Chapter 17

Assessment of the Atka mackerel stock in the Gulf of Alaska

EXECUTIVE SUMMARY

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Introduction

Gulf of Alaska (GOA) Atka mackerel has been moved to a biennial stock assessment schedule to coincide with the availability of new survey data from the biennial trawl survey. A full assessment was presented in 2011, which included data from the 2011 GOA bottom trawl survey. On alternate (even) years we present an executive summary with updated catch, last year's key assessment parameters, any significant new information available in the interim, and projections for this year. Although a survey was conducted in 2013, we provide an expanded executive summary with updated catch and new survey information as described below.

Due to the government shut-down in October 2013, stock assessments for an abbreviated suite of model runs are required only for Steller sea lion prey species (pollock, Pacific cod, Bering Sea/Aleutian Islands Atka mackerel), and species where a conservation concern has been noted. For all other Tier 1-3 stocks, updated projections from last year using 2013 catch data are required at a minimum. Results will be presented in executive summaries using the "off-year" format for stocks on biennial assessment cycles. For stocks managed in Tiers 4-6, executive summaries using the "off-year" format for biennial assessment cycles are required. Gulf of Alaska assessments that rely on trawl survey data for specifications will use the 2013 GOA trawl survey in the estimates of biological reference points and harvest recommendations.

Gulf of Alaska Atka mackerel have been managed under Tier 6 specifications since 1996 due to the lack of reliable estimates of current biomass. In 2007, the assessment presented Tier 5 calculations of ABC and OFL based on 2007 survey biomass estimates, for consideration. However the Plan Team and SSC agreed with the authors that reliable estimates of Atka mackerel biomass were not available and recommended continuing management under Tier 6. The 2011 assessment and 2012 update presented Tier 6 recommendations and did not present Tier 5 calculations given the large variances associated with the 2011 survey biomass estimates, which were essentially based on two significant hauls encountered in the western Gulf of Alaska. The Council set the Gulf-wide 2013 (and 2014) OFL, ABC, and TAC for Atka mackerel at 6,200 t, 4,700 t, and 2,000 t. The 2011 full assessment is available on the web (Lowe *et al*. 2011, http://www.afsc.noaa.gov/refm/docs/2011/GOAatka.pdf).

New information and projection

New catch information includes updated 2012 catch (1,187 t), and 2013 catch (1,244 t) as of November 9, 2013 (Table 17.1, http://alaskafisheries.noaa.gov/2013/car110_goa.pdf). The 2013 GOA Atka mackerel catch through November 9 was 62% of the 2013 TAC; the 2012 GOA Atka mackerel catch was 59% of the TAC. Figure 17.1 shows the preliminary 2013 distributions of observed catches of Atka mackerel in the Gulf of Alaska summed over 20 km areas. Most of these catches occurred during July through October. Open circles represent observed catches greater than 1 t. Large catches were taken in the Shumagin (610) area and to some extent in the Chirikof (620) area. Under the Rockfish Program. catcher processors who historically would move out of 610 after the POP fishery closed, are now remaining in the

area and targeting northern and pelagic shelf rockfish. This is contributing to greater catches (much of it discarded) of Atka mackerel.

Since the 2011 assessment and 2012 update, ages from the 2012 GOA fisheries have become available. A total of 78 otoliths were collected from 21 hauls from the Shumagin and Chirikof areas. The data show the strong 2006 and 2007 year classes observed in the Aleutian Islands (Figure 17.2). The 1999 and 2001 year classes, which were very strong in the Aleutian Islands, are still observed in the GOA age distribution.

New survey information is available from the 2013 summer bottom trawl survey. The 2011 survey showed 90% of the GOA Atka mackerel biomass was caught in 2 hauls off Unimak and Sanak Islands, in the 1-100 m depth strata (Figure 17.3). The most recent data from the 2013 survey showed 68% of the GOA Atka mackerel biomass was caught in a large haul off Sanak Island, also in the 1-100 m depth strata (Figure 17.3). Bottom trawl survey information is presented for 2005, 2007, 2009, 2011, and 2013 for consideration (Table 17.2).

Atka mackerel have been inconsistently caught in the GOA surveys, appearing in 29%, 20%, 24%, 24%, and 16% of the hauls in the Shumagin area in the 2005, 2007, 2009, 2011, and 2013 GOA surveys (Table 17.2, Figure 17.3). What can be concluded from this is that the general groundfish GOA bottom trawl survey, as it has been designed and used since 1984, does not assess GOA Atka mackerel well, and the resulting biomass estimates are not considered reliable indicators of absolute abundance or indices of trend.

Most of the GOA Atka mackerel biomass (96%, 98%, 99.6%, 90%, and 69% in 2005, 2007, 2009, 2011, and 2013) is distributed within the Shumagin area of the western GOA (Area 610, Figure 17.3, Table 17.2). Atka mackerel were encountered in 16% and 18% of the hauls conducted in the Shumagin and Chirikof areas in the 2013 survey. The 2013 estimate of GOA Atka mackerel biomass is 105,411 t, with a coefficient of variation (*CV*) of 67%, reflecting a variance of 4.96 billion (Table 17.2). The estimate of Shumagin area biomass is 72,249 t, with a coefficient of variation of 94%, reflecting a variance of 4.6 billion (Table 17.2).

There is no new information incorporated into the projection. For the 2014 (and 2015) fishery, we recommend an ABC of 4,700 t. This ABC is equivalent to last year's ABC for 2013. The corresponding reference values for Atka mackerel are summarized below. Because information for Atka mackerel is very limited, they are managed in Tier 6.

Quantity	As estimated or *specified last* year for: 2013	2014	As estimated or *recommended this* year for: **2014**	2015
M (natural mortality)	0.3	0.3	**0.3**	0.3
Tier	6	6	**6**	6
OFL (t)	6,200	6,200	**6,200**	6,200
maxABC (t)	4,700	4,700	**4,700**	4,700
Specified/recommended ABC (t)	4,700	4,700	**4,700**	4,700
Status	As determined *last* year for: 2011	2012	As determined *this* year for: 2012	2013
Overfishing	n/a	n/a	**n/a**	n/a
(for Tier 6 stocks, data are not available to determine whether the stock is in an overfished condition)				

Area apportionment

There is no area apportionment for GOA Atka mackerel. The Council manages GOA Atka mackerel on a Gulf-wide basis.

Research priorities

Regional and seasonal food habits data for Gulf of Alaska Atka mackerel is very limited. Studies to determine the impacts of environmental indicators such as temperature regime and oceanographic features on Atka mackerel are needed. Further studies to determine whether there have been any changes in life history parameters over time (e.g. maturity-at-age, fecundity, weight- and length-at-age) would be informative. More information on Atka mackerel habitat preferences would be useful to improve our understanding of Essential Fish Habitat (EFH), and improve our assessment of the impacts to habitat due to fishing. Better habitat mapping of the Gulf of Alaska would provide information for survey stratification and the extent of trawlable and untrawlable habitat, which could help to improve imprecise survey biomass estimates.

Summaries for the Plan Team

Species	Year	Biomass	OFL	ABC	TAC	Catch
Atka mackerel (Gulfwide)	2012	Unknown	6,200	4,700	2,000	1,187
	2013	Unknown	6,200	4,700	2,000	1,244[1]
	2014	Unknown	6,200	4,700		
	2015	Unknown	6,200	4,700		

1/ Current as of November 9, 2013 (http://alaskafisheries.noaa.gov/2013/car110_goa.pdf).

Table 17.1 Gulf of Alaska Atka mackerel catches (including discards), and corresponding Acceptable Biological Catches (ABC), Total Allowable Catches (TAC), and Overfishing Levels (OFL) set by the North Pacific Fishery Management Council from 1977 to the present. Catches, ABCs, TACs, and OFLs are in t.

Year	Catch	ABC	TAC	OFL
1977	19,455		22,000[e]	
1978	19,588		24,800[e]	
1979	10,949		26,800[e]	
1980	13,166		28,700[e]	
1981	18,727		28,700[e]	
1982	6,760		28,700[e]	
1983	12,260		28,700[e]	
1984	1,153		28,700[e]	
1985	1,848		5,000[e]	
1986	4	4,700	4,678[e]	
1987	1	0	240[f]	
1988[a]	[b]			
1989	[b]			
1990	1,416[c]			
1991	3,258[c]			
1992	13,834[c]			
1993	5,146[c]			
1994[d]	3,538	4,800	3,500	19,040
1995	701	3,240	3,240	11,700
1996	1,580	3,240	3,240	9,800
1997	331	1,000	1,000	6,200
1998	317	600	600	6,200
1999	262	600	600	6,200
2000	170	600	600	6,200
2001	76	600	600	6,200
2002	85	600	600	6,200
2003	583	600	600	6,200
2004	819	600	600	6,200
2005	799	600	600	6,200
2006	876	4,700	1,500	6,200
2007	1,459	4,700	1,500	6,200
2008	2,109	4,700	1,500	6,200
2009	2,223	4,700	2,000	6,200
2010	2,405	4,700	2,000	6,200
2011	1,615	4,700	2,000	6,200
2012	1,187	4,700	2,000	6,200
2013g	1,244	4,700	2,000	6,200

a/ Atka mackerel were added to the Other Species category in 1988.
b/ Catches of Atka mackerel were included in the Other Species category.
c/ Catches of Atka mackerel was reported separately for 1990-1993.
d/ Atka mackerel were assigned a target species in 1994.
e/ Reported as OY (Optimum Yield).
f/ Reported as TQ (Target Quota).
g/ 2013 data as of Nov. 9, 2013 from NMFS Alaska Regional Office CAS

Table 17.2. Gulf of Alaska Atka mackerel mean biomass estimates (biomass, t), variance, and coefficient of variation (*CV*), by area from the 2005, 2007, 2009, 2011, and 2013 Gulf of Alaska bottom trawl surveys. Number of hauls conducted in each area, and number and percentage (%) of hauls with Atka mackerel catch are also given.

	Year	Haul count	Hauls with catch*	% hauls with catch*	Biomass	Biomass variance	*CV*
2005	Shumagin	180	53	29%	97,233	2,500,113,153	51%
	Chirikof	177	38	21%	2,533	473,332	27%
	Kodiak	293	9	3%	1,147	642,670	70%
	Yakutat	92	0	--	--	--	--
	Southeast	97	0	--	--	--	--
	Gulf of Alaska	839	100	12%	100,913	2,501,229,155	50%
2007	Shumagin	205	42	20%	80,546	1,412,393,581	47%
	Chirikof	199	18	9%	1,562	650,483	52%
	Kodiak	274	11	4%	219	6,124	36%
	Yakutat	76	0	--	--	--	--
	Southeast	66	0	--	--	--	--
	Gulf of Alaska	820	71	9%	82,328	1,413,050,188	46%
2009	Shumagin	196	48	24%	135,089	12,748,474,113	84%
	Chirikof	190	14	7%	224	6,987	37%
	Kodiak	280	21	8%	294	5,497	25%
	Yakutat	83	1	1%	16	266	100%
	Southeast	74	0	--	--	--	--
	Gulf of Alaska	823	84	10%	135,623	12,748,486,855	83%
2011	Shumagin	163	39	24%	87,888	2,891,008,491	61%
	Chirikof	155	37	24%	8,676	34,850,679	68%
	Kodiak	228	9	4%	670	151,812	58%
	Yakutat	68	0	--	--	--	--
	Southeast	56	0	--	--	--	--
	Gulf of Alaska	670	85	13%	97,234	2,926,010,982	56%
2013	Shumagin	136	22	16%	72,249	4,584,424,199	94%
	Chirikof	126	23	18%	26,554	345,077,199	70%
	Kodiak	187	26	14%	6,293	26,407,221	82%
	Yakutat	61	6	10%	297	15,090	41%
	Southeast	38	1	3%	18	344	100%
	Gulf of Alaska	548	78	14%	105,411	4,955,924,053	67%

*Catch of Atka mackerel

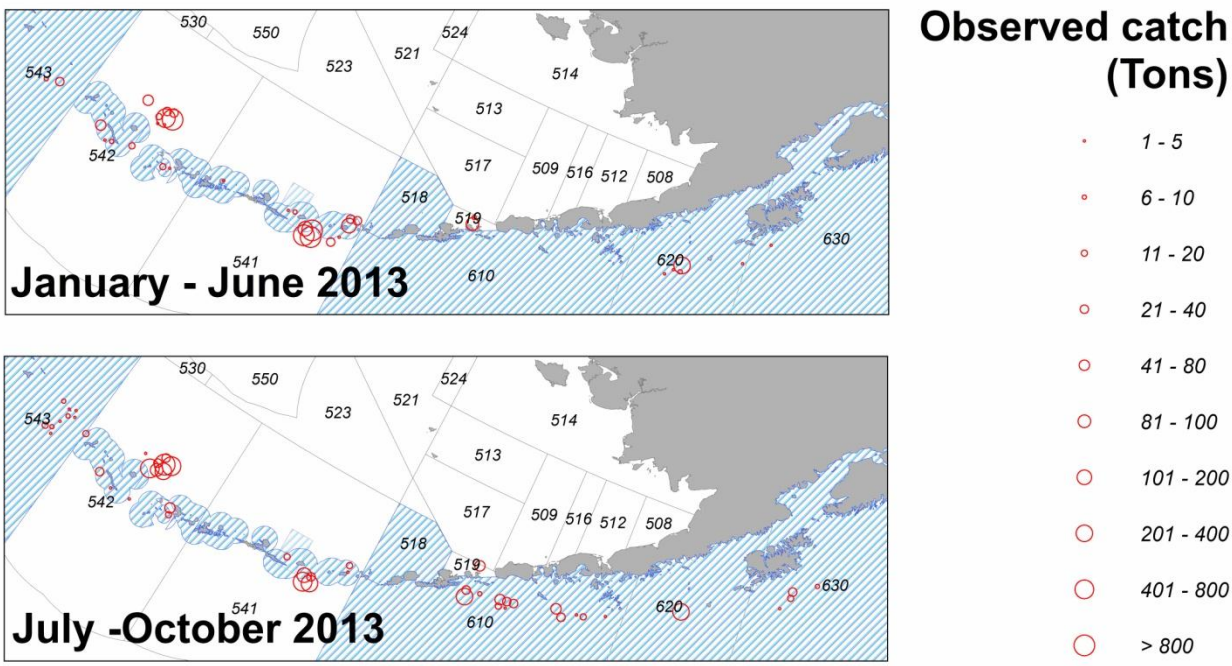

Figure 17.1. Observed catches of Atka mackerel summed for 20 km^2 cells for 2013 where observed catch per haul was greater than 1 t. Shaded areas represent areas closed to directed Atka mackerel fishing.

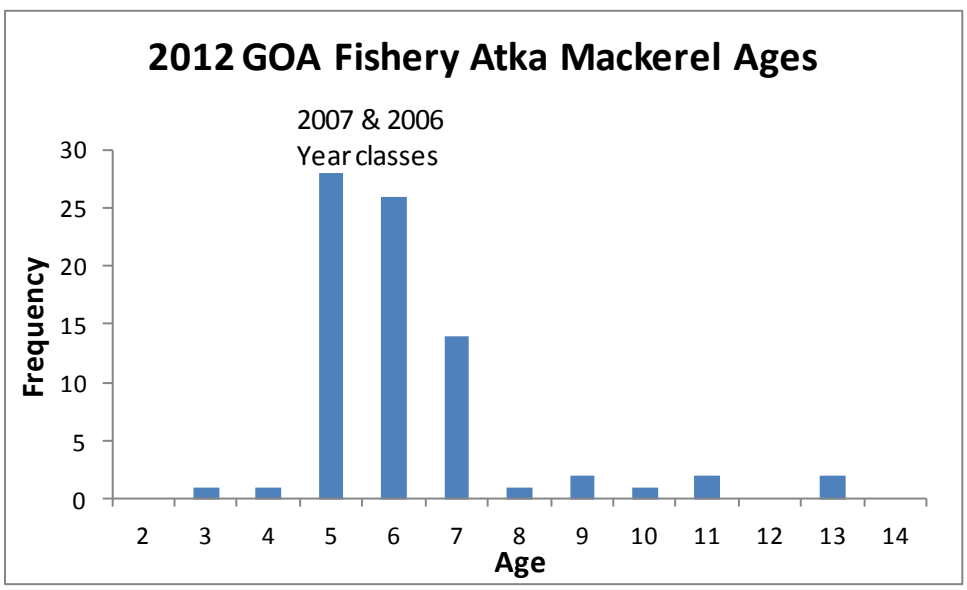

Figure 17.2. Age frequency distribution of Atka mackerel from the 2012 Gulf of Alaska fisheries. A total of 78 otoliths were collected and aged from the Shumagin (610) and Chirikof (620) areas.

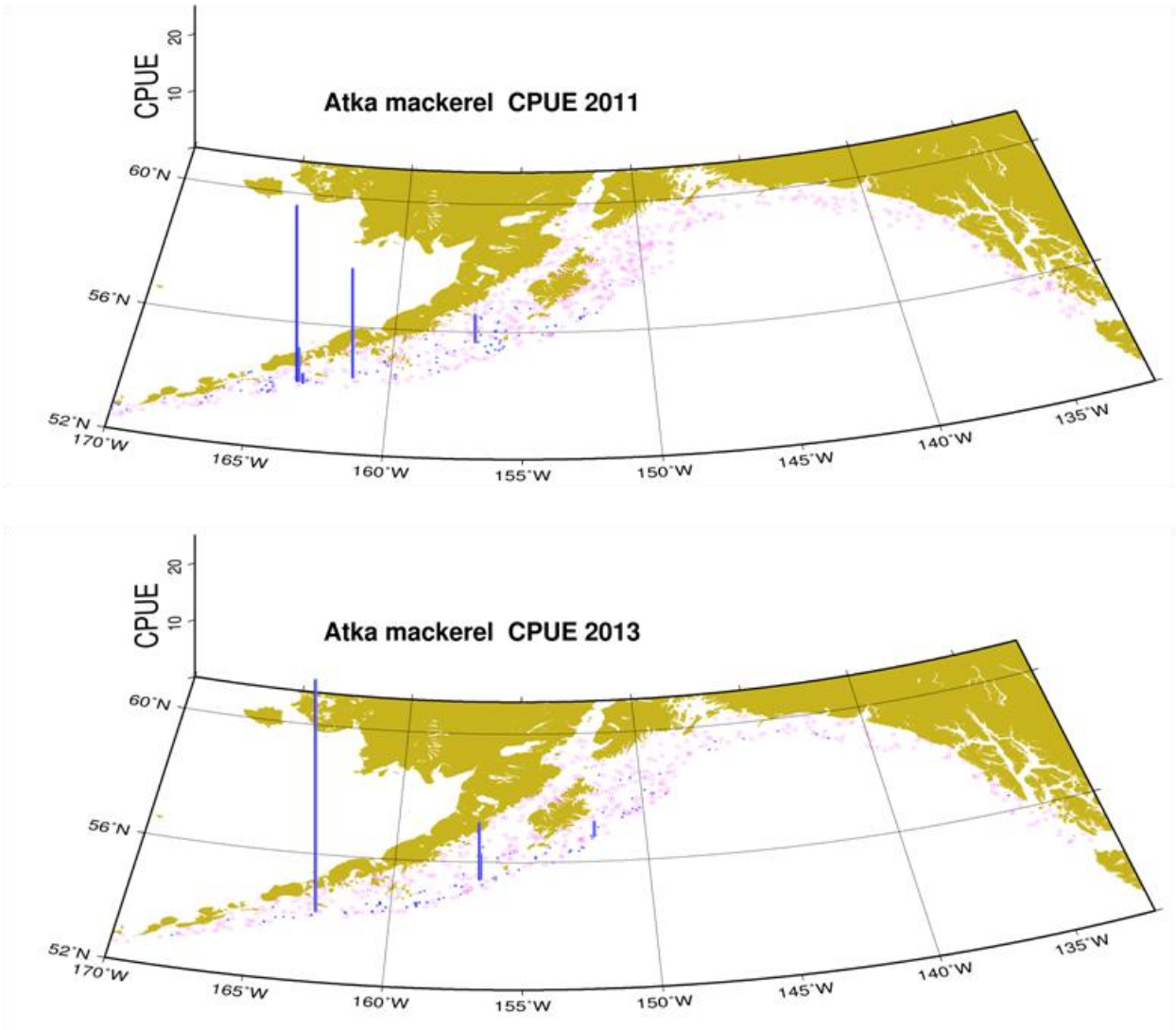

Figure 17.3. Atka mackerel bottom trawl survey CPUE by station for 2011 and 2013. Circles represent tows where Atka mackerel were absent, height of bars is proportional to CPUE by weight.

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