GOA Rex Sole (update)

Carey McGilliard

antity	As estimated or *specified last* year for: 2014	2015	As estimated or *recommended this* year for: 2015*	2016*
natural mortality rate)	0.17	0.17	0.17	0.17
r	5	5	5	5
jected total (3+) biomass (t)	84,702	83,012	82,972	81,414
nale spawning biomass (t)	53,164	52,807	49,804	48,554
$B_{100\%}$	55,393	55,393	55,393	55,393
$B_{40\%}$	22,159	22,159	22,159	22,159
$B_{35\%}$	19,434	19,434	19,434	19,434
$_{L}=M$	0.170	0.170	0.17	0.17
$xF_{ABC}=0.75*M$	0.128	0.128	0.128	0.128
$_{C}$	0.128	0.128	0.128	0.128
L (t)	12,207	11,963	11,957	11,733
xABC (t)	9,341	9,155	9,150	8,979
C (t)	9,341	9,155	9,150	8,979
tus	As determined in 2013 for: 2012	2013	As determined in 2014 for: 2013	2014
erfishing	no	n/a	no	n/a

Area Apportionment

tity	Western	Central	West Yakutat	Southeast	Total
rtionment	13.74%	63.57%	8.44%	14.25%	100.00%
ABC (t)	1,258	5,816	772	1,304	9,150
ABC (t)	1,234	5,707	758	1,280	8,979

Summary Information

Year	Biomass[1]	OFL[2]	ABC[2]	TAC[2]	Catch[3]
2013	86,684	12,492	9,560	9,560	3,707
2014	84,702	12,207	9,341	9,341	3,474
2015	82,972	11,957	9,150		
2016	81,414	11,733	8,979		

More Summary Information

Area	2014				2015		2016	
	OFL[1]	ABC[1]	TAC[1]	Catch[3]	OFL[2]	ABC[2]	OFL[2]	ABC[2]
W	--	1,270	1,270	110	--	1,258	--	1,234
C	--	6,231	6,231	3,363	--	5,816	--	5,707
WYAK	--	813	813	1	--	772	--	758
SE	--	1,027	1,027	0	--	1,304	--	1,280
Total	12,207	9,341	9,341	3,474	11,957	9,150	11,733	8,979

Data Gaps and Research Priorities

Move assessment to Stock Synthesis for further exploration

Explore survey and fishery selectivity patterns

Estimate growth internally and based on more recent data, if possible

Consider using ADF&G small mesh survey data

Explore stock-recruit curves

Account for ageing error

Explore data weighting

Explore ways to better account for uncertainty (e.g. uncertainty in natural mortality and catchability)

GOA Deepwater Flatfish Complex (update)

Carey McGilliard

ecies	Quantity	As estimated or *specified last* year for: 2014	2015	As estimated or *recommended this* year fo 2015	
	M (natural mortality rate)	0.085	0.085	0.085	
	Tier	3a	3a	3a	
	Projected total (3+) biomass (t)	182,727	181,781	182,160	1
	Female spawning biomass (t)				
	Projected				
	Upper 95% confidence interval	66,181	67,078	67,233	
	Point estimate	66,147	67,001	67,156	
	Lower 95% confidence interval	66,126	66,945	67,100	
er sole	$B_{100\%}$	70,544	70,544	70,544	
	$B_{40\%}$	28,218	28,218	28,218	
	$B_{35\%}$	24,690	24,690	24,690	
	F_{OFL}	0.12	0.12	0.12	
	$maxF_{ABC}$	0.1	0.1	0.1	
	F_{ABC}	0.1	0.1	0.1	
	OFL (t)	15,915	15,711	15,749	
	maxABC (t)	13,289	13,120	13,151	
	ABC (t)	13,289	13,120	13,151	

cies	Quantity	As estimated or *specified last* year for: 2014	2015	As estimated or *recommended this* year for 2015
nland oot	Tier	6	6	6
	OFL (t)	238	238	238
	maxABC (t)	179	179	179
	ABC (t)	179	179	179
psea le	Tier	6	6	6
	OFL (t)	6	6	6
	maxABC (t)	4	4	4
	ABC (t)	4	4	4
water fish plex	OFL (t)	16,159	15,955	15,993
	maxABC (t)	13,472	13,303	13,334
	ABC (t)	13,472	13,303	13,334
	Status	As determined in 2013 for: 2012	2013	As determined in 2014 for: 2013
	Overfishing	no	n/a	no
	Overfished	n/a	no	n/a
	Approaching overfished	n/a	no	n/a

Area Apportionment

Quantity	Species	Western	Central	West Yakutat	Southeast	Total
Area Apportionment	Dover sole	1.18%	28.02%	41.54%	29.26%	100.00%
	Greenland turbot	81.17%	0.00%	6.40%	12.43%	100.00%
	Deepsea sole	0.00%	100.00%	0.00%	0.00%	100.00%
2015 ABC (t)	Dover sole	156	3,684	5,463	3,848	13,151
	Greenland turbot	145	0	11	22	179
	Deepsea sole	0	4	0	0	4
	Deepwater Flatfish	301	3,688	5,474	3,870	13,334
2016 ABC (t)	Dover sole	154	3,640	5,398	3,802	12,994
	Greenland turbot	145	0	11	22	179
	Deepsea sole	0	4	0	0	4
	Deepwater Flatfish	299	3,644	5,409	3,824	13,177

Summary Information

Year	Biomass[1]	OFL[2]	ABC[2]	TAC[2]	Catch[3]
2013	173,853	6,834	5,126	5,126	242
2014	182,727	16,159	13,472	13,472	338
2015	182,160	15,993	13,334		
2016	181,691	15,803	13,177		

More Summary Information

Area	2014				2015		2016	
	OFL[1]	ABC[1]	TAC[1]	Catch[3]	OFL[2]	ABC[2]	OFL[2]	ABC[2]
W	--	302	302	67	--	301	--	299
C	--	3,727	3,727	262	--	3,688	--	3,644
WYAK	--	5,532	5,532	5	--	5,474	--	5,409
SE	--	3,911	3,911	4	--	3,870	--	3,824
Total	16,159	13,472	13,472	338		13,334		13,177

Responses to SSC and Plan Team Comments

Nov 2013: Explore random effects survey averaging approach for ortionment calculations. Will address this in 2015, including new surve a.

Nov. 2013/SSC, Dec 2013: Based on suggestions from the author, stigate catchability and natural mortality. Planned for 2015 full assess do a joint likelihood profile over catchability and natural mortality and sider estimation of one or both parameters using priors.

Nov. 2013/SSC Dec 2013: Do a stock structure template. Will do this i 5.

Nov. 2013: Pursue items listed for future research by author in 2013 essment. See “Data Gaps and Research Priorities” on next slide

Data Gaps and Research Priorities

plore ways to better account for uncertainty (e.g. certainty in natural mortality and catchability)

velop an ageing error matrix for GOA Dover sole

plore adjusting effective sample sizes of survey length mposition data to number of hauls

plore potential causes of patterns in early recruitment viations estimated by some 2013 alternative models.

GOA Flathead Sole (update)

Carey McGilliard

Quantity	As estimated or *specified last* year for: 2014	2015	As estimated or *recommended this* year for: 2015*	2016*
M (natural mortality rate)	0.2	0.2	0.2	0.2
Tier	3a	3a	3a	3a
Projected total (3+) biomass (t)	252,361	253,418	254,602	256,029
Female spawning biomass (t)				
Projected				
Upper 95% confidence interval	84,076	83,287	83,900	83,606
Point estimate	84,058	83,204	83,818	83,342
Lower 95% confidence interval	84,045	83,141	83,754	83,135
$B_{100\%}$	88,829	88,829	88,829	88,829
$B_{40\%}$	35,532	35,532	35,532	35,532
$B_{35\%}$	31,090	31,090	31,090	31,090
F_{OFL}	0.61	0.61	0.61	0.61
$maxF_{ABC}$	0.47	0.47	0.47	0.47
F_{ABC}	0.47	0.47	0.47	0.47
OFL (t)	50,664	50,376	50,792	50,818
maxABC (t)	41,231	41,007	41,349	41,378
ABC (t)	41,231	41,007	41,349	41,378
Status	As determined in 2012 for: 2011	2012	As determined in 2013 for: 2012	2013
Overfishing	no	n/a	no	n/a
Overfished	n/a	no	n/a	no
Approaching overfished	n/a	no	n/a	no

Area Apportionment

tity	**Western**	**Central**	**West Yakutat**	**Southeast**	**To**
rtionment	30.88%	60.16%	8.55%	0.41%	100
ABC (t)	12,767	24,876	3,535	171	41,
ABC (t)	12,776	24,893	3,538	171	41,

Summary Information

ar	Biomass[1]	OFL[2]	ABC[2]	TAC[2]	Cat
13	236,745	61,036	48,738	30,496	2,8
14	252,361	50,664	41,231	27,746	2,3
15	254,602	50,792	41,349		
16	256,029	50,818	41,378		

More Summary Information

a	2014				2015		2016	
	OFL[1]	ABC[1]	TAC[1]	Catch[3]	OFL[2]	ABC[2]	OFL[2]	A
	--	12,730	8,650	202	--	12,767	--	12
	--	24,805	15,400	2,114	--	24,876	--	24
K	--	3,525	3,525	1	--	3,535	--	3,
	--	171	171	0	--	171	--	1
l	50,664	41,231	27,746	2,317	50,792	41,349	50,818	41

Responses to SSC and Plan Team Comments

, Nov 2013: Explore natural mortality and catchability and effects on
ctivity. Potentially use a prior on natural mortality based on max obser
. A joint likelihood profile over natural mortality and catchability is plar
exploration of using a prior on natural mortality based on max observ
will be considered for the 2015 assessment

, Nov 2013; SSC, Dec 2013: Develop a stock-specific ageing error matri
lore extreme patterns in early recruitment deviations that occurred in s
3 models. Will do in 2015.

Data Gaps and Research Priorities

velop a stock-specific ageing error matrix

ust effective sample sizes of survey length frequencies to num
hauls

plore natural mortality and catchability and methods for
ounting for uncertainty in these parameters into the assessm

plore potential causes of extreme early recruitment deviations
t occurred in some models in 2013.

quest ageing of otoliths from fishery

End

Exploration of the early rec dev pattern (already done for Dover sole)

- not having as many early recruits and not having any early recruits and having even more early recruits

- including early recruits in the main rec dev vector

- length based asymptotic selectivity for survey 1

- dome-shaped selectivity for survey 1

- length-based asymptotic selectivity for the fishery

-Leaving out various years of age-comp data

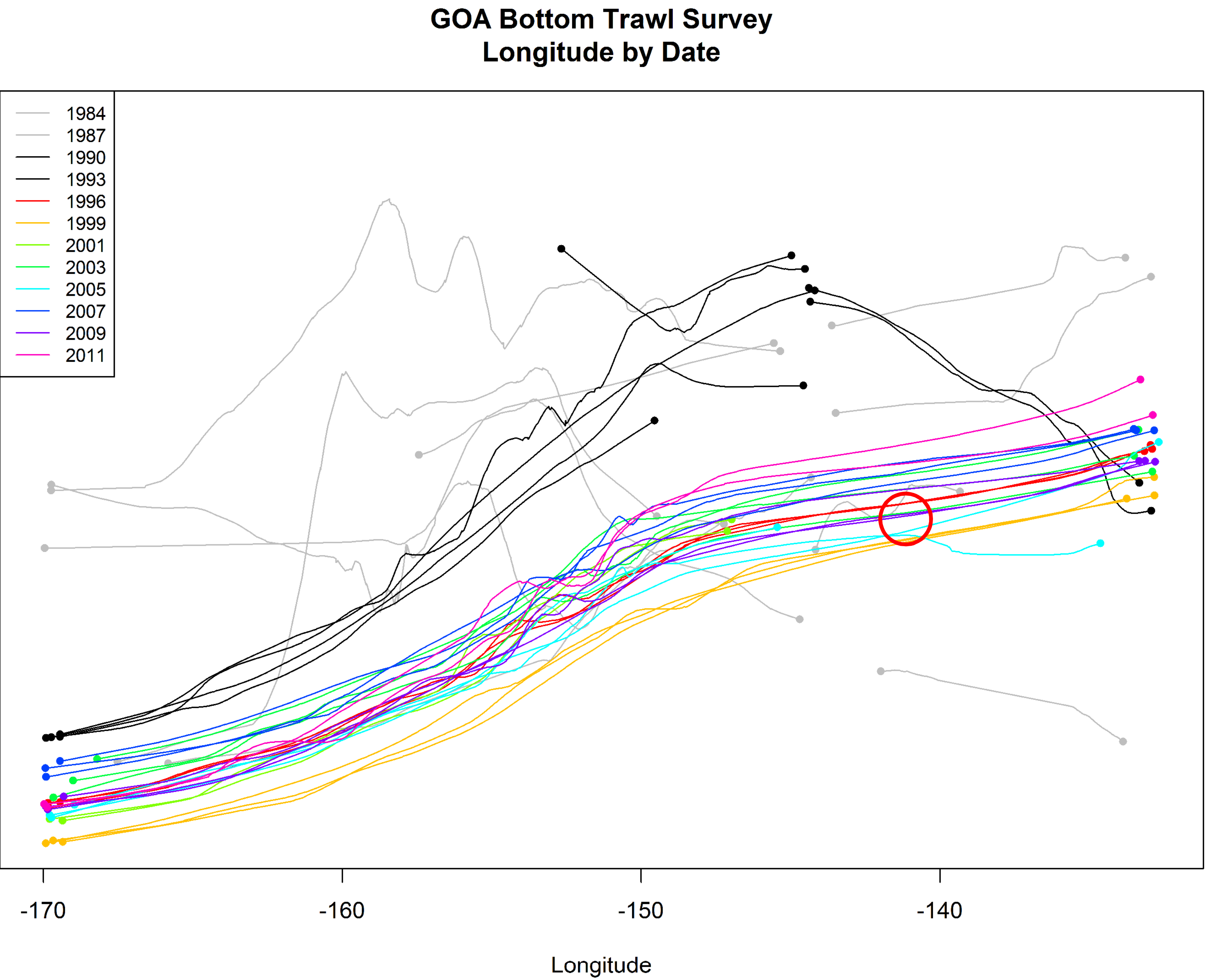
- leaving out the influence of the length comps

- leaving out the influence of the age comps (eliminates the problem)

- leaving out the survey biomass years corresponding to a downward trend in biomass

- adding in the 1984 and 1987 comp data

- limiting the maximum value of rec devs (makes a much bigger red line loop/mismatch between observed and expected) for the survey 1 female age comps



Also, 30 mi
tows in 1
and 1987, v
more rec
years: 15
tows

Francis (2011) Data Weighting Method

se:

tial: to investigate whether effective sample sizes of fishery length comps were reasonable relative to ef
mple sizes of survey composition data

assign weights to composition data sources that account for the influence of intra-year correlations in le
e comps that are not explicitly modeled, to avoid preventing the model from fitting the biomass index w

les of correlations not in the model: time-varying selectivity, time- and age-varying natura
ity

ound:

ngth and age comp data are often overdispersed relative to the variance assumed by the multinomial lik
the model

Allister and Ianelli (1997), Appendix 2: calculates weights to account for overdispersed data relative to v
the multinomial, ignores correlations

nnington and Volstad (2004): Intra-haul correlation lowers effective sample size

- E.g. fish of similar ages or lengths are often caught together in a haul
- The precision of the mean lengths or ages based on a sample of fish from marine surveys is much lower relative to the pr
  the mean length or age based on a random sample of the population
- Precision for some marine surveys is close to the number of hauls, not number of fish

ncis (2011):

- Same concept as for Pennington and Volstad, (measuring precision of means), except applied to intra-year correlations, r
  intra-haul correlations
- Same idea as McAllister and Ianelli, but accounts for correlations by comparing variation in mean lengths or ages relative
  expected means by year (where means are assumed to be normally distributed)

ial alternative: explicitly model time-varying effects that influence proportions at length a
t residuals are not as correlated

Potential Future Work (Dover sole)

- Estimate an ageing error matrix specific to AFSC samples of GOA Dove sole
- Further exploration of potential causes of patterns in early recruitmen deviations
- Continued consideration of removing 1984, 1987 survey biomass data
- Explore catchability and natural mortality within the model
- Number of hauls, other approaches to relative weighting within each source of composition data
- Explore whether time-varying and spatially-varying growth is occurrin and potential influence on assessment model
- Alternative approaches to accounting for ontogenetic movement
- Collection and analysis of additional maturity data for GOA Dover sole

Rex Sole Calculations

OFL = Fofl*Adult_biomass

ABC = Fabc*Adult_biomass

Fofl = M

Fabc= 0.75*M

Adult_biomass(2011) is summed total_biomass-at-age * maturity_at_age from the 2011 assessment (the most recent one)

Adult_biomass(t+1) = (1-exp(-Z))/Z * Adult_biomass(t) (used in update years)