



## Pacific Fishery Management Council

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### MEMORANDUM

DATE: September 4, 2007

TO: Overfished Groundfish Stock Assessment Teams, Scientific and Statistical Committee Groundfish Subcommittee, and Interested Persons

FROM: John DeVore, Groundfish Staff Officer

SUBJECT: Requested Rebuilding Analyses for Overfished Groundfish

The Pacific Fishery Management Council will convene a Groundfish Stock Assessment Review (STAR) Panel October 1-5, 2007 to review draft stock assessments for the southern portion of the black rockfish stock in waters off California and Oregon, the blue rockfish stock in waters off California, and draft rebuilding analyses for bocaccio, canary rockfish, cowcod, darkblotched rockfish, Pacific ocean perch, widow rockfish, and yelloweye rockfish.

In preparation for the October STAR Panel review, Stock Assessment Teams are asked to address requests A-C below before proceeding to the projections requested under D.

- A. Define how virgin biomass ( $B_0$ ) is to be calculated for the current rebuilding analysis (from the assessment; based on average recruitment over the early years, etc.).
- B. Define how future recruitment is to be generated.
- C. Provide the projected year to rebuild if all fishing mortalities were eliminated beginning in 2009 ( $T_{F=0}$ ).
- D. Provide the following projections:
  - 1) Projections of yields, median rebuilding times, and rebuilding probabilities at  $T_{TARGET}$  and  $T_{MAX}$  under the SPR harvest rates specified in rebuilding plans adopted under Amendment 16-4 (see attached Table 4-2 from the FMP depicting the  $F_{SPR}$  harvest rates). NOTE: If the estimated mean generation time has changed in the assessment,  $T_{MAX}$  needs to be recalculated by adding estimated mean generation time to the  $T_{MIN}$  value specified in Table 4-2.
  - 2) Projections of yields, median rebuilding times, SPR harvest rates, and rebuilding probabilities at  $T_{TARGET}$  and  $T_{MAX}$  under the harvest rates (solved for using new models) which produce the current optimum yield amounts in place for 2007-2008.
  - 3) Projections of yields and SPR harvest rates (solved for using new models) which rebuild the stock in 50 percent of the runs by the  $T_{TARGET}$  specified in Amendment 16-4.

4) Projections of yields, median rebuilding times, SPR harvest rates, and rebuilding probabilities at  $T_{TARGET}$  and  $T_{MAX}$  under the ABC harvest rate.

Other suggested needs:

- ABC projections.
- Projections with median rebuilding times evenly distributed between  $T_{F=0}$  and  $T_{MAX}$ . These projections should be determined by projecting the median rebuilding times under the most conservative rebuilding strategy (i.e.,  $T_{F=0}$ ) and the most liberal, allowable rebuilding strategy (i.e.,  $T_{MAX}$ ) and then parsing intermediate time intervals in even quartile increments. That is, if  $T_{F=0} = 10$  years and  $T_{MAX} = 50$  years, then the intermediate alternatives would have rebuilding times equal to 20, 30, and 40 years, respectively. Through iteration, determine the SPR harvest rate, 2009 and 2010 OYs, and the probability of rebuilding by  $T_{MAX}$  (i.e.,  $P_{MAX}$ ) under each alternative rebuilding schedule. This will allow the Council to explore the tradeoff between economic impacts associated with alternative harvest levels and conservation needs of the stock.

Finally, one last bit of guidance on specifying total mortalities in 2007 and 2008 in your rebuilding analyses. All projections in the rebuilding analysis should begin in the year 2009. Total removals in 2007 and 2008 should either be the specified 2007 and 2008 OYs or the GMT's best impact projections from the most recent bycatch scorecard.

Please feel free to contact me ([John.DeVore@noaa.gov](mailto:John.DeVore@noaa.gov); 503-820-2413) if you have any questions.

TABLE 4-2. Specified rebuilding plan parameters revised under Amendment 16-4.

Species	$B_0$	$B_{MSY}$	$T_{MIN}^*$	$T_{MAX}$	$T_{F=0}^*$	$P_{MAX}$	$T_{TARGET}$	Harvest Control Rule (SPR Harvest Rate)
<b>Darkblotched Rockfish</b>	26,650 M eggs 37,838 units of spawning output	10,660 M eggs 15,135 units of spawning output	2009	2033	2010	100%	2011	F60.7%
<b>Pacific Ocean Perch</b>			2015	2043	2015	92.90%	2017	F86.4%
<b>Canary Rockfish</b>	34,155 mt 13,402 B eggs	13,662 mt	2048	2071	2053	55.40%	2063	F88.7%
<b>Bocaccio</b>	in 2005	5,361 B eggs	2018	2032	2021	77.70%	2026	F77.7%
<b>Cowcod</b>	3,045 mt	1,218 mt	2035	2074	2035	90.60%	2039	F90.0%
<b>Widow Rockfish</b>	49,678 M eggs	19,871 M eggs	2013	2033	2013	95.20%	2015	F95.0%
<b>Yelloweye Rockfish</b>	3,322 mt	1,328 mt	2046	2096	2048	80%	2084	F71.9% **

\*  $T_{MIN}$  is the shortest time to rebuild from the onset of the rebuilding plan or from the first year of a rebuilding plan, which is usually the year after the stock was declared overfished. The shortest possible time to rebuild the stocks with rebuilding plans under consideration in Amendment 16-4 is  $T_{F=0}$ , which is the median time to rebuild the stock if all fishing-related mortality were eliminated beginning in 2007. (**NOTE: For 2007 rebuilding analyses,  $T_{F=0}$  is the median rebuilding time if all fishing related mortality were eliminated beginning in 2009.**)

\*\* The yelloweye rebuilding plan specifies a harvest rate ramp-down strategy before resuming a constant harvest rate in 2011. F71.9% is the constant harvest rate beginning in 2011.