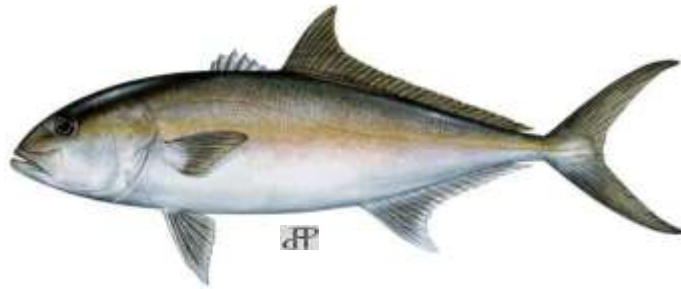


Modifications to the Greater Amberjack Recreational Bag Limit, Fishing Year and Season



Framework Action to the Fishery Management Plan for the Reef Fish Resources of the Gulf of Mexico

August 2019



This is a publication of the Gulf of Mexico Fishery Management Council Pursuant to National Oceanic and Atmospheric Administration Award No. NA15NMF44100111.

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ENVIRONMENTAL ASSESSMENT COVER SHEET

Name of Action

Modifications to the Greater Amberjack Recreational Bag Limit, Fishing Year and Season:
Framework Action to the to the Fishery Management Plan for the Reef Fish Resources of the Gulf
of Mexico

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Type of Action

- Administrative Legislative
 Draft Final

ABBREVIATIONS USED IN THIS DOCUMENT

ABC	acceptable biological catch
ACL	annual catch limit
ACT	annual catch target
AM	accountability measure
Bmsy	stock biomass level capable of producing an equilibrium yield of MSY
Council	Gulf of Mexico Fishery Management Council
Headboat	Headboat Survey
EA	Environmental Assessment
EIS	Environmental Impact Statement
EJ	environmental justice
E.O.	Executive Order
FL	fork length
FMP	Fishery Management Plan
F _{MSY}	fishing mortality rate corresponding to an equilibrium yield of MSY
Gulf	Gulf of Mexico
LA Creel	Louisiana Creel Survey
M	Instantaneous rate of natural mortality
MFMT	Maximum fishing mortality threshold
MMPA	Marine Mammal Protection Act
MRIP	Marine Recreational Information Program
MSST	Minimum stock size threshold
MSY	Maximum sustainable yield
NMFS	National Marine Fisheries Service
NOAA	National Oceanic Atmospheric Administration
OY	Optimum yield
RA	Regional Administrator
SEDAR	Southeast Data, Assessment and Review
SERO	Southeast Regional Office
SPR	Spawning potential ratio
SSC	Scientific and Statistical Committee
TPWD	Texas Parks and Wildlife Department
ww	whole weight

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CHAPTER 1. INTRODUCTION

1.1 Background

In 2016, an update to the Southeast Data Assessment and Review (SEDAR) 33 greater amberjack stock assessment was completed. The Gulf of Mexico Fishery Management Council's (Council) Scientific and Statistical Committee (SSC) reviewed this update at its March 2017 meeting. The SSC accepted the greater amberjack update assessment as the best scientific information available and concluded that greater amberjack was still overfished and undergoing overfishing, and the stock would not be rebuilt by 2019 as previously projected. To address the results of the most recent stock assessment, the Council completed a framework action (GMFMC 2017a) that modified the acceptable biological catch (ABC), sector specific annual catch limits (ACL), and annual catch targets (ACT) for greater amberjack (Table 1.1.1). The new catch limits reduced the allowable harvest for the 2018 and 2019 fishing years, with an increase in 2020 and beyond, and are expected to end overfishing and rebuild the stock by 2027. The 2018 fourth quarter update report on stock status, removed Gulf greater amberjack from the list of species undergoing overfishing, but remains overfished.¹ As of the most recent report, the Gulf greater amberjack stock status remains unchanged since then.

Table 1.1.1. Current stock ABC, recreational ACL, and recreational ACT (pounds whole weight).

Year	ABC	ACL	ACT
2018	1,182,000	862,860	716,173
2019	1,489,000	1,086,970	902,185
2020+	1,794,000	1,309,620	1,086,985

Source: GMFMC (2017a)

In addition, accountability measures (AM) put in place through Reef Fish Amendment 30A (GMFMC 2008) require the Regional Administrator to close the respective sector to further harvest of greater amberjack when the sector's ACT has been met or estimated to have been met, and to reduce that sector's ACL and ACT in the following year by the amount of any overage of the sector ACL. Overage adjustments resulting from these AMs have occurred in both the recreational and commercial sectors and have led to dramatically shortened fishing seasons in some years (Table 1.1.2).

¹ <https://www.fisheries.noaa.gov/national/population-assessments/fishery-stock-status-updates>

Table 1.1.2 Recreational landings (pounds whole weight) of Gulf greater amberjack, ACTs, and ACLs since 2008.

Year	Landings	ACT	Adjusted ACT	% ACT	ACL	Adjusted ACL	% ACL	Closure Date
2008	1,318,662	-	-	NA	1,368,000	-	96.4	-
2009	1,480,315	-	-	NA	1,368,000	-	108.2	10/24/2009
2010	1,225,225	-	-	NA	1,368,000	1,243,184	105.9	-
2011	949,999	-	-	NA	1,368,000	1,315,224	78.5	-
2012	1,238,718	1,130,000	-	NA	1,299,000	-	96.7	-
2013	1,620,761	1,130,000	-	NA	1,299,000	-	118.1	-
2014	1,090,048	1,130,000	895,438	102.0	1,299,000	1,063,538	85.8	8/25/2014
2015	1,407,551	1,130,000	-	119.7	1,299,000	-	104.2	9/28/2015
2016	2,037,378	1,092,372	933,731	218.1	1,255,600	1,101,959	184.8	6/1/2016
2017	794,202	1,092,372	385,413	206.1	1,255,600	548,641	144.8	3/24/17
2017/2018*	622,011	716,173	-	86.9	862,860	-	72.1	None
2018/2019**	929,497	902,185	-	103.0	1,086,970	-	85.5	5/1/2019

* Landings from January 1 – January 27, 2018 and May 2018 (closed January 28 – April 30 and June 1 – July 31)

**2018/2019 landings are preliminary; Data presented for 201/2019 are complete through May 30, 2019.

Source: See Appendix A.2 Data sources

The fishing year for most reef fish species is January 1 – December 31 (GMFMC 1981). As a result, many species are open to harvest on January 1 each year, but the season may be closed prior to year’s end if a species is subject to in-season monitoring and reaches its ACL or ACT (GMFMC 2011). The result may be fewer reef fish species open to harvest later in the calendar year. This could be attributed to socioeconomic preferences, prevailing weather patterns, market conditions, or migratory patterns of some species and thus, may not allow maximum benefits to be realized from the reef fish resource. At the August 2017 meeting, the Council began working on an action to open recreational fishing for greater amberjack later in the calendar year to improve fishermen’s access to greater amberjack and provide an opportunity to harvest a prized reef fish species during a period of the year when some other desirable species are prohibited from harvest (e.g., red snapper).

Effective in 2018 (GMFMC 2017b), the recreational fishing year was modified from the calendar year to August 1 – July 31. Additionally, fixed closed seasons were established within the new fishing year from November 1 – April 30, and June 1 – July 31. This resulted in a fishing season that is potentially open August 1 through October 31, and May 1 – May 31, provided the ACT is not met before the end of the fishing season.

Although the Council intended the new fishing year and closed periods to provide both a fall and spring fishing season, recreational landings of Gulf greater amberjack during the fall 2018 season met the ACT. As a result, harvest was closed for the remainder of the fishing year (i.e., through July 2019) and no harvest was allowed in May 2019.² To address public concerns with achieving both a fall and spring open period for recreational Gulf greater amberjack harvest, the Council initiated development of a framework action examining approaches to accomplish this management goal. The framework action includes alternatives for changing the bag and possession limits, the fishing year, and the season structure.

1.2 Purpose and Need

The purpose of this framework action is to modify the gulf greater amberjack recreational bag limit, recreational fishing year, and fishing season.

The need for this framework action is to maximize fishing opportunities for the recreational sector while constraining harvest to the management target and rebuilding the Gulf greater amberjack stock. The purpose of this framework action is to modify the Gulf greater amberjack recreational bag limit, recreational fishing year, and fixed closed season.

1.3 History of Management

This history of management covers actions pertinent to the harvest of Gulf greater amberjack by the recreational sector. A complete history of management for the Reef Fish Fishery Management Plan (FMP) is available on the Council's website.³

The Reef Fish FMP (with environmental impact statement [EIS]) was implemented in November 1984. The original list of species included in the management unit consisted of snappers, groupers, and sea basses. Gray triggerfish and *Seriola* species, including greater amberjack, were in a second list of species included in the fishery, but not in the management unit. The species in this list were not considered to be target species, because they were generally taken incidentally to the directed fishery for species in the management unit. Their inclusion in the Reef Fish FMP was for purposes of data collection, and their take was not regulated.

Amendment 1 (with environmental assessment [EA]) implemented in 1990, added greater amberjack and lesser amberjack to the list of species in the management unit. It set a greater amberjack recreational minimum size limit of 28 inches fork length (FL), a 3-fish recreational bag limit, and a commercial minimum size limit of 36 inches FL. This amendment's objective was to stabilize the long-term population levels of all reef fish species. A framework procedure for specification of total allowable catch was created to allow for annual management changes.

² <https://www.fisheries.noaa.gov/bulletin/recreational-harvest-closures-greater-amberjack-and-gray-triggerfish-federal-waters>

³ http://www.gulfcouncil.org/fishery_management_plans/reef_fish_management.php

This amendment also established a commercial vessel permit for reef fish as a requirement for harvest in excess of the bag limit and for the sale of reef fish.

Amendment 5 (with supplemental EIS), implemented in 1994, required that all finfish, except for oceanic migratory species, be landed with head and fins attached, and closed the region of Riley's Hump (near Dry Tortugas, Florida) to all fishing during May and June to protect mutton snapper spawning aggregations.

Amendment 12 (with EA), submitted in 1995 and implemented in 1997, reduced the greater amberjack bag limit from three fish to one fish per person, and created an aggregate bag limit of 20 reef fish for all reef fish species not having a bag limit (including lesser amberjack, banded rudderfish, almaco jack, and gray triggerfish). The National Marine Fisheries Service (NMFS) disapproved proposed provisions to include lesser amberjack and banded rudderfish along with greater amberjack in an aggregate one-fish bag limit and to establish a 28-inch FL minimum size limit for those species.

Amendment 15 (with EA), implemented in 1998, established a fixed closed season for the commercial harvest of greater amberjack in the Gulf during the months of March, April, and May.

A Regulatory Amendment (with EA), implemented in 1999, created two marine reserves (i.e., closed two areas), 115 and 104 square nautical miles respectively, year-round to all fishing under the jurisdiction of the Council with a 4-year sunset clause.

Generic Sustainable Fisheries Act Amendment (with EA), partially approved and implemented in 1999, set the maximum fishing mortality threshold (MFMT) for greater amberjack at the fishing mortality necessary to achieve 30% of the unfished spawning potential ratio (SPR) $F_{30\% SPR}$. Estimates of maximum sustainable yield (MSY), minimum stock size threshold (MSST), and optimum yield (OY) were disapproved, because they were based on SPR proxies rather than biomass-based estimates.

Secretarial Amendment 2 (with EIS), implemented in 2003, specified MSY for greater amberjack as the yield associated with $F_{30\% SPR}$ (proxy for fishing mortality rate corresponding to an equilibrium yield of MSY [F_{MSY}]) when the stock is at equilibrium, optimum yield (OY) as the yield associated with an $F_{40\% SPR}$ when the stock is at equilibrium, maximum fishing mortality threshold MFMT equal to $F_{30\% SPR}$, and minimum stock size threshold MSST equal to $(1 - M) * B_{MSY}$ (where M = natural mortality and B_{MSY} = stock biomass level capable of producing an equilibrium yield of MSY) or 75% of B_{MSY} . It also set a rebuilding plan limiting the harvest to 2,900,000 lbs for 2003-2005, 5,200,000 lbs for 2006-2008, 7,000,000 lbs for 2009-2011, and for 7,900,000 lbs for 2012. This was expected to rebuild the stock in 7 years. Regulations implemented in 1997 and 1998 (Amendments 12 and 15 to the Reef Fish FMP) were deemed sufficient to comply with the rebuilding plan so no new regulations were implemented.

Amendment 30A (with EIS), implemented in 2008, was developed to stop overfishing of gray triggerfish and greater amberjack. The amendment established ACLs and accountability

measures (AM) for greater amberjack and gray triggerfish. For greater amberjack, the rebuilding plan was modified, increasing the recreational minimum size limit to 30 inches FL, implementing a zero bag limit for captain and crew of for-hire vessels, and setting commercial and recreational ACTs. **Amendment 30A** also established an allocation for greater amberjack harvest of 73% recreational and 27% commercial, which would be in effect until such time that the Council, through the recommendations of an Ad Hoc Allocation Committee, could implement a separate amendment that fairly and equitably allocated Reef Fish FMP resources between recreational and commercial sectors.

A Regulatory Amendment (with EA), implemented in 2011, specified the greater amberjack recreational closed season from June 1 – July 31. The intended effect of this final rule was to mitigate the social and economic impacts associated with implementing in-season closures.

Amendment 35 (with EA), implemented in 2012 in response to a 2010 update stock assessment, established a new ACL equal to the ABC at 1,780,000 lbs, which was less than the current ACL of 1,830,000 lbs. Reducing the ABC by 18% was expected to end overfishing. The rule also established a commercial trip limit of 2,000 lbs whole weight (ww) throughout the fishing year. The Council also considered bag limits and closed season management measures for the recreational sector but did not alter any recreational management measures.

2015 Framework Action (with EA), implemented in 2016 decreased the total ACL from 1,780,000 lbs to 1,720,000 lbs, set the commercial ACL at 464,400 lbs and the commercial ACT at 394,740 lbs, set the recreational ACL at 1,255,600 lbs and the recreational ACT at 1,092,372 lbs, reduced the commercial trip limit from 2,000 lbs to 1,500 lbs, and increased the recreational minimum size limit from 30 inches FL to 34 inches FL (GMFMC 2016).

Amendment 44 (with EA), was implemented in December 21, 2017. This amendment changed the minimum stock size threshold for seven species in the Reef Fish FMP, including greater amberjack. After the approval of Amendment 44, the greater amberjack stock was still classified as overfished and undergoing overfishing.

The Council approved two framework actions in 2017 that addressed management of Gulf greater amberjack. **Modifications to Greater Amberjack Allowable Harvest and Rebuilding Plan** (with EA) was implemented on January 27, 2018 (GMFMC 2017a). The action set the sector-specific ACLs and ACTs for 2018 to 2020 and beyond. In addition, this framework action modified the fixed season closure for the recreational sector to be January 1 through June 30 each year.

Modifications to the Greater Amberjack Fishing Year and the Recreational Fixed Closed Season (with EA; GMFMC 2017b). This action modified the recreational fishing year to begin on August 1 and run through July 31 of the following year. It also modified the fixed closed season so that recreational harvest is prohibited from November 1 – April 30 and June 1 – July 31. The final rule was effective April 30, 2018.

CHAPTER 2. MANAGEMENT ALTERNATIVES

2.1 Action 1– Modify the Recreational Bag Limit for Greater Amberjack

Alternative 1: No Action – Do not reduce the current 1 fish per angler per day recreational bag limit.

Alternative 2: Reduce the recreational bag limit to 1 fish per 2 or fewer anglers per day.

Alternative 3: Reduce the recreational bag limit to 1 fish per 3 or fewer anglers per day.

Alternative 4: Reduce the recreational bag limit to 1 fish per 6 or fewer anglers per day.

Discussion

The recreational bag limit for Gulf of Mexico (Gulf) greater amberjack is 1 fish per angler per day and was implemented in 1997 (GMFMC 1995). The Gulf of Mexico Fishery Management Council (Council) is considering options to reduce the recreational bag limit below 1 fish per angler per day in an effort to reduce the likelihood of exceeding the annual catch target (ACT) and potentially allow for an increase in season length (Table 2.1.1).

Table 2.1.1. The number of Gulf greater amberjack that can be retained relative to the size of the fishing party (number of anglers) for **Alternatives 1 – 4.**

Number of Anglers	1 fish per angler (Alt. 1)	1 fish for 2 or fewer anglers (Alt. 2)	1 fish for 3 or fewer anglers (Alt. 3)	1 fish for 6 or fewer anglers (Alt. 4)
	Allowable number of fish	Allowable number of fish	Allowable number of fish	Allowable number of fish
1	1	1	1	1
2	2	1	1	1
3	3	2	1	1
4	4	2	2	1
5	5	3	2	1
6	6	3	2	1
7	7	4	3	2
8	8	4	3	2
9	9	5	3	2
10	10	5	4	2
11	11	6	4	2
12	12	6	4	2

However, harvest rates are difficult to predict when management changes are frequent and for the fall months, specifically August through October, which have few landings data to inform forecasting analyses (Appendix A). **Alternatives 2 -4** are expected to modestly reduce harvest (Table 2.1.2). The bag limit would need to be further reduced to achieve any substantial harvest reduction.

Table 2.1.2. Percent reductions in recreational landings under **Alternatives 1-4** relative to **Alternative 1**.

Bag limit alternatives	Reduction	Allowance
Alternative 1: One fish per angler	0%	N/A
Alternative 2: One fish per 2 or fewer anglers	9.5%	1-2 anglers on vessel retain 1 fish; 3-4 anglers on vessel retain 2 fish, etc.
Alternative 3: One fish per 3 or fewer anglers	12.3%	1-3 anglers on vessel retain 1 fish; 4-6 anglers on vessel retain 2 fish, etc.
Alternative 4: One fish per 6 or fewer anglers	16.2%	1-6 anglers on vessel retain 1 fish; 7-12 anglers on vessel retain 2 fish, etc.

Source: See Appendix A.2 Data sources

The Council has previously considered modifications from the 1 fish per angler per day bag limit in the past. During the development of Amendment 30A to the Reef Fish Fishery Management Plan of the Gulf (Reef Fish FMP), the Council received comments during public hearings and from the Reef Fish Advisory Panel that called this type of bag limit the least acceptable way to manage the recreational sector (GMFMC 2008). The comments stated that bag limits less than 1 fish per angler per day would be arduous to enforce and would disproportionately affect the for-hire component of the recreational sector. During the development of Amendment 35 to the Reef Fish FMP, the Council also determined that there was little public interest in bag limits of less than 1 fish per angler per day and moved the action to considered by rejected (GMFMC 2012). Contemporary input from stakeholders at the June 2019 Council meeting indicated interest in reducing the recreational bag limit as a tool for extending the fishing season. However, results from recent analyses have indicated that even a reduction in the bag limit to 1 fish per 6 or fewer anglers would only reduce harvest by 16.2% (Table 2.1.1). This result is similar to what was found when drafting GMFMC 2017b where a further reduction to the bag limit did not greatly reduce harvest. Ultimately, a reduction in bag limit was not pursued as a viable alternative for GMFMC 2017b.

2.2 Action 2– Modify the Greater Amberjack Recreational Fishing Year

Alternative 1: No Action – Do not modify the current August 1 – July 31 fishing year.

Alternative 2: Modify the fishing year to be January 1 – December 31.

Discussion

The current fishing year (August 1 – July 31; **Alternative 1**) for recreational greater amberjack was established in the Framework to Modify the Greater Amberjack Fishing Year and the Recreational Fixed Closed Season (GMFMC 2017b). The fishing year for most reef fish species is based on the calendar year, January 1 – December 31 (**Alternative 2**) and was established in the original Reef Fish FMP (GMFMC 1981). Even though neither **Alternative 1** nor **2** modify the length of the fishing year (both represent a 12 month period), harvest rates do vary by month (Figure 2.2.1) which can confound forecast analyses. For example, opening the fishing year in a month with high historical harvest may limit the season duration relative to beginning the fishing year in a month with less historical harvest.

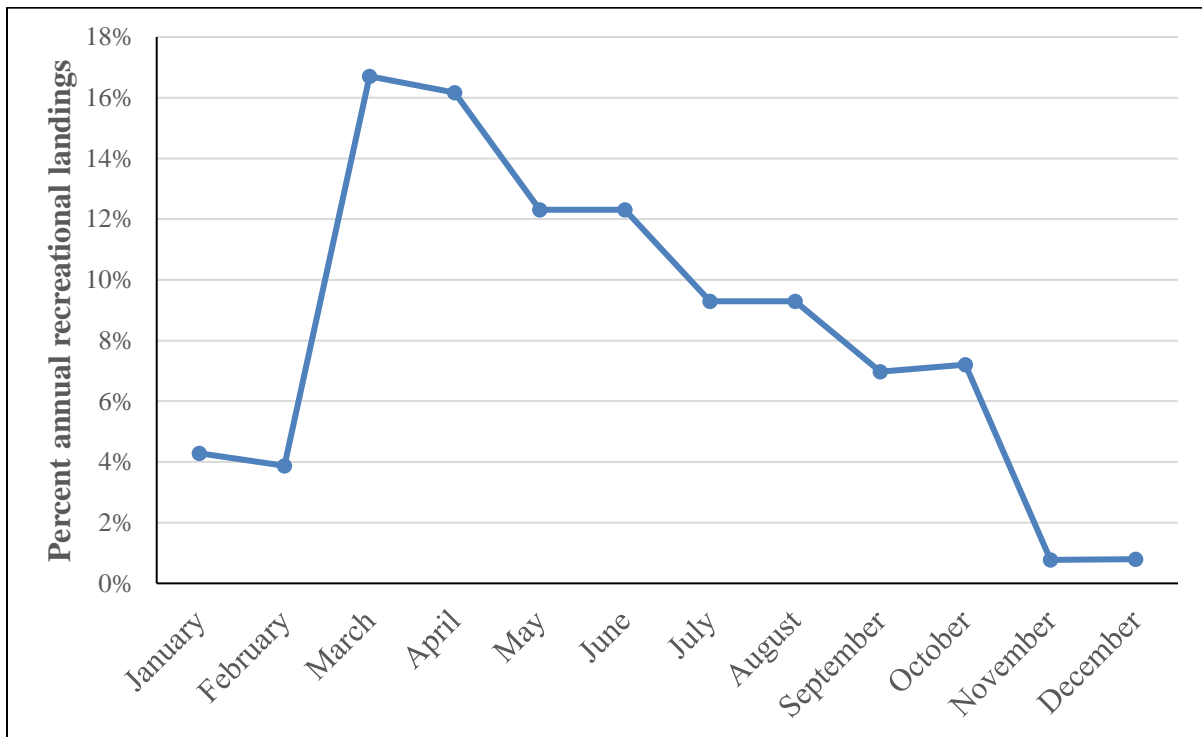


Figure 2.2.1. Percent annual landings of recreationally harvested Gulf greater amberjack by month from 2011-2018. All of the predicted landings before 2013 were modified to account for the change in landings from the increase in size limit from 30 to 34 inches fork length in January 2016. A more detailed explanation of data sources for calculation of daily recreational catch rates by month are available in Appendix A.

Under **Alternative 1** the recreational fishing year for greater amberjack begins each year on August 1 and extends through July 31. This creates a fishing year for the recreational harvest of greater amberjack that differs from all other federally managed reef fish except for commercial and recreational yellowtail snapper, which was changed to an August 1 through July 31 fishing year in 2017 (GMFMC 2016). Under current management, many reef fish species open to harvest each year on January 1, but some species close before the end of the calendar year if the annual catch limit (ACL) or ACT is met or projected to be met. The result is that fewer species may be open to harvest later in the calendar year. **Alternative 1** provides access to a highly prized species later in the calendar year during a period of the year when the harvest of other prized species (e.g., red snapper) is typically prohibited in federal waters. However, under **Alternative 1**, there is a disparity in the fishing year for greater amberjack between the commercial and recreational sectors. This complicates efforts to monitor annual harvest and to determine if the combined commercial and recreational landings have exceeded the acceptable biological catch. Furthermore, **Alternative 1** did not allow for a spring season in the 2018/2019 fishing year as the ACT was exceeded by the end of the fall fishing season. **Alternative 2** would re-establish a January 1 – December 31 fishing year for both sectors and allows for estimates of total harvest (i.e., both recreational and commercial sectors) that is within the same time period that is useful for stock assessments and monitoring the progress of the rebuilding plan. **Alternative 2** would also allow harvest to begin during the shorter spring season (May) which would increase the likelihood of being able to harvest during the spring and fall.

Alternative 1 affects the recreational landings monitoring process for three of the Gulf states (Florida, Alabama, and Mississippi). Recreational landings of greater amberjack from private anglers and state permitted for-hire vessels are estimated via the Marine Recreational Information Program (MRIP) in six two-month waves for these three states, while Louisiana and Texas recreational landings are monitored through state programs. The two months included in wave 4 (July and August) are the last month of one fishing year (July) and the first month of the next fishing year (August). Thus, **Alternative 1** requires wave 4 (July – August landings) to be split into separate fishing years. This increases the uncertainty of the landings estimate and causes delays in producing estimates of annual harvest. **Alternative 2** would move the start of the fishing year back to January 1, and, therefore, would not require an adjustment for splitting wave 4 in the MRIP data. However, implementation of **Alternative 2** would take special consideration as to when implementation would occur and could lead to a potential truncated fishing year or a prolonged period of no harvest until the start of the calendar year.

Under **Alternative 1**, the 2019/2020 recreational fishing year would begin on August 1, 2019, and extend through July 31, 2020. Each subsequent recreational fishing year would also begin on August 1 and extend through July 31 of the following calendar year. Under **Alternative 2**, the recreational fishing year would return to the calendar year of January 1 – December 31. Both alternatives would use the 2020 and beyond recreational ACL and ACT established in a recent greater amberjack framework action (GMFMC 2017a) at the beginning of the next fishing year.

2.3 Action 3– Modify the Greater Amberjack Recreational Season

Alternative 1: No Action – Do not modify the current November 1 – April 30 and June 1 – July 31 seasonal closure (open May 1 – May 31 and August 1 – October 31).

Alternative 2: Modify the recreational seasonal closure to be November 1 – April 30 and June 1 – August 31 (Open May 1 – May 31 and September 1 – October 31).

Alternative 3: Modify the recreational seasonal closure to be November 1 – April 30 and May 21 – July 31 (Open May 1 – May 20 and August 1- October 31).

Alternative 4: Modify the recreational seasonal closure to be November 1 – April 30 and May 21 – August 31 (Open May 1 – May 20 and September 1- October 31).

Discussion

The peak spawning period for greater amberjack is March through April in most of the Gulf (Wells and Rooker 2002; Murie and Parkyn 2008; SEDAR 33 2014) and April through May in the Florida Keys (Harris et al. 2007). **Alternatives 1 - 4** would retain a closed season during part of the peak spawning period (March through April). **Alternatives 1 - 4** would still allow for harvest of greater amberjack after the red snapper season has closed or right before it typically opens. Modifications to the current closed seasons (**Alternative 1**) would include adding the month of August to the summer closed season (**Alternative 2**), limiting harvest in the month of May to 20 days (**Alternative 3**), or both adding the month of August to the summer closed season and limiting harvest in the month of May to 20 days (**Alternative 4**) (Table 2.3.1).

Table 2.3.1. Optional recreational seasons for Gulf greater amberjack (Action 3) for each fishing year alternative (Action 2). Black indicates months where no harvest would be permitted (closed season) and white indicates months where harvest is permitted (open season). The hatched pattern during the month of May for **Alternatives 3 and 4** indicate a partial open season within the month where harvest would be allowed from May 1 – May 20.

Fishing year August 1 – July 31 (Action 2 Alternative 1)												
Action 3	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul
Alternative 1												
Alternative 2												
Alternative 3												
Alternative 4												
Fishing year January 1 – December 31 (Action 2 Alternative 2)												
Action 3	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Alternative 1												
Alternative 2												
Alternative 3												
Alternative 4												

Greater amberjack accountability measures (AM) include requiring the Regional Administrator (RA) to close the respective sector to further harvest of greater amberjack when the sector’s ACT has been met or projected to be met, and to reduce that sector’s ACL and ACT in the following year by the amount of any overage of the sector ACL. In years when an ACL overage occurs, the amount of the overage must be subtracted from the following fishing year’s recreational ACL and ACT.

Alternative 1 would maintain the current recreational fishing season that was effective in January 2018, which allows for recreational harvest of greater amberjack in the fall and May when the harvest of other species, such as red snapper, is prohibited. This fishing season also provides protection to the stock during its rebuilding period (GMFMC 2017b). However, during the 2018/2019 fishing year, no harvest was permitted for the month of May (2019) due to the ACT having been harvested during the fall open period in 2018. Due to the timing of the rule, the entire ACL for 2017/2018 was available in May and subsequently a closure did not occur. The recreational sector has now experienced an in-season closure on the harvest of greater amberjack in all full fishing years since 2014 (Table 2.3.2).

Table 2.3.2 Recreational greater amberjack closures from 2013-2019.

Fishing Year	Closure Date
2018/2019	May 1
2017/2018	None
2017	March 24
2016	June 1
2015	September 28
2014	August 24
2013	None

Combined Analysis of Actions 1, 2, and 3

The estimated season duration depends on the bag limit selected in Action 1 and the fishing year selected in Action 2. Alternatives for bag limit modification would have different effects on the percent by which the recreational harvest would be reduced and variability in the daily catch rate between months would influence the overall cumulative harvest rate differently depending on when the beginning of the fishing year is defined. To account for these uncertainties, forecasting analyses for all combinations of alternatives from Actions 1 -3 were performed to predict the season duration for the recreational harvest of Gulf greater amberjack (Tables 2.3.3 – 2.3.6). In all analyses, season duration is defined as the amount of time (in days) estimated to land the recreational ACT of 1,086,985 lbs whole weight (lbs ww) under each action and alternative combination.

Table 2.3.3. Estimated recreational season durations with a bag limit of 1 fish per angler per day (Action 1 Alternative 1) for both fishing year alternatives (Action 2), and all 4 season alternatives (Action 3).

Fishing Year	Estimated Closure Date	Number of days open
August 1 to July 31 Fishing Year (Action 2 Alternative 1)		
Open period August 1 – October 31 and May 1 – May 31 (Alt. 1)	10-May	102
Open period September 1 – October 31 and May 1 – May 31 (Alt. 2)	None	92
Open period August 1 – October 31 and May 1 – May 20 (Alt. 3)	10-May	102
Open period September 1 – October 31 and May 1 – May 20 (Alt. 4)	None	92
January 1 to December 31 Fishing Year (Action 2 Alternative 2)		
Open period May 1 – May 31 and August 1 – October 31 (Alt. 1)	24-Sep	86
Open period May 1 – May 31 and September 1 – October 31 (Alt. 2)	None	92
Open period May 1 – May 20 and August 1 – October 31 (Alt. 3)	24-Sep	105
Open period May 1 – May 20 and September 1 – October 31 (Alt. 4)	None	81

Source: See Appendix A.2 Data sources

Table 2.3.4. Estimated recreational season durations with a bag limit of 1 fish per 2 or fewer anglers per day (Action 1 Alternative 2) for both fishing year alternatives (Action 2), and all 4 season alternatives (Action 3).

Fishing Year	Estimated Closure Date	Number of days open
August 1 to July 31 Fishing Year (Action 2 Alternative 1)		
Open period August 1 – October 31 and May 1 – May 31 (Alt. 1)	17-May	109
Open period September 1 – October 31 and May 1 – May 31 (Alt. 2)	None	92
Open period August 1 – October 31 and May 1 – May 20 (Alt. 3)	17-May	109
Open period September 1 – October 31 and May 1 – May 20 (Alt. 4)	None	81
January 1 to December 31 Fishing Year (Action 2 Alternative 2)		
Open period May 1 – May 31 and August 1 – October 31 (Alt. 1)	7-Oct	99
Open period May 1 – May 31 and September 1 – October 31 (Alt. 2)	None	92
Open period May 1 – May 20 and August 1 – October 31 (Alt. 3)	26-Oct	107
Open period May 1 – May 20 and September 1 – October 31 (Alt. 4)	None	81

Source: See Appendix A.2 Data sources

Table 2.3.5. Estimated recreational season durations with a bag limit of 1 fish per 3 or fewer anglers per day (Action 1 Alternative 3) for both fishing year alternatives (Action 2), and all 4 season alternatives (Action 3).

Fishing Year	Estimated Closure Date	Number of days open
August 1 to July 31 Fishing Year (Action 2 Alternative 1)		
Open period August 1 – October 31 and May 1 – May 31 (Alt. 1)	19-May	111
Open period September 1 – October 31 and May 1 – May 31 (Alt. 2)	None	92
Open period August 1 – October 31 and May 1 – May 20 (Alt. 3)	19-May	111
Open period September 1 – October 31 and May 1 – May 20 (Alt. 4)	None	81
January 1 to December 31 Fishing Year (Action 2 Alternative 2)		
Open period May 1 – May 31 and August 1 – October 31 (Alt. 1)	11-Oct	103
Open period May 1 – May 31 and September 1 – October 31 (Alt. 2)	None	92
Open period May 1 – May 20 and August 1 – October 31 (Alt. 3)	30-Oct	111
Open period May 1 – May 20 and September 1 – October 31 (Alt. 4)	None	112

Source: See Appendix A.2 Data sources

Table 2.3.6. Estimated recreational season durations with a bag limit of 1 fish per 6 or fewer anglers per day (Action 1 Alternative 4) for both fishing year alternatives (Action 2), and all 4 season alternatives (Action 3).

Fishing Year	Estimated Closure Date	Number of days open
August 1 to July 31 Fishing Year (Action 2 Alternative 1)		
Open period August 1 – October 31 and May 1 – May 31 (Alt. 1)	23-May	115
Open period September 1 – October 31 and May 1 – May 31 (Alt. 2)	None	92
Open period August 1 – October 31 and May 1 – May 20 (Alt. 3)	None	112
Open period September 1 – October 31 and May 1 – May 20 (Alt. 4)	None	81
January 1 to December 31 Fishing Year (Action 2 Alternative 2)		
Open period May 1 – May 31 and August 1 – October 31 (Alt. 1)	17-Oct	109
Open period May 1 – May 31 and September 1 – October 31 (Alt. 2)	None	92
Open period May 1 – May 20 and August 1 – October 31 (Alt. 3)	None	112
Open period May 1 – May 20 and September 1 – October 31 (Alt. 4)	None	81

Source: See Appendix A.2 Data sources

Modifications to the bag limit (Action 1, Alternatives 1-4) does not have a sizable effect on estimated season duration. For example, the maximum season duration estimated under a bag limit of 1 fish per angler (Action 1 Alternative 1), 1 fish per 2 or fewer anglers (Action 1 Alternative 2), 1 fish per 3 or fewer anglers (Action 1 Alternative 3), and 1 fish per 6 or fewer anglers (Action 1 Alternative 4) would be 105, 109, 112, and 115 days respectively. Overall, only the combinations that extend the summer closed season to include the month of August (Action 3 Alternative 2), or that extend the summer closed season to include August and partially close the month of May (Action 3 Alternatives 4) result in no in-season closure for either fishing year (Action 2 Alternatives 1 and 2). The only combinations of alternatives that are estimated to achieve a fishing season that includes August in the fall open season (Action 3 Alternative 3) is when harvest is restricted to 1 fish per 6 or fewer anglers per day (Action 1 Alternative 4) for either fishing year (Action 2 Alternatives 1-2).

There is uncertainty in the estimates produced by the decision tool because it assumes future catch rates will stay the same; however, in practice catch rates may increase or decrease for various reasons. Additionally, the month of May begins a new data collection wave in the Marine Recreational Information Plan (MRIP) and it will be difficult to quickly process data landings data in during that month with a partial open season (**Alternatives 3 and 4**). However, this information is important so a baseline for all years could be explored.

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APPENDIX A. ALTERNATIVE ANALYSES: MODELING RECREATIONAL BAG LIMIT CHANGES, RECREATIONAL FISHING YEAR AND SEASONS FOR GULF OF MEXICO GREATER AMBERJACK

A.1 Introduction

Greater amberjack (*Seriola dumerili*) are one of 31 reef fish species managed by the Gulf of Mexico Fishery Management Council (Council). Greater amberjack are in the Council's Fishery Management Plan (FMP) for the Reef Fish Resources of the Gulf of Mexico. The FMP provides management for reef fish species in the federal waters of the Gulf of Mexico.

In 2016, a stock assessment was conducted for the Gulf of Mexico greater amberjack (SEDAR 33 Update). Results from the assessment showed the greater amberjack stock is overfished and experiencing overfishing. A Framework Action is currently being drafted and its purpose is to examine possible modifications to the recreational bag limit, recreational fishing year and season. The current management measures for the recreational sector are an August 1 to July 31 fishing year, closed seasons from November 1 – April 30 and June 1 to July 31, minimum size of 34 inches fork length (FL), and one greater amberjack per angler per day bag limit.

A.2 Data Sources

Recreational landings data for Gulf of Mexico greater amberjack were obtained from the Southeast Fisheries Science Center (SEFSC) Marine Recreational Information Program (MRIP), the Texas Parks and Wildlife Department (TPWD) Creel Survey, Louisiana Creel survey (LA Creel) and the Headboat Survey (Headboat). MRIP, TPWD, and LA Creel conducted dockside intercepts to collect information on the size and number of greater amberjack. Headboat collected size and number of greater amberjack through logbooks completed by headboat operators. Recreational landings come from MRIPACLspec_rec81_19wv1_30May19wLACreel_2014v2_2018.xlsx.

A.3 Methods

The Council is considering changes to the recreational bag limit, recreational fishing year and season, for Gulf greater amberjack in a Framework Action. The Council's management measures proposed in the current Framework Action were explored.

A.3.1 Predicted Landings

The Framework Action currently being drafted will be imposed on future fishing years. An estimate of future landings are required to explore the impact of modifying the season start date and different closed seasons.

The greater amberjack recreational fishery has had several regulations changes over the past five years. For example there have been changes to the start of the fishing year, bag limit, size limit, and changes to the periods of time when the recreational sector was open for harvest. Since the recreational sector has had numerous regulation changes it was assumed that landings in recent years are the best predictor of future landings. One specific and significant change to the recreational sector occurred on January 4, 2016 when the size limit was increased from 30 to 34 inches fork length. This size limit change can impact the catch rates since it forces the fishers to release fish less than 34 inches and potentially target fish 34 inches or greater. This change to the catch was examined by looking at the size of greater amberjack harvested in the recreational sector before the size limit change (2013-2015) and after the size limit change (2016-2018). Before the size limit change the average length was 36.4 inches FL (standard deviation = 6.37) and it increased to an average length of 38.7 inches fork length (standard deviation = 5.12). The different average lengths were compared with a two sample t-test, and there is a significant difference between them ($n = 2,354$; t Value = 8.09, $P < 0.001$). There was a change to the length distribution of greater amberjack after the size limit was increased (Figure A.3.1). Therefore, landings data from 2016 or earlier was used to predict future landings.

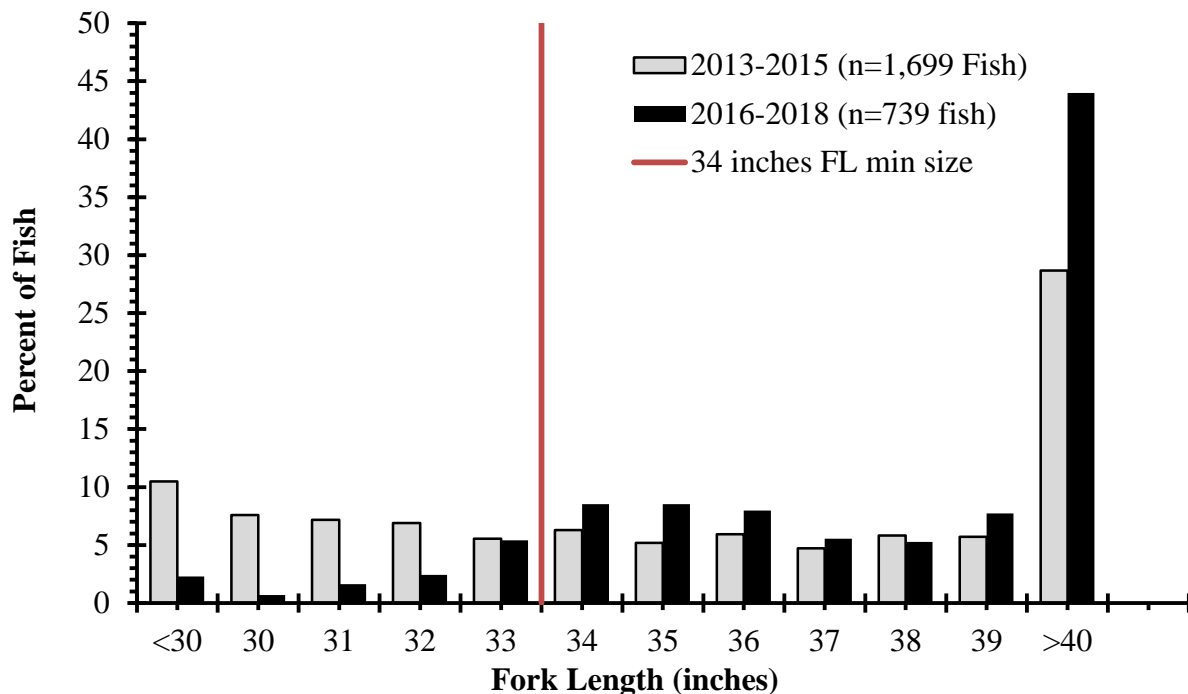


Figure A.3.1. Length distribution of Gulf of Mexico recreational greater amberjack before (2013-2015) and after (2016-2018). These time periods were used because the size limit changed from 30 to 34 inches fork length on January 4, 2016. Length data came from MRIP, TPWD, LA Creel, and Headboat datasets.

The recreational landings from 2016 to 2018 were examined to determine when the fishery was open. Predicted landings for January and February were determined from the average landings from 2016 and 2017 since the recreational sector was open for this time period in these two years. The only time the recreational sector was open in March and April since the size limit

change was in 2016, therefore, the landings in March and April of 2016 were used to predict future March and April landings. The recreational sector was open in May in 2016 and 2018 and the average from May in these two years was used to predict future May landings. The recreational sector has been closed in June for the past three years so it was assumed the landings in June are the same as the predicted landings in May. A similar situation occurred in July and August where the recreational sector was closed from 2016-2018 in July and only open in August of 2018. Landings from August of 2018 were used to predict future August landings and it was assumed the landings in July have the same catch rate as August. The only time the recreational sector was open in September and October since the size limit change was in 2018, therefore, the landings in September and October of 2018 were used to predict future September and October landings. The last time the greater amberjack recreational sector was open in November and December was in 2011, 2012, and 2013. The landings from 2011, 2012, and 2013 were first reduced to adjust for the decrease in landings from the change in the size limit and the percent reductions came from the 2015 Framework Action. Then average landings from 2011-2013 were used to predict future November and December landings. Details of the landings used to create future predicted landings are shown in Table A.3.1. The predicted future landings are plotted in Figure A.3.2.

Table A.3.1. Details of the landings used to determine the predicted recreational landings for greater amberjack.

	Jan/Feb	Mar/Apr	May/June	Jul/Aug	Sep/Oct	Nov/Dec
Details	Average of 2016 and 2017 landings	2016 Landings	Average of 2016 and 2018 Landings in May. June landings assumed to be the same as May	2018 Landings in August. July landings assumed to be same as August	2018 Landings	2011-2013 landings were modified due to the size limit increase. Average landings by wave from 2011-2013.

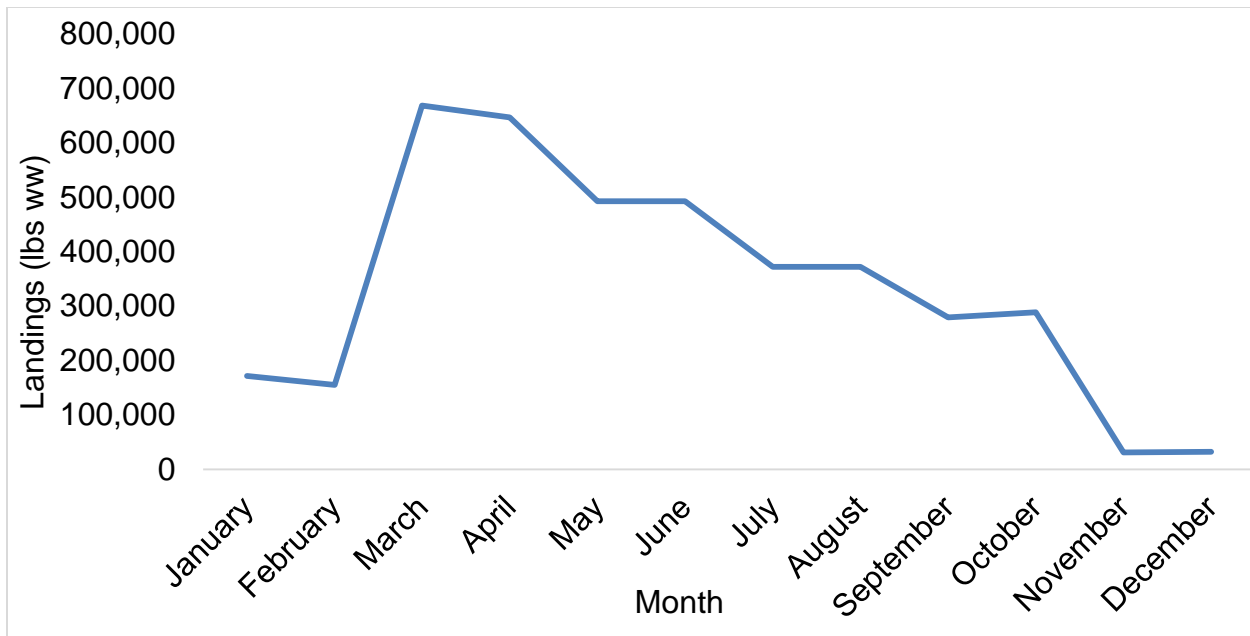


Figure A3.2. Predicted future Gulf of Mexico greater amberjack recreational landings by month.

A.3.2 Season Analyses

Recreational landings of greater amberjack are highly seasonal in the Gulf of Mexico; thus, reductions associated with seasonal closures differ greatly depending upon the time period selected for closure (Figure A.3.2). Following the Actions and Alternative presented in the Council’s Framework Action the predicted landings were projected until the Annual Catch Target (ACT) of 1,086,985 pounds whole weight (lbs ww) was met. A range of fishing years and closed seasons were examined and the landings were compared.

The Council is also considering modifying the bag limit to reduce landings. The current bag limit is one fish per person per day and the Council is considering reducing the bag limit even further. The Council is considering one fish for every two people or one fish for every three people with an allowance for fewer people. Table A.3.2 illustrates the allowance of fish per person being proposed by the Council. The statistics on number of anglers and the number of greater amberjack harvested per trip from 2016, 2017, and 2018 were analyzed. Percent reduction in landings from the fractional bag limits were calculated by determining what percentage of the landings will be reduced from reducing the bag limit (Table A.3.3).

Table A.3.2. Allowance of Gulf of Mexico greater amberjack for the proposed changes to the recreational bag limit.

Number of Anglers	1 fish per angler	1 fish for 2 or fewer anglers	1 fish for 3 or fewer anglers	1 fish for 6 or fewer anglers
	Allowable number of fish	Allowable number of fish	Allowable number of fish	Allowable number of fish
1	1	1	1	1
2	2	1	1	1
3	3	2	1	1
4	4	2	2	1
5	5	3	2	1
6	6	3	2	1
7	7	4	3	2
8	8	4	3	2
9	9	5	3	2
10	10	5	4	2
11	11	6	4	2
12	12	6	4	2

Table A.3.3. Projected percent reductions of greater amberjack landings from imposing bag limits on the Gulf of Mexico recreational sector. The current bag limit is 1 fish per angler per day.

Bag limit alternatives	Reduction	Allowance
One fish per angler	0%	N/A
One fish per 2 or fewer anglers	9.5%	1-2 anglers on vessel retain 1 fish; 3-4 anglers on vessel retain 2 fish, etc.
One fish per 3 or fewer anglers	12.3%	1-3 anglers on vessel retain 1 fish; 4-6 anglers on vessel retain 2 fish, etc.
One fish per 6 or fewer anglers	16.2%	1-6 anglers on vessel retain 1 fish; 7-12 anglers on vessel retain 2 fish, etc.

The calculated reduction in landings from reducing the bag limit to one fish for up to two people or one fish for up to three people were applied to the predicted future landings. The modified predicted future landings were analyzed to determine when the ACT would be met.

A.4 References

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