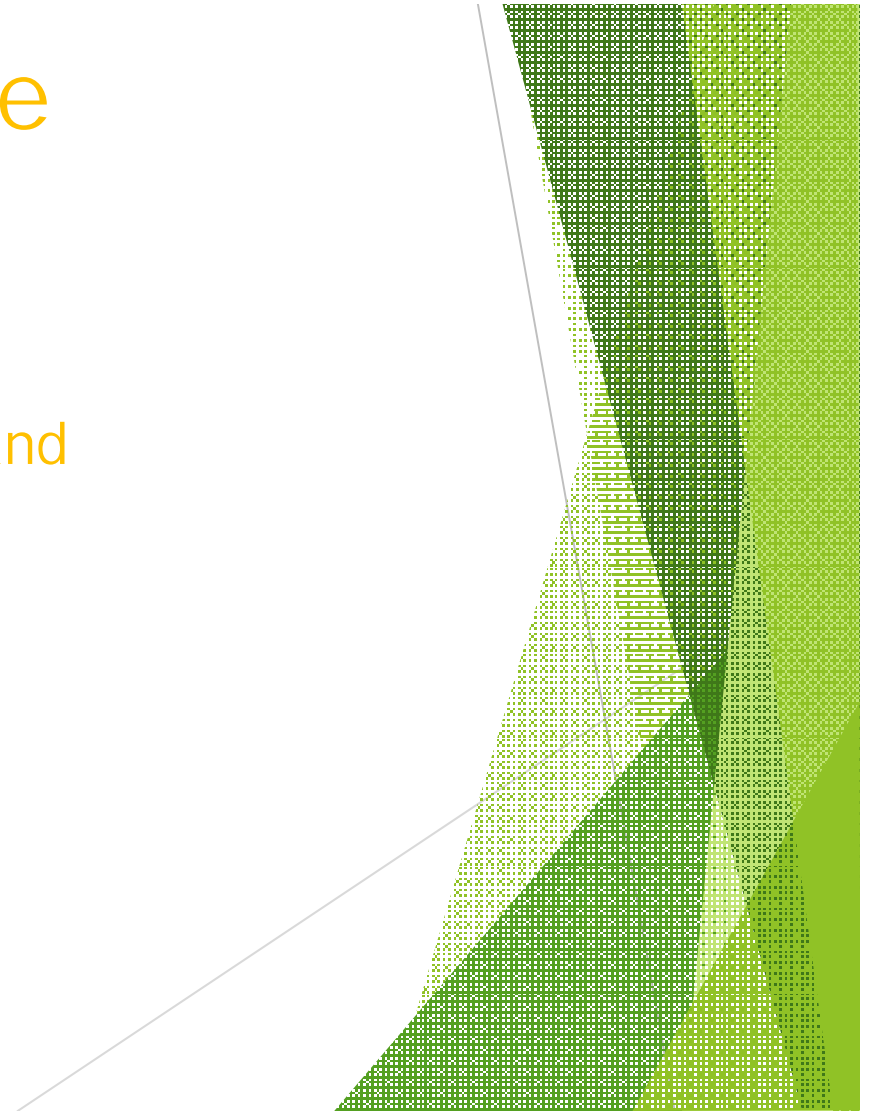
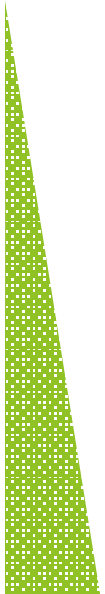


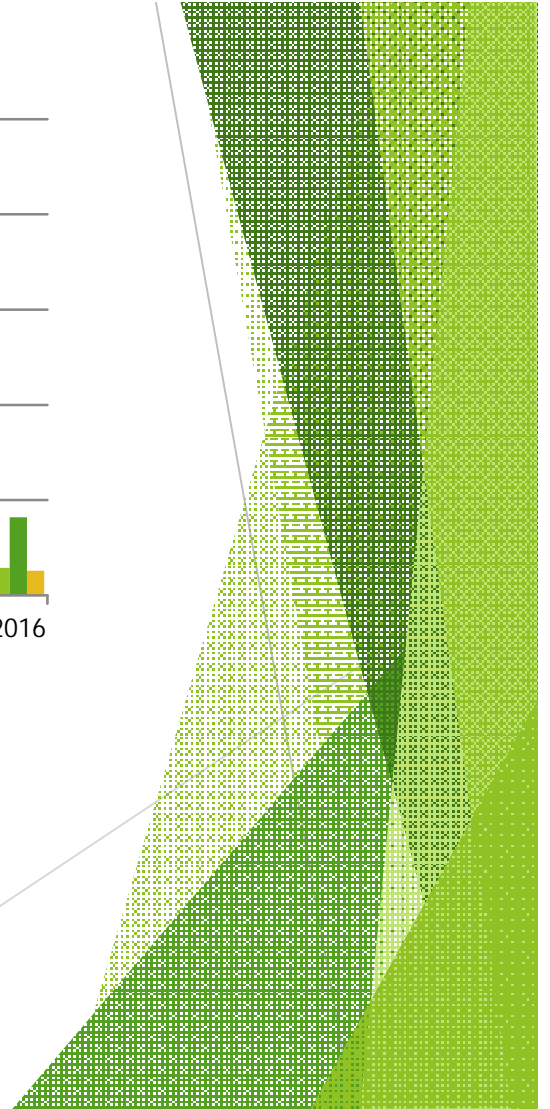
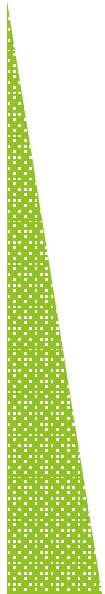
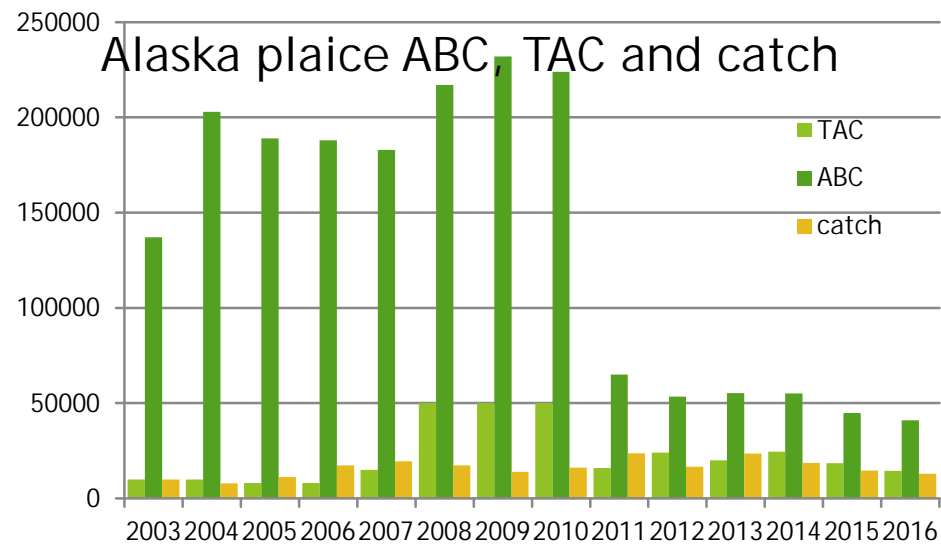


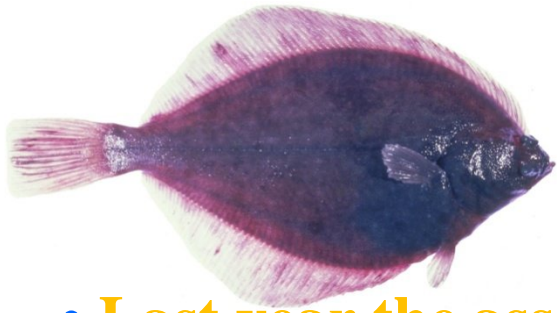
Alaska plaice

by

Wilderbuer, Nichol and
Spencer







• Last year the assessment model was not run to include the 2015 survey biomass and 2014 age composition information from the survey and fishery.

Changes to the input data

- 2014 shelf survey age composition
- 2015 and 2016 shelf survey size composition
- 2015 and 2016 shelf survey biomass point estimates and standard errors
- Estimate of catch (t) and discards for 2015 and 2016
- Estimate of retained and discarded portions of the 2015 catch



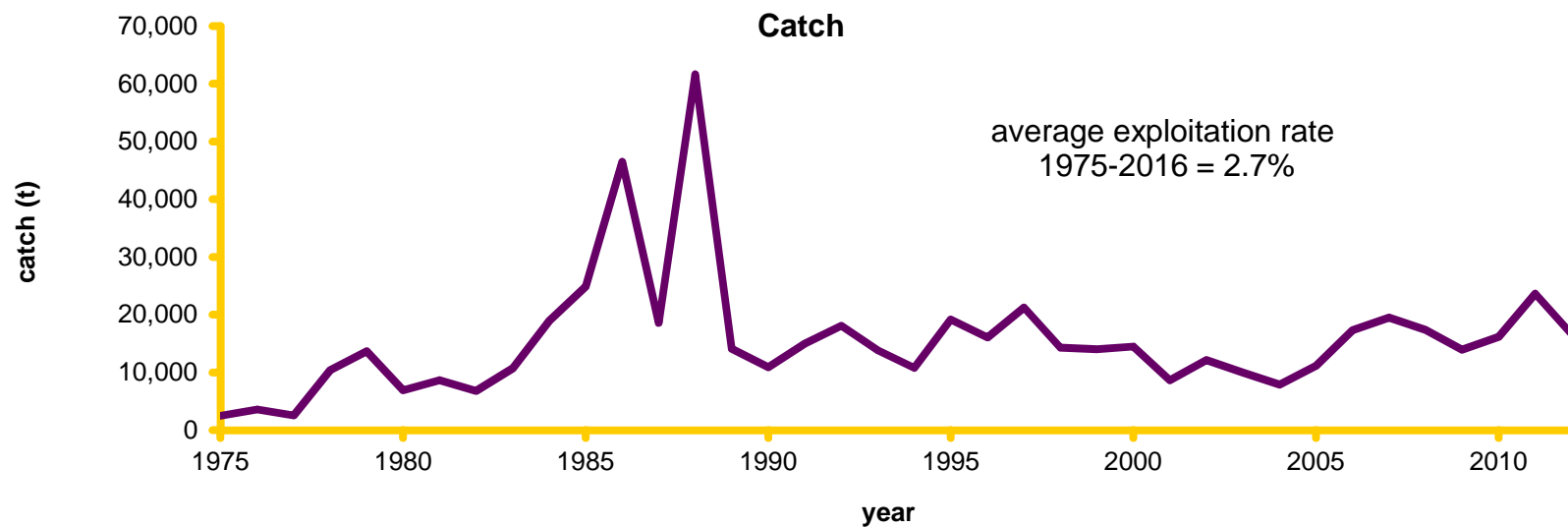
Alaska plaice



Quantity	As estimated or specified last year for:		As estimated or recommended this year for:	
	2016	2017	2017	2018
M (natural mortality rate)	0.13	0.13	0.13	0.13
Tier	3a	3a	3a	3a
Projected total (3+) biomass (t)	468,100	465,400	412,600	407,300
Female spawning biomass (t)	204,600	193,600	186,300	177,500
$B_{100\%}$	328,800	328,800	276,250	276,500
$B_{40\%}$	131,500	131,500	110,500	110,500
$B_{35\%}$	115,100	115,100	96,700	96,700
F_{OFL}	0.175	0.175	0.154	0.154
$maxF_{ABC}$	0.143	0.143	0.128	0.128
F_{ABC}	0.143	0.143	0.128	0.128
OFL (t)	49,000	46,800	42,800	36,900
maxABC (t)	41,000	39,100	36,000	32,100
ABC (t)				
Status	As determined last year for:		As determined this year for:	
	2014	2015	2015	2016
Overfishing	no	n/a	No	n/a
Overfished	n/a	no	n/a	no
Approaching overfished	n/a	no	n/a	no

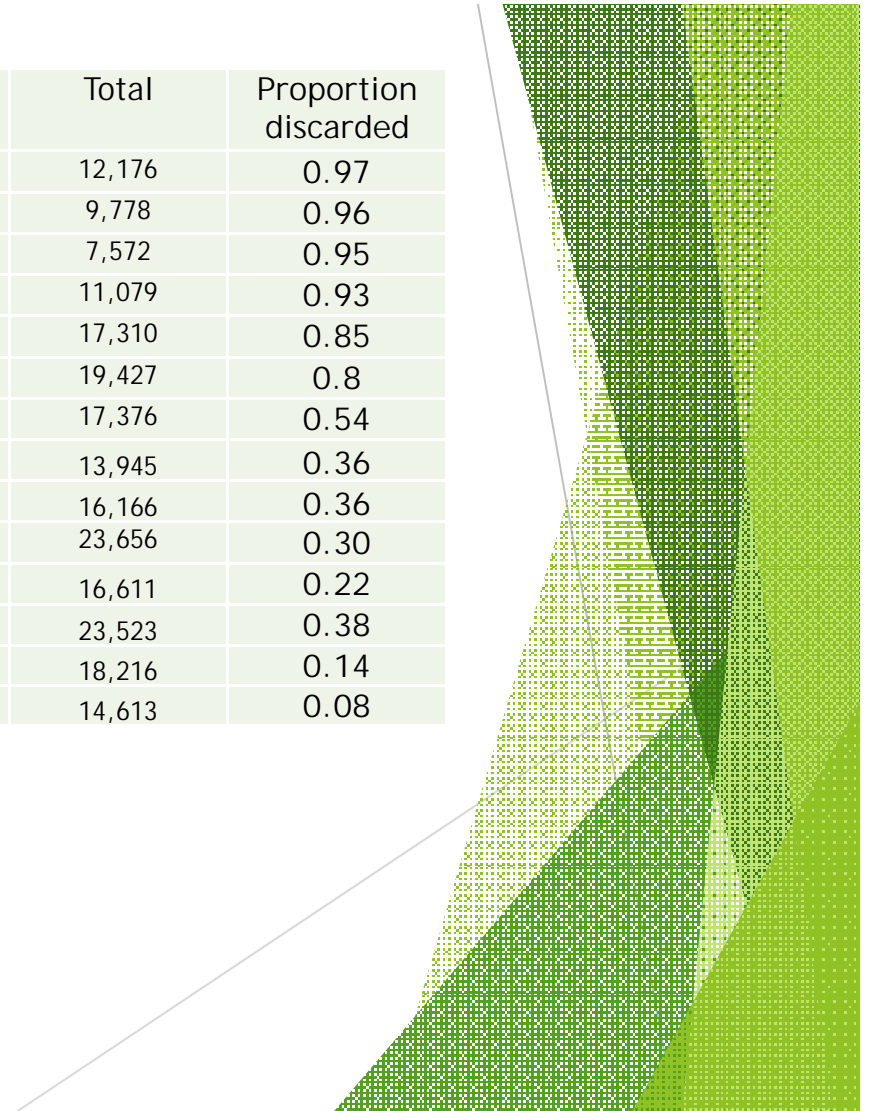
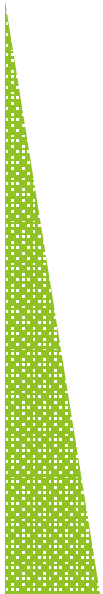


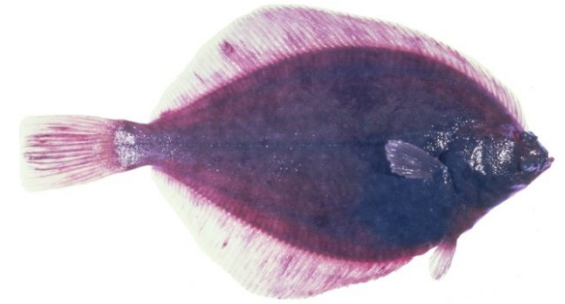
2016 catch = 12,957 t
average 1975-2016 exploitation rate = 2.7%



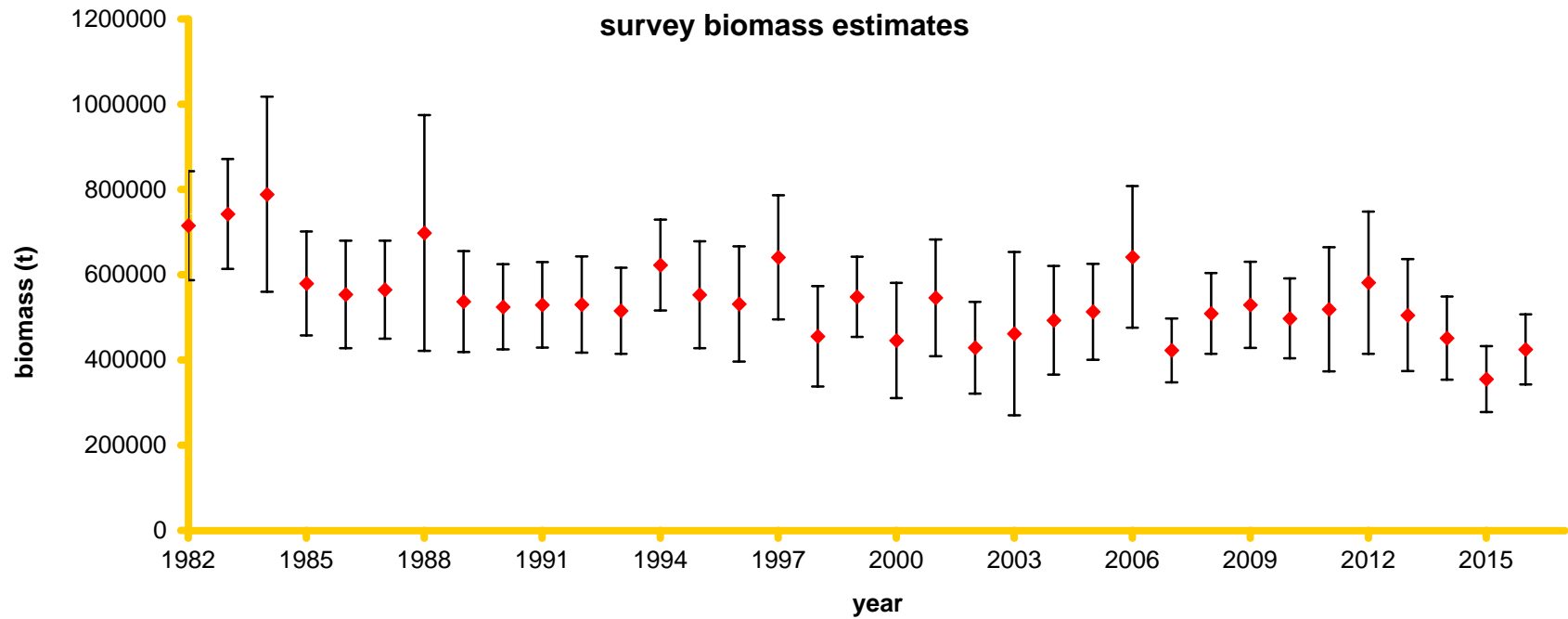


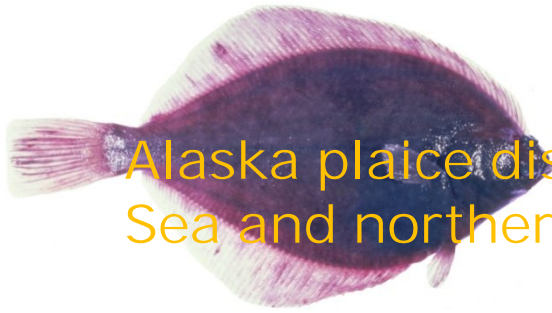
year	Discard	Retained	Total	Proportion discarded
2002	11,806	370	12,176	0.97
2003	9,428	350	9,778	0.96
2004	7,193	379	7,572	0.95
2005	10,293	786	11,079	0.93
2006	14,746	2,564	17,310	0.85
2007	15,481	3,946	19,427	0.8
2008	9,330	8,046	17,376	0.54
2009	5,061	8,882	13,945	0.36
2010	5,845	10,322	16,166	0.36
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	2,469	15,747	18,216	0.14
2015	1,231	13,382	14,613	0.08



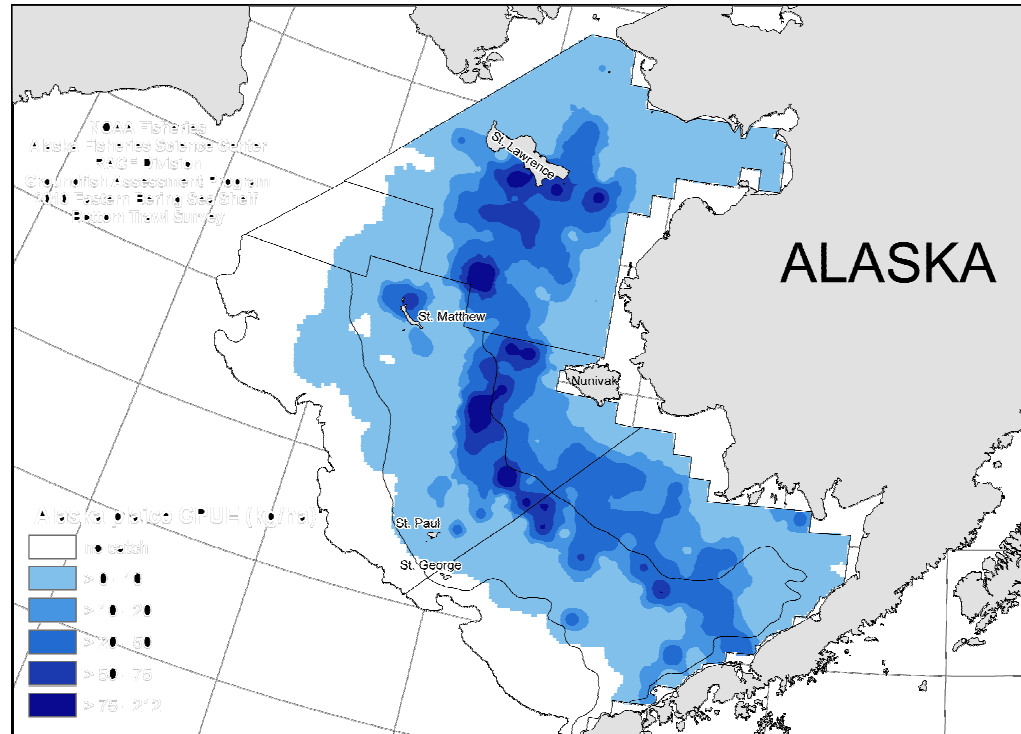
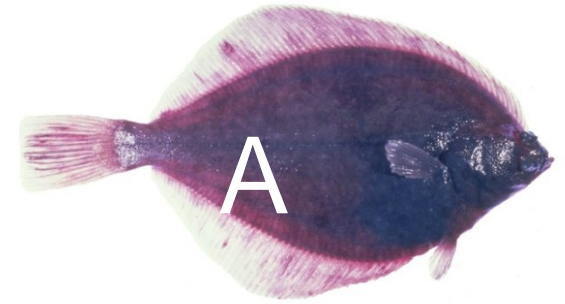


2016 shelf survey biomass estimate = 425,200 t





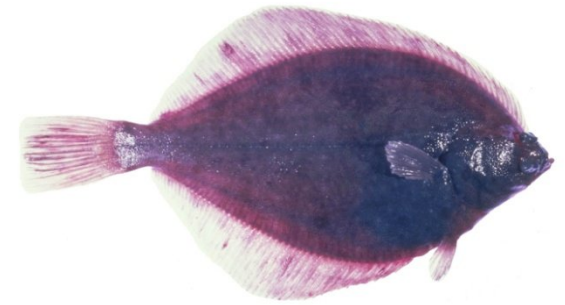
Alaska plaice distribution in the 2010 Bering Sea and northern Bering Sea trawl survey



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



Alaska plaice split-sex model



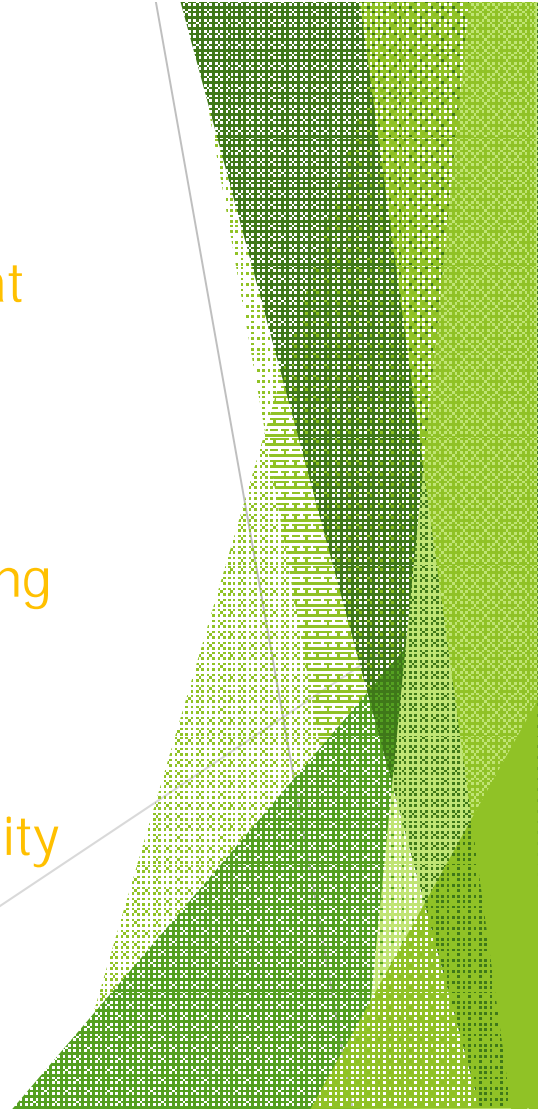
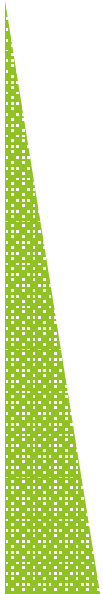
uses:

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

Estimates:

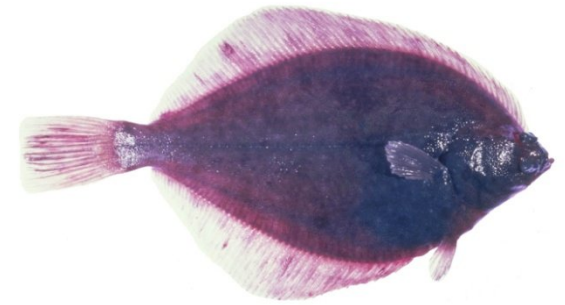
Sex-specific estimates of population number, fishing mortality, selectivity, fishery and survey age composition.

Allows for estimation of sex-specific natural mortality

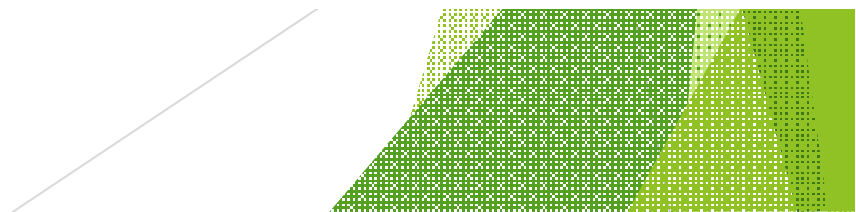
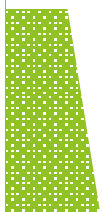
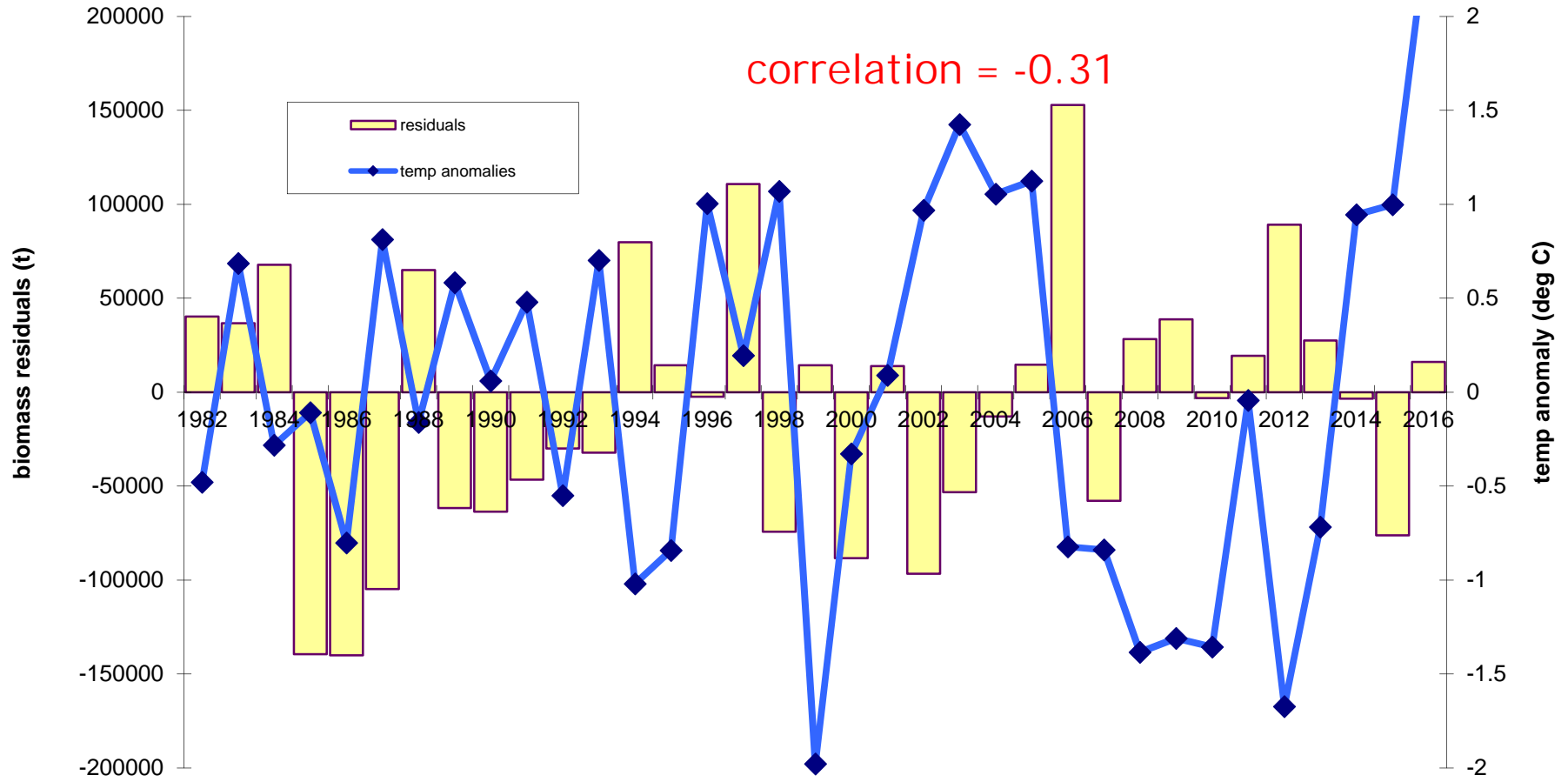
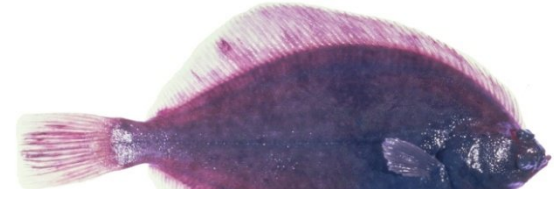
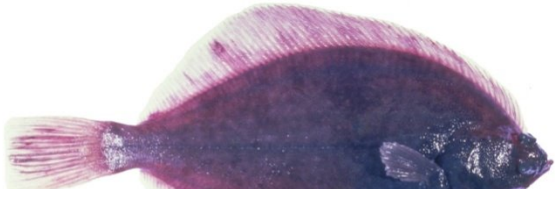




Stock assessment model

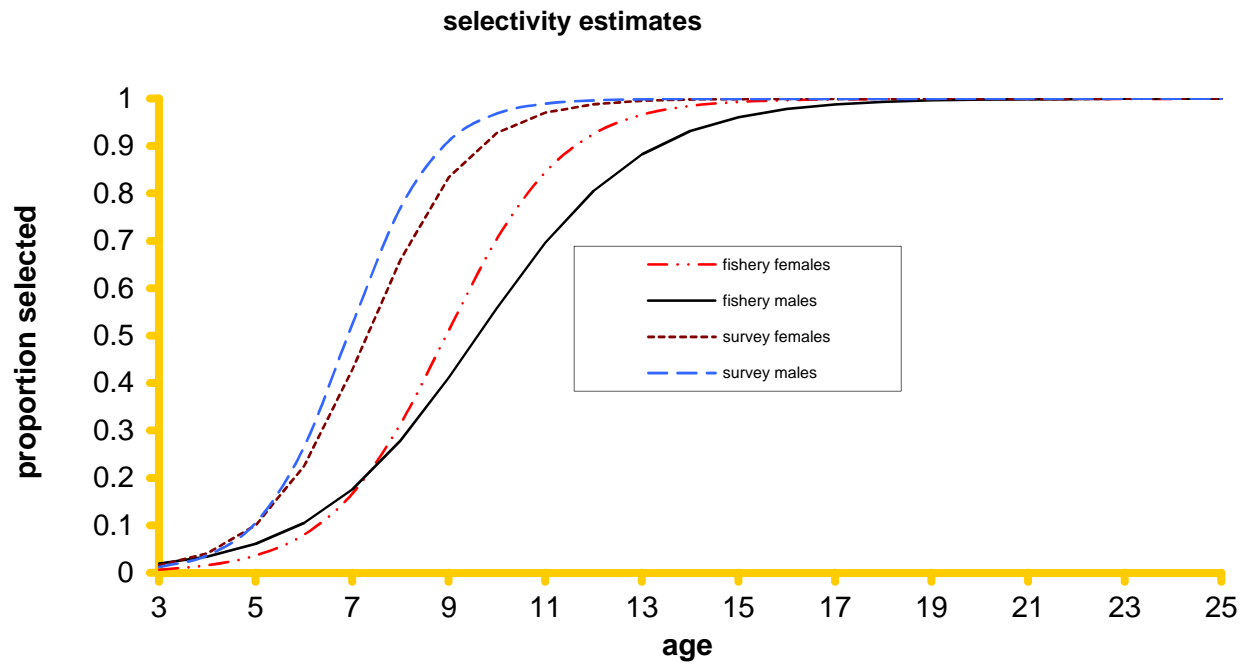


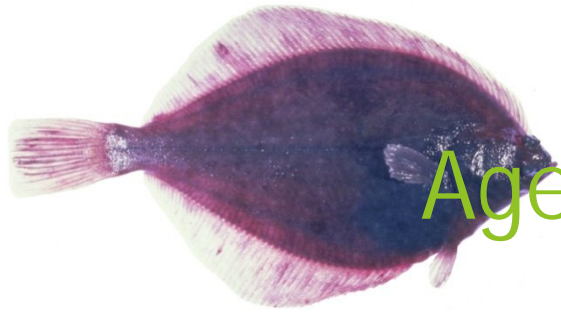
- Data components include:
- fishery size comps 1983-87, 1989-91, 1996-1997, 1999, 2003-2005, 2008-2015
- fishery age comps 2000, 2002-2003
- Survey biomass 1982-2016
- Survey age comps 1982, 1988, 1992-1995, 1998, 2000-2002, 2005-2014
- Survey length comps 1983-1987, 1989-91, 1996-97, 1999, 2003-2004, 2015-2016
- 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)





Alaska plaice



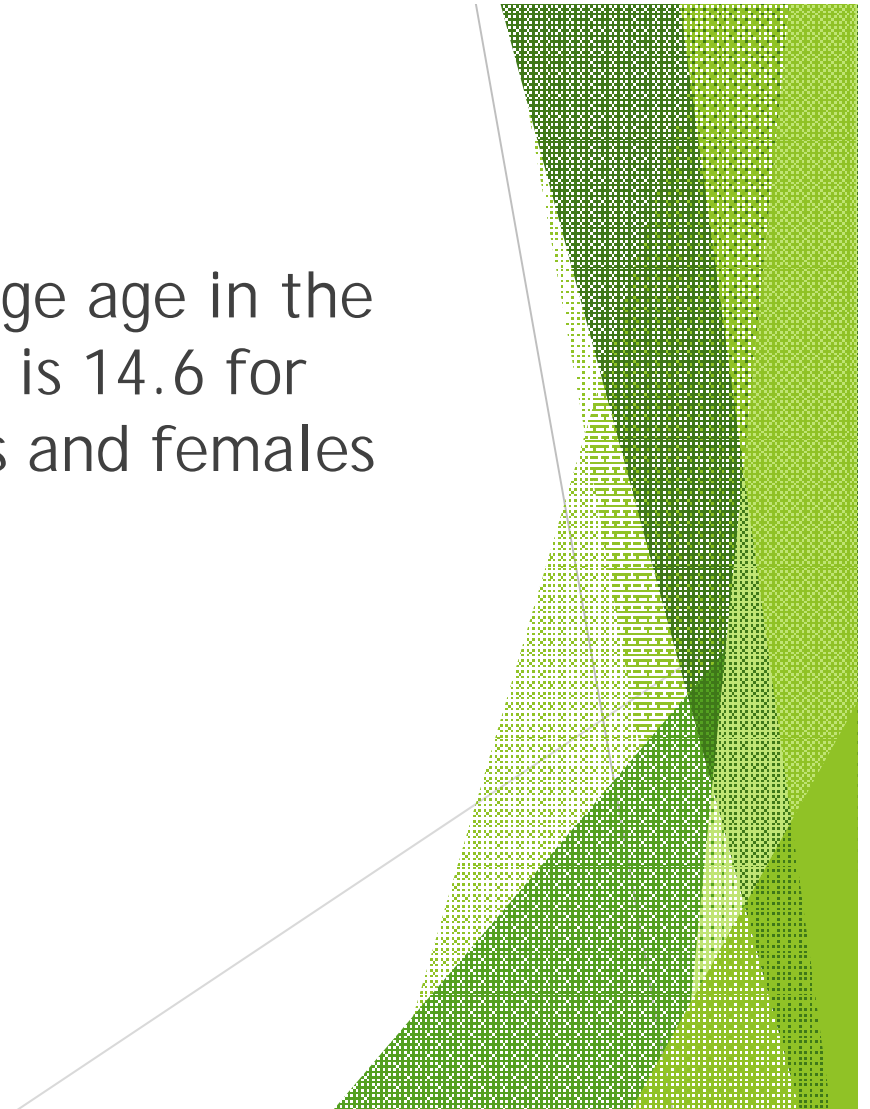
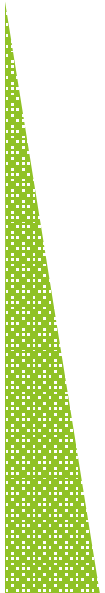


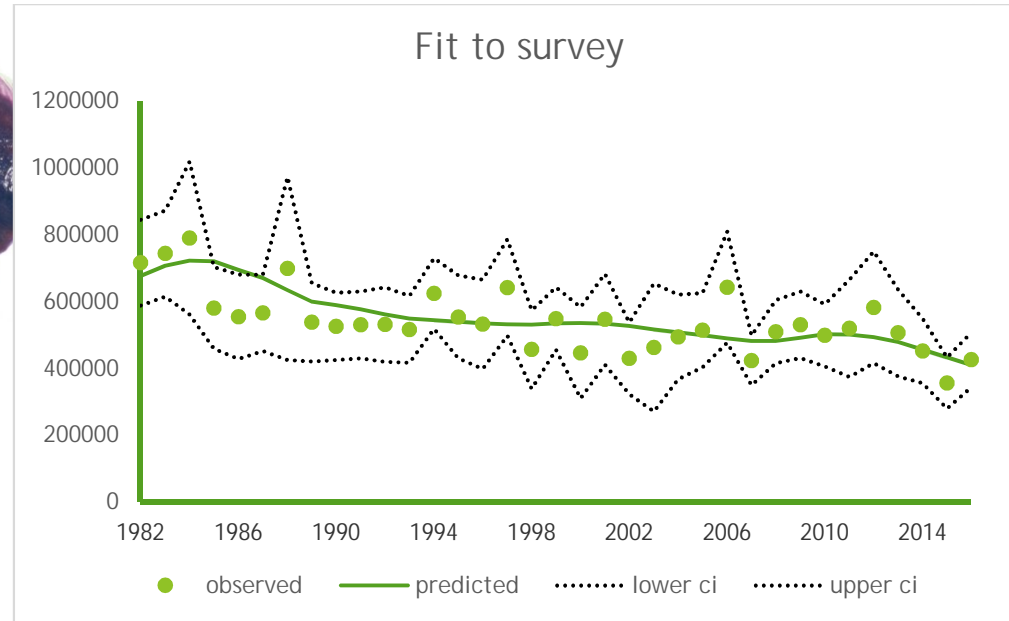
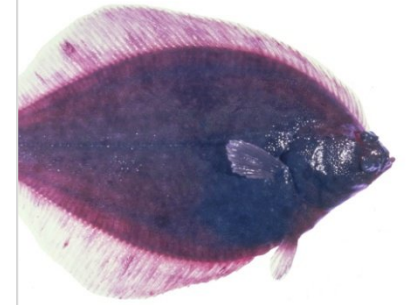
Age composition



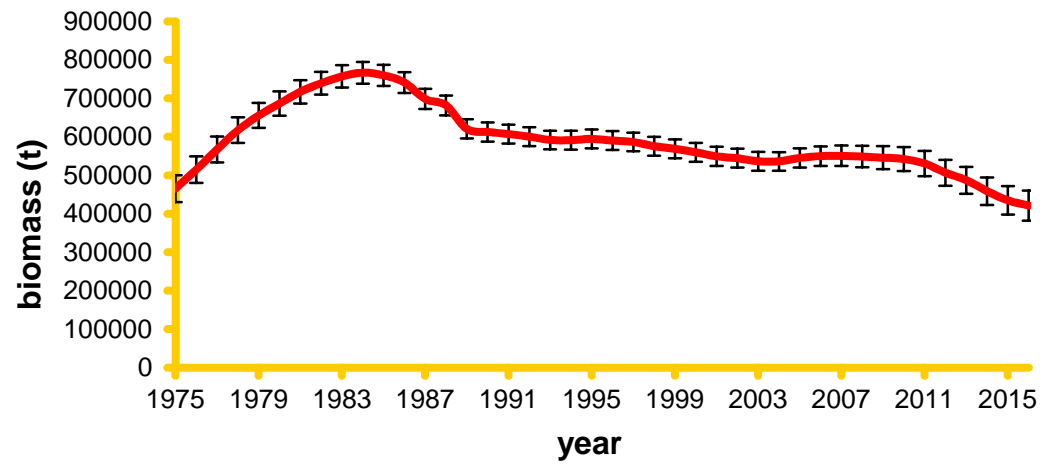
► Average age in the population is 9.0 for males and females

► Average age in the catch is 14.6 for males and females

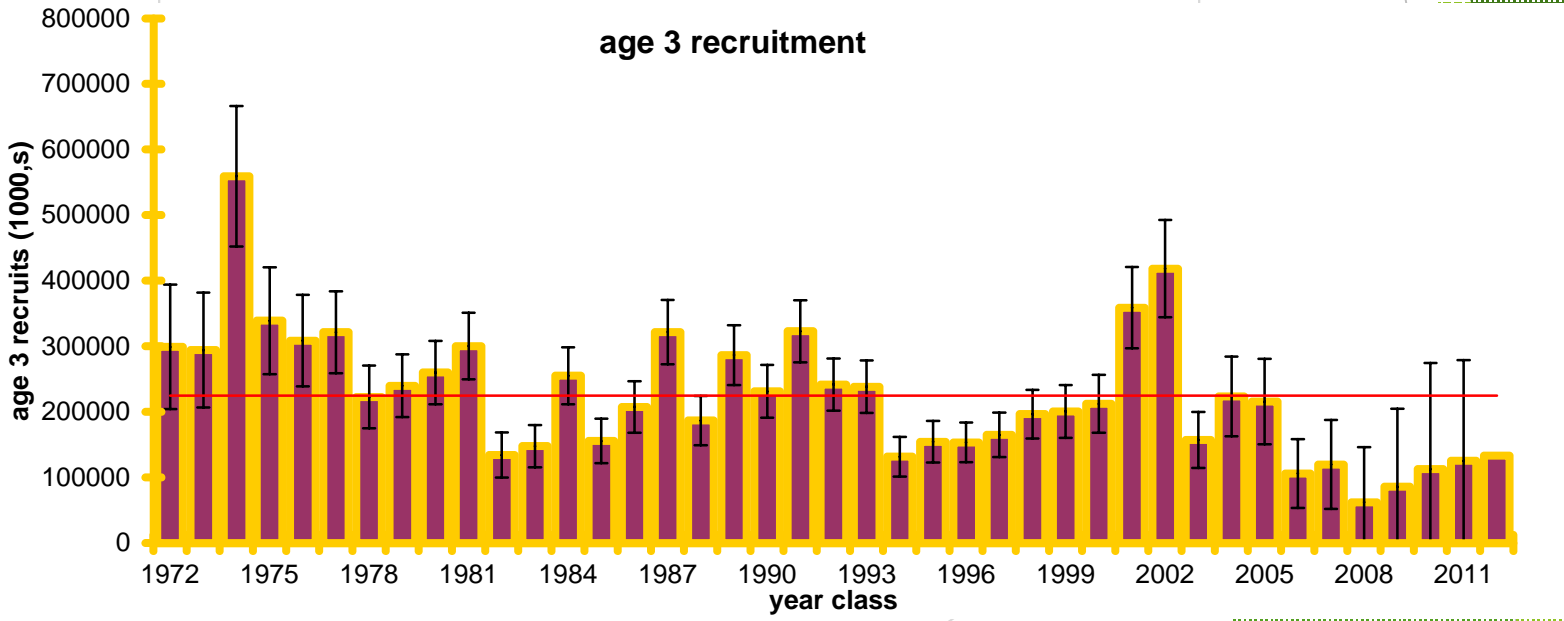
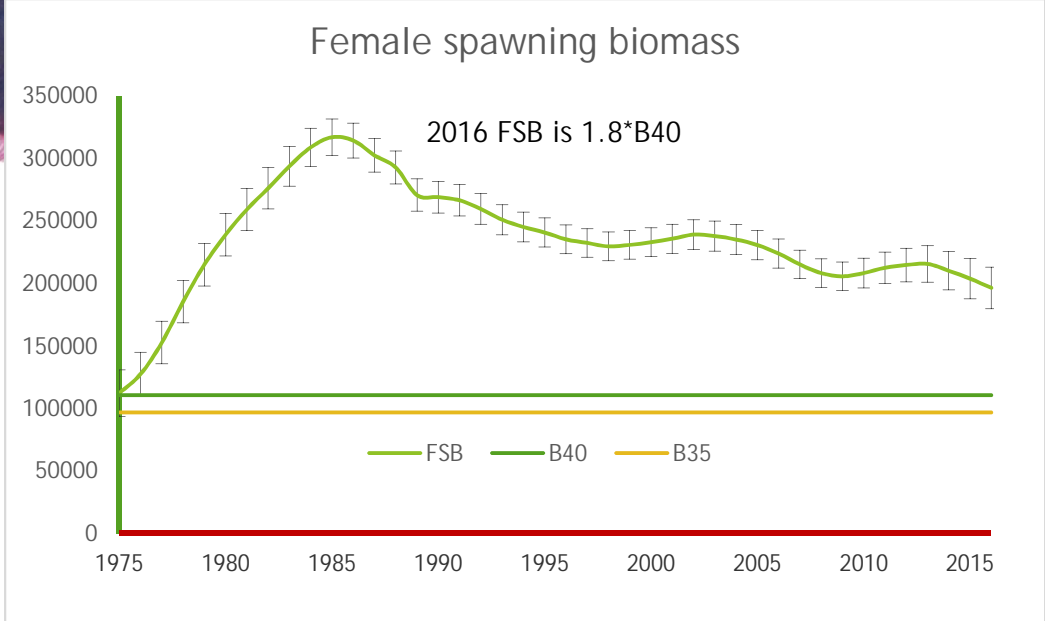
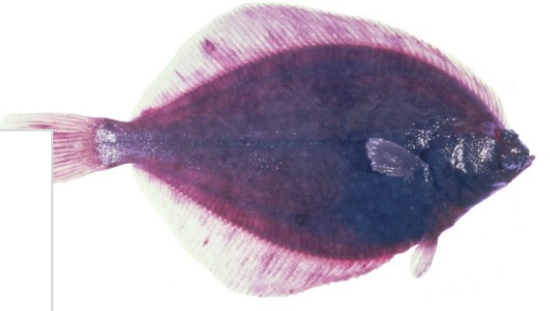
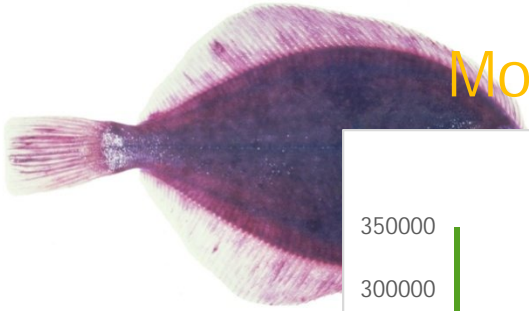


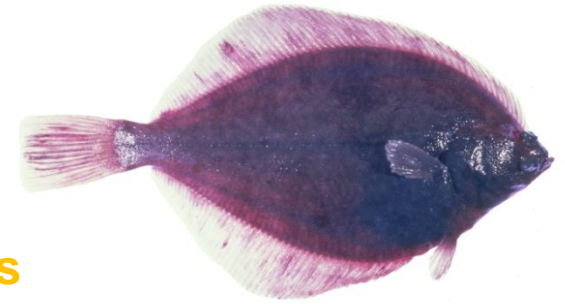


Total biomass

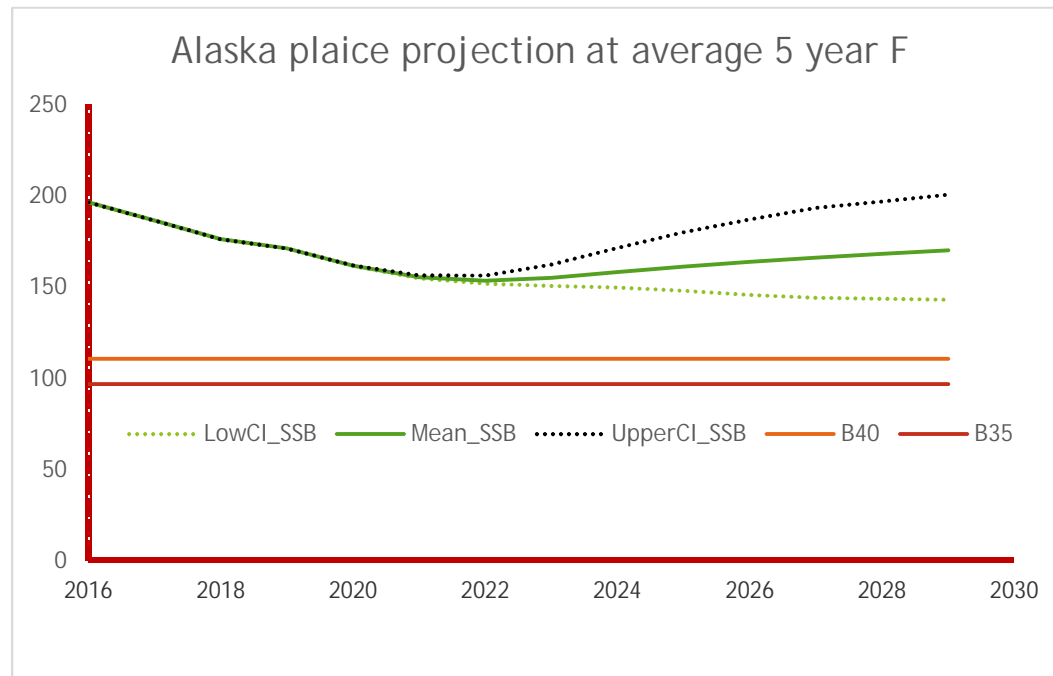


Model results





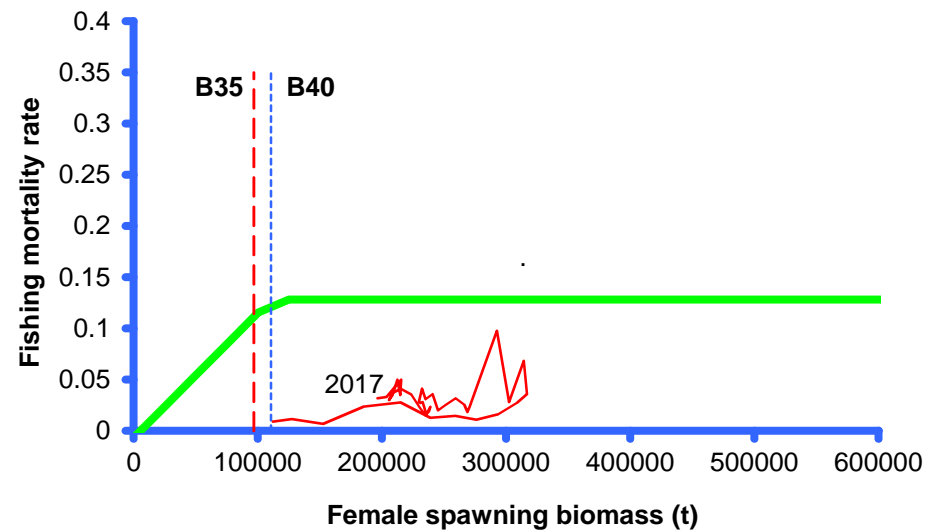
Projected female spawning biomass

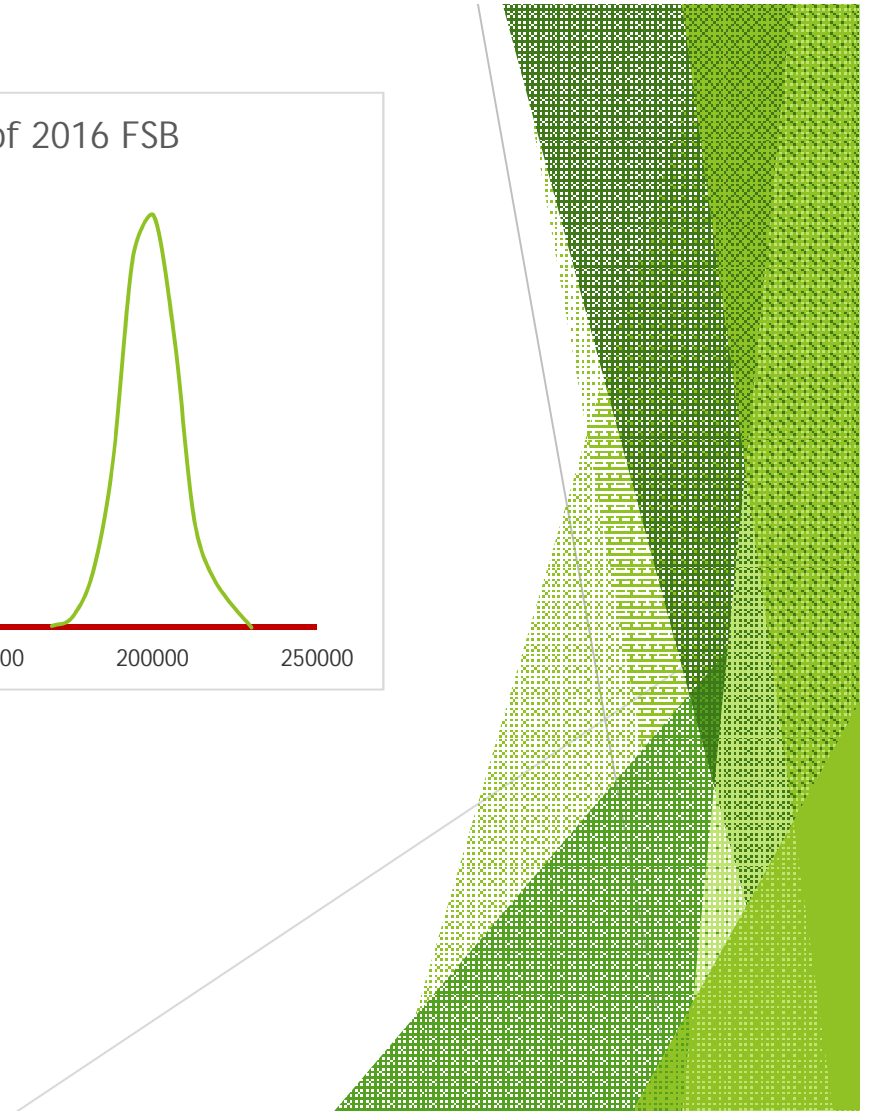
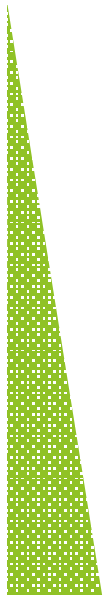
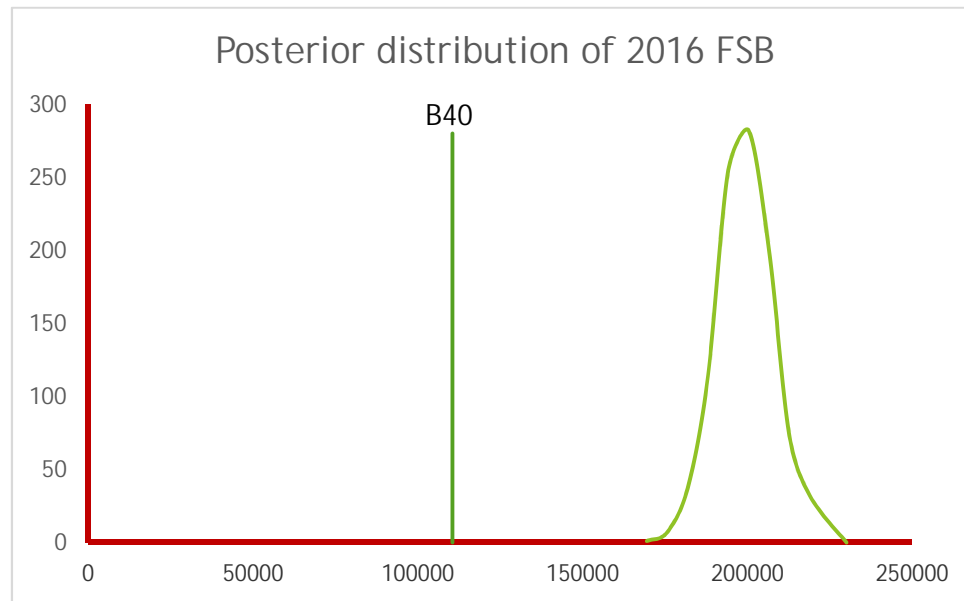
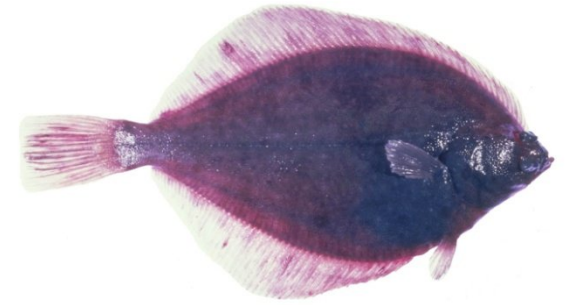


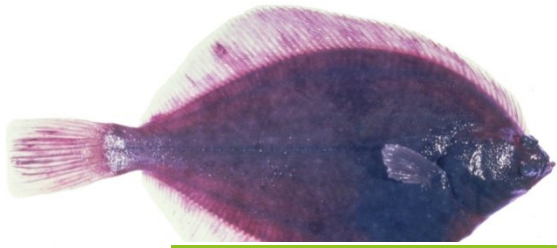


Historical relationship between Fishing mortality and female spawning biomass and the biological reference points.

BSAI Alaska plaice







Alaska plaice



	As estimated or specified last year for:		As estimated or recommended this year for:	
	2016	2017	2017	2018
Quantity				
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Tier	3a	3a	3a	3a
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Overfished	n/a	no	n/a	no
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