SEDAR73 Red Snapper: Hypothetical reduction in recreational discards

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Abstract

This report describes a hypothetical analysis of the SEDAR73 South Atlantic red snapper stock assessment, in which general recreational discards were reduced by 50%. Deterministic projections were also modified, assuming descender device usage for impaired or otherwise vented fish was 100%. The revised, hypothetical assessment still characterizes the stock as overfished and experiencing overfishing. The SEDAR73 current levels of dead discards were near ~571,000 fish, of which the vast majority came from the recreational private boat fleet. If discards were half that level (~285,500), the revised, hypothetical projection indicates that dead discards would need to be reduced by approximately 60% to end overfishing.

Introduction

To help frame discussions about South Atlantic red snapper discards, the SEFSC re-ran the SEDAR73[1] base assessment model with a single modification: the entire time series of discards from the general recreational fleet were cut in half relative to the SEDAR73 estimates. This new time series is not intended to represent reality. It is purely hypothetical and is intended as a "what if" scenario.

In addition to re-running the assessment model, new projections were computed. These projections stem from the revised, hypothetical assessment with reduced general recreational discards, and they further assume that descender device usage for impaired or otherwise vented fish increases from 75% (SEDAR73 value) to 100% (hypothetical).

Methods

The base run of the South Atlantic red snapper stock assessment model was re-run after reducing the general recreational discards to half of the input values used in SEDAR73. This hypothetical modification resulted in new stock and fishery status indicators.

Stemming from the revised assessment model run, new stock projections were computed. These analyses included only the deterministic projections and thus focus on expected values without computation of uncertainty (as provided by stochastic projections in SEDAR73).

[1] https://sedarweb.org/documents/sedar-73-stock-assessment-report-south-atlantic-red-snapper/

Except for modifications described here, the projection methods are identical to those of Scenario 13[2], which was selected by the SSC for setting the ABC at their July 2021 meeting. Scenario 13 was defined by the following attributes:

- recruitment was based on the recent 10-yr average
- release mortality applied the "mixed" approach
- fishing rate was F=F30
- discard-mortality reductions from descender devices were not reallocated to landings

The projection of this report had the same attributes. It differed in that its initial conditions (in 2020) were based on the revised, hypothetical assessment. In addition, the projected discard mortality rate was reduced relative to that used in Scenario 13, from an assumption of 75% descender device utility to 100%. To do so, the data used to inform the discard mortality rate under various levels of descender device usage were digitized and reanalyzed for this report (Fig. 4 of Vecchio et al. SEDAR73-WP15[3]). Note that the value of 100% pertains only to fish that were impaired or would have otherwise been vented, but not fish released in good condition, consistent with SEDAR73-WP15. This new hypothetical discard mortality rate for the general recreational sector was 0.21, reduced from 0.26 at the end of the assessment period. The ratio of new to old (0.21:0.26) was assumed also to apply to the headboat and commercial fleets in these hypothetical projections.

Results and discussion

Status indicators of the hypothetical assessment relative to the SEDAR73 assessment are presented in Table 1 and Figure 1. Results of the corresponding hypothetical projection are shown in Table 2 and Figure 2.

It is important to highlight that the hypothetical assessment and corresponding projection of this report are not recommended for use in management, neither as an alternative state of nature nor for catch advice. The information presented here is purely hypothetical, based on an imaginary time series of general recreational discards. These results are for illustrative purposes only and are intended simply to help frame the discussion on reducing red snapper discards in the general recreational fleet.

[2] https://safmc.net/documents/2022/06/sedar73-red-snapper-forecasts-new-methodology-and-additional-scenarios.pdf/

[3] https://sedarweb.org/documents/sedar-73-wp15-utility-and-usage-of-descender-devices-in-the-red-snapper-recreational-fishery-in-the-south-atlantic-revised-12-4-2020/

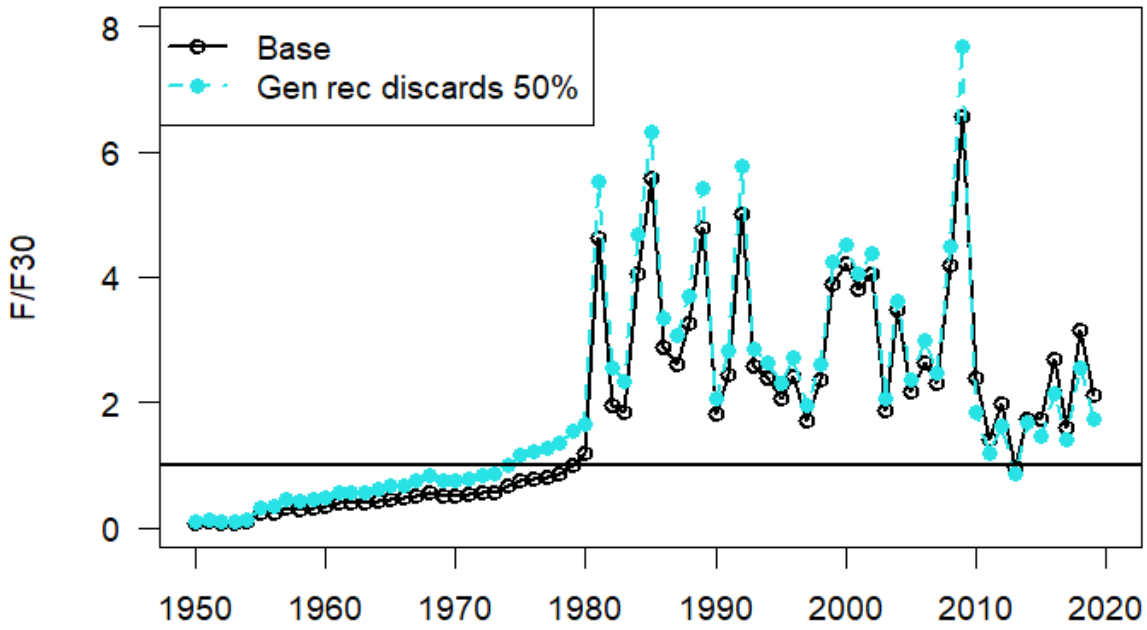
Table 1. Estimated status indicators from the base run of the SEDAR73 assessment model (reproduced from Table 27 of the assessment report) and from this hypothetical rerun with general recreational discards reduced by half.

Quantity	Units	SEDAR73 value	Hypothetical value
$F_{30\%}$	y^{-1}	0.21	0.19
$SSB_{F30\%}$	Eggs (1E8)	635426	527911
$F_{2017\text{-}2019}/F_{30\%}$	—	2.2	1.8
$SSB_{2019}/SSB_{F30\%}$	—	0.44	0.48

Table 2. Comparison of the Scenario 13 projection results with the hypothetical projections of this report. The projections are defined by F= F30 starting in 2022 and recent average recruitment. Benchmarks are based on Block 3 and discard mortality on Block 4 with no reallocation of F toward landings. R = number of age-1 recruits (in 1000s), F = fishing mortality rate (per year), S = spawning stock (1e8 eggs), L = landings expressed in numbers (n, in 1000s) or whole weight (w, in 1000 lb), and D = dead discards expressed in numbers (n, in 1000s) or whole weight (w, in 1000 lb). The extension "b" indicates expected values (deterministic) from the base run; the extension "h" indicates expected values from the hypothetical run.

year	R.b	R.h	F.b	F.h	S.b	S.h	L.b(n)	L.h(n)	L.b(w)	L.h(w)	D.b(n)	D.h(n)	D.b(w)	D.h(w)
2020	718	483	0.39	0.29	307585	284699	40	40	416	414	443	241	2019	1214
2021	718	483	0.35	0.26	347034	327556	39	39	420	418	332	166	1626	906
2022	718	483	0.21	0.19	401322	377042	25	31	284	353	195	119	983	681
2023	718	483	0.21	0.19	465178	426636	28	33	327	394	202	118	1036	681
2024	718	483	0.21	0.19	529917	472864	31	35	368	429	207	117	1076	674
2025	718	483	0.21	0.19	593360	515204	33	36	408	460	210	117	1104	671
2026	718	483	0.21	0.19	653509	553030	35	37	446	488	211	117	1122	671

Figure 1. Time series of status indicators from the SEDAR73 base run of the assessment model (Base) and from the hypothetical run with general recreational discards reduced by 50%.



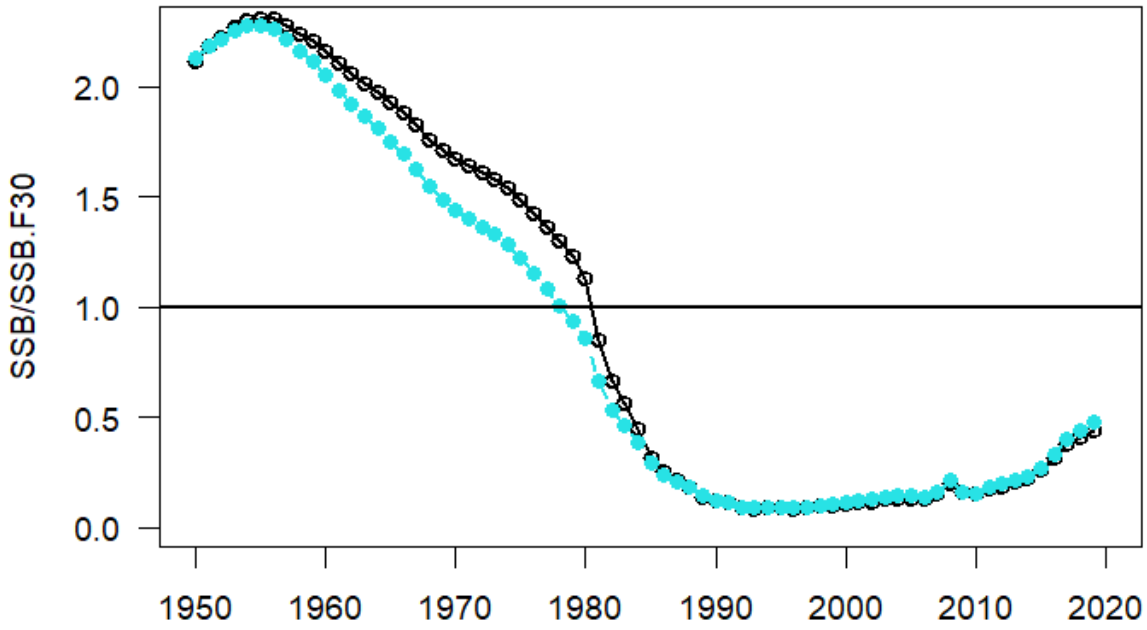


Figure 2. Deterministic projection results with F=F30 starting in 2022 and recent average recruitment. Benchmarks are based on Block 3, and discard mortality on Block 4 (assuming 100% descender devices) with no reallocation of F toward landings. Horizontal blue lines represent F30 benchmarks. For the assessment period (1950-2019), the solid black line indicates the base run, the dashed line indicates the median of ensemble analyses, and the gray area indicates the 90% credible intervals.