Chapter 4.1: Assessment of the northern and southern rock sole (*Lepidopsetta polyxystra and bilineata*) stocks in the Gulf of Alaska for 2017

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Executive Summary

Introduction

Assessment for northern and southern rock sole which are part of the shallow water flatfish complex has been moved to a biennial schedule to coincide with the expected receipt of new survey data. Usually, on alternate (even) years we will present an executive summary with last year's key assessment parameters and projections for this year. A discussion at the September 2006 Groundfish Plan Team meetings concluded the following two important points for updating information in off-year assessments:

1) Anytime the assessment model is re-run and presented in the SAFE Report, a full assessment document **must** be produced.
2) The single-species projection model **may** be re-run using new catch data without re-running the assessment model.

Biomass, OFL and ABC estimates for northern and southern rock sole are combined with other flatfish species for determination of values for the shallow water flatfish complex (Turnock et al. 2015, http://www.afsc.noaa.gov/refm/docs/2015/GOAshallowflat.pdf).

Summary of changes in the Assessment Inputs

Changes in the input data: The new information available are the updated 2015 catch for rock sole of 2,622 t and the partial 2016 catch of 2,702 t through October 13. Projected catch to the end of 2016 using the average fraction of catch to October 13 from the last 10 years (84.3%) would be 3,205 t. Catch in 2017 was set at the estimated 2016 catch.

Changes in the assessment methodology: The input catches for 2015, 2016 and 2017 were changed otherwise there were are no changes to the assessment methodology. Biomass, OFL and ABC values for northern and southern rock sole are estimated using projections from the 2015 assessment model with catches updated for 2015 and 2016. Catches of rock sole in 2015 and 2016 were split evenly between northern and southern rock sole for projections. The total catch in 2016 for rock sole (3,205 t) was estimated using the average fraction of catch to October 13 over the last 10 years (0.843) and the estimated catch to October 13, 2016 (2,702 t). The total catch estimate for 2016 was used as the catch in 2017 for projections. 2017 biomass, OFL and ABC estimates were lower for projections from the 2015 assessment because 2016 catch was set at the ABC (A'mar, et al. 2015). The 2016 catch (3,205 t) used in the current projections for 2016 and 2017 was lower than the ABC estimates for both northern and southern rock sole (27,400 t).

The biomass, OFL and ABC values for northern and southern rock sole are added into the shallow-water flatfish complex values to estimate OFL and ABC for the complex.

The recommended northern rock sole ABC and OFL levels are:

Northern Rock Sole

Quantity	As estimated or *specified last* year for: 2016	2017	As estimated or *recommended this* year for: 2017	2018
M (natural mortality rate)	0.2,0.250*	0.2, 0.250*	0.2,0.250*	0.2, 0.250*
Tier	3a	3a	3a	3a
Projected total (age 3+) biomass (t)	75,600	68,400	76,837	80,120
Projected Female spawning biomass	35,600	30,900	36,683	38,431
$B_{100\%}$	51,800	51, 800	51,800	51, 800
$B_{40\%}$	20,700	20,700	20,700	20,700
$B_{35\%}$	18,100	18,100	18,100	18,100
F_{OFL}	0.299	0.299	0.299	0.299
$maxF_{ABC}$	0.248	0.248	0.248	0.248
F_{ABC}	0.248	0.248	0.248	0.248
OFL (t)	14,000	12,800	14,548	15,146
maxABC (t)	11,800	10,800	12,283	12,788
ABC (t)	11,800	10,800	12,283	12,788
Status	As determined *last* year for: 2014	2015	As determined *this* year for: 2015	2016
Overfishing	no	n/a	no	n/a
Overfished	n/a	no	n/a	no
Approaching overfished	n/a	no	n/a	no

*Estimated in model for males

The recommended southern rock sole ABC and OFL levels are:

Southern Rock Sole

Quantity	As estimated or *specified last* year for: 2016	2017	As estimated or *recommended this* year for: 2017	2018
M (natural mortality rate)	0.2, 0.248*	0.2, 0.248*	0.2, 0.248*	0.2, 0.248*
Tier	3a	3a	3a	3a
Projected total (age 3+) biomass (t)	138,600	120,200	133,922	131,828
Projected Female spawning biomass	74,000	60,600	71,786	67,851
$B_{100\%}$	93,500	93,500	93,500	93,500

$B_{40\%}$	37,400	37,400	37,400	37,400
$B_{35\%}$	32,700	32,700	32,700	32,700
F_{OFL}	0.222	0.222	0.222	0.222
$maxF_{ABC}$	0.186	0.186	0.186	0.186
F_{ABC}	0.186	0.186	0.186	0.186
OFL (t)	22,700	19,600	22,215	21,927
maxABC (t)	19,200	16,600	18,865	18,618
ABC (t)	19,200	16,600	18,865	18,618
Status	As determined *last* year for: 2014	2015	As determined *this* year for: 2015	2016
Overfishing	no	n/a	no	n/a
Overfished	n/a	no	n/a	no
Approaching overfished	n/a	no	n/a	no

*Estimated in model for males

Responses to SSC and Plan Team Comments on Assessments in General

SSC (Oct 2016): "The SSC reminds groundfish and crab stock assessment authors to follow their respective guidelines for SAFE preparation."

Authors' response: SAFE guidelines were followed.

Responses to SSC and Plan Team Comments Specific to this Assessment

Last year, the SSC noted the need for the assessment document to be edited to improve specificity and clarity. Clarity has been improved, however some additional editing is still necessary. For instance, some figures and tables are not cited at all in the document and labeling of some figures can be improved. In addition, the SSC requests the assessment authors to explain the increase in the 95% asymptotic intervals in age-0 recruitment estimates since 2010 compared to the 1990s and 2000s in Fig. 4.1.51 on p. 539. Overall, good progress has been made with this stock assessment.

Authors' response: There were no specific comments for this assessment which can be addressed in an off-cycle year.

Literature Cited

A'mar, Z.T. and W. Palsson. 2015. Assessment of the northern and southern rock sole (*Lepidopsetta polyxystra and bilineata*) stocks in the Gulf of Alaska for 2014. In: Stock Assessment and Fishery Evaluation Report for Groundfish Resources in the Gulf of Alaska. North Pacific Fishery Management Council, Anchorage, AK, USA.

Turnock, B.J., Z.T. A'mar, and T. Wilderbuer. 2015. Assessment of the shallow-water flatfish stock complex in the Gulf of Alaska. In: Stock Assessment and Fishery Evaluation Report for Groundfish Resources in the Gulf of Alaska. North Pacific Fishery Management Council, Anchorage, AK, USA.

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