19. Assessment of the sculpin complex in the Gulf of Alaska

Ingrid Spies, Dan Nichol, and Todd T. TenBrink

Introduction

The Gulf of Alaska (GOA) sculpin complex has been managed as an independent complex with its own harvest specifications since 2010, when the North Pacific Fishery Management Council passed Amendment 87 to the GOA Fishery Management Plan, which separated the Other Species complex into its constituent species groups. This non-target species complex is on a biennial assessment schedule to coincide with the frequency of trawl surveys in the Gulf of Alaska. The 2011 full assessment can be found at http://www.afsc.noaa.gov/REFM/docs/2011/GOAsculpin.pdf . Due to a temporary lapse in appropriations, the U.S. federal government implemented a shutdown from October 1 – October 16, 2013. Although the GOA trawl survey was completed in 2013, the shutdown did not allow time to produce a full stock assessment for the sculpin complex and many other species. Therefore an executive summary is presented to provide management recommendations for the 2014 fishing season. Gulf of Alaska sculpins are managed as a Tier 5 stock, and a weighted average of species-specific natural mortality rates (*M*) is applied to the aggregate sculpin biomass to estimate standard reference points. Biomass and reference points are presented based on standard methods using data from the 2013 NMFS GOA trawl survey.

Updated ABC, OFL, and Catch

The GOA catch of sculpins in 2012 was 875 t, and the 2013 catch through October 20, 2013 was 1,323 t. The complex stock size, harvest, and fishing rate reference values are shown in the following table. As in the 2011 assessment, we use a Tier 5 approach and average survey biomass from the last four surveys (2007, 2009, 2011, and 2013). The 2013 GOA survey biomass estimate for sculpins was 33,550 t, a slight decrease from the 2011 estimate of 34,732 t. The complex weighted mortality increased slightly from 0.220 to 0.222. This resulted in a small decrease in the 2014 recommended ABC and OFL. Catch has remained below the OFL for GOA sculpins, so the stock complex is not currently subject to overfishing.

Summary of Results

Quantity	As estimated or *specified last* year for: 2013	2014	As estimated or *recommended this* year for: 2014	2015
M (natural mortality rate) [1]	0.220	0.220	0.222	0.222
Tier	5	5	5	5
Biomass point estimate (t) [2]	34,732	34,732	33,550	33,550
Upper 95% confidence interval			37,199	37,199
Lower 95% confidence interval			29,900	29,900
F_{OFL}	0.220	0.220	0.222	0.222
maxF_{ABC} (= 0.75 *x* F_{OFL})	0.165	0.165	0.166	0.166
F_{ABC}	0.165	0.165	0.166	0.166
OFL (t)	7,641	7,641	7,448	7,448
maxABC (t)	5,731	5,731	5,569	5,569
ABC (t)	5,731	5,731	5,569	5,569
Status	As determined *last* year for: 2010	2011	As determined *this* year for: 2011	2012
Is the stock being subjected to overfishing?	n/a		n/a	

[1] *This is a sculpin complex average mortality rate, a biomass-weighted average of the instantaneous natural mortality rates for the four most abundant sculpins in the GOA: bigmouth (Hemitripterus bolini), great (Myoxocephalus polyacanthocephalus), plain (Myoxocephalus jaok), and yellow Irish lord (Hemilepidotus jordani).*

Area apportionment

There is no area apportionment for GOA sculpins, which are managed for the entire GOA.

Summaries for Plan Team

Year	Biomass	OFL	ABC	TAC	Catch
2012	34,610	7,641	5,731	5,731	875
2013	34,732	7,614	5,884	5,884	1,323[1]
2014	33,550	7,448	5,569		
2015	33,550	7,448	5,569		

[1] Current as of October 20, 2013, Source: 2013 (http://alaskafisheries.noaa.gov/2013/car110_goa.pdf).

Results

Recent estimates of *M* are available for four of the sculpin species in the GOA sculpin complex: yellow Irish lord, great sculpin, bigmouth sculpin, and plain sculpin. Together, these 4 species comprised 97% of

the estimated GOA sculpin biomass in 2011 (Figure 19.1). A biomass-weighted average *M* was calculated according to the following table:

species	average biomass[1]	proportion of total biomass	*M*	weighted contribution to *M*	weighted average *M*
yellow Irish lord	19,138	0.57	0.17	0.097	
great	7,654	0.23	0.28	0.064	
bigmouth	3,455	0.10	0.21	0.021	
plain	3,303	0.10	0.40	0.040	
					0.222

[1] Average survey biomass is the mean estimate of biomass from the last four surveys (2007, 2009, 2011, and 2013).

Data Gaps and Research Priorities

Data gaps exist in sculpin species life history characteristics, spatial distribution and abundance in Alaskan waters. Most importantly no data on maximum age exists for the four main sculpin species in the GOA. Therefore, collections for age data on yellow Irish lord, great sculpin, bigmouth sculpin and plain sculpin are needed from the GOA. Over 90% of all sculpins caught in the fisheries of the GOA from 2004-2012 were from the genera *Myoxocephalus*, *Hemitripterus*, and *Hemilepidotus*. Collecting seasonal food habits data (with additional summer collections) would help to clarify the role of both large and small sculpin species within the GOA ecosystem. In addition, there is a need for GOA specific research on natural mortality of sculpin species. These data are necessary to improve management strategies for non-target species.

(This page intentionally left blank)