

19. Assessment of the sculpin complex in the Bering Sea and Aleutian Islands

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Introduction

In 2011, Bering Sea and BSAI sculpins were moved to a biennial assessment schedule to coincide with the frequency of trawl surveys in the Aleutian Islands (AI) and the eastern Bering Sea (EBS). These surveys occur in even years, and for these years, full assessment of sculpins in the BSAI will be conducted. The 2012 full assessment can be found at <http://www.afsc.noaa.gov/REFM/Docs/2012/BSAIsculpin.pdf>. The sculpin assessment is conducted with Tier 5 methods. In this assessment, the current estimated biomass is obtained from mean biomass estimates over the past four survey years for the six most abundant sculpins in the BSAI: bigmouth (*Hemitripterus bolini*), great (*Myoxocephalus polyacanthocephalus*), plain (*Myoxocephalus jaok*), threaded (*Gymnocanthus pistilliger*), warty (*Myoxocephalus verrucosus*), and yellow Irish lord (*Hemilepidotus jordani*). An exploitation rate is then applied to the estimated current biomass to obtain the ABC and OFL. The sculpin complex mortality rate is a biomass-weighted average of the instantaneous natural mortality rates for these six species. The complex mortality rate may change as new survey data become available.

Updated ABC, OFL, and Catch

The BSAI catch of sculpins in 2012 was 5796 t, with 807 t in the AI and 4989 t in the EBS. The 2013 catch of sculpins, through October 20, 2013, was 5383 t, with 597 t in the AI and 4786 t in the EBS.

Because neither the time series of survey biomass estimates nor the proxy values for F_{abc} and F_{off} have changed since 2012, the estimated ABC and OFL values for 2014 and 2015 in this update are identical to the values for 2013 and 2014 produced in the 2012 assessment. Stock size, harvest, and fishing rate reference values are shown in the following table:

Quantity/Status	As estimated or specified last year for:		As estimated or recommended this year for:	
	2013	2014	2014	2015
Sculpin complex average mortality rate*	0.280	0.280	0.280	0.280
Specified/recommended Tier	5	5	5	5
Biomass (t)	215,713	215,713	215,713	215,713
F_{OFL} ($F = \text{complex mortality rate}$)	0.28	0.28	0.28	0.28
$\max F_{ABC}$ (maximum allowable = $0.75x F_{OFL}$)	0.21	0.21	0.21	0.21
Specified/recommended F_{ABC}	0.21	0.21	0.21	0.21
Specified/recommended OFL (t)	56,424	56,424	56,424	56,424
Specified/recommended ABC (t)	42,318	42,318	42,318	42,318
Status	As determined last year for:		As determined this year for:	
	2011	2012	2012	2013
Is the stock being subjected to overfishing?	No	n/a	No	n/a

Data gaps and research priorities

Sculpin life history has been studied more extensively recently in Alaska waters than in the Gulf of Alaska. Age and growth, reproduction, and diet were recently studied in samples five large sculpin species from the BSAI (plain, great, warty, and bigmouth sculpins and yellow Irish lord). This research has provided critical information on growth, longevity, maturation, predator-prey relationships, and natural mortality rates. Data gaps continue to persist on ageing and reproduction of the larger species in this complex. For example, our ageing criteria for bigmouth sculpin have not been fully established, and the reproductive biology of this species and the plain and warty sculpins has not been fully investigated. The smaller sculpin species, although only a small percentage of the commercial bycatch, have not been a priority we know little about their life history parameters. Upward movement in the tier system for sculpins would require more research.

Summaries for the Plan Team

Year	Biomass	OFL	ABC	TAC	Catch
2012	208,181	58,300	43,700	5,750	5796
2013	215,713	56,424	42,318	5,600	5383 ¹
2014	215,713	56,424	42,318		
2015	215,713	56,424	42,318		

¹Current as of October 20, 2013.