

12. Assessment of the Dusky Rockfish stock in the Gulf of Alaska

Chris R. Lunsford, S. Kalei Shotwell, Peter-John F. Hulson, and Dana H. Hanselman
November 2012

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 (Lunsford et al., 2011, available online at <http://www.afsc.noaa.gov/REFM/docs/2011/GOAdusky.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 Gulf of Alaska dusky rockfish 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 2,523 t, and estimated 2012-2014 catches of 4,162 t, 2,832 t, and 2,643 t, respectively. The 2012 catch was estimated by expanding the October 1, 2012 official catch by a factor of 1.05, 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 catches, we updated the yield ratio (0.59), which was the average of the ratio of catch to ABC for the last three complete catch years (2009-2011). This yield ratio was multiplied by the projected ABCs for 2013 and 2014 from the 2011 assessment model to generate catches for those years. The yield ratio was lower than last year's ratio of 0.65 whereas the expansion factor was the same as last year's expansion factor.

For the 2013 fishery, we recommend the maximum allowable ABC of 4,700 t from the updated projection model. This ABC is 8% lower than the 2012 ABC of 5,118 t but similar to the ABC of 4,762 t projected for 2013 in the 2011 assessment. Recommended area apportionments of ABC are 377 t for the Western area, 3,533 t for the Central area, 495 t for the West Yakutat area, and 295 t for the Southeast/Outside area. The 2013 Gulf-wide OFL for dusky rockfish is 5,746 t.

Reference values for dusky 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 <i>specified last year for:</i>		As estimated or <i>recommended this year for:</i>	
	2012	2013	2013	2014
<i>M</i> (natural mortality rate)	0.07	0.07	0.07	0.07
Tier	3a	3a	3a	3a
Projected total (ages 4+) biomass (t)	66,771	64,064	63,515	61,938
Female spawning biomass (t)				
Projected	27,357	25,643	25,337	23,874
<i>B</i> _{100%}	49,683	49,683	49,683	49,683
<i>B</i> _{40%}	19,873	19,873	19,873	19,873
<i>B</i> _{35%}	17,389	17,389	17,389	17,389
<i>F</i> _{OFL}	0.122	0.122	0.122	0.122
<i>maxF</i> _{ABC}	0.098	0.098	0.098	0.098
<i>F</i> _{ABC}	0.098	0.098	0.098	0.098
OFL (t)	6,257	5,822	5,746	5,395
maxABC (t)	5,118	4,762	4,700	4,413
ABC (t)	5,118	4,762	4,700	4,413
Status	As determined <i>last year for:</i>		As determined <i>this year for:</i>	
	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 dusky 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. The 2012 catch in the Western Gulf exceeded the 2012 ABC in that area and the 2012 catch in the Central Gulf was higher than previous years. This was likely due to both an increased number of vessels fishing in the Western Gulf and an increase in the 2012 ABC of northern rockfish in the Central Gulf, which often constrains the dusky rockfish catch in the region.

Year	Western	Central	Eastern	West Yakutat	E. Yakutat/Southeast	Gulfwide Total	Gulfwide ABC	Gulfwide TAC
2011 ¹	366	2,098		58	1	2,523	4,663	4,754
2012	434	3,529		2	< 1	3,966	5,118	5,118

¹Gulfwide TAC for 2011 is for the Pelagic Shelf Rockfish stock complex.

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 dusky rockfish.

	Western	Central	West Yakutat ¹	E Yakutat / Southeast ¹	Total
Area Apportionment	8.0%	75.2%	10.5%	6.3%	100%
Area ABC (t)	377	3,533	495	295	4,700
OFL (t)					5,746

¹Amendment 41 prohibited trawling in the eastern area east of 140° W longitude. To account for the portion of the dusky rockfish biomass in the West Yakutat area that is still open to trawling a ratio is calculated to apportion the eastern area into West Yakutat and East Yakutat/Southeast Outside. This ratio is the same as last year (0.63).

Summaries for Plan Team

Species	Year	Biomass ¹	OFL	ABC	TAC ²	Catch ³
Dusky Rockfish	2011	64,774	5,649	4,663	4,754	2,523
	2012	66,771	6,257	5,118	5,118	3,966
	2013	63,515	5,746	4,700		
	2014	61,938	5,395	4,413		

Stock/ Assemblage	Area	2012				2013		2014	
		OFL	ABC	TAC	Catch ³	OFL	ABC	OFL	ABC
Dusky Rockfish	W		409	409	434		377		354
	C		3,849	3,849	3,529		3,533		3,317
	WYAK		542	542	2		495		465
	SEO		318	318	< 1		295		277
	E		--	--	--				
	Total	6,257	5,118	5,118	3,966	5,746	4,700	5,395	4,413

¹Total biomass (ages 4+) from the age-structured model

²Gulfwide TAC for 2011 is for the Pelagic Shelf Rockfish stock complex.

³Current 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 noted the low recruitment estimates (with high uncertainty) for recent year classes, and requests a retrospective analysis to evaluate how changes in available data affect estimated year-class strength.” (Plan Team, November 2011)

“Results from model 3 showed the age at 50% maturity from model 3 was approximately 10 years, a decline from the value of approximately 11 years used in previous assessments. This resulted in an increase in the recommended F_{OFL} and F_{ABC} . The SSC asks the author to consider whether this downward adjustment in the age at 50% maturity is warranted.” (SSC, December 2011)

Responses to Comments and Research Priorities for Full Assessment

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 retrospective analysis report) submitted to the Plan Team in September 2012. In addition, we anticipate that many of the comments specific to the dusky 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.