Appendix C

Gulf of Alaska Squids (Executive Summary)

by

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16.1 Introduction

This is the first GOA squid stock assessment and fishery evaluation (SAFE). Historically, GOA squids have been managed as part of the GOA Other Species complex, and no assessment was required because the Other Species TAC is established as 5% of all target species TACs under the GOA FMP. If squid are managed separately from the Other Species complex, under the requirements of the current data quality Tier system they could be managed under Tier 5 or Tier 6, the lowest information Tiers. Tier 6 is applied to the management of BSAI squids, which have historically been managed separately from the Other Species complex in the BSAI. The rationale for Tier 6-based quota recommendations is that there is no reliable biomass estimates for squid in the BSAI; however, both Tier 5 and 6 options were presented along with available biomass and catch information for the GOA during the February 2006 SSC meeting and the September 2006 GOA Plan Team meeting.

The Overfishing Level (OFL) under Tier 5 is calculated as the F OFL (based on the natural mortality rate M) times estimated biomass. Two options are presented for determining the appropriate F OFL for squid. We suggest one approach which would alter Tier 5 criteria setting F OFL lower than M based on research on acceptable harvest rates for squids from other ecosystems, and another approach that maintains the Tier 5 F OFL = M but applies a different OFL calculation assuming that average biomass can be seen as initial biomass for a given year. In both cases, the Tier 5 Acceptable Biological Catch (ABC) is calculated as 75% of F OFL times estimated biomass.

All Tier 5 recommendations are based on the average squid biomass estimated from the three recent GOA surveys. Two options were presented to make this calculation. If the 2001 survey is not used because slope regions and the eastern GOA were not surveyed then the average would be based on the 1999, 2003, and 2005 survey biomass estimates (4,450 mt). If the 2001 survey is included because the it is more recent despite excluding some survey regions, then the 2001, 2003, and 2005 survey biomass estimates would be used to calculate the average (5,944 mt).

Tier 6 ABC is calculated as 0.75 times the average catch from 1978-1995, and Tier 6 OFL is calculated as the average catch over the same period. The catch history for GOA squids extends back only to 1991 at present, to Tier 6 ABC is calculated as 0.75 times the average catch from 1990-2005, and Tier 6 OFL is calculated as the average catch from 1990-2005.

16.2 Updated catch and projection

New catch information includes updated 2005 catches and 2006 catch as of November 4, 2006 (http://www.fakr.noaa.gov/2006/car110_goa.pdf). Data from 2006 has not been incorporated into any

ABC or OFL calculation. The Tier 6 calculation, although unchanged, reflects the final 2005 catch estimate (see table under Summaries for the Plan Team).

Year	ABC	TAC	Other Species Catch*	Estimated Squid Catch**	Squid % of Other Species Catch	Management Method
2005	NA	13,871	2,294	626	27%	Other Species TAC (Skates removed)
2006	NA	13,856	3,601	1,526	42%	Other Species TAC (Skates removed)

NA – Not applicable; *Does not include catch of skates in Pacific halibut fisheries; **Estimated squid catch as of November 9, 2006 from Alaska Regional Office.

16.3 Data gaps and research priorities

Clearly, there is little information for stock assessment of the squid complex in the GOA. However, ecosystem models estimate that the proportion of squid mortality attributable to incidental catch in groundfish fisheries in the GOA region is extremely small relative to that attributable to predation mortality. Therefore, improving information available for squid stock assessment seems a low priority as long as catch remains at its current low level.

However, investigating any potential interactions between incidental removal of squids and foraging by protected species of concern (toothed whales) seems a higher priority for research. Limited data suggests that squids may make up 67 to 85% of the diet (by weight) for toothed whales in the GOA. Research should investigate whether the location and timing of incidental squid removals potentially overlap with foraging seasons and areas for toothed whales, and whether the magnitude of squid catch at these key areas and times is sufficient to limit the forage available for these cetaceans.

Management might consider improvements to the current monitoring of squid species within the complex such as getting observers to measure a subset of the bycatch in order to classify the squid catch by size. This would be extremely helpful to investigate potential ecosystem effects (e.g. “large” squid the size of *Moroteuthis robusta* are more predator than prey in the ecosystem, while smaller squid species may be most important as prey). In the future, it might also be important to be able to estimate the species composition of squid complex bycatch to determine relative impacts on marine mammals and other predators that depend on squids for prey, as well as relative impacts to the squid population themselves.

16.4 Summaries for the Plan Team

	Tier 5 1999, 2003, and 2005 surveys	Tier 5 2001, 2003, and 2005 surveys	Tier 6 with catch history from 1990-2005
Avg. Survey Biomass	4,450 mt	5,944 mt	NA
ABC option 1	834	1,115	80 mt
OFL option 1	1,112	1,486	106
ABC option 2	1,576	2,105	80
OFL option 2	1,924	2,570	106

NA – Not applicable.