

**Scoping Document for Amendment 39
to the Fishery Management Plan
for the Reef Fish Resources
of the Gulf of Mexico**

Regional Management for Recreational Red Snapper

December 2012



Gulf of Mexico Fishery Management
Council
2203 North Lois Avenue, Suite 1100
Tampa, Florida 33607
813-348-1630
813-348-1711 (fax)
888-833-1844 Toll Free
gulfcouncil@gulfcouncil.org
<http://www.gulfcouncil.org>



National Oceanic & Atmospheric
Administration
National Marine Fisheries Service
Southeast Regional Office
263 13th Avenue South
St. Petersburg, Florida 33701
727-824-5305
727-824-5308 (fax)
<http://sero.nmfs.noaa.gov>

This page intentionally left blank.

TABLE OF CONTENTS

Introduction.....	2
History of Council Discussions on Regional Management	4
Purpose and Need	6
Scope of Actions	7
I. Defining regions	7
II. Allocating quota among regions	10
III. Administration of regional management program.....	11
• Regional management guidelines.....	12
• Review of regional management proposals.....	13
• Permits and licenses.....	13
• For-hire vessels.....	14
• Monitoring, reporting, and enforcement.....	14
• Accountability Measures (AMs)	15
IV. Further actions	15
Pros and Cons	16
References.....	17
Appendix A. Recreational red snapper landings.....	18
Appendix B. Analysis on cost of improving harvest information	23
Appendix C. Previous discussion papers and reports	28
October 2008: Ad Hoc Recreational Red Snapper Advisory Panel Meeting report.....	28
January 2009: Discussion paper, management of recreational for-hire red snapper fishery	33
August 2010: Discussion paper on potential regional management of red snapper	35
October 2010: Discussion paper on potential regional management of red snapper.....	38

Introduction

Currently, recreational fishing of red snapper is managed for the entire U.S. Gulf of Mexico (Gulf) as a single stock. A stock can be defined as a managed unit of fish with a genetic relationship, similar movement patterns, and geographic distributions (Wootton 1998). The Gulf red snapper management unit extends from the Texas/Mexico border in the west to the eastern Gulf waters of Florida, south down to the Florida Keys and out through the Dry Tortugas (regional boundary with the South Atlantic Fishery Management Council). Since 1996, the recreational fishing season for red snapper has become progressively shorter (Table 1). Shorter seasons have continued despite an annual increase in the quota since 2010, as the quota continues to be caught in a shorter amount of time.

Table 1. Recreational red snapper seasons, quotas, and landings.

Year	Season dates	Number of Days	Recreational Quota	Recreational Landings
1996	January 1 – December 31	365	4.47 mp	4.346 mp
1997	January 1 – November 27	330	4.47 mp	6.008 mp
1998	January 1 – September 30	272	4.47 mp	4.258 mp
1999	January 1 – August 29	240	4.47 mp	3.999 mp
2000	April 21 – October 31	194	4.47 mp	3.932 mp
2001	April 21 – October 31	194	4.47 mp	4.468 mp
2002	April 21 – October 31	194	4.47 mp	5.383 mp
2003	April 21 – October 31	194	4.47 mp	4.847 mp
2004	April 21 – October 31	194	4.47 mp	4.996 mp
2005	April 21 – October 31	194	4.47 mp	4.084 mp
2006	April 21 – October 31	194	4.47 mp	4.021 mp
2007	April 21 – October 31	194	3.185 mp	4.440 mp
2008	June 1 – August 4	65	2.45 mp	3.712 mp
2009	June 1 – August 14	75	2.45 mp	4.625 mp
2010	June 1 – July 23; Oct 1 – Nov. 21 (Fri, Sat., & Sun.)	77	3.403 mp	2.239 mp
2011	June 1 – July 18	48	3.866 mp	4.603 mp
2012	June 1 – July 15	45	3.959 mp	5.796 mp (estimated)
2013			4.146 mp	

Quotas and landings are in whole weight. Source: Linton 2012.

The Gulf of Mexico Fishery Management Council (Council) is considering regional management as a way to provide greater flexibility in how the recreational quota is managed. Regional management is a tool that moves away from a one-size-fits-all regulatory approach and towards enabling areas of the Gulf to propose management measures most suitable to their region. Regional level regulations could be tailored to varied local conditions or situations. For example, tourist seasons vary around the Gulf such that one region may benefit more from a

winter season while a summer season would be preferable in another region. Regions could be identified based on ecological, biological, or geo-political boundaries.

Red snapper would remain a federally managed species. The Council and the National Marine Fisheries Service (NMFS) would continue to oversee management of the stock. This includes continuing to comply with the mandate to ensure the red snapper annual quota is not exceeded and that conservation objectives are achieved. States or regions that participate in the program could design management options to better fit their needs. However, the proposed options must achieve the same conservation goals as the federal management measures in existence at any given time (i.e., constrain the catches of participating fishermen to the region's allocation of the total quota).

This plan amendment would establish the framework and administrative process for regional management. The general concept is that each year, in coordination with the quota setting process, regional authorities would submit management plan proposals which would be reviewed by the Council and NMFS to ensure compliance with federal mandates and that they conform to the goals of the red snapper rebuilding plan. Proposals would include a description of regional regulations, including procedures for monitoring and reporting landings. Regional accountability measures would also have to be defined. Those regions where a regional management plan is not submitted in a given year would fish within the total quota and current regulations.

The Scientific and Statistical Committee (SSC) would determine the allowable biological catch (ABC), while the Council and NMFS would determine the total recreational red snapper quota which would be allocated among the regions. Although regional authorities would be enabled to enact their own regulations for their regional quota, a total quota would remain for the entire Gulf. When a regional quota is projected to be reached, red snapper fishing would be closed according to the guiding accountability measures. The total recreational quota would also need to be monitored, and when projected to be reached, red snapper fishing would be closed for the entire Gulf even if a region has remaining quota. Furthermore, it would be at the discretion of the Council and NMFS to require particular management restrictions that may be based on biological factors, such as a minimum size limit threshold.

The delegation of management to regions would require the Council to allocate the recreational red snapper quota among the regions. If the Council proceeds with an amendment to address overages, including overage adjustments, procedures to address regional overages would be needed. Furthermore, it is not a foregone conclusion that states would continue to enact fishing regulations consistent with the federal regulations.

The red snapper stock assessment currently assesses the red snapper stock as eastern and western sub-units based on a division at the Mississippi River. During the Red Snapper Update Assessment (SEDAR 7 Update 2009) it was estimated that the eastern and western sub-units of the red snapper stock were projected to rebuild at different rates and to different spawning potential ratio (SPR) levels. The overall rebuilding target for red snapper is a spawning stock biomass (SSB) level reached when fishing at a fishing mortality rate (F) of $F_{SPR 26\%}$, or $SSB_{SPR 26\%}$. However, the western sub-unit is projected to rebuild to approximately $SSB_{SPR 27\%}$, while the eastern sub-unit is projected to rebuild to approximately $SSB_{SPR 18\%}$ (SEDAR 7 Update

2009). The ultimate result of fishing the eastern sub-unit harder than the western sub-unit is that the eastern fishery is projected to continue to be prosecuted on mostly small, young fish resulting in a population age distribution that is projected to continue to be severely truncated. In the western sub-unit more fish are projected to recruit to older, more highly fecund age classes over time. Therefore, the western Gulf would potentially carry a disproportionate burden of stock recovery because it is estimated to have higher stock biomass and the average fishing mortality rate is estimated to be lower. Dividing the Gulf into additional regions with varying management measures may exacerbate these issues. Therefore, the Southeast Fisheries Science Center (SEFSC) in coordination with the Council and NMFS may need to establish some management measures such as minimum size limits, season length, and bag limits that better assure the red snapper rebuilding schedule will remain on track in all regions.

There are benefits and challenges to adopting regional management. The benefits include providing regional level flexibility in the design of management measures. The consideration of regional differences in regulations may optimize socio-economic benefits. For example, the distance from shore anglers must travel to fish and the optimal times of year to fish based on weather conditions or tourist seasons may vary, favoring different fishing seasons around the Gulf. The challenges of a regional management approach include a significantly more complex regulatory framework, as a single quota would be divided and managed separately. Effort shifting between regions may reduce the effectiveness of regionalized management. Also, the geographic distribution of the stock may change as the stock rebuilds, resulting in a pattern of landings that may not reflect the original allocation that is distributed. Monitoring catches on a regional level may be less precise than on a Gulf-wide level and require increased sample sizes for data collection. Regional management would require cooperation among states joined into a single region and require formation of an administrative panel or committee to represent the states within that region.

History of Council Discussions on Regional Management

The issue of regional management for recreational red snapper fishing has been addressed or reviewed in the following documents and meetings.

Reef Fish 27/Shrimp 14 Amendment (GMFMC 2007), implemented in 2008, addressed differences in shrimp and red snapper fishing effort between the western and eastern Gulf, and the impacts of fishing on the red snapper rebuilding plan. The Council considered options for modifying recreational red snapper fishing effort including different season opening dates and weekend only or consecutive seasons, for the following regions: Texas and the rest of the Gulf; two regions, east and west of the Mississippi River; and maintaining consistent Gulf-wide regulations. The Council ultimately opted to maintain consistent Gulf-wide regulations, with a recreational season from June 1 through September 15.

Early versions of the amendment proposed establishing regulations for commercial red snapper fishing for the eastern and western Gulf. The action was considered but rejected because

establishing different regulations would compromise the objectives of the individual fishing quota (IFQ) program and reduce the flexibility and efficiency of IFQ program participants.

The Ad Hoc Recreational Red Snapper Advisory Panel (Panel) discussed regional management at their October 2008 meeting, using a briefing report as a guideline. Their discussion included options for how regions would be defined (number and boundaries), how the quota could be allocated among regions, issues for regional accountability measures, enforceability of states or regions with varying seasons and regulations, the regulatory bodies needed to administer separate region's management, and the issues with current data collection systems and repercussions thereof for moving forward with regional management. Appendix C includes the relevant portions of the Panel meeting's report including motions passed and the briefing report.

The SEDAR 7 red snapper assessment provided an option to set two regional TACs with the Mississippi River as the dividing line (SEDAR 7 2005; SEDAR 7 Update 2009). These assessments assume there are two sub-units of the red snapper stock within this region, separated commercially by the Mississippi River (shrimp statistical grids 12 and 13) and recreationally at the Mississippi/Louisiana state line. The most information has been collected and developed thus far based on the assessment process following this particular split for regional management.

A paper presented to the Council at their January 2009 meeting included discussion focused on red snapper regional management for the for-hire fleet (as opposed to the entire recreational sector, as considered by the remaining papers). The paper compared three plans or sets of recommendations presented to the Council. The Council requested pros and cons of recreational red snapper management to include regional management as one component, the Save Our Selves (SOS) plan, and the Panel recommendations. The paper included options for regions based on state boundaries and allocation options based on three time series, where each would result in a different allocation split for each region. Appendix C includes the relevant portions of the paper including the estimates of allocations based on the proposed regions and time series.

At the Red Snapper Advisory Panel meeting in December 2009, the challenges of red snapper regional management for both the commercial and recreational sectors were discussed, including the existing IFQ program for the commercial sector, and concerns that should part of the Gulf be closed when another was open to red snapper fishing, fishers would travel to the open region to fish, potentially increasing fishing pressure. The panel passed a motion that the Council not consider regional red snapper management at this time.

The discussion paper reviewed at the August 2010 meeting included biological information from the joint Reef Fish 27/Shrimp 14 amendment and presented some pros and cons to regional management (Appendix C.) The paper explored regional management for both the commercial and recreational sectors and considered two potential regions: two regions breaking at the Mississippi River, and three regions along state boundaries where Louisiana, Mississippi, and Alabama are aggregated as a central subzone.

A red snapper regional management discussion paper presented to the Council at their October 2010 meeting included an additional regional option requested by the Council: two regions with

a boundary at the Florida/Alabama state line, which lies near a faunal break at Mobile Bay. This document retained consideration of regional management for the commercial sector.

The Louisiana Department of Wildlife and Fisheries (LDWF) presented a proposal to the Council for a recreational red snapper regional management pilot program. The LDWF proposes a Louisiana recreational red snapper season from the Saturday preceding Palm Sunday each year through September 30 of the same year, with a bag limit of 3 fish per day and a 16-inch minimum size limit. A weekend is defined as Friday, Saturday, and Sunday, with the exception of Memorial Day and Labor Day, when Monday would be classified as a weekend as well. The proposal was presented by LDWF and discussed at the Council's June and August 2012 meetings.

At its June 2012 meeting, the Council passed a motion requesting that Louisiana provide the Council with the details of their proposed regional management plan for red snapper. They also passed a motion to develop a plan amendment with alternatives for regional management of recreational harvest of red snapper, and designated that the priority for this amendment be "C."

At its August 2012 meeting, the Council passed a motion instructing staff to develop a plan amendment scoping document for a regional management system in the Gulf of Mexico for recreational red snapper to be discussed at the October 2012 meeting. The document at hand was developed in response to the motion.

In December 2012, the directors of each Gulf state's department of natural resources met in New Orleans to discuss the concept and issues of regional management. The directors were in agreement as to their interest in learning more and pursuing regional management.

Purpose and Need

The purpose of this proposed action is to provide flexibility and choice in the recreational harvest of red snapper. Regional management would enable regions and their associated communities to specify the optimal management parameters that best meet the needs of their local constituents thereby addressing regional socio-economic concerns. The need is to adhere to the National Standards of the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act), particularly National Standard 6, which states that conservation and management measures shall take into account and allow for variations among, and contingencies in, fisheries, fishery resources, and catches.

The Magnuson-Stevens Act requires the NMFS and the regional fishery management councils to prevent overfishing, to achieve, on a continuing basis, the optimum yield from federally managed fish stocks, and to rebuild stocks that have been determined to be overfished.

Scope of Actions

This amendment would establish the framework and administrative process for regional management of recreational red snapper, requiring several actions. Each of these actions entails challenges and issues. For the purposes of scoping, the challenges and issues are discussed broadly, framing decisions yet to be made by the Council in developing the program.

I. Defining regions

The regions for managing recreational red snapper could be based on geo-political or bio-ecological criteria. The Council has previously reviewed the following options. Challenges as to the feasibility of each include the data available to support the subsequent decision on allocation (most difficult if individual states are selected), or the administrative requirements for a multi-state region (formation of a regional authority).

The Council could define the regions through selection of a preferred alternative. Alternately, the Council could establish the program framework and allow states to submit proposals signaling their participation. If more than one state chooses to join together into a single region, they would submit a joint proposal. States that elect not to participate would be managed by the currently established Gulf-wide regulations.

- **Two regions separated by Mississippi River:** east (FL, AL, MS) and west (LA, TX). Stock assessments are currently based on these two subpopulations which consider stock biomass, fishing mortality, shrimp effort and bycatch, as well as larval transport studies. Although the stock assessments place the split at the Mississippi River, for management purposes it may be more practical to split the regions at the Louisiana-Mississippi state boundary to avoid dividing Louisiana into two regions.

- **Two regions separated at the faunal break:** east (FL) and west (AL, MS, LA, TX). Literature suggests a faunal break between Mobile Bay and the Florida Panhandle (Bortone 1977; Bortone et al. 1979; Gilmore 2001; Shipp 1992; Swift et al. 1986). Although the faunal break occurs at Mobile Bay, within the state boundary of Alabama, for management purposes it may be more practical to split the regions at the Alabama-Florida state boundary to avoid dividing Alabama into two regions.

- **Three regions:** east (FL), central (AL, MS, and LA), and west (TX). Grouping central states partially mitigates issues of sampling under the five regions option.

- **Five regions:** each state as a separate region. Preferred option of the Ad Hoc Recreational Red Snapper Advisory Panel (2008). The LDWF has submitted a proposal to the Council for a pilot program to allow Louisiana to manage red snapper as a separate region.

Challenges and Issues

How many regions?

Generally, more regions will mean a more subdivided quota, which will entail more complicated management. There are also issues with using the Marine Recreational Information (MRIP) catch estimates for states where landings are low, especially Mississippi. This is problematic because if catches are low, there will be greater variability in the landings estimates. In addition, Texas Parks and Wildlife Department (TPWD) uses its own survey for estimating catches, using a different methodology than MRIP. If regional management is at the state level, this could create a question of whether the catch estimates for Texas are comparable to those of the other states.

Fewer regions would require greater cooperation among states within the same region, requiring agreement on the region's regulations. Except for adopting separate regional management for each of the five states, the remaining options would require two or more states to cooperate and agree to a common regional management plan. For such regions, the states would have to establish a regional authority, such as a committee or panel, that oversees development of the proposal and be the designated contact for monitoring landings, reporting catches to NMFS, and implementing closures when the quota is reached. For example, a committee could be formed from the respective participating states' departments of wildlife and fisheries.

How much would it cost to improve the harvest information?

Regional management may increase the need for more accurate recreational red snapper landings information at the regional/state level. An analysis of the estimated costs of increased sampling to reduce the error rates associated with the landings estimates is provided in Appendix B. The estimated costs for various reduction targets are also provided.

Should regional boundaries be established into the EEZ?

Under current management, state and federal waters Gulf wide are open during the red snapper season. By allowing regions to set their own fishing seasons, some areas of the Gulf could be open while others are closed. The Council could choose to extend boundary lines of state waters into the EEZ, to correspond with the states or regions.

If boundaries are established, it would be up to the Council to define the regulatory function of the boundaries. The boundaries could be used to restrict red snapper landings in that portion of the EEZ to the corresponding state or region's anglers. Alternately, they could be used to enable NMFS to close federal waters off of a state when that state determines its regional allocation has been reached. Or, they could be used to close a portion of the EEZ off a state that does not adopt compatible regulations. Regardless of their purpose, the establishment of state or regional boundaries and corresponding regulations would have to account for enforcement concerns.

Would all states be required to participate? What would be the implications should a state decline to participate?

Should any of the states not wish to participate in regional management, additional issues would arise. First, allocation decisions would still need to be made which would indirectly affect the allocation of any non-participating state. Additional actions may be required entailing permitting and eligibility of participants, to ensure that all anglers have fair access to red snapper fishing.

Would the selected regions pose issues for the stock assessment?

As discussed in the introduction, the Red Snapper Update Assessment (SEDAR 7 Update 2009) estimated that the western Gulf sub-unit would carry a disproportionate burden of stock recovery because it is currently estimated to have higher stock biomass and the average fishing mortality rate at age that is estimated to be lower in the west than in the east. Therefore, the eastern and western sub-units of the red snapper stock were projected to rebuild at different rates and to different spawning potential ratio levels. However, the ultimate result of fishing the eastern sub-unit harder than the western sub-unit is that the eastern fishery is projected to continue to be prosecuted on mostly small, young fish resulting in a population age distribution projected to continue to be truncated.

A recent red snapper larval transport study in the northern Gulf examined the potential for repopulating the eastern Gulf stock through larval transport from the more populous western stock (Johnson et al. 2009). Red snapper larval abundance was determined to be twice as great over the Louisiana-Texas shelf as over the Mississippi-Alabama shelf and four times as great over the Mississippi-Alabama shelf as over the west Florida shelf (Hanisko et al. 2007). Hanisko et al. (2007) compared the larval abundance from fall plankton studies in the eastern Gulf and determined the area off Mississippi/Alabama was disproportionately smaller than off west Florida, but accounted for half the abundance of red snapper larvae in the eastern Gulf.

A regional management plan would need to take these biological differences into account. For example, if a smaller minimum size limit was selected it is possible that the red snapper rebuilding plan would be prolonged because a greater number of small red snapper are likely to be landed, further truncating the age classes in the eastern Gulf. Differences in gear type selectivities, fishing seasons, and minimum size limits for regions would need to be considered during the stock assessment process. It would be ideal to complete fishery-independent surveys with the same effort throughout the Gulf. One issue that was pointed out during the 2009 update assessment concerned the low frequency of collection and use of fishery-independent data for red snapper in the eastern sub-unit. The Assessment Panel for SEDAR 7 Update (2009) agreed that fishery-independent bottom longline samples were too few and red snapper encounters were too rare to make these data useful for the eastern region. If regional authorities were developed future fishery-independent surveys would need to focus on sampling proportionally across the Gulf providing comparable sample sizes among the regions.

II. Allocating quota among regions

The recreational red snapper quota would need to be allocated among the regions. Allocation is an inherently controversial issue. The apportionment of red snapper resources would need to follow the Principles and Guidelines for Allocation adopted by the Council. Potential ways to determine the allocation among regions could include:

- Landings (see Tables A-1 through A-4)
 - Which time series would be used?
 - Would states receive credit for landings recorded outside of the federal fishing season? For example, Texas records landings year-round; Florida extended its season in 2008.
 - Using past landings to determine allocation may not be representative of red snapper regional abundance once the stock is rebuilt.
 - Should landings be based on numbers or pounds of fish landed in each region? There are regional differences in the average weight of red snapper.
- Biological or abundance-based (this is changing over time under the rebuilding plan)
 - How could this be determined? There is very limited fishery-independent data available to make this determination.
- Relative proportion of anglers among the states (varies year-to-year)
 - Use number of angler trips by state? (see Table A-5)
 - Use number of fishing licenses? Should headboat and charterboat licenses be given greater weight than private licenses since those vessels carry more anglers? How would offshore anglers who fish for red snapper be differentiated from inshore anglers?

Challenges and Issues

Some issues arise with using landings to determine regional allocations. First, allocations would vary depending on the time series selected. A paper discussed at the January 2009 Council meeting (Appendix C) compared the potential allocations from using three year ranges: 1981-2006, 1986-2006, and 2000-2006. The analysis considered three regional options: two regions, divided at the Mississippi River; three regions, where a central region includes Louisiana, Mississippi, and Alabama; and five regions representing the five Gulf States. What is apparent from using the different time series is that more allocation would be assigned to the east (Florida), when a more recent time series is used. This reflects the change in abundance of red snapper since implementation of the rebuilding plan.

This relates to another issue with the use of landings to determine allocation. The proportion of red snapper landings around the Gulf has changed and is changing over time. Red snapper was determined to be overfished and undergoing overfishing in 1988. In 2009, it was determined that overfishing had ended, although the stock was still determined to be overfished. Thus, using landings from this time to determine allocations may not reflect the regional distribution of red snapper once the stock is rebuilt. Red snapper are more recently observed in greater abundance further to the east. Therefore, should these changing patterns of abundance and rebuilding of the stock be taken into consideration when determining allocation based on landings?

Recreational red snapper landings data are available from a variety of data sources, including the MRIP, the TPWD creel survey, and the Southeast Headboat Survey (HBS). The MRIP and TPWD landings estimates are generated through a combination of dockside intercepts and fishing effort surveys, whereas the HBS generates estimates through logbook reported landings and biological sampling of catches. Each survey generates landings by state and/or region, mode of fishing (charter, private, headboat), and area fished (exclusive economic zone (EEZ) vs. state waters) (Appendix A). The MRIP also provides estimates of the precision of landings estimates, which vary from state to state based on the number of samples collected and the variability in responses received. The precision of HBS and TPWD landings is not estimated. Variability in landings estimates is higher for individual states than Gulf-wide landings estimates. As a result, state landings estimates are less precise and more variable, which makes monitoring of regional allocations more complex. An analysis of the estimated costs of increased sampling required to reduce the error rates associated with the landings estimates is provided in Appendix B.

Another approach to allocating red snapper quota to selected regions could be based on regional abundance. This would require fishery-independent data to determine regional abundance; these data are very limited. Finally, another approach could be based on the relative population of anglers around the Gulf. Under this approach, areas where there is greater effort, such as a greater number of trips taken, could be granted a proportionally larger part of the quota. Any of these approaches may be controversial, and each approach would likely be favored by a state that receives a greater proportion of the quota, and resisted by a state that would receive a smaller proportion of the quota. Furthermore, the availability of data to support each allocation option must be considered.

At the December 10, 2012 meeting of the five Gulf States regional directors, the attendees unanimously agreed to make a recommendation to the Council that 2006 landings be removed from any series of average landings chosen to determine allocations, due to the impacts from hurricanes at that time.

III. Administration of regional management program

This amendment would include several actions that lay out the process under which the regional authorities would submit a management proposal each year. The proposal would detail how the region would manage its allocation. This regional management proposal would include:

- Description of proposed regulations.
- If more than one state exists within a region, description of the committee that will oversee management (required during first year's application, only).
- Analysis of how expected landings would remain within the region's allocation under the proposed regional regulations.
- Description of how the state or region would monitor landings in-season, including a plan for notifying NMFS when the region approaches its allocation.
- Analysis of how the proposed regulations comply with the Magnuson-Stevens Act and other applicable law.
- Description of how regional regulations would be enforced.
- Other requirements determined by the Council.

Provided that proposed regulations do not violate the regional management guidelines detailed below, regional management regulations could include any of the following:

- season opening and closure dates
- weekend only or weekday only seasonal components
- no-take zones
- modifications to the bag limit
- allowing or disallowing captain and crew to maintain a bag limit

It is not likely that minimum size limit changes would be included under regional management because of the concerns, discussed earlier, that the size limit changes could have on the rebuilding plan. This would not preclude the Council from adjusting size limits at the Gulf-wide level.

Challenges and Issues

If an option for two or three regions is selected, the states aggregated into a single region would need to cooperate and agree on the regulations for their shared region. Currently, the Council has received a proposal from Louisiana detailing the structure of their preferred regional management approach. If any option other than five individual regions was to be selected, Louisiana would need to negotiate its proposed regulations with another state in its region (Texas, under a two region approach, or Mississippi and Alabama under a three region approach).

For regions consisting of more than one state, a regional management authority would need to be formed to coordinate management for the region. This could lessen some of the benefits of a regional management approach by introducing an added layer to the administrative environment.

Although regions could propose the regulations best suited to their constituents, modifications to existing management parameters may result in the quota being landed in a shorter period of time. For example, the joint Reef Fish 27/Shrimp 14 amendment notes that decreasing the recreational minimum size limit reduces the number of red snapper discarded dead, but increases landings and catch rates. To compensate for increases in landings resulting from lower minimum size limits, more restrictive bag limits and closed seasons must be imposed to constrain landings within specified recreational quota levels. Alternately, an issue may arise when one region's season is closed when another region is open. Increased pressure (effort) may result in the open region as anglers travel there to fish. This form of effort shifting could result in shorter seasons than projected as the quota is caught faster.

The following are some additional actions that may be included in the program design.

- **Regional management guidelines**

The Council may choose to establish guidelines to serve as minimal management requirements for the regions. For example, the Council could establish thresholds which regional management proposals may not exceed. Such thresholds could be based on biological considerations, such as requiring a minimum size for red snapper. If adopted, regional plans would not be permitted to

allow landings of red snapper below the established minimum size. Regional management guidelines could also address socioeconomic considerations, such as prohibiting regional regulations from affecting private and for-hire vessels differently. For example, the Council could require an analysis on how proposed management measures would impact for-hire operations.

- **Review of regional management proposals**

A proposal review process would be set up to include the Council, SSC, NMFS, and SEFSC. The purpose of the review process is to ensure that the regional management proposal(s) are consistent with federal mandates and other applicable law, as well as to review for scientific accuracy. For example, National Standard 2 requires conservation and management measures be based on the best scientific information available (e.g., requires that the projected season, bag limit, etc., established under the regional management program is supported by the best available science regarding expected catch rates, fish weight, etc.). If deficiencies were identified during the review and approval process, then the proposal(s) would be returned to the respective state(s) or regional management authority along with the reasons for the rejection and alternative season, bag, and size limit options that could be selected in various combinations to achieve conservation equivalency. Although states may support this management approach, red snapper would still be managed under a Gulf-wide quota, and not just the regional bag limits and proposed seasons.

- **Permits and licenses**

National Standard 4 (NS4) requires that conservation and management measures not discriminate between residents of different states and that any needed allocations are fair and equitable to all fishermen; reasonably calculated to promote conservation; and do not result in any individual, corporation, or entity acquiring excessive shares (e.g., requires that NMFS ensures a region's management proposal is consistent with these criteria and that the regional management program, including eligibility requirements, does not differentiate among U.S. citizens, nationals, resident aliens, or corporations on the basis of their state of residence). Furthermore, Section 304(d) of the Magnuson-Stevens Act authorizes the NMFS to establish fees to administer a permit system and to enter into cooperative agreements with states to administer a permit system, but prohibits NMFS from setting fees at a level that exceeds the administrative costs incurred to issue the permits.

Currently in each of the Gulf States when fishing in its state waters, non-state residents are charged more for a fishing license than are state residents. Management measures for federal waters do not allow different fees based on residency, as this would violate NS4. If management of red snapper is delegated to a state that manages fishing in its state and federal waters, the prohibition on discriminating between residents of different states would prohibit states from charging residents and non-residents a different license fee. A potential solution to this issue would be the creation of a separate regional permit for the harvest of recreational red snapper.

- **For-hire vessels**

Currently federally-permitted reef fish for-hire vessels (charter and headboats) must abide by the more strict regulations when state and federal regulations are different. For example, if a state's waters are open for red snapper fishing and federal waters are closed, a federally-permitted for-hire vessel would not be able to harvest red snapper from state waters. This regulation could restrict for-hire vessels from fully benefiting from regional management. To address this issue the Council may need to consider modifying this regulation to allow for-hire vessels to abide by the regional regulations.

- **Monitoring, reporting, and enforcement**

Each regional management authority's proposal would need to specify, and provide supporting analysis, for the monitoring and reporting of landings, and enforcement. Enforcement could be most complicated near the boundaries between regions. Regions would need to specify whether regulations and enforcement should be based on location of catch or landings site.

All participating regional management authorities would need to report landings and discard information to NMFS regularly to ensure monitoring accuracy, and to notify NMFS when they are approaching their allocation. The NMFS and participating regional management authorities would implement concurrent closures in federal and state waters when each participating region reached its allocation. Federal closures would apply to federal waters adjacent to the state or region in which the allocation was reached.

Challenges and Issues

Having multiple regions with different regulations will increase the complexity of the regulatory framework, and thus the difficulty of enforcement. The more regions that are created, the more difficult enforcement will likely be.

For regions consisting of more than one state, a regional management authority for the region would need to be established, as described above. This could create an additional level of administrative effort, potentially slowing the process of data reporting.

Within each region, the number of MRIP surveys would be less than the Gulf as a whole. As a result, the precision of regional landings estimates would be less than the Gulf-wide estimates. Minimum standards would need to be established for the precision and timeliness of catch estimates. If necessary, the states or regional management authorities may need to develop supplemental sampling programs to bring the precision of the regional landings estimate to acceptable levels of precision.

- **Accountability Measures (AMs)**

Section 407(d) of the Magnuson-Stevens Act requires the NMFS to establish a separate quota for recreational fishing (including charter for-hire fishing) and to close the recreational sector when it reaches the quota. The NMFS has the authority to prohibit all further recreational fishing for the remainder of the year when the total recreational red snapper quota has been reached. This is mandated regardless of the contribution of regional management program participants not yet fulfilling their respective allocation of the quota. This requirement is intended to ensure the prevention of overfishing, consistent with National Standard 1. With separate recreational regions, it is possible that one region could be shut down due to having reached its quota while another region is allowed to continue fishing. This is provisional on the overall recreational quota not having been met. Once the total recreational quota is met, all recreational harvest of red snapper would be prohibited regardless of whether one or more regions have reached their respective allocations.

The use of accountability measures (AMs) is mandated by the Magnuson-Stevens Act to avoid overfishing. AMs consist of in-season and post-season corrective actions should catches exceed the quota. For example, the harvest of a given species may be closed at some point during the year when the annual catch limit is estimated to have been caught (in-season AM), or a subsequent season may be shortened following a season when the ACL was exceeded (post-season AM).

Currently, there is not an overage adjustment (post-season AM) for recreational red snapper. If an overage occurs, then the rebuilding schedule is reviewed with respect to the overage and the yield stream adjusted by the SSC. In 2010, there was an underage due to the Deepwater Horizon MC252 oil spill. The underage was evaluated and an adjustment was made, resulting in a fall recreational red snapper season.

Regional management would require the establishment of AMS to include the actions to be taken by individual regions when their quota is met or exceeded, as well as the actions to be taken for the entire Gulf when the total quota is met or exceeded. Because a region could be affected by the quota overage of another region, the Council may want to consider inter-regional AMs concerning overage adjustments. With a subdivided quota, it is also possible that a region's quota overage is greater than its allocation for the following year. Any overages would need to be taken into account when approving the regional proposals, including the length of the fishing season for the following year.

IV. Further actions

- Should there be a sunset provision on regional management (similar to a pilot program)?
- Should there be periodic adjustments to the initial allocation? Red snapper is under a rebuilding plan and has been overfished since 1990. As the stock rebuilds and abundance patterns change, should there be a timeline for re-examining the allocation decision between regions?

Pros and Cons

This section summarizes the challenges and issues raised under the potential actions above.

Pros:

- Regulations could increase flexibility and reflect local preferences for bag limits or seasons, thereby addressing socio-economic concerns.
- Currently, all proposed options for regions have boundaries following state lines, which are well-known and established.
- Regulations could be modified to account for regional differences in bycatch mortality.

Cons:

- Potential changes in fishing behavior and effort in reaction to regional management cannot be forecast.
- It is possible that red snapper landings of non-participating states with state waters extending nine miles out (Florida and Texas) could significantly increase following regional management.
- Effort shifting between regions may reduce the effectiveness of regional management by resulting in greater effort and thus shorter seasons.
- Law enforcement issues could be more difficult when each region is under different management criteria. States may have compliance issues with adjacent regions.
- It is possible that if one region exceeds its quota substantially, the quotas of other regions are impacted by shortened fishing seasons.
- Fishery-independent sampling methods would need to be conducted proportionally for each region.

Pro or Con?

- Would separate seasons for different regions alleviate or contribute to congestion or unsafe boating conditions?
- Landings and data collection would become the responsibility of the states.
- If more than one state exists in a single region, cooperation among states will be required.

References

- Bortone, S.A. 1977. Revision of the sea basses of the genus *Diplectrum* (Pisces: Serranidae). NOAA Technical Report NMFS Circular 404: 49 p.
- Bortone, S.A., R.L. Shipp, G.F. Mayer, and J.L. Oglesby. 1979. Taxometric analysis of a demersal fish fauna. *Ambio Special Report* 6: 83-85.
- Gilmore, R.G. Jr. 2001. The origin of Florida Fish and Fisheries. *Proceedings of the Gulf and Caribbean Fisheries Institute* 52:713-731.
- GMFMC. 2007. Final amendment 27 to the reef fish fishery management plan and amendment 14 to the shrimp fishery management plan including supplemental environmental impact statement, regulatory impact review, and regulatory flexibility act analysis. Gulf of Mexico Fishery Management Council. Tampa, Florida.
- Hanisko, David S., Joanne Lyczkowski-Shultz, and G.Walter Ingram. 2007. Indices of larval red snapper occurrence and abundance for use in stock assessment. *American Fisheries Society Symposium* 60:285-300.
- Johnson, D.R., H.M. Perry, J. Lyczkowski-Shultz, and D. Hanisko. 2009. Red snapper larval transport in the northern Gulf of Mexico. *Transactions of the American Fisheries Society* 138:458-470.
- Linton, B. 2012. Population projections for Gulf of Mexico red snapper with preliminary 2012 landings estimates. National Marine Fisheries Service, Southeast Fisheries Science Center, Miami, Florida. 24 p.
- SEDAR 7. 2005. Stock assessment report of SEDAR 7 Gulf of Mexico red snapper. Southeast Data, Assessment, and Review. North Charleston, South Carolina.
<http://www.sefsc.noaa.gov/sedar/>.
- SEDAR 7 Update. 2009. Update stock assessment report of SEDAR 7 Gulf of Mexico red snapper. Southeast Data, Assessment, and Review. North Charleston, South Carolina.
<http://www.sefsc.noaa.gov/sedar/>.
- Shipp, R.L. Biogeography of Alabama's marine fishes. 1992. *Catalog of Freshwater and Marine Fishes of Alabama*. Bulletin 14: 7-9.
- Swift, C.C., C. R. Gilbert, S.A. Bortone, G. H. Burgess, R.W. Yerger. 1986. Pages 213-265 *in* C.H Hocutt, and E.O. Wiley (editors). *Zoogeography of the freshwater fishes of the southeastern United States: Savannah River to Lake Pontchartrain*.
- Wootton, Robert J. 1998. *Ecology of Teleost Fishes*. Kluwer Academic Publishers, The Netherlands.

Appendix A. Recreational red snapper landings

This section includes recreational red snapper landings for the Gulf states, landings from the EEZ and state waters, and the proportion of total landings represented by each state. The proportional distribution of recreational red snapper landings among the states is provided in Table A-1. The proportion of landings from state and federal waters for each state is provided in Table A-2. As expected, in Louisiana, Alabama, and Mississippi, the Gulf States with state waters extending three miles into the Gulf, recreational red snapper landed in the EEZ represent the quasi-totality of their recreational red snapper landings. In contrast, recreational red snapper landings in state waters in Texas and Florida (west coast), where jurisdiction over state waters extends nine miles out, account for a larger proportion of the total landings. Landings in federal and state waters for each state are provided in Tables A-3 and A-4, respectively.

Table A-1. Percentage of Recreational Red Snapper Landings from state and federal waters – by State (1986 -2011).

Year	State				
	Alabama	Florida	Louisiana	Mississippi	Texas
1986	10.32	52.43	18.21	0.07	18.96
1987	17.77	43.45	11.03	2.73	25.03
1988	17.77	32.39	24.78	0.83	24.23
1989	15.69	16.21	20.66	10.52	36.91
1990	41.30	20.36	12.90	3.11	22.32
1991	28.21	15.08	31.58	5.98	19.16
1992	31.40	7.39	22.88	16.76	21.56
1993	28.45	17.65	21.86	9.51	22.53
1994	31.10	12.89	20.10	7.55	28.36
1995	32.12	9.86	25.80	1.97	30.24
1996	30.75	14.77	16.75	3.45	34.28
1997	37.92	16.15	15.59	8.27	22.07
1998	30.87	23.68	16.41	3.09	25.95
1999	42.05	25.65	14.06	3.54	14.71
2000	31.85	31.43	17.52	1.20	18.00
2001	42.78	35.62	6.26	3.92	11.41
2002	41.13	33.89	6.17	5.00	13.81
2003	40.20	33.16	7.89	5.01	13.74
2004	41.67	38.21	6.14	1.23	12.74
2005	33.99	39.71	11.97	0.08	14.26
2006	22.85	43.50	16.64	0.59	16.41
2007	24.35	50.92	13.68	0.52	10.52
2008	20.81	54.07	15.29	0.50	9.32
2009	31.87	36.38	15.71	1.75	14.28
2010	23.23	49.18	6.57	0.49	20.53
2011	50.13	32.52	6.21	.65	10.49

Source: SEFC ACL Dataset (Oct 2012). All values in percent, based on landings provided in Tables A-3 and A-4.

Table A-2. Recreational Red Snapper Landings in Federal (EEZ) and State Waters by State – (1986-2011).

Year	Alabama		Florida		Louisiana		Mississippi		Texas		Gulf	
	EEZ	State	EEZ	State	EEZ	State	EEZ	State	EEZ	State	EEZ	State
1986	98%	2%	53%	47%	93%	7%	100%	0%	91%	9%	72%	28%
1987	85%	15%	76%	24%	94%	6%	100%	0%	89%	11%	83%	17%
1988	91%	9%	85%	15%	100%	0%	72%	28%	87%	13%	90%	10%
1989	99%	1%	75%	25%	100%	0%	98%	2%	87%	13%	91%	9%
1990	86%	14%	31%	69%	90%	10%	97%	3%	85%	15%	75%	25%
1991	96%	4%	24%	76%	99%	1%	100%	0%	86%	14%	84%	16%
1992	95%	5%	70%	30%	80%	20%	93%	7%	86%	14%	88%	12%
1993	94%	6%	64%	36%	99%	1%	100%	0%	84%	16%	88%	12%
1994	95%	5%	74%	26%	90%	10%	93%	7%	86%	14%	89%	11%
1995	99%	1%	8%	92%	98%	2%	100%	0%	83%	17%	85%	15%
1996	99%	1%	56%	44%	99%	1%	99%	1%	88%	12%	89%	11%
1997	98%	2%	69%	31%	90%	10%	92%	8%	86%	14%	89%	11%
1998	94%	6%	73%	27%	81%	19%	96%	4%	87%	13%	85%	15%
1999	95%	5%	65%	35%	97%	3%	69%	31%	83%	17%	85%	15%
2000	98%	2%	64%	36%	90%	10%	40%	60%	85%	15%	83%	17%
2001	94%	6%	73%	27%	91%	9%	100%	0%	86%	14%	86%	14%
2002	99%	1%	77%	23%	100%	0%	97%	3%	85%	15%	89%	11%
2003	97%	3%	78%	22%	100%	0%	100%	0%	87%	13%	90%	10%
2004	92%	8%	65%	35%	100%	0%	100%	0%	89%	11%	82%	18%
2005	96%	4%	69%	31%	100%	0%	100%	0%	80%	20%	83%	17%
2006	97%	3%	74%	26%	89%	11%	72%	28%	82%	18%	83%	17%
2007	86%	14%	48%	52%	93%	7%	100%	0%	79%	21%	67%	33%
2008	89%	11%	52%	48%	96%	4%	90%	10%	40%	60%	65%	35%
2009	98%	2%	72%	28%	91%	9%	100%	0%	79%	21%	85%	15%
2010	93%	7%	45%	55%	100%	0%	100%	0%	73%	27%	66%	34%
2011	96%	4%	65%	35%	86%	14%	100%	0%	65%	35%	82%	18%

Source: SEFSC Recreational ACL Dataset (Oct 2012), Headboat Survey CRNF Files (1986-2011). Percent values are based on landings provided in Tables A-3 and A-4.

Table A-3. Annual Red Snapper Recreational Landings in *Federal Waters* by State (1986 – 2011).

Year	State									
	Alabama		Florida		Louisiana		Mississippi		Texas	
	Landings	%	Landings	%	Landings	%	Landings	%	Landings	%
1986	280,743	14.1	765,838	38.4	468,816	23.5	1,961	0.1	476,276	23.9
1987	275,185	18.2	596,725	39.4	187,985	12.4	49,494	3.3	403,479	26.7
1988	414,945	17.9	707,675	30.5	636,232	27.5	15,186	0.7	543,651	23.5
1989	414,580	17.2	321,794	13.4	548,777	22.8	273,415	11.4	848,741	35.3
1990	571,487	47.1	100,590	8.3	187,152	15.4	48,756	4.0	305,985	25.2
1991	641,334	32.2	83,821	4.2	737,422	37.0	140,946	7.1	389,207	19.5
1992	1,163,618	34.1	202,286	5.9	717,430	21.0	606,585	17.8	726,886	21.3
1993	1,527,452	30.4	645,511	12.9	1,225,993	24.4	540,685	10.8	1,081,097	21.5
1994	1,562,550	33.3	507,166	10.8	959,375	20.4	371,000	7.9	1,292,405	27.5
1995	1,528,706	37.3	36,893	0.9	1,220,872	29.8	94,669	2.3	1,212,980	29.6
1996	1,327,953	34.4	356,729	9.2	721,575	18.7	148,521	3.8	1,305,735	33.8
1997	2,237,446	41.9	672,585	12.6	840,403	15.7	458,764	8.6	1,134,579	21.2
1998	1,241,822	34.2	734,169	20.2	564,374	15.5	126,872	3.5	964,967	26.6
1999	1,601,426	47.1	665,108	19.6	546,299	16.1	97,361	2.9	486,592	14.3
2000	1,221,836	37.6	793,188	24.4	619,010	19.0	18,827	0.6	600,609	18.5
2001	1,805,421	47.1	1,165,368	30.4	253,565	6.6	175,345	4.6	437,377	11.4
2002	2,190,999	45.5	1,397,524	29.0	331,223	6.9	261,756	5.4	633,022	13.1
2003	1,889,066	43.5	1,249,032	28.8	382,144	8.8	242,844	5.6	577,602	13.3
2004	1,918,516	46.8	1,242,281	30.3	307,024	7.5	61,280	1.5	566,212	13.8
2005	1,331,607	39.1	1,115,047	32.7	488,794	14.3	3,397	0.1	468,523	13.8
2006	894,520	26.8	1,290,006	38.7	594,808	17.8	17,041	0.5	540,890	16.2
2007	928,483	31.3	1,076,968	36.3	566,724	19.1	23,217	0.8	370,503	12.5
2008	684,716	28.3	1,036,061	42.8	546,116	22.6	16,710	0.7	137,124	5.7
2009	1,443,797	36.8	1,218,846	31.1	658,357	16.8	81,048	2.1	521,173	13.3
2010	485,869	32.8	500,727	33.8	147,181	9.9	10,905	0.7	336,980	22.7
2011	2,212,126	58.6	969,173	25.7	246,621	6.5	30,053	.8	315,183	8.4

Source: SEFSC Recreational ACL Dataset (Oct 2012), Headboat Survey CRNF Files (1986-2011); Landings in lbs ww.

Table A-4. Annual Red Snapper Recreational Landings in State Waters by State (1986 – 2011).

Year	State									
	Alabama		Florida		Louisiana		Mississippi		Texas	
	Landings	%	Landings	%	Landings	%	Landings	%	Landings	%
1986	5,154	0.66	686,650	88.43	35,755	4.60	0	0.00	48,965	6.31
1987	47,223	15.65	191,686	63.51	12,177	4.03	0	0.00	50,721	16.81
1988	41,510	16.57	124,068	49.53	139	0.06	6,033	2.41	78,730	31.43
1989	2,318	0.93	108,774	43.66	63	0.03	6,153	2.47	131,825	52.91
1990	95,060	23.77	227,949	57.01	21,108	5.28	1,468	0.37	54,257	13.57
1991	23,894	6.53	271,802	74.34	7,304	2.00	24	0.01	62,611	17.12
1992	60,930	12.62	85,836	17.78	174,804	36.22	47,144	9.77	113,960	23.61
1993	90,338	13.56	358,111	53.77	16,994	2.55	175	0.03	200,390	30.09
1994	85,463	14.09	175,843	28.99	105,664	17.42	29,208	4.81	210,436	34.69
1995	17,739	2.46	438,014	60.83	21,255	2.95	309	0.04	242,799	33.72
1996	8,547	1.76	285,035	58.68	6,305	1.30	1,488	0.31	184,346	37.95
1997	41,202	6.20	297,729	44.80	96,438	14.51	38,041	5.72	191,203	28.77
1998	72,584	11.60	274,072	43.82	134,128	21.44	4,713	0.75	139,960	22.38
1999	79,990	13.28	360,659	59.88	15,949	2.65	44,188	7.34	101,491	16.85
2000	30,467	4.49	442,739	65.25	69,711	10.27	28,514	4.20	107,137	15.79
2001	106,169	16.82	426,280	67.54	26,233	4.16	0	0.00	72,508	11.49
2002	22,991	4.04	426,899	75.07	731	0.13	7,625	1.34	110,389	19.41
2003	59,588	11.77	358,040	70.72	112	0.02	0	0.00	88,533	17.49
2004	163,594	18.16	666,990	74.03	0	0.00	0	0.00	70,439	7.82
2005	56,286	8.32	506,454	74.88	0	0.00	0	0.00	113,658	16.80
2006	24,484	3.58	459,333	67.15	74,351	10.87	6,763	0.99	119,097	17.41
2007	152,752	10.36	1,184,077	80.32	40,814	2.77	0	0.00	96,477	6.54
2008	87,653	6.79	970,985	75.22	21,495	1.67	1,932	0.15	208,865	16.18
2009	30,193	4.30	463,611	66.10	68,390	9.75	0	0.00	139,162	19.84
2010	34,227	4.52	600,346	79.28	0	0.00	0	0.00	122,673	16.20
2011	91,266	11.1	525,081	63.9	38,546	4.7	0	0.00	166,867	20.30

Source: SEFSC Recreational ACL Dataset (Oct 2012), Headboat Survey CRNF Files (1986-2010); Landings in lbs whole weight.

Recreational Red Snapper Effort

Annual red snapper angler trips in the Gulf and by state are provided in Table A-5. The analysis of a series of 5-year averages, computed between 1986 and 1990, 1996 and 2000, and, 2005 and 2009 illustrates the increase in recreational red snapper-related effort recorded in the Gulf of Mexico. Average annual numbers of angler trips increased from 400,467 (1986-1990) to 599,878 (1996-2000) and 740,950 (2005-2009).

Table A-5. Annual Red Snapper Recreational Angler-Trips by State.

Year	State					Gulf Trips
	Alabama	Florida	Louisiana	Mississippi	Texas	
1986	67,145	132,712	65,926	51,842	59,323	376,949
1987	68,726	236,234	37,466	52,071	59,896	454,394
1988	74,834	169,063	41,446	56,345	59,918	401,607
1989	96,734	120,791	57,359	54,723	55,800	385,408
1990	141,354	76,822	50,742	57,768	57,290	383,977
1991	114,603	125,506	36,875	59,574	58,703	395,262
1992	125,965	77,441	47,385	78,269	57,477	386,537
1993	193,028	180,239	85,278	86,659	57,838	603,042
1994	151,064	151,608	73,811	77,772	72,225	526,480
1995	169,460	85,567	98,786	70,485	79,786	504,085
1996	139,765	119,329	60,296	69,121	85,756	474,268
1997	216,457	177,892	57,346	92,329	81,971	625,994
1998	180,108	259,870	47,124	82,072	91,734	660,909
1999	215,368	275,492	51,874	41,604	53,800	638,139
2000	169,012	258,094	55,487	52,157	65,331	600,080
2001	193,353	272,449	35,056	54,628	59,961	615,447
2002	209,080	281,908	26,044	68,912	71,866	657,810
2003	222,910	260,779	37,110	69,735	68,031	658,566
2004	232,454	350,462	48,176	63,402	71,338	765,832
2005	163,973	300,083	57,519	43,693	65,054	630,322
2006	155,204	394,724	116,984	61,664	89,043	817,618
2007	190,765	478,461	118,149	61,385	76,048	924,809
2008	152,944	374,035	70,269	23,898	39,279	660,424
2009	198,541	303,631	64,384	49,737	55,283	671,576
2010	76,530	181,090	10,967	34,703	46,529	349,819
2011	251,027	186,401	24,996	30,062	49,891	542,377

Source: NMFS-SERO

Appendix B. Analysis on cost of improving harvest information

Regional management may increase the need for more accurate recreational red snapper landings information at the regional/state level. Table B-1 contains the estimated recreational red snapper landings (number of fish and pounds (lbs)) for the charter and private modes by state for Waves 3 and 4 (May-June and July-August) in 2011 and 2012. Tables B-2 and B-3 contain the estimated Percent Standard Error (PSE) associated with the landings estimates for the charter mode (Table B-2) and private mode (Table B-3). These estimates were produced using Marine Recreational Information Program (MRIP) data. At this time, comparable estimates of these estimates for alternative combinations of state groupings are not available.

As shown in Table B-2, the estimated PSEs for the charter mode during 2011 and 2012 ranged from a low of 12.8 (lbs landed, Florida, 2011, Wave 3) to a high of 94.7 (number of fish and lbs landed, Mississippi, 2012, Wave 3). For the private mode (Table B-3), the comparable estimates are 23.4 (number of fish landed, Florida, 2011, Wave 3) and 100.3 (number of fish and lbs landed, Mississippi, 2011, Wave 3).

Table B-1. Estimated red snapper landings (number of fish and pounds (lbs)), charter mode, by state, Waves 3 and 4, 2011 and 2012.

			Charter Mode		Private Mode	
Year	Wave	State	Landings (number of fish)	Landings (lbs)	Landings (number of fish)	Landings (lbs)
2011	3	Alabama	23,816	221,703	96,770	751,336
		Florida	71,753	390,613	129,196	671,734
		Louisiana	0	0	12,398	110,865
		Mississippi	405	1,373	288	1,213
	4	Alabama	17,524	143,451	78,746	696,835
		Florida	30,624	144,976	31,878	158,382
		Louisiana	4,730	47,108	14,220	121,180
		Mississippi	0	0	0	0
2012	3	Alabama	27,779	276,092	64,564	642,614
		Florida	70,344	398,541	122,955	761,805
		Louisiana	12,842	137,749	23,304	165,182
		Mississippi	140	1,803	0	0
	4	Alabama	12,486	112,070	49,579	427,347
		Florida	48,327	271,943	71,624	524,511
		Louisiana	7,948	77,869	55,257	361,619
		Mississippi	0	0	26,333	326,731

Source: Personal Communication, NMFS Fisheries Statistics Division, December 21, 2012.

Table B-2. Estimated PSEs, red snapper landings (number of fish and pounds (lbs)), charter mode, by state, Waves 3 and 4, 2011 and 2012.

Charter Mode			PSE		50% Reduction in PSE		75% Reduction in PSE	
Year	Wave	State	Landings (number of fish)	Landings (lbs)	Landings (number of fish)	Landings (lbs)	Landings (number of fish)	Landings (lbs)
2011	3	Alabama	19.3	20.6	9.65	10.3	4.83	5.15
		Florida	13	12.8	6.5	6.4	3.25	3.20
		Louisiana	NA	NA				
		Mississippi	50.7	50.7	25.35	25.35	12.68	12.68
	4	Alabama	45.4	45.2	22.7	22.6	11.35	11.30
		Florida	27.2	25.3	13.6	12.65	6.80	6.33
		Louisiana	52.4	54.5	26.2	27.25	13.10	13.63
		Mississippi	NA	NA				
2012	3	Alabama	18.7	23.2	9.35	11.6	4.68	5.80
		Florida	15.4	17	7.7	8.5	3.85	4.25
		Louisiana	28.3	29	14.15	14.5	7.08	7.25
		Mississippi	94.7	94.7	47.35	47.35	23.68	23.68
	4	Alabama	44.5	43.7	22.25	21.85	11.13	10.93
		Florida	24.4	24.5	12.2	12.25	6.10	6.13
		Louisiana	57.4	59.6	28.7	29.8	14.35	14.90
		Mississippi	NA	NA				

Source: PSE estimates provided by Personal Communication, NMFS Fisheries Statistics Division, December 21, 2012. Estimates of 50% and 75% reductions in PSEs calculated by NMFS Southeast Regional Office (SERO).

Table B-3. Estimated PSEs, red snapper landings (number of fish and pounds), private mode, by state, Waves 3 and 4, 2011 and 2012.

Private Mode			PSE		50% Reduction in PSE		75% Reduction in PSE	
Year	Wave	State	Landings (number of fish)	Landings (lbs)	Landings (number of fish)	Landings (lbs)	Landings (number of fish)	Landings (lbs)
2011	3	Alabama	36.8	36.4	18.4	18.2	9.20	9.10
		Florida	23.4	23.9	11.7	11.95	5.85	5.98
		Louisiana	49.2	48.4	24.6	24.2	12.30	12.10
		Mississippi	100.3	100.3	50.15	50.15	25.08	25.08
	4	Alabama	43	46.9	21.5	23.45	10.75	11.73
		Florida	43	43	21.5	21.5	10.75	10.75
		Louisiana	65.7	68.3	32.85	34.15	16.43	17.08
		Mississippi	NA	NA				
2012	3	Alabama	28.9	29.7	14.45	14.85	7.23	7.43
		Florida	26.4	27.2	13.2	13.6	6.60	6.80
		Louisiana	55	54.9	27.5	27.45	13.75	13.73
		Mississippi	NA	NA				
	4	Alabama	43.1	40.5	21.55	20.25	10.78	10.13
		Florida	30.9	35	15.45	17.5	7.73	8.75
		Louisiana	43.6	45.9	21.8	22.95	10.90	11.48
		Mississippi	70.4	70.4	35.2	35.2	17.60	17.60

Source: PSE estimates provided by Personal Communication, NMFS Fisheries Statistics Division, December 21, 2012. Estimates of 50% and 75% reductions in PSEs calculated by NMFS SERO.

Because of the formulation involved in the calculation of PSE, the PSE is a function of the sample size of the underlying data. To achieve a 50% reduction in the value of a sample PSE would require the collection of four times the number of observations used to produce the original value. For example, if 100 observations result in a PSE of 60, 400 observations would be required to reduce the PSE by 50% from 60 to 30. This relationship holds if additional reductions are desired. For example, if the desire is to further reduce this estimate (PSE = 30, 400 observations) by an additional 50% to 15 (net reduction of 75% from original PSE estimate of 60), a four-fold increase in the number of observations would be required, resulting in a total of 1,600 observations.

Table B-4 contains estimates of the number of charter and private mode intercepts (combined) allocated per wave (Waves 3 and 4) and state, the average cost per intercept, the total intercept cost per wave, and the estimated cost to achieve 50% and 75% reductions in the recreational red snapper landings (number or lbs) PSE. The estimated costs per intercept are not actual contract costs. The intercept data is collected through cooperative contracts negotiated under a fixed price grant and not as a result of a unit-price contract. Other costs, such as state matching contributions and Gulf States Marine Fisheries Commission (Commission) services, which include, but are not limited to data entry, administrations, and supervisions, are not reflected in

these average costs. As a result, the estimates provided represent prorated average costs per intercept for discussion purposes. To simplify the table, only the costs of target improvements and not the associated number of intercepts are provided. The number of intercepts, however, can be easily calculated using the baseline (current) number of intercepts and appropriate expansion factors (four and 16) used to generate the associated cost estimates. Because the projected costs are only based on an average per-unit intercept cost, and do not include any costs associated with additional state or Commission services, the estimates provided may understate actual necessary cost increases.

The information contained in Tables B-2 and B-3 can be used to identify appropriate “sectors” (state, mode, and wave estimate combinations) for improvement. Estimates of the cost of improvement can then be obtained from Table B-4. However, estimates of the number of intercepts allocated by mode were not available for this analysis. As a result, the information contained in Table B-4 assumes an increase in the number of intercepts collected for both the charter and private modes. If improvement is only targeted for a single mode for a specific state and wave, then the resultant cost would be less than the estimate provided in Table B-4.

Table B-4. Number of intercepts allocated (charter and private modes combined), estimated cost per intercept and total per wave, by state, Waves 3 and 4, and estimated costs to achieve 50% and 75% reduction in the estimated PSE.

	Wave	State	Intercepts Allocated	Estimated Cost per Intercept	Estimated Total Cost per Wave	50% Reduction in PSE	75% Reduction in PSE
	3	Alabama	383	\$65.57	\$25,111	\$100,446	\$401,784
		Florida	3,231	\$84.51	\$273,039	\$1,092,155	\$4,368,621
		Louisiana	970	\$139.08	\$134,906	\$539,625	\$2,158,502
		Mississippi	277	\$113.45	\$31,424	\$125,697	\$502,790
	4	Alabama	355	\$65.57	\$23,276	\$93,103	\$372,411
		Florida	2,827	\$84.51	\$238,898	\$955,594	\$3,822,375
		Louisiana	832	\$139.08	\$115,713	\$462,854	\$1,851,416
		Mississippi	229	\$113.45	\$25,979	\$103,916	\$415,664
	Combined	Alabama	738	\$65.57	\$48,387	\$193,549	\$774,195
		Florida	6,058	\$84.51	\$511,937	\$2,047,749	\$8,190,996
		Louisiana	1,802	\$139.08	\$250,620	\$1,002,479	\$4,009,918
		Mississippi	506	\$113.45	\$57,403	\$229,613	\$918,453

Source: Estimates of the number of intercepts allocated and the total annual cost to conduct the MRIP in each state (total not provided in the table) provided by Personal Communication, NMFS Fisheries Statistics Division, December 21, 2012. Remaining estimates (cost per intercept, total cost per wave, and cost to achieve 50% and 75% reductions in PSEs) calculated by NMFS SERO.

Table B-5 contains estimates of the potential intercept cost increases under two PSE reduction scenarios, a maximum landed lbs PSE of either 30 or 20 for any state and mode. These results are based on 2012 PSEs. To reduce the PSE for all states to less than or equal to 30 would require an increase in survey costs of approximately \$2.4 million per year. To reduce the PSE to

20 or less would increase survey costs by approximately \$8.1 million per year. As previously noted, these results apply only to improvements of data collection in Waves 3 and 4. If the red snapper season is expanded to include additional waves (months) under regional management, additional survey cost increases would likely be required to meet these estimates targets.

Table B-5. Estimated costs of example PSE reduction targets.

	Wave	State	Maximum 30 PSE (Landings lbs)			Maximum 20 PSE (Landings lbs)		
			Expansion Factor	Estimated PSE	Cost	Expansion Factor	Estimated PSE	Cost
	3	Alabama	NA	29.7	\$25,111	4	14.9	\$100,446
		Florida	NA	27.2	\$273,039	4	13.6	\$1,092,155
		Louisiana	4	27.5	\$539,625	16	13.8	\$2,158,502
		Mississippi	16	23.7	\$502,790	64	11.9	\$2,011,158
	4	Alabama	4	20.3	\$93,103	16	10.2	\$372,411
		Florida	4	17.5	\$955,594	4	17.5	\$955,594
		Louisiana	4	23.0	\$462,854	16	11.5	\$1,851,416
		Mississippi	16	17.6	\$415,664	16	17.6	\$415,664
New Total Cost					\$3,267,779			\$8,957,345
Current Cost					\$868,348			\$868,348
Cost Increase					\$2,399,432			\$8,088,997

Source: NMFS SERO.

Appendix C. Previous discussion papers and reports

This appendix includes text from previous documents reviewed by the Council addressing regional management of recreational red snapper. Because the Council's motion specified regional management of recreational red snapper, sections of documents focused on the commercial sector or for-hire component of the recreational sector exclusively, are omitted.

October 2008: Ad Hoc Recreational Red Snapper Advisory Panel Meeting report

Kenner, LA.
October 20-22, 2008

Regional Management of Recreational Red Snapper Fishing

Jeff Barger noted that halibut was managed on a regional basis in Alaska. It was also noted that summer flounder have state by state allocations in the Atlantic. The Panel discussed three options for dividing the Gulf into management regions:

- Option 1: Divide the Gulf by state boundaries.
- Option 2: Divide the Gulf into east, (Florida), central (AL, MS, LA), and west (Texas). Regions extend from the beach out 200 nautical miles.
- Option 3: Divide the Gulf into 2 regions, east and west of the MS River.

The Panel, after discussion, concluded that dividing the Gulf by state boundaries made the most sense, due to socioeconomic differences between the states and the fact that these are existing, well-known boundaries.

Motion: Divide the Gulf into 5 zones by state boundaries.
Motion passed 7 to 2.

Steven Atran noted that there could be stock assessment issues associated with dividing the Gulf into regions with different regulations (i.e., different selectivities), and any such proposals would need to be reviewed by the SEFSC and/or SSC.

Regional management will require that the recreational allocation of red snapper TAC be suballocated among the regions. The Panel discussion focused primarily on two ways of determining allocations: 1) based on the state-by-state recreational red snapper catches for all years of available data (1982-2006), or 2) based on all years of available data when there was a 9.12 million pound TAC (1996-2006) to avoid possible biases from changing TAC. Some additional suggestions or modifications included,

- Exclude 2008 from allocation calculations due to concerns on how the shortened season may have affected state allocations,
- Exclude post-Katrina years from calculations.

- Only count landings each year during the period when federal waters were open in order to minimize the impact of fish caught under incompatible state regulations.
- Allocate by days at sea rather than by pounds landed.

A motion was made to base allocations on the years with a 9.12 million pound TAC, 1996-2006). A substitute motion to allocate based on all available years (1982-2006) failed by a vote of 4 to 5. The Panel then voted on and passed the original motion.

Motion: Use the years 1996 to 2006 for setting state regional allocation of red snapper.
Motion passed 7 to 2.

The Panel discussed whether to have a set-aside of a portion of the recreational allocation that could be used to help prevent accountability measures from being activated if a state/region exceeded its allocation, but felt that the current TAC was too low to consider any type of set-aside.

Motion: For allocation, there will be no set-aside and there will be a firm quota per region.
Motion passed unanimously.

The Panel discussed enforceability of state/regions with different seasons or other regulations. For example, a vessel leaving from one region where the fishery was closed might land in a different region where the fishery was open. If the catch was counted against the second region's allocation, this might create an equitability issue. The Panel passed the following motion to address enforcement and equitability issues.

Motion: Vessels must land their catch in the same region from which they depart.
Motion passed 7 to 1 with 1 abstention. (Monty Weeks abstained because he felt consideration of this issue was unnecessary.)

The Panel discussed how to obtain stakeholder advice for each region's management. The Panel agreed that, rather than have a Gulf-wide AP, there should be a separate AP for each region to provide management recommendations to the Council. The Panel also felt that each region should be responsible for its allocation, and ACLs and AMs should be on a regional basis.

Motion: To have the Gulf Council establish separate regional APs for each state to recommend management measures for that state to the Council.
Motion passed unanimously.

Motion: ACLs and accountability measures would be on a state by state basis.
Motion passed unanimously.

Note: in the above motions, there was discussion whether to use "state" or "region". The Panel decided to use "state" in order to emphasize their preference that management regions be divided along state lines. However, these motions are still intended to recommend regional APs, ACLs and AMs if some other regional division is adopted.

Regional management will require accurate catch data on a regional basis, and Panel members expressed concern over the quality of the catch data. Jim Cowan noted that a state with a relatively small number of access points, such as Alabama, might be better able to monitor landings and generate more accurate catch data than a state with a large number of access points. In addition, Panel members expressed concern that the NMFS data is only reviewed internally and does not undergo any independent external review. One suggestion was made that an independent group such as the Center of Independent Experts might be used to provide periodic external reviews of the data and data collection process.

Motion:· The AP has grave concerns with the data collection system and the repercussions thereof. The AP requests the collection of peer reviewed data from outside the system.

Motion passed 7 to 0 with 2 abstentions. (Myron Fischer abstained because he did not understand what was meant by peer-review. Jerry Anderson also abstained.)

Briefing Reports Used by the AHRRSAP When Discussing the Main Issues

Develop a Program for Regional Management of Recreational Management of Red Snapper

Brief Description:

Gulf of Mexico red snapper are managed as a unit stock throughout their range, and regulations are the same throughout the Gulf EEZ. Under this recommendation, the Gulf would be divided into two (or more) geographic regions, and each region would have its own set of recreational fishing regulations (size limits, bag limits, closed seasons). Regional regulations could be developed that would reflect regional differences in availability of red snapper, localized differences in growth rates, habitat or other environmental factors, and localized differences in socio-economic value of the stock. Since red snapper would still be considered as a unit stock, the combined effects of the regional regulations would still need to comply with the Gulf-wide rebuilding requirements.

To implement a regional approach, the recreational allocation of red snapper TAC could be subdivided into regional allocations based on the historical proportion of catch from each region. Annual catch limits (ACLs) and accountability measures (AMs) could be applied on a regional basis. Regulations would then be developed that keep each region's catch within its allocation.

The SEDAR 7 red snapper assessment provided an option to set two regional TACs with the Mississippi River as the dividing line. However, the Council focused on implementing needed revisions to the rebuilding plan and retained management by Gulf-wide TAC and regulations.

Places where the idea is currently being implemented:

At the federal level, there are no recreational examples. However, the commercial Gulf group king mackerel quota is divided into an Eastern Zone and a Western Zone. The Eastern Zone is further divided into a Florida East sub-zone and Florida West sub-zone, with the Florida West sub-zone further divided by gear type. Under Highly Migratory Species (HMS), commercial bluefin tuna catches are regulated by area and gear type. Also, non-sandbar large coastal sharks (LCS) have regional quotas for the Gulf of Mexico and the Atlantic.

At the state level, Florida has three regions for snook with separate size limits and closed seasons, and three regions for seatrout with separate bag limits and closed seasons.

There are no region-specific permits for the above examples. A valid permit allows access to all regions.

Pros:

- Allows for regional differences in biology, habitat, and socio-economic conditions
- Can optimize regulations to account for regional differences in release mortality

Cons:

- More complex regulatory framework.
- Effort shifting between regions may reduce effectiveness of regionalized management.
- Geographic distribution of stock may change as the stock rebuilds, resulting in a regional allocation that does not reflect the redistribution.
- Monitoring catches on a regional level may be less precise than on a Gulf-wide level.

Scoping Issues

How many regions should there be?

- 2 regions - East Gulf, West Gulf
- 3 regions - Florida, AL/MS/LA, Texas
- 4 regions - Florida Peninsula, Northeast Gulf, Northwest Gulf, South Texas
- More regions

Where should the regional boundaries be located?

- Use state boundaries
- Use statistical grid boundaries
- Use natural boundaries
- Use a mixture of above

How should the recreational red snapper allocation be subdivided among regions?

- Each region should get a fixed sub-allocation and ACL/AM based on the historical proportion of recreational landings during the years XXXX - YYVY. Any changes to the sub-allocation would require a plan amendment.
- Each region should get a sub-allocation and ACL/AM based on the most recent 3 years (or some other number) of recreational landings. Sub-allocations will be recalculated every 3 years (or some other number) so that the distribution can keep pace with demographic changes.
- Do not sub-allocate the recreational allocation. While there may be different fishing regulations within each region, there will remain a single Gulf-wide recreational allocation and ACL/AM.

Should there be an allocation set-aside?

- Yes, set-aside a portion of the recreational allocation, not to exceed 5% (or some other percentage) that can be utilized by a sector that exceeds its sub-allocation. Unused set-

aside will be distributed proportionately to each sector in the following year, not to exceed 5% of each sector's base sub-allocation.

- No, the entire recreational allocation should be sub-allocated to the regions.

Should there be regional access restrictions?

- Yes, each angler/vessel must have a regional endorsement for the region being fished.
- No, any recreational angler can fish in any region.

How should the AP recommendations for regional fishing regulations be determined? Note, the Council will still be responsible for final action, and NMFS for approval and implementation. Regional regulations must have a reasonable expectation of meeting regional sub-allocations.

- Establish a separate regional AP for each region to recommend management measures for that region to the Council.
- Do not establish regional APs. The existing Red Snapper AP will continue to make recommendations for each region, but only members from a given region can vote on that region's regulations.
- Do not establish regional APs. The existing Red Snapper AP will continue to make recommendations as a whole for each region.

January 2009: Discussion paper, management of recreational for-hire red snapper fishery

Presented at January 2009 Council meeting

Possible options for dividing the Gulf into regional management areas for the red snapper recreational for-hire fishery include:

- 2 regions: east and west of the Mississippi River.
- 3 regions: east, (Florida), central (AL, MS, LA), and west (Texas).
- 5 regions: divide the Gulf by state boundaries (AHRRSAP recommendation)

Regional management allows fishing regulations to account for regional differences in different areas of the Gulf. For example, one region may benefit more from a winter open season while a summer season would be preferred in another region. As part of a regional management system, the AHRRSAP recommended that regional APs be established to recommend management measures to the Council (however, the Panel's recommendation for regional management was that it apply to the entire recreational fishery, not just the for-hire sector).

The following estimates of allocations are based on the current 5.0 mp TAC with 49% allocated to the recreational fishery (2.4 mp). The regional break-outs are based on relative landings of for-hire vessels only (charter and headboat). Landings allocations are in pounds.

2 regions (TX/LA and MS/AL/FL)

Base years	For-hire Allocation	Private Rec. Allocation	Percent and pounds of for-hire sector allocation	
			TX/LA	MS/AL/FL
1981-2006	61% 1,494,500	39% 955,500	44% 657,976	56% 836,524
1986-2006	62% 1,519,000	38% 931,000	41% 591,633	59% 853,867
2000-2006	57% 1,396,500	43% 1,053,500	29% 412,553	71% 983,947

Source: NMFS/SEFSC/SERO – October 2008 Council briefing book Tab B4(d) Landings Data for Rec Red Snapper.xls; 1981-2003 landings from Turner 2005 (SEDAR7-RW-08); 2004-2006 landings from MRFSS, TPWD, and Headboat surveys.

Note: If a 2-region management were split at the Mississippi River, a small portion of the TX/LA allocation would go to the eastern region.

3 regions

Base years	For-hire Allocation	Private Rec. Allocation	Percent and pounds of for-hire sector allocation		
			TX	LA/MS/AL	FL
1981-	61%	39%	27%	46%	27%

2006	1,494,500	955,500	404,032	692,403	398,065
1986-2006	62% 1,519,000	38% 931,000	28% 408,552	42% 596,685	30% 440,263
2000-2006	57% 1,396,500	43% 1,053,500	20% 285,175	44% 612,011	36% 499,314

Source: NMFS/SEFSC/SERO – October 2008 Council briefing book Tab B4(d) Landings Data for Rec Red Snapper.xls; 1981-2003 landings from Turner 2005 (SEDAR7-RW-08); 2004-2006 landings from MRFSS, TPWD, and Headboat surveys.

5 regions

Base years	For-hire Allocation	Private Rec. Allocation	Percent and pounds of for-hire sector allocation				
			TX	LA	MS	AL	FL
1981-2006	61% 1,494,500	39% 955,500	27% 404,032	17% 253,944	1% 12,919	28% 425,540	27% 398,065
1986-2006	62% 1,519,000	38% 931,000	28% 408,552	13% 183,081	1% 13,447	28% 400,157	30% 440,263
2000-2006	57% 1,396,500	43% 1,053,500	20% 285,175	9% 127,378	1% 11,858	34% 472,775	36% 499,314

Source: NMFS/SEFSC/SERO – October 2008 Council briefing book Tab B4(d) Landings Data for Rec Red Snapper.xls; 1981-2003 landings from Turner 2005 (SEDAR7-RW-08); 2004-2006 landings from MRFSS, TPWD, and Headboat surveys.

August 2010: Discussion paper on potential regional management of red snapper

Presented at August 2010 Council meeting

This paper explores regional management of red snapper in the Gulf of Mexico. Currently, the Council manages red snapper as one stock. A stock can be defined as a managed unit of fish with a genetic relationship, similar movement patterns, and geographic distributions. The Gulf of Mexico red snapper management unit extends from the Texas/Mexico border in the west to the east Gulf waters of Florida down to the Florida Keys and out through the Dry Tortugas, the regional boundary with the South Atlantic Council.

- ***Split the stock into two management units at the Mississippi River 1) Florida, Alabama, and Mississippi (eastern sub-unit) and 2) Louisiana and Texas (western sub-unit)***
- ***Split the stock into three management units-1) Florida (eastern sub-unit), 2) Louisiana, Mississippi, and Alabama (central sub-unit), and Texas (western sub-unit)***

The benchmark and update assessment assumes there are two sub-units of the red snapper stock within this region, separated roughly by the Mississippi River (Louisiana/Mississippi state lines). In response to the SEDAR 7 2005 benchmark assessment Amendment 27 reduced fishing mortality proportionally in all fisheries including shrimp bycatch and established a biomass target of 26% spawning potential ratio (SPR) Gulf-wide instead of subdividing the eastern and western sub-units.

The 2009 update assessment estimated that the western Gulf sub-unit would carry a disproportionate burden of stock recovery because it is currently estimated to have higher stock biomass and the average fishing mortality rate (F) at age, estimated to be lower in the west than in the east. Therefore, the eastern and western sub-units of the red snapper stock were projected to rebuild at different rates and to different SPR levels. The overall rebuilding target for red snapper is 26% SPR. However, the western sub-unit is projected to rebuild to approximately 27% SPR, while the eastern sub-unit is projected to rebuild to approximately 18% SPR (2009 Red Snapper update assessment).

The eastern sub-unit appears to be expanding farther to the east in areas red snapper formerly occurred and in greater abundance than it has been reported to occur in recent years (2009 Red Snapper update assessment). However, the ultimate result of fishing the eastern sub-unit harder than the western sub-unit is that the eastern fishery is projected to continue to be prosecuted on mostly small, young fish resulting in a population age distribution projected to continue to be severely truncated. In the west more and more fish are projected to recruit to older, more highly fecund, age classes over time (Tables 1, 2, and 3). The Assessment Workshop panel expressed concerns about the continually truncated age distribution on the long-term viability of the stock and fishery in the eastern sub-unit. The Scientific and Statistical Committee recommended revising the red snapper rebuilding plan as soon as practicable to achieve MSY or MSY proxy for the eastern and western sub-units (December 2009). Whereas, the Red Snapper Advisory

Panel recommended that the Council not consider regional red snapper management at this time; only 1 member was opposed to this motion (December 2009).

The 2009 update assessment also pointed out several issues with data collection and use of fishery-independent data for red snapper in the eastern sub-unit. For example, the Assessment Panel agreed that bottom longline samples were too few and red snapper encounters were too rare to make these data useful for the eastern region. In addition, expansion of red snapper in the eastern sub-unit has primarily been achieved through recruitment of very young red snapper, and that the age composition data coming from fishery catches in those areas will appear truncated for at least one generation even with no overfishing. However, there was insufficient fishery-independent sampling to clearly establish the degree to which this range expansion may be occurring (e.g., there are essentially no SEAMAP trawl data east of Alabama).

Recreational Data

If the Gulf of Mexico was divided into two management sub-units the estimated average recreational landings from 2007-2009 showed the eastern Gulf had much greater recreational landings (74%) versus the western Gulf (26%; Table 6). Using the same landings, if the Gulf was divided into three management sub-units the estimated recreational landings from the eastern, central, and western Gulf are 47%, 42%, and 11%, respectively (Table 7). The 2009 update assessment documented similar results in recreational landings in 2007 and 2008 with 87% of the red snapper landed (fish killed) coming from the eastern Gulf compared to the western Gulf (Table 8). In 2007, 90% of the recreational red snapper caught in the east were estimated to be released alive and in 2008, 87% of red snapper caught were estimated to be released alive.

Table 6. Recreational landings (headboat, charterboat, private, and shore mode) by eastern and western sub-units. Note: 2009 data is preliminary. Source: Southeast Fisheries Science Center ACL datasets, 2010.

Region	2007	2008	2009*	Average
East	3,365,496	2,798,057	3,237,495	3,133,683
West	1,077,710	915,349	1,364,253	1,119,104

Table 7. Recreational landings (headboat, charterboat, private, and shore mode) by eastern, central, and western sub-units. Note: 2009 data is preliminary. Source: Southeast Fisheries Science Center ACL datasets, 2010.

Region	2007	2008	2009*	Average
East	2,261,044	2,007,046	1,682,457	1,983,516
Central	1,711,990	1,358,623	2,281,786	1,784,133
West	470,172	347,737	637,505	485,138

Table 8. Estimated MRFSS A+B1 (fish killed) and B2 catch (released alive) by Gulf region for red snapper in the Gulf of Mexico. Charterboat and cbt/hbt estimates use the new method or are calibrated to the new method. Source: Table 14 in the red snapper updated assessment 2009.

Year	East		West		Total AB1	Total B2
	AB1	B2	AB1	B2		
2006	768,406	2,120,624	200,599	437,517	969,005	2,558,141
2007	968,971	2,477,771	148,397	277,120	1,117,368	2,754,891
2008	619,303	1,662,170	89,516	253,994	708,818	1,916,164

Larval Abundance and Transport

During the benchmark assessment SEDAR 7 in 2005 the panel recommended continued work to derive mixing rates to determine if there was evidence for localized recruitment in the east or whether recruits were derived from other areas. Trawl surveys completed by SEAMAP were not conducted east of the Florida/Alabama border and probably would not have captured localized recruitment which may occur on the west Florida shelf (SEDAR 7 2005).

A recent red snapper larval transport study in the northern Gulf of Mexico examined the potential for repopulating the eastern Gulf stock through larval transport from the more populous western stock (Johnson et al. 2009). Red snapper larval abundance was determined to be twice as great over the Louisiana-Texas shelf as over the Mississippi-Alabama shelf and four times as great over the Mississippi-Alabama shelf as over the west Florida shelf (Hanisko et al. 2007). Hanisko et al. (2007) compared the larval abundance from fall plankton studies off the eastern Gulf and determined the area off Mississippi/Alabama was disproportionately smaller than off west Florida, but accounted for half of the 12% total red snapper larvae abundance (Figure 1).

The Johnson et al. (2009) red snapper larval transport study found there were three major topographic impediments in the Gulf of Mexico: the Mississippi River Delta, DeSoto Canyon, and the Apalachicola peninsula (Figure 2). Results indicated that these topographic impediments had the potential to foster geographic separation of the stocks based on larval transport and ocean currents, but did not impede mixing between the eastern and western sub-units because transport pathways toward the west occurred during non-summer spawning months of September, October, and May (Figure 2). The eastward transport of larvae occurred during the summer months from the Mississippi River across the Apalachicola peninsula, but then were diverted southward over the deeper continental slope region. It is unclear how successful settlement of red snapper would be in the deeper waters of the outer continental shelf or whether they could migrate to shallow waters to settle. Based on the surface currents and SEAMAP larval sampling it was determined that the region east of DeSoto Canyon and the Big Bend area had limited potential for receiving larvae from spawning activity in the west providing evidence that separate eastern and western management units may be warranted (Johnson et al. 2009).

October 2010: Discussion paper on potential regional management of red snapper

Presented to the Council at the October 2010 meeting. Selected sections focused on recreational management

Alternative 1: No action, Do not establish regional management units for the red snapper stock.

Alternative 2: Split the stock into two management sub-units at the Mississippi River (shrimp statistical grids 12 and 13) 1) Florida, Alabama, and Mississippi (eastern sub-unit) and 2) Louisiana and Texas (western sub-unit). Commercial landings are split between eastern and western Louisiana (shrimp statistical grid 12 and 13; whereas, recreational landings are based on each state).

Alternative 3: Split the stock into three management sub-units-1) Florida (eastern sub-unit), 2) Louisiana, Mississippi, and Alabama (central sub-unit), and Texas (western sub-unit).

Alternative 4: Split the stock into two management sub-units at the Florida/Alabama state line-1) Florida (eastern sub-unit) and 2) the other four states (western sub-unit).

Recreational Data

Under **Alternative 2**, if the Gulf of Mexico was divided into two management sub-units at the Mississippi/Louisiana state line, the estimated average recreational landings from 2007-2009 indicate the eastern Gulf would have much greater recreational landings (74%) versus the western Gulf (26%; Table 6). Using the same landings, if the Gulf was divided into three management sub-units (**Alternative 3**), the estimated recreational landings from the eastern, central, and western Gulf would be 47%, 42%, and 11%, respectively (Table 7). Under **Alternative 4**, if the Gulf of Mexico was divided into two management sub-units at the Florida/Alabama state line the estimated recreational landings from the eastern Gulf would be 47% and the western Gulf 53%, respectively (Table 8).

Table 6. Alternative 2 partitioning of the recreational landings (headboat, charterboat, private, and shore mode) by eastern and western sub-units at the Louisiana state line. Source: Southeast Fisheries Science Center ACL datasets, 2010.

Region	2007	2008	2009	Average
East	3,365,496	2,798,057	3,237,495	3,133,683
West	1,077,710	915,349	1,364,253	1,119,104

Table 7. Alternative 3 partitioning of the recreational landings (headboat, charterboat, private, and shore mode) by eastern, central, and western sub-units. Source: Southeast Fisheries Science Center ACL datasets, 2010.

Region	2007	2008	2009	Average
East	2,261,044	2,007,046	1,682,457	1,983,516
Central	1,711,990	1,358,623	2,281,786	1,784,133
West	470,172	347,737	637,505	485,138

Table 8. Alternative 4 partitioning of the recreational landings (headboat, charterboat, private, and shore mode) by eastern and western sub-units using the Florida/Alabama state line. Source: Southeast Fisheries Science Center ACL datasets, 2010.

Region	2007	2008	2009	Average
East	2,261,044	2,007,046	1,682,457	1,983,516
West	2,182,162	1,706,360	2,919,291	2,269,271

The 2009 update assessment documented similar results in recreational landings in 2007 and 2008 with 87% of the red snapper landed (fish killed) coming from the eastern Gulf compared to the western Gulf (Table 9). In 2007, 90% of the recreational red snapper caught in the east were estimated to be released alive and in 2008, 87% of red snapper caught were estimated to be released alive.

Table 9. Estimated MRFSS A+B1 (fish killed) and B2 catch (released alive) by Gulf region for red snapper in the Gulf of Mexico. Charterboat and cbt/hbt estimates use the new method or are calibrated to the new method. Source: Table 14 in the red snapper updated assessment 2009.

Year	East		West		Total AB1	Total B2
	AB1	B2	AB1	B2		
2006	768,406	2,120,624	200,599	437,517	969,005	2,558,141
2007	968,971	2,477,771	148,397	277,120	1,117,368	2,754,891
2008	619,303	1,662,170	89,516	253,994	708,818	1,916,164

Larval Abundance and Transport

During the benchmark assessment SEDAR 7 in 2005 the panel recommended continued work to derive mixing rates to determine if there was evidence for localized recruitment in the east or if recruits were derived from other areas. Trawl surveys completed by SEAMAP were not conducted east of the Florida/Alabama border and probably would not have captured localized recruitment which may occur on the west Florida shelf (SEDAR 7 2005).

A recent red snapper larval transport study in the northern Gulf of Mexico examined the potential for repopulating the eastern Gulf stock through larval transport from the more populous western stock (Johnson et al. 2009). Red snapper larval abundance was determined to be twice as great over the Louisiana-Texas shelf as over the Mississippi-Alabama shelf and four times as great over the Mississippi-Alabama shelf as over the west Florida shelf (Hanisko et al. 2007). Hanisko et al. (2007) compared the larval abundance from fall plankton studies off the eastern Gulf and determined the area off Mississippi/Alabama was disproportionately smaller than off west Florida, but accounted for half of the 12% total red snapper larvae abundance (Figure 3).

The Johnson et al. (2009) red snapper larval transport study found there were three major topographic impediments in the Gulf of Mexico: the Mississippi River Delta, DeSoto Canyon, and the Apalachicola peninsula (Figure 4). Results indicated that these topographic impediments had the potential to foster geographic separation of the stocks based on larval transport and ocean currents, but did not impede mixing between the eastern and western sub-units because transport

pathways toward the west occurred during non-summer spawning months of September, October, and May (Figure 3). The eastward transport of larvae occurred during the summer months from the Mississippi River across the Apalachicola peninsula, but then were diverted southward over the deeper continental slope region. It is unclear how successful settlement of red snapper would be in the deeper waters of the outer continental shelf or whether they could migrate to shallow waters to settle. Based on the surface currents and SEAMAP larval sampling it was determined that the region east of DeSoto Canyon and the Big Bend area had limited potential for receiving larvae from spawning activity in the west providing evidence that separate eastern and western management units may be warranted (Johnson et al. 2009).

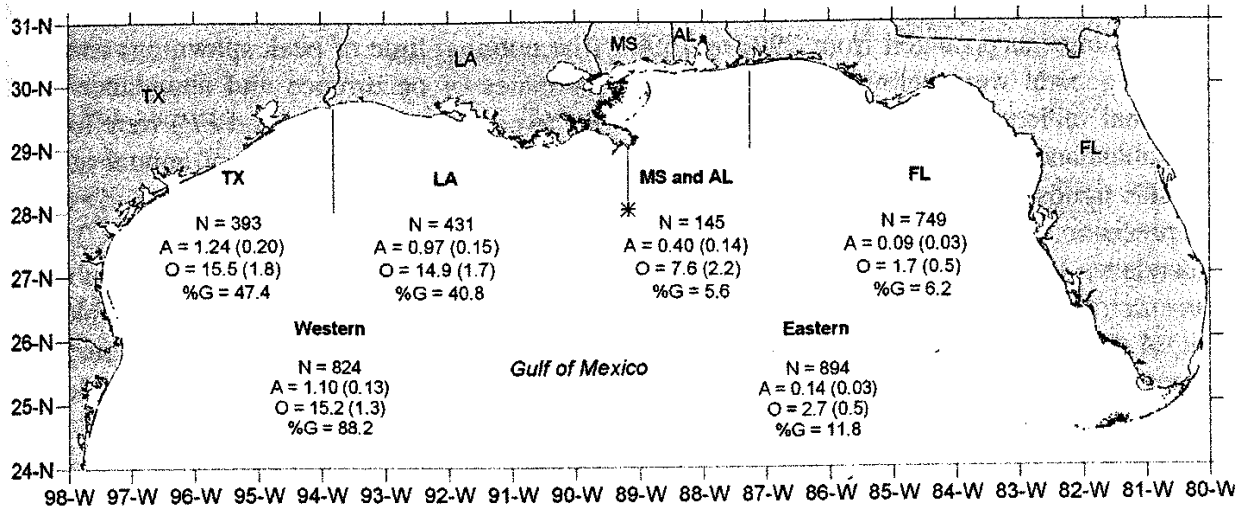


Figure 3. Mean abundance (A), percent occurrence (O), and percentage of Gulf of Mexico total abundance (%G) of red snapper, *Lutjanus campechanus* larvae from the western and eastern Gulf of Mexico, and the Texas (TX), Louisiana (LA), Mississippi/Alabama (MS and AL), and Florida sub-regions and percent occurrence. Western and eastern Gulf of Mexico regions are separated at the mouth of the Mississippi River (*) and the sub-regions by the plotted demarcation lines. Source: Hanikso et al. 2007.

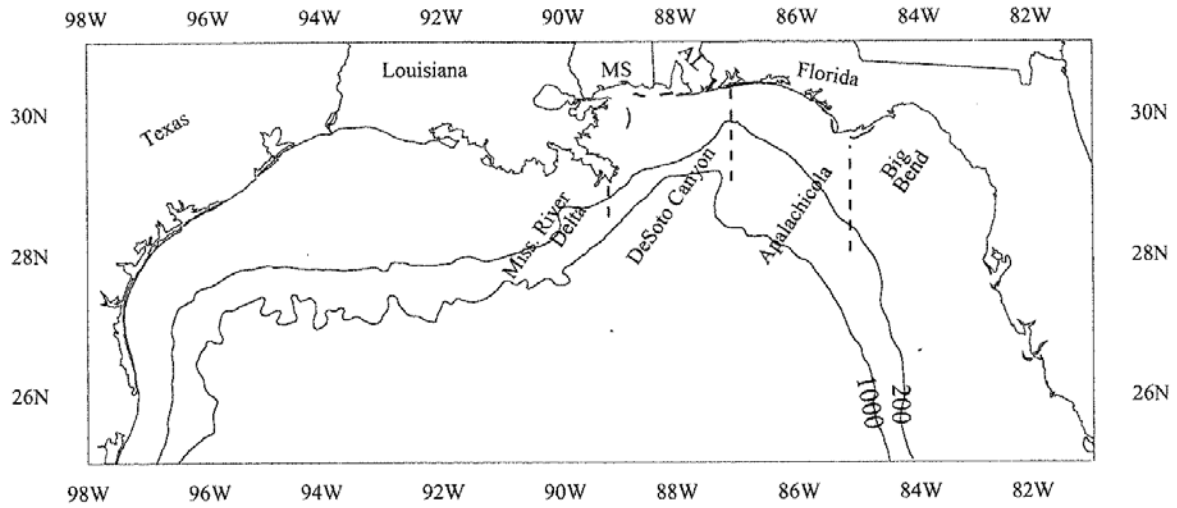


Figure 4. Area in the Gulf of Mexico where surface currents and red snapper larval transport was studied, dashed lines delineate topographic impediments to alongshore flow. Source: Johnson et al. 2009.