Black Sea Bass Projections IV—Revised

Prepared by NMFS Southeast Fisheries Science Center

Issued: 29 May 2012

Revised: 8 June 2012

1 Description of projections

This report describes black sea bass projections requested in a memorandum dated 3 May 2012 from David Cupka to Dr. Bonnie Bonwith (see Appendix). In these projections, fishing mortality rate in 2011 was set to provide the observed level of landings, and in subsequent years, F was set equal to $F_{rebuild}$. In the original issue of this report (dated 29 May 2012), $F_{rebuild}$ was defined to be the maximum fishing mortality rate that allows rebuilding in 2016 with probability of 0.5. In this revised report, $F_{rebuild}$ is defined to be the maximum fishing mortality rate that allows rebuilding in 2016 with probability of 0.66.

2 Results

General recreational landings in 2011 were estimated to be 406,017 lb whole weight. Headboat landings in 2011 were estimated to be 232,570 lb. Commercial handline landings in 2011 were estimated to be 42,793 lb, and commercial pots (+other+trawl) were estimated to be 366,308 lb. Summed across fleets, total 2011 landings were 1,047,688 lb (Table 1). This estimate indicates an overage of 23.7% relative to the 847,000 lb quota.

With 2011 landings equal to 1,047,688 lb whole weight, $F_{rebuild}=0.31$ allows rebuilding in 2016 with probability 0.66 (Figure 1, Table 2).

3. Comments on projections

As usual, projections should be interpreted in light of the model assumptions and key aspects of the data. Some major considerations are the following (reproduced verbatim from the assessment report):

- In general, projections of fish stocks are highly uncertain, particularly in the long term (e.g., beyond 5–10 years).

- Although projections included many major sources of uncertainty, they did not include structural (model) uncertainty. That is, projection results are conditional on one set of functional forms used to describe population dynamics, selectivity, recruitment, etc.

- Fisheries were assumed to continue fishing at their estimated current proportions of total effort, using the estimated current selectivity patterns. New management regulations that alter those proportions or selectivities would likely affect projection results.

- The projections assumed that the estimated spawner-recruit relationship applies in the future and that past residuals represent future uncertainty in recruitment. If future recruitment is characterized by runs of large or small year classes, possibly due to environmental or ecological conditions, stock trajectories may be affected.

- Projections were based on the calendar year because they are extensions of the assessment model. A shift in the fishing year relative to calendar year may introduce some unquantified disconnect between projection results and management implementation. However, if quotas are reached each year prior to December 31, as might be expected, all fishing mortality within a fishing year would also occur within the same calendar year.

- Projections apply the Baranov catch equation to relate F and landings using a one-year time step, as in the assessment. The catch equation implicitly assumes that mortality occurs evenly throughout the year. This assumption is violated when seasonal closures are in effect, introducing additional and unquantified uncertainty into the projection results.

- The 2011 landings were expected to exceed the quota, but at the time of this assessment, the degree of overage is unknown. When that information becomes available, projections may need revision, as results were sensitive to 2011 landings in the $L_{rebuild}$ and $F_{rebuild}$ scenarios. Revised projections might additionally account for any Accountability Measures implemented in response to exceeding the 2011 quota.

This current set of projections addresses uncertainty in the 2011 overage, as described in the last bullet above. However, it does not include effects of any Accountability Measures.

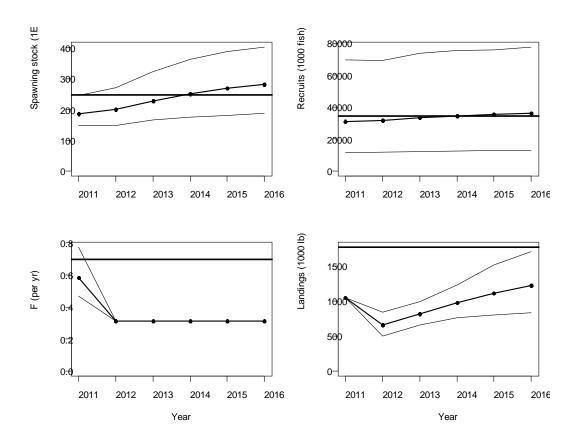Table 1. Estimated black sea bass landings in 2011 (lb whole weight).

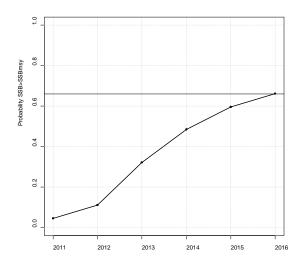|	Commercial lines	Commercial pots*	Headboat	General recreational	Total
2011	42793	366308	232570	406017	1,047,688

*Commercial pots includes trawl and other gears, as in SEDAR25.

Table 2. Projection results under scenario where fishing mortality rate is fixed at F = $F_{rebuild}$, with 2011 landings at their estimated level (1,047,688 lb) and with rebuilding probability of 0.66 in 2016. F = fishing mortality rate (per year), Pr(SSB > SSB_{MSY}) = proportion of stochastic projection replicates exceeding SSB_{MSY}, SSB = spawning stock (1E10 eggs) at peak spawning time, R = recruits (1000 age-0 fish), D = discard mortalities (1000 fish or 1000 lb whole weight), L = landings (1000 fish or 1000 lb whole weight), and Sum L = cumulative landings (1000 lb). For reference, estimated benchmarks are F_{MSY} = 0.698 (per yr), SSBMSY = 248 (1E10 eggs), and MSY = 1767 (1000 lb). Expected values presented are from deterministic projections.

year	F	pr.recover	SSB (1E10 eggs)	R (1000)	D (1000)	D (1000 lb)	L (1000)	L (1000 lb)	Sum L (1000 lb)
2011	0.58	0.04	186.5	30739	143	57	1356	1048	1048
2012	0.31	0.11	199.7	31641	85	34	820	657	1705
2013	0.31	0.32	227.5	33320	97	39	990	817	2522
2014	0.31	0.48	250.1	34511	104	42	1157	976	3497
2015	0.31	0.60	267.8	35356	110	45	1286	1112	4609
2016	0.31	0.66	281.6	35959	114	47	1384	1220	5829

Figure 1. Projection results under scenario where fishing mortality rate is fixed at F = $F_{rebuild}$, with 2011 landings at their estimated level. In top four panels, expected values represented by dotted solid lines, and uncertainty represented by thin lines corresponding to 5th and 95th percentiles of replicate projections. Horizontal lines mark MSY-related quantities. Spawning stock (SSB) is at time of peak spawning. In bottom panel, the curve represents the proportion of projection replicates for which SSB has reached at least SSB_{MSY} = 248.

Appendix

SOUTH ATLANTIC FISHERY MANAGEMENT COUNCIL

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David Cupka, Chairman   Robert K. Mahood, Executive Director
Ben Hartig, Vice Chairman   Gregg Waugh, Deputy Executive Director

May 3, 2012

<u>MEMORANDUM</u>

TO: Bonnie Ponwith

FROM: David Cupka DC

SUBJECT: Data Request – Black Sea Bass projections with 2011 data

At their November 2011 meeting, the SSC reviewed the stock assessments for black sea bass and golden tilefish conducted through SEDAR 25 with data through 2010. While the SSC endorsed the black sea bass assessment as appropriate for use in management, they recommended that the projections be re-run once the observed 2011 data were available:

The SSC recommends using rebuilding projections that reflect the actual 2011 catch, since the values is an influential uncertainty in the ABC. If the actual catch is not available for inclusion in the projections, the SSC supports the use of the 150% of 2011 landings run, based on the current estimates of 2011 landings and the projected overages.

Amendment 18A (recently approved) includes an action to change the rebuilding strategy for this stock based on the 2011 assessment. However, at the time the amendment was submitted for approval, the Council did not have projection tables that included recreational and commercial catches through 2011. Hence the Council's preferred rebuilding strategy alternative was based on projected catches assuming a 150% overage in 2011.

The Council requests that the SEFSC provide updated projection results for $F_{rebuild}$ that include actual 2011 recreational and commercial landings as recommended by the SSC. These results should be provided to the Council office by Friday, June 1, 2012 so that the Council may discuss possible adjustments to the black sea bass rebuilding strategy at their June 2012 meeting.

Thank you for your consideration of our request. If you have any questions, please contact Bob.

cc: Roy Crabtree
      David Cupka
      Ben Hartig
      Bob Mahood
      Gregg Waugh
      John Carmichael
      Myra Brouwer
      Brian Cheuvront