21. Assessment of the squid stock complex in the Gulf of Alaska

Olav A. Ormseth
NMFS Alaska Fisheries Science Center

Executive Summary

Squids in the Gulf of Alaska (GOA) are managed as a single stock complex comprising approximately 15 species. Harvest recommendations are based on an historical catch approach setting OFL equal to maximum historical catch during 1997 - 2007 and ABC equal to 0.75 * OFL. Gulf of Alaska squids are on a biennial stock assessment schedule, with full assessments due in odd years. The most recent full assessment is from 2015 and is available online (www.afsc.noaa.gov/REFM/docs/2015/GOAsquid.pdf).

Summary of Changes in Assessment Inputs

1) Total catch and retention rates have been updated through October 2016.
2) The Alaska Regional Office has revised some of the earlier catch estimates for GOA squids. As a result, the maximum historical catch value (from 2006; see Table 2) is slightly lower and the harvest recommendations have been changed accordingly.

Summary of Results

1) The amount of squid catch in 2015 & 2016 is similar to recent years except 2012, when it was anomalously low (Table 2). Squid catch patterns are also similar to earlier years (Table 3). Squid retention rates are variable but indicate that many captured squids are retained (Table 4).

	As estimated or *specified last* year for:		As estimated or *recommended this* year for:	
Quantity/Status	*2016*	*2017*	**2017**	2018
Tier	*6*	*6*	**6**	6
maximum historical catch 1997-2007	*1,530*	*1,530*	**1,516**	1,516
Recommended OFL (max. hist. catch; t)	*1,530*	*1,530*	**1,516**	1,516
Maximum ABC (0.75*OFL; t)	*1,148*	*1,148*	**1,137**	1,137
Recommended ABC (0.75*OFL; t)	*1,148*	*1,148*	**1,137**	1,137
Status	As determined *last* year for: *2014*	*2015*	As determined *this* year for: 2015	2016
Overfishing	*No*	*n/a*	No	n/a
(for Tier 6 stocks, data are not available to determine whether the stock is in an overfished condition)				

Responses to SSC and Plan Team Comments on Assessments in General

There were no relevant comments on assessments in general.

Responses to SSC and Plan Team Comments Specific to this Assessment

From the December 2015 SSC report:
The SSC did not agree with the PT's and author's recommendation for harvest specifications. For these reasons, the SSC recommended the status quo approach for setting 2016/2017 harvest specifications.

> *Response*: The author accepts the SSC recommendation of the SSC and this year's recommended harvest is once again based on the status quo.

Tables

Table 1. Biomass estimates (t) of miscellaneous squids, *Berryteuthis magister*, and total squids from the GOA bottom trawl survey, 1984-2015. CV = coefficient of variation.

	miscellaneous squids		*B. magister*		total squids	
	biomass	CV	biomass	CV	biomass	CV
1984	546	0.35	2,762	0.15	3,308	0.14
1987	577	0.30	4,506	0.34	5,083	0.30
1990	276	0.43	4,033	0.17	4,309	0.16
1993	1,029	0.73	8,447	0.13	9,476	0.14
1996	26	0.28	4,884	0.14	4,911	0.14
1999	254	0.46	1,873	0.13	2,127	0.13
2001	703	0.62	5,909	0.30	6,612	0.27
2003	71	0.23	6,251	0.18	6,322	0.18
2005	249	0.51	4,650	0.18	4,899	0.18
2007	310	0.45	11,681	0.20	11,991	0.20
2009	188	0.61	8,415	0.16	8,603	0.16
2011	392	0.65	4,040	0.13	4,431	0.14
2013	568	0.80	9,675	0.16	10,243	0.16
2015	387	0.65	13,692	0.12	14,079	0.12

Table 2. Estimated total catches of squid (t) in the Gulf of Alaska groundfish fisheries, 1990-2016 (1990 is the earliest year for which GOA squid catch data are available). This table also includes annual TACs for the Other Species complex and estimated Other Species catch, 1990-2010, as well as specifications for the squid complex beginning in 2011. Squid catch reported here does not include catch in areas 649 & 659, which do not count against the squid TAC.

	squid catch (t)	Other Species catch (t)	Other Species TAC (t)	squid TAC (t)	squid ABC (t)	squid OFL (t)	management method
1990	60	6,289	n/a				Other Species TAC
1991	117	5,700	n/a				Other Species TAC (incl. Atka)
1992	88	12,313	13,432				Other Species TAC (incl. Atka)
1993	104	6,867	14,602				Other Species TAC (incl. Atka)
1994	39	2,721	14,505				Other Species TAC
1995	25	3,421	13,308				Other Species TAC
1996	42	4,480	12,390				Other Species TAC
1997	92	5,439	13,470				Other Species TAC
1998	50	3,748	15,570				Other Species TAC
1999	33	3,858	14,600				Other Species TAC
2000	19	5,649	14,215				Other Species TAC
2001	91	4,804	13,619				Other Species TAC
2002	42	3,748	11,330				Other Species TAC
2003	77	6,266	11,260				Other Species TAC
2004	157	1,705	12,942				Other Species TAC (no skates)
2005	633	2,513	13,871				Other Species TAC (no skates)
2006	1,516	3,881	13,856				Other Species TAC (no skates)
2007	411	3,035	4,500				Other Species TAC (no skates)
2008	83	2,967	4,500				Other Species TAC (no skates)
2009	338	3,188	4,500				Other Species TAC (no skates)
2010	131	1,724	4,500				Other Species TAC (no skates)
2011	231			1,148	1,148	1,530	squid complex
2012	18			1,148	1,148	1,530	squid complex
2013	321			1,148	1,148	1,530	squid complex
2014	91			1,148	1,148	1,530	squid complex
2015	409			1,148	1,148	1,530	squid complex
*2016**	185			1,148	1,148	1,530	squid complex

Data sources and notes: squid catch 1990-1996, Gaichas et al. 1999; squid catch 1997-2002, AKRO Blend; squid catch 2003-2016, AKRO CAS; Other Species catch, AKRO Blend and CAS; TAC, AKRO harvest specifications. Other Species catch from 1990-2003 does not include catch of skates in the IFQ Pacific halibut fishery, and after 2003 includes no skate catch at all.

* 2016 catch data are incomplete; retrieved October 16, 2016.

Table 3. Estimated catch (t) of all squid species in the Gulf of Alaska combined by NMFS statistical area, 1997-2016. Data sources: 1997-2002, AKRO Blend; 2003-2016, AKRO CAS. The 2016 data are incomplete; retrieved October 16, 2016. Note that catch from areas 649 and 659 in the GOA are not included as they do not count towards the squid TAC.

	NMFS statistical area					
	WGOA	**CGOA**		**EGOA**		**GOA total**
	610	**620**	**630**	**640**	**650**	
1997	46	4	36	2	4	92
1998	18	8	21	3	0	50
1999	6	11	14	2	0	33
2000	7	2	8	2	0	19
2001	19	54	17	1	0	91
2002	19	12	10	1	0	42
2003	19	43	13	2	0	77
2004	15	129	11	2	0	157
2005	13	607	11	2	0	633
2006	12	1,485	14	5	0	1,516
2007	3	403	5	0	0	411
2008	4	77	2	0	0	83
2009	12	315	10	1	0	338
2010	3	121	5	2	0	131
2011	8	201	18	4	0	231
2012	5	6	5	2	0	18
2013	1	278	40	2	0	321
2014	4	70	17	0	0	91
2015	6	296	107	0	0	409
2016	*3*	*106*	*76*	*0*	*0*	*185*

Table 4. Retention rates of squids in federal groundfish fisheries, 2011-2016. Data source: AKRO CAS. The 2016 data are incomplete; retrieved October 12, 2016.
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year	percent retained
2011	77%
2012	12%
2013	92%
2014	60%
2015	78%
*2016**	*45%*

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