WRITTEN TESTIMONY
OF
CAPTAIN DAVID NELSON
CHARTER/COMMERCIAL FISHING CAPTAIN PONCE INLET, FLORIDA

FOR A HEARING ON NOAA'S FISHERY SCIENCE:
IS THE LACK OF BASIC SCIENCE COSTING JOBS?
BEFORE THE
UNITED STATES HOUSE OF REPRESENTATIVES
COMMITTEE ON NATURAL RESOURCES
SUBCOMMITTEE ON INSULAR AFFAIRS, OCEANS AND WILDLIFE
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Chairman Fleming and members of the subcommittee: Thank you for the opportunity to testify before you today concerning NOAA's fishery science. I am Captain David Nelson and I have been fishing the region under the jurisdiction of the South Atlantic Council my entire life. This area of water is from North Carolina to Florida from 3 miles out to 200 miles and is referred to as the South Atlantic region for management purposes. I represent all American fishermen, recreational and commercial, as well as the American seafood consumers.

For fisheries managers to follow the law under the Magnuson-Stevens Act the science that is being used must be accurate. When it comes to fisheries science, nothing is more important than the data. Unfortunately, the data that is being used to mange nearly all of our fisheries in the South Atlantic are not adequate. Unfortunately, many people involved in fisheries science continuously hide behind the "Best science available" clause in Magnuson and this has led to many flawed assessments being produced by SEDAR in the South Atlantic region. SEDAR is a process of creating assessments that stands for Southeast Data Assessment and Review. Most of the problems in the assessment results are the result of not having data, misuse of unreliable data, and huge assumptions about many stocks.

The recent stock assessment work has been conducted through the National Marine Fisheries Service (NMFS) SouthEast Data, Assessment and Review (SEDAR) process. SEDAR science is under the leadership of the NMFS Southeast Fisheries Science Center (SEFSC) located in Miami, Florida effecting fishing from North Carolina to Texas and the Caribbean Sea. The SEDAR process has a history of failed stock assessment products resulting in thousands of lost fishing jobs during recent years. Meanwhile the NMFS leadership does nothing to mitigate the damages to the fishing communities.

A major problem in the southeast region is some of the best available fishery data on species like Atlantic red snapper has been no data at all. Some SEFSC scientists create assumptions amounting to a best guess about historical participation before recorded catches and landings were slowly mandated by the NMFS leadership. This misrepresentation of the past fishing efforts being utilized as the *"best scientific information available"* should be considered a violation of the National Standard 2 intentions for the basic fishery sciences provided in the 2006 Magnuson-Stevens Fishery Conservation and Management Reauthorization Act (MSA).

Counting how many fish are in the ocean is a daunting task with the best data. Regional science centers, such as New England, have decades of fisheries data from multiple sources. Even with this excellent data, the stock assessments in the New England region are still full of uncertainty. We are finding out now, that many fisheries are much healthier than their assessment results had claimed. In these cases under fishing is occurring on many stocks. The regions, where under fishing is occurring, costs the nation jobs and violates the Magnuson Stevens Act where maximum sustainable yield for the benefit of the nation is required.

In the South Atlantic region, the problems with the science are multiplied because the data sources are extremely limited and the data that is available is often applied wrong due to lack of important data, science, and knowledge about the fish that is being assessed. Another problem in the South Atlantic is that the best available science and data on species like red snapper has not been used, which is also a violation of MSA. All of these problems with the science have led to job losses, businesses failing, and loss of important tax revenue.

To accurately assess the status of a stock of fish, scientists need high quality data from a variety of sources, including fishery dependent and fishery independent data. Fishery dependent data comes from landings of fish by fishermen, and these are tied to many factors outside of actual abundance, such as effort and weather. This data can be collected by portside samplers or from fish markets reporting landings. Fishery dependent data really only shows the health of the fisheries landings and not the health of the stock itself. According to, Dr. Demaster of the NMFS, in his recent testimony before the Senate he claims, “Basing stock assessments just on fishery dependent data is very risky”(Senate Testimony 56:45).

Fishery independent data is collected by scientists and are not dependent on fishing, such as underwater video and diver observations. These data are usually collected by research vessels in a very controlled scientific manner. This type of data is extremely important in determining the health of a given stock of fish. In fact, without fishery independent data it is hard to know the true health of any stock of fish.

In the South Atlantic region, all stock assessments with a few exceptions, are based solely on fishery dependent data. For example, fishery independent data on red snapper does not exist in the South Atlantic region. Red snapper is arguably the most important bottom species for all sectors in the entire region, and in over 30 years, the National Marine Fisheries Service has collected zero fishery independent data on them. This important species was assessed using only hook and line landings data which can be effected by many factors such as; regulations, effort, weather, current, cold water, economics, fish prices, alternative target species, angler experience, fish biology, feeding habits, available food, and many others. This limited data creates a lot of uncertainty.

To add to this uncertainty the fishery dependent data that has been collected on red snapper is very limited and in many cases was not adjusted properly. For example, headboat data must be adjusted because they only fish a limited area and do not catch older red snapper. This data must be adjusted so that the computer model knows that the data is biased.

The landings records and port sampling of catches come from four states; NC, SC, GA, and FL. The area of highest abundance for red snapper is North Florida and Georgia, from Cape Canaveral, FL to Savannah, Georgia. This sampling can also be broken down into sectors; commercial, recreational for-hire, and recreational private. The for-hire sector includes head boats and charter boats. In this region, the largest group or sector is the private recreational fishery or private boat owners.

This being the case then sampling should be focused in Georgia and North Florida and on the private recreational sector. In fact the opposite is true. In the South Atlantic region from 1977 to 2008 a total of 13 fishing trips were sampled in the entire state of Georgia in the recreational sector and all of these were head boat samples. In that same time period there were a total of five private recreational boats sampled in all four states combined, the largest sector of the red snapper fishery (Sedar 24 Table 2.6.2). From 1990 to 2001 headboat sampling was also extremely limited with less than 1% of trips sampled for the decade. (Table 2.6.2)

It can easily be seen that the landings in the South Atlantic have not been properly sampled, especially in the private recreational sector. Since 1977 the most frequently sampled sector is the head boat sector. The sampling of this sector dropped off tremendously from 1990 to 2008 and then increased somewhat in 2009. However, there is a heavy reliance on the headboat data in all assessments in the South Atlantic even though there are huge problems with this data.

For data to be usable it should cover the entire range of the species that is being assessed. For example, red snapper live from near shore out to 100 miles from shore in many parts of the South Atlantic in water up to 350 feet deep. In comparison ninety percent of all headboats fish an extremely limited area inside of thirty miles and in water less than 120 feet deep. To reach 120 feet of water out of Jacksonville, Florida it is over 35 miles, too far for headboats and most recreational anglers. Headboat landings data covers less than 1/3 of the red snapper habitat and does not cover the area of highest abundance from 120 to 160 feet of water. Another problem with the headboat data is that headboats are not able to target all age groups of red snapper. This causes more bias in the data. The headboat index for all species is overused and should not be relied upon to show the health of fish that live beyond the areas that headboats fish.

In the case of red snapper this lack of quality data caused scientists to create catches of fish out of thin air using 40 year old data, so that the computer model would fit the data. In other words, fish were deliberately killed off in the computer, that were not really caught by fishermen.

In Sedar 15 the reliance on the poor data from headboats leads to the following discussion by the assessment panel about getting the data to fit or fixing the problem, but never questioning the data itself:

Sedar 15 Assessment Workshop Pages 8-10:

Catch-at-age model

The catch-at-age model gave a poor fit to the 1978 – 1983 headboat length composition data. The problem has to do with large number of year classes that have similar size range –confidence limits bound mean of ~700mm. The model forces many of older fish into that length range. The removal of those predicted lengths during 1978-1983 requires either truncated age classes from poor recruitment or removing those larger fish using high fishing mortality prior to the 1978-1983 period.

The first attempt to fix this problem examined changes to selectivity patterns on larger fish early in the time series and then allowing selectivity parameter to change annually. This did not 8 Assessment Workshop Report South Atlantic Red Snapper SEDAR15 SAR1 SECTION III provide a better fit to headboat length composition and was not retained in subsequent model runs.

It was determined that the large number of recruits that were artificially put into system with stock recruitment function during 50s and 60s was carrying through into predicted length composition during 1978-1983. To reduce this problem, recruitment deviations were begun at earlier year (1971) in model. Although this solution fixed the problem it may be doing so at expense of missing a much higher F in the early years of modeling period. Discussion also focused on fact that the observed recruitment pattern may not be defensible. Next attempt at fitting headboat length compostion data focused on getting rid of larger fish using increased selectivities in period 1. Assume in period 1 all selectivities are same across fisheries and allow selectivities to change linearly (a50) each year shifting towards left and getting steaper. This effectively kills off the larger fish earlier. Also fix slope of parameter in period 2. See Fishery selectivity section for discussion of this approach. These changes in the fishery selectivity functions did not improve fits to the headboat length composition. The modifications of period 1 selectivities was dropped.
The following model runs went back to modifications of stock recruitment function to reduce recruitment of fish during early period. The initial period of poor stock recruitment fits were argued to be a “burn in” period and there was discussion that this might be defensible given that it includes 1950s and 1960s. If the “burn in” period was dropped from S/R curve it looks good and would be defensible. Is this satisfactory? It was decided that this approach was not satisfactory because of possibly missing high fishing mortality during early period that was documented in literature.
The landings data from period 1 were re-visited. A new approach of estimating MRFSS landings from 1946 to 1980 was attempted using ratio of commercial to recreational from later periods and applying that during period 1. These new MRFSS estimates did not fix

> the headboat length composition fits; the increased recreational landings in period 1 was not enough to remove large fish predictions in the 1978-1983 headboat fishery. Another approach allowed bias estimation of those earlier landings which did fix headboat length fits.

In the following paragraph the assessment group talks about using US Fish and Wildlife surveys that are 30 to 40 years old even though they were deemed unreliable by the US Fish and Wildlife Service.

> Data from these reports were not included in data workshop because MRFSS? USFW? deemed these data untrustworthy. However, the assessment group felt that creel surveys from the 1960s and 1970s could be considered trustworthy. Recreational landings from these reports were much higher (order of magnitude) than linear interpolation approach (from 1946 to 1980), ratio, and bias estimation? approach. The next step was to linear interpolate between red snapper landings data from USFW reports; observed data for 1955, 1960, and 1965 was interpolated through from 1945 to 1980. Results were similar and a bias parameter on those new landings data. The base run used these linear interpolations on the 1945 to 1980 for recreational landings (headboat and private); this allowed improvement of fits to headboat length compositions. Anchor point years for linear interpolation of recreational landings are 1946, 1960, 1965, 1970, and 1981. There are no head boat landings before 1972 in base run. The biomass of the stock is below 5% of virgin biomass at terminal year in base run but also when setting recruitment at low levels in period 1. The assessment group felt that high fishing mortality based on survey from sportfishing report was more realistic and defensible than low recruitment during period 1 and poor fit of S/R relationship.

At no time in the above discussion does anyone in the group question the data. The reason that the above discussion took place is that the computer was forced to match the data from the headboats even though the data was not a true picture of the red snapper in the SA. To help the computer results match the data 30 million pounds of red snapper were removed from the stock that were not actually caught by fishermen. This was done by using data that was deemed untrustworthy by the very group that had created them, the US Fish and Wildlife service. This was an assessment that was going to force a 40,000 square mile closure to all bottom fishing in the South Atlantic but was found to be fatally flawed and a new assessment was completed. Once these landings were corrected in the next assessment called Sedar 24, it was found that a bottom closure was not necessary and the region was saved from economic devastation that a bottom closure would have brought.

Landings Corrected

2008 Sedar 15 Inflated Landings	2010 Sedar 24 Actual Landings
1955-1975 - 80 million pounds	1955-1975 – 50 million pounds

Difference – 30 million pounds of landings created from thin air due to lack of data.

In response to the many problems found in Sedar 15 the NMFS did another benchmark assessment on red snapper in the South Atlantic with fishermen involved and the new assessment was much closer to reality in every area except for red snapper productivity. Sedar 24 still resulted in closing the red snapper fishery because of one glaring issue, how many juvenile red snapper were produced annually from 1955 to 1975 before there was any data. Without any data the computer model is supposed to follow the spawner-recruit curve, which means that on average a stock must produce enough offspring or recruits, to cover natural mortality. Following the spawner/recruit curve without any data was the best science available. However, without any data on recruitment in Sedar 24, the computer was allowed to destroy the stock from 1955 to 1975 with no data or scientific basis. This is the explanation in Sedar 24 about the reliability of these recruitment numbers:

> Sedar 24 Assessment Workshop page 18
> http://www.sefsc.noaa.gov/sedar/
>
> The initial recruitment in 1955 was assumed to be the expected value from the spawner-recruit curve. For the remainder of the initialization period (1955–1975), recruitment was permitted to deviate from the spawnerrecruit curve. However, without CPUE or age/length composition data prior to 1976, there is little information to estimate those historic recruitment deviations with accuracy. Thus, the estimates of historic recruitment should not be considered reliable

The last line above is very troubling when thousands of jobs and hundreds of businesses depend on these estimates being reliable. This deviation from the spawner/recruit curve, was not the best science available and allowed the computer to remove over 5,000,000 red snapper from the stock by not allowing the stock to reproduce at a normal biological level. All of the best scientific information available on red snapper has shown that red snapper are the most productive bottom species in the entire South Atlantic without exception. In fact according to Brown-Peterson-, "A single nine pound female can produce 60 million eggs in one year" (152) Red snapper fall under the category of fish known as "Periodic strategists" (Rose, Cowan, Winemiller, Hilborn, Page 299).

> "The longevity and high fecundity (egg production) of periodic strategists should more than offset their low early survivorship, resulting in periodic strategists having the highest compensatory reserve" (Rose, Cowan, Winemiller, Hilborn, -Page 300)"

Compensatory reserve is the ability to offset high mortality either natural or fishing. This means that of all of the bottom fish in the South Atlantic, red snapper should be the healthiest in spite of fishing. However, the computer model base run that was chosen shows red snapper did not even produce enough offspring to make up for natural mortality. This also violates the laws of nature according to the following, "Population stability, which can include bounded fluctuations, implies that, averaged over a long enough time period, reproduction is balanced by mortality" (Rose, Cowan, Winemiller, Hilborn- page 295)

The red snapper fishery in the SA is a hook and line fishery for all sectors. According to all scientific information available this is one of the most environmentally friendly and sustainable types of fishing. In fact, line caught fish are recommended by most environmental groups as good choices for the environment. The facts are that you have an extremely productive species of fish that has been harvested since the early 1900's by a very sustainable and environmentally friendly method, hook and line. This is a fish that has a broad range of habitat and before it was closed in 2009 was rebuilding in a healthy manner.

According to Sedar 15 the stock collapsed in 37 years under fishing pressure. When the fishing pressure was corrected in Sedar 24 the stock collapsed because it did not produce enough offspring to even exist and was on its way to extinction without fishing. An important question that needs to be answered is how did red snapper in the SA, one of the most highly productive species in the region being caught using a sustainable method such as hook and line, completely collapse in 37 years under limited fishing pressure? Did the stock of fish really collapse or is the science wrong? It should be obvious that the science is wrong and the fishery should be opened immediately by emergency rule to help save businesses barely hanging on by a thread.

According to the last assessment Sedar 24, there are only 511,000 red snapper left from North Carolina to Florida out to 100 miles from shore. This would make it nearly impossible for anyone regardless of experience to go out and catch just one red snapper. Over the past three years an overwhelming number of people in the region have given public testimony that the red snapper population in the region is healthier than it has been in decades. In the recent tagging trips conducted by the state of Florida every trip has been a huge success with numbers near 70 to 100 red snapper tagged in a single day. In the recent NMFS long line survey conducted for one year in 2010-2011 the most prevalent reef species caught besides black sea bass was red snapper. In fact, the ratio of red snapper to red grouper caught on the NMFS long line trips was 100 to 1 and these fish share the same habitat. According to NMFS red grouper outnumber red snapper 3 to 1 in the computer models, however even their long line survey showed that this is not true. In the last 3-5 years red snapper landings have outnumbered red grouper more than 100 to 1 in the region between North Florida and South Carolina, yet, we can still fish for and catch red grouper but not red snapper. Red snapper outnumber mangrove snapper in the offshore waters from North Florida to South Carolina and we can keep mangrove snapper but not red snapper. It just does not make sense.

On a personal note my summer charter income is down 90% since the red snapper closure. My winter commercial income is down 70% since the closure. Headboat and charter boat revenues are all down in the region, since the closure. Fish market revenue is down since the closure. If this closure was actually necessary then all of these businesses would be supportive and I would too. However, this crisis has been created by lack of data and not lack of fish and the current plan is to keep red snapper closed until 2014. This is completely unacceptable and there needs to be an investigation into this matter. There needs to be an emergency opening of red snapper so that the people who are left standing can still make something with what is left of the summer season. Open it for three years back to old regulations that were working and during that three years make a concerted effort to collect data. Then in three years, complete a benchmark assessment with the best available data that is adjusted properly and everyone in the region will accept the results gladly.

The problems with the science in the South Atlantic region are too numerous to count; from lack of data and knowledge about species to limited sampling and zero fishery independent data. These assessments can cause huge economic hardships such as lost jobs and bankrupt businesses. These assessments can destroy people's lives with their results and no one is held accountable because it was the best science available. If there is not sufficient data as is the case with red snapper, there should be no changes to regulations until data is collected that can accurately determine the status of this fishery. Science should not be able to destroy people's lives unless that science at least resembles reality. The science on red snapper is not even on the same planet as reality. We need someone in Congress to step up and help us to get this fishery open and put people back to work. Two other committees that we hope to get involved in this are 'Science and Technology" which investigates science that is produced by government agencies and the Oversight and Investigations committee that oversees the Commerce department under which NOAA and its' science would be included.

Businesses are being destroyed and jobs are being lost because of a crisis created in a computer. The red snapper population in the South Atlantic region has been rebuilding in a healthy manner since 1992 and thousands have testified to that fact. For the science to claim that there are only 511,000 red snapper left from North Carolina to Florida is an insult to the hard working Americans who have been denied access to this healthy natural resource. Please help us get this extremely healthy fishery opened.

Chairman Fleming and other members of the subcommittee, thank you for allowing me to testify on this important matter. I will answer any questions that you might have.