

Selectivity of red snapper in the South Atlantic More than Just Depth

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Abstract

SEDAR 24 AW-05 argues that selectivity for Atlantic red snapper is flat topped for all hook and line fisheries for all years and all areas. The facts indicate otherwise.

- There is evidence that red snapper do not mix uniformly throughout the range and therefore are not equally available to exploitation regardless of area or depth.
- There is a major area of suitable habitat outside 30 fathoms that is fishable only at times when weather and current allow.
- Fishing is generally concentrated on permanent bottom structure and features that are believed to hold fish, can be revisited, and can be anchored over. These larger structures are less frequented by larger red snapper as the research has shown.
- Within the fishable areas inside 30 fathoms, the head boat sector by nature (slow multi-passenger boat, limited to less than 9 hrs. running and fishing time) generally is restricted to operating within 2-hours running from port and fishing in depths of 10 to 20 fathoms.
- In general, Commercial boats catch larger fish than do the recreational boats, two factors appear to be involved: a) Commercial boats fish are better able to fish in deeper water and stronger currents, and b) commercial gear and fishermen better can handle large fish.
- Research suggests that smaller snapper bite more readily than do older fish.
- The pattern of the fishery has changed since WW II, with the deeper waters and fish lightly exploited in the earlier years when fish finders and navigation was less developed.
- The conclusion I draw is that AW-05 has failed to address these cases when availability, selectivity and catchability have all changed over time.

Background

My name is David Nelson and I have been a red snapper fisherman my entire life. I have over thirty years' experience in the headboat, charter boat, and commercial fishing sectors. Since the mid 1970's I have been fishing with my father Paul Nelson II out of Ponce Inlet, south to Cape Canaveral and north to Jacksonville. Having fished all three of these sectors for much of my life I am an expert in the area of selectivity in regards to red snapper.

Introduction

The SEDAR 24 AW-05 paper about selectivity is basically a defense of the use of flat top selectivity for South Atlantic red snapper. This paper is very necessary to justify flat topped selectivity for South Atlantic red snapper for a number of reasons. First because the closest related stocks and species, Gulf of Mexico red snapper and South Atlantic mutton snapper, are dome shaped. Because of the huge lack of fishery independent data in the SA common sense should dictate that the SA red snapper should be dome shaped as well. In 27 years the NMFS has failed to collect one piece of fishery independent data on SA red snapper. With no concrete data except for area of habitat and crude depth of areas fished, the AW-05 has many flaws in multiple areas. SEDAR 24 AW-05 argues that selectivity for Atlantic red snapper is flat topped for all hook and line fisheries for all years and all areas. The facts indicate otherwise.

Depth Information vs. Reality

The defense of flat top selectivity focuses mainly on depth and areas fished by different sectors. This is an important part of the argument for selectivity however there are many other parts that will be addressed here. Since depth is the major focus of AW-05 then that is where I will begin. A major aspect covered in the paper involved depth and how the Atlantic lacks the area of deeper waters compared to the Gulf of Mexico. Relative to the Gulf of Mexico the area is small, but it is still very significant. The “Break” is an almost continuous major ledge (30 fathoms) that stretches over 600 miles from Florida to North Carolina. This area of hard bottom has 10 to 25 feet of relief, major caves, and offers enough protection for millions of snapper and other species of all sizes and ages. The area between 30 and 50 fathoms is also a very significant area of habitat. Both of these areas are protected from handline fishing by the Gulf Stream current which makes it nearly impossible to fish most of the year.

Another area the AW paper focuses on involves the different sectors and how often they fish certain depths. There are some major problems in this data especially the headboat data. A very important point not mentioned in regards to the head boat data is the fact that most headboats that target red snapper do not fish beyond thirty miles from shore. In the early period it was rare for a headboat to go any further than 20 miles because the average headboat only traveled at 10-12 knots (Moe page 11 map)

On the line graph on page 33 it shows headboats fishing for red snapper in 150-250 plus feet of water. This completely false and it needs to be corrected. Almost all headboats that catch red snapper anchor over the reef they are fishing. There are not many boats that anchor in water over 150 feet and bottom fish 20-50 lines. This part of the paper needs to be clarified because this is not accurate when it comes to headboats fishing for red snapper. Most all headboats fish in water 60-120 feet deep and anchor to fish on the bottom for red snapper. This deep water data is from south of Martin County where they drift fish for species other than red snapper.

In this same section on depths, the charter or for hire sector, has depths that are much too high as well. In the early period most charter boats fished for king mackerel most of the charter season and only bottom fished when it was necessary (Moe page 10). Before

advances in marine electronics in the late 1970's few charter boats went offshore of 20-25 miles (Moe)

Today many charter boats fish for red snapper in areas inshore (100-150 feet) and then troll or drift for amberjack in deeper water. This was explained at the DW by industry professionals during workshop meetings. Once again it seems that the fishermen's input at the data workshop was ignored.

Other Considerations

Effort at Depth

On page 18, of S-24 AW-05, there are two scatter plots for age and length for given depths. Since effort from 60-150 feet is 10-15 times greater than effort from 150-300 feet it is very clear that on average older fish are caught in deeper water. This scatter plot does not include many other factors such as; feeding habits of older fish, habitat requirements of larger fish, and strength of larger fish all of which will be addressed below. There is also no mention of the difficulties in fishing the Gulf Stream current.

Before the late 1970's it was very rare for any recreational fishermen to venture further from shore than 20-25 miles (Moe). Even the commercial sector was limited for a variety of reasons as the bottom long line fishery was not started until the early 1980's. All early period aging data should be applied to the model using dome shaped selectivity. This was not done in SEDAR 15 and is why the model was not a good fit to the data. If this selectivity adjustment is made then the age data will more closely match the historical landings.

Gear and Feeding Habits

Another area not addressed properly is gear and feeding habits. On page 31 it says:

“Gear selectivity could decline at older ages if the hook gear is fragile enough to allow the biggest fish to break the line and escape. In general, the hook gear used to capture red snapper utilizes hook sizes that are more than sufficient for capturing 20” inch fish and larger. The gear is often rigged with 100+ pound test monofilament line so that the biggest fish are unlikely to escape the gear. With red snapper there is the potential for preferential selection of the older fish as some fishermen have indicated that bigger red snapper tend to be more aggressive when biting a hook. The term “hook happy” has been used to describe red snapper, owing to their overall aggressive nature when biting a hook, potentially outcompeting other reef fish species”.

This entire section is full of errors and un-scientific in almost every aspect. “The gear is often rigged” is a very broad statement. What gear? Who's gear? Where and what depth? This has no scientific basis what so ever and should be removed completely. In fact since the early 1990's most recreational fishermen began using much lighter tackle because it increases the number of bites by 8-10 times more than heavier tackle. Some have gone to leader as light as 40 pound test in some cases. Commercial fishermen began using the lighter leaders even before this. In the last five years the change has been to tackle in the 25-30 pound class because the bite frequency is higher by a factor of 25 or more (4-10 pound fish) compared to standard 100 pound test leader. Even with 100

pound test leader red snapper over 20 pounds will still break the line after darting under the ledge with their extreme power.

The quote, “Preferential selection of older fish as some fishermen have indicated that bigger red snapper tend to be more aggressive when biting a hook” is another unscientific claim with zero data to back it up. In fact it is completely the opposite of the truth. Red snapper under 8 pounds are much more aggressive feeders over larger fish by a factor of ten or more. Who are “Some fishermen”? “Some fishermen” by the thousands showed up at dozens of meetings to tell the scientists that the red snapper were rebuilding in a healthy manner, but no one used that information in a scientific paper. It seems like the scientists that are working on this only want to use the testimony of fishermen when it covers their mistakes. It is true that small snapper under ten pounds, will outcompete other fish on the reef including other larger red snapper due to their need to feed and being quicker than the larger slower fish.

Selectivity can be affected by many factors and according to Andrew Cooper in the booklet, “A Guide to Fisheries Stock Assessments” selectivity patterns are defined on page 25:

“Flat-topped” partial-recruitment patterns occur when the older classes have the highest instantaneous fishing mortality rates”

“Dome-shaped” partial recruitment patterns occur when the intermediate age classes have the highest instantaneous fishing mortality rates”

According to this definition the dome-shaped selectivity should be applied to the Atlantic red snapper. The age data alone shows this without any further investigation. The Gulf of Mexico and South Atlantic handline age data is almost identical. Red snapper ages 3-8 are seen most frequently and older fish are caught less frequently.

Beyond the age data there are a number of other factors that support dome-shaped selectivity; Feeding habits and growth of older fish, habitat requirements and movement of larger fish, and strength of larger fish. None of these factors were addressed properly in the AW-05 paper.

Feedings Habits and Growth (SEDAR 15 SAR 1 SECTION III page 17)

In the AW-05 paper it uses the term “Hook happy” referring to larger red snapper when they feed. This is not completely true and normally applies to young red snapper. Older red snapper are not nearly as aggressive feeders and some of this has to do with growth. In the first three years of a red snapper’s life it grows approximately 21.4 inches (or more) or over seven inches per year. In the next 17 years it grows nearly 14 inches or 0.82 inches per year (SEDAR 15). By weight the early numbers are even more astounding. From age one to age five a red snappers’ weight increases an average of 180% per year, and from age six to age twenty it only increases an average of 10-20% annually. This early growth in of itself is one of the major reasons that so many young fish (3-5 years old) are aged and so few older fish are aged. This large amount of growth

in the early years is one of the reasons for the higher numbers of younger fish being caught. They must feed far more often than older fish. This fact is not even mentioned in the AW-05 paper about selectivity.

Habitat Requirements and Movement

In the most recent science on red snapper movements, using acoustic tracking, small red snapper were found near large structures during the day and left them at night to forage for food. There was also a lack of larger older fish around these structures. According to Patterson on page 226,

“The lack of older red snapper at both platforms and artificial reef sites may indicate thigmotaxis or the threat of predation subsides with age and size; thus, larger, older fish display lower site fidelity and greater movement (Patterson et al. 2001; Patterson and Cowan 2003; Stelcheck et al. 2007, this volume)”.

According to this best available science on red snapper movement, larger fish are less likely to live near larger reefs or structure as smaller fish. The vast majority of bottom fishing in the SA is spent over large ledges and reefs. For at least 80% of recreational fishermen, large structures and ledges are where they fish. For commercial fishermen, at least 60% of their fishing time is spent on larger ledges or structure.

The reason most fishermen prefer these fishing spots is that they are easier to find and anchor on. They also may hold other species besides red snapper that can be targeted also. Most large structure or ledges are found on local fishing charts and therefore are fished much more often by the general public. According to the best available science above larger red snapper have low site fidelity where most fishermen actually fish. This causes them to be selected less often by all sectors. There are still large red snapper on these spots but they appear less often. This best available science was not even mentioned in the AW-05 paper.

In regards to movement, Patterson’s paper in 2007 on the movement of red snapper, on page 225 it claims,

“Mitchell et al. (2004) reported larger (median TL ranged from 545 to 815 mm among surveys), older red snapper were captured at higher rates in outer shelf habitats during experimental longline surveys in the eastern (off Alabama-Mississippi) and western (off Texas) GOM. Fishery-dependent data confirm that larger, older fish are captured much more frequently in commercial fishery sectors operating farther from shore (Allman and Fitzhugh 2007, this volume)”.

This fact above is supported by a long line survey. In the past thirty years there has been almost no fishery independent data collected for SA red snapper such as long line surveys. As of this writing the bid process is under way to collect data from deep water using industry experts. Also, the state of Florida has also taken the initiative to start a tagging program using industry experts.

Fish Size and Strength

For all fishermen the size and strength of a red snapper may be the number one factor that prevents it from being captured. For the average recreational fisherman the differences of catching a five pound red snapper and a 25 pound red snapper are substantial. It is not a matter of the pound test of the line but many other factors such as angler skill level and the amount of rocks and hard bottom near the fish. When all snapper are hooked they head for the nearest ledge so that they can swim under for protection. For a five pound red snapper this is rarely accomplished for lack of strength. However, for a 20-25 pound red snapper this is accomplished more than 75% of the time with all other factors being equal, even with 100 pound test leader. .

For commercial fishermen the idea is to catch as many fish in the shortest amount of time and return to port with the least amount of expenses. A small ledge or live bottom may not hold the amount of fish that a commercial red snapper fisherman would even bother to target. To be the most productive this means 5-10 pound fish in large schools on good size ledges. Obviously if a fisherman finds a school of larger older fish he will target them as well this just does not happen as often and causes the landings data to be skewed to younger fish.

Conclusion

Overall the AW-05 paper includes a number of inaccurate assumptions. This can happen when assessment scientists try to define something as important as selectivity without consulting with the fishermen first. Selectivity in a hook and line fishery is much different than a net fishery. According to Cooper, "To be "fully selected" implies that 100% of the fish that encounter a given gear are caught by that gear". There is never 100% percent fishing mortality when you are hook and line fishing. This is impossible because there are so many factors involved that fishermen have no control over when it comes to a fish biting the hook.

The conclusion I draw is that AW-05 has failed to address these cases when availability, selectivity and catchability have all changed over time. My paper does not pretend to offer quantitative solutions to address the selectivity issue, but I believe it does indicate strongly that a flat topped selectivity curve for Atlantic red snapper hook and line fisheries is not scientifically supported.

References

SEDAR 24 AW-05

SEDAR 24-RD08 - Moe

A Guide to Fisheries Stock Assessments, by Andrew Cooper- Sea Grant

A Review of Movement in Gulf of Mexico Red Snapper: Implications for Population Structure William F. Patterson, III *Department of Biology-University of West Florida*
11000 University Parkway, Pensacola, Florida 32514 USA

Link:

<http://uwf.edu/wpatterson/Patterson.%202007.%20Review%20of%20red%20snapper%20movement.pdf>