Investigating the Impact of Carrying Over or Paying Back Multiple Theoretical Landings Underages/Overages on Population Status Metrics.

Addendum: Impact on overages without payback

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Executive summary

- A series of 4 overage scenarios were simulated for red snapper to investigate the impact of failing to payback overages.
- Stock status declined relative to ABC projections for at least 10 years following the overage and rebuilding time was substantially increased.
- Non payback of overages will delay rebuilding and reduce stock status relative to ABC projections.

1. INTRODUCTION

This addendum addressed the council request to investigate the impact of failing to payback overages on stock status and rebuild timelines. This currently occurs in red snapper as while the stock currently in a rebuilding plan it is not designated as overfished. The concern raised was that no requiring paybacks of overage could increase the time to rebuild. Catch can be expected to fall into one of three categories (Table 1):

1) ABC>CATCH>ACL : Good scenario : Better expectations than ABC
2) OFL>CATCH>ABC : Marginal scenario : Worse expectations than ABC but still sustainable
3) CATCH>OFL : Poor scenario : Not sustainable

For this analysis we considered categories 1 and 2 to quantify the impact of differing levels of undesirable overharvest.

2. METHODS

For analysis of this request 4 deterministic projections were produced for red snapper using Stock Synthesis (SS3, V3.24U; Methot and Wetzel, 2013):

1) A base projection where the stock is harvested from 2019-2039 at the ABC levels.

2-5) Four single overage event projections where an overage of 1%, 10%, 25%, or 50% occurs in 2019 relative to the projected ABC for all fleets. All fleets are then projected to harvest at ABC levels from 2020-2039.

3. RESULTS

Impact on rebuilding/biomass status

In all overage scenarios the spawning stock biomass was depleted relative to ABC projections for 10-20 years following the overage event with reductions up to 6% (Table 2). Substantial delays in rebuilding timeline also occurred ranging from a 1 year delay when catch was 1% above ABC to a 6 year delay when catch was 50% above ABC.

DISCUSSION

- These results show that despite red snapper not being designated as overfished, allowing overages without payback provisions can be expected to have large impacts on stock status and rebuilding time.
- The delays in rebuilding time show that even a single year of substantial overfishing can have impacts lasting decades and delay rebuilding for up to 6 years at 50% overage.
- In addition, these results are expected to be a conservative estimate as projecting recreational fleets with fixed numbers of catch resulted in total catch in weight being very slightly lower than ABC.
- Failing to implement paybacks was found to have negative impacts no matter how large or small the specific overage was. If rebuilding targets are to be met, overages should be paid back at 1:1 in the following year

CAVEATS

- Differences in selectivity and discarding patterns between fleets mean that reassigning carryovers or paybacks to fleets other than the ones that originally observed the overage or underage may lead to differential impacts on stock status and rebuilding.
- Due to the hypothetical nature of these simulations the results are not meant to be used as the basis for setting future catches for the example stock assessments presented.

4. ACKNOWLEDGEMENTS

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6. LITERATURE CITED

Methot, R.D., and Wetzel, C.R. 2013. Stock synthesis: A biological and statistical framework for fish stock assessment and fishery management. Fish. Res. 42: 86-99.

SEDAR (Southeast Data, Assessment, and Review). 2017. SEDAR 52 Stock Assessment Report Gulf of Mexico Red Snapper. SEDAR, North Charleston, SC.

TABLES

Table 1. Theoretical consequences of catches greater than ACL on spawning stock biomass and expected time to rebuild.

	SSB	Time to Rebuild
ABC > CATCH > ACL	Increasing faster than ABC projections	Decreasing faster than ABC
OFL > CATCH > ABC	Increasing slower than ABC projections	Decreasing slower than ABC
CATCH > OFL	Increasing much slower than ABC or Decreasing	Increasing, will not achieve rebuild

Table 2. Relative reduction in spawning stock biomass over a ten year period and increase in rebuilding time following a single years catch overage relative to ABC.

	ABC	1% Overage	10% Overage	25% Overage	50% Overage
SSB/SSB_{ABC} 10 year average	1	0.999	0.989	0.972	0.945
Additional years to rebuild	0	1	2	3	6