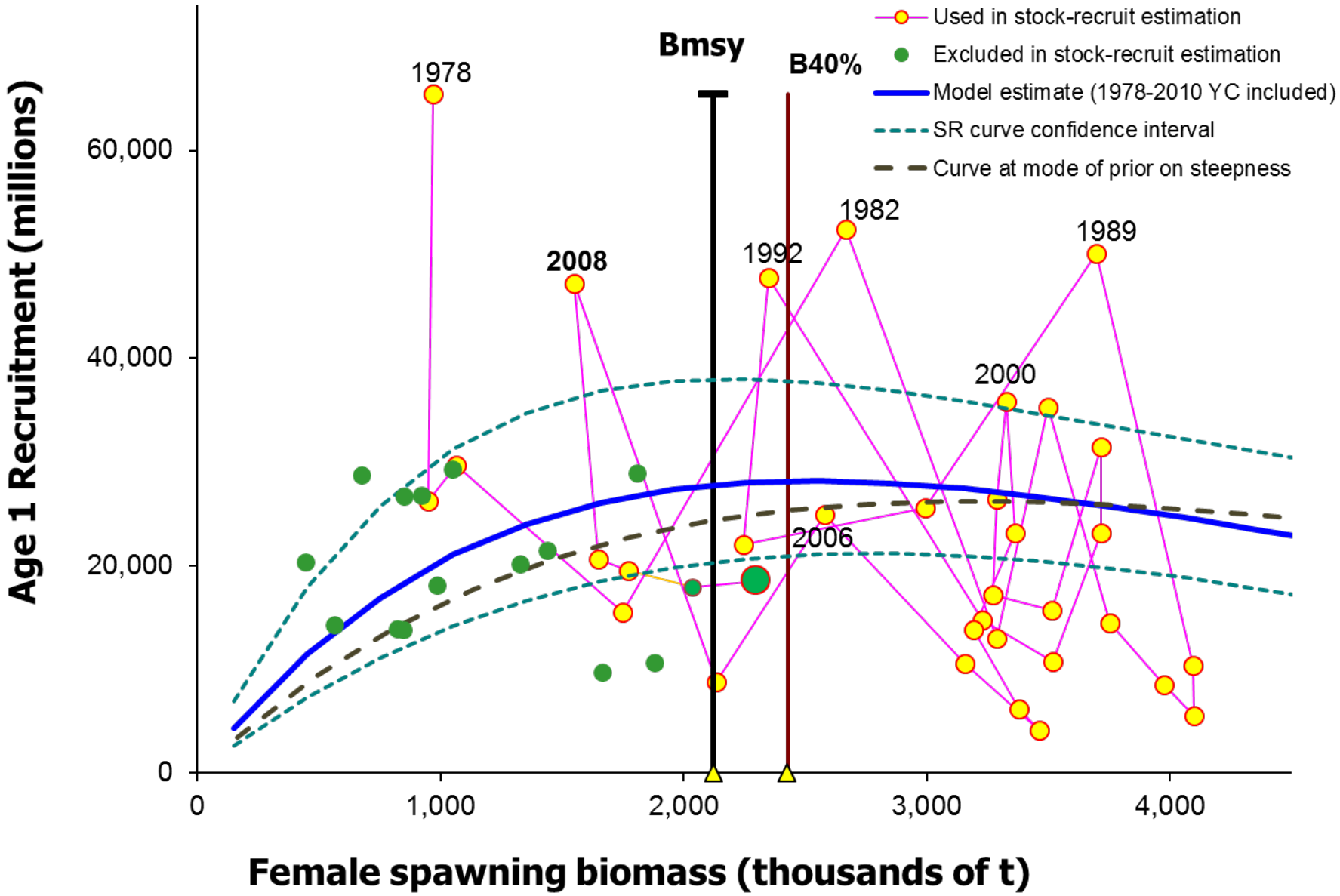


EBS pollock

Assessment

Results

2013 Stock recruitment

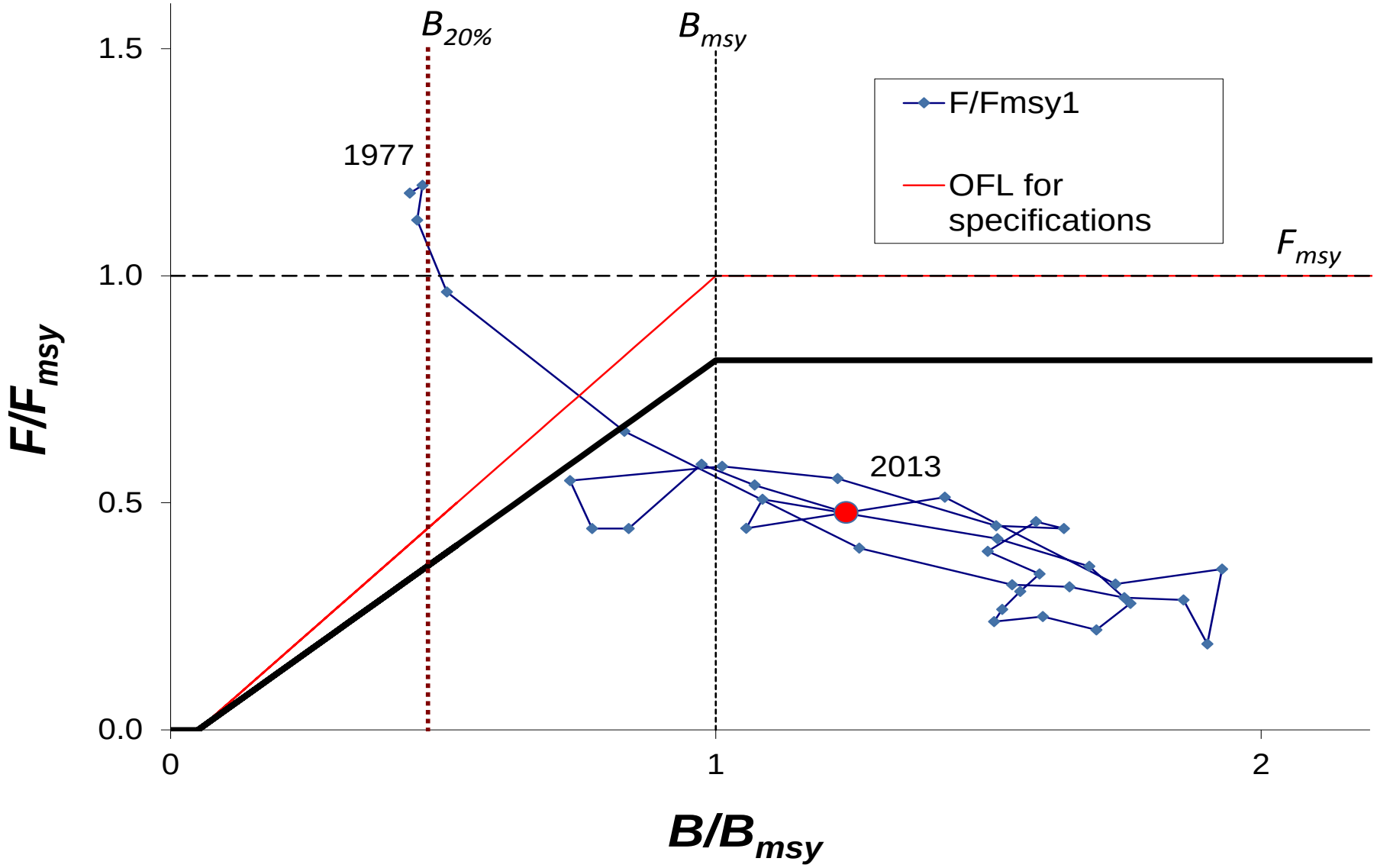


EBS pollock

Assessment

Results

Fishery snail-trail…



EBS pollock summary

- Outlook
  - Fishing mortality reduced
  - Survey age composition narrow, but high in 2013
  - Spawning biomass projected to decline if catch more than about 1.1 million t
  - Roe production poor
    - May be sign of lower reproductive output?

EBS walleye pollock, continued

- Beginning with the 2010 assessment, the Team and SSC have based ABC recommendations on the most recent 5-year average fishing mortality rate.
- This year, the authors' base their 2014 and 2015 ABC recommendations on the same strategy, giving values of 1.369 million t and 1.258 million t, respectively.
- The Team concurs with these recommendations, noting that this assessment is very much in line with projections made last year and noting also that the October government shutdown limited opportunities for analysis of alternative harvest strategies.

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EBS walleye pollock, concluded

Area	Year	Biomass	OFL	ABC	TAC	Catch
Eastern Bering Sea	2012	8,340,000	2,470,000	1,220,000	1,200,000	1,205,258
	2013	8,140,000	2,550,000	1,375,000	1,247,000	1,267,963
	2014	8,045,000	2,795,000	1,369,000	n/a	n/a
	2015	7,778,000	2,693,000	1,258,000	n/a	n/a

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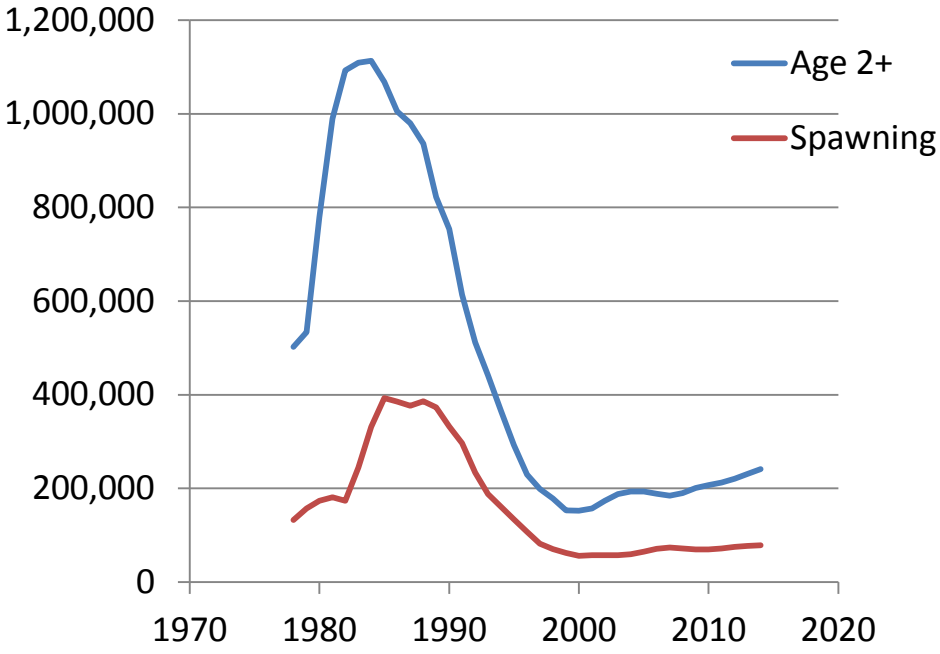
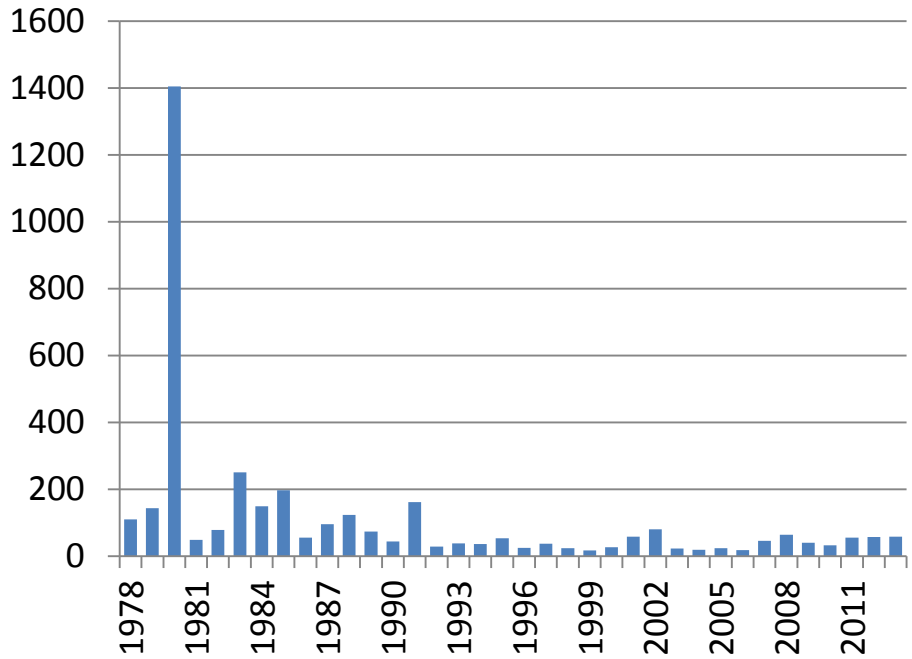
AI walleye pollock

Biomass (t)



Recruitment



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AI walleye pollock, concluded

Area	Year	Biomass	OFL	ABC	TAC	Catch
Aleutian Islands	2012	251,000	39,600	32,500	19,000	975
	2013	266,000	45,600	37,300	19,000	2,964
	2014	259,525	42,811	35,048	n/a	n/a
	2015	289,307	47,713	39,412	n/a	n/a

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Pacific cod

•There is a major change in the Pacific cod assessment this year. Previously an analytical assessment was done for cod in the eastern Bering Sea (EBS), and the abundance estimate from that assessment was extrapolated to the Aleutian Islands (AI) region on the basis of survey estimates of relative abundance.

•This year, in anticipation of separate regional specifications of OFL and ABC by the SSC, separate assessments were done for the EBS and AI regions. The assessment author and the Team recommend a Tier 3 assessment for the EBS and a Tier 5 assessment for the Aleutians.

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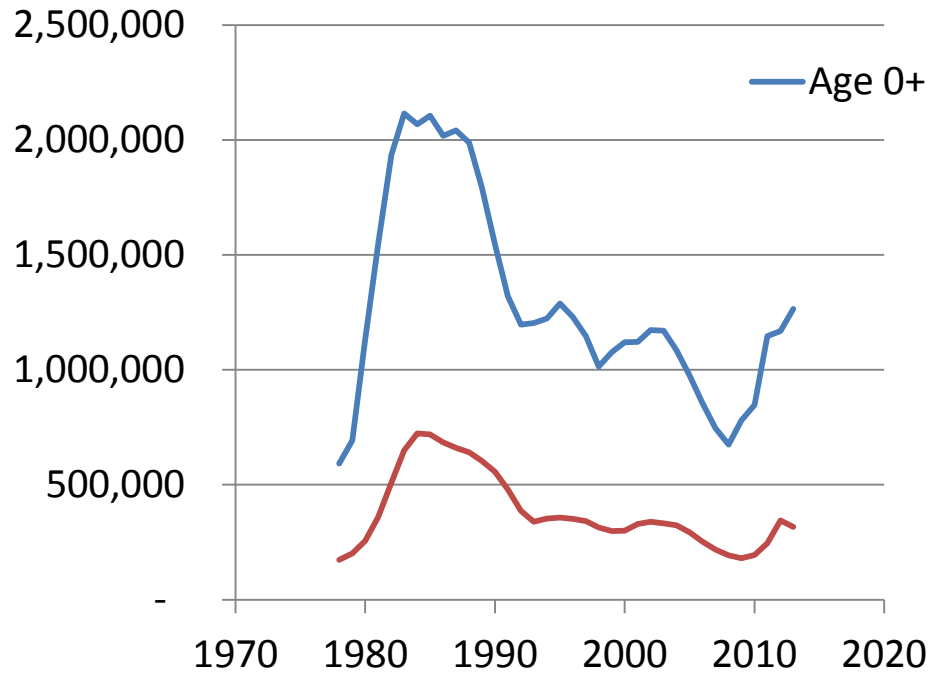
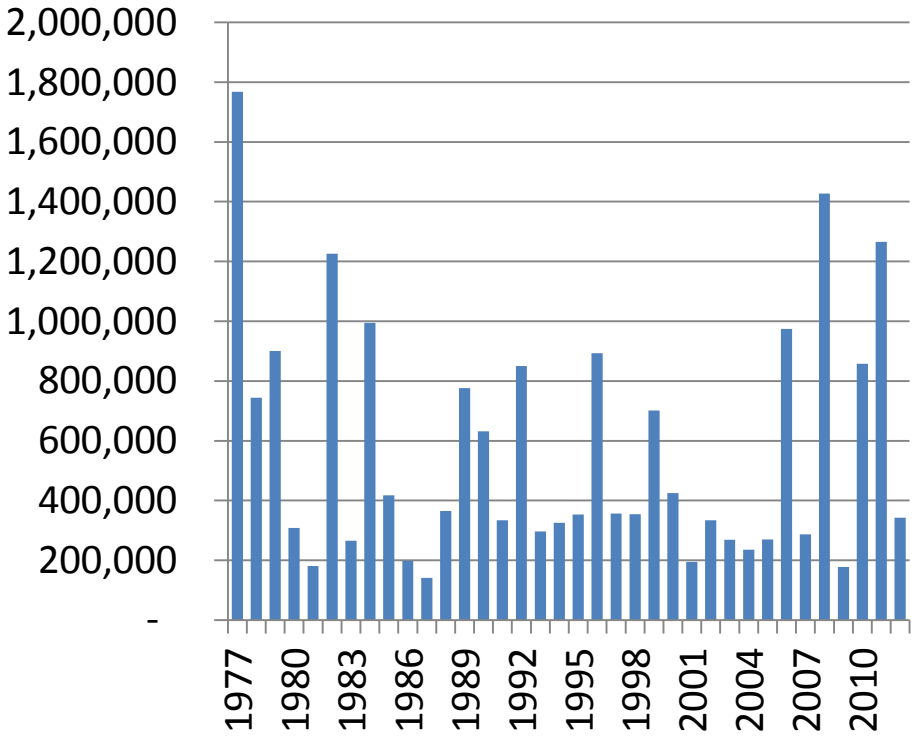
EBS Pacific cod

Biomass (t)



Recruitment



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EBS Pacific cod, continued

- Model changes/alternatives:
  - This year's assessment is a rerun of last year's accepted model (Model 1, the same as the 2011 accepted model) with updated data files.
  - The 2006, 2008, and 2010 year classes appear to be strong, and spawning abundance is expected to increase in the near term.
- The Team also repeated its previous recommendation that studies of the vertical distribution of Pacific cod continue in order to test the previous finding that the average product of survey catchability and selectivity across the 60-81 cm size range is 0.47 (based on vertical distribution from archival tags).

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EBS Pacific cod, concluded

Area	Year	Age 3+ biomass	OFL	ABC	TAC*	Catch
BS/AI	2012	1,620,000	369,000	314,000	275,000	245,823
	2013	1,510,000	359,000	307,000	260,000	221,396
EBS	2014	1,550,000	299,000	255,000	n/a	n/a
	2015	1,600,000	319,000	272,000	n/a	n/a

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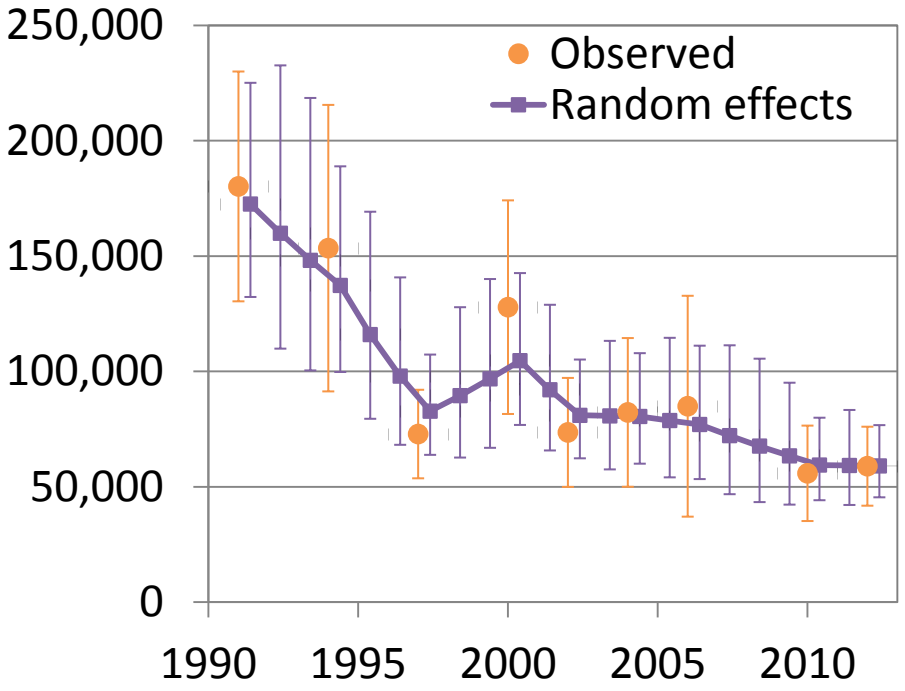
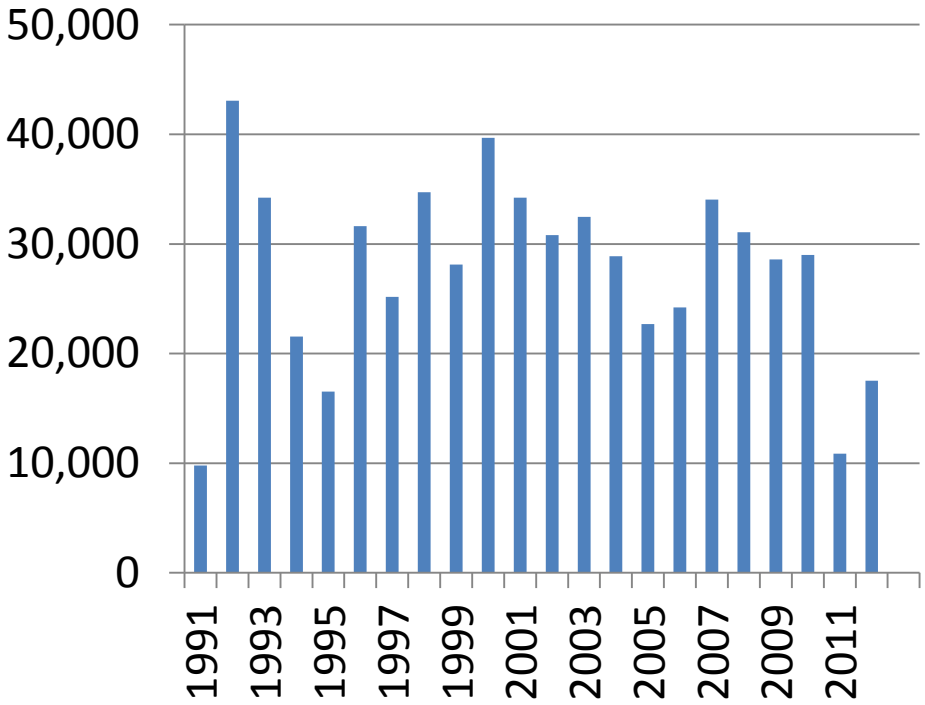
AI Pacific cod

Survey biomass (t)



Catch



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AI Pacific cod, continued

- Model changes/alternatives:
  - The Team concluded that neither of the age-structured models performed credibly. For the time being, the author and the Team recommend a Tier 5 approach, specifically the random effects model.
  - Assuming a natural mortality rate of 0.34 (as in the EBS assessment), this results in 2014 and 2015 maximum permissible ABCs of 15,100 t, which are the Team's recommended ABC values.
  - Work on a Tier 3 assessment is anticipated to continue.

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AI Pacific cod, concluded

Area	Year	Age 3+ biomass	OFL	ABC	TAC*	Catch
BS/AI	2012	1,620,000	369,000	314,000	275,000	245,823
	2013	1,510,000	359,000	307,000	260,000	221,396
AI	2014	59,000**	20,100	15,100	n/a	n/a
	2015	59,000**	20,100	15,100	n/a	n/a

**Biomass shown for AI cod is survey biomass (Tier 5) not Age 3+ biomass.

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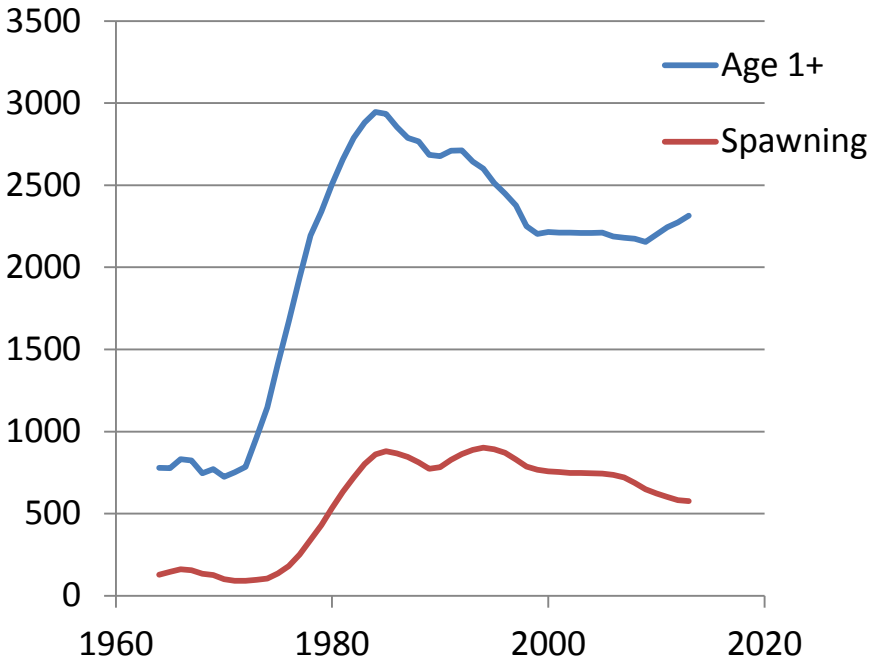
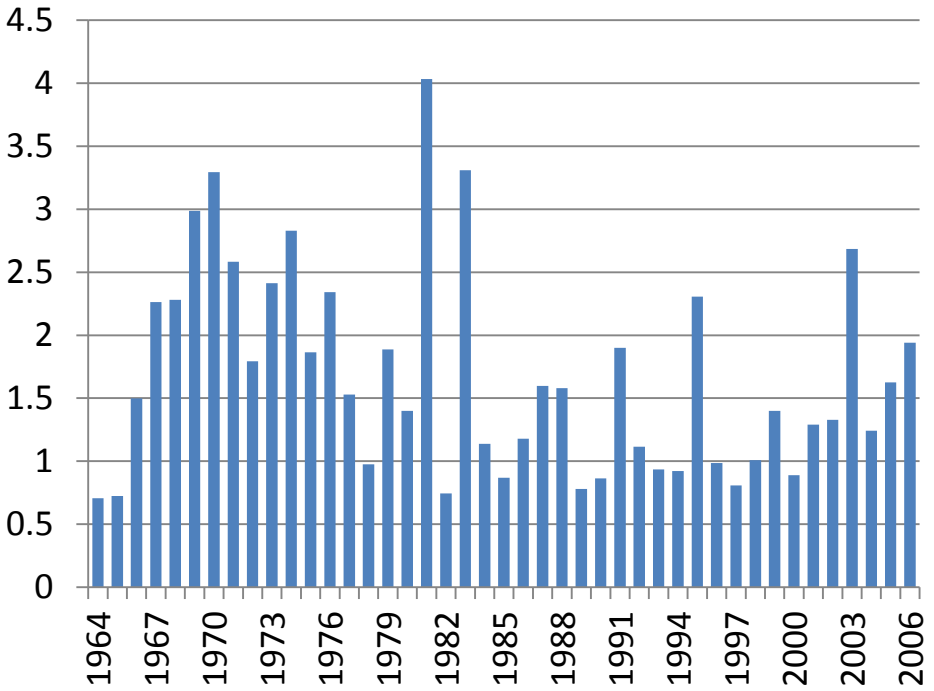
Yellowfin sole

Biomass (thousands mt)



Recruitment



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Yellowfin sole, concluded

Area	Year	Age 6+ Biomass	OFL	ABC	TAC	Catch
BSAI	2012	1,950,000	222,000	203,000	202,000	147,186
	2013	1,960,000	220,000	206,000	198,000	156,302
	2014	2,113,000	259,700	239,800	n/a	n/a
	2015	2,188,000	268,900	248,300	n/a	n/a

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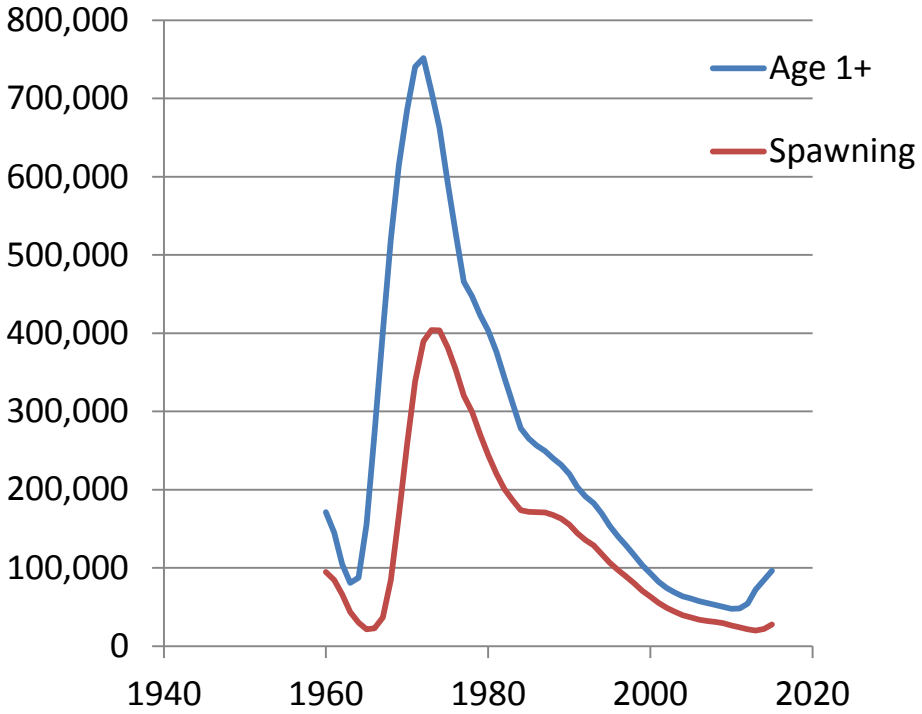
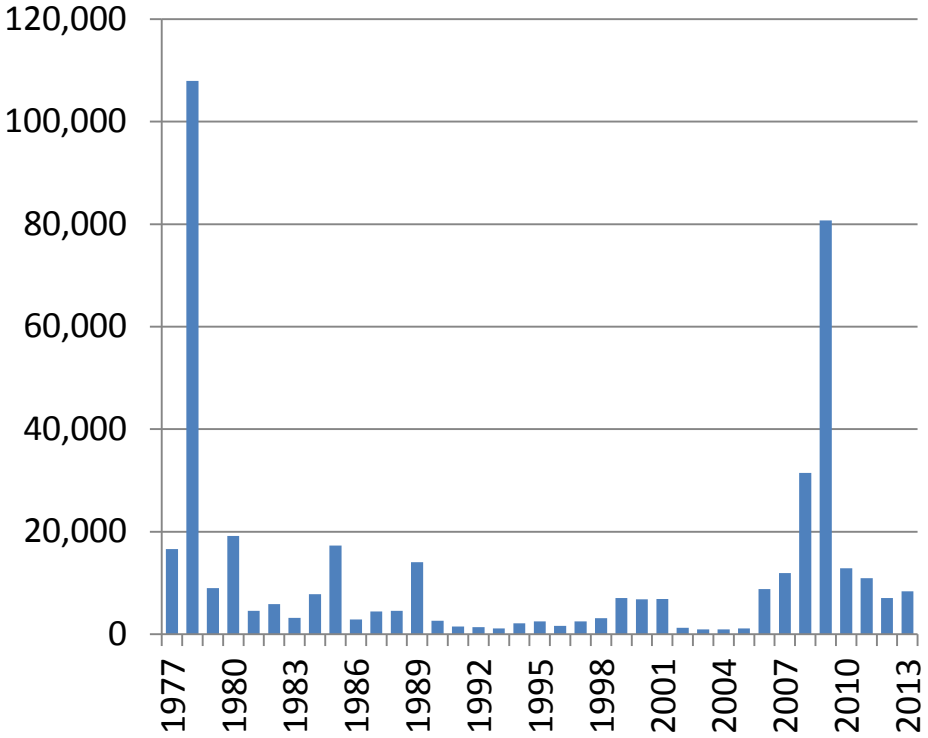
Greenland turbot

Biomass (t)



Recruitment



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Greenland turbot, concluded

Area	Year	Age 1+ Biomass	OFL	ABC	TAC	Catch
BSAI	2012	76,900	11,700	9,660	8,660	4,720
	2013	81,000	2,540	2,060	2,060	1,747
	2014	84,546	2,647	2,124	n/a	n/a
	2015	96,298	3,864	3,173	n/a	n/a

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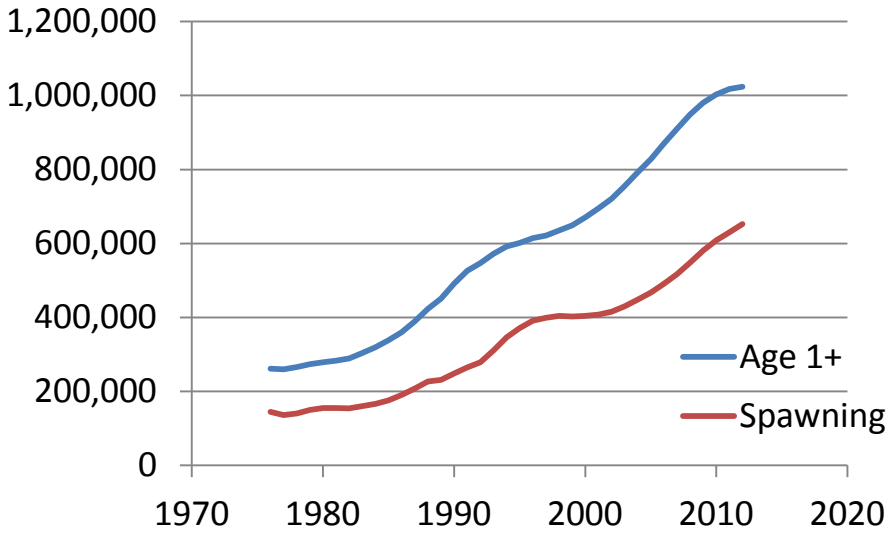
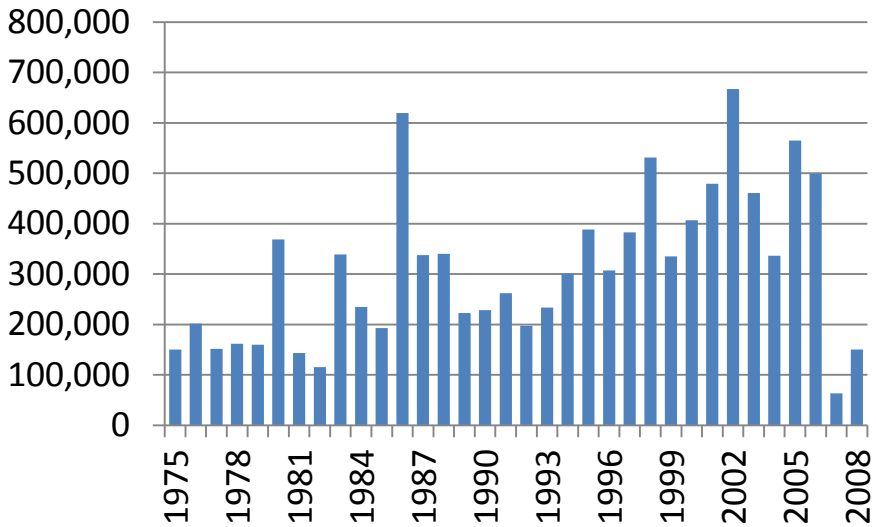
Arrowtooth flounder

Biomass (t)



Recruitment



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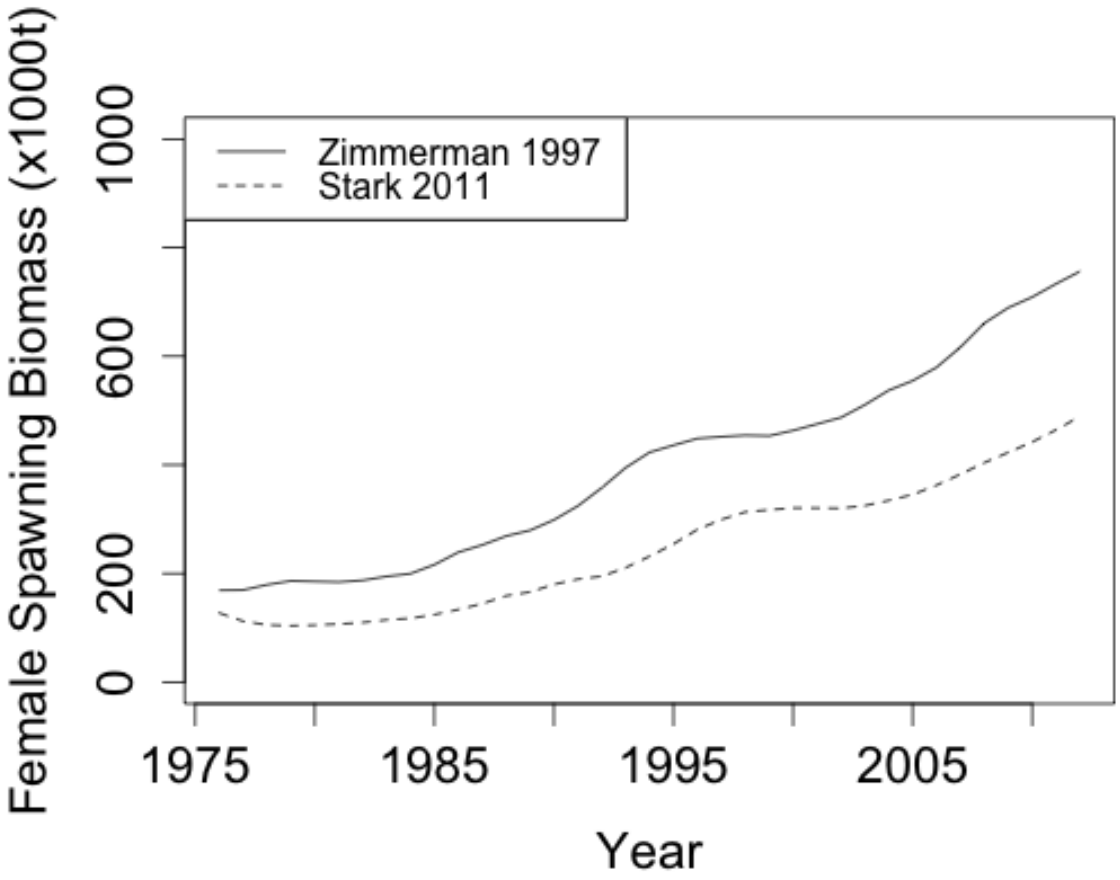
Arrowtooth flounder, continued

- Effect of new maturity curve on spawning biomass



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Arrowtooth flounder, concluded

Area	Year	Age 1+ Bio	OFL	ABC	TAC	Catch
BSAI	2012	1,130,000	181,000	150,000	25,000	22,714
	2013	1,130,000	186,000	152,000	25,000	20,158
	2014	1,023,440	125,642	106,599	n/a	n/a
	2015	995,494	125,025	106,089	n/a	n/a

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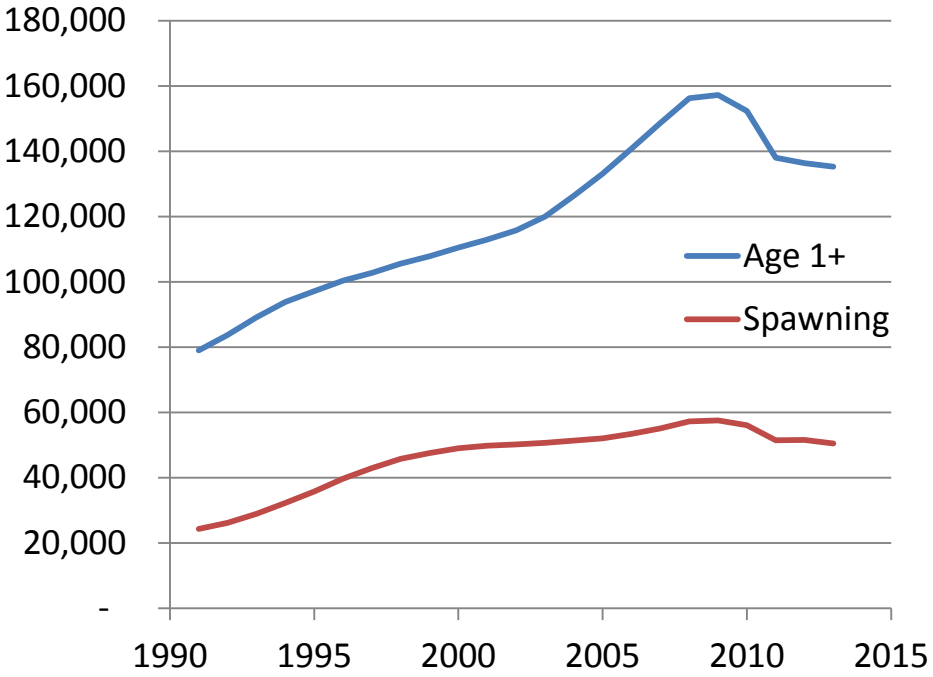
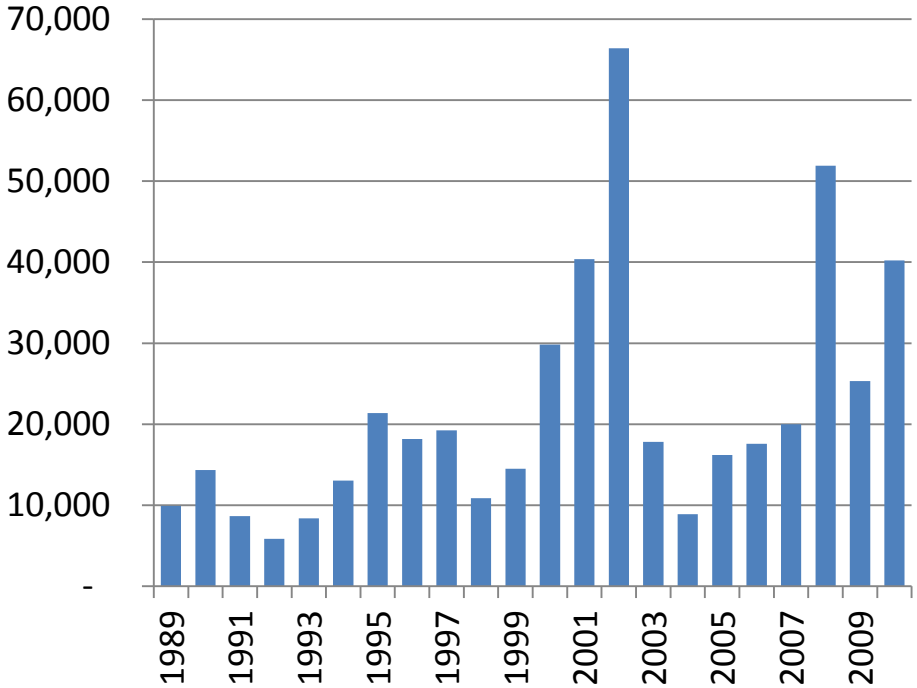
Kamchatka flounder

Biomass (t)



Recruitment



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Kamchatka flounder, continued

- Model changes/alternatives:
  - In 2011 and 2012, this stock was managed under Tier 5. An age-structured model was presented to the Team and SSC in September and October of 2012. The SSC did not accept the model, and recommended a large number of further evaluations. For 2013, the stock continued to be managed under Tier 5.
  - The authors responded to the SSC's October 2013 recommendations in a preliminary assessment presented to the Team and SSC in September and October of this year. For this year's final assessment, the projection model was run, based on parameters and numbers at age from the age-structured model presented in the preliminary assessment.

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Kamchatka flounder, concluded

Area	Year	Age 1+ Bio	OFL	ABC	TAC	Catch
BSAI	2012	125,000	24,800	18,600	17,700	9,668
	2013	125,000	16,300	12,200	10,000	7,794
	2014	136,600	8,270	7,100	n/a	n/a
	2015	138,700	8,500	7,300	n/a	n/a

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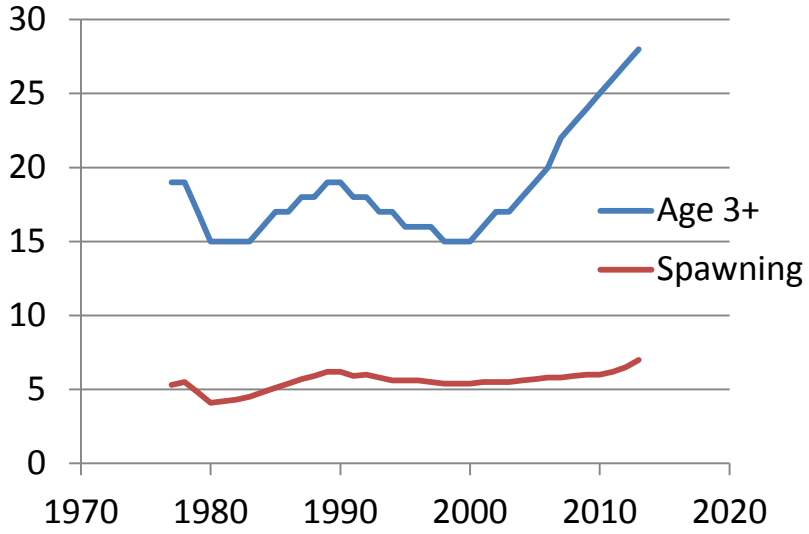
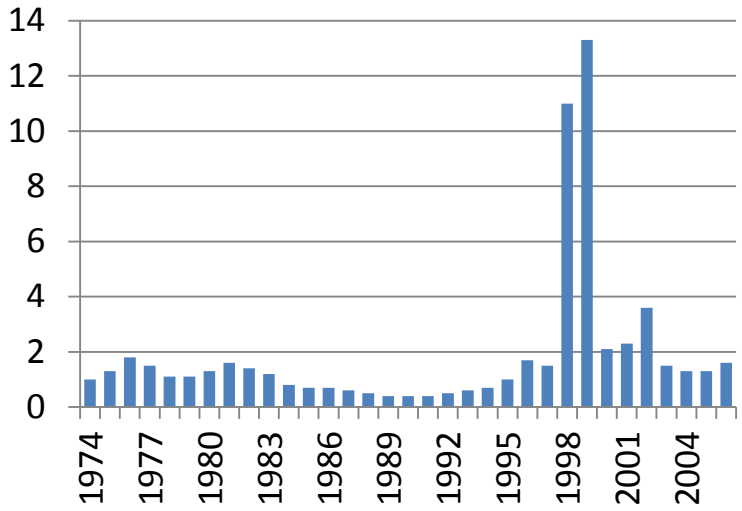
Blackspotted and rougheye rockfish

Biomass (thousands t)



Recruitment



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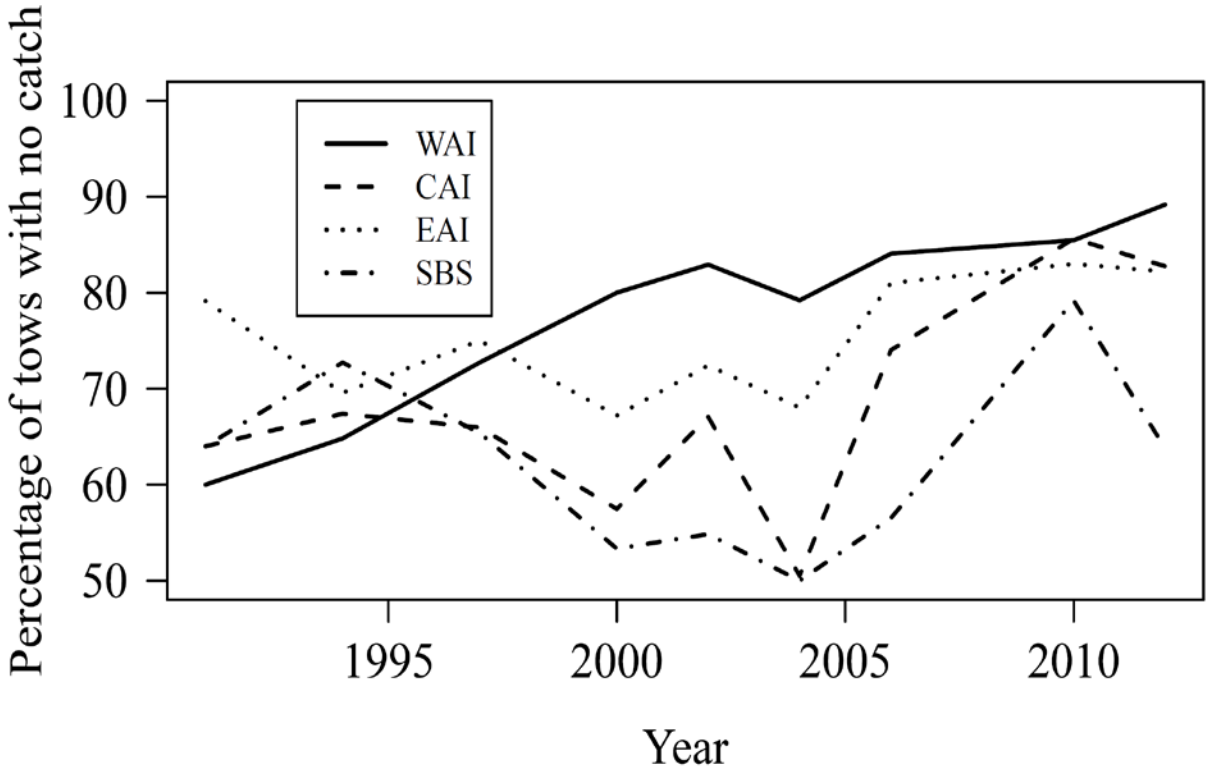
Percentage of survey tows in which blackspotted/rougheye rockfish were *not* caught

(i.e., the "skunk" index)



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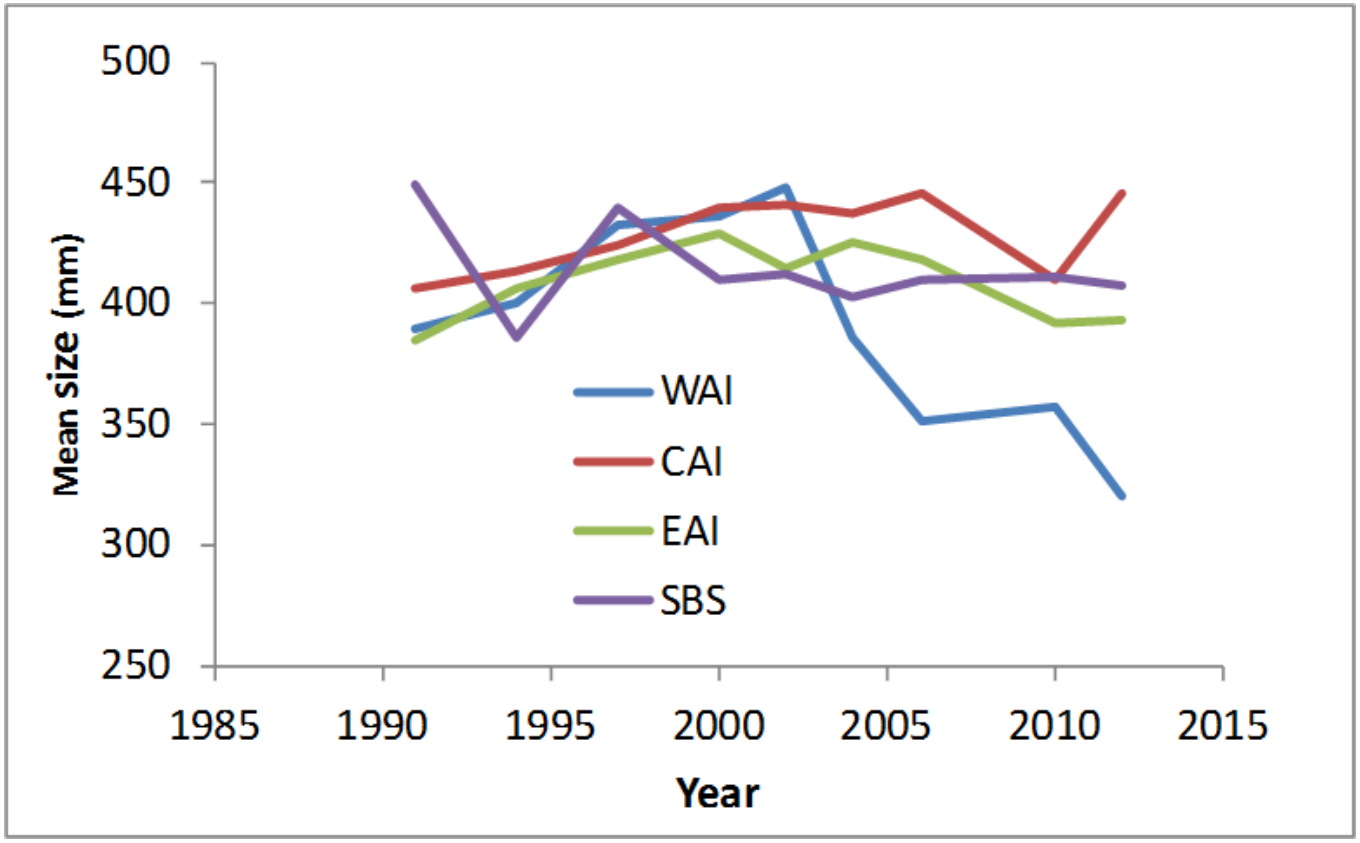
Changes in mean size by subarea



ANOVA models indicate a significant year effect in all areas except the SBS. However, the differences in mean size between years is much larger in the western AI than in other areas.

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Blackspotted and rougheye rockfish, continued

- The Team found the quantity and quality of the information presented to be compelling and … concurred with the authors' conclusions that the blackspotted/rougheye rockfish abundance has been reduced in the WAI.
- The Team has more concern over local overexploitation of this assemblage than other stocks that have been subjected to the stock structure template.
- If the SSC concurs with this level of concern, the Team anticipates a management response in 2014. The Team recommended that the authors update the 7 metrics [of stock status] in time for the September 2014 meeting. At that meeting, the Team will review the WAI stock status again and evaluate the effect of any management response in 2014.

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Blackspotted and rougheye rockfish, concluded

Area/sub area	Year	Total Bio[1].	OFL	ABC	TAC	Catch
BSAI	2012	24,900	576	475	475	201
	2013	29,800	462	378	378	341
	2014	30,400	505	416	n/a	n/a
	2015	31,400	580	478	n/a	n/a

[1] Total biomass from AI age-structured projection model and survey biomass estimates from EBS.

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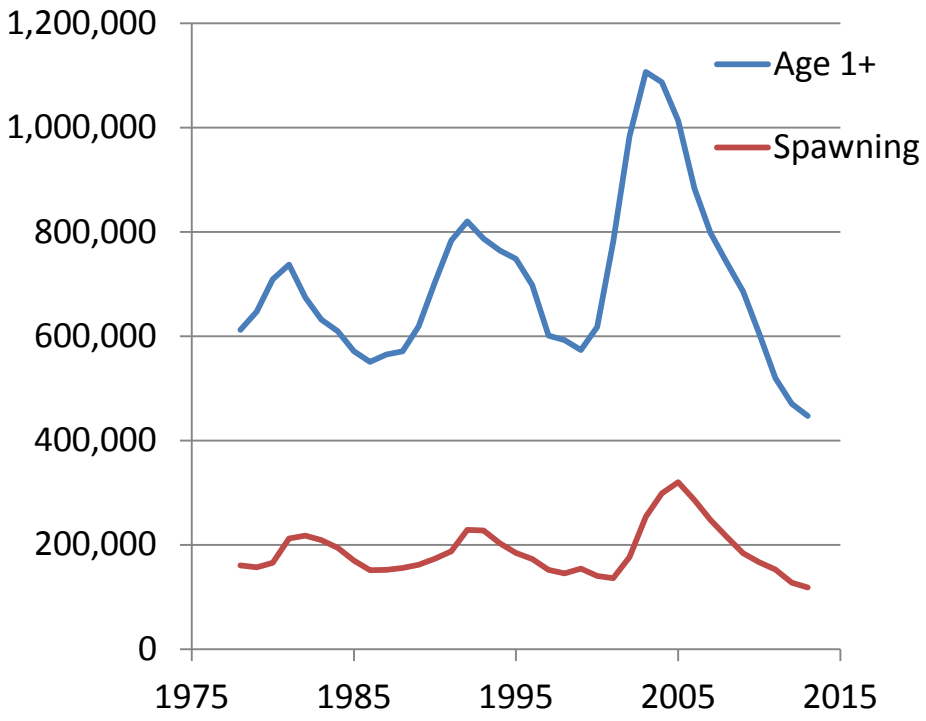
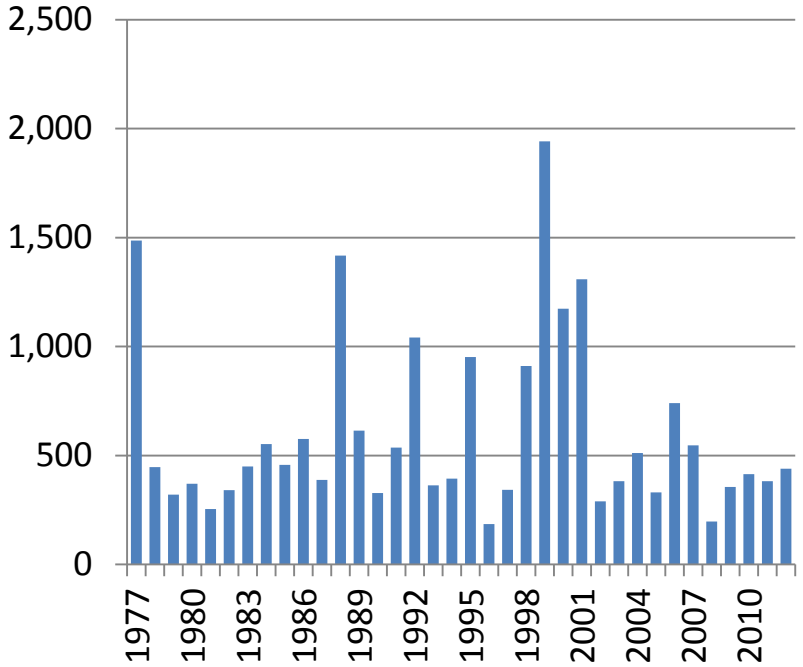
Atka mackerel

Biomass (thousands t)



Recruitment



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Atka mackerel, concluded

Area	Year	Age 3+ Biomass	OFL	ABC	TAC	Catch
BSAI	2012	405,000	96,500	81,400	50,763	47,831
	2013	289,000	57,700	50,000	25,920	23,180
	2014	384,364	74,492	64,131	n/a	n/a
	2015	387,308	74,898	64,477	n/a	n/a

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