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 normally on a biennial stock assessment schedule, with full assessments due in odd years. In 2013 however, the shutdown of the federal government limited the amount of time to prepare assessments and the author was requested to do only an executive summary similar to an "off-year" assessment. The full assessment from 2011 is available online (www.afsc.noaa.gov/REFM/docs/2011/GOAsquid.pdf).

Summary of Changes

Biomass estimates for GOA squids have been added from the 2013 bottom trawl survey; total catch and retention rates have been updated through October 2013.

Summary of Results

1) Survey biomass estimates increased relative to 2009 & 2011, however the bottom trawl survey is not considered a reliable measure of squid abundance (Table 1).
2) The amount of squid catch is similar to recent years except 2011, when it was anomalously low (Table 2). Squid catch patterns are also similar to earlier years (Tables 3-5). Squid retention rates are variable but indicate that most captured squids are retained (Table 6).

	last year		**this year**	
Quantity/Status	*2013*	*2014*	**2014**	2015
M (natural mortality)	*n/a*	*n/a*	**n/a**	n/a
Specified/recommended Tier	*6*	*6*	**6**	6
Biomass	*n/a*	*n/a*	**n/a**	n/a
average historical catch 1997-2007	*272*	*272*	**272**	272
maximum historical catch 1997-2007	*1,530*	*1,530*	**1,530**	1,530
Recommended OFL (max. hist. catch; t)	*1,530*	*1,530*	**1,530**	1,530
Maximum ABC (0.75*OFL; t)	*1,148*	*1,148*	**1,148**	1,148
Recommended ABC (0.75*OFL; t)	*1,148*	*1,148*	**1,148**	1,148
Status	*As determined last year for:*		As determined this year for:	
	2011	*2012*	2012	2013
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)				

Tables

Table 1. Biomass estimates (t) of *Berryteuthis magister*, unidentified squids, and total squids from the GOA bottom trawl survey, 1984-2013. CV = coefficient of variation.

	squid unidentified		*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

Table 2. Estimated total catches of squid (t) in the Gulf of Alaska groundfish fisheries, 1990-2013 (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 (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	97	5,439	13,470				Other Species TAC
1998	59	3,748	15,570				Other Species TAC
1999	41	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	43	3,748	11,330				Other Species TAC
2003	97	6,266	11,260				Other Species TAC
2004	162	1,705	12,942				Other Species TAC (no skates)
2005	636	2,513	13,871				Other Species TAC (no skates)
2006	1,530	3,881	13,856				Other Species TAC (no skates)
2007	416	3,035	4,500				Other Species TAC (no skates)
2008	98	2,967	4,500				Other Species TAC (no skates)
2009	345	3,188	4,500				Other Species TAC (no skates)
2010	139	1,724	4,500				Other Species TAC (no skates)
2011	238			1,148	1,148	1,530	squid complex
2012	22			1,148	1,148	1,530	squid complex
*2013**	*199*			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 2003-2012, 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.

*2013 catch data are incomplete; retrieved September 18, 2013.

Table 3. Estimated catch (t) of all squid species in the Gulf of Alaska combined by target fishery, 1997-2002. Data source: AKRO Blend.

target fishery	1997	1998	1999	2000	2001	2002
deep flatfish	5	3	6	1	1	1
flathead sole	1	0	0	0	1	0
other target	14	0	0	0	0	0
Pacific cod	1	1	1	0	1	0
rex sole	1	1	4	2	3	1
rockfish	8	6	7	7	9	7
sablefish	0	0	2	0	0	0
shallow flatfish	0	0	0	0	0	0
arrowtooth	1	3	1	1	2	7
pollock	66	46	20	7	74	28
total	97	60	41	18	91	44

Table 4. Estimated catch (t) of all squid species in the Gulf of Alaska combined by target fishery, 2003-2013. Data source: AKRO CAS. The 2013 data are incomplete; retrieved September 18, 2013.

target	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	*2013**
pollock	68	145	632	1,518	410	92	321	129	209	7	*189*
rockfish	9	12	2	10	3	5	14	4	12	15	*8*
rex sole	2	0	0	0	0	0	2	3	1	0	*1*
sablefish	0	4	0	0	0	0	0	0	0	0	*1*
ATF	3	1	2	1	2	0	7	2	16	0	*0*
Pacific cod	14	0	0	0	0	0	0	0	0	0	*0*
deep flat.	0	1	0	0	0	0	0	0	0	0	*0*
shall. flat.	0	0	0	0	1	0	1	0	0	0	*0*
GOA total	**97**	**162**	**636**	**1,530**	**416**	**98**	**345**	**139**	**238**	**22**	***199***

* 2013 data are incomplete; retrieved September 18, 2013

Table 5. Estimated catch (t) of all squid species in the Gulf of Alaska combined by NMFS statistical area, 1997-2013. Data sources: 1997-2002, AKRO Blend; 2003-2013, AKRO CAS. The 2013 data are incomplete; retrieved September 18, 2013.

	NMFS statistical area							
	WGOA	**CGOA**			**EGOA**			
	610	**620**	**630**	**640**	**649**	**650**	**659**	**total**
1997	46	4	36	2	6	4	0	98
1998	18	8	21	3	9	0	0	59
1999	6	11	14	2	8	0	0	41
2000	7	2	8	2	0	0	0	19
2001	19	54	17	1	0	0	0	91
2002	19	12	10	1	0	0	0	42
2003	19	43	13	2	20	0	0	97
2004	15	129	11	2	5	0	0	162
2005	13	607	11	2	3	0	0	636
2006	12	1,485	14	5	14	0	0	1,530
2007	3	403	5	0	0	0	0	412
2008	4	77	2	0	0	0	0	84
2009	12	315	10	1	7	0	0	345
2010	3	121	5	2	8	0	0	139
2011	8	201	18	4	7	0	0	238
2012	5	6	5	2	4	0	0	22
*2013**	*0*	*136*	*21*	*2*	*39*	*0*	*0*	*199*

*2013 are incomplete; retrieved September 18, 2013.

Table 6. Retention rates of squids in federal groundfish fisheries, 2011-2013. Data source: AKRO CAS. The 2013 data are incomplete; retrieved September 18, 2013.
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year	percent retained
2011	77%
2012	12%
*2013**	*91%*

*2013 are incomplete; retrieved September 18, 2013.

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