

# 13. Assessment of the Rougheye and Blackspotted Rockfish stock complex in the Gulf of Alaska

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## Executive Summary

Rockfish are assessed on a biennial stock assessment schedule to coincide with the availability of new survey data. For Gulf of Alaska rockfish in alternate (even) years we present an executive summary to recommend harvest levels for the next two years. Please refer to last year's full stock assessment report for further information regarding the assessment model (Shotwell et al., 2011, available online at <http://www.afsc.noaa.gov/REFM/docs/2011/GOArougheye.pdf>). A full stock assessment document with updated assessment and projection model results will be presented in next year's SAFE report.

We use a statistical age-structured model as the primary assessment tool for the Gulf of Alaska rougheye and blackspotted rockfish (RE/BS) stock complex which qualifies as a Tier 3 stock. For an off-cycle year, we do not re-run the assessment model, but do update the projection model with new catch information. This incorporates the most current catch information without re-estimating model parameters and biological reference points.

## Summary of changes in Assessment Inputs

*Changes in the input data:* There were no changes made to the assessment model inputs since this was an off-cycle year. New data added to the projection model included an updated 2011 catch and new estimated catches for 2012-2014.

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

## Summary of Results

New catch estimates for this year's projection model are an updated 2011 catch of 543 t, and estimated 2012-2014 catches of 555 t, 405 t, and 412 t, respectively. The 2012 catch was estimated by expanding the October 1, 2012 official catch by a factor of 1.014, which represents the average fraction of catch taken between October 1 and December 31 in the last three complete years (2009-2011). To estimate future catch, we updated the yield ratio (0.33), which was the average of the ratio of catch to ABC for the last three complete catch years (2009-2011). The projected ABCs for 2013 and 2014 from the 2011 assessment model were then multiplied by the updated yield ratio to generate catch for those years. The yield ratio was slightly higher than last year's ratio of 0.29 whereas the expansion factor was the same as last year's expansion factor.

For the 2013 fishery, we recommend the maximum allowable ABC of 1,232 t from the updated projection model. This ABC is slightly more than last year's ABC of 1,223 t and slightly less than last year's projected 2013 ABC of 1,240 t. Recommended ABCs from area apportionments are 81 t for the Western area, 856 t for the Central area, and 295 t for the Eastern area. The 2012 Gulfwide OFL for RE/BS rockfish is 1,482 t.

Reference values for RE/BS 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, is not currently overfished, nor is it approaching a condition of being overfished.

Quantity	As estimated or specified last year for:		As estimated or recommended this year for:	
	2012	2013	2013	2014
<i>M</i> (natural mortality rate)	0.034	0.034	0.034	0.034
Tier	3a	3a	3a	3a
Projected total (ages 3+) biomass (t)	42,856	43,085	42,883	43,067
Female spawning biomass (t)				
Projected	12,610	12,877	12,786	13,019
<i>B</i> <sub>100%</sub>	24,329	24,329	24,329	24,329
<i>B</i> <sub>40%</sub>	9,732	9,732	9,732	9,732
<i>B</i> <sub>35%</sub>	8,515	8,515	8,515	8,515
<i>F</i> <sub>OFL</sub>	0.047	0.047	0.047	0.047
<i>maxF</i> <sub>ABC</sub>	0.039	0.039	0.039	0.039
<i>F</i> <sub>ABC</sub>	0.039	0.039	0.039	0.039
OFL (t)	1,472	1,492	<b>1,482</b>	1,508
maxABC (t)	1,223	1,240	1,232	1,254
ABC (t)	1,223	1,240	<b>1,232</b>	1,254
Status	As determined last year for:		As determined this year for:	
	2010	2011	2011	2012
Overfishing	No	n/a	No	n/a
Overfished	n/a	No	n/a	No
Approaching overfished	n/a	No	n/a	No

Updated catch data (t) for RE/BS rockfish in the Gulf of Alaska as of October 1, 2012 (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
2011	28	368	147	543	1,312	1,312
2012	30	355	162	547	1,223	1,223

### Area Apportionment

The apportionment percentages are the same as in the 2011 full assessment. The following table shows the recommended apportionment for 2013. Please refer to last year's full stock assessment report for information regarding the apportionment rationale for RE/BS rockfish.

	Western	Central	Eastern	Total
Area Apportionment	6.60%	69.46%	23.94%	100%
Area ABC (t)	<b>81</b>	<b>856</b>	<b>295</b>	<b>1,232</b>
OFL (t)				<b>1,482</b>

### Summaries for Plan Team

Species	Year	Biomass <sup>1</sup>	OFL	ABC	TAC	Catch <sup>2</sup>
RE/BS complex	2011	45,907	1,579	1,312	1,312	543
	2012	42,856	1,472	1,223	1,223	547
	2013	42,883	1,482	1,232		
	2014	43,067	1,508	1,254		

Stock/ Assemblage	Area	2012				2013		2014	
		OFL	ABC	TAC	Catch <sup>2</sup>	OFL	ABC	OFL	ABC
RE/BS complex	W		80	80	30		81		83
	C		850	850	355		856		871
	E		293	293	162		295		300
	Total	1,472	1,223	1,223	547	1,482	1,232	1,508	1,254

<sup>1</sup>Total biomass (ages 3+) from the age-structured model

<sup>2</sup>Current as of October 1, 2012. Source: NMFS Alaska Regional Office Catch Accounting System via the AKFIN database (<http://www.akfin.org>).

### SSC and Plan Team Comments on Assessments in General

*“The SSC is pleased to see that many assessment authors have examined retrospective bias in the assessment and encourages the authors and Plan Teams to determine guidelines for how to best evaluate and present retrospective patterns associated with estimates of biomass and recruitment. We recommend that all assessment authors (Tier 3 and higher) bring retrospective analyses forward in next year’s assessments.”* (SSC, December 2011)

*“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)

*“For the November 2012 SAFE report, the Teams recommend that authors conduct a retrospective analysis back 10 years (thus, back to 2002 for the 2012 assessments), and show the patterns for spawning biomass (both the time series of estimates and the time series of proportional changes relative to the 2012 run). This is consistent with a December 2011 NPFMC SSC request for stock assessment authors to conduct a retrospective analysis. The base model used for the retrospective analysis should be the author’s recommended model, even if it differs from the accepted model from previous years.”* (Plan Team, September 2012)

### SSC and Plan Team Comments Specific to this Assessment

*“The Team asks the [rockfish] authors to investigate whether the conversion matrix has changed over time. Additionally, the Team requests that the criteria for omitting data in stock assessment models be*

*based upon the quality of the data (e.g. bias, sampling methods, information content, redundancy with other data, etc.) rather than the effect of the data on modeled quantities.” (Plan Team, November 2011)*

*“The Team supports the author’s suggestion to conduct sensitivity analysis on optimum plus group for age comps. The Team also supports the author’s interest to explore selectivity patterns. The Team also encouraged the author to continue to investigate difference in the longline and trawl survey to help understand the different trends.” (Plan Team, November 2011)*

*“SSC supports the Plan Team recommendation for the author to continue to investigate difference in the longline and trawl survey to help understand the different trends.” (SSC, December 2011)*

*“In response to SSC comments the authors commented on the veracity of model based estimates of trawl survey catchability. The authors reported that the model based estimate of survey catchability is 1.42 compared with a submersible observations in a 2006 analysis and yielded a catchability of 0.85. The SSC encourages the author to report on the evidence to support the current model based estimate given the discrepancy between experimental and model based estimates of catchability.” (SSC, December 2011)*

### **Responses to Comments and Research Priorities for Full Assessment**

We will provide responses to the previously listed SSC and Plan Team Comments 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 retrospective analysis report) submitted to the Plan Team in September 2012. In addition, we anticipate that many of the comments specific to the RE/BS rockfish assessment will be considered in the upcoming 2013 Center for Independent Experts (CIE) Alaska rockfish scientific peer review. Evaluation of assessment methods to estimate model parameters, uncertainty, and projections as well as recommendations or prioritizations for future research to improve the assessments will likely be part of this process. Finally, preliminary results from new research on RE/BS maturity and an application of genetic species identification to biomass estimation will likely be included in next year’s full assessment.