

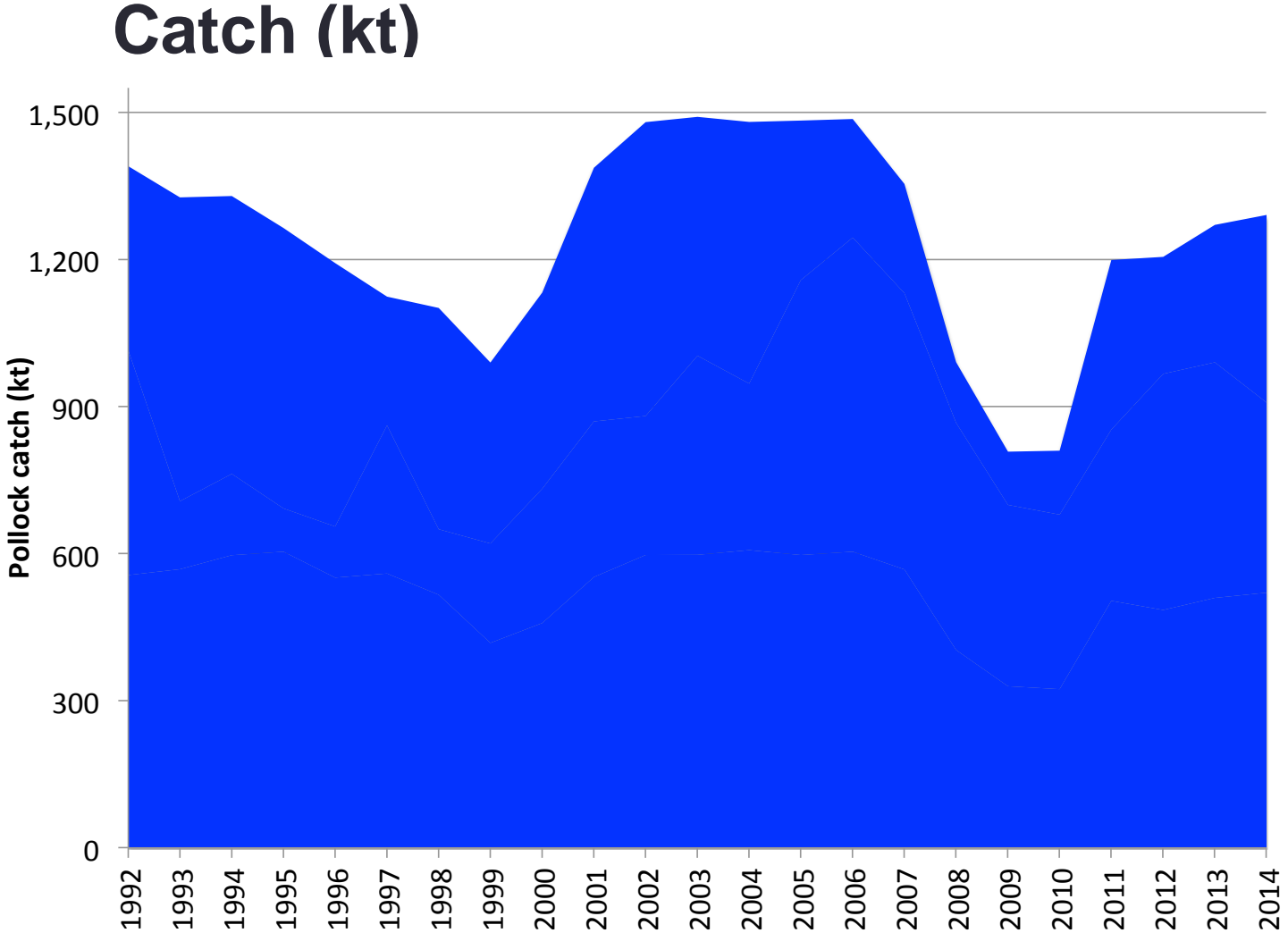
EASTERN BERING SEA POLLOCK ASSESSMENT PREVIEW

James Ianelli

Alaska Fisheries Science Center, NMFS/NOAA
Seattle WA

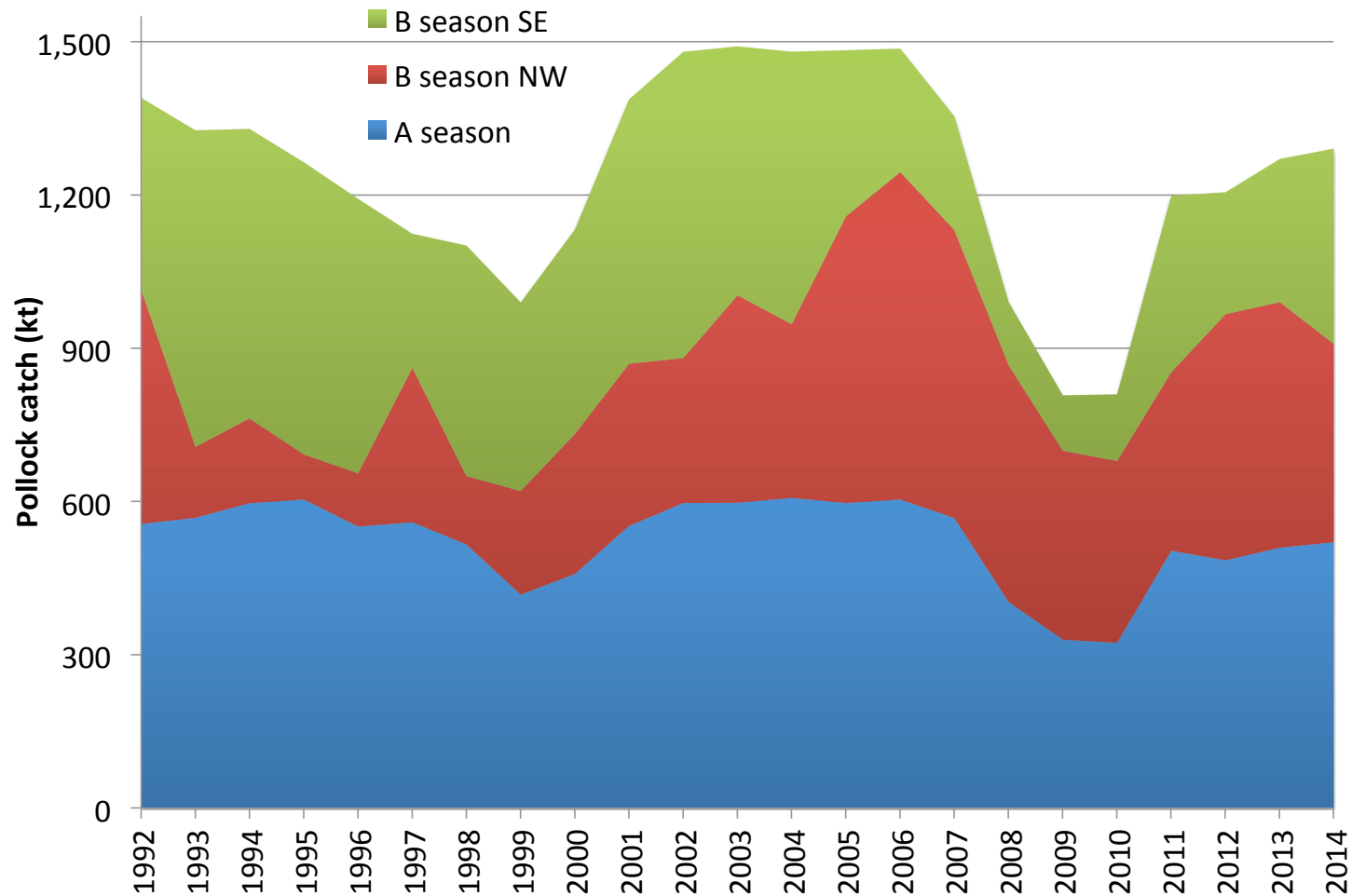
November 2014

Eastern Bering Sea pollock fishery and assessment



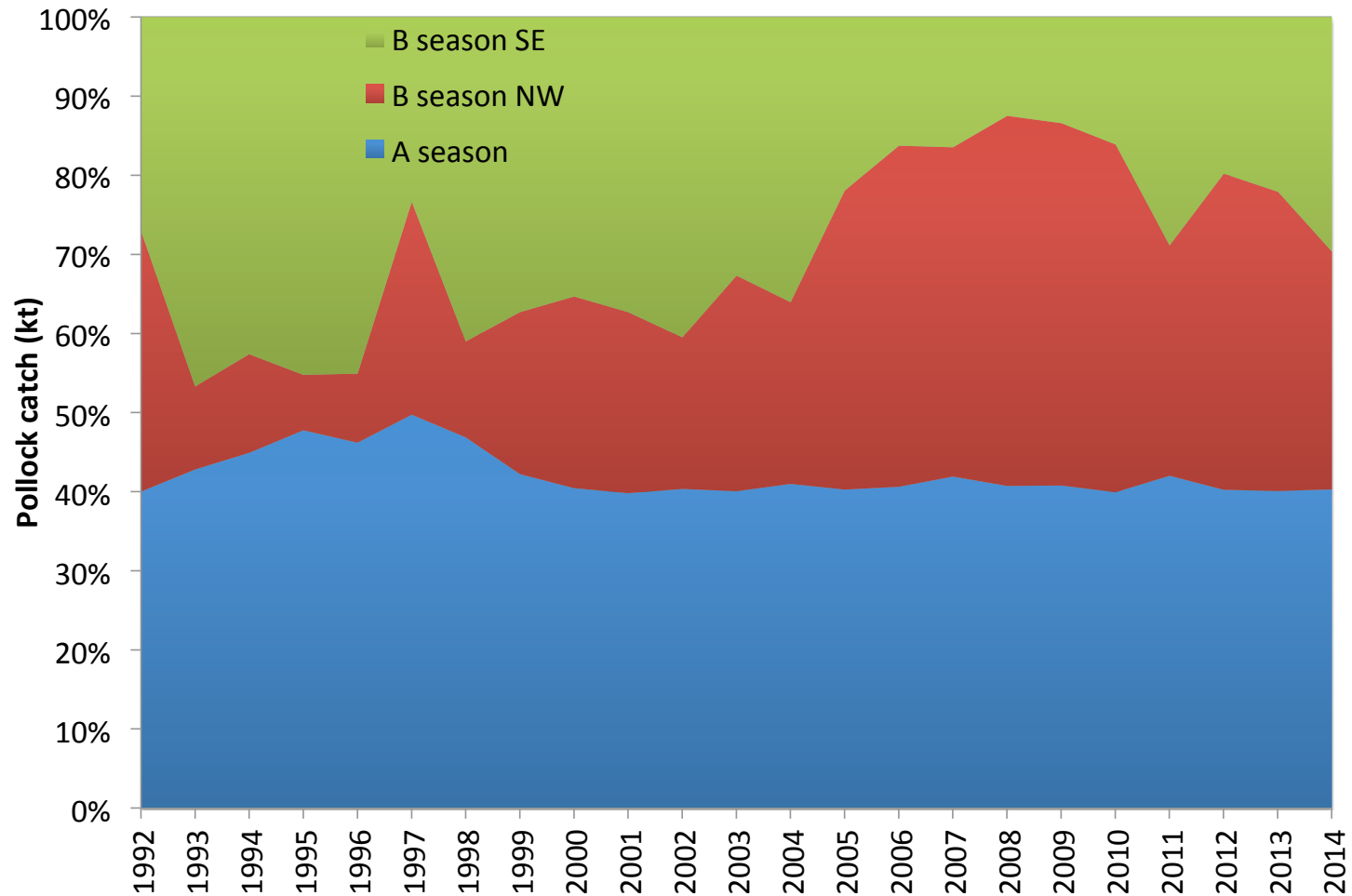
Seasonal and area catch patterns

Bering Sea pollock

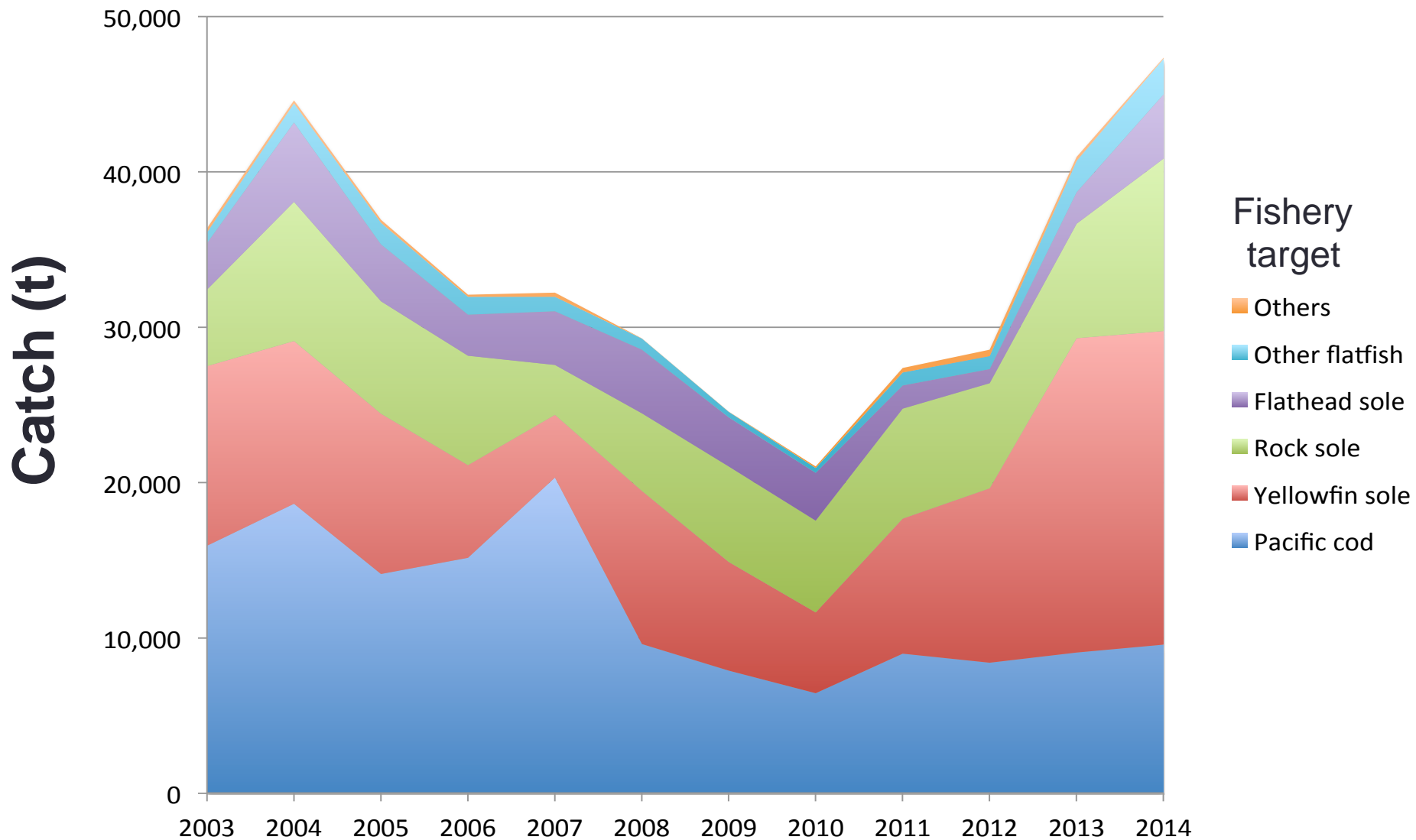


Seasonal and area catch patterns

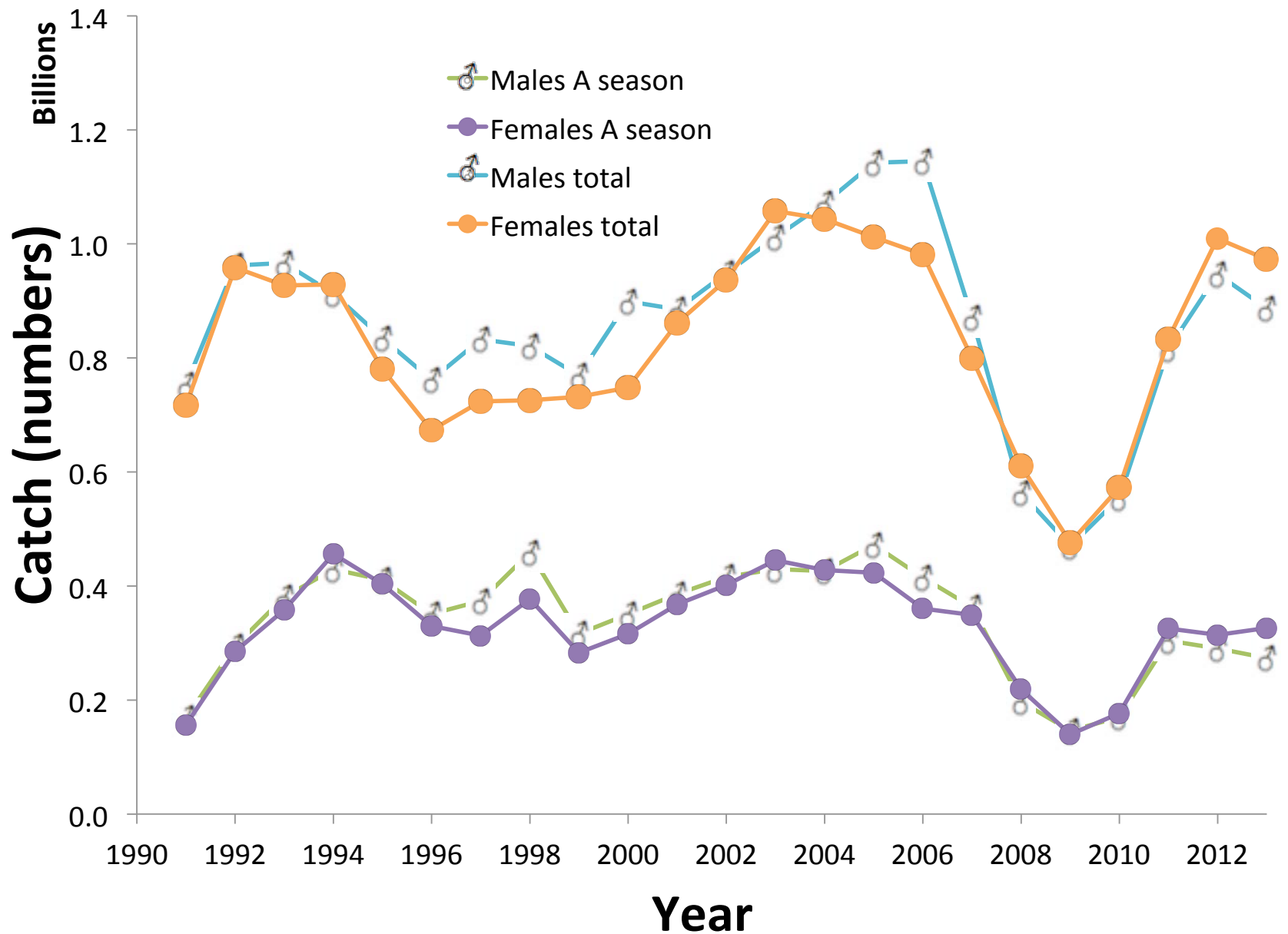
Bering Sea pollock



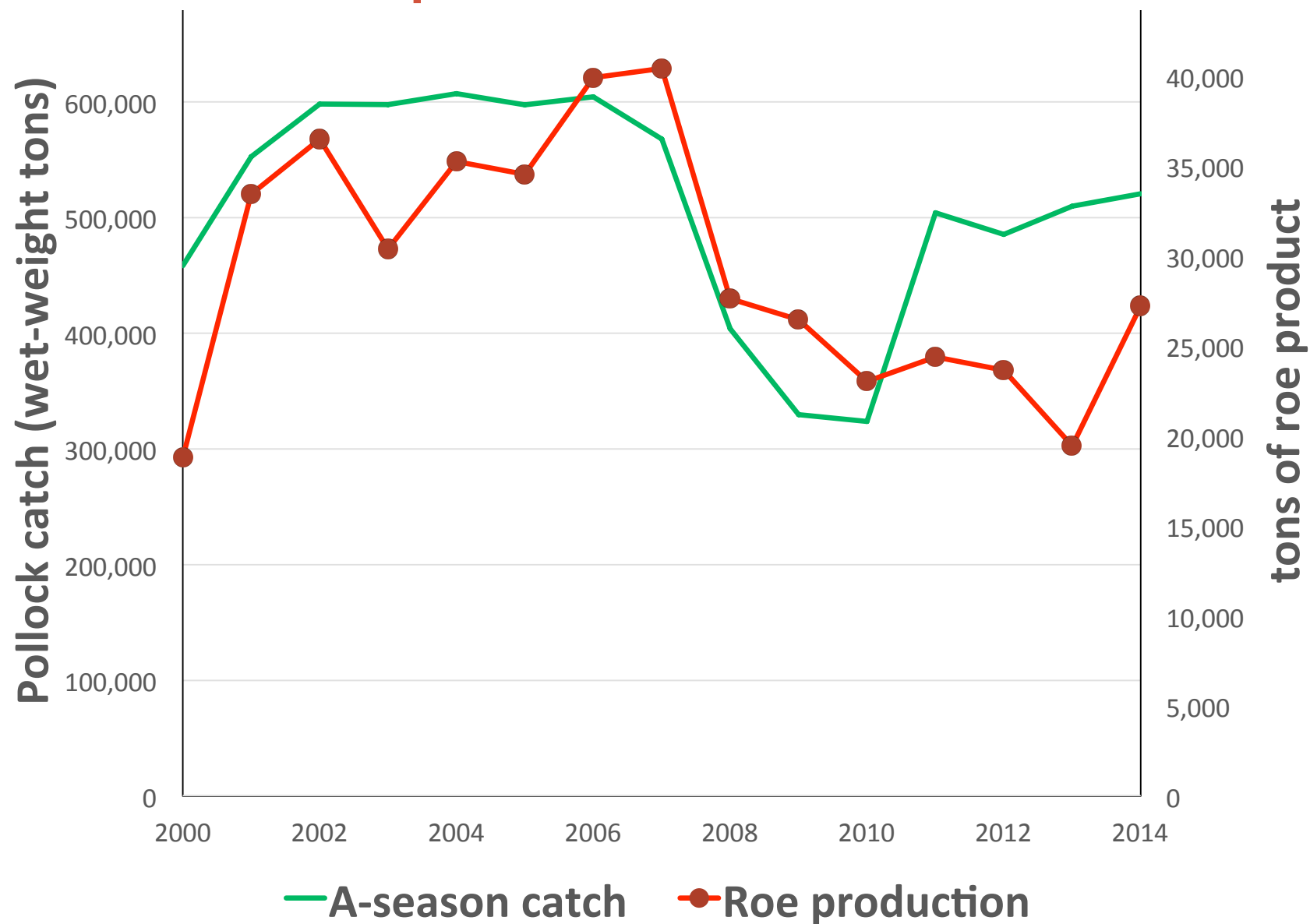
Catch of pollock in non-pollock fisheries



Catch in numbers—by sex

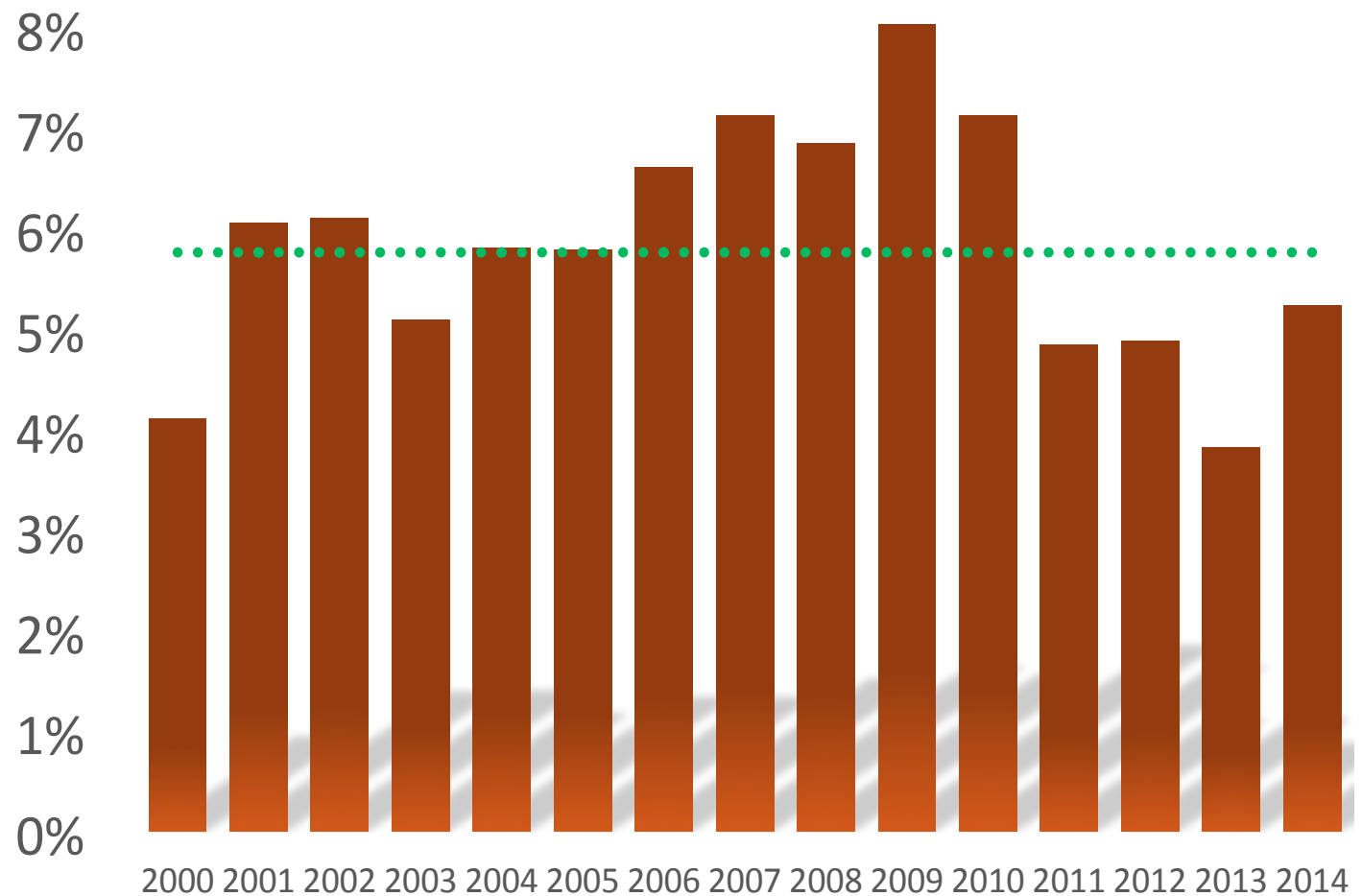


Pollock roe production

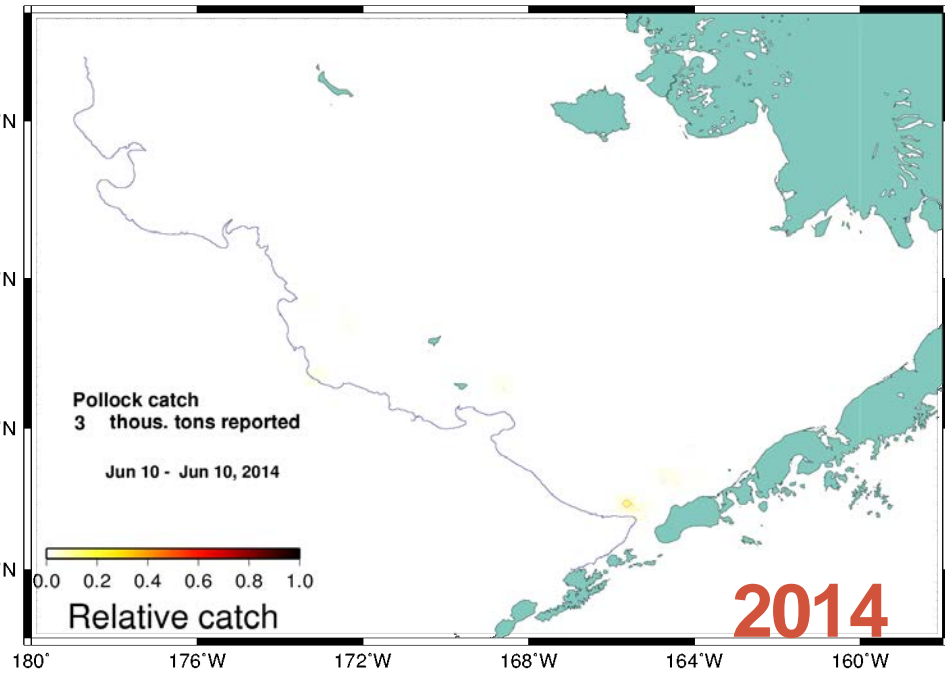
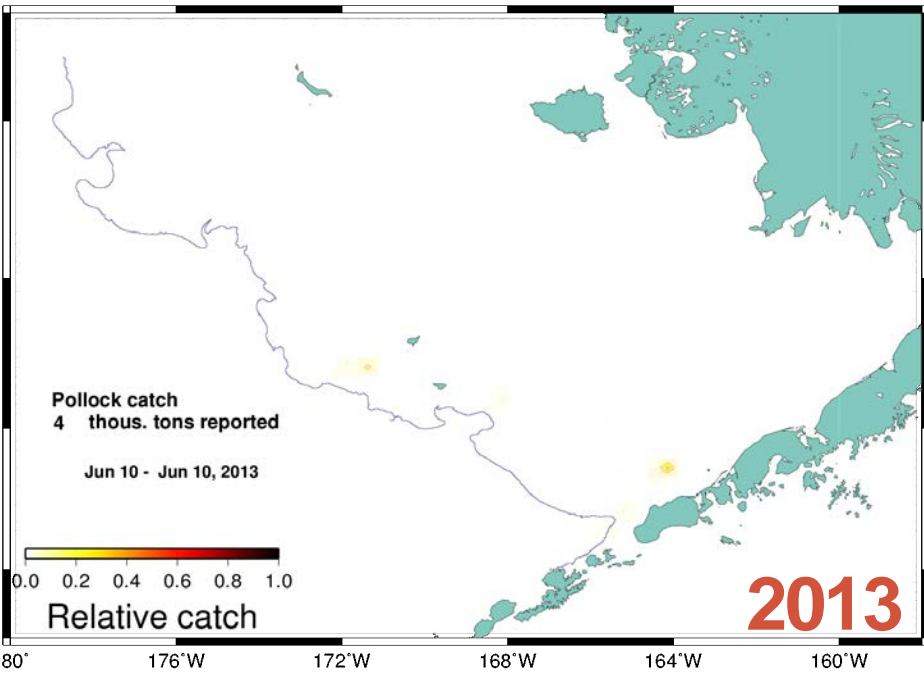
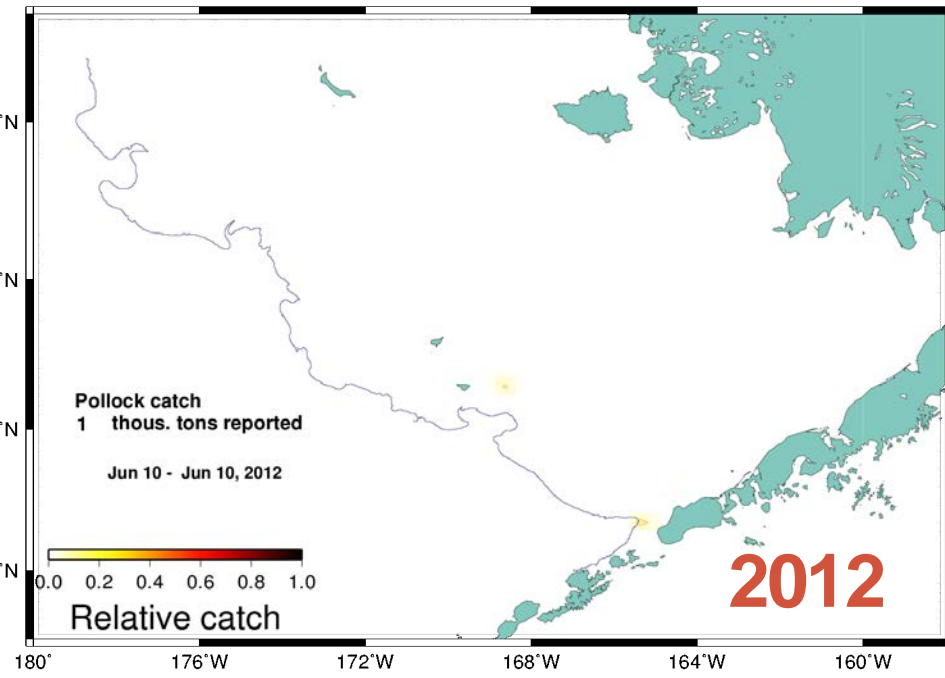
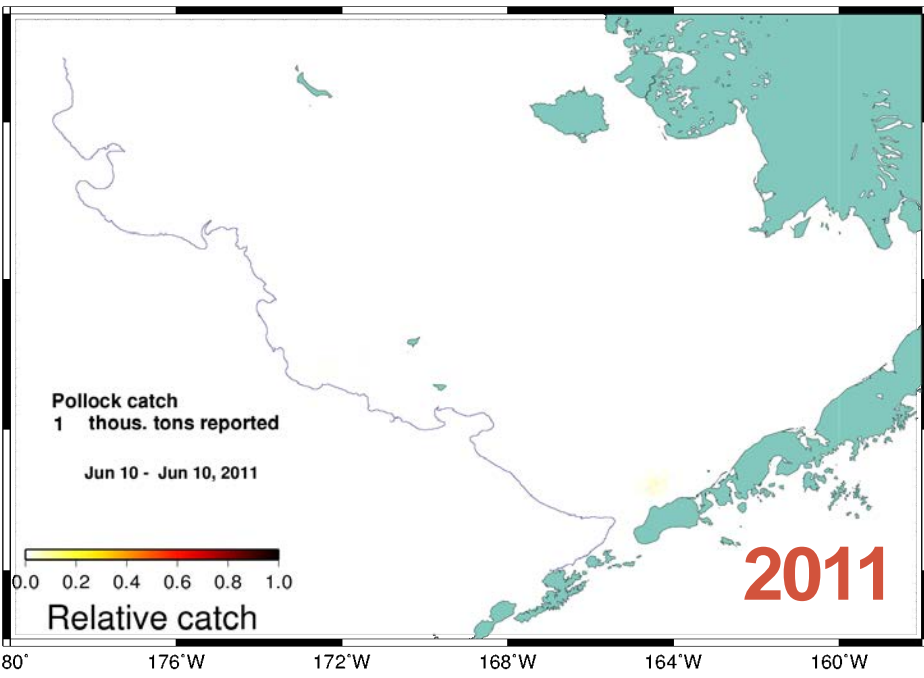


Pollock roe production

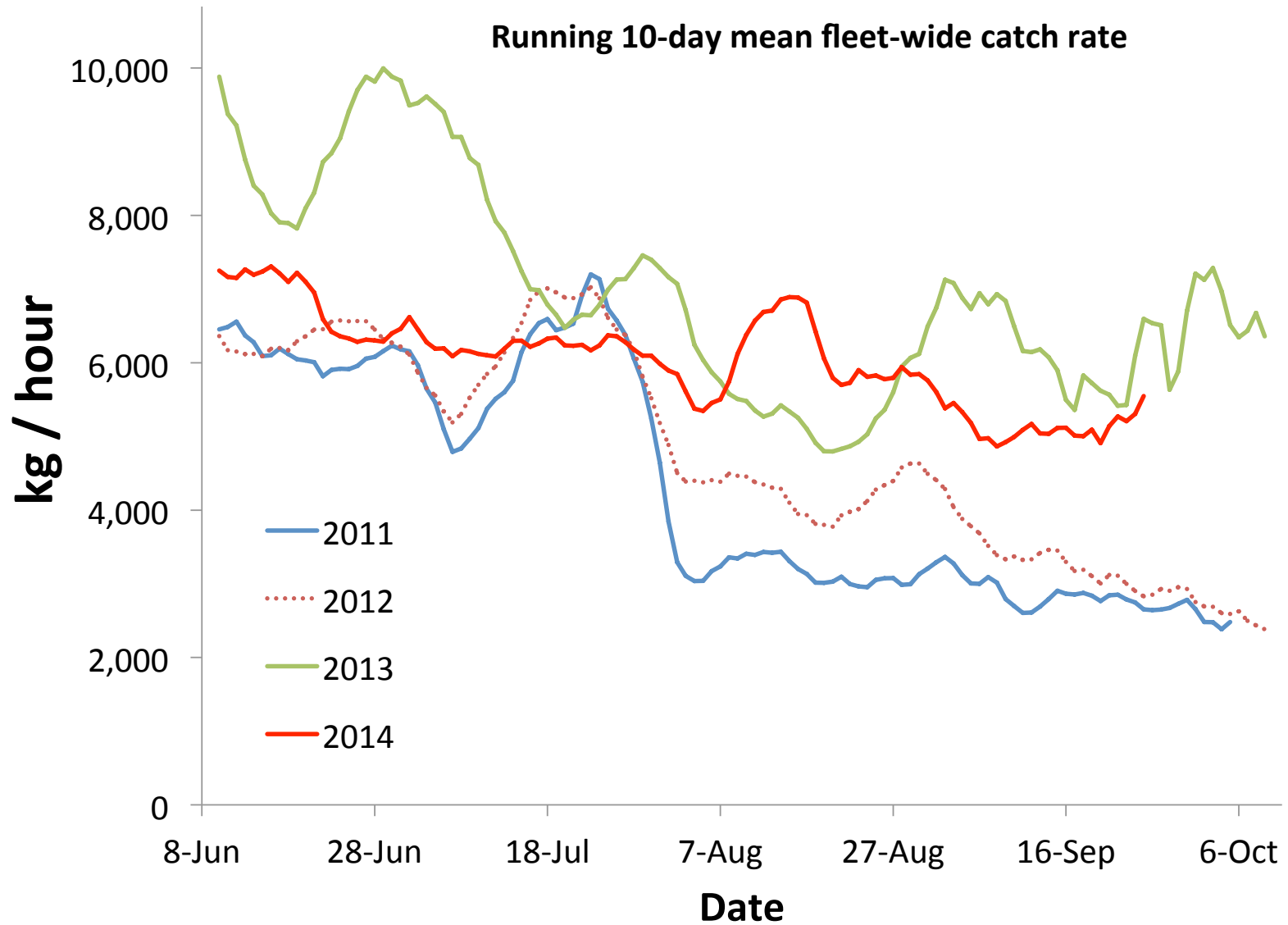
Roe per ton of pollock caught



Summer fishing distributions

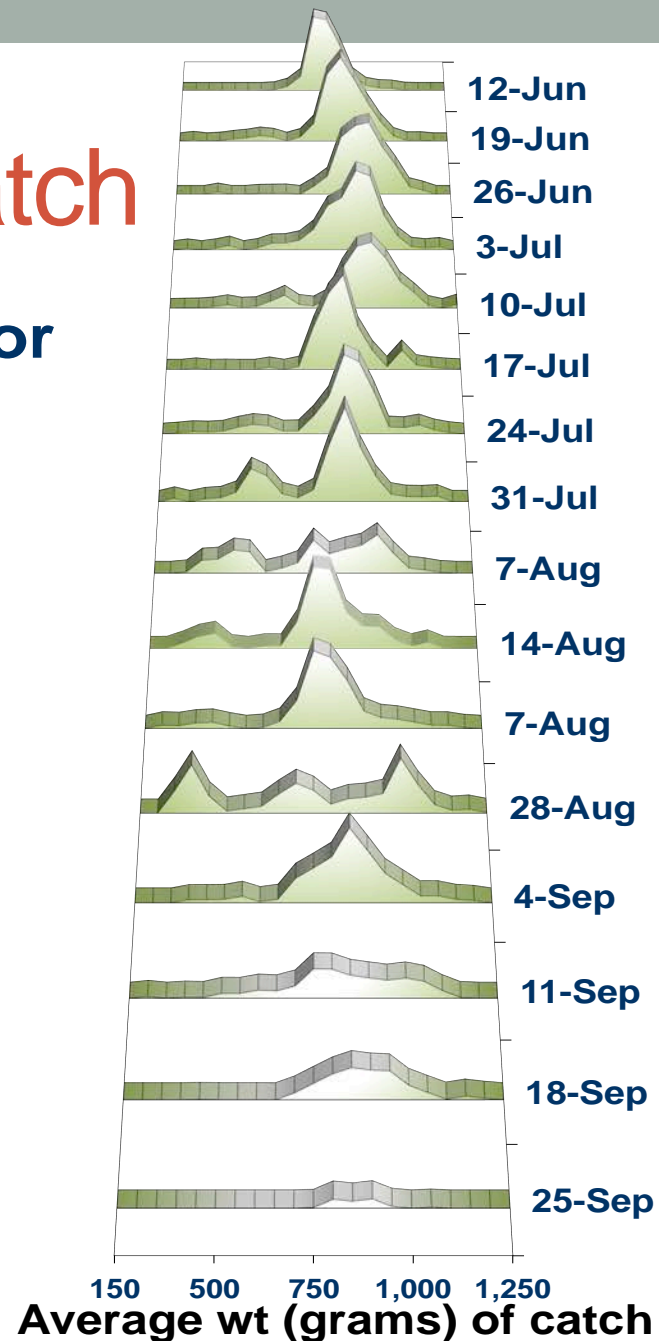


Fishing conditions



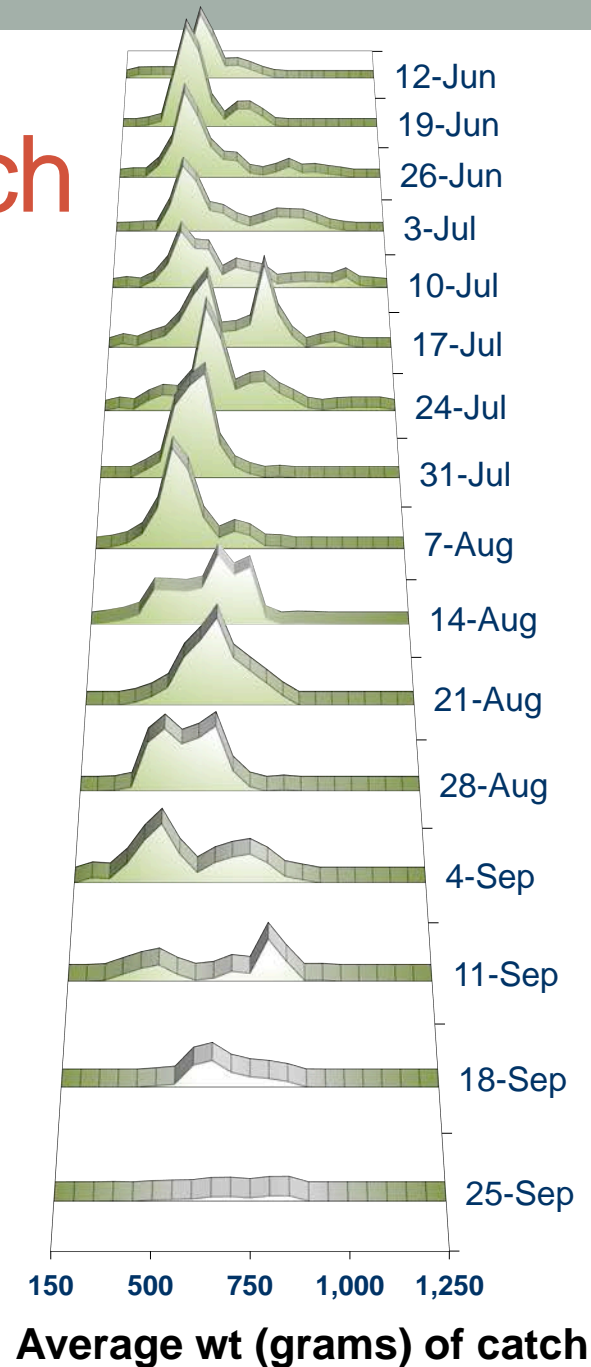
Pollock sizes in catch

Shore-based sector
by week (2014)



Pollock sizes in catch

Off-shore
by week (2014)



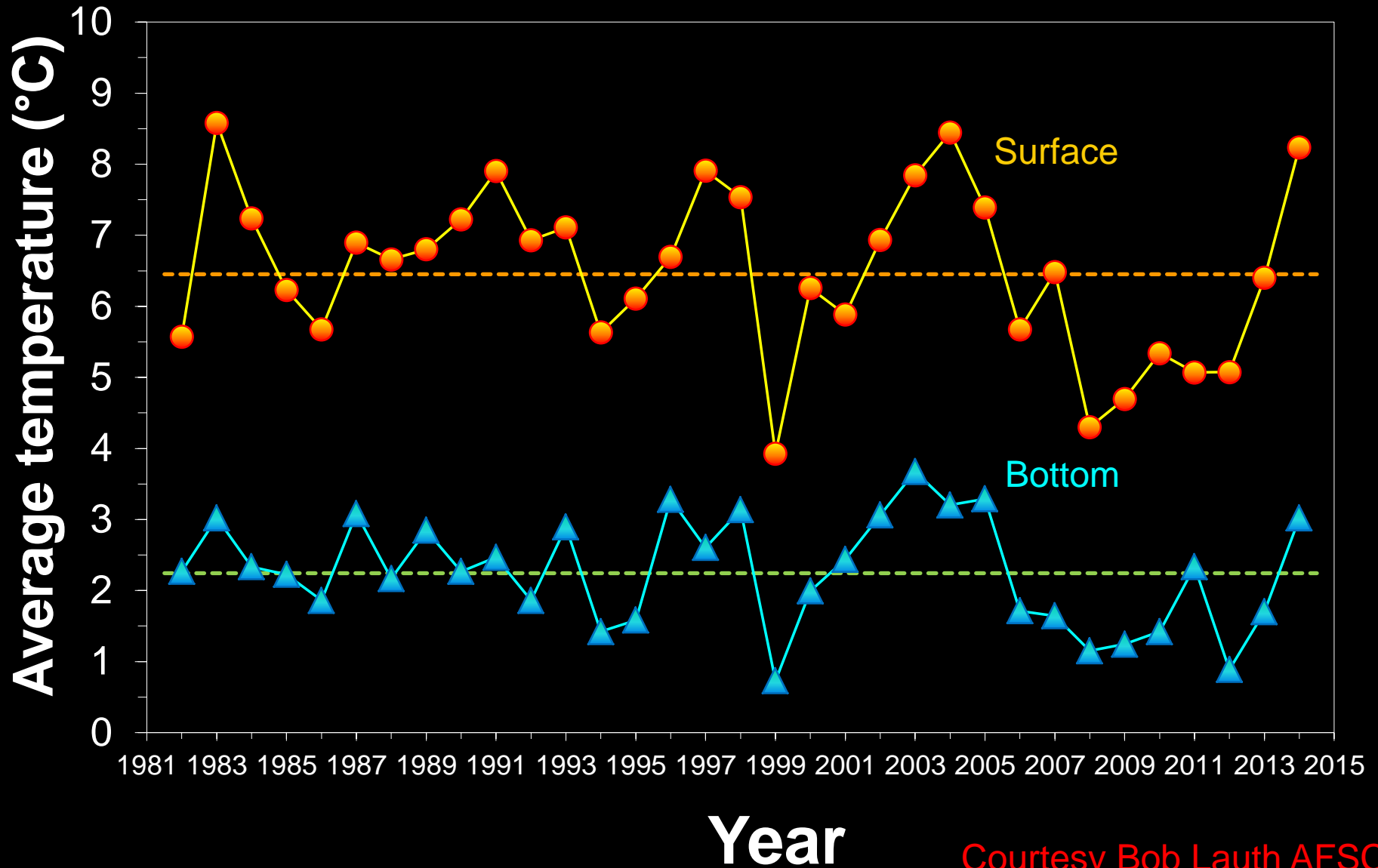
Bottom-trawl survey



Environmental conditions in Bering Sea

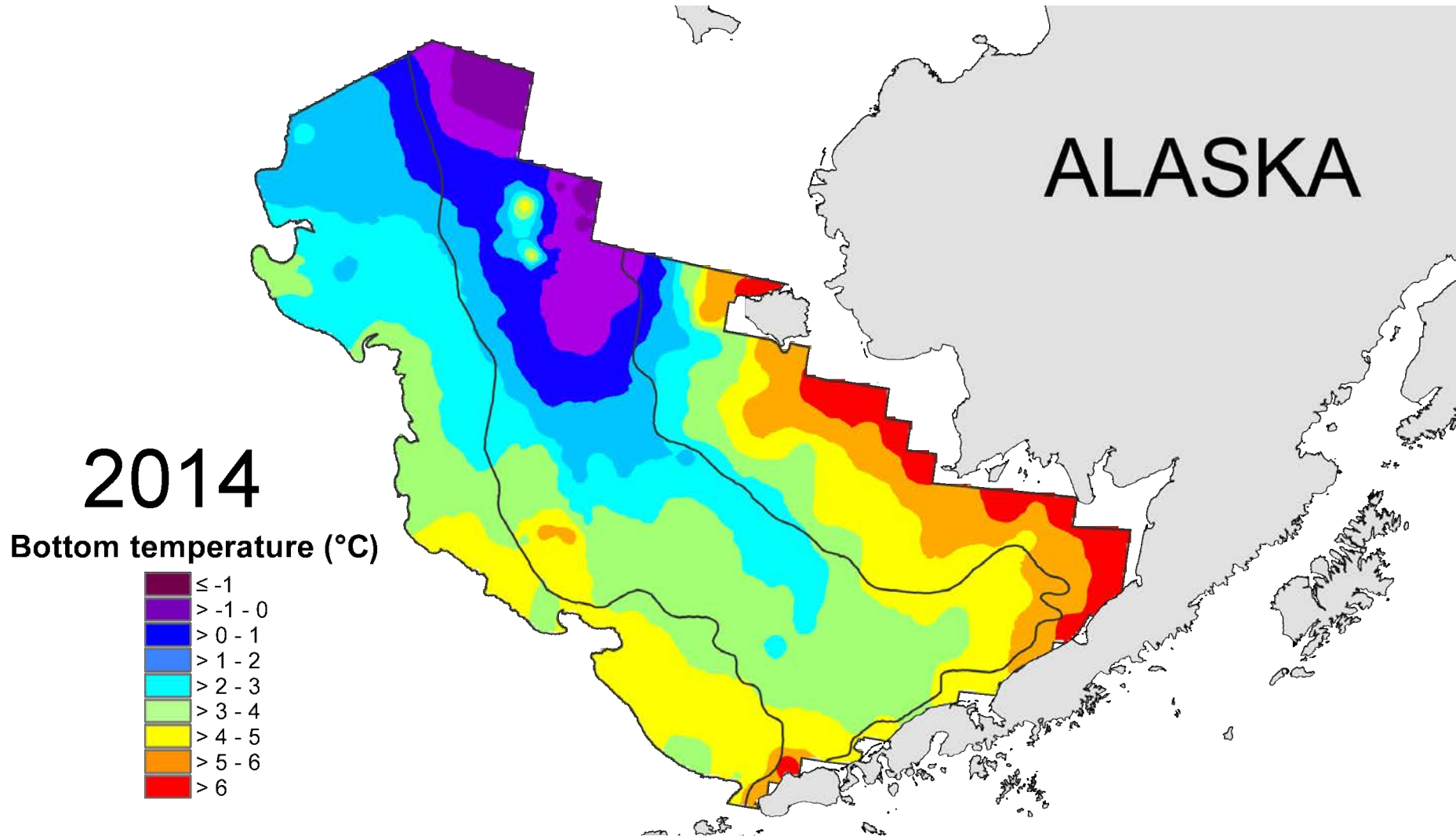


Eastern Bering Sea shelf temperatures



Courtesy Bob Lauth AFSC

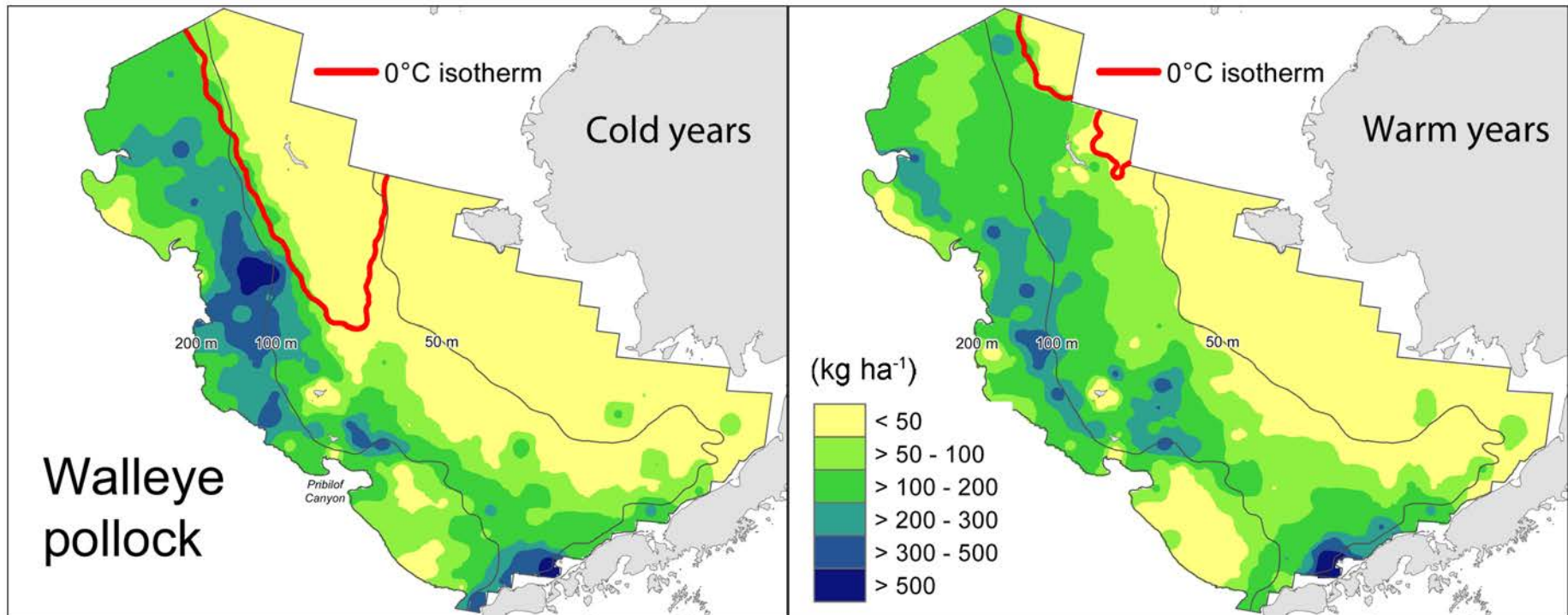
2014 Bottom trawl survey surface temperatures



Courtesy Bob Lauth AFSC

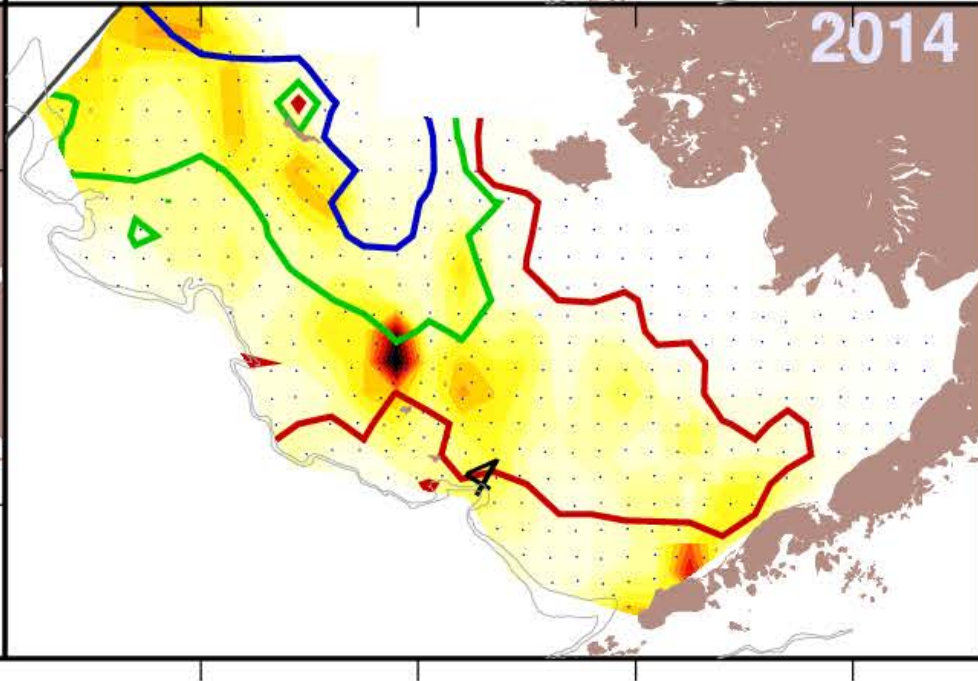
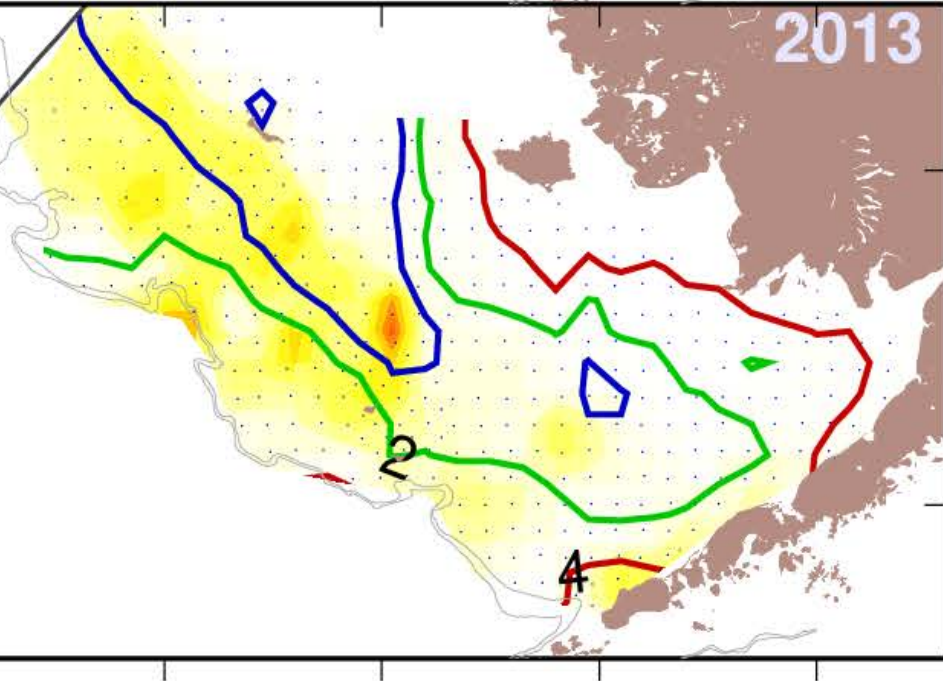
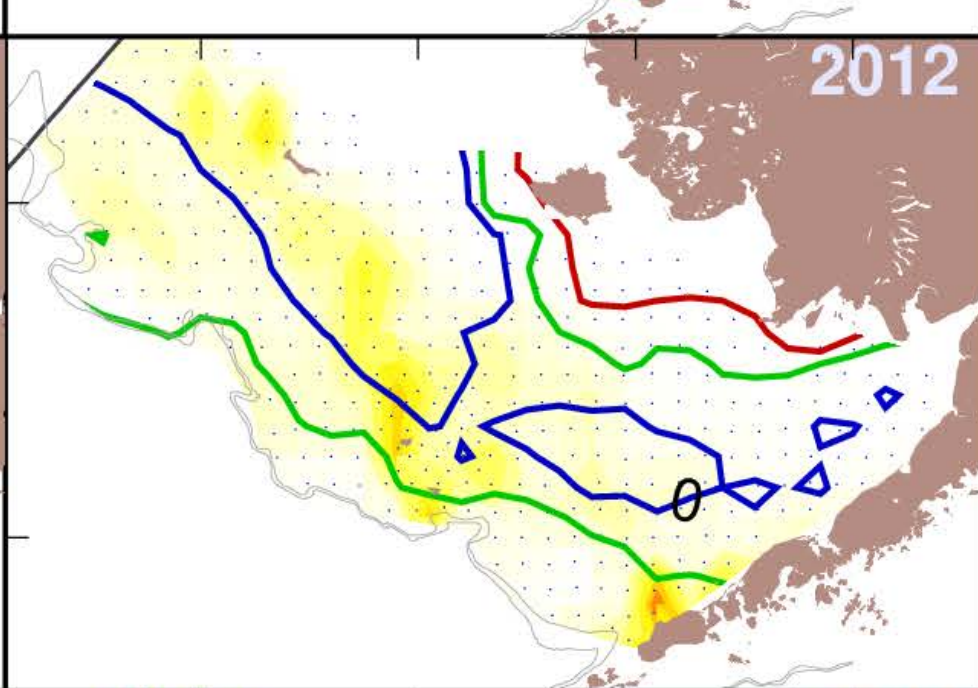
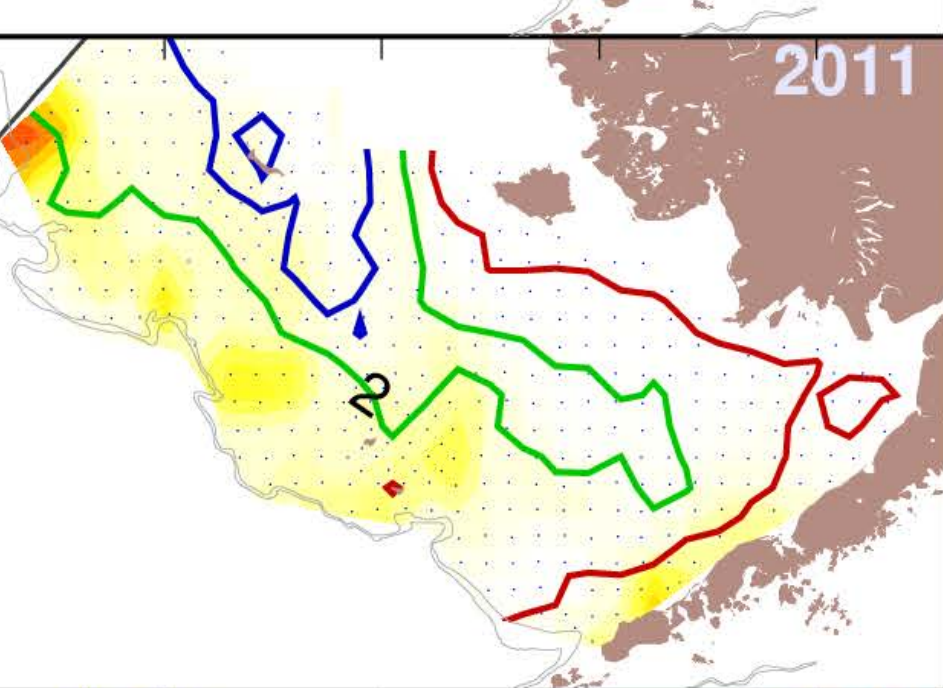
Pollock distribution relative to temperature

Average 1982-2013

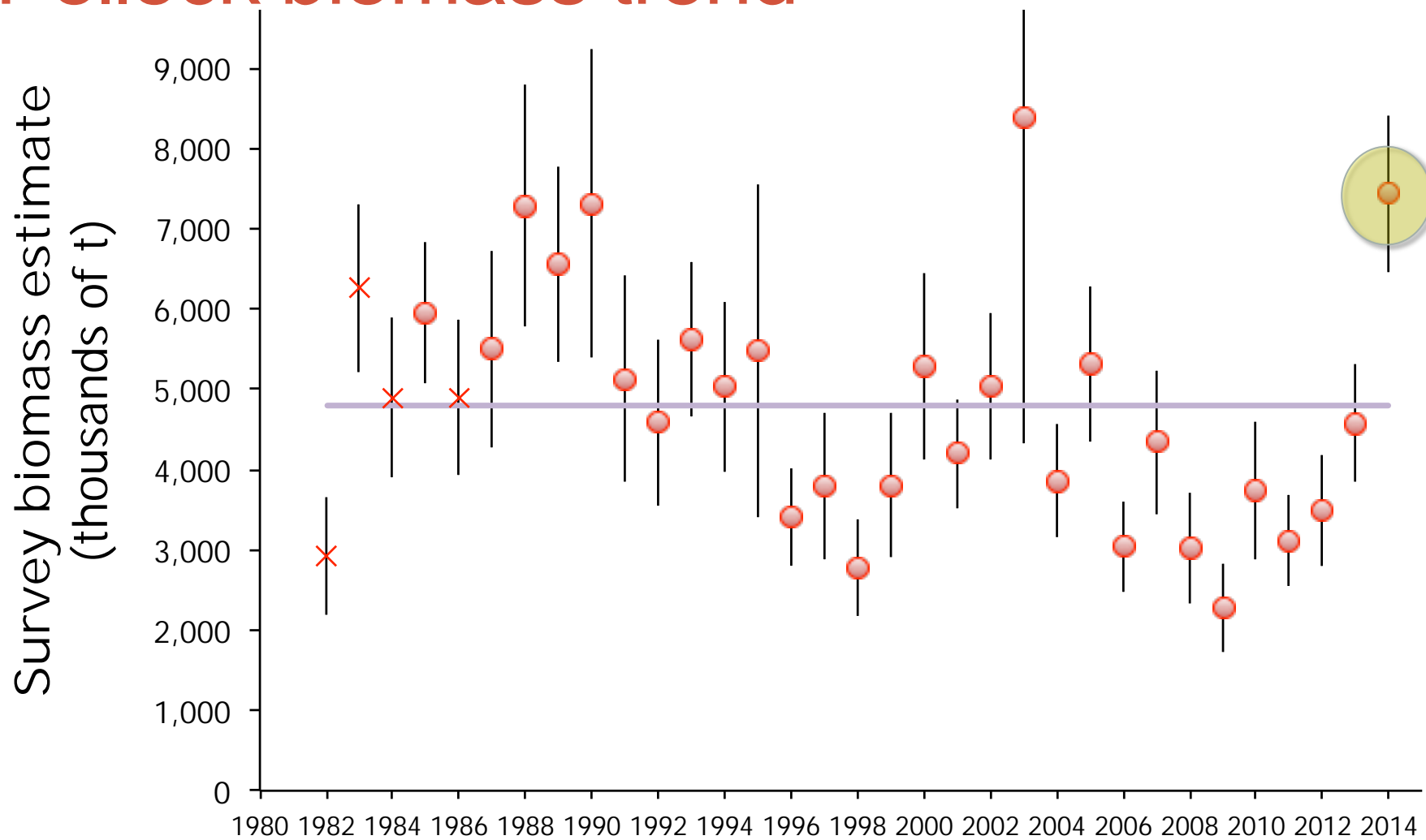


16 coldest years

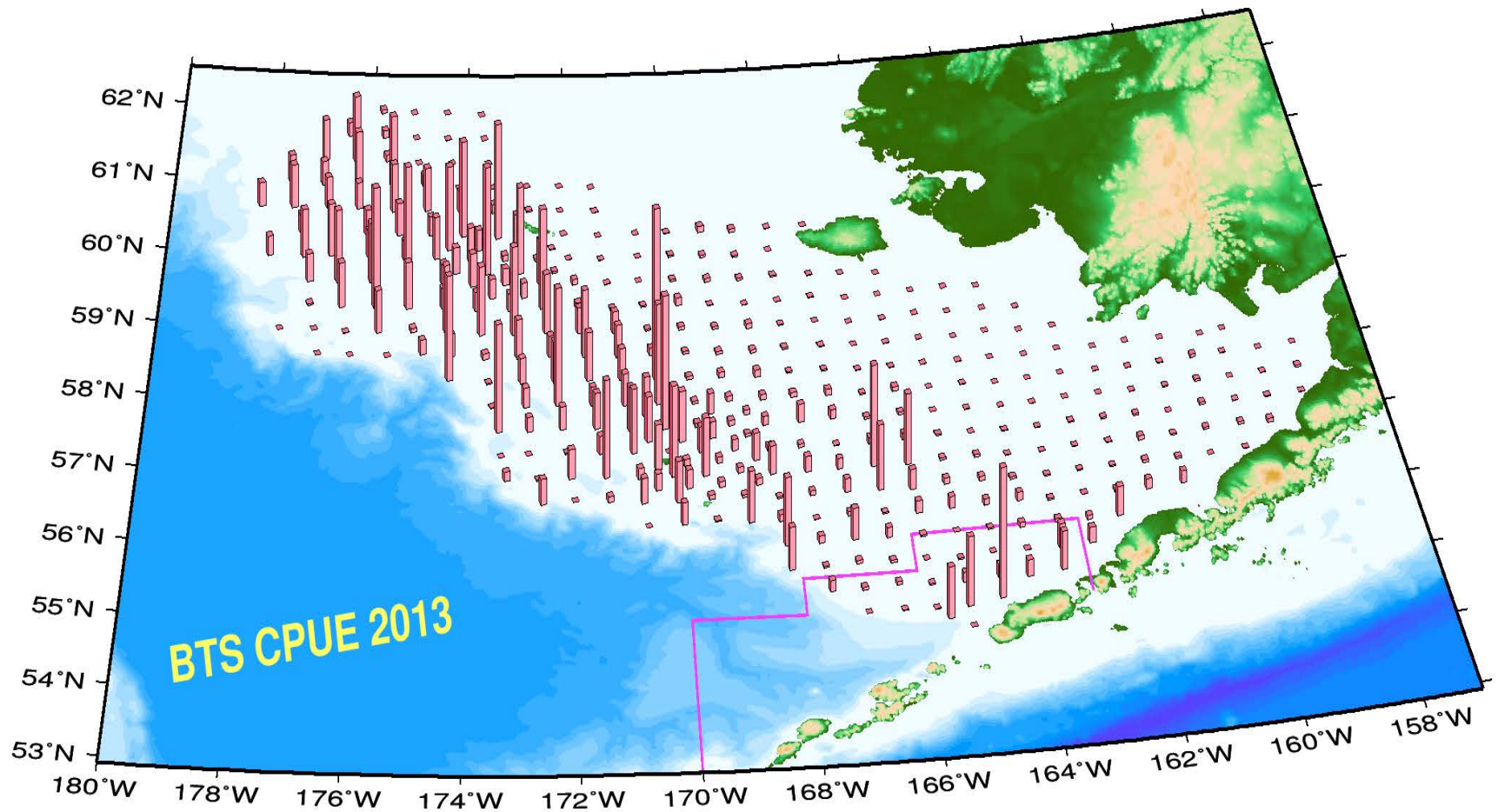
16 warmest years



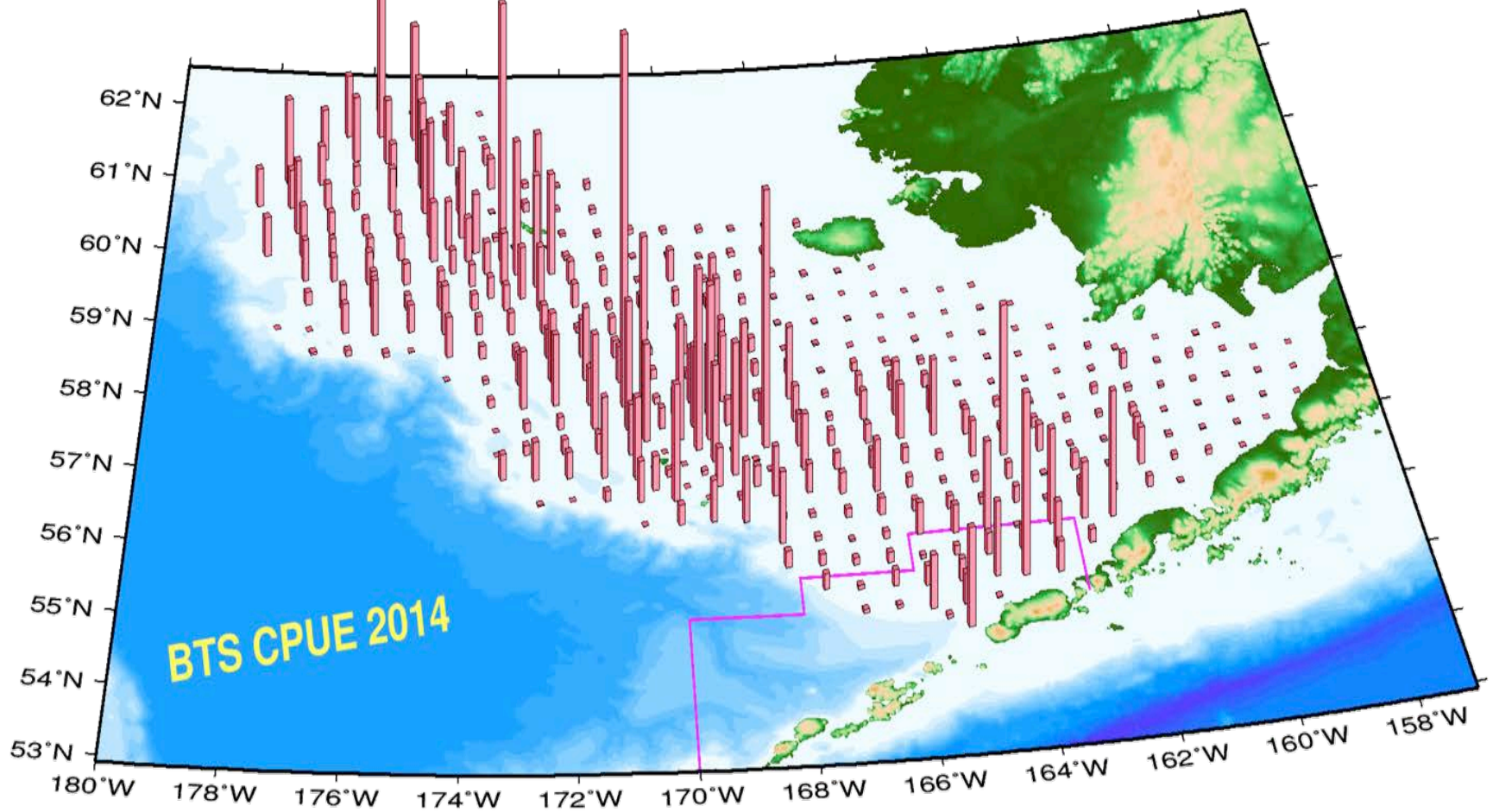
Pollock biomass trend



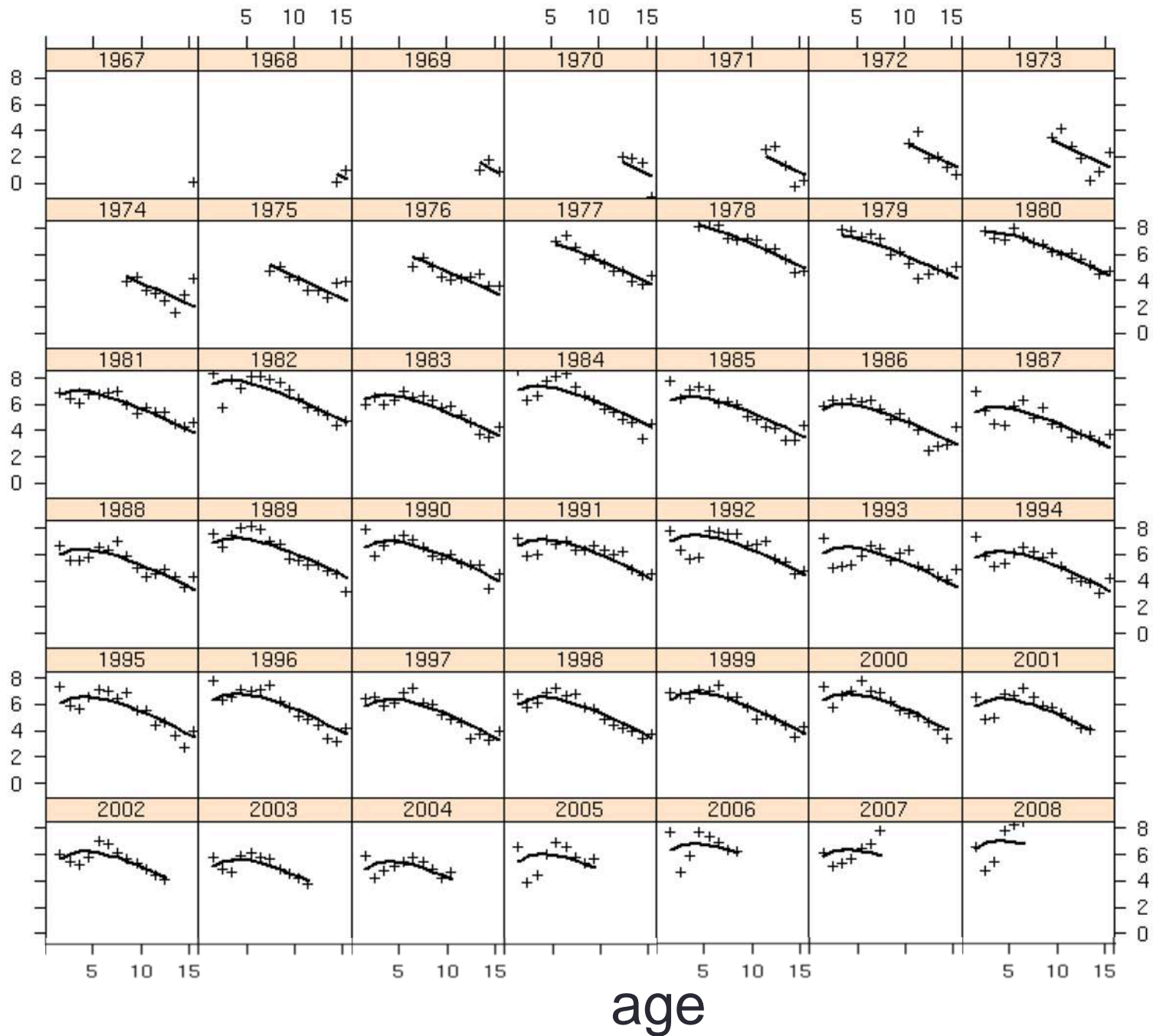
2013 pollock survey—4.6 million t



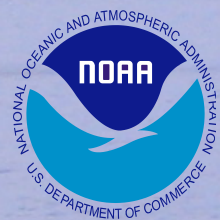
2014 pollock survey—7.4 million t



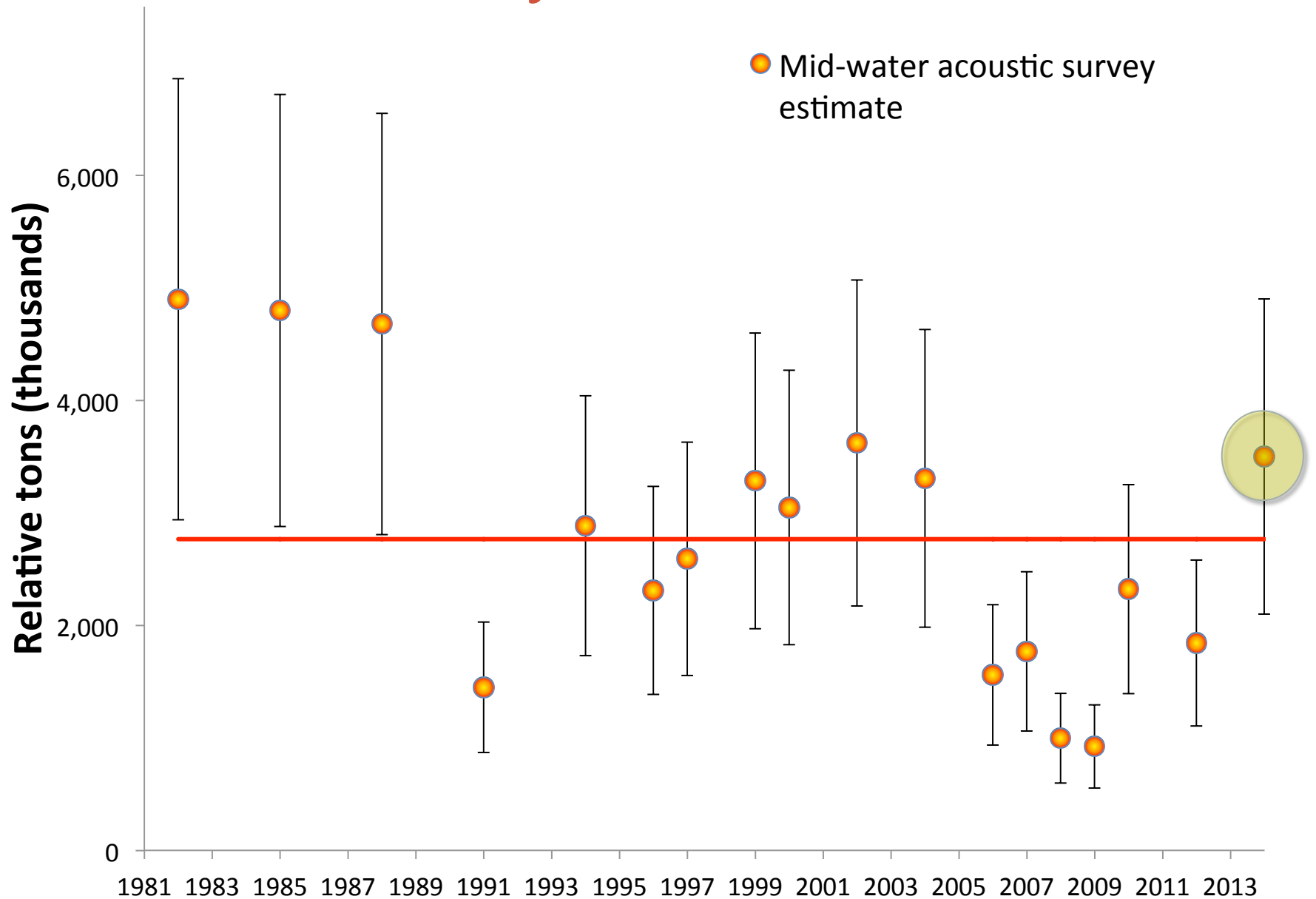
Bottom
Trawl
Survey
Abundance
at age
...
by
cohort
Log-scale

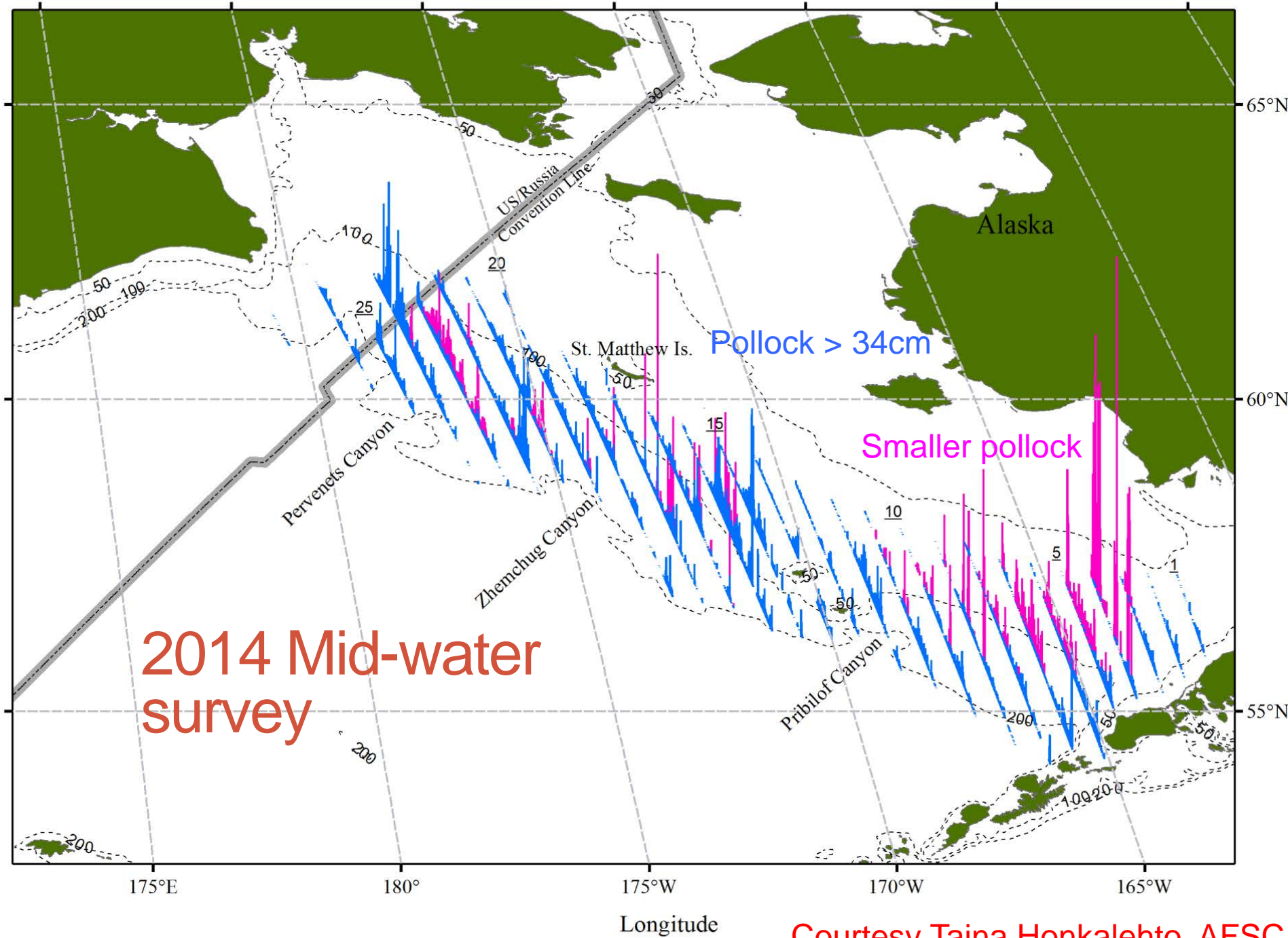


Biennial mid-water survey



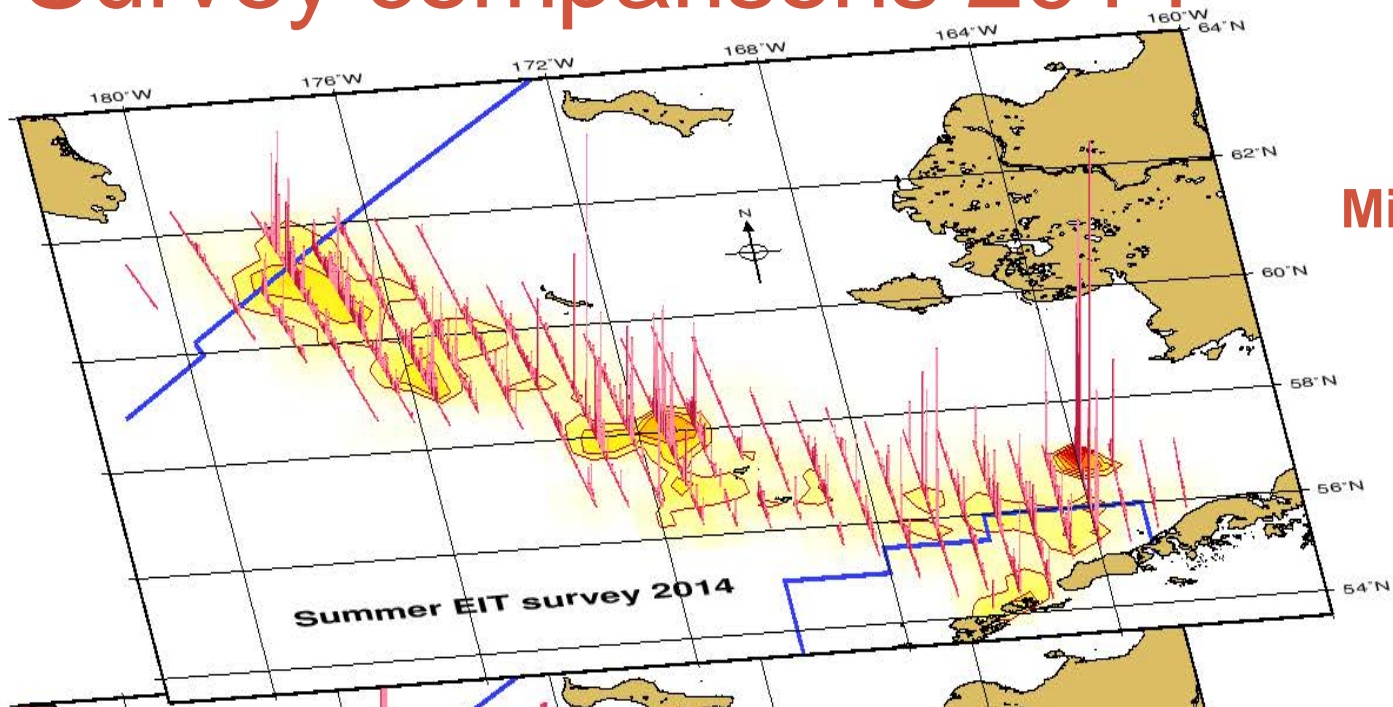
Acoustic survey estimates



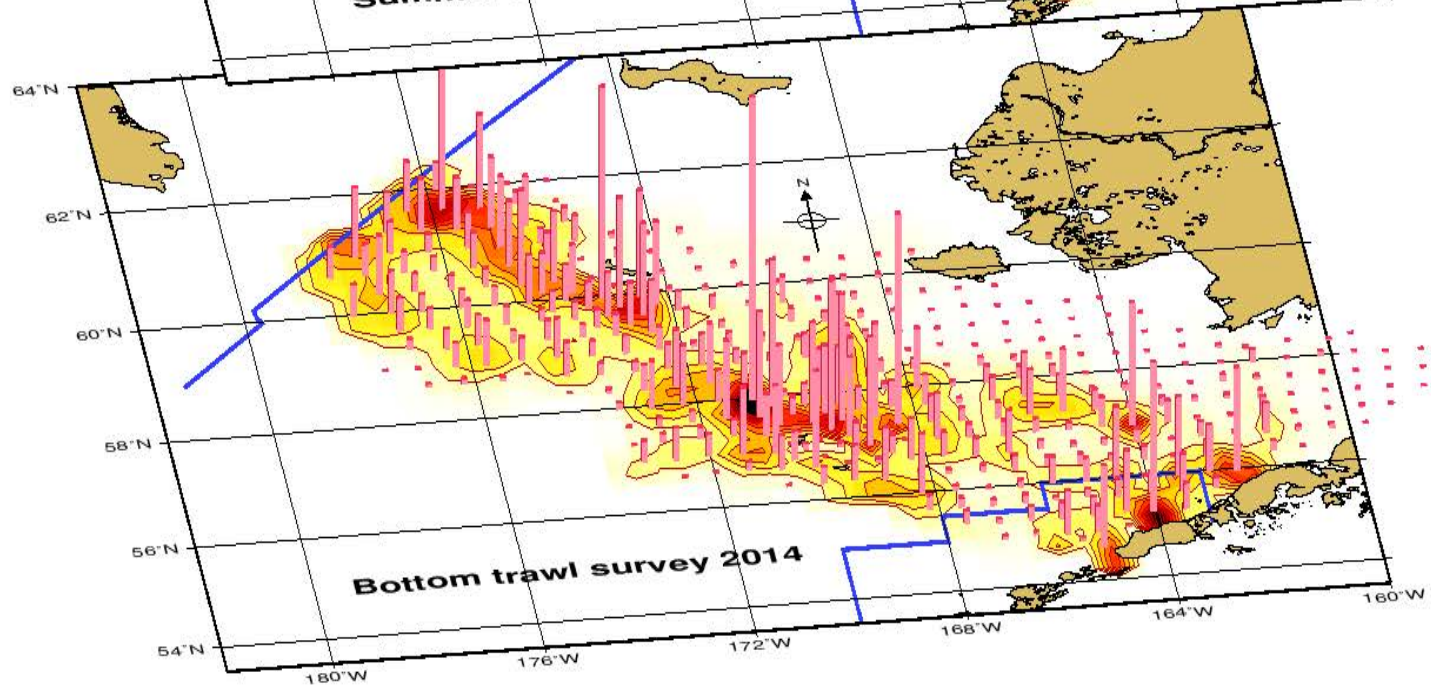


Courtesy Taina Honkalehto, AFSC

Survey comparisons 2014

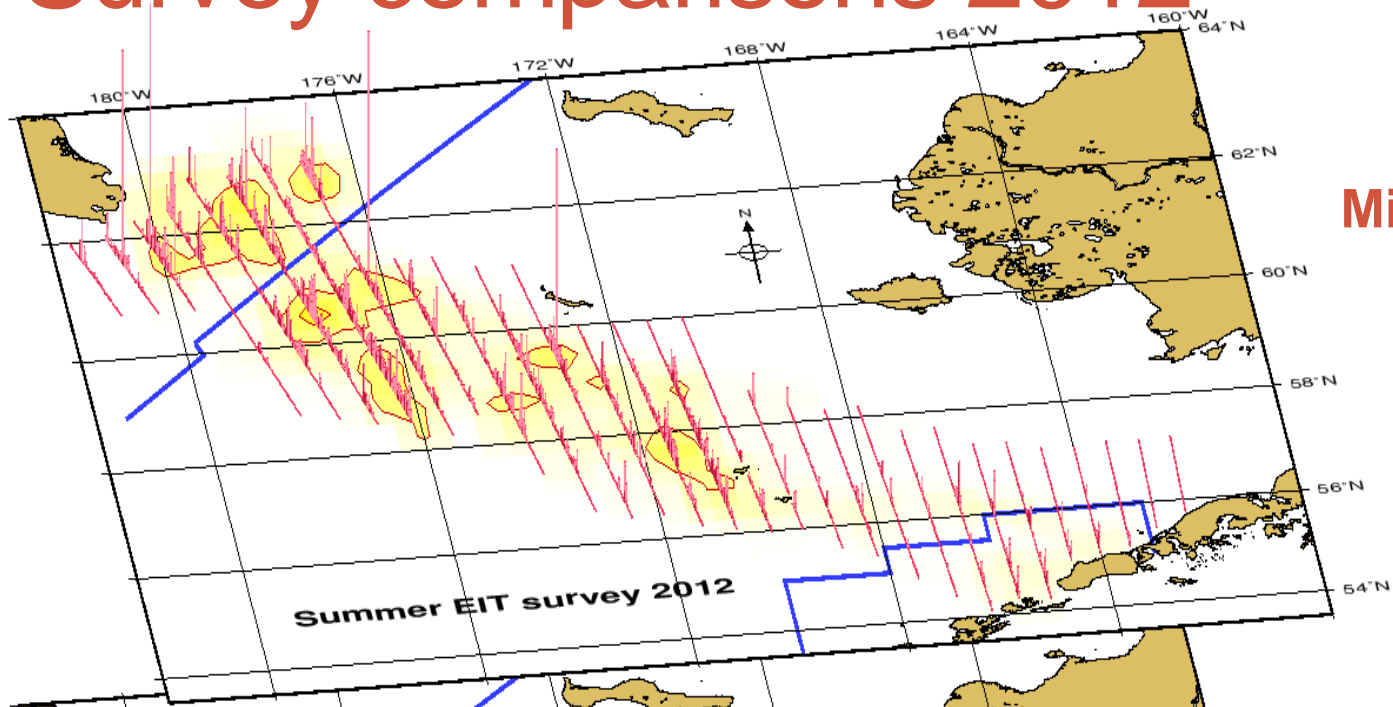


Mid-water survey

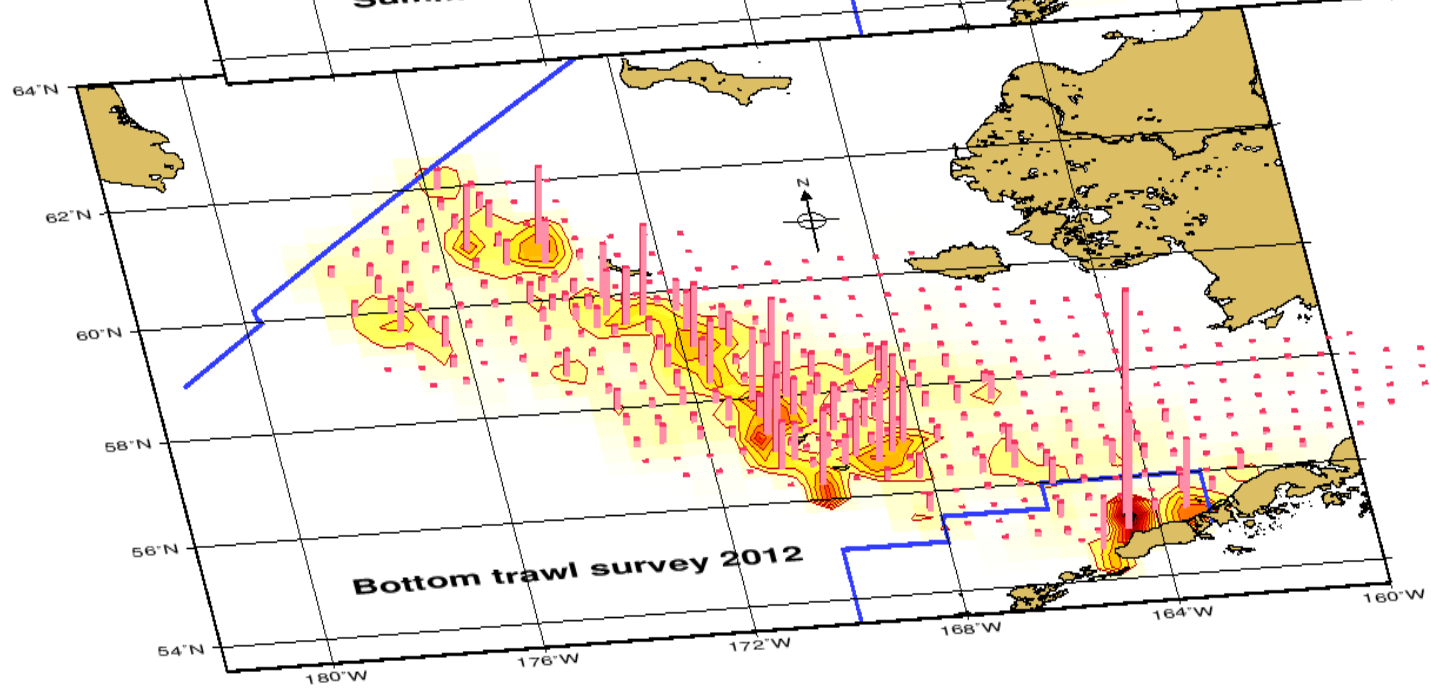


Bottom survey

Survey comparisons 2012



Mid-water survey



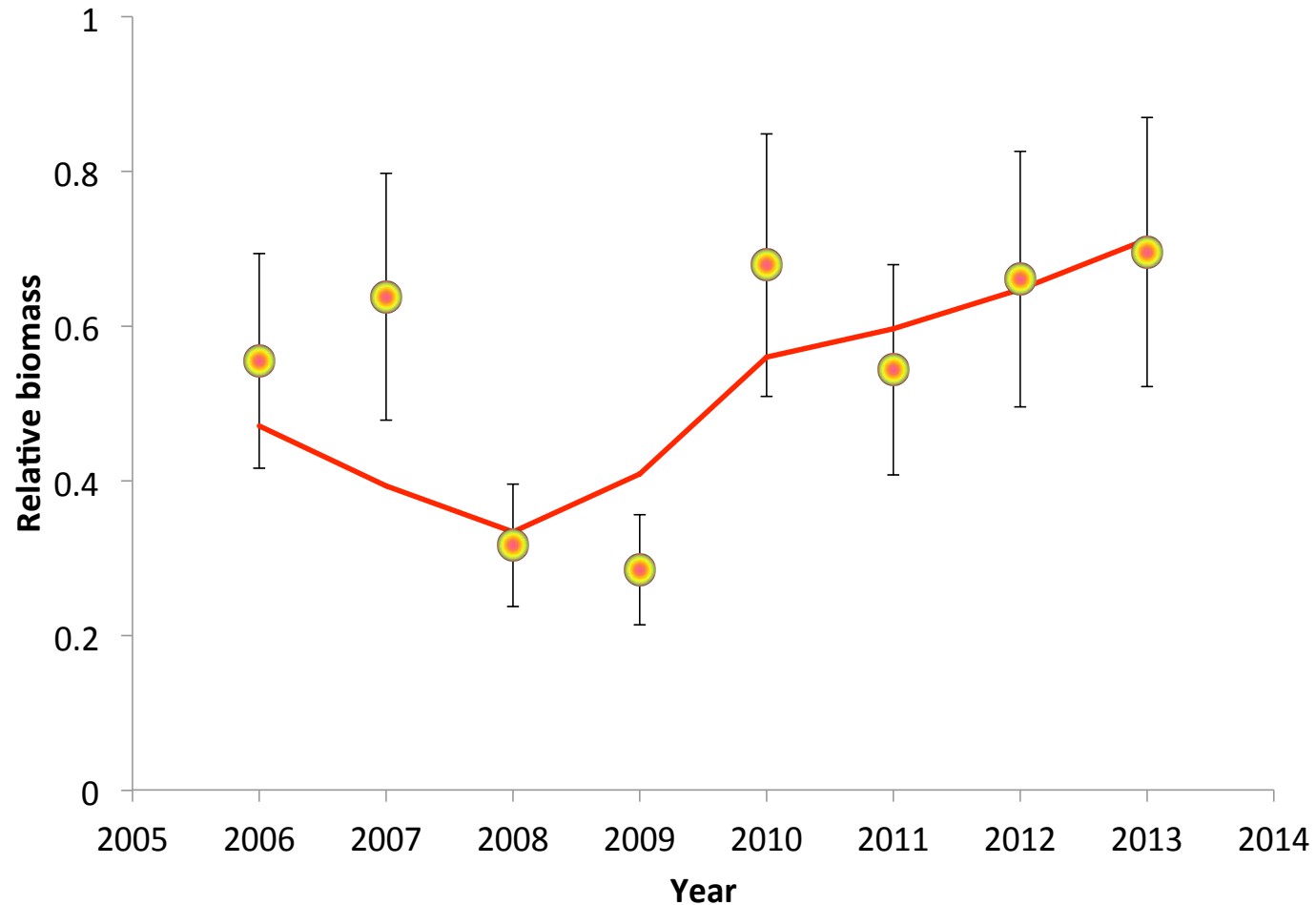
Bottom survey

Other index data

“Acoustic vessels of opportunity” (AVO)

New data added every other year

Timed with off-year of dedicated pollock survey



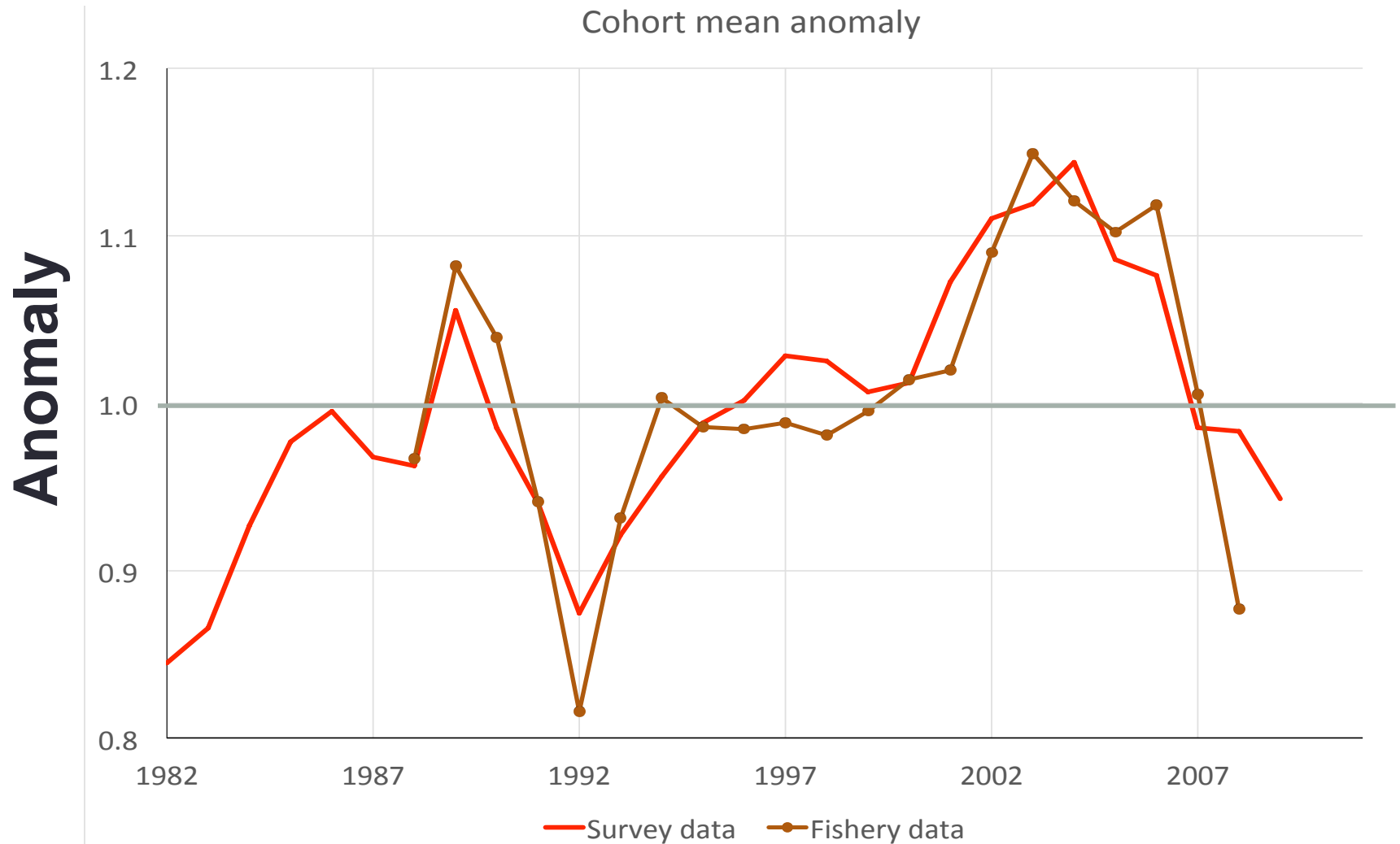
Biological considerations

- Growth variability

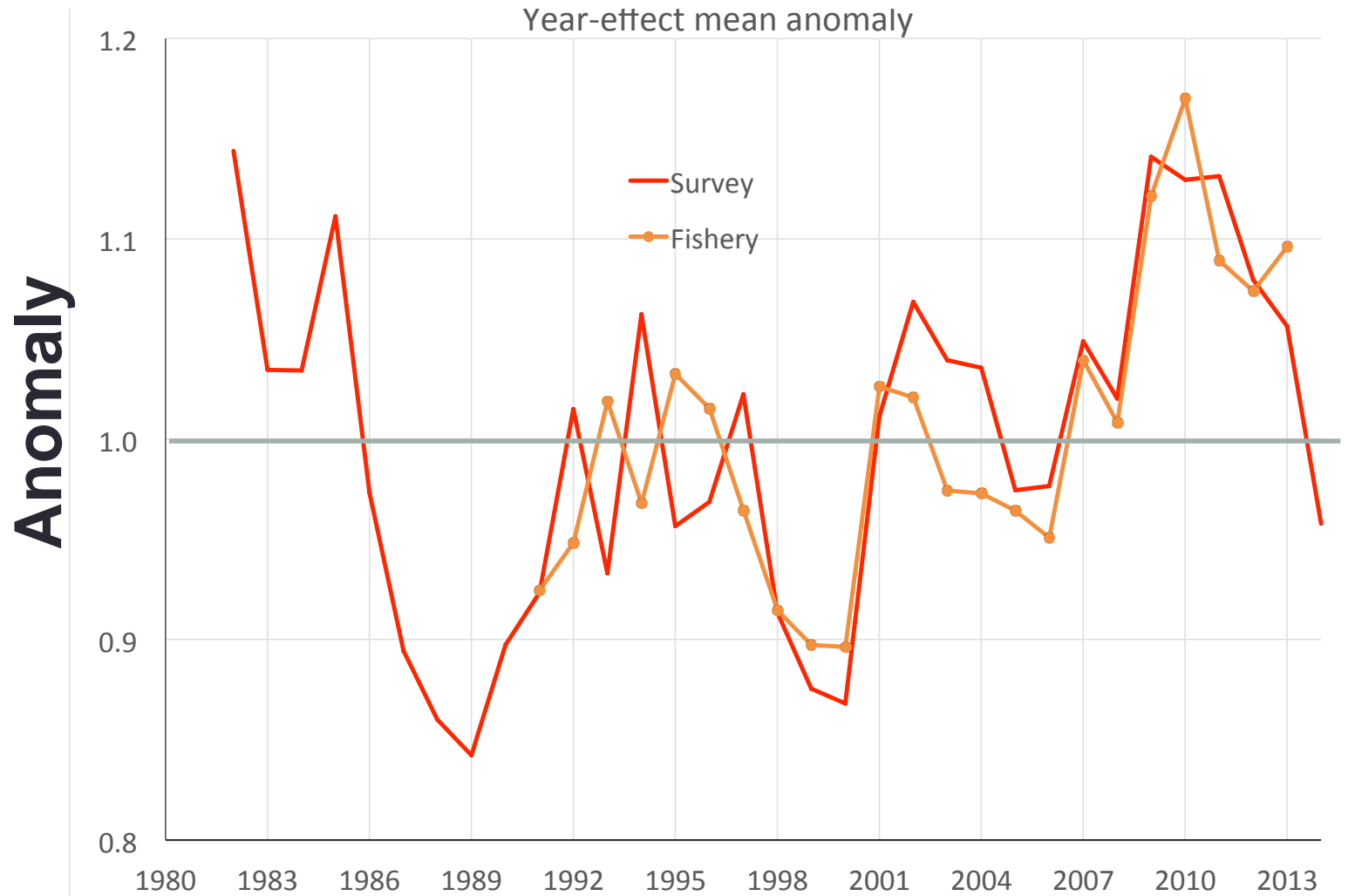
	3	4	5	6	7	8	9	10	11	12	13	14	15
1991	0.81	0.94	0.94	0.94	0.95	0.86	0.87	0.88	0.82	0.85	0.81	0.82	0.75
1992	1.12	0.92	1.00	0.93	0.91	0.95	0.89	0.96	0.90	0.87	0.77	0.87	0.87
1993	1.40	1.21	1.02	1.00	1.04	1.01	1.03	0.97	1.03	1.06	1.08	1.08	0.99
1994	1.11	1.28	1.13	0.97	0.79	0.98	1.20	1.04	0.98	0.97	0.90	0.84	0.84
1995	1.06	0.99	1.13	1.10	0.96	0.94	1.06	1.05	1.03	1.03	0.91	0.78	0.83
1996	0.91	0.81	1.05	1.03	1.06	0.92	0.88	0.86	1.02	1.03	1.01	1.12	0.93
1997	0.91	0.92	0.86	0.96	1.00	1.04	0.94	0.97	1.03	1.01	1.13	0.94	0.86
1998	1.05	1.16	0.97	0.81	0.87	1.00	1.01	0.98	0.94	0.97	1.02	1.00	1.04
1999	1.13	0.99	0.99	0.91	0.81	0.88	0.90	1.00	0.88	0.97	0.76	0.73	0.80
2000	0.99	1.03	0.98	0.95	0.88	0.78	0.84	0.80	0.93	0.91	0.86	1.07	1.05
2001	0.91	0.98	1.04	1.02	1.08	0.97	0.92	0.89	0.97	1.00	1.04	0.94	1.01
2002	1.07	1.00	1.04	1.03	1.02	0.99	0.96	0.86	0.95	0.98	1.05	0.85	0.99
2003	1.37	1.08	1.01	1.00	0.97	0.93	0.94	0.96	0.89	0.84	0.94	0.86	1.04
2004	1.14	1.14	0.99	1.00	1.00	0.90	0.88	0.95	0.85	0.81	0.88	0.83	0.75
2005	1.00	1.00	0.99	0.96	0.99	0.92	0.92	0.86	0.92	0.90	0.86	0.75	0.86
2006	0.86	0.88	0.94	0.98	0.96	0.93	0.91	0.88	0.89	0.88	0.85	0.90	0.88
2007	0.96	1.00	0.99	1.02	1.08	1.07	1.03	1.00	0.97	1.04	0.92	1.13	0.93
2008	0.93	1.03	1.01	1.00	1.01	1.01	0.96	0.95	0.96	0.97	0.99	1.03	0.91
2009	0.97	1.08	1.06	1.16	1.14	1.12	1.21	1.17	1.19	1.13	1.19	1.40	1.39
2010	1.07	0.96	1.03	1.19	1.24	1.22	1.16	1.25	1.18	1.27	1.27	1.31	1.33
2011	0.82	1.00	1.03	1.05	1.09	1.19	1.15	1.18	1.15	1.11	1.38	1.11	1.37
2012	0.76	0.81	0.99	1.07	1.09	1.14	1.13	1.20	1.18	1.13	1.12	1.30	1.28

??

Evaluation of changes in growth

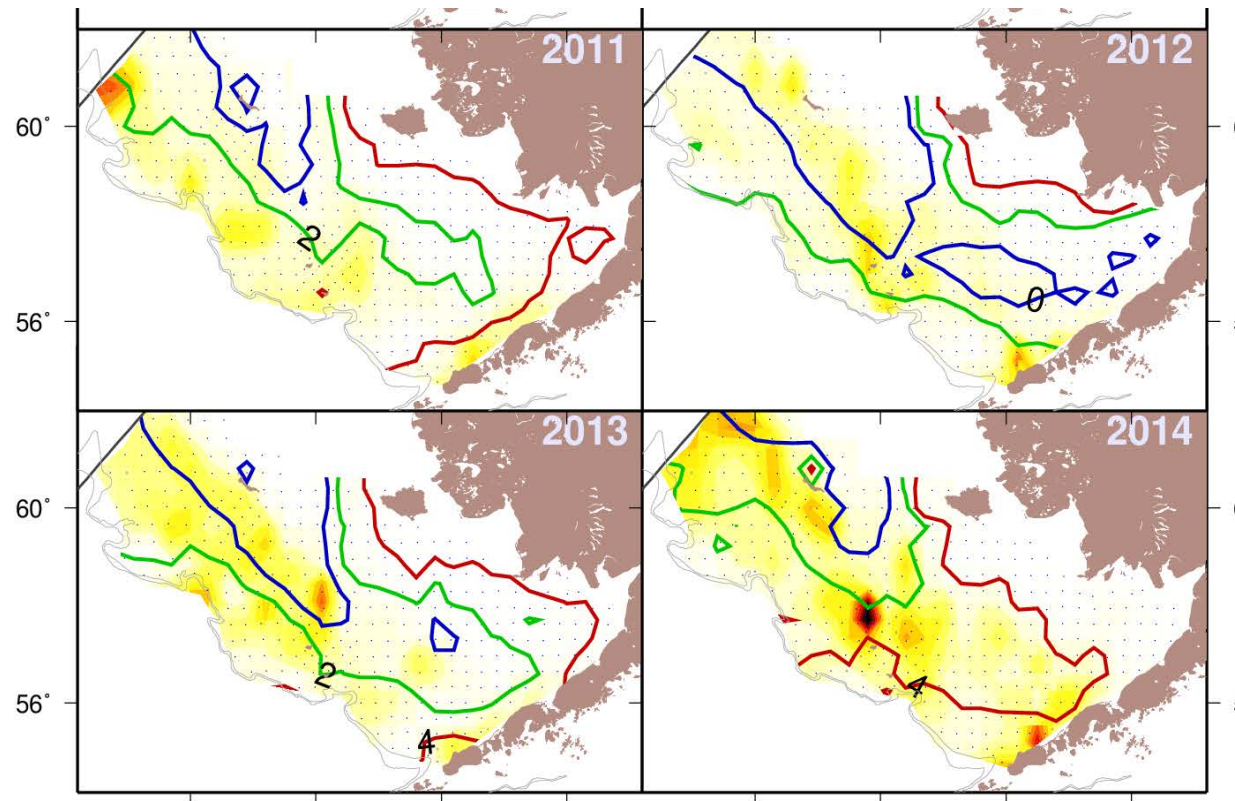


Year-effect

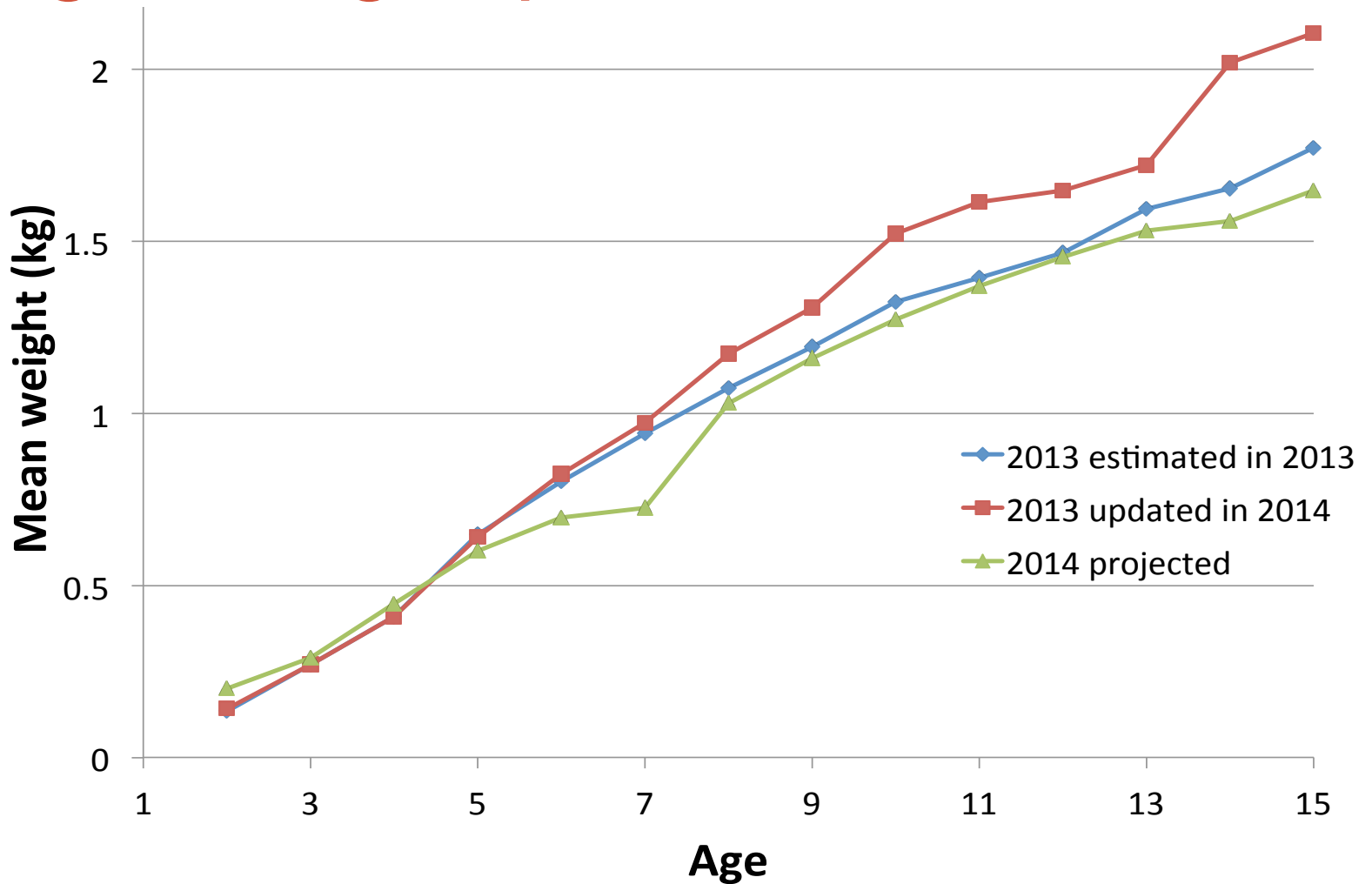


Summary on growth patterns

- More work needed
- Spatial pattern at young ages may be key
 - Year effects low relative to cohort effects



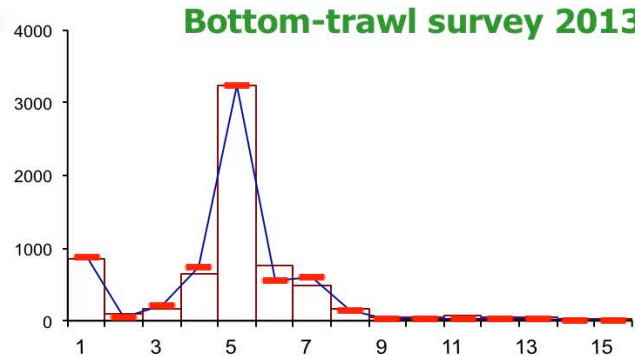
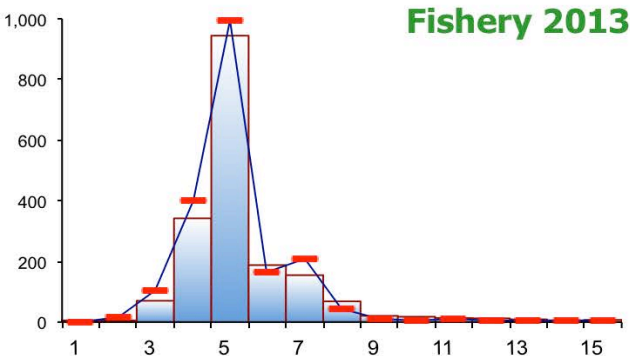
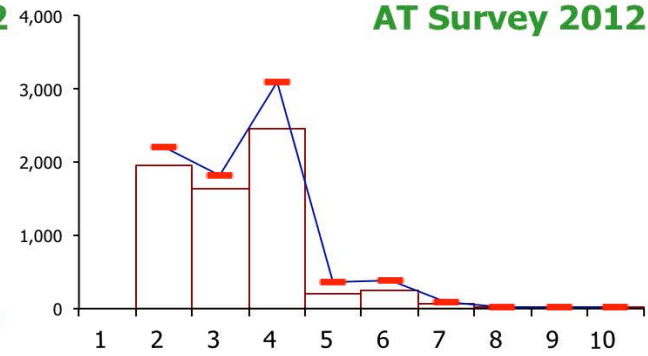
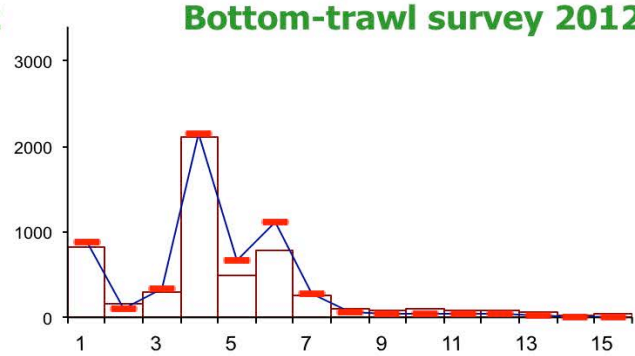
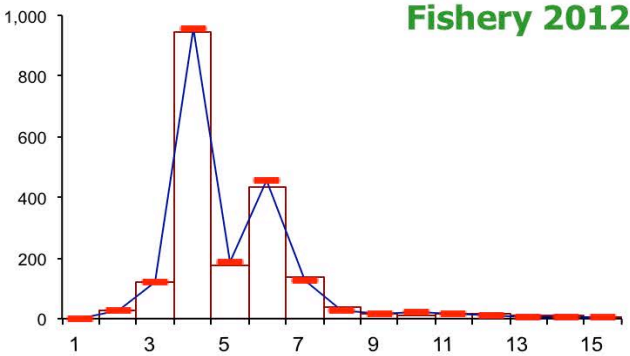
Weight-at-age update



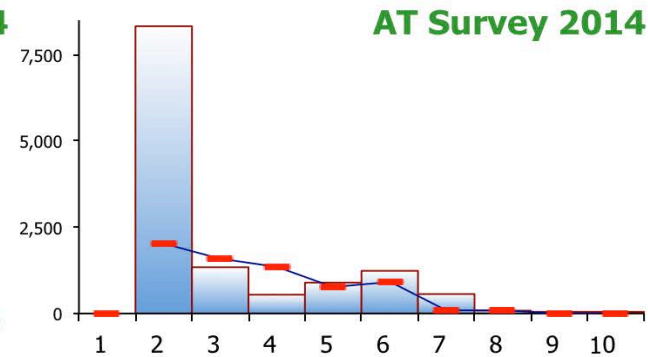
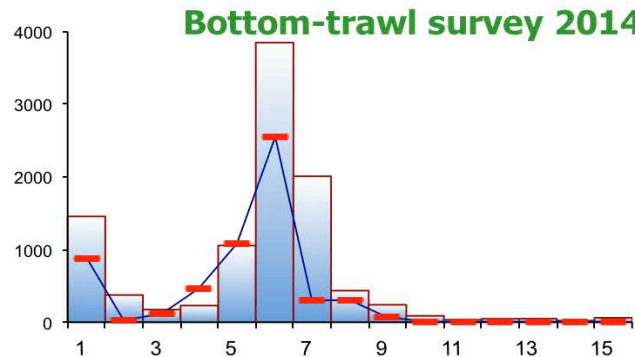
Effect of new data

New data in 2014

Model 0.0



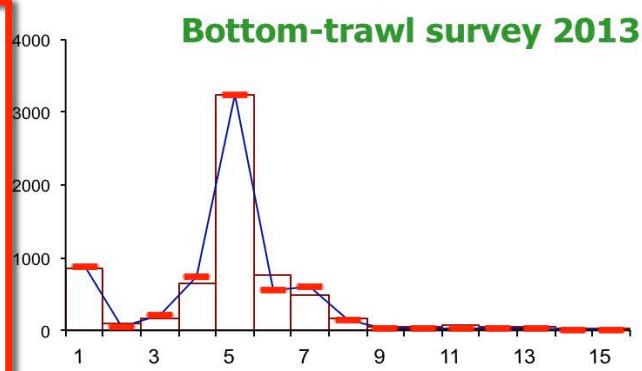
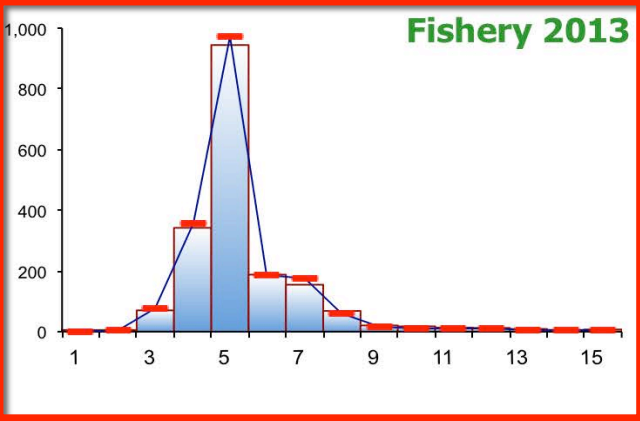
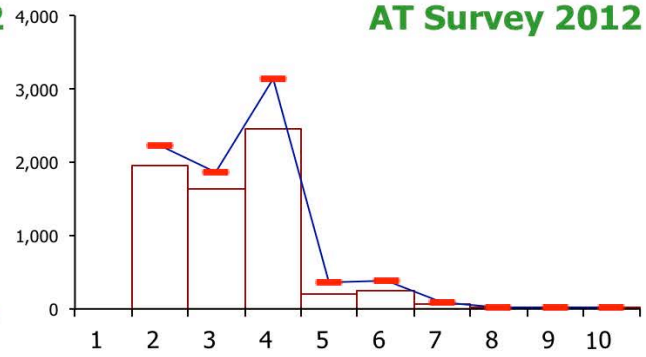
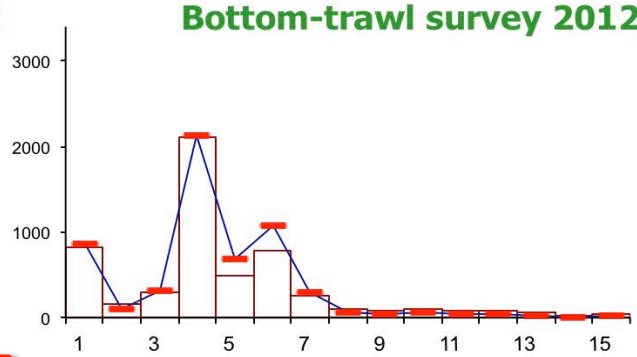
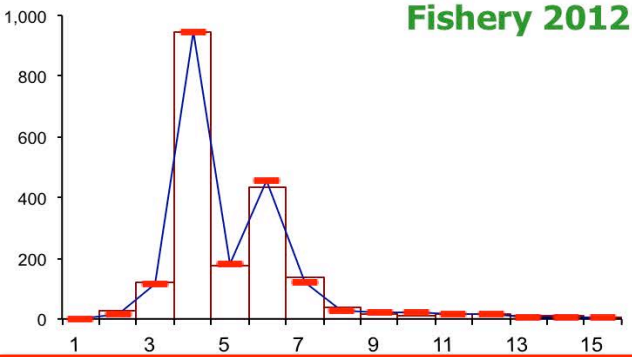
No new data



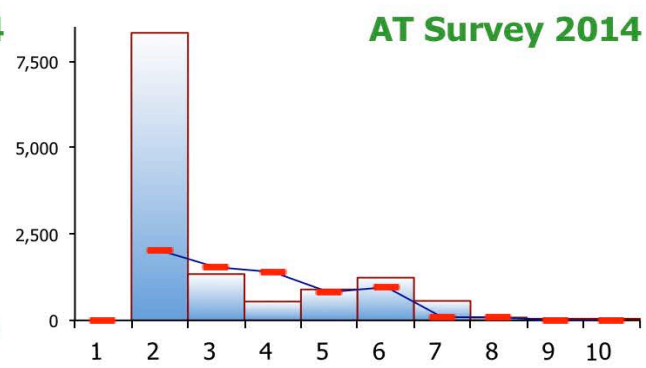
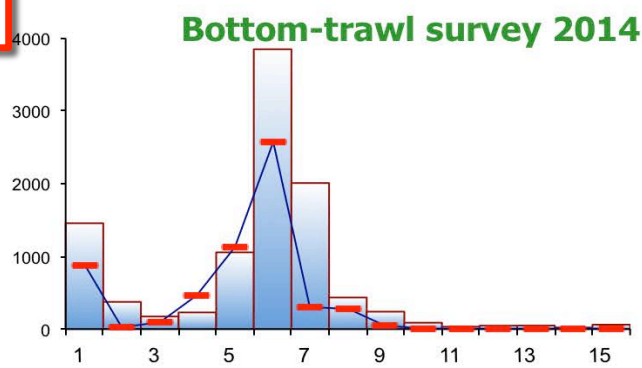
Age

New data in 2014

Model 0.1



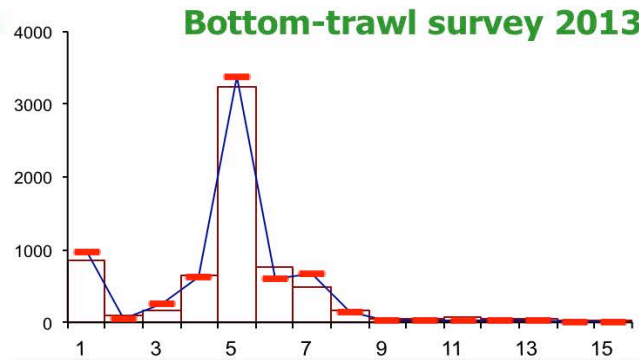
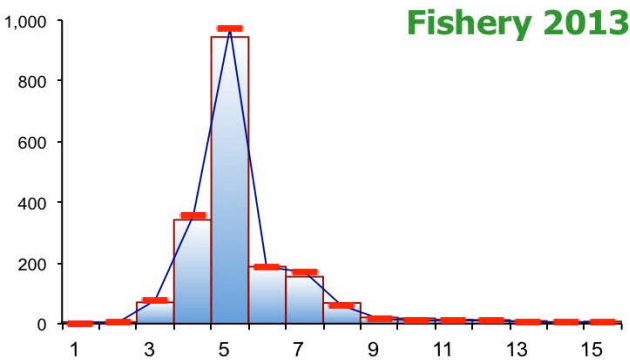
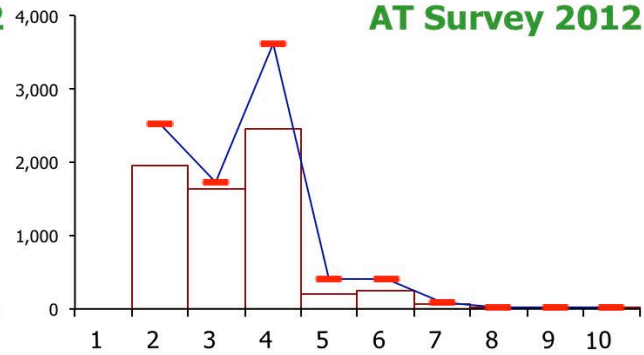
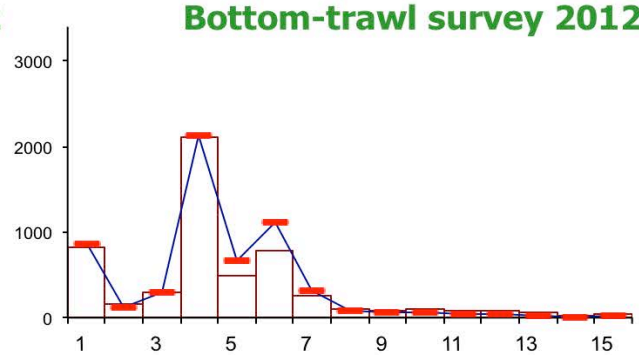
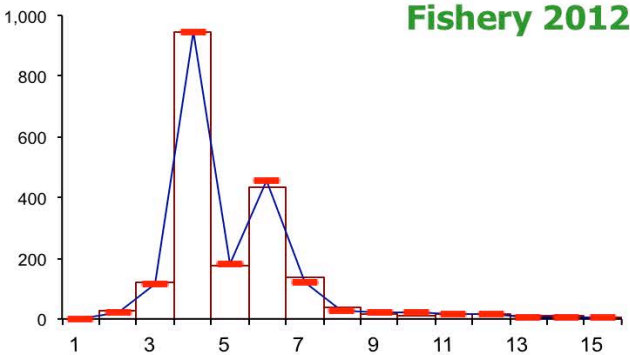
2013 fishery data



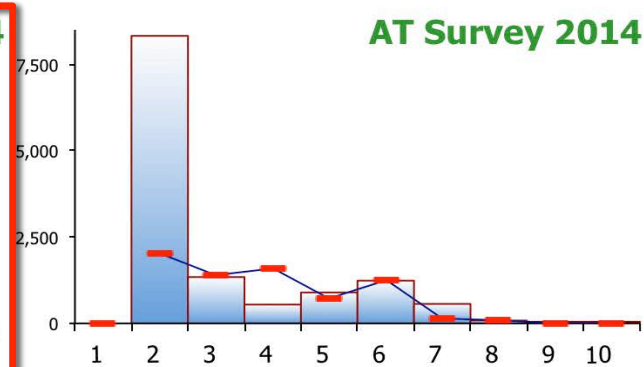
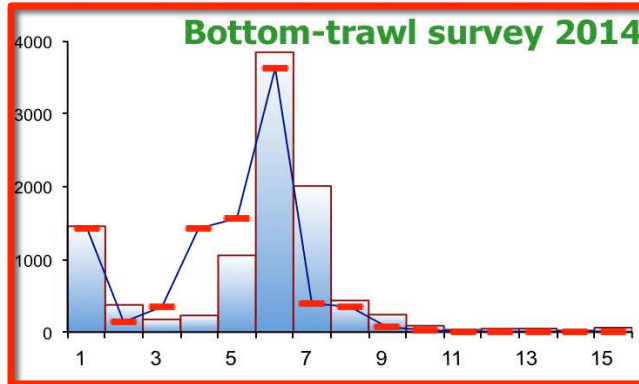
Age

New data in 2014

Model 0.2



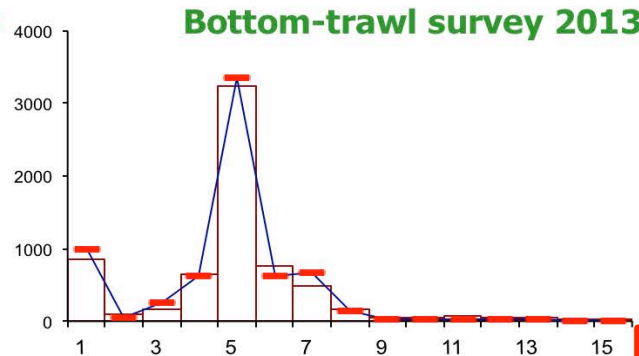
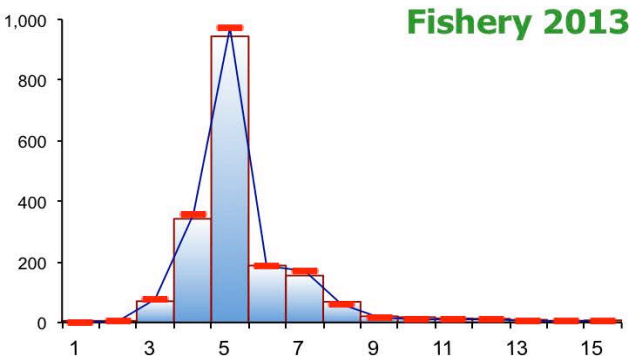
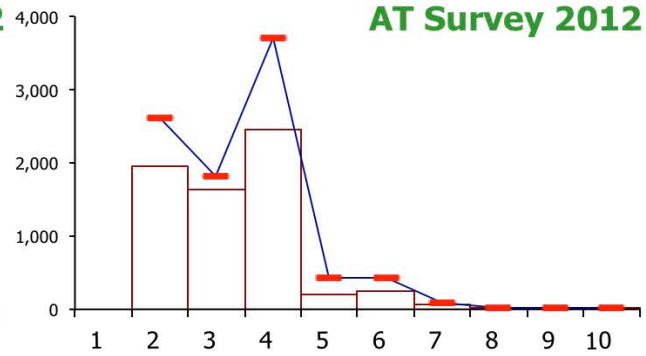
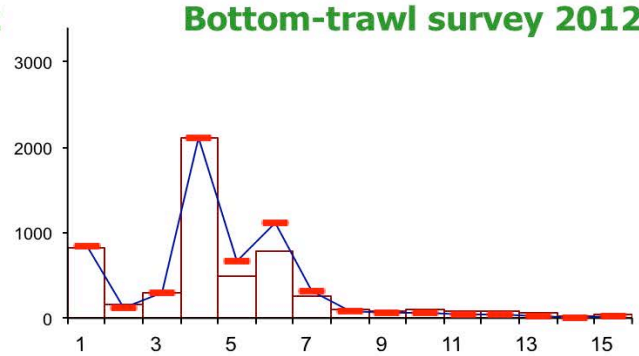
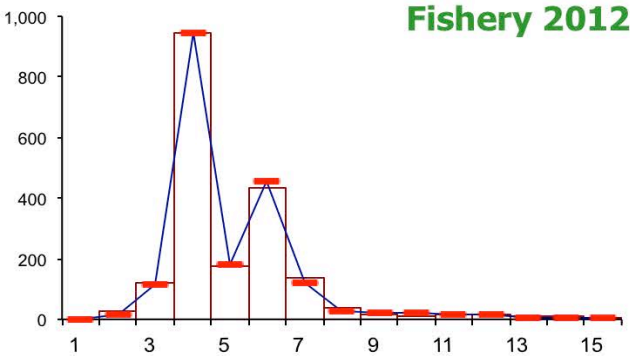
+ Bottom-trawl data



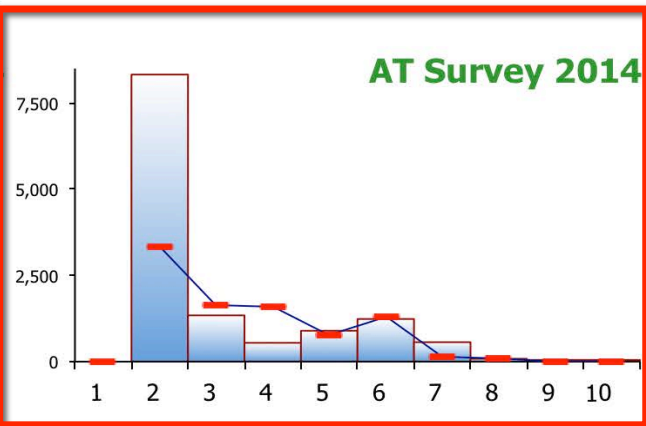
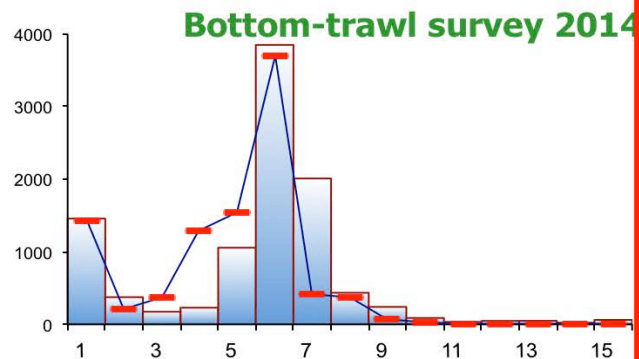
Age

New data in 2014

Model 0.3



All new data



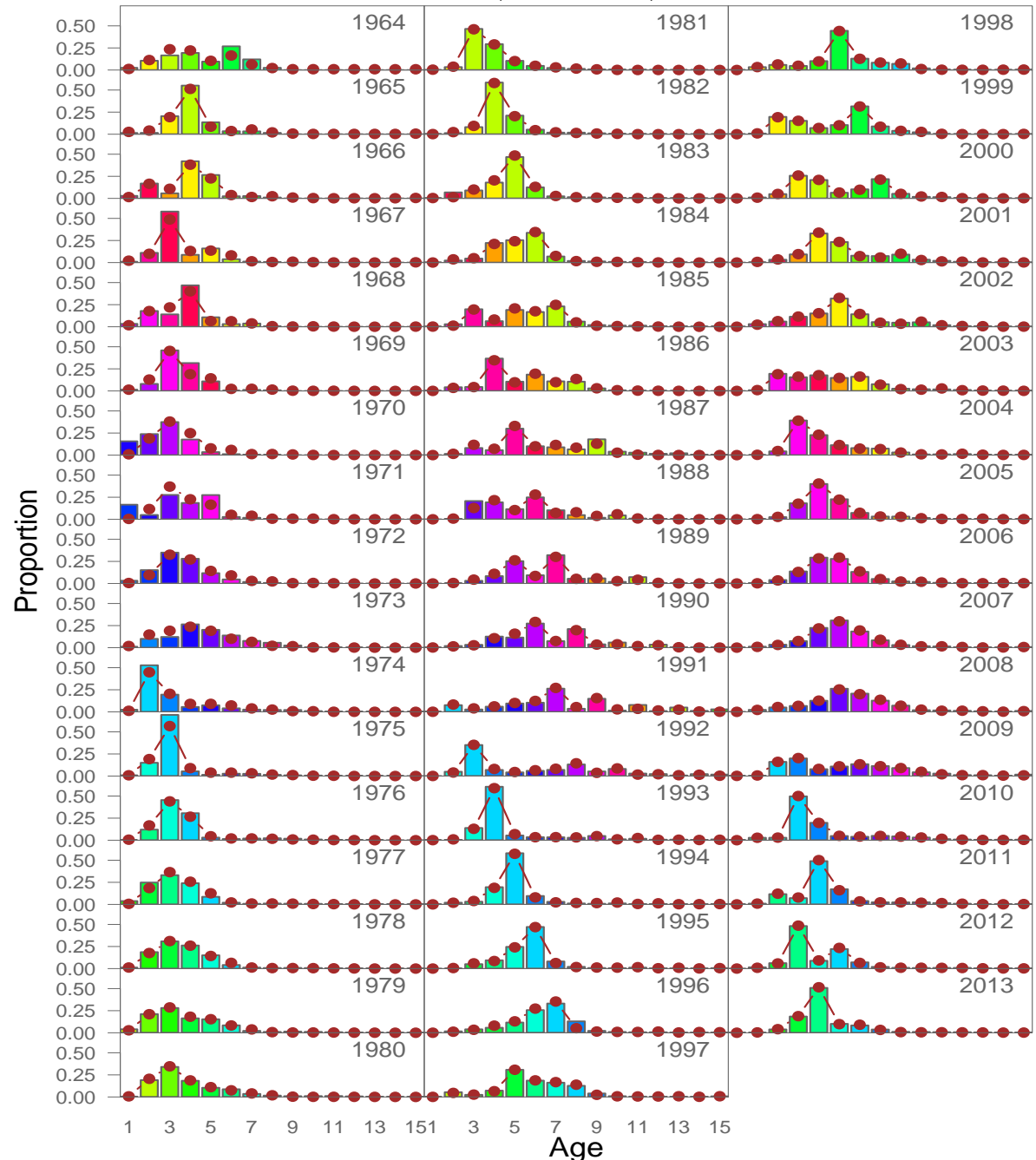
Age

EBS pollock fishery age composition data

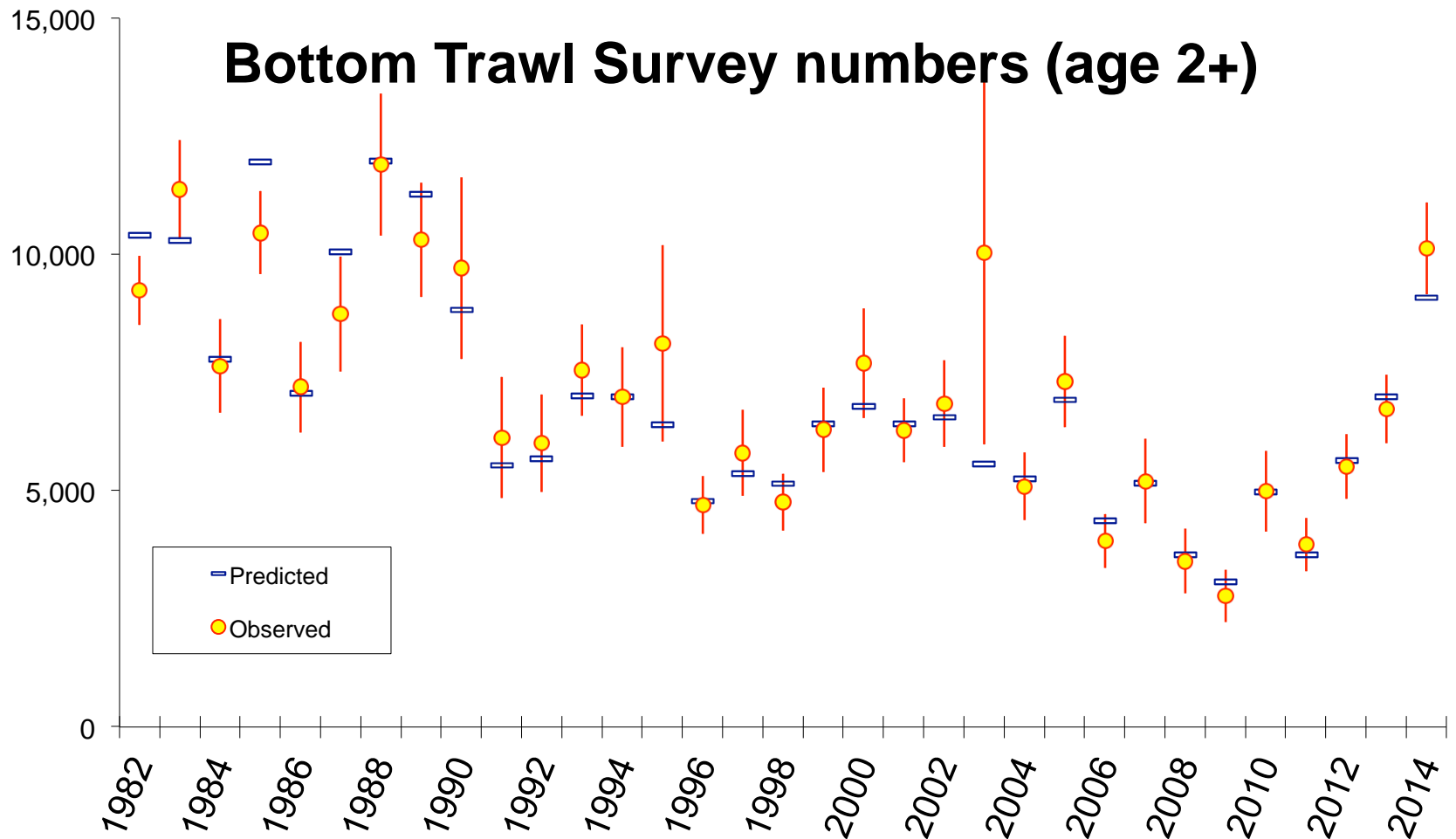
(2014 Assessment)

Fit to fishery

Age composition data



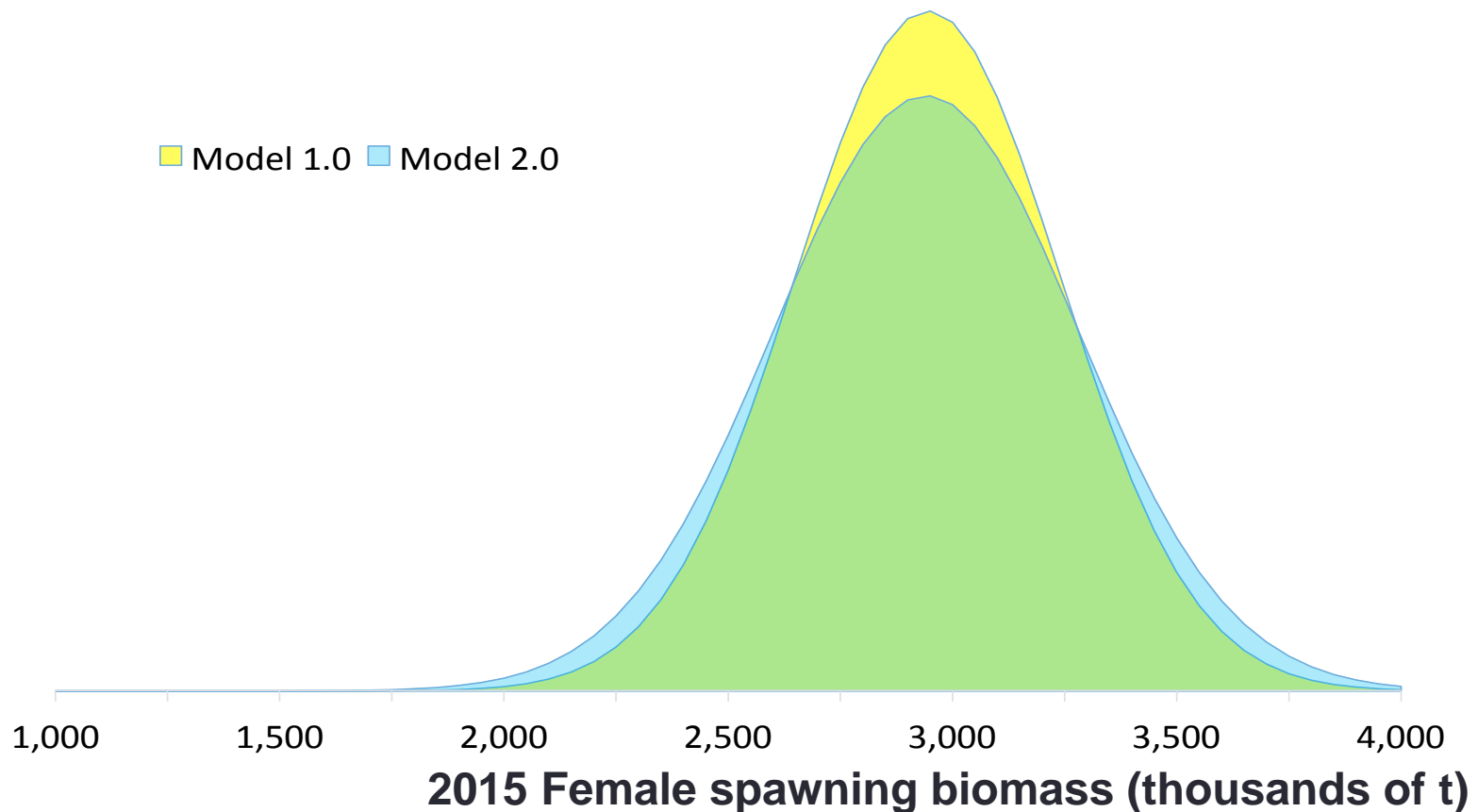
Fit to bottom trawl numbers



Improved interpretations of bottom trawl survey data

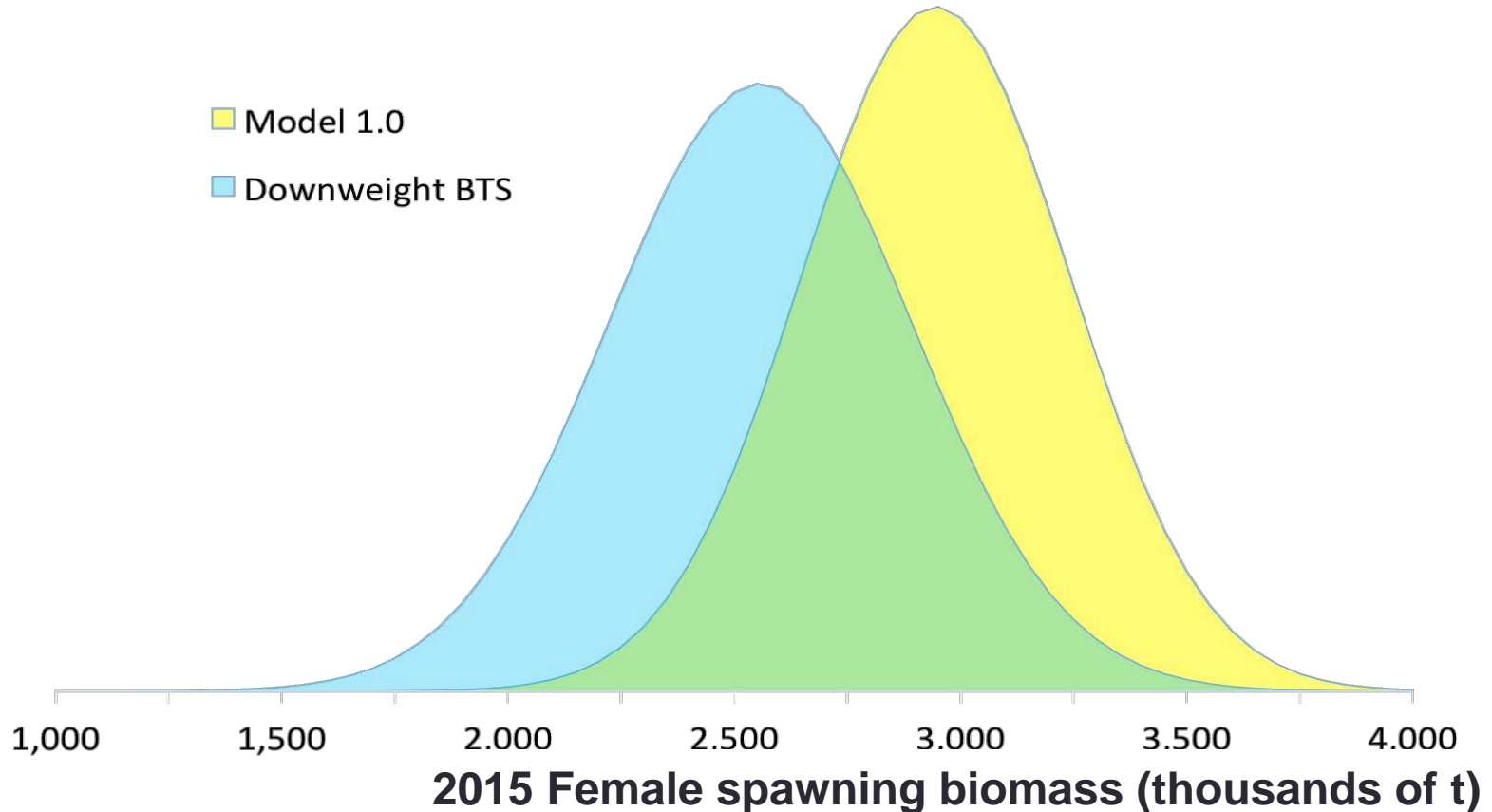
Stan Kotwicki study

2014 spawning biomass distribution

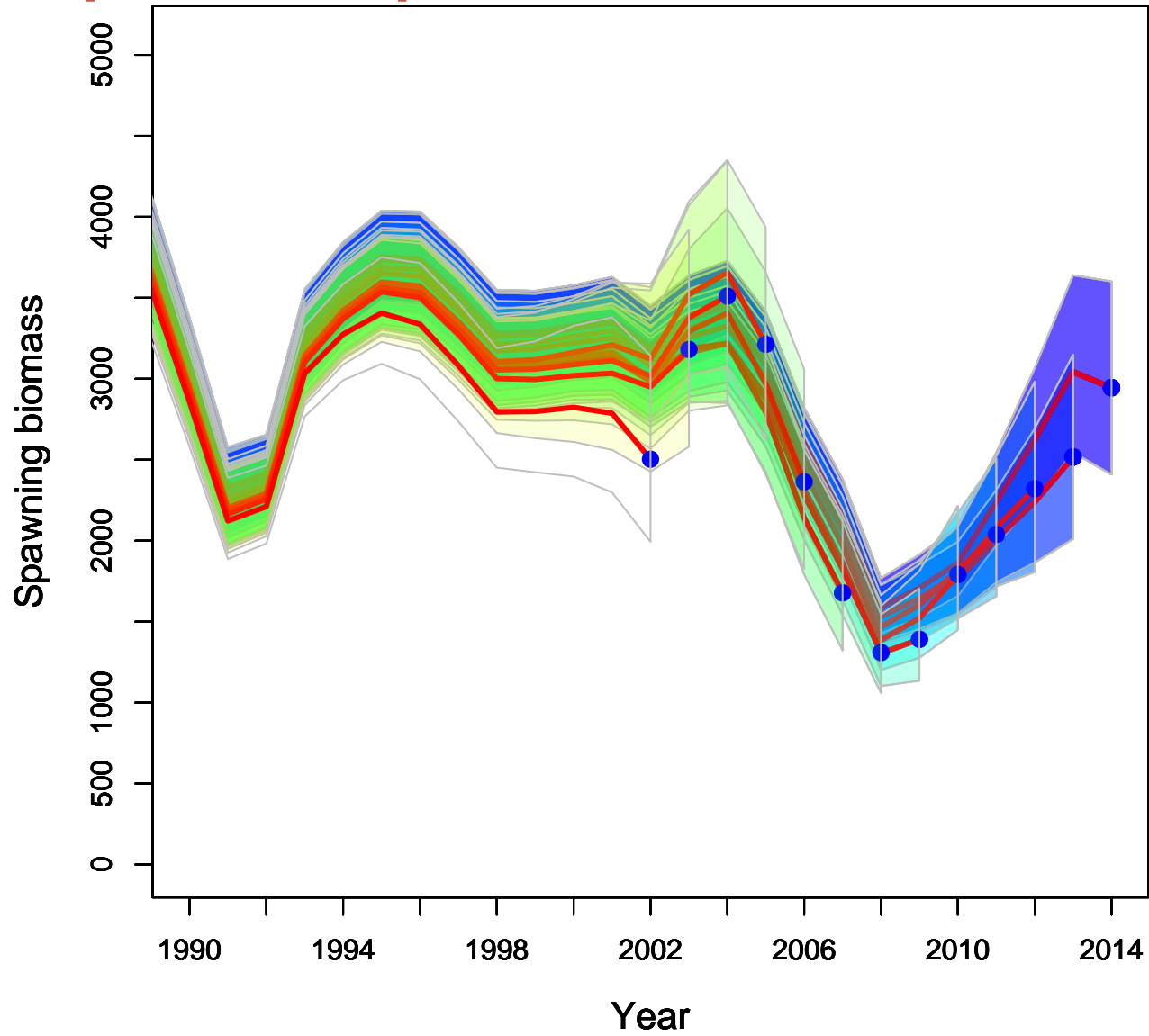


Impact of bottom trawl survey data

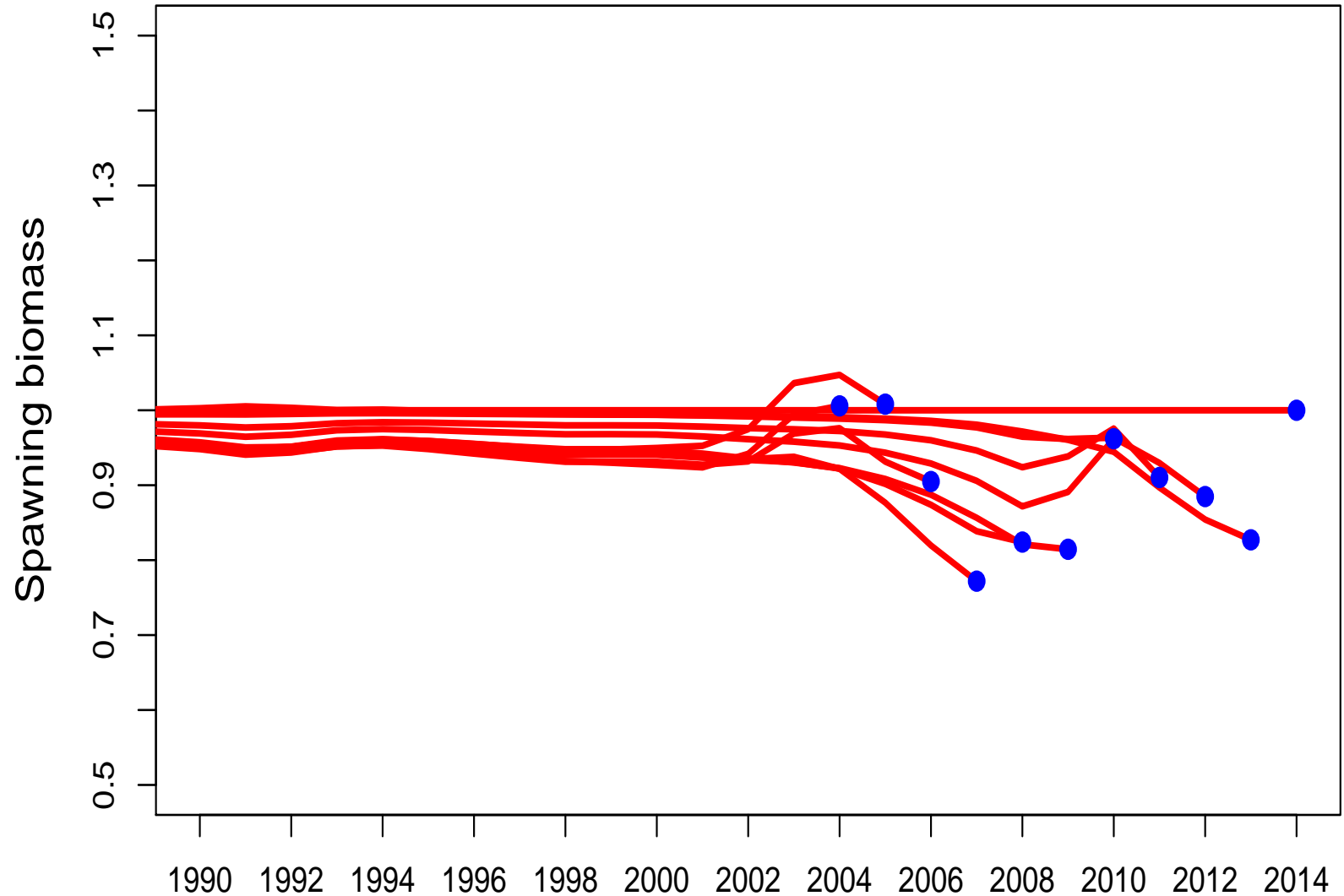
Remove influence of bottom trawl survey



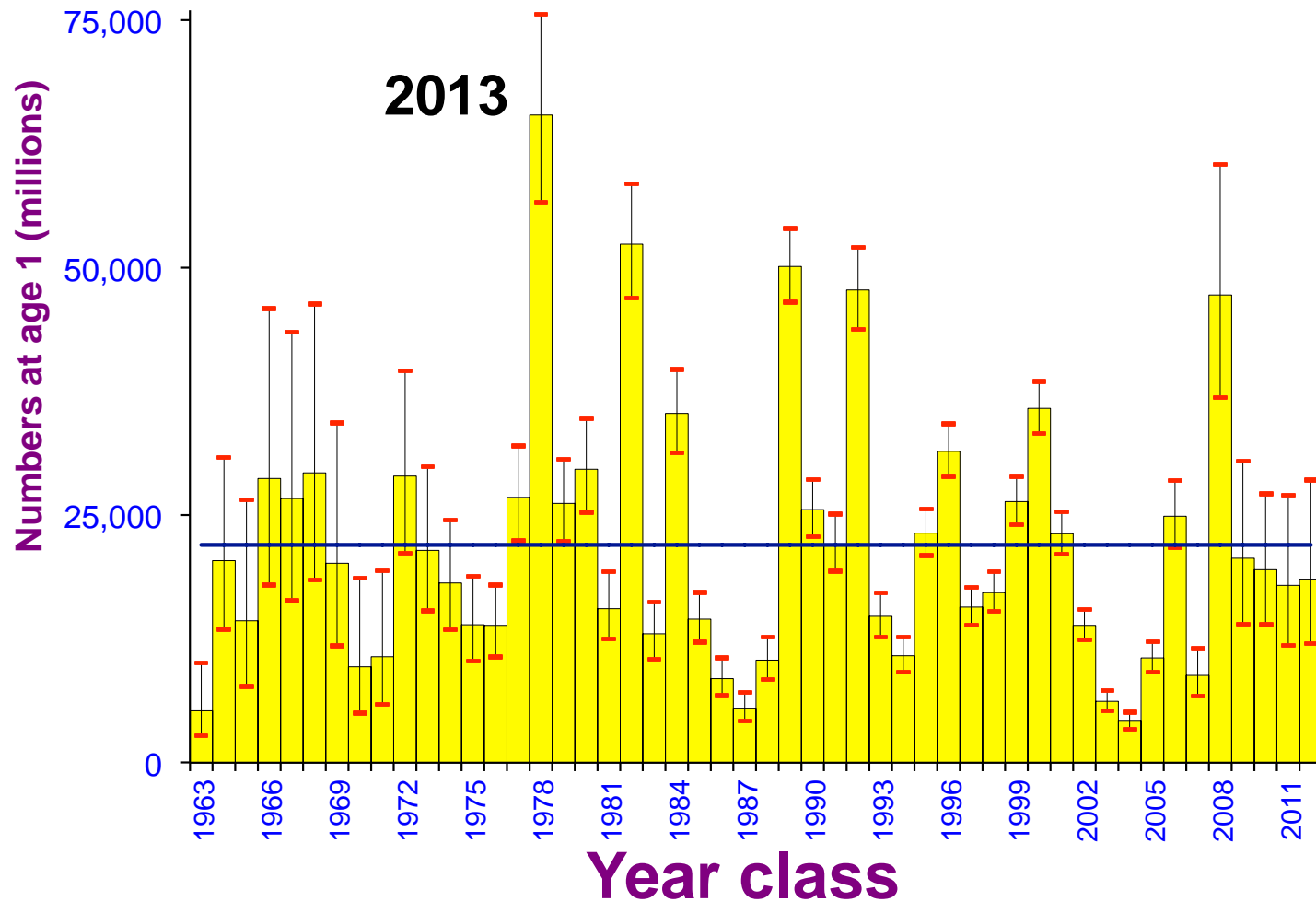
Retrospective patterns



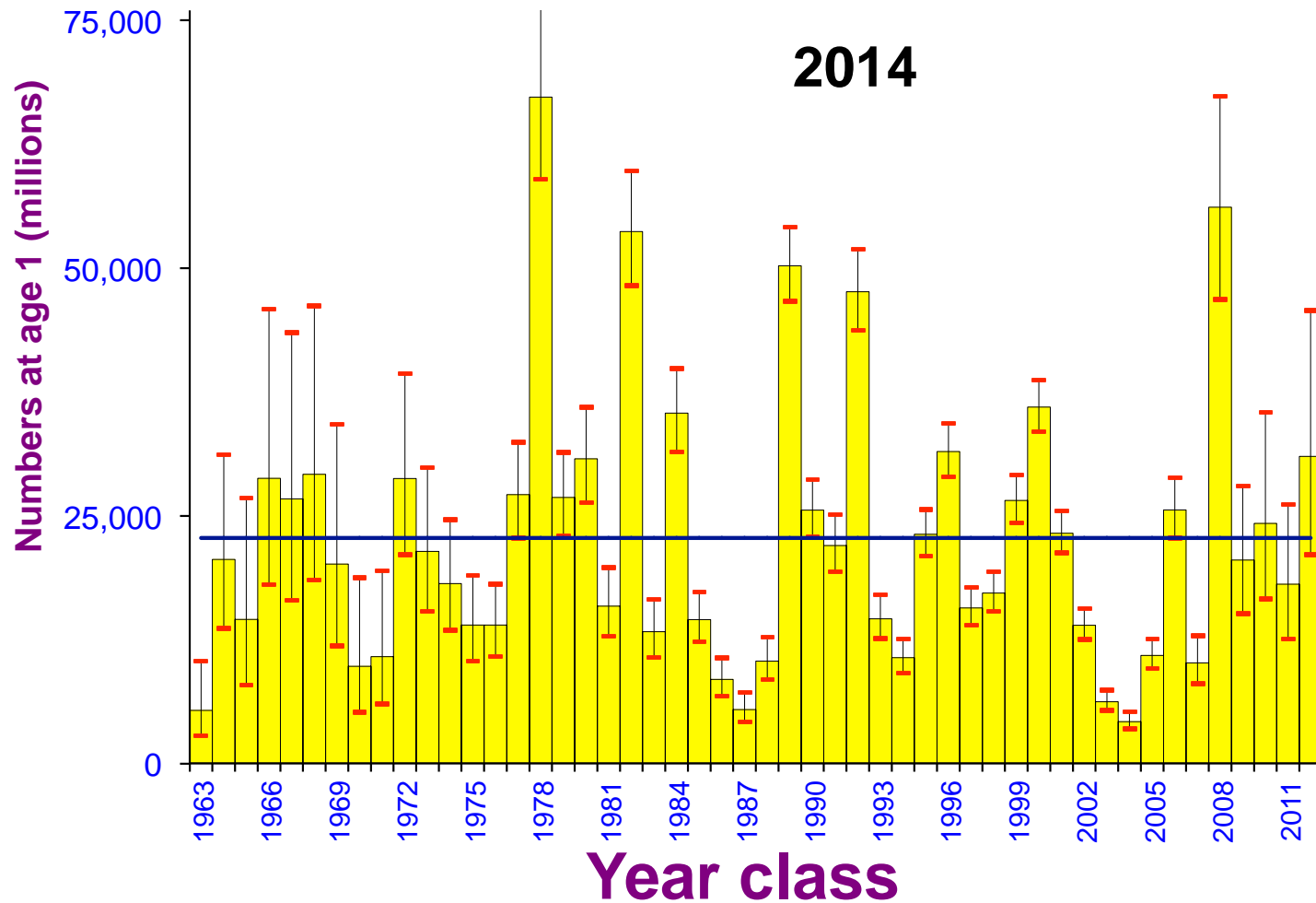
SSB retrospective (relative)

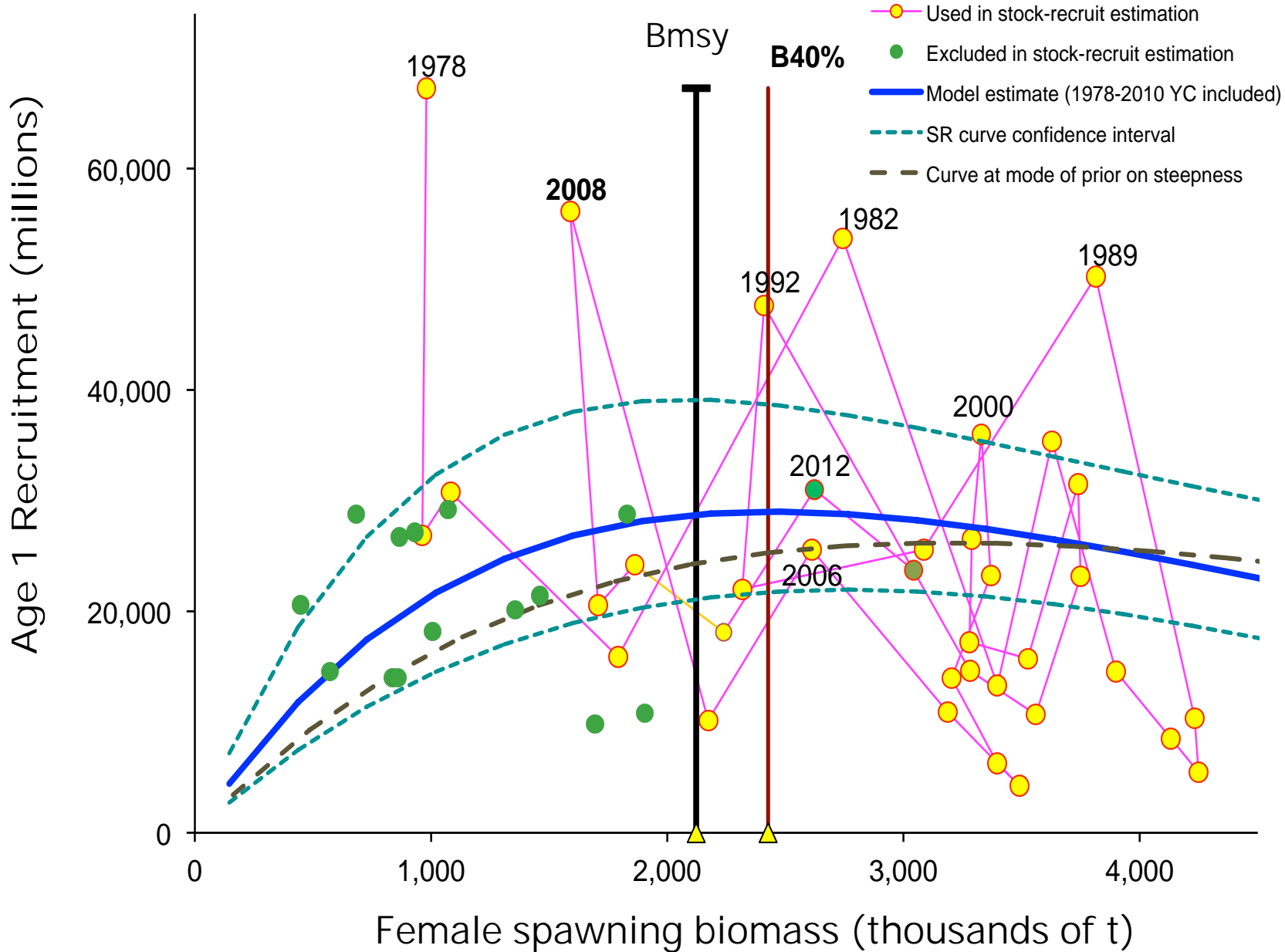


2013 model estimates of year class



2014 model estimates of year class





Catch recommendations

- 1.35 million t....
 - **Model** estimate of catch that stabilizes spawning biomass
 - Tier 1 harvest rate quite high
 - Maximum permissible 2015 ABC nearly at 2.9 million t
 - Clearly result in greater future variability
 - Recent 5-years at higher (~1.5 million t 2002-2006) were followed by lowest ABCs (810kt in 2009-2010)
 - Plausibly more related to warmer conditions that led too poor recruitment...but
 - 2012 year-class early indications good
 - Similar to long-term expected yield in Tier 3 (1.39 million t)

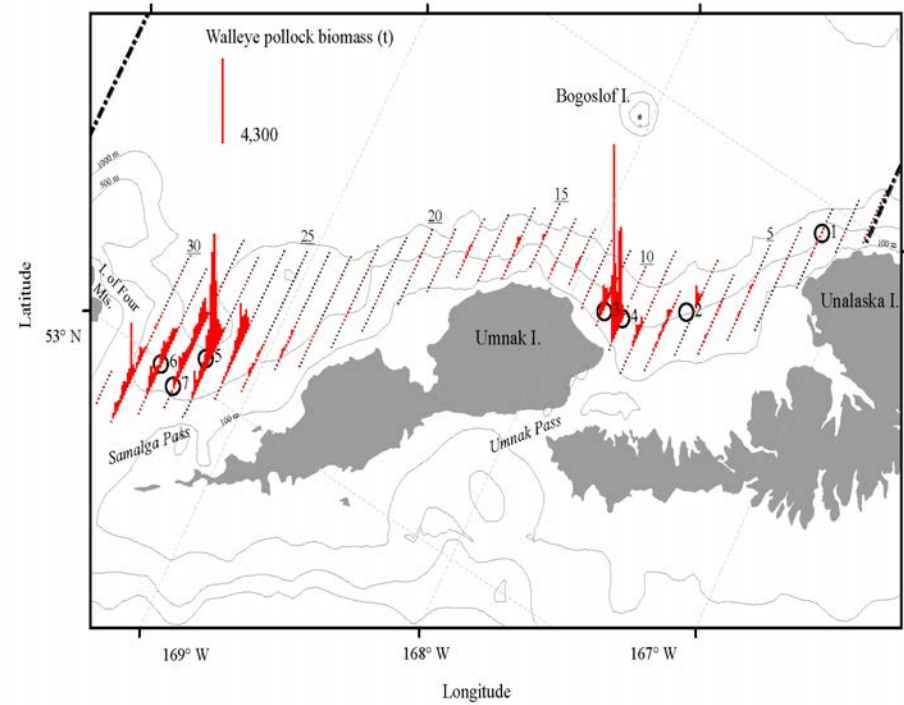
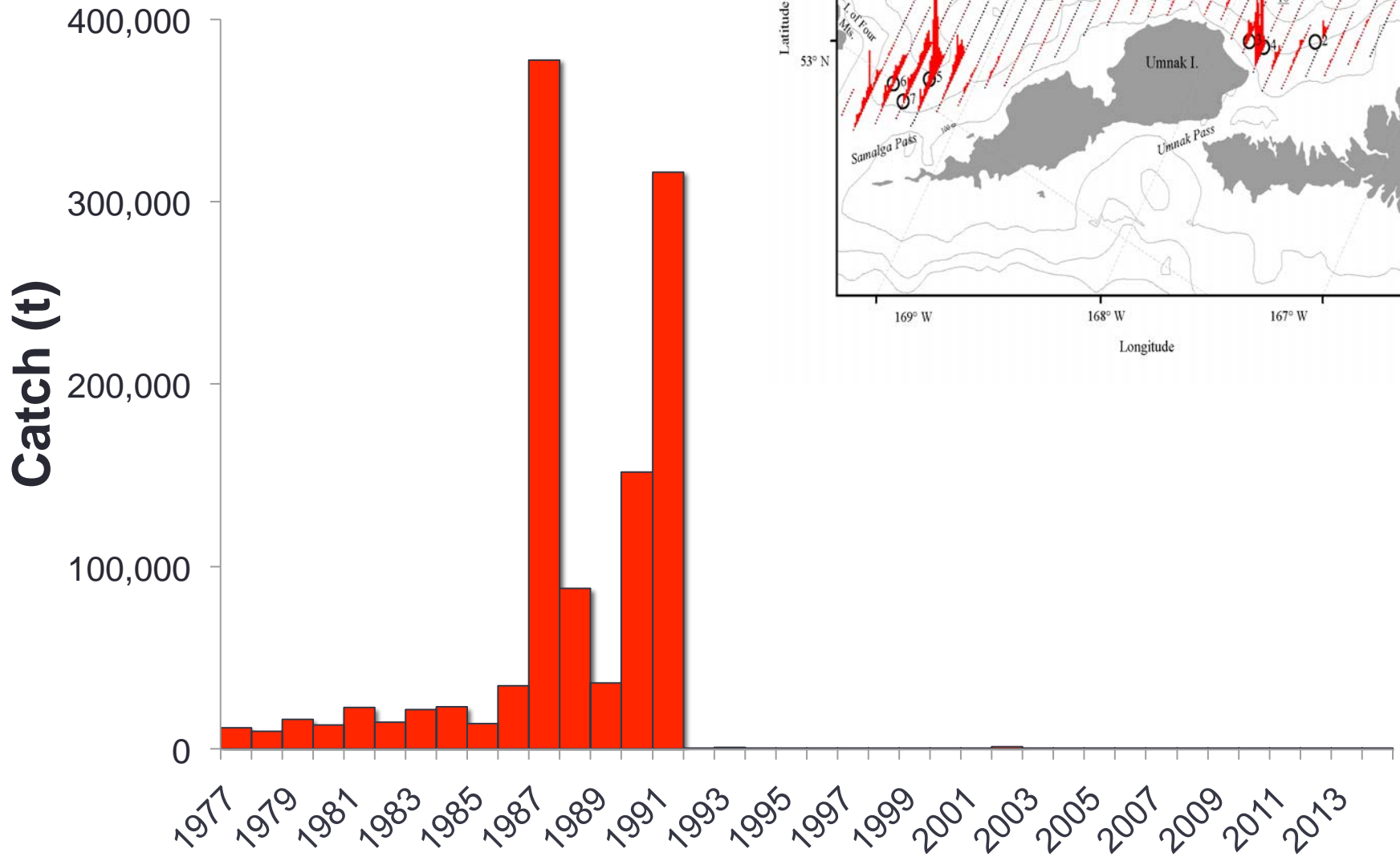
Issues

Salmon bycatch

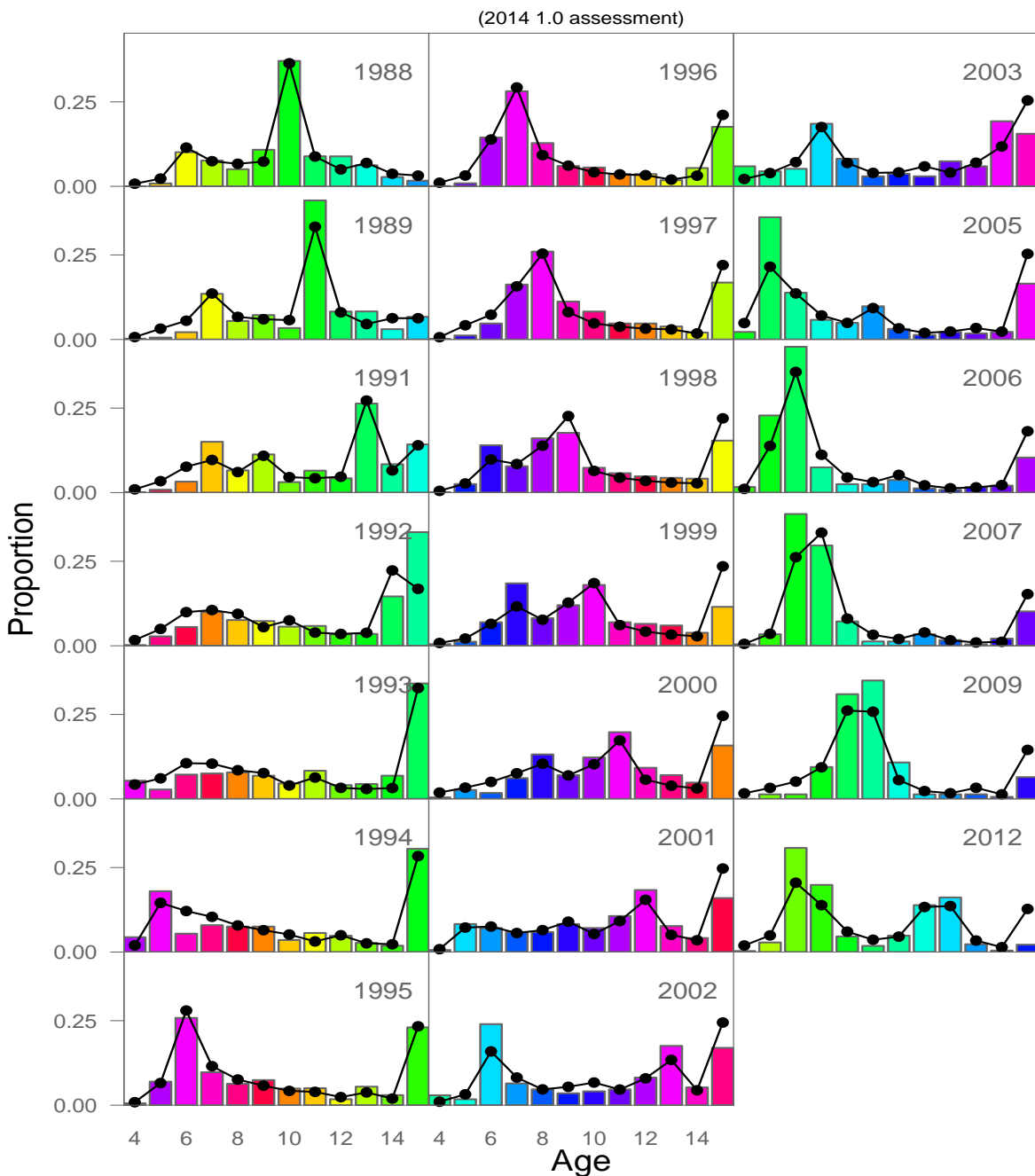
- Sept 2014 petition to call for an emergency closure and cap of 15 thousand Chinook salmon
- Bycatch was lower than that and fishing was 98% complete
- EA/RIR Initial review draft completed
 - To be presented at the December 2014 Council meeting

Medium-term effect of warm conditions

Bogoslof Island



Bogoslof Survey Age composition $M=0.2$



Bogoslof Survey Age composition M estimated

