

Economic Impact of Red Snapper Seasons in Alabama

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CONTINUING EDUCATION & COMMUNITY ENGAGEMENT



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Red Snapper Team Members

ALABAMA DEPARTMENT OF CORRECTIONS

Jessica Simmons

ALABAMA DEPARTMENT OF LABOR

Donal Cieutat

ALABAMA DEPARTMENT OF REVENUE

Scott Donaldson

Keisha Ellis

ALABAMA SUPERCOMPUTER AUTHORITY

Tracie Klepac

RETIREMENT SYSTEMS OF ALABAMA

Jeremy Darabaris

Raven Smith



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CHRIS BLANKENSHIP

Commissioner Alabama Department of Conservation and Natural Resources

CRYSTAL HIGHTOWER

Senior Research Laboratory Manager, Fisheries Ecology Lab University of South Alabama, Dauphin Island Sea Lab

JIM ZEIGLER

State Auditor



Introduction

Alabama's recreational red snapper fishing season is a critical part of Alabama's recreation and tourism industry, with significant economic impact on Gulf Coast communities. Decades of overfishing led to a dwindling stock and the need for protection of the valuable fishery. The federal government closely regulates red snapper fishing in both the Gulf of Mexico and the Atlantic Ocean. These regulatory efforts created a quota system that splits the catch limits of red snapper between commercial and recreational fishing. In the last 10 years, while scientists and fishing enthusiasts alike observed increases in the population, the National Oceanic and Atmospheric Administration (NOAA) continued to decrease the days that private recreational anglers could fish for red snapper in efforts to further recover the fishery. The 2007 fishing season was 194 days, while the 2016 season was a mere eleven days. In 2017, NOAA set the shortest federal recreational snapper season ever – just three days in June. These short seasons have led to fierce debate over the management of the fishery with respect to abundance estimates, quota allocation, and season length.

The CPM Solutions Red Snapper Team was tasked with researching the economic impact of a federally regulated, limited red snapper season in Alabama and the ramifications of future extended seasons for recreational anglers. Additionally, the team was asked to propose strategies and recommendations for state management of red snapper fishing that ensure long term protection of the fishery and a positive economic impact on Alabama's Gulf Coast.



Red Snapper General Information

The red snapper derives its name from its characteristic red color and its noticeable canine teeth. The U.S. Food and Drug Administration (FDA) recognizes only the *Lutjanus campechanus* species as the red snapper, although unscrupulous vendors fraudulently sell many other species as red snapper (U.S. Food and Drug Administration, 1980). The *Lutjanus campechanus* is commonly referred to as the red snapper, northern red snapper, gulf red snapper, and American red snapper, among other appellations. The beautiful pinkish red color is darkest along the top of the fish down

its spine and fades to a paler underbelly. Fish caught in deeper waters tend to be redder than those caught in the shallower water. The eyes are also a dark red. An ecologically important top predator, the red snapper range from the Atlantic coast of the U.S. as far north as Massachusetts to as far south as Brazil and include the entire Gulf of Mexico and Caribbean Sea (Bester, 2017).

The red snapper is prized as both a game fish and a seafood dish. Anglers enjoy the thrill of catching this aggressive fish. Chefs and home cooks alike value the

Red Snapper...

May reach 40 inches and 50 pounds Have been reported as old as 57 years Spawn from May to October Are both predators and prey Are found at depths of 30 to 620 feet

mild tasting delicate meat as a healthy and delicious source of protein. Gulf Coast communities have been catching and cooking these highly esteemed fish for generations – indeed the red snapper is enshrined in the cultural fishing identity and culinary history of the South.



Historical Background of the Fishery

Overfishing and Declining Population

Red snapper fishing in the Gulf of Mexico began at least as far back as the 1840s with the earliest known fishery off the coast of Pensacola, Florida. Technological improvements in storage abilities, rail transportation, and boat manufacturing over the next hundred years allowed more fish to be harvested while increased leisure time and tourism (particularly after World War II) generated more interest in recreational fishing. Furthermore, the years following World War II saw a rapid expansion of shrimping in the Gulf. Young red snapper were caught accidentally in the shrimp trawls, causing significant reductions in the fish population. From the 1950s through the 1980s, both commercial and recreational fishing of red snapper boomed along with the increasing shrimping activity. A 2007 study revealed that 90% of the red snapper deaths due to fishing occurred in shrimp trawls (Brandt & Jackson, 2013). As a result, by 1990, the red snapper fishery had declined to well below sustainable population levels (NOAA Fisheries, 2019).

Management of the Fishery

The Magnuson-Stevens Fishery Conservation and Management Act (MSA) was passed by Congress in 1976 establishing law for managing the fisheries of the nation's federal waters, which it defined as 200 nautical miles from shore. The act empowered the Department of Commerce to manage the fisheries and also create eight regional fishery management councils including the Gulf of Mexico Fishery Management Council (Gulf Council). The National Oceanic and Atmospheric Administration (NOAA) is the arm of the Department of Commerce that manages all U.S. fisheries. The Fishery Management Plan for Reef Fish Resources in the Gulf of Mexico was implemented in 1984. The various policies of the late 1980s aimed to rebuild the red snapper population by reducing the annual fish harvest, restricting licenses, imposing per-trip bag limits, restricting sizes of fish that could be kept, establishing fishing seasons, and limiting types of fishing gear. Of particular importance, shrimp fisherman were required to utilize nets that would reduce the young red snapper that were caught. Figure 1.



Assessments of the red snapper population in the Gulf have been conducted since 1988 to determine the size and sustainability of the stock. The first assessment determined that red snapper was overfished and undergoing overfishing has been substantiated by subsequent assessments through the 2000s. Fishing and shrimping efforts were removing more fish than the stock could replenish. Spawning potential is a measure of the impact that fishing has on the ability of a fish stock to contribute to spawning or releasing eggs. NOAA Fisheries has determined the target spawning potential of red snapper to be 26%. The actual spawning potential calculated by the stock assessments reached a low point of 2% in 1990 (NOAA Fisheries, 2019).



Recreational Management Measures

Figure 1 - Recreational Management Methods; NOAA Fisheries

Despite the regulatory efforts to increase the red snapper populations, by 2005 the spawning potential was still below 5%. As a result, dramatic regulations were implemented: recreational and commercial quotas were reduced by 45%, bag limits were reduced from 5 fish to 2, an individual commercial quota system was introduced, and shrimp trawling between depths of 60-180 feet was slashed by 74%. While these regulations have changed some over the years since 2005, their effectiveness on rebuilding the red snapper fishery has remained high. The 2018 assessments indicated that the spawning potential has reached 20%; the red snapper is no longer overfished, no



longer undergoing overfishing, but more rebuilding is needed to reach the target spawning potential of 26% (NOAA Fisheries, 2019).

Importance of Continued Management

A healthy population of any species requires an optimized mix of inhabitants of different ages to ensure the species thrives. The current red snapper population in the Gulf contains too many younger fish relative to the number of older fish for the stock to thrive. Red snapper have a long life span and a slow maturation rate. Older females produce significantly more eggs than younger females do. NOAA Fisheries first implemented highly restrictive measures to improve the stock numbers in 2005 and 2007. The juvenile red snapper of 2005 will not reach their peak reproductive years until 2027 when they are twenty years old.

The 2018 assessments indicate that the red snapper stock should reach the target spawning potential of 26% by 2028, assuming continued good management practices (Southeast Data, Assessment, and Review, 2018).



Figure 2 - Red Snapper Productivity by Age; NOAA Fisheries



Assessment and the Great Red Snapper Count

While all stakeholders agree that the red snapper fishery is rebuilding itself, the estimates and the assessment methodology are a source of discontent. Criticisms of the official assessments comes from anglers and conservation officials alike. Anecdotal reports from Gulf Coast anglers claim an abundance of red snapper, asserting that the population is much greater than the Gulf Council's official assessment, the Southeast Data Assessment and Review (SEDAR), indicates. A frequent criticism and problem of perception of the NOAA stock assessments is that they only count fish living on natural reefs, when Alabama has a significant investment in artificial reef habitat.

Christopher Blankenship, Commissioner of the Alabama Department of Conservation and Natural Resources (ADCNR), describes the difference between the count methodology used by the State of Alabama and that used by NOAA in the SEDAR assessment. "The problem with the SEDAR estimates is both methodology and frequency," he states. "It also does not take into account geographical differences. It lumps all the Gulf together in one estimate." Alabama utilizes multiple techniques to analyze the red snapper population across different habitats. Mr. Blankenship adds, "Trawl data is used for part of the data but bottom longline data is key to getting the larger, more fecund (more eggs) fish. Previously, NOAA was excluding artificial reef areas because they did not want to snag the line. We have collected that data off Alabama and are providing that into the stock assessment now." Additionally, ADCNR uses count data that is significantly more current than the 4-5-year-old research used in the assessments by NOAA and the Gulf Council (Blankenship, 2019). ADCNR conducts its own population estimate annually in conjunction with Auburn University and the University of South Alabama, which it then provides to the SEDAR stock assessment. The annual data gives the ADCNR ample timely data on the fishery and fishing efforts in waters managed by the state.

"The problem with the SEDAR estimates is both methodology and frequency. It also does not take into account geographical differences. It lumps all the Gulf together in one estimate."

-- Commissioner Christopher Blankenship, ADCNR

In cooperation with ADCNR and university researchers, Dauphin Island Sea Lab performs Fishery Independent (FI) stock assessments. The SEDAR assessments are largely influenced by fish caught and landed by the



fisherman, therefore influenced by fishing location, species targeting activities, hook size and other factors that can skew the analysis of the population. The Sea Lab utilizes trawling, vertical and bottom long line, remote operated vehicle imaging, side scan sonar, and dock surveillance video in its arsenal. Its data minimizes the impact of hook size, in particular, to get a better idea of the age distribution of the red snapper (Hightower, 2019).

Because of the discontent and debate over red snapper abundance or overfishing status and growing frustration from Gulf coast constituents, Senator Richard Shelby (AL) convinced other lawmakers in Congress to fund an independent estimate of the red snapper population in the Gulf. The Mississippi-Alabama Sea Grant administers the \$10 million project that began in 2017 and will end in 2019. The official project name is 'Estimating the absolute abundance of red snapper in the U.S. Gulf of Mexico,' however even Sea Grant calls it 'The Great Red Snapper Count.' The project utilizes a multidisciplinary team and numerous methods to estimate the population. An important factor for Alabama, "the Great Snapper Count will most definitely take into account fish on artificial reefs," says Mr. Blankenship (Blankenship, 2019).

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Alabama Pilots Self-Management Program

Alabama's Artificial Reefs



One reason Alabama salt water fishermen are particularly engaged in red snapper fishing is due to the large population the Alabama waters can boast. Alabama has a narrow slice of the federal waters of the Gulf, about 3%, compared to its neighbor, Florida, with 46%. However, Alabama's private anglers land nearly as many red snapper as Florida's, more in some years. The reason anglers pull so many fish from Alabama waters is the heavy investment that the state has made in creating artificial reefs. Alabama maintains the largest artificial reef program in the U.S. with well over a thousand square miles of water designated as permit zones. In 2019, Alabama added seven new nearshore reef zones.

The Problem

While recreational fishermen, federal officials, and conservation proponents all agree that the red snapper fishery is rebuilding, the restrictions imposed by the Gulf Council's allocation of the catch limits resulted in frustratingly short seasons for private recreational fishing. *See Figure 1, page 7.* In particular, the 2016 and 2017 seasons inspired backlash as the recreational sector saw eleven and three days of red snapper fishing, respectively. Increasingly, angler frustration was fueled particularly on the Alabama coast by the feeling that the snapper were abundant. Fishermen describe the fish as "jumping in the boat". Expressing dismay and anger at the regulatory discards



they believed were unnecessary, anglers frequently cried out for more days in the season, higher bag limits, or both. Believing the artificial reefs in Alabama waters to host abundant red snapper, demands on the Alabama coast were particularly persuasive. Senator Shelby and Representative Byrne listened to their constituent voices and were instrumental in securing funding for the Great Red Snapper Count. Importantly, a key directive in the Great Red Snapper Count is capturing data on where the fish live. Representative Bradley Byrne was deeply critical of NOAA Fisheries ability to assess the stock in the Gulf in an article in which he states that "with less money [Alabama] is able to do a better job" (Byrne, 2015).

Additionally, NOAA fisheries responded to the criticisms that the states of the Gulf Coast had better data on the abundance of red snapper and therefore could manage the populations themselves by creating Exempted Fishing Permits (EFP). The EFPs allowed the Gulf Council states to manage the seasons in a pilot scenario provided they abide by the federally mandated catch limits and quotas, demonstrate they can keep track of those catch limits, and prevent going over their limits. The EFP covers the 2018 and 2019 red snapper fishing seasons. Alabama's proposal to manage the catch limit in its waters proved largely successful in 2018.

Snapper Check

Fishing effort and landings of red snapper were previously estimated by Dockside surveys, the Coastal Household Telephone Survey, the For-Hire Captains Survey, and on-site surveys. Alabama's proposal to the EFP was to use a new program called Snapper Check to monitor the fishing effort and landings of red snapper in addition to the Dockside Surveys conducted by the Marine Resources Division of ADCNR. Snapper Check reports are required for all red snapper landed in Alabama, regardless of where the fish were caught.

Amendment 50

In April of 2019, the Gulf Council approved the Reef Fish Amendment 50: State Management for Recreational Red Snapper. In this action, commonly referred to as Amendment 50, the Council chose to delegate management of the recreational private angling component of the fishery to each of the Gulf Council member states effective in the 2020 season. Additionally, the Council allocated



26.298% of the Gulf recreational private angling component, 1.12 million pounds of red snapper, to Alabama, an increase over previous years.

The Gulf Council will still set the allocations of the federal catch limits to each state and manage both the commercial component and the recreational for-hire charter boat component. The delegated authority includes:

- Setting seasons in state and federal waters
- Establishing or modifying bag limits
- Establishing or modifying minimum size limits, within 14-18 inches
- Establishing or modifying maximum size limits
- Monitoring harvest levels
- Closing the federal waters adjacent to the state's waters

The amendment now awaits approval by the Secretary of Commerce, which is expected.

Likely environmental impacts

In Alabama's request for delegation of the fishery management, the state writes that it anticipates no significant change in fishing effort as a result of the delegated management and therefore "the effects on the biological environment …would likely be minimal" (Gulf of Mexico Fishery Management Council, 2019).



Economic Impact

Assessing the economic impact of the red snapper fishery on Alabama is multilayered and complex. Salt water recreational fishing, which includes red snapper fishing, impacts the economy by generating sales and jobs when anglers buy equipment like bait and tackle; rent or buy boats; book charter fishing trips; eat in local restaurants; buy gas for cars and boats; pay dock fees; buy fishing licenses; and book hotels. Because fishing trips target and result in the harvesting of multiple species of fish, not just red snapper, any estimation model has its limits. Other key species sought after in the Gulf include kingfish, red drum, seatrout, flounder, grouper, and mackerel. Although red snapper are a common catch and extremely popular with anglers, researchers cannot easily assign a value to a fish or the act of fishing.

Different researchers define economic impact and economic value using different measures. The U.S. Department of Commerce and NOAA Fisheries report economic impact of recreational salt water fishing by measures of employment, sales, and personal income generated by expenditures on fishing trips and fishing-related durable goods (i.e. equipment used for recreational fishing) (National Marine Fisheries Service, 2018). Below are the estimated economic impacts of recreational anglers in the Gulf of Mexico by state (ibid.).

	Trips	Jobs	Sales	Income
Alabama	2,567,000	16,114	\$1.4 B	\$616 M
West Florida	13,219,000	60,179	\$6.8 B	\$2.6 B
Louisiana	2,242,000	14,142	\$1.6 B	\$608 M
Mississippi	1,512,000	5,351	\$637 M	\$211 M
Texas	1,187,000	16,030	\$2.0 B	\$746 M

 Table 1 - Gulf of Mexico Economic Impacts of Recreational Fishing Expenditures, U.S. Dept. of Commerce

ADCNR Commissioner Chris Blankenship states that a larger red snapper season could mean the addition of millions of dollars in revenue for Alabama, though concedes that he is unaware of a specific study that has a dollar amount (Blankenship, 2019).



Recommendations

Alabama can do much to increase the economic impact of the recreational private angler component of the red snapper fishery without jeopardizing its long-term health. The CPM Solutions Red Snapper Team identified three main areas of recommendations: management of the fishery, marketing, and economic data collection.

Management of the Private Angler Fishery

With the Gulf Council's approval of State Management for Recreational Red Snapper fishing early this year, Alabama will be able to make changes in the management practices that caused animosity between regulators and private anglers in recent years. The primary recommendation is to increase the season length by adding spring dates and possibly fall dates. Increases in the allowable catch are anticipated and should support additional dates. By adding dates in the spring, particularly the last two weeks in April, Alabama can expand its red snapper season to dates that aren't as economically influenced by the peak tourist season. Local anglers will not compete with casual tourist fishing. Removing the influence of the typical tourist season may also help Alabama to better estimate the impacts of red snapper fishing on local economies. If the allowable catch is not exceeded in the spring and summer season, extending the season with dates in the fall would also provide fishing dates outside of the peak tourist season. Expansion of the season could bring millions of dollars to Alabama and support coastal communities during times when tourism dollars ebb.

Increasing season length demands more frequent assessment of the red snapper population. The Team recommends that Alabama petition NOAA and the Gulf Council to conduct stock assessments at least every two years. Additionally, the petition should also request an increase in the Alabama percentage of the catch limit based on the biennial assessments.

Additionally, the long-term growth of the fishery is dependent on increasing spawning by the fish that can produce the most eggs – the older, larger fish. To this end, the Team recommends establishing a maximum size limit that would exclude most fish older than ten years. A maximum size limit about 30 inches should protect mature fish while minimally affecting anglers.



Marketing

Researching red snapper fishing in Alabama illuminated one very important fact. Alabama's state and federal waters are host to an amazing amount of red snapper. While Alabama has a small section of shoreline compared to Florida, Louisiana, and Texas, our red snapper fishery is quite productive. In some years, landings of red snapper in Alabama have exceeded those of Florida. Yet, everyone thinks of Florida communities like Destin when they think of salt water fishing. The CPM Solutions Red Snapper Team recommends that Alabama launch an ad campaign to increase awareness of the Alabama's red snapper fishing, especially on our prolific artificial reefs. A partnership between the Alabama Tourism Department (Tourism) and the ADCNR should develop and promote our fishing opportunities through online and traditional media and tourism welcome centers. Additionally, the state or local communities on Alabama's coast should consider creating a red snapper festival in the expanded spring season in April.



Figure 3 - Photograph by Glen Casey © 2018, Orange Beach, Alabama

Furthermore, ADCNR should conduct a constituent outreach and education program to ensure the private anglers and coastal communities are well informed of red snapper population assessments and management methods of the fishery. An informative outreach program would go a long way to reduce the frustration and debate around the management of the red snapper fishery.



Economic Data Collection

The U.S. Commerce Department reports on the economic impact of salt water recreational fishing by region and state each year. This data aggregates the impact of all recreationally fished species as most fishing trips target and land multiple species of fish. Quantifying the impact of any one species is quite challenging. The CPM Solutions Red Snapper Team recommends cooperation between Tourism, ADCNR, the Department of Revenue (ADOR), and the Department of Economic and Community Affairs (ADECA) to devise innovative ways to capture the economic impact of this important natural resource to our state. Minimally, surveying tourists on welcome centers kiosks or website visitors could capture purpose of travel, if the visitor is planning a fishing trip, and which species they might target. The Snapper Check app could ask if any members of the fishing party are from out of state. Salt water fishing license applications could be used to provide data on target species, out of state anglers, purpose of travel, and length of stay. This data could provide state officials with valuable insight into the economic impact of red snapper to our state.



Conclusions

The inspiration for this research project was the near-boiling point of frustration expressed by recreational anglers and Gulf Coast communities over the unreasonably short red snapper seasons of 2016 and 2017. In researching the issue, our Red Snapper Team learned that Alabama is in a very good place regarding the red snapper fishery, especially the recreational sector. First, while we learned how the fishery was almost destroyed in the latter half of the twentieth century, we also discovered that good management practices have been put in place. The fishery is rebuilding quickly. Coastal communities, private anglers, and commercial fishermen have not only heeded but embraced the plans by conservation officials to improve the red snapper stock. As a result, the livelihoods and lifestyles of those community stakeholders have been enriched by what is clearly now an abundance of a culturally significant natural resource – the red snapper.

Secondly, the Red Snapper Team discovered that the hot-button issue of draconian federal regulations is not as much of a problem after all. In 2018, the federal government gave Alabama conservation officials the authority to manage the season for recreational anglers for both 2018 and 2019 to pilot and demonstrate their effectiveness. This year, NOAA is poised to transfer management of the private recreational sector to state control permanently. The "interference" of federal regulators has abated. Private recreational anglers can look forward to longer seasons in the coming years as the red snapper populations continue to increase. Alabama Department of Conservation and Natural Resources Commissioner Chris Blankenship has proven his department is not merely capable; it is heroically invested in the sustainability of the red snapper fishery. Our state is in good hands.

Finally, the team was inspired by learning what a rich history our state has with this fish. Alabamians have been creating artificial reefs since the 1950s to cultivate a red snapper fishery that should be the envy of the nation. With a mere fifty-three miles of shoreline, the stubborn ingenuity of our coastal communities found a way to make a little go a long way as Southerners always do. Our universities have collaborated with each other and partnered with government officials to ensure that the Dauphin Island Sea Lab is renowned for its excellence in marine science education, research, coastal zone management policy and public engagement. Alabamians have been cooking up this beautiful fish for over 200 years. Asking an Orange Beach local how to cook



red snapper would bring to mind Forrest Gump listening to Bubba talk for days about shrimp. Make no bones about it, the red snapper fish has left an indelible impression on the collective consciousness of our state.



References

- Alexander, K. (2018, June). The Temptation of Red Snapper. *Water Log: A Legal Reporter of the Mississippi-Alabama Sea Grant Consortium*, pp. 6-10.
- Bannon, S. (2017, January 9). Application for an Exempted Fishing Permit (EFP). Dauphin Island, AL: Alabama Department of Conservation and Natural Resources Marine Resources Division.
- Bester, C. (2017, May 10). *Northern Red Snapper*. Retrieved from Florida Museum of Natural History: https://www.floridamuseum.ufl.edu/discover-fish/species-profiles/lutjanus-campechanus/
- Blankenship, C. M. (2019). Commissioner, Alabama Department of Conservation and Natural Resources. (D. Cieutat, Interviewer)
- Brandt, J. R., & Jackson, D. C. (2013). Influences of Artificial Reefs on Juvenile Red Snapper along the Mississippi Gulf Coast. *Marine and Coastal Fisheries: Dynamics, Management, and Ecosystem Science*, 1-10. doi:DOI: 10.1080/19425120.2012.736445
- Byrne, B. (2015). *Byrne: Red snapper debate a microcosm of government incompetence*. Retrieved from yellowhammernews.com: https://yellowhammernews.com/byrne-red-snapper-debate-microcosm-government-incompetence/
- Department of Conservation and Natural Resources. (2018, September 1). *Saltwater Recreational Licenses*. Retrieved from Outdoor Alabama: https://www.outdooralabama.com/licenses/saltwater-recreational-licenses
- Gulf of Mexico Fishery Management Council. (2018). *Modification of Gulf of Mexico Red Snapper and West Florida Hogfish Annual Catch Limits*. Gulf of Mexico Fishery Management Council.
- Gulf of Mexico Fishery Management Council. (2019). *Alabama Mangement for Recreational Red Snapper*. Gulf of Mexico Fishery Management Council.

Hightower, C. (2019, June 26). (D. Cieutat, & J. Simmons, Interviewers)



- Jefferson, A. E., & Drymon, J. M. (June, 2018). The Great Snapper Count. *Water Log: A Legal Reporter of the Mississippi-Alabama Sea Grant Consortium*, pp. 11-12.
- National Marine Fisheries Service. (2018). *Fisheries Economics of the United States*, 2016. U.S. Department of Commerce, NOAA Tech. Memo. NMFS-F/SPO-187.
- NOAA Fisheries. (2019, March 5). *History of Management of Gulf of Mexico Red Snapper*. Retrieved from NOAA Fisheries: https://www.fisheries.noaa.gov/history-management-gulf-mexico-red-snapper
- NOAA Fisheries. (n.d.). *Species Directory Red Snapper*. Retrieved from NOAA Fisheries: https://www.fisheries.noaa.gov/species/red-snapper
- Southeast Data, Assessment, and Review. (2018). SEDAR 52 Stock Assessment Report Gulf of Mexico Red Snapper. North Charleston, SC: SEDAR.
- State Seasons Gives Anglers Access to Abundant Red Snapper. (2018, June). *Great Days Outdoors*.
- U.S. Food and Drug Administration. (1980, October). CPG Sec. 540.475 Snapper Labeling. Retrieved from U.S. Food and Drug Administration Web site: https://www.fda.gov/regulatory-information/search-fda-guidance-documents/cpg-sec-540475-snapper-labeling