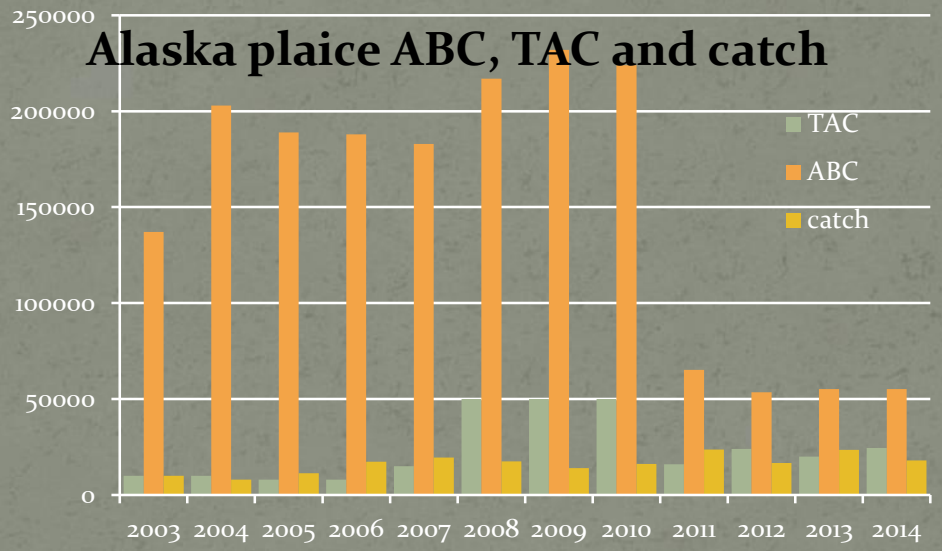
Alaska plaice

by

Wilderbuer, Nichol and Spencer


Alaska plaice ABC, TAC and catch
250000
200000
150000
100000
50000
0
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
TAC
ABC
catch

Changes to the input data

- Last year the assessment model was not run to include the 2013 survey biomass and 2012 age composition information from the survey and fishery.

- 2012 and 2013 shelf survey age composition

- 2014 shelf survey size composition

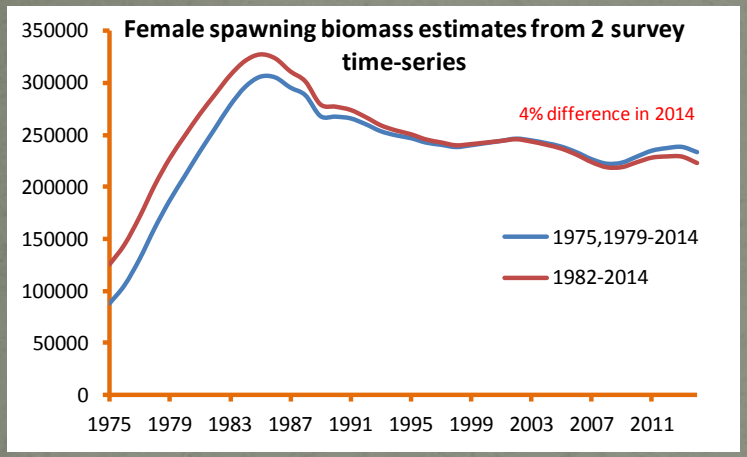
- 2013 and 2014 shelf survey biomass point estimates and standard errors

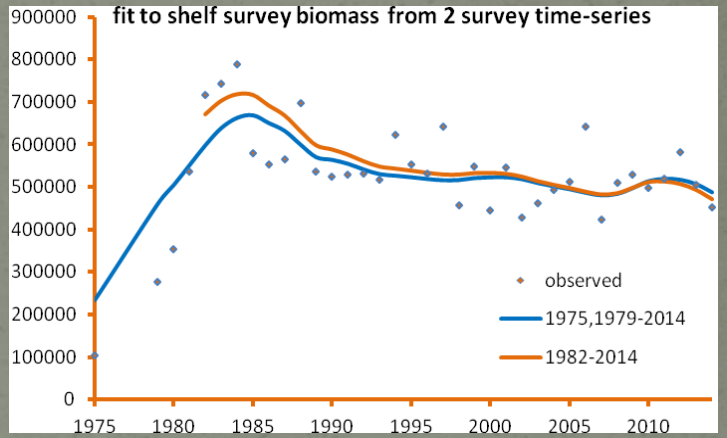
- Estimate of catch (t) and discards for 2013 and 2014

- Estimate of retained and discarded portions of the 2013 catch

Changes to the input data

The current assessment does not incorporate 1975, and 1979-1981 survey biomass data.



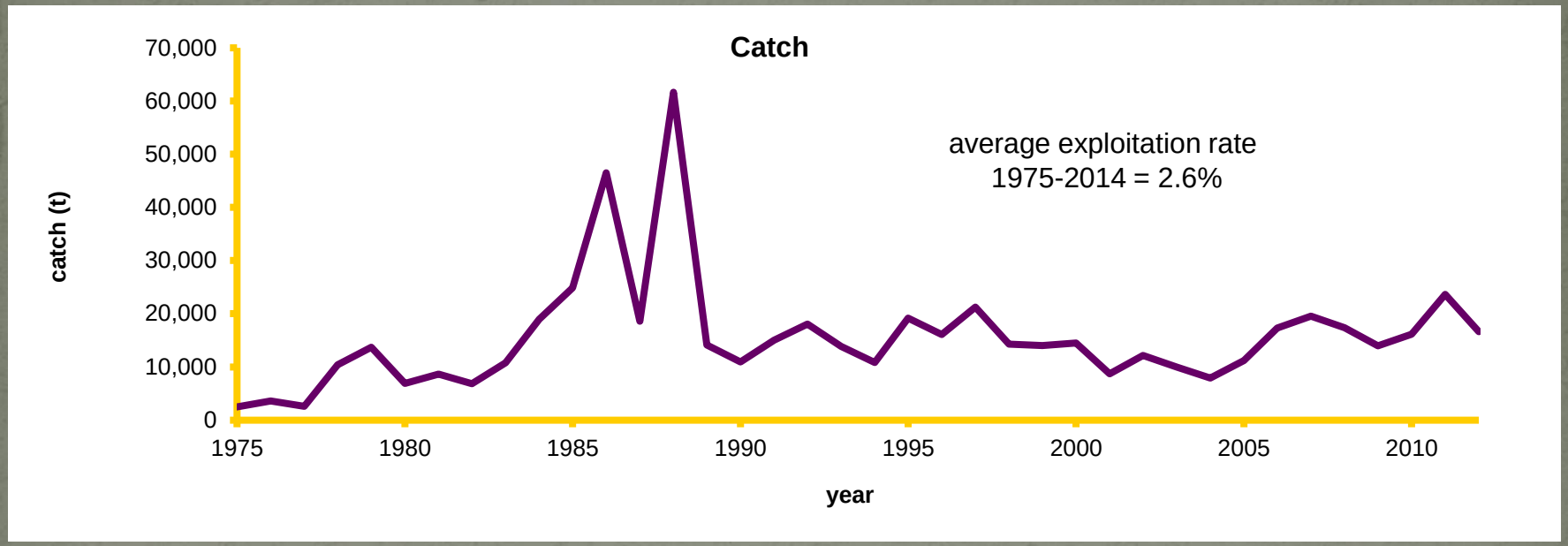


The 2014 assessment introduces a new maturity schedule

Alaska plaice

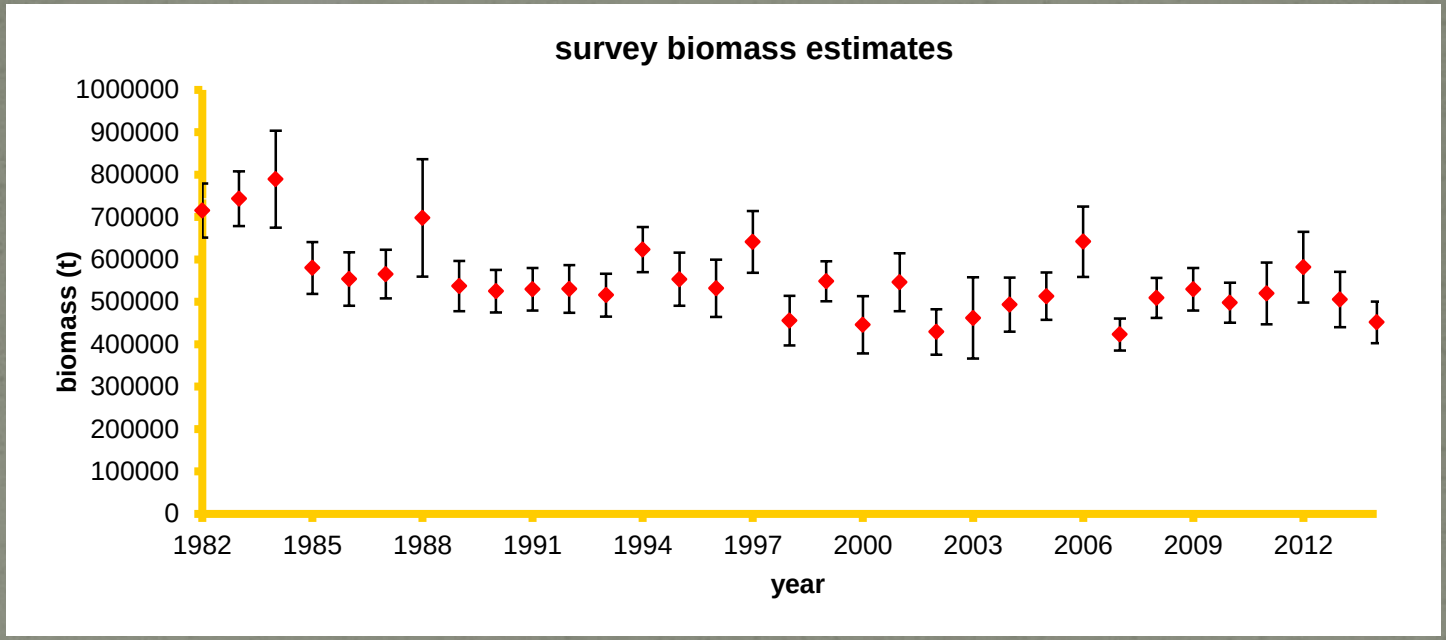
Quantity/Status	Last year 2014	Last year 2015	This year 2015	This year 2016
M (natural mortality)	0.13	0.13	**0.13**	0.13
Specified/recommended Tier	3a	3a	**3a**	3a
Projected biomass (ages 3+)	576,300	572,900	**471,500**	462,600
Female spawning biomass (t)				
Projected	250,600	246,300	**215,300**	201,300
$B_{100\%}$	380,100		**355,250**	
$B_{40\%}$	152,000		**142,100**	
$B_{35\%}$	133,000		**124,300**	
F_{OFL}	0.19	0.19	**0.175**	**0.175**
$maxF_{ABC}$ (maximum allowable = F40%)	0.158	0.151	**0.143**	**0.143**
Specified/recommended F_{ABC}	0.158	0.151	**0.143**	**0.143**
Specified/recommended ABC (t)	55,100	54,700	**44,900**	42,900
Specified/recommended OFL (t)	66,800	66,300	**54,000**	51,600
Is the stock being subjected to overfishing?	No	No	No	No
Is the stock currently overfished?	No	No	No	No
Is the stock approaching a condition of being overfished?	No	No	No	No

2014 catch = 18,600 t
average 1975-2014 exploitation rate = 3%

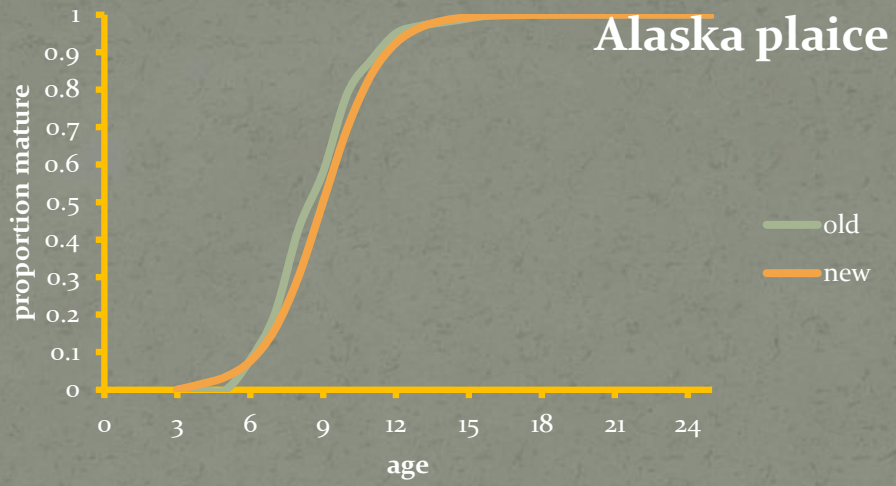


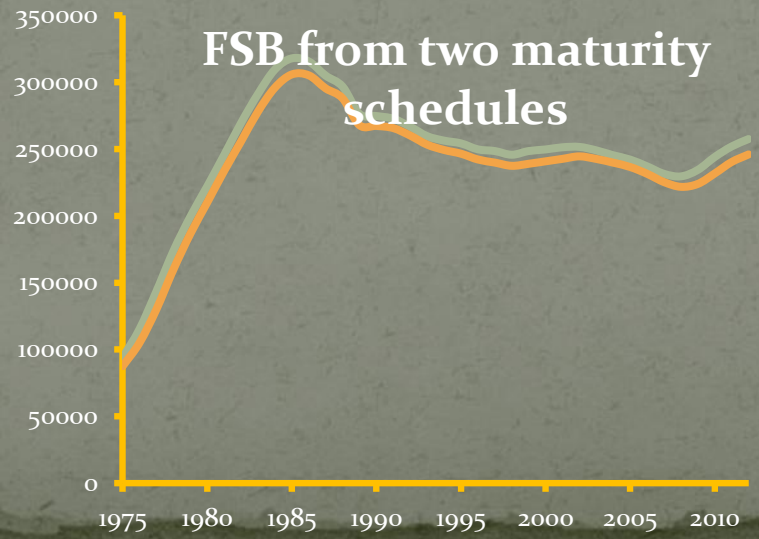
year	Discard	Retained	Total	Proportion discarded
2002	11,806	370	12,176	0.97
2003	9,428	350	9,778	0.96
2004	7,193	379	7,572	0.95
2005	10,293	786	11,079	0.93
2006	14,746	2,564	17,310	0.85
2007	15,481	3,946	19,427	0.8
2008	9,330	8,046	17,376	0.54
2009	5,061	8,882	13,945	0.36
2010	5,845	10,322	16,166	0.36
2011	7,197	16,459	23,656	0.30
2012	3,589	13,023	16,611	0.22
2013	9,053	14,470	23,523	0.38

2014 shelf survey biomass estimate = 451,600 t
22% decrease from 2012 to 2014



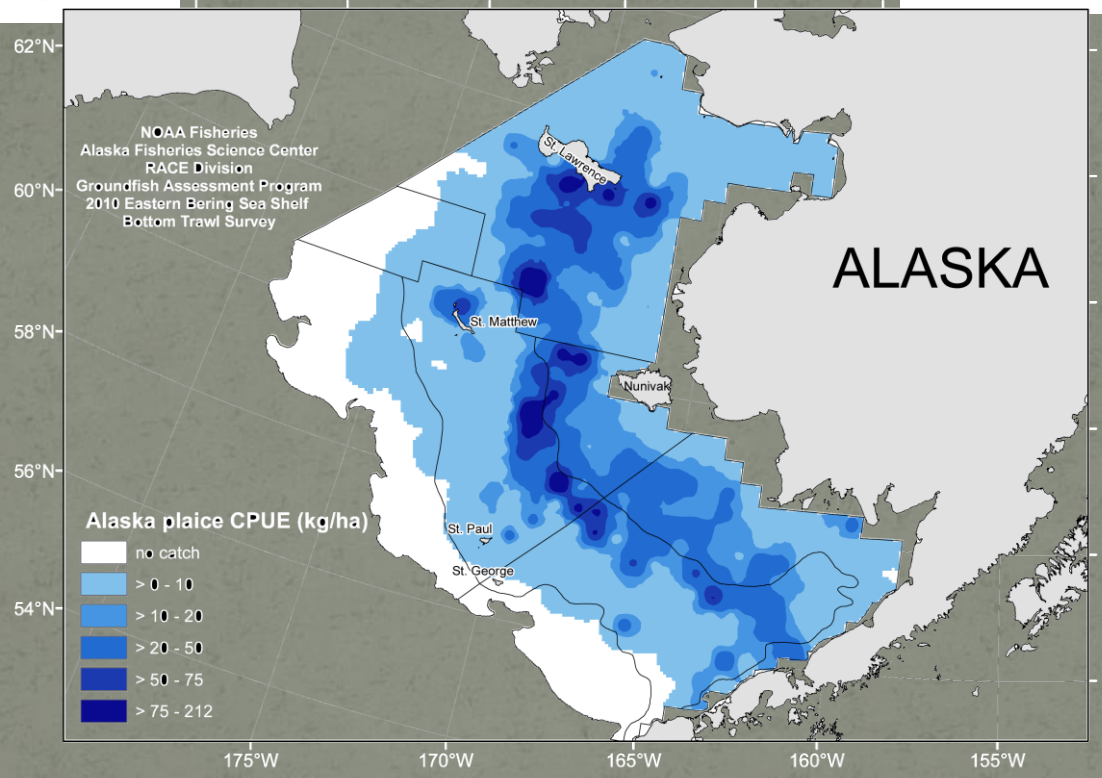
New maturity from histology





5% decrease in end year FSB

Alaska plaice distribution in the 2010 Bering Sea and northern Bering Sea trawl survey



- 38% of the total biomass was found in the northern Bering Sea

Alaska plaice split-sex model

uses:

sex-specific estimates of fishery and survey age composition and length composition and weight at age

Estimates:

Sex-specific estimates of population number, fishing mortality, selectivity, fishery and survey age composition.

Allows for estimation of sex-specific natural mortality

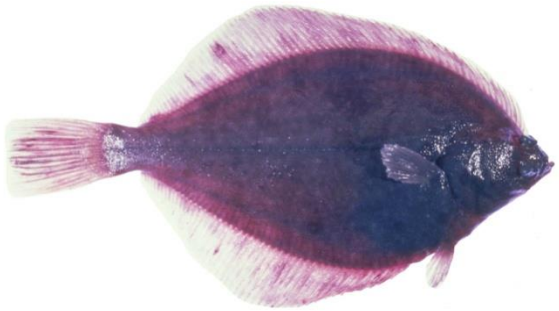
Stock assessment model

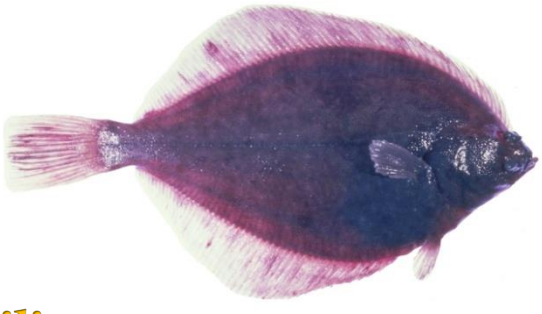
- Data components include:
- fishery size comps 1983-87,1989-91, 1996-1997, 1999, 2003-2005, 2008-2012
- fishery age comps 2000, 2002-2003
- Survey biomass 1975, 1979-2014
- Survey age comps 1982, 1988, 1992-1995, 1998, 2000-2002, 2005- 2013
- Survey length comps 1983-1987, 1989-91,1996-97,1999,2003-2004, 2014

- selectivity is fixed asymptotic for older fish.

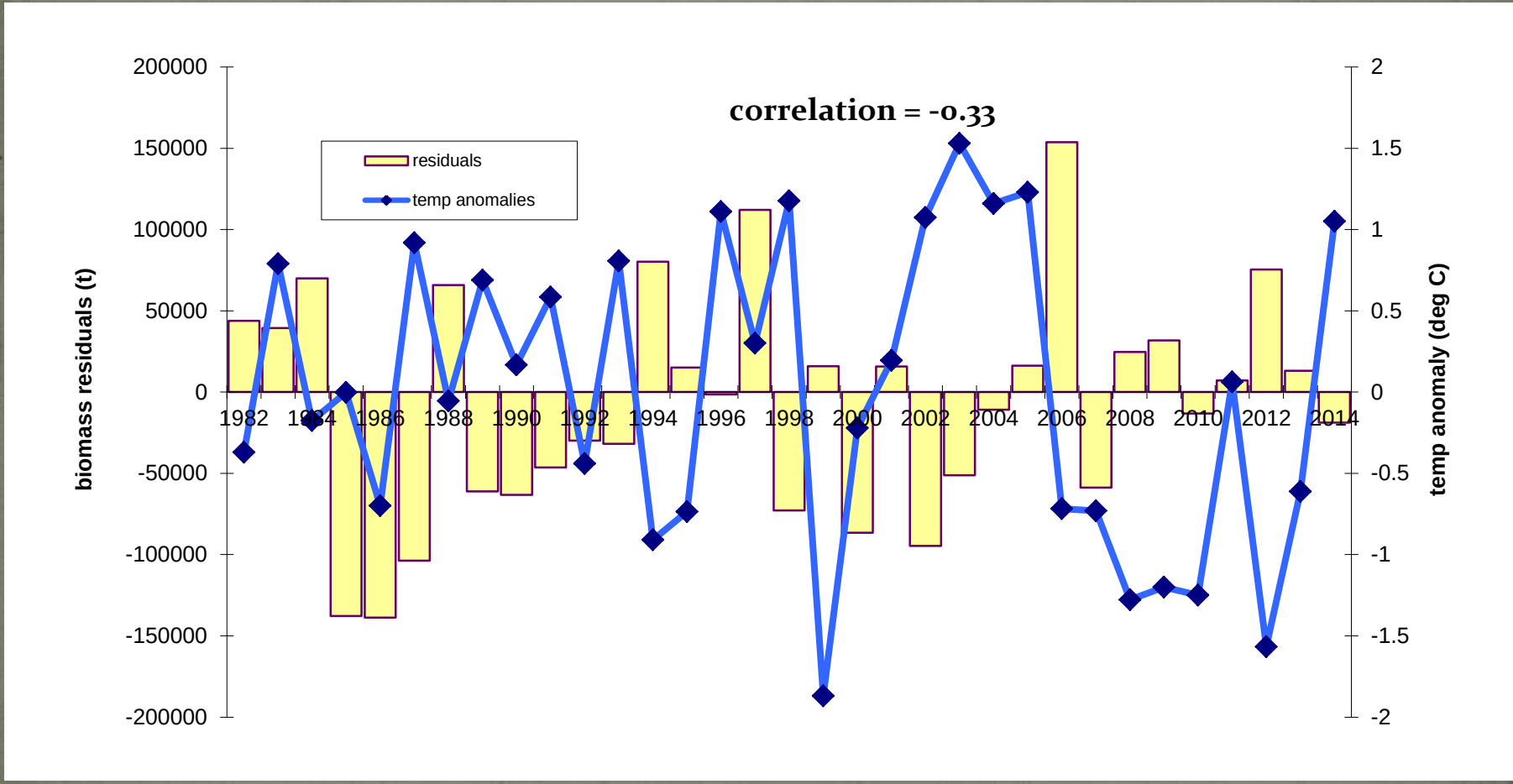
- natural mortality was fixed at 0.13 for males and females

- Catchability was fixed at 1.2 and was found not to be related to temperature in a past assessment (Spencer et al. 2004)

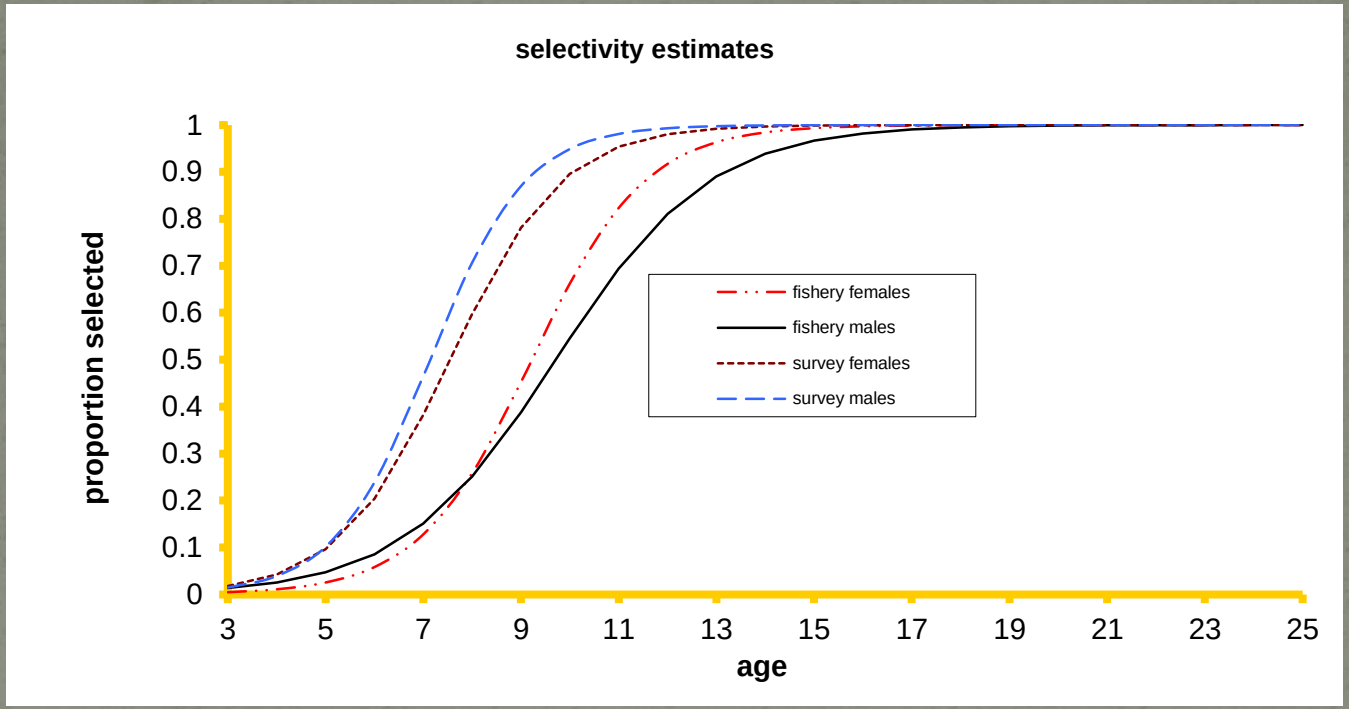


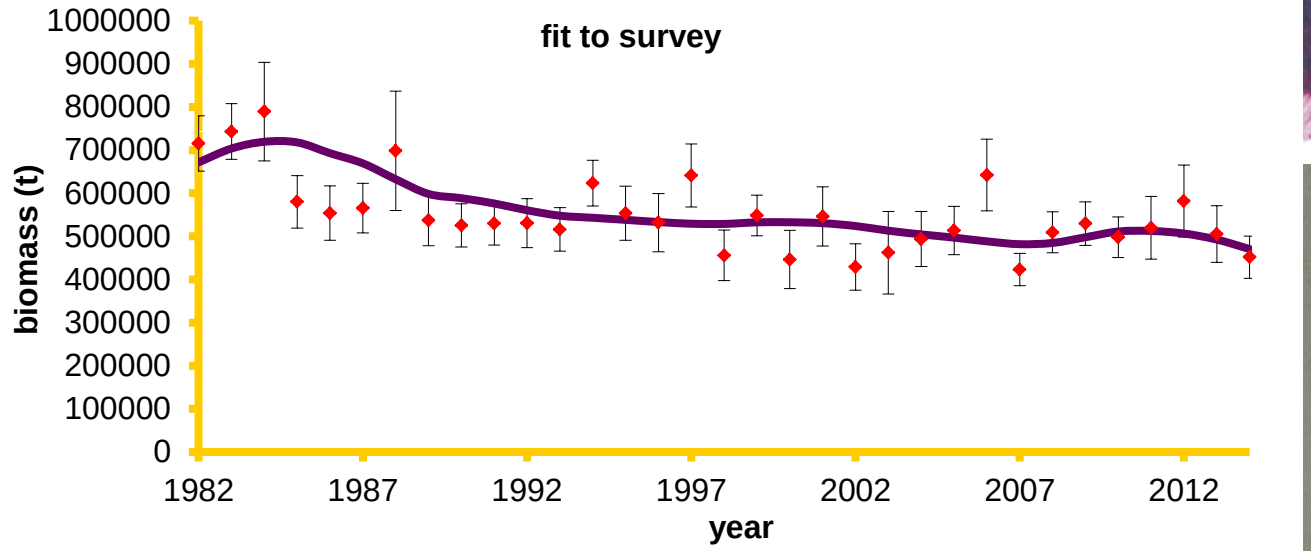


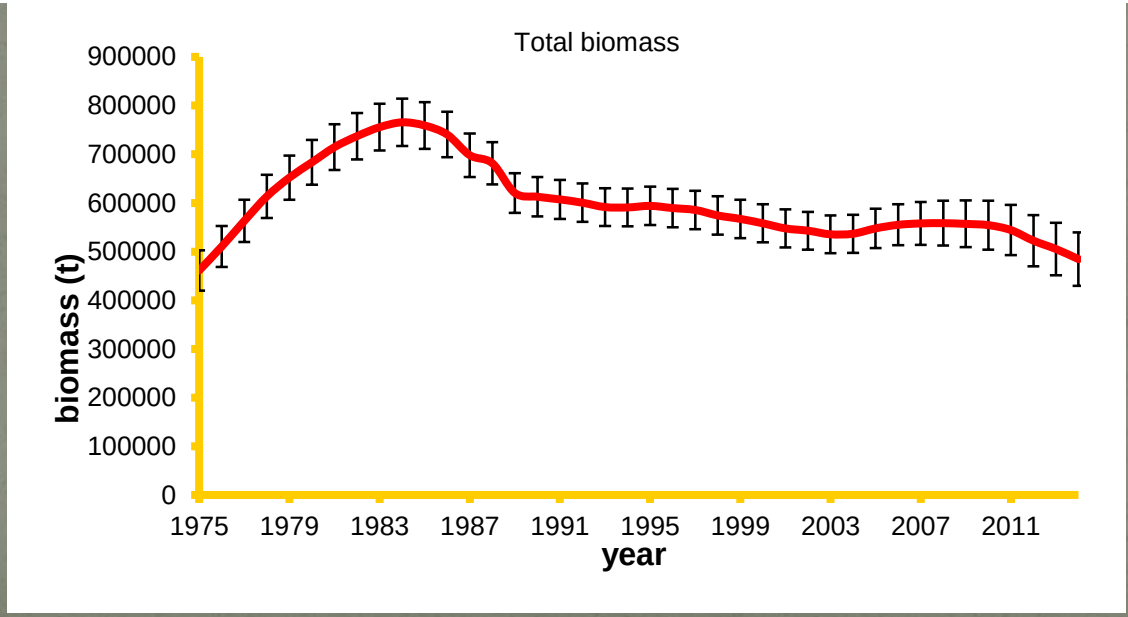
Temperature seems unrelated to catchability

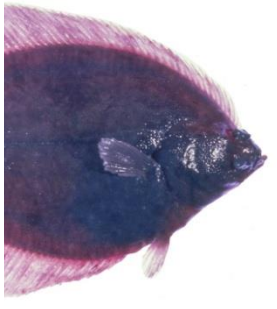


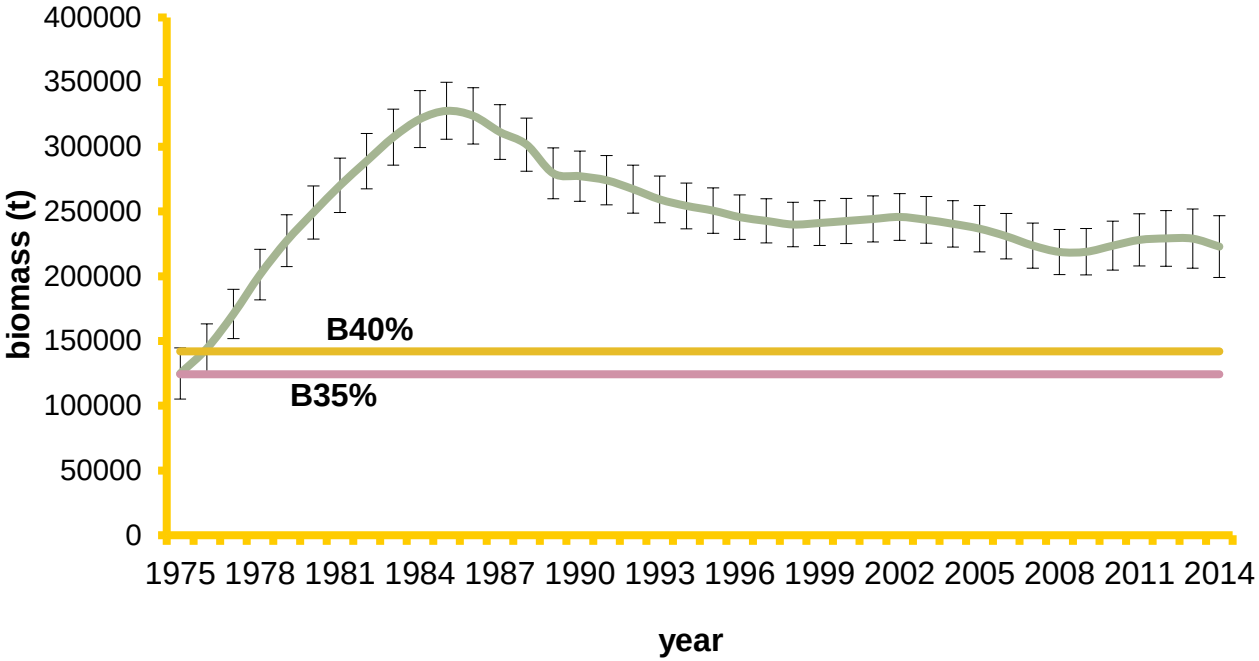
Alaska plaice

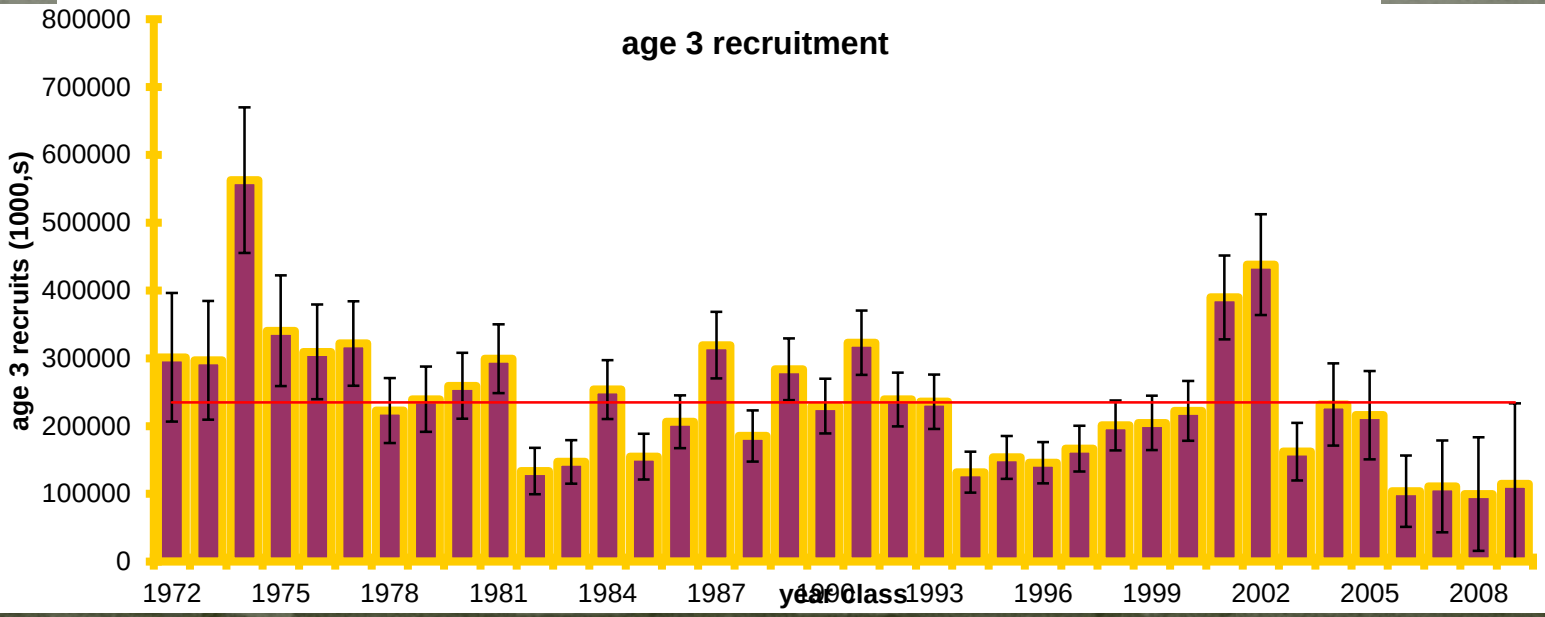



fit to survey
biomass (t)
1000000
900000
800000
700000
600000
500000
400000
300000
200000
100000
0
1982
1987
1992
1997
2002
2007
2012
year

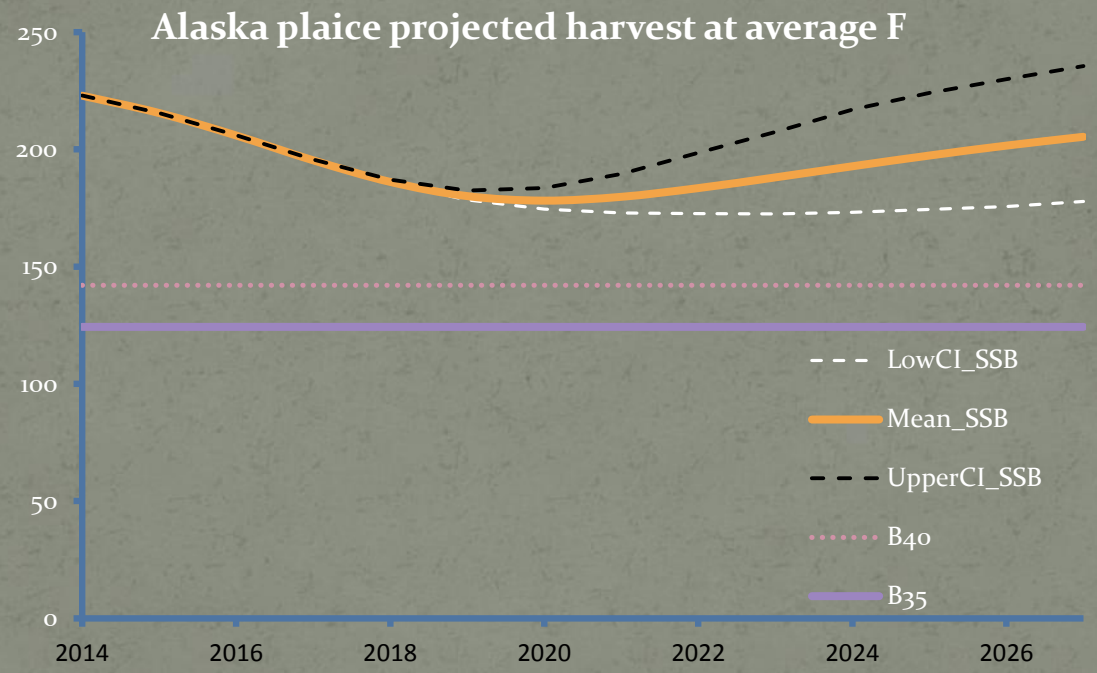

Total biomass
biomass (t)
900000
800000
700000
600000
500000
400000
300000
200000
100000
0
1975
1979
1983
1987
1991
1995
1999
2003
2007
2011
year



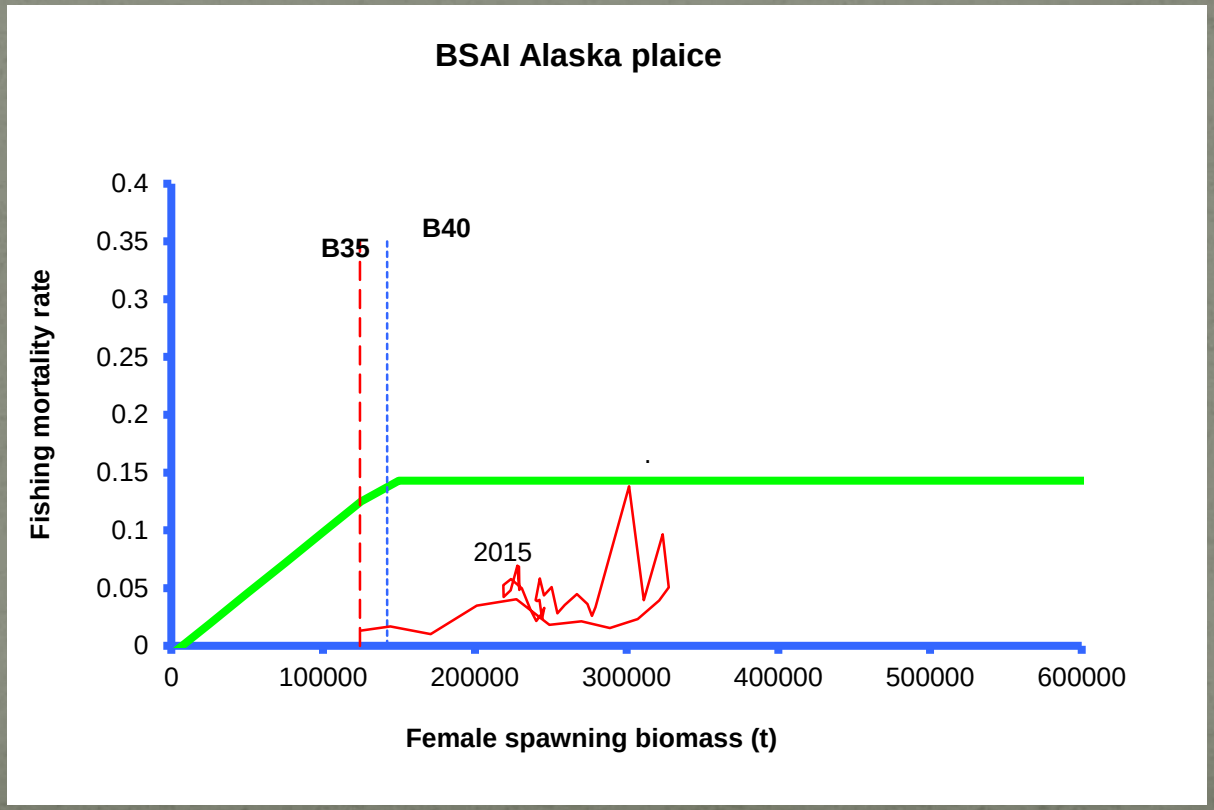

Female spawning biomass
biomass (t)
400000
350000
300000
250000
200000
150000
100000
50000
0
B40%
B35%
1975 1978 1981 1984 1987 1990 1993 1996 1999 2002 2005 2008 2011 2014
year

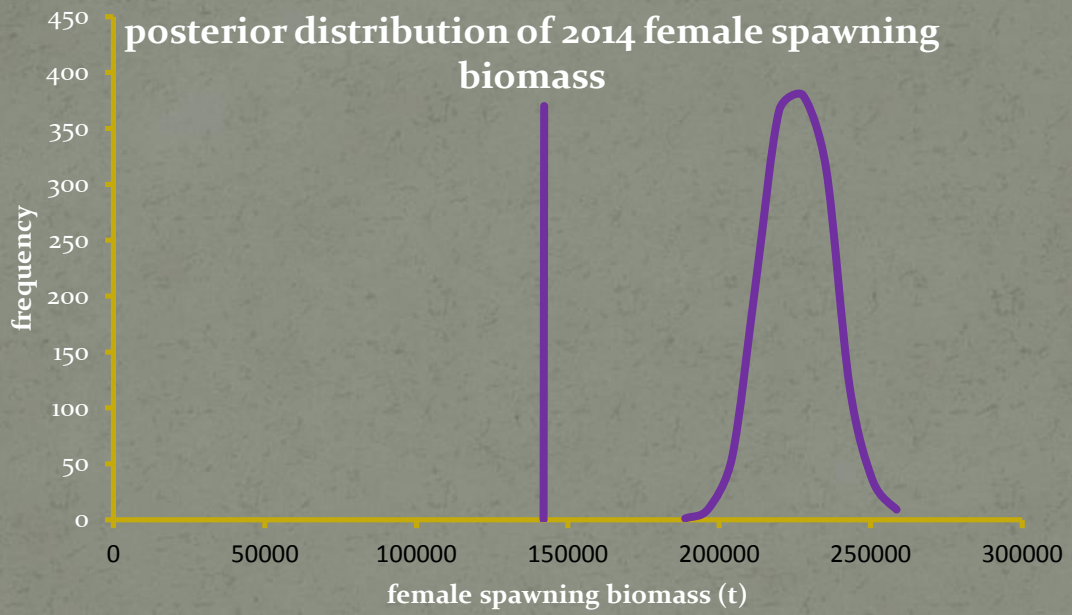

age 3 recruitment
age 3 recruits (1000,s)
800000
700000
600000
500000
400000
300000
200000
100000
0
1972 1975 1978 1981 1984 1987 1990 1993 1996 1999 2002 2005 2008
year class

Projected female spawning biomass



Historical relationship between Fishing mortality and female spawning biomass and the biological reference points.




posterior distribution of 2014 female spawning biomass
frequency
450
400
350
300
250
200
150
100
50
0
0
50000
100000
150000
200000
250000
300000
female spawning biomass (t)

Tier 3 management

- 2015 ABC 44,900 t
- 2015 OFL 54,000 t
- $F_{ABC} = F_{40\%} = 0.143$
- $F_{OFL} = F_{35\%} = 0.175$
- 2014 catch = 18,600 t

Tier 3 management

- 2014 ABC 55,100 t
- 2014 OFL 66,800 t
- $F_{ABC} = F_{40\%} = 0.158$
- $F_{OFL} = F_{35\%} = 0.19$