CHAPTER 14: ASSESSMENT OF THE DEMERSAL SHELF ROCKFISH STOCK COMPLEX IN THE SOUTHEAST OUTSIDE DISTRICT OF THE GULF OF ALASKA

Kristen Green (kristen.green@alaska.gov), David Carlile, Mike Jaenicke, and Scott Meyer

Alaska Department of Fish and Game
Commercial Fisheries Division
204 Lake Street, Room 103
Sitka, Alaska 99835

Executive Summary

Demersal Shelf Rockfish (DSR) assemblage (yelloweye, quillback, copper, rosethorn, canary, China, and tiger rockfish) are assessed on a biennial cycle, with full stock assessments conducted in odd calendar years to coincide with new survey data. The last full DSR stock assessment was submitted in 2009, thus we are scheduled to present a full stock assessment in 2011. However, due to funding constraints and submersible availability, we have not conducted a new submersible survey, hence this year an executive summary is again submitted with updated average weight information only. We are scheduled to conduct a submersible survey in 2012, and plan on conducting a full stock assessment using updated fish density estimates and habitat information at that time.

Summary of Changes in Assessment Inputs

Relative to the December 2010 Stock Assessment and Fishery Evaluation report (SAFE) (Green et al. 2010 http://www.afsc.noaa.gov/refm/docs/2010/GOAdsr.pdf), the following changes have been made:

The only new information available for this report is updated catch information for Southeast Outside Subdistrict (SEO) and average weights for yelloweye rockfish catch from port sampling of the commercial fishery landings in all four management areas in SEO. The changes in average weights (from 4.23 to 4.35 kg in East Yakutat (EYKT), from 3.50 to 3.22 kg in Central Southeast Outside (CSEO), from 3.73 to 3.43 kg in Northern Southeast Outside (NSEO) and from 3.31 to 3.51 kg in SSEO resulted in small changes to the biomass estimate for each management area (from 4,625 mt to 4,756 mt in EYKT, from 4,254 to 3,914 mt in CSEO, from 1,503 to 1,385 mt in NSEO and from 4,013 to 4,252 mt in SSEO). The overall yelloweye rockfish biomass estimate for 2012 is 14,307 mt; a slight decrease from 14,395 mt in 2011. For 2012, the total DSR biomass is calculated by adjusting the yelloweye rockfish biomass by 2% to account for other DSR species. In 2011, non-yelloweye DSR rockfish comprised 2% of the commercial harvest.

Summary of Results

DSR biomass, fishing limits and catch in metric tons.

	Last year		This year	
Quantity	2011	2012	**2012**	2013
M (natural mortality)	0.02	0.02	**0.02**	0.02
Tier	4	4	**4**	4
Yelloweye Biomass (t)	14,395		**14,307**	
Female spawning biomass (t)				
Projected	N/A		N/A	
$B_{100\%}$	N/A		N/A	
$B_{40\%}$	N/A		N/A	
$B_{35\%}$	N/A		N/A	
F_{OFL} =F35%	0.032	0.032	**0.032**	0.032
$maxF_{ABC}$ (maximum allowable = F40%)	0.026	0.026	**0.026**	0.026
Specified/recommended F_{ABC}	0.020	0.020	**0.020**	0.020
Total DSR ABC (Yelloweye ABC/0.98) (t)			**293**	
Total DSR OFL (Yelloweye OFL/0.98) (t)			**467**	
Status	As determined last year for:		As determined this year for:	
	2011	2012	2012	2013
Is the stock being subjected to overfishing?	No	No	No	No
Is the stock currently overfished?	No	No	No	No
Is the stock approaching a condition of being overfished?	No	No	No	No

Responses to the SSC Comments

Scientific and Statistical Committee Comments Specific to Demersal Shelf Rockfishes:

"The SSC wishes to thank the stock assessment authors for the additional information provided in this year's SAFE regarding the bootstrap estimates of precision for catches in the recreational fisheries, and looks forward to estimates of confidence intervals in the next assessment."

Confidence intervals were provided in this year's recreational fishery removals.

"Although a density survey may not be funded in 2011, the SSC is encouraged to hear that a new survey is planned in 2012, and expresses its concern that adequate resources be devoted to assessing the stock on an ongoing basis so as to maintain a consistent stream of revised densities in future years. We also look forward to reviewing the age structured assessment model in the next assessment cycle. We recommend exploring the use of alternative survey indices (e.g., IPHC longline survey) in the age structured assessment model."

We are still scheduled to receive funding for DSR research in FY13, and we plan to conduct a submersible survey and update fish density estimates in August 2012.

The age-structured assessment model for yelloweye rockfish continues to developed and evaluated. A progress report will be given during the November 2011 plan team meeting to get plan team feedback and guidance on further development and evaluation of the model.

Introduction

We continue to use a habitat-based stock assessment to calculate total DSR biomass. Total yelloweye rockfish biomass is estimated for each management area in the SEO as the product of density, mean fish weight, and area estimates of DSR habitat. Yelloweye rockfish density is derived using line transects conducted from an occupied submersible. Average weights from yelloweye caught in the directed DSR commercial fishery were available for SSEO, but since a directed fishery was not opened in EYKT, CSEO, or NSEO, we used the mean weights from yelloweye landed as incidental catch in the halibut fishery in these areas. Area estimates of DSR habitat are a combination of National Oceanic Survey (NOS) data, sidescan and multibeam data and fishermen logbook data. A harvest rate of F=M (0.02) is used to set the ABC. The acceptable biological catch (ABC) for DSR is set using Tier IV definitions with F=M=0.02 and adjusting for the other species landed in the assemblage. For 2012, the recommended ABC for yelloweye rockfish is increased by 2 % (this percentage is based on the previous year's commercial harvest species assemblage). The overfishing level was set using $F_{35\%}$=0.032 and adjusting 2% for the other species landed.

The survey data used to calculate the yelloweye biomass in each of the four management areas in SEO, and the total ABC for 2012 are described in Table 1.

Table 1. Yelloweye rockfish density estimates (#/km^2), rocky habitat (km^2), and total DSR biomass (mt) by area and year.

	EYKT	CSEO	NSEO	SSEO	Total
Survey year	2009	2007	2001	2005	
Density yelloweye/km^2	1930	1068	1420	2196	
CV(D)	0.1660	0.1271	0.3144	0.1716	
Avg wt (kg)	4.35	3.22	3.43	3.51	
Habitat km^2	744	1404	472	732	3352
Biomass point estimate (mt)	6246	4828	2299	5642	19015
Biomass lower 90% CI (mt)	4756	3914	1385	4252	14307
Yelloweye ABC (F=0.02) (mt)	95	78	28	85	286
DSR ABC (yelloweye ABC/0.98)	97	80	29	87	293
Overfishing (F=0.032) yelloweye OFL/0.98	155	128	45	139	467

We recommend a 2012 ABC of 293 mt, a slight decrease from the 2011 ABC of 300 mt. Subsistence DSR removals are deducted off the ABC prior to the allocation of the TAC between the commercial and sport fisheries. For 2012, 7 mt was deducted from the ABC for DSR caught in the subsistence fisheries. This equates to a total TAC of 286 mt. In 2006 the Board of Fisheries (BOF) allocated the SEO DSR Total Allowable Catch (TAC) in the following manner: 84% to the commercial fishery and 16% to the sport fishery, thus 46 mt is allocated to sport fisheries and 240 mt is allocated to commercial fisheries for 2012.

Fishery

2011 *Total DSR Removal*

The total estimated DSR removal from 2011 is 169 mt (Table 2). This number includes all sport and commercial incidental and directed harvest, as well as estimated unreported discard mortality. Incidental commercial catch includes DSR caught in the lingcod, Pacific cod, halibut, and sablefish fisheries. Overages refer to DSR landed in excess of the allowed bycatch of DSR in the halibut fishery (equal to 10% of the target species).

Table 2. Updated Sport and Commercial Catch from 2011.

2011 DSR Catch SEO (mt)	*Directed Commercial*	*Incidental Commercial*[1]	*Recreational Fisheries*[2]	*Total*
Landed	22	84	35	141
Estimated discard	0	8	4	12
Overages (halibut fishery) >10%	0	24	0	24
Total	22	116	39	177

[1] All commercial incidental landings through October 20, 2011 (halibut, lingcod, Pacific cod, sablefish).
[2] Sport landings are preliminary estimates for 2011.

2011 Commercial Directed DSR Fishery and Outlook to 2012

Before the decision is made to open a directed DSR commercial fishery in January, ADF&G estimates the amount of yelloweye bycatch from the commercial halibut fishery, and deducts this from the commercial portion of the TAC (see Brylinsky et al. 2009, page 5, for a description of the methodology used to calculate the yelloweye bycatch). In 2011, the portion of the TAC available to the commercial directed DSR fishery in SEO was 89 mt. The SSEO management area was opened to a directed fishery, as the TAC apportioned to other management areas was insufficient to conduct and adequately manage a directed fishery. In SSEO, 25 mt was available to the directed commercial DSR fishery; 22 mt were harvested (Table 2). For SEO in 2012, the yelloweye rockfish bycatch landings will be calculated in December 2011, and these data will be evaluated prior to opening a directed DSR commercial fishery in 2012.

Full Retention of Incidental DSR Catch in Commercial Fishery

Since the implementation of the state and federal full retention regulations for DSR, over 95% of the landed overages of DSR in the state and federal waters are now retained for personal use rather than being donated or sold. To date in 2011, 74% (17 mt) of the DSR overages (24 mt) were reported from federal waters. There appears to be increasing compliance with the full retention regulations and there continues to be an outreach campaign by Alaska Longline Fishermen's Association, Fishing Vessel Owner's Association, and Petersburg Vessel Owner's Association to their members to comply with full retention regulations. In addition, the Alaska Longline Fishermen's Association is currently involved with a project to identify areas of high rockfish bycatch so that halibut and sablefish longline fishermen can avoid making sets in these areas in an effort to reduce rockfish bycatch.

Table 3. DSR incidental catch (mt) landed in the SEO commercial halibut fishery by year.

SEO	*2007*	*2008*	*2009*	*2010*	*2011*[1]
landed within incidental catch limits	154	114	108	94	56
landed overage (>10%)	36	30	28	31	24
Total	190	144	136	125	80

[1] Numbers through October 20, 2011.

Table 4. Disposition of DSR incidental catch overages (mt) landed in the SEO commercial halibut fishery, by year.

Overage Description	*2007*	*2008*	*2009*	*2010*	*2011*[1]
Fed. Forfeiture	0	0.1	1.2	0.0	0.4
State Forfeiture	3.5	1.5	0.4	0.1	0.5
Fed. Retained, not sold	24.2	20.3	19.7	26.0	17.1
State Retained, not sold	8.4	8.0	6.4	5.2	5.6
Total	36.2	29.9	27.8	31.3	23.6

[1] Numbers through October 20, 2011.

2011 Recreational Fishery Removals

The 2010 harvest biomass was estimated using a combination of Statewide Harvest Survey (SWHS), creel survey, and charter logbook data. The total removals were estimated as the sum of the mass of the harvest (retained catch) and release mortality (Brylinksky et al. 2009). Harvest biomass estimates were stratified by user group (charter, non-charter) to reduce potential bias caused by non-proportional sampling. Harvest from the EYKT (East Yakutat) portion of the Southeast Outside (SEO) area was also included in the harvest estimation, although the harvest was less than 0.1 mt. Estimating the proportion of non-charter harvest that came from the SEO waters of each SWHS area continues to be problematic due to the lack of data from a comprehensive set of landing sites for non-charter harvest. This was addressed by using the outside proportion calculated for the charter fleet from logbook data was substituted for the non-charter harvest as well. Non-charter removals accounted for 25% of the sport removals in 2010.

The 2010 release mortality biomass was also estimated using the same method as last year (Green et al. 2010). The release proportions from logbook data were applied specifically for yelloweye rockfish, and the release proportion for all other non-pelagics was applied to the remaining DSR species.

Because SWHS estimates are only available through 2010, preliminary estimates were provided for 2011. Five methods of projecting the harvest (in numbers of fish) were evaluated retrospectively based on absolute deviations and mean squared deviations. The best method for projecting charter harvest was to expand the 2011 creel survey estimates by the previous 5-year average ratio between the creel survey and SWHS. Because the relationships between creel survey and SWHS estimates were very weak for the private sector, double exponential time series forecasts were chosen to projecting these harvests. Efforts to improve harvest projections are ongoing, including possible incorporation of logbook data in the charter projections. These efforts will also include methods to describe the uncertainty in the projections, which we cannot calculate for the methods used this year. The retrospective projections included quite large errors in some years due to high year-to-year variability in the harvest estimates.

Table 5. Final estimates of 2010 and preliminary estimates of 2011 recreational DSR removals (retained and discard mortality, mt) in the SEO portion of Southeast Alaska. Estimates were stratified user group (charter, non-charter) but combined for this table.

Type of Estimate		*2010*	*2011*
Retained Harvest	Estimate	47.1	34.7
	StdErr	2.7	--[b]
	95% CI[a]	41.8 – 52.3	--[b]
Discard Mortality	Estimate	4.4	4.4
	StdErr	0.2	--[b]
	95% CI[a]	3.9 – 4.8	--[b]
Total	**Estimate**	**51.4**	**39.1**
	StdErr	2.9	--[b]
	95% CI[a]	45.8 – 57.1	--[b]

[b] Methods to describe uncertainty of projections have not yet been developed.

Research Priorities

The DSR stock assessment research has relied on the Delta submersible as a survey tool since 1989. The Delta submersible has been integral in the generation of a long (20+ year) time series of rockfish density data, however the Delta has not been available for use since 2009 for various reasons. As a result, ADF&G has not been able to conduct a submersible survey to update yelloweye rockfish densities in 2011 as planned.

ADF&G is currently exploring the use of other submersibles for summer 2012 stock assessment research. There is also a strong possibility that the Delta will be available for use. If we have sufficient staffing and funding in FY 13, one of our priorities is to conduct a side-by-side comparison of the Delta submersible and another visual survey tool (e.g. an ROV). The goal of this project would be to determine a calibration factor between the submersible and an alternative visual survey method. This would provide us additional options for stock assessment research in future surveys.

Also, as indicated above, ADF&G continues to work on an age-structured model for yelloweye which may include yelloweye (bycatch) CPUE from the IPHC longline survey as source of relative abundance information to supplement abundance data from submersible-based surveys.

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