15. Assessment of the Thornyhead stock complex in the Gulf of Alaska

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Executive Summary

Alaska rockfish are assessed on a biennial stock assessment schedule to coincide with the availability of new survey data. For Gulf of Alaska (GOA) thornyheads in off-cycle (even) years, we present an executive summary to recommend harvest levels for the next two years. Please refer to the last full stock assessment report presented in 2011 for further information regarding the assessment calculations (Murphy and Ianelli 2011, http://www.afsc.noaa.gov/refm/docs/2011/GOAthorny.pdf). A full stock assessment document with updated assessment results will be presented in next year's SAFE report.

We use the exploitable biomass from the most recent GOA trawl survey (expanded to 700-1000 m) to determine the recommended ABC for thornyhead rockfish, which qualifies as a Tier 5 stock. For an off-cycle year, there is no new survey information for thornyhead rockfish; therefore, the 2013 estimates (Shotwell et al. 2013, http://www.afsc.noaa.gov/REFM/Docs/2013/GOAthorny.pdf) are rolled over for the next two years.

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

Quantity	As estimated or *specified last* year for:		As estimated or *recommended this* year for:	
	2014	2015	2015	2016
M (natural mortality rate)	0.03	0.03	0.03	0.03
Tier	5	5	5	5
Biomass (t)	81,816	81,816	81,816	81,816
F_{OFL}	0.03	0.03	0.03	0.03
$maxF_{ABC}$	0.0225	0.0225	0.0225	0.0225
F_{ABC}	0.0225	0.0225	0.0225	0.0225
OFL (t)	2,454	2,454	**2,454**	2,454
maxABC (t)	1,841	1,841	1,841	1,841
ABC (t)	1,841	1,841	**1,841**	1,841
Status	As determined *last* year for:		As determined *this* year for:	
	2012	2013	2013	2014
Overfishing	No	n/a	No	n/a

Updated catch data (t) for thornyhead rockfish in the Gulf of Alaska as of October 1, 2014 (NMFS Alaska Regional Office Catch Accounting System via the Alaska Fisheries Information Network (AKFIN) database, http://www.akfin.org) are summarized in the following table.

Year	Western	Central	Eastern	Gulfwide Total	Gulfwide ABC	Gulfwide TAC
2013	304	541	309	1,154	1,665	1,665
2014	132	624	208	964	1,841	1,841

Gulfwide catch of thornyhead rockfish for 2014 (as of Oct 1) is 16% lower than the 2013 catch with decreases of 57% and 33% occurring in the Western and Eastern GOA, respectively, and an increase in the Central GOA of 15%. The catch decreased by 36% in the sablefish fishery compared to 2013 and increased by 47% in the rockfish fishery and 126% in the flatfish fishery compared to 2013. The catch was lower in the Western GOA than in previous years because the 2014 rockfish trawl fishery in this region was not opened to directed fishing until October 15. Final catch estimates for this region will likely be similar to previous years when the directed fishery catch is included and preliminary estimates suggest this to be the case (225 t as of November 3). In 2014, the Western GOA ABC increased to 235 t which decreases the potential for the Western GOA ABC to be reached or exceeded this year.

In 2013 the restructured observer program began, and the extent that this program affected estimated catches of thornyhead rockfish in the small-boat fisheries is uncertain. Understanding the potential for catch accounting biases due to shifts in observer coverage will require further study and we will continue to monitor the shifts in the future.

For the 2015 fishery, we recommend the maximum allowable ABC of 1,841 t for thornyhead rockfish. Reference values for thornyhead rockfish are summarized in the following table, with the recommended ABC and OFL values in bold. The stock was not being subjected to overfishing last year.

Area Apportionment

The following table shows the recommended apportionments for 2015 and 2016 based on the 2013 survey biomass distribution (expanded to account for 701-1000 m). Please refer to the 2011 full stock assessment report for information regarding the apportionment rationale for thornyhead rockfish.

Area Apportionment		Western 13%	Central 47%	Eastern 40%	Total 100%
2015	Area ABC (t)	**235**	**875**	**731**	**1,841**
	OFL (t)				**2,454**
2016	Area ABC (t)	**235**	**875**	**731**	**1,841**
	OFL (t)				**2,454**

Summaries for Plan Team

Species	Year	Biomass[1]	OFL	ABC	TAC	Catch[2]
Thornyhead rockfish	2013	73,990	2,220	1,665	1,665	1,154
	2014	81,816	2,454	1,841	1,841	964
	2015	81,816	2,454	1,841		
	2016	81,816	2,454	1,841		

Stock/ Assemblage	Area	2014 OFL	2014 ABC	2014 TAC	2014 Catch[2]	2015 OFL	2015 ABC	2016 OFL	2016 ABC
Thornyhead rockfish	W		235	235	132		235		235
	C		875	875	624		875		875
	E		731	731	208		731		731
	Total	2,454	1,841	1,841	964	2,454	1,841	2,454	1,841

[1]Total biomass from trawl survey estimates and includes expansion to 701-1000 m.

[2]Current as of October 1, 2014. Source: NMFS Alaska Regional Office Catch Accounting System via the Alaska Fisheries Information Network (AKFIN) database (http://www.akfin.org).

SSC and Plan Team Comments on Assessments in General

Since this is an off-cycle year and only an executive summary is presented, we respond here to priority comments. For comments relevant to or that require a full assessment, we will present responses in next year's full assessment.

"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)

A report for generating the time series of other removals is available on the AKFIN stock assessment dashboard entitled "Non-Commercial Catch" (http://www.akfin.org). We will use this report to update the appendix of other removals in next year's full stock assessment.

"The SSC recommends that authors address the CIE review during full assessment updates scheduled in 2014." (SSC, December 2013)

Full assessment updates for GOA rockfish will be completed in 2015 and CIE review comments will be addressed at that time. Additionally, an AFSC response to the rockfish CIE review was prepared that addresses some of their concerns. Please refer to the "Summary and response to the 2013 CIE review of the AFSC rockfish" document presented to the September 2013 Plan Team for further details regarding this response:

http://www.afsc.noaa.gov/REFM/stocks/Plan_Team/2013/Sept/2013_Rockfish_CIE_Response.pdf.

"The Teams recommended that SAFE chapter authors continue to include "other" removals as an appendix. Optionally, authors could also calculate the impact of these removals on reference points and specifications, but are not required to include such calculations in final recommendations for OFL and ABC." (Plan Team, September 2013)

The AKFIN report on Non-Commercial Catch will be used in next year's full stock assessment for generating the other removals appendix.

"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)
"The SSC encourages assessment authors of stocks managed in Tier 5 to consider the recommendations found in the draft survey averaging workgroup report." (SSC, December 2012)
"The Teams recommend that stock assessment authors calculate biomass for Tier 5 stocks based on the random effects model and compare these values to status quo. In addition, the Teams recommend that the working group examine autorcorrelation in subarea recruitment when conducting spatial simulations for evaluating apportionment." (Plan Team, September 2014)

Various approaches to calculated biomass based on the random effects model were presented to the Plan Team in September 2013. Continued efforts are underway to determine the most appropriate approach for this species and will be presented in the next full assessment.

SSC and Plan Team Comments Specific to this Assessment

"The Plan Team recommends that in addition to the current assessment methodology, authors use the Kalman filter method to estimate survey biomass and summarize the results for comparison at the September 2013 meeting." (Plan Team, November 2012)
"The SSC agrees with the Plan Team recommendation that trawl surveys extend to 500 m in order to more completely cover available thornyhead habitat and that a Kalman filter approach to estimating biomass be used in the next assessment." (SSC, December 2012)

As stated previously, efforts are underway to determine the most appropriate approach for this species and will be presented in the next full assessment

"The Team recommends the author explore the longline survey as an alternative or additional index to the trawl survey and to consider impacts of the trawl survey sampling fewer stations and restricting depth to shallower than 700m in recent surveys. The Team also recommends further exploration of the random effects model for estimating thornyhead biomass. Finally, the Team recommends the author provide an executive summary for the 2014 assessment as no new data will be available, and to include any outstanding Team or SSC recommendations with the summary." (Plan Team, November 2013)

In response to this recommendation by the Plan Team, we provide an executive summary with Plan Team and SSC comments for this assessment year. Several current research efforts are in progress investigating issues regarding bottom trawl survey catchability and survey biomass estimation. The continued reduction in survey effort over the past several surveys should be considered in these initiatives as there was a 30% drop in stations sampled on the 2013 survey compared to the long-term average. Precision and accuracy of biomass estimates are particularly vulnerable for deep-water species like thornyhead rockfish due to the already low number of stations sampled in the deep strata. We will incorporate the results of these studies when they become available to consider the effects of reduced trawl survey effort on thornyhead rockfish trawl survey biomass estimates. In future assessments we also plan to explore the use of the longline survey as an alternative or additional index.