20. Assessment of the Shark stock complex in the Gulf of Alaska (Executive Summary)

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Executive Summary

The shark complex (spiny dogfish, Pacific sleeper shark, salmon shark and other/unidentified sharks) in the Gulf of Alaska (GOA) is now being assessed on a biennial stock assessment schedule. GOA sharks are a complex of Tier 5 (spiny dogfish) and Tier 6 (all other sharks) species. The OFL is based on the sum of the Tier 5 and Tier 6 (average historical catch between the years 1997 - 2007) recommendations for the individual species (ABC is 75% of OFL). For this off-year summary, we have updated the time series of catch through Oct 1, 2012 to reflect any changes that might have occurred in the Catch Accounting System (for the years 2003 – 2012). For further information regarding the assessment, please refer to last year's full stock assessment, which is available online (Tribuzio et al. 2011, http://www.afsc.noaa.gov/REFM/docs/2011/GOAshark.pdf). A full stock assessment document with updated survey and catch estimates will be presented in next year's SAFE report.

Summary of changes in Assessment Inputs

Changes in the input data: There were no changes made to the assessment inputs since this was an off-cycle year.

Changes in assessment methodology: There were no changes in assessment methodology since this was an off-cycle year.

Summary of Results

For 2013 we recommend the maximum allowable ABC of 6,028 t and an OFL of 8,037 t for the shark complex. Catch in 2011 was 522 t and in 2012 was 452 t (as of October 1). The complex was not being subjected to overfishing last year. The ABC/OFL for the shark complex is the sum of the computations for the individual species. Spiny dogfish is the only Tier 5 species, and OFL = M*Biomass, with ABC = 0.75*OFL. The remaining shark species are Tier 6 species with OFL = avg. historical catch (1997 – 2007) and ABC = 0.75*OFL.

Spiny Dogfish Quantity	As estimated or *specified last* year for: 2012	 2013	As estimated or *recommended this* year for: 2013	 2014
M (natural mortality rate)	0.097	0.097	0.097	0.097
Tier	5	5	5	5
Biomass (t)	79,257	79,257	79,257	79,257
F_{OFL}	0.097	0.097	0.097	0.097
$maxF_{ABC}$	0.073	0.073	0.073	0.073
F_{ABC}	0.073	0.073	0.073	0.073
OFL (t)	7,467	7,467	**7,467**	7,467
maxABC (t)	5,600	5,600	5,600	5,600
ABC (t)	5,600	5,600	**5,600**	5,600
Status	As determined *last* year for: 2010	 2011	As determined *this* year for: 2011	 2012
Overfishing	No	n/a	No	n/a

Pacific sleeper, salmon and other sharks Quantity	As estimated or *specified last* year for: 2012	 2013	As estimated or *recommended this* year for: 2013	 2014
Tier	6	6	6	6
OFL (t)	571	571	**571**	571
maxABC (t)	428	428	428	428
ABC (t)	428	428	**428**	428
Status	As determined *last* year for: 2010	 2011	As determined *this* year for: 2011	 2012
Overfishing	No	n/a	No	n/a

Summaries for Plan Team

Species	Year	Biomass	OFL	ABC	TAC	Catch[1]
Shark Complex	2011	74,355	8,263	6,167	6,167	522
	2012	118,621	8,037	6,028	6,028	452
	2013	118,621	8,037	6,028		
	2014	118,621	8,037	6,028		

[1]Catch as of Oct 1, 2012

SSC and Plan Team Comments on Assessments in General

"The SSC concurs with the Plan Teams' recommendation that the authors consider issues for sablefish where there may be overlap between the catch-in-areas and halibut fishery incidental catch estimation (HFICE) estimates. In general, for all species, it would be good to understand the unaccounted for catches and the degree of overlap between the CAS and HFICE estimates, and to discuss these at the Plan Team meetings next September." (SSC, December 2011)

"The Teams recommend that authors continue to include other removals in an appendix for 2013. Authors may apply those removals in estimating ABC and OFL; however, if this is done, results based on the approach used in the previous assessment must also be presented. The Teams recommend that the "other" removals data set continue to be compiled, and expanded to include all sources of removal." (Plan Team, September 2012)

"The Plan Teams recommend that assessment authors retain status quo assessment approaches for the November 2012 SAFE report but also apply the Kalman filter or random effects survey averaging methods for Tier 5 stocks and summarize the analytical results for comparison purposes only. ADMB code for implementing the random effects method will be made available." (Plan Team, September 2012)

SSC and Plan Team Comments Specific to this Assessment

"Develop biomass indices for lowest tier species (Tier 5 for crab, Tier 6 for groundfish), such as sharks, and conduct net efficiency studies for spiny dogfish. Explore alternative methodologies for Tier 5 and 6 stocks, such as length-based methods or biomass dynamics models." (SSC, June 2012)

"The Plan Team encourages the inclusion of the HFICE data in future models, and possibly some measure of fishing effort. Also, the Team suggested that using some alternative series (e.g., the ratio estimator for the period prior to 2003) may be useful for sensitivity analysis." (Plan Team, September 2012)

"The assessment authors indicated that they intend to compare results from this demographic modeling analysis with results from planned biomass dynamic models and length-based models. The SSC encourages these efforts and urges the authors to incorporate these models into an improved stock assessment for spiny dogfish in the near future." (SSC, December 2011)

"The SSC recommends that total shark catches should be incorporated into the historical catch estimates and OFL/ABC determinations. This is an important issue, as HFICE estimates approach current ABCs." (SSC, December 2011)

Responses to Comments and Research Priorities

Responses to the previously listed SSC and Plan Team Comments will be provided in next year's full stock assessment report. To address several of these comments, we plan to follow the recommendations listed in the various working group reports (e.g. the methods for averaging surveys report) submitted to the Plan Team in September 2012. In addition, we have plans to investigate stock structure and migration patterns through tagging and genetics studies; examine spiny dogfish age estimates and growth models (ongoing NPRB funded study); and to investigate survey efficiency (i.e. catchability) for spiny dogfish by examining tagging data.

Literature Cited

Tribuzio, C.A., K.B. Echave, C. Rodgveller, P. Hulson, and K.J. Goldman. 2011. Assessment of the Shark Stock Complex in the Gulf of Alaska. *In* Stock assessment and fishery evaluation report for the groundfish resources of the Gulf of Alaska for 2011. North Pacific Fishery Management Council, 605 W 4th Ave, Suite 306, Anchorage, AK 99501. Pgs. 1393 – 1446.

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