Fishery management strategies for Red Snapper

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Complaints about snapper & grouper fishing

Many species overfished/overfishing including six of the top ten landed species

High levels of discarding and “why can’t we just keep these fish”

Very short seasons for some species like red snapper

Management spiral of lowering ACLs which causes more discards which then leads to further lowering of ACLs

This has become a catch and release fishery. It is not well suited for that.

Red Snapper Season Announced For South Atlantic & It's Abysmal

Measly recreational red snapper season announced for the South Atlantic, and that's using the term "season" liberally.

May 26, 2023

Project goal

How can we model the economic and biological effects of a limited number of significantly different regulatory regimes that would minimize those discards while potentially increasing retained catch?

Model should be:

1) sufficiently realistic with fishery dynamics

2) flexible enough to model a multispecies fishery (start with red snapper)

Funded internally by NOAA

History

Crosson, Shertzer, Erik Williams (SEFSC), Rick DeVictor (SERO), Jie Cao (SSC), Genny Nesslage (SSC), Chris Dumas (SSC)

Ideas workshop at the Beaufort lab spring 2022 included many members of the Atlantic assessment team and SSC

Reviewed by the SSC in October 2022 and April 2024

Now published in *North American Journal of Fisheries Management*, Shertzer et al. 2024
https://doi.org/10.1002/nafm.10966

Management tools used in the South Atlantic for Snapper-Grouper Species

- Bag limits
- Vessel limits
- Trip limits
- Minimum size limits
- Limited access
- Area closures
- Time closures
- Gear requirements

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Management tools not used (or very infrequently) in the South Atlantic for Snapper-Grouper Species

- Aggregate SG bag limit
- Closed/limited access
- Large area closures
- Catch shares
- Time closures across all species
- Lotteries
- Maximum/slot size limits
- Tag program/stamp
- Limits on the number of rec trips
- Allowing full retention

Scenario Modeling

Spatial population model of Red Snapper and the multispecies fishery that captures them in the southeast U.S. Atlantic.

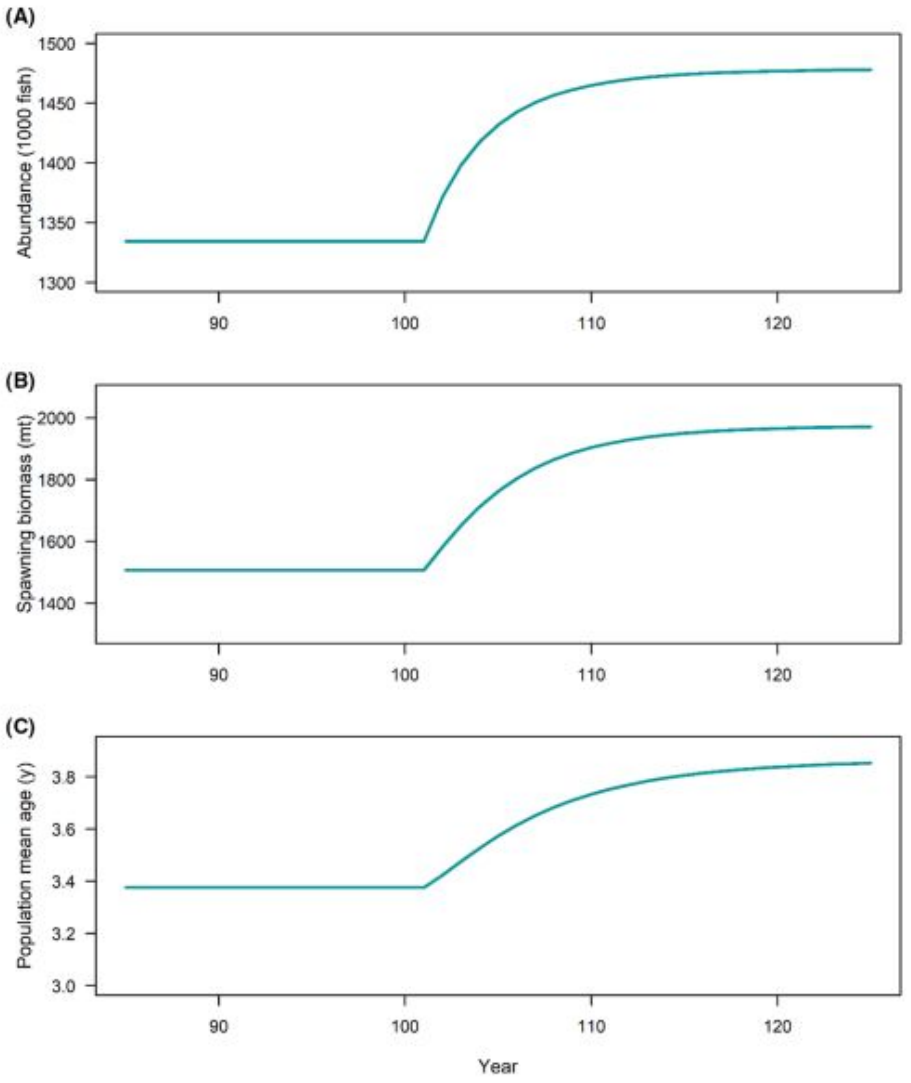
We simulated and compared 25 different management measures that fall broadly into the categories of

- gear modifications including discard mortality mitigation
- size limits
- spatial approaches
- general effort reduction (temporal or otherwise)

Modeling

For each scenario, we simulated current conditions. We then compared outcomes under current conditions to those under the management scenario.

Starting with red snapper, but expandable to include other SG species.



Criteria

Criteria for comparison address the management goals

- decrease dead discards
- rebuild the age structure
- increase landings
- increase spawning biomass

Can we turn a catch and release fishery back into a catch and keep fishery?

Gear modifications and discard mitigation

Fishing power has increased substantially, with improved boating equipment, electronics, and information-sharing technology.

- Test the effect on the recreational fleet by reducing its catchability by 10% or 30%.

Discard mitigation scenarios via descender devices, assuming 100% compliance:

- Vecchio et al 2020: lower estimate of effectiveness (from Sedar 73)
- Runde et al 2021: higher estimate of effectiveness

Size limits and effort reductions

Minimum size limit scenario: increase to 24 inches

Effort reduction scenarios:

- 25% or 75% of current effort, which can be distributed via seasons/landing tags/other.

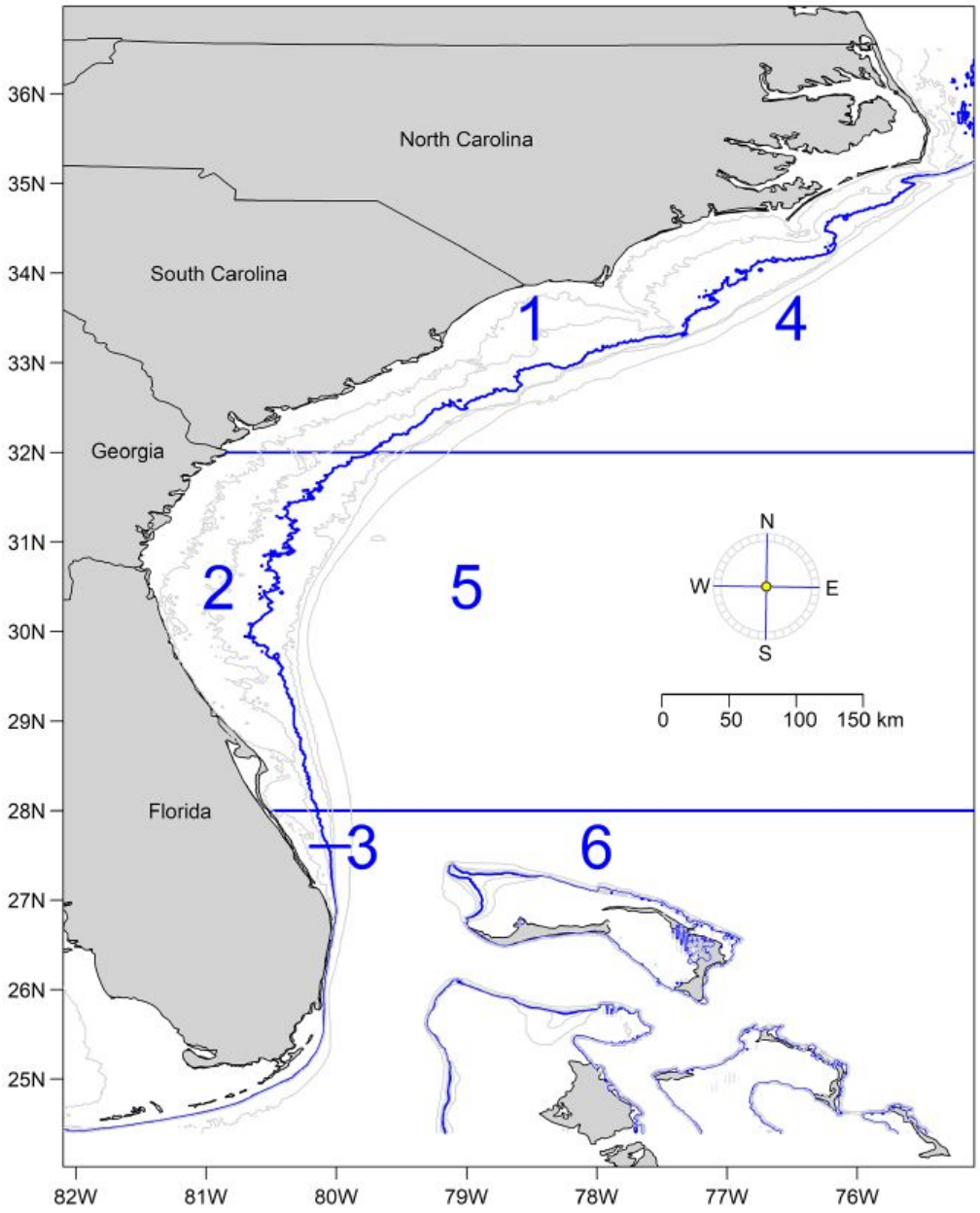
- 25% or 75% of current effort but with full retention (no discarding)

Area experiments

Blue lines at 28°N and 32°N

Blue curve at the 35-m isobath. Light-gray isobaths are 15, 25, 45, 55, & 200 m.

Four hypothetical scenarios explore effects of prohibiting red snapper retention, four prohibiting all bottom fishing in the area, four prohibiting only rec effort.



Comparative performance metrics

- equilibrium values of abundance
- spawning biomass
- mean age of the population
- landings (in numbers) of each fleet
- dead discards (in numbers) of each fleet
- mean weight (kg) of the landings of each fleet
- area-specific catch rates (landed fish in numbers per unit effort) of the recreational fleet

Results of 25 scenarios

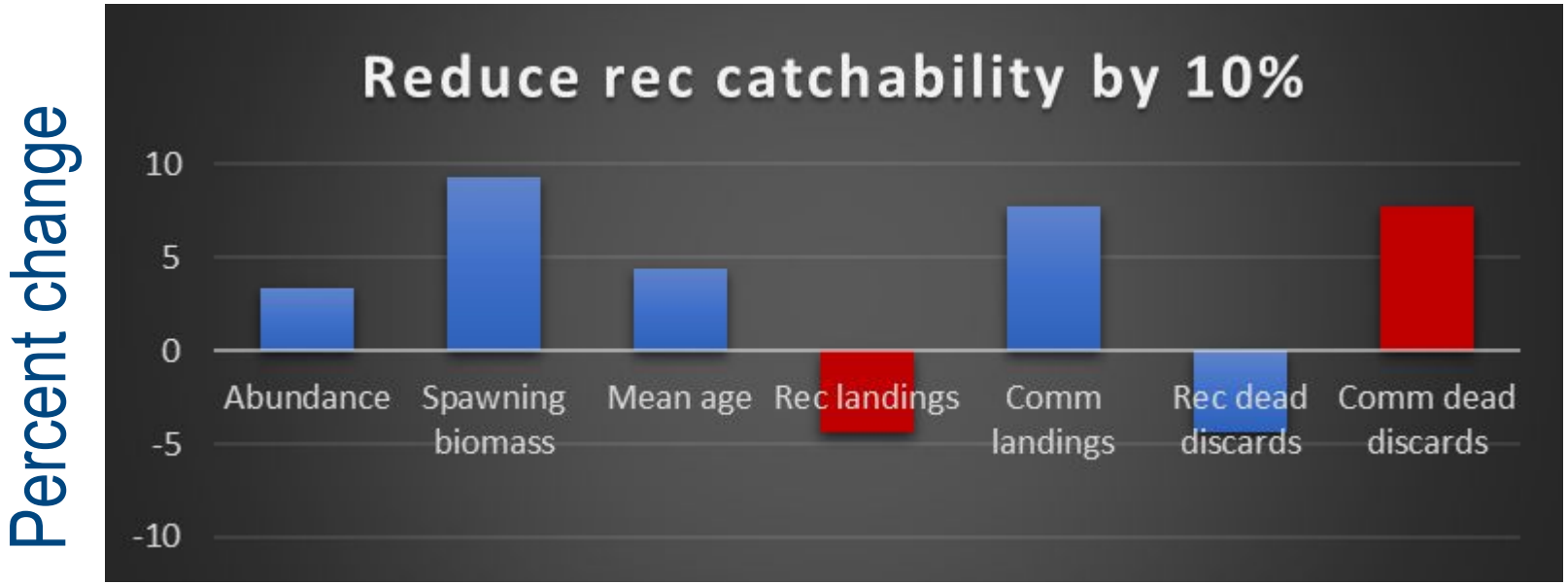
- Descender devices have modest effects, depending on assumptions
- Size limits are not a good management tool for red snapper
- Reductions in recreational effort were the most promising scenario
- Spatial measures that still allow effort do little for red snapper

In following slides, the number in parentheses in purple (2) is the scenario in Table 3 of the paper and in the graphs.

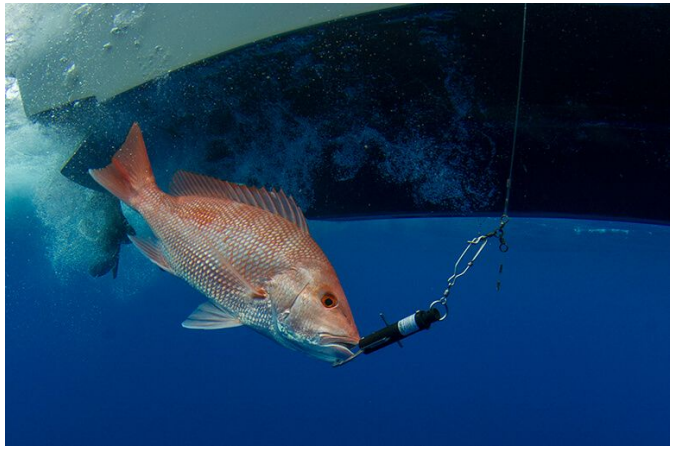
- Blue is desirable change, red is undesirable change

Gear modifications

Unspecified gear modifications to reduce fishing power are unknown (!) and inefficient (ie 10% reduction in catchability only reduced landings and discards < 5%) (1), and a 30% reduction in catchability only reduced landings and discards < 15% (2)



Descender devices



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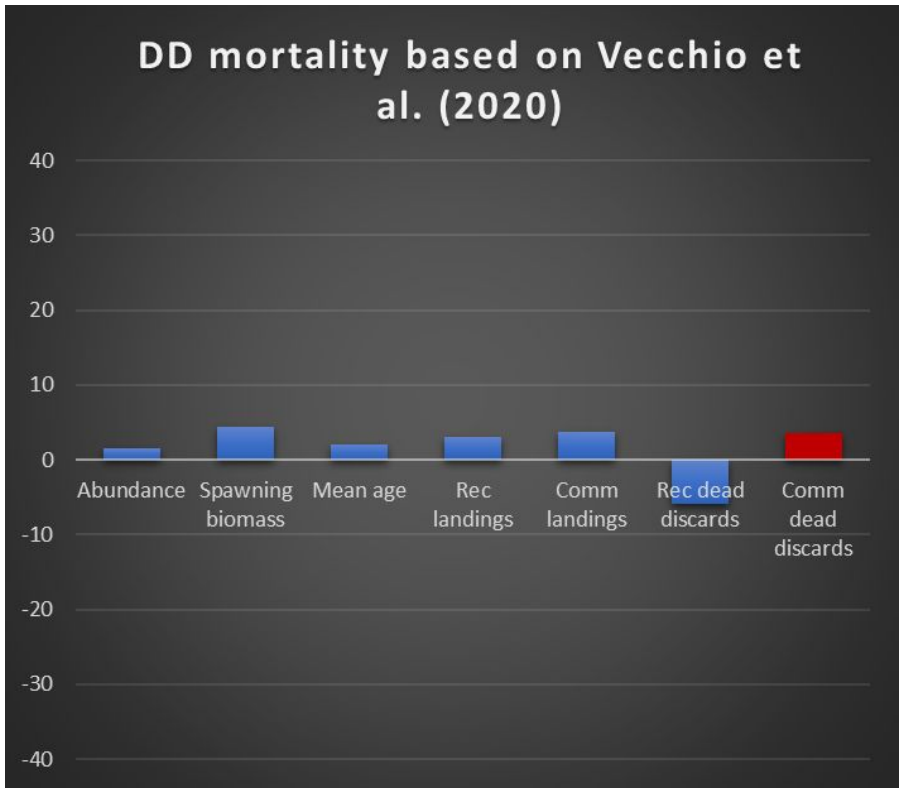

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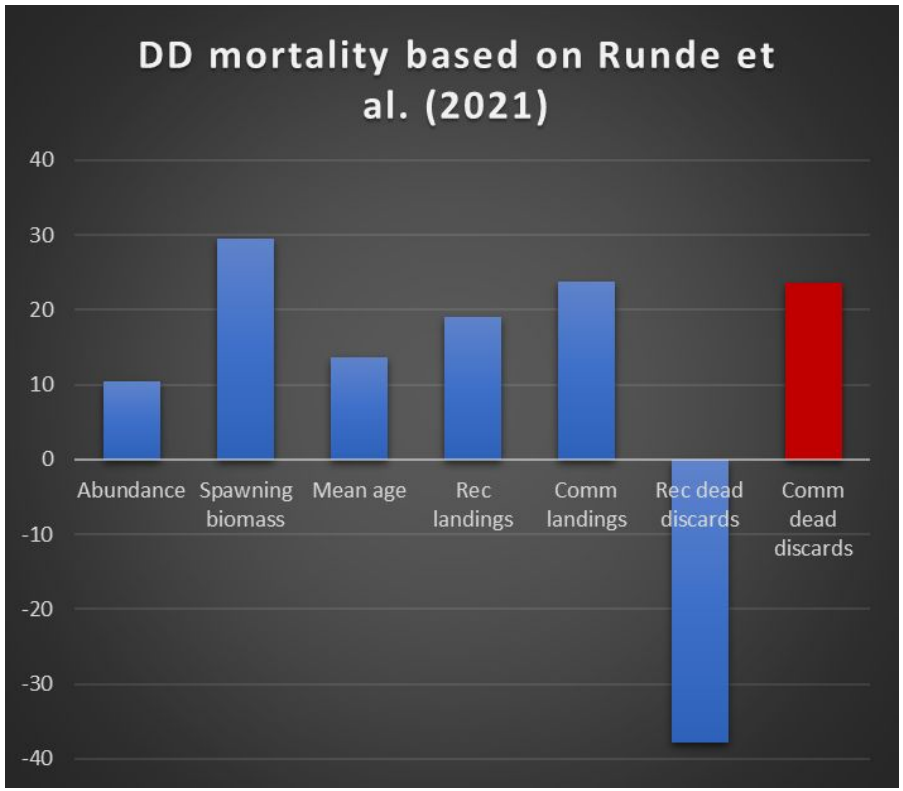
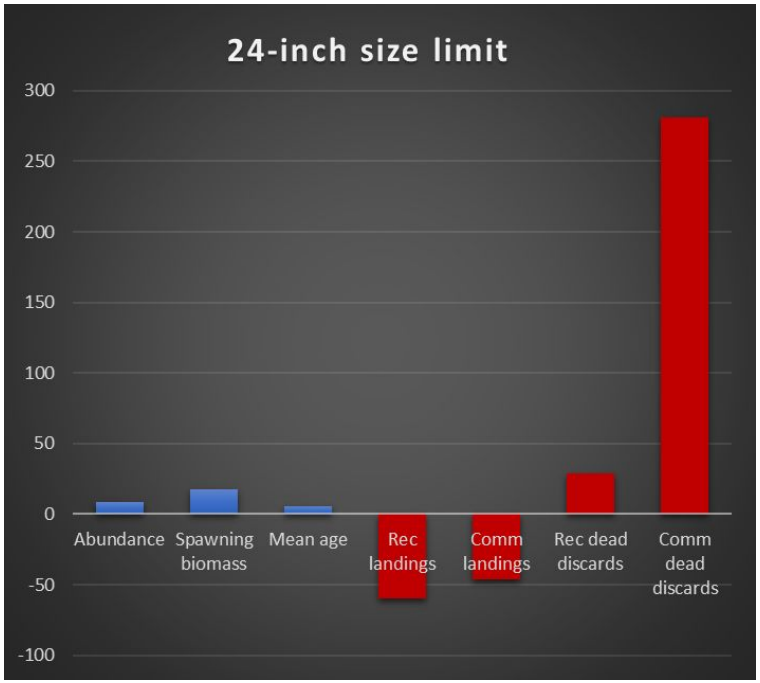


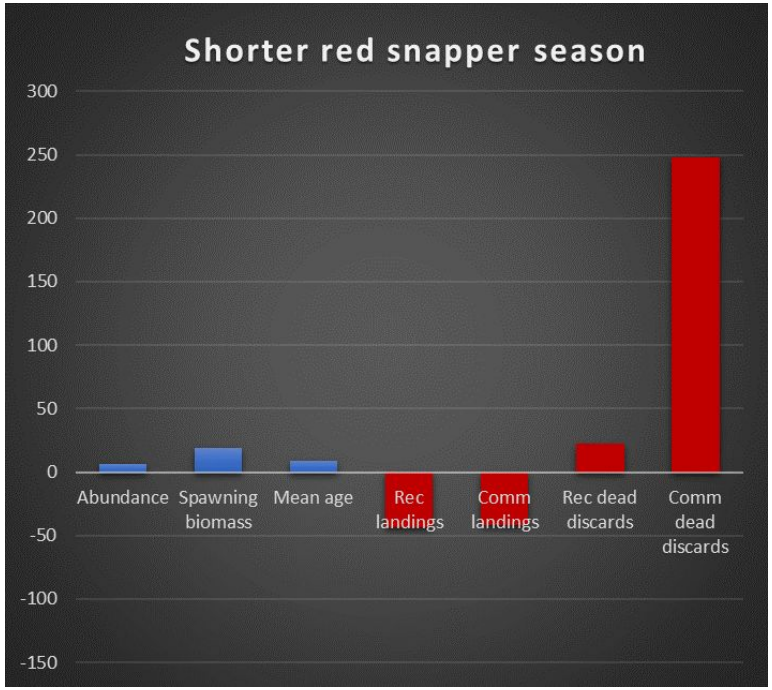
Size limits

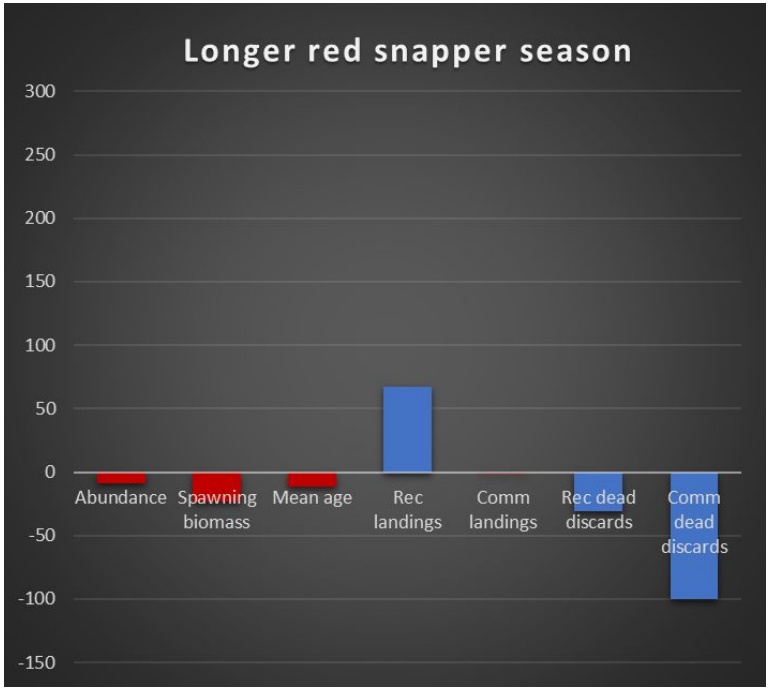
24 inch size limit (5) increased stock size BUT resulted in fewer landings and more dead discards.



Red snapper seasons

A short red snapper season (6) enhances rebuilding but increases discards and reduces catch (as we can see currently in real life). A longer red snapper season (7) initially increases catch but leads to a drop in abundance.





Effort reductions

Reducing fishing effort on the snapper–grouper complex (8-13) was among the most effective management strategies for rebuilding Red Snapper, increasing the average weight of landings and increasing recreational catch rates.

Paper does not differentiate between snapper grouper season closures or something more individualized like tags or a set number of allowed trips

Effort reductions

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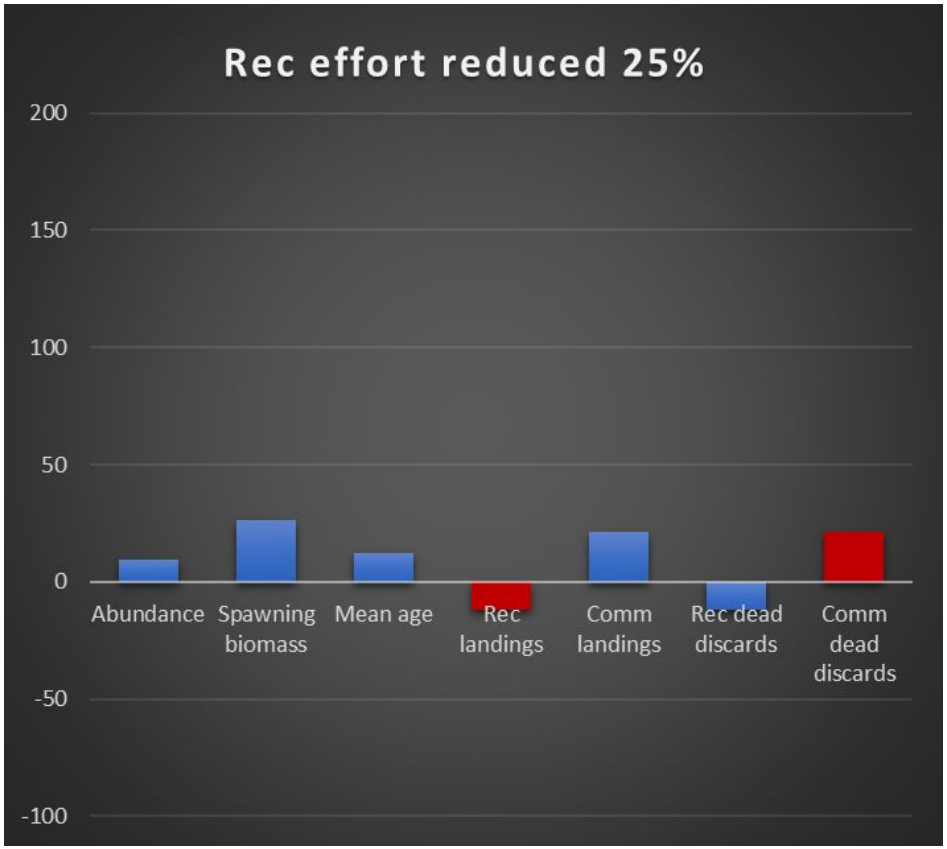

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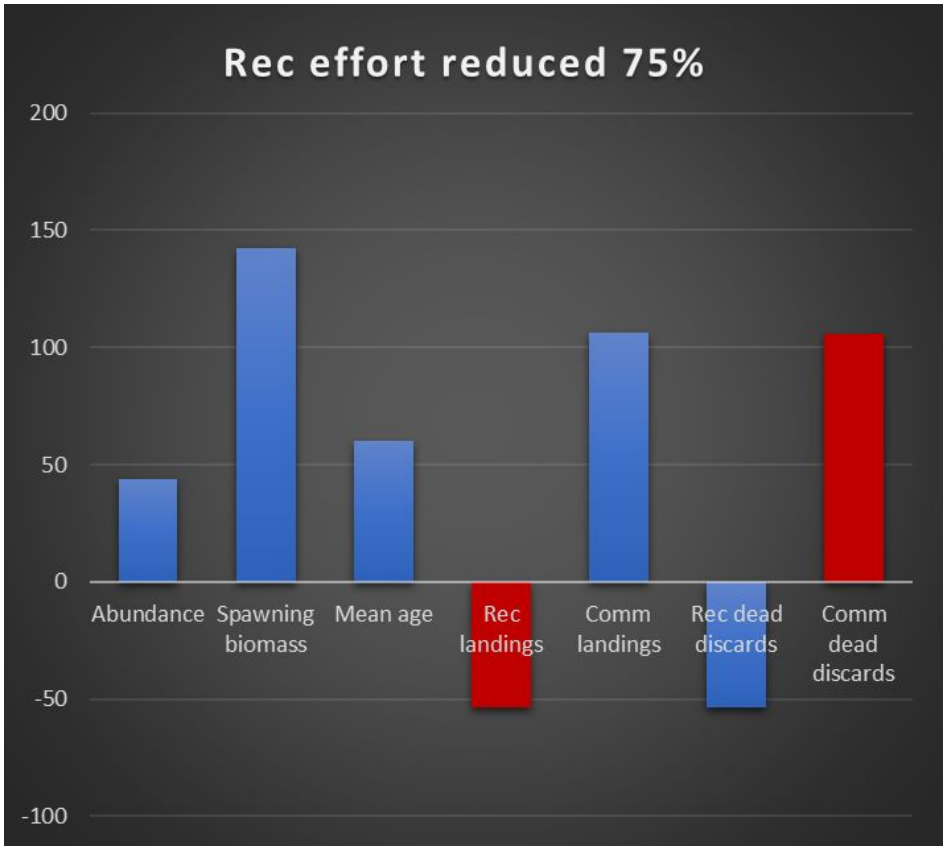

Effort reductions with full retention

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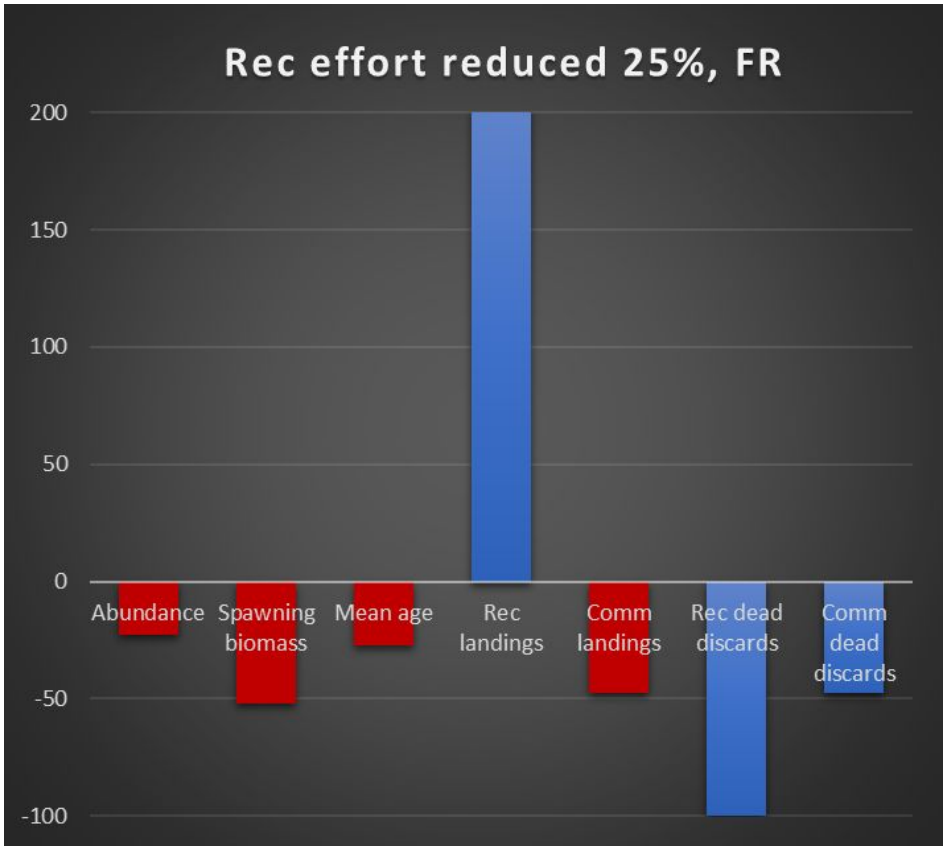

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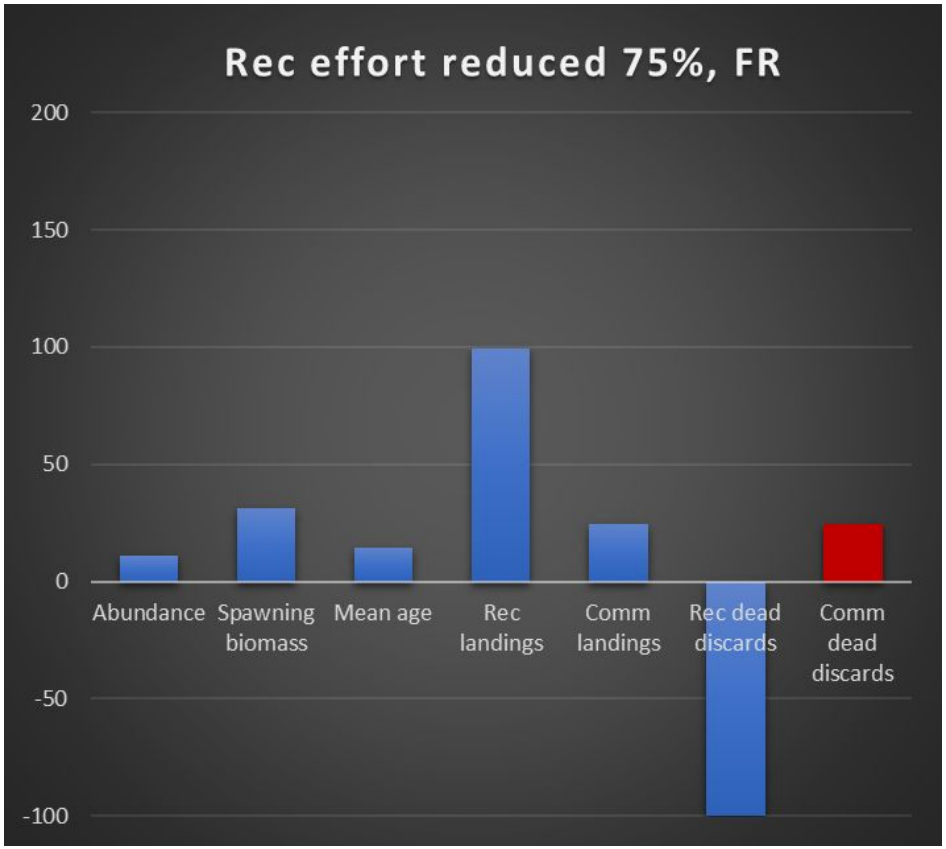

Area closures experiment

Generally reduced red snapper catch, stock size generally increased overall BUT reduced in open areas

Almost all benefits come from closing to rec sector

Closing areas just to red snapper landings (14-17) increased dead discards with little return

Closing areas to all effort (18-21) increased biomass but decreased landings, especially in middle areas (16, 20, 24)

Area closures experiment

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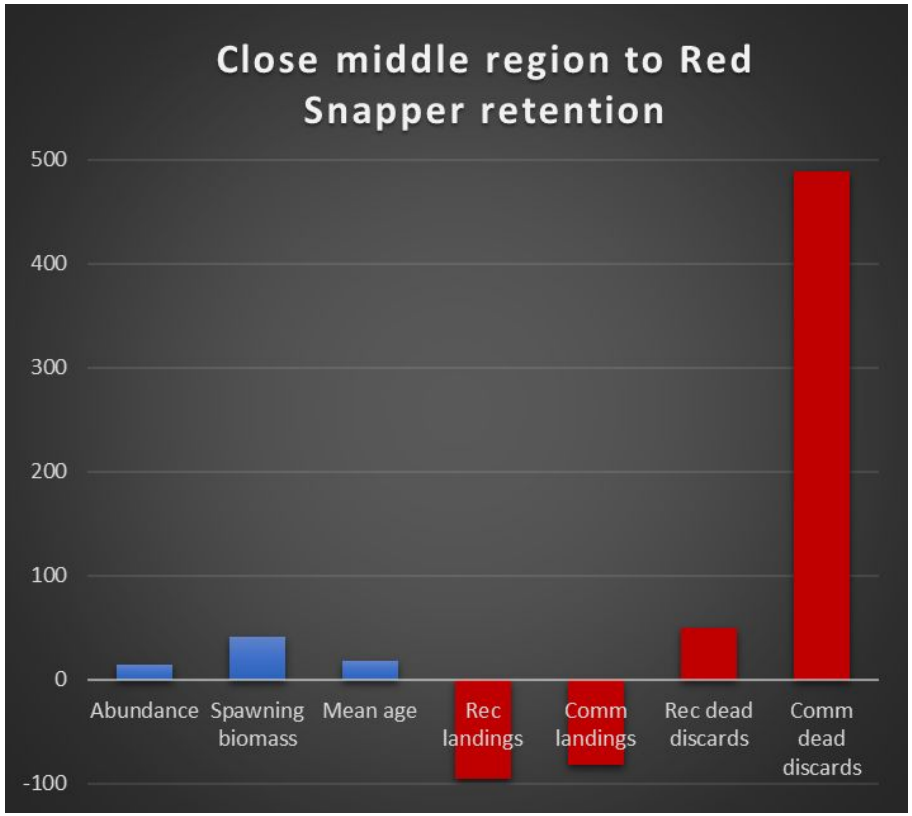

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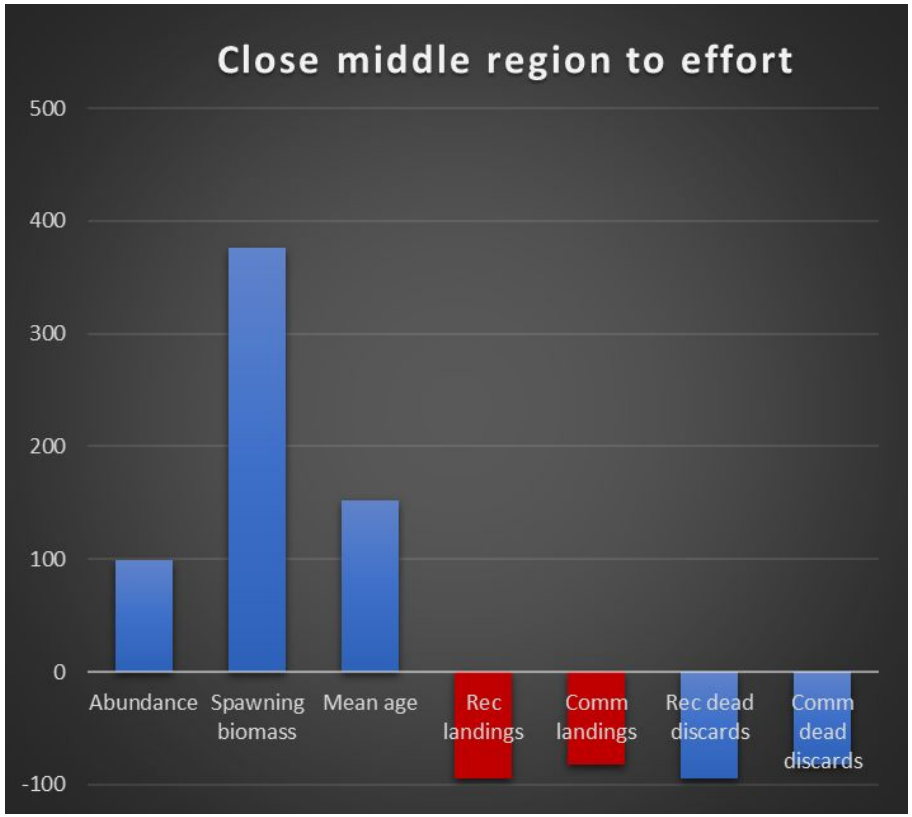

Conclusions

The measures most effective at rebuilding the stock are those that limit fishing effort, either throughout the year or in locations where Red Snapper are most abundant. They increase stock size, landings, catch rates, and likely positively affect other overfished stocks. Full retention could replace discarding.

Area closures also reduce discards, but also reduce retained catch

Input controls (regs on effort) can reduce dead discards; output controls (regs on catch) generally do not. The exception is the output control of discard mortality mitigation.

Next steps for our modeling

Incorporate additional species that are caught with red snapper including gag, black sea bass, red porgy, vermillion snapper, red grouper.

Economic valuations

Synched up bottom seasons

Aggregate bag limits

What would the Council like us to bring back? Priorities?

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Questions?

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