

Modifications to the Gulf of Mexico Migratory Group King Mackerel Sector Allocations



Draft Amendment 33 to the Fishery Management Plan for the Coastal Migratory Pelagic Resources in the Gulf of Mexico and Atlantic Region

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ENVIRONMENTAL ASSESSMENT COVER SHEET

Modifications to the Gulf of Mexico Migratory Group King Mackerel Sector Allocations:
Amendment 33 to the Fishery Management Plan for Coastal Migratory Pelagic Resources in the
Gulf of Mexico and Atlantic Region including Environmental Assessment

Responsible Agencies and Contact Persons

Gulf of Mexico Fishery Management Council
4107 W. Spruce Street, Suite 200
Tampa, Florida 33607
Matt Freeman (matt.freeman@gulfcouncil.org)

813-348-1630
813-348-1711 (fax)
gulfcouncil@gulfcouncil.org
<http://www.gulfcouncil.org>

South Atlantic Fishery Management Council
4055 Faber Place, Suite 201
North Charleston, South Carolina 29405
Christina Wiegand (christina.wiegand@safmc.net)

1-866-732-6210
843-769-4520 (fax)
www.safmc.net

National Marine Fisheries Service (Lead Agency)
Southeast Regional Office
263 13th Avenue South
St. Petersburg, Florida 33701
Kelli O'Donnell (kelli.odonnell@noaa.gov)
Karla Gore (karla.gore@noaa.gov)

727-824-5305
727-824-5308 (fax)
[SERO website](#)

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This Environmental Assessment is being prepared using the 2020 CEQ NEPA Regulations. The effective date of the 2020 CEQ NEPA Regulations was September 14, 2020, and reviews begun after this date are required to apply the 2020 regulations unless there is a clear and fundamental conflict with an applicable statute. 85 Fed. Reg. at 43372-73 (§§ 1506.13, 1507.3(a)). This Environmental Assessment began on June 22, 2021, and accordingly proceeds under the 2020 regulations.

ABBREVIATIONS USED IN THIS DOCUMENT

ABC	acceptable biological catch
ACL	annual catch limit
AM	accountability measure
AP	Advisory Panel
Atlantic king mackerel	Atlantic migratory group king mackerel
CMP	coastal migratory pelagics
CHTS	coastal household telephone survey
Councils	Gulf of Mexico and South Atlantic Fishery Management Councils
CS	consumer surplus
EA	environmental assessment
EIS	environmental impact statement
F	fishing mortality
FES	Fishing Effort Survey
FMP	Fishery Management Plan
Gulf	Gulf of Mexico
Gulf Council	Gulf of Mexico Fishery Management Council
Gulf king mackerel	Gulf of Mexico migratory group king mackerel
GMFMC	Gulf of Mexico Fishery Management Council
lbs	pounds
lw	landed weight
M	natural mortality
MFMT	maximum fishing mortality threshold
mp	million pounds
MRIP	Marine Recreational Information Program
MSST	minimum stock size threshold
MSY	maximum sustainable yield
OFL	overfishing limit
OY	optimum yield
PS	producer surplus
RFA	regulatory flexibility analysis
RIR	regulatory impact review
SAFMC	South Atlantic Fishery Management Council
SEDAR	Southeast Data, Assessment, and Review
SEFSC	Southeast Fisheries Science Center
South Atlantic Council	South Atlantic Fishery Management Council
spr	spawning potential ratio
SSB	spawning stock biomass
SSC	Scientific & Statistical Committee
TAC	total allowable catch
ww	whole weight

TABLE OF CONTENTS

Abbreviations Used in this Document	ii
Table of Contents	iii
List of Tables	v
List of Figures	viii
Chapter 1. Introduction	1
1.1 Background	1
1.2 Gulf of Mexico Fishery Management Council and South Atlantic Fishery Management Council Joint Coastal Migratory Pelagic (CMP) Fishery Management Plan (FMP) Objectives	9
1.3 Purpose and Need	9
1.4 History of Management	10
Chapter 2. Management alternatives	14
2.1 Action: Modify the Sector Allocation for Gulf of Mexico (Gulf) Migratory Group King Mackerel (Gulf King Mackerel).	14
Chapter 3. Affected Environment	26
3.1 Description of the Fishery	26
3.1.1 Commercial Sector	26
3.1.2 Recreational Sector	33
3.2 Description of the Physical Environment	38
3.3 Description of the Biological and Ecological Environment	40
3.3.1 Gulf King Mackerel Life History and Biology	40
3.3.2 General Information	42
3.4 Description of the Economic Environment	46
3.4.1 Commercial Sector	46
3.4.2 Recreational Sector	53
3.5 Description of the Social Environment	64
3.5.1 Commercial Sector	65
3.5.2 Recreational Sector	69
3.5.3 Environmental Justice, Equity, and Underserved Communities	71
3.6 Description of the Administrative Environment	74
3.6.1 Federal Fishery Management	74
3.6.2 State Fishery Management	75
Chapter 4. Environmental Consequences	76

4.1 Action 1: Modify the Sector Allocation for Gulf of Mexico (Gulf) Migratory Group King Mackerel (Gulf King Mackerel).	76
4.1.1 Direct and Indirect Effects on the Physical Environment.....	76
4.1.2 Direct and Indirect Effects on the Biological Environment.....	76
4.1.3 Direct and Indirect Effects on the Economic Environment	77
4.1.4 Direct and Indirect Effects on the Social Environment	82
4.1.5 Direct and Indirect Effects on the Administrative Environment	84
4.2 Cumulative Effects Analysis (CEA).....	84
Chapter 5. List of Preparers	88
Chapter 6. References	89
Appendix A. Other Applicable Laws.....	98
Appendix B. Changes to Recreational Data Collection.....	103
Appendix C. Gulf of Mexico Fishery Management Council and South Atlantic Fishery Management Council Joint Coastal Migratory Pelagic Fishery Management Plan Objectives, Pre-June 2022 Gulf Council Meeting	106
Appendix D. Gulf King Mackerel ABC Projections Analysis	107
Appendix E. Considered but Rejected.....	115

LIST OF TABLES

Table 1.1.1. Gulf king mackerel recreational (lbs ww) and commercial landings (lbs lw), recreational landings in MRIP-CHTS and MRIP-FES, the recreational ACL in MRIP-CHTS, the commercial ACL, total landings using MRIP-CHTS and MRIP-FES units, and the total Gulf king mackerel ACL in MRIP-CHTS, for the fishing years 2001/2002 – 2019/2020.....	5
Table 1.1.2. Gulf king mackerel commercial landings (lbs lw) by Zone.....	6
Table 1.1.3. OFL and ABC for Gulf king mackerel for 2021/2022 – 2023/2024 and subsequent fishing years, as recommended by the Gulf Council’s SSC in September 2020 and resulting ACLs as determined by the Gulf Council.....	7
Table 2.1.1. Proportion of sector ACLs landed and proportion of total ACL landed for Gulf king mackerel in MRIP-CHTS for the 2001/2002 – 2019/2020 fishing years.	17
Table 2.1.2. Commercial landings and ACL for Gulf king mackerel by zone for the 2016/2017 – 2019/2020 fishing years.....	18
Table 2.1.3. Stepwise progression of data treatment to generate information provided in Tables 2.1.4 and 2.1.5.....	22
Table 2.1.4. Recreational landings, commercial landings, total landings (lbs lw), and comparisons of the annual difference between the total landings, and the predicted total ACL from Model 2 of the SEFSC Simulation (which assume the commercial landings equal the commercial ACL) for Gulf king mackerel for the 2016/2017 through 2019/2020 fishing years, the proposed 2023/2024 total ACL as recommended by the SSC, and the remaining proposed total ACL percentage.	23
Table 2.1.5. Comparison of Alternative 2 and Alternative 3 to the average of the sector-specific landings from the last four fishing years (2016/2017 – 2019/2020).	24
Table 2.1.6. Resulting catch limits for Gulf king mackerel based on allocation of 68% recreational and 32% commercial, 58% recreational and 42% commercial, or 47% recreational and 53% commercial, compared to 2023/2024 recommended total ACL in MRIP-FES units....	24
Table 2.1.7. Gulf commercial zone-specific catch limits for Gulf king mackerel in MRIP-FES units based on allocation of 68% recreational and 32% commercial, 58% recreational and 42% commercial, or 47% recreational and 53% commercial, compared to 2023/2024 recommended commercial ACL.....	25
Figure 3.1.1.1. King mackerel commercial management measure implementations, total TAC/ACL, total landings, and season length by zone for 1993/1994-2021/2022.....	28
Table 3.1.1.2. Gulf king mackerel commercial landings, and ACLs by zone, gillnet payback-adjusted ACL, percent quota and ACL landed by zone, and closure dates for the fishing years 2000/2001 through 2021/2022. Units are in pounds lw. H&L = hook and line; GN = gillnet....	29
Figure 3.1.2.1. King mackerel recreational management measure implementations, total TAC/ACL, total landings, and season length for 1986/1987-2021/2022. Units are in MRIP Coastal Household Telephone Survey (CHTS).	35
Table 3.1.2.2. Gulf king mackerel recreational landings in MRIP-CHTS and MRIP Fishing Effort Survey (FES), recreational ACL in MRIP-CHTS, percent of ACL landed, and closure dates for the fishing years 1986/1987 through 2019/2020. Units are in lbs lw.	35
Table 3.2.1. Total Gulf greenhouse gas 2014 emissions estimates.....	40
Table 3.3.2.1. Gulf king mackerel biological processes analyzed for climate change sensitivities.....	46

Table 3.4.1.1. Number of vessels, number of trips, and landings (lbs gw) by year for Gulf king mackerel in Gulf jurisdictional waters.....	48
Table 3.4.1.2. Number of vessels and ex-vessel revenue by year (2021 dollars) for Gulf king mackerel in Gulf jurisdictional waters.....	49
Table 3.4.1.3. Number of vessels, number of trips, and landings (lbs gw) by year for Gulf king mackerel in South Atlantic jurisdictional waters.....	50
Table 3.4.1.4. Number of vessels and ex-vessel revenue by year (2021 dollars) for Gulf king mackerel in South Atlantic jurisdictional waters.....	51
Table 3.4.1.5. Average annual business activity (2016 through 2020) associated with the commercial harvest of Gulf king mackerel in Gulf jurisdictional waters.....	52
Table 3.4.1.6. Average annual business activity (2016 through 2020) associated with the commercial harvest of Gulf king mackerel in South Atlantic jurisdictional waters. All monetary estimates are in 2021 dollars.....	53
Table 3.4.2.1. Gulf king mackerel recreational target trips, by mode, state, and calendar year.	56
Table 3.4.2.2. Gulf king mackerel recreational catch trips, by mode, state, and calendar year..	57
Table 3.4.2.3. Gulf headboat angler days and percent distribution by state (2016 - 2020).	58
Table 3.4.2.4. Gulf headboat angler days (in thousands) and percent distribution by month (2016 - 2020).....	59
Table 3.4.2.5. South Atlantic headboat angler days and percent distribution by state (2016 - 2020).	59
Table 3.4.2.6. South Atlantic headboat angler days and percent distribution by month (2016 through 2020).....	60
Table 3.4.2.7. Trip-level economics for offshore trips by Gulf and South Atlantic charter vessels and Southeast headboats in 2017 (2021 dollars).....	62
Table 3.4.2.8. Estimated annual average economic impacts (2016-2020) from recreational trips that targeted Gulf king mackerel, by state and mode, using state-level multipliers.	64
Table 3.5.1.1. Top communities by number of commercial king mackerel permits in the Gulf and along the east coast of Florida.....	66
Table 3.5.2.1. Top communities by number of federal Gulf CMP for-hire permits, including historical captain permits.	70
Table 3.6.2.1. Gulf state marine resource agencies and web pages.	75
Table 4.1.3.1. Changes in the Gulf commercial sector ACL and in the Gulf commercial zone-specific ACLs, as the difference between Alternatives 2 and 1 and between Alternatives 3 and 1	78
Table 4.1.3.2. Expected changes in the commercial sector revenue and commercial zone-specific revenues, as the difference between Alternatives 2 and 1 and between Alternatives 3 and 1	79
Table 4.1.3.3. Expected changes in the commercial sector PS and in the commercial zone-specific PS, as the difference between Alternatives 2 and 1 and between Alternatives 3 and 1	79
Table 4.1.3.4. Changes in the recreational sector ACL, as the difference between Alternatives 2 and 1 and between Alternatives 3 and 1	80
Table 4.1.3.5. Expected change in the recreational sector's CS, based on the difference between the sector ACLs under Alternatives 2 and 3 and the MRIP-FES equivalent for Alternative 1 while accounting for historical landings averaged over the 2015/2016 to 2019/2020 fishing years.	82

Table 4.1.4.1. Comparison of the sector allocations, sector ACLs for the 2023/2024+ fishing year, difference between the sector ACL and its 4-year average landings (2016/2017-2019/2020), and percent greater than the average landings for each sector ACL under **Alternatives 1-3.** 83

LIST OF FIGURES

Figure 1.1.1. Gulf and Atlantic king mackerel migratory group boundaries as currently used by the Councils.	2
Figure 2.1.1. Trends in Gulf king mackerel total landings and by sector compared to the sector and total ACLs for the 2001/2002 – 2019/2020 fishing years.....	18
Figure 2.1.2. Gulf of Mexico king mackerel bag limit distribution from 2015/2016 through 2019/2020 fishing years.....	19
Figure 2.1.3. Total catch (A+B1+B2) of Gulf king mackerel divided into total harvest (A [retained catch] + B1 [observed dead discards]; orange) and fish reported as released alive (B2; green), with the proportion of the total catch comprised of fish released alive shown as a percentage for each calendar year for 2016 – 2020.	20
Figure 3.1.1.1. King mackerel commercial management measure implementations, total TAC/ACL, total landings, and season length by zone for 1993/1994-2021/2022.....	28
Figure 3.2.1. Mean annual sea surface temperature derived from the Advanced Very High-Resolution Radiometer Pathfinder Version 5 sea surface temperature data set.	38
Figure 3.4.2.1. Recreational landings of Gulf king mackerel by mode and fishing year (2015/2016 – 2019/2020).....	54
Figure 3.5.1.1. Regional Quotient (pounds) for top communities ranked by Gulf king mackerel landings from 2016 through 2020.....	67
Figure 3.5.1.2. Commercial fishing engagement and reliance for top king mackerel communities.....	68
Figure 3.5.1.3. Local Quotient for top king mackerel communities.	69
Figure 3.5.2.1. Top 20 Gulf recreational fishing communities’ engagement and reliance.....	71
Figure 3.5.3.1. Social vulnerability indices for top commercial and recreational king mackerel and CMP communities.....	73
Figure 3.5.3.2. Social vulnerability indices for top commercial and recreational king mackerel and CMP communities continued.....	74
Figure 4.1.3.1 Gulf of Mexico king mackerel bag limit distribution from 2015/2016 through 2019/2020 fishing years.....	81

CHAPTER 1. INTRODUCTION

1.1 Background

Amendment 33 to the Fishery Management Plan (FMP) for Coastal Migratory Pelagic (CMP) Resources in the Gulf of Mexico and Atlantic Region (CMP FMP) is being developed by the Gulf of Mexico (Gulf) Fishery Management Council (Gulf Council) and the South Atlantic Fishery Management Council (South Atlantic Council) to consider reallocation of the total annual catch limit (ACL) between the Gulf migratory group (Gulf king mackerel) commercial and recreational sectors. Reallocation is being considered to address the differences in sector landings relative to sector ACLs, while accounting for adjustments in historical recreational landings from the replacement of the Marine Recreational Information Program's (MRIP) Coastal Household Telephone Survey (CHTS) data with MRIP's Fishing Effort Survey (FES) data. At its June 2022 meeting, the Gulf Council took final action on Framework Amendment 11 under the CMP FMP to address recommended revisions to the overfishing limit (OFL) and acceptable biological catch (ABC) for Gulf king mackerel, based on recommendations from the Gulf Council's Scientific and Statistical Committee (SSC) after review of the Southeast Data Assessment and Review (SEDAR) 38 Update stock assessment which uses MRIP-FES data. In Framework Amendment 11 under the CMP FMP, the Gulf Council retained the current allocation of 68% recreational, 32% commercial to set the sector ACLs. On October 7, 2022, NMFS published a proposed rule to implement Framework Amendment 11 under the CMP FMP.

Migratory Groups

King mackerel is managed jointly by the Gulf Council and South Atlantic Council (together: "Councils") under the CMP FMP. Two migratory groups of king mackerel are managed in the southeastern US: the Atlantic migratory group (Atlantic king mackerel) and Gulf king mackerel. Gulf king mackerel is found from Texas to the Miami-Dade/Monroe County line in southeastern Florida, and includes a seasonal mixing zone south of U.S. Highway 1 in the Florida Keys (Figure 1.1.1). This mixing zone occurs between November 1 and April 30, where king mackerel from the Gulf and Atlantic migratory groups are thought to mix (SEDAR 38 2014). The Gulf Council is responsible for establishing management measures for Gulf king mackerel, which includes the fish in the mixing zone; the South Atlantic Council is responsible for establishing management measures for Atlantic king mackerel within its jurisdiction excluding the fish in mixing zone (GMFMC and SAFMC 2016a). The current stock and management boundaries were established in May 2017 in Amendment 26 to the CMP FMP (GMFMC and SAFMC 2016a), and are shown in Figure 1.1.1. This amendment focuses only on Gulf king mackerel; therefore, there will be no further references to Atlantic king mackerel.

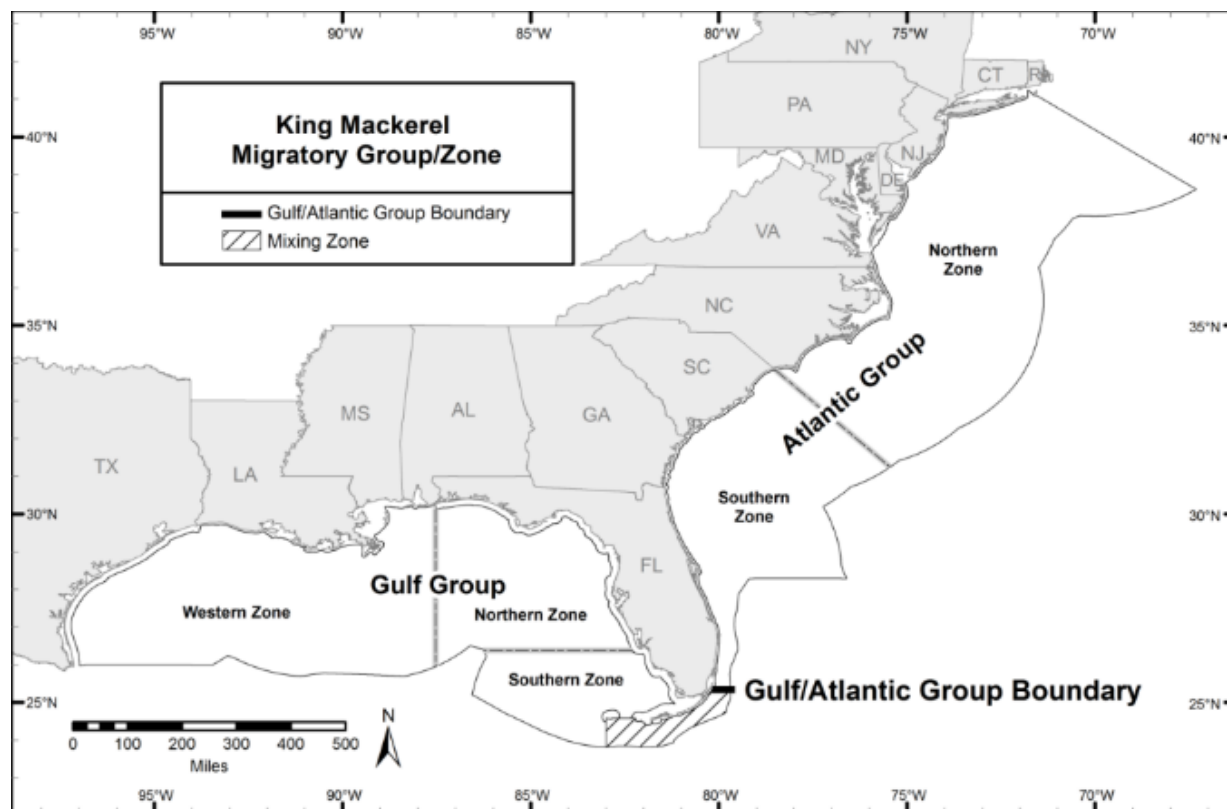


Figure 1.1.1. Gulf and Atlantic king mackerel migratory group boundaries as currently used by the Councils. Gulf king mackerel is further divided into commercial management Zones, which are managed by the Gulf Council, and includes the mixing zone (hashed area). The South Atlantic Council management area is divided into a Northern and Southern Zone, extending north to the easternmost tip of Long Island, New York.

Gulf King Mackerel

Found from Texas to the Miami-Dade/Monroe County Line in southeastern Florida. Management authority is given to the Gulf Council; however, CMP FMP species, including Gulf king mackerel, are jointly managed between the Gulf and South Atlantic Councils.

Sector Allocations

The Gulf king mackerel ACL is divided 68% to the recreational sector, and 32% to the commercial sector. 2% of the commercial allocation was originally shifted from the recreational sector and is intended to accommodate the sale of king mackerel by the for-hire component.

Commercial Zones

Three management zones are established for the commercial harvest of Gulf king mackerel: the Western zone, which extends from Texas to the Florida-Alabama state line; the Northern Zone, which extends from the Florida-Alabama state line south to the Monroe/Collier County Line in southwestern Florida; and, the Southern Zone, which extends from Monroe/Collier County Line east to the Miami-Dade/Monroe County line in southeastern Florida.

Allocations

Gulf king mackerel is managed with sector allocations, dividing the total stock ACL with 32% for the commercial sector and 68% for the recreational sector. These sector allocations, established in Amendment 1 to the CMP FMP (GMFMC and SAFMC 1985), used the average of available commercial and recreational landings data from the years 1975 – 1979. At that time, it was determined the recreational fishery accounted for approximately 70% of harvest, and the commercial fishery approximately 30%. However, the recreational allocation was reduced to 68% to adjust for the recreational catch that was sold by the for-hire component of the recreational sector and counted against the commercial allocation. This 2% shift is still included in the current sector allocations for Gulf king mackerel.

In the Gulf, the total commercial allocation (32%) is divided between three zones across two fishing fleets. The three commercial fishing zones are the Western (40%), Northern (18%), and Southern Zone (42%) (see Figure 1.1.1). Handline (hook-and-line) fishing for Gulf king mackerel is permitted in all three zones. Run-around gillnet fishing for Gulf king mackerel is permitted only in the Southern Zone. The Southern Zone commercial allocation is split equally between the hook-and-line and run-around gillnet components (21% each).

Gulf King Mackerel Fishing Year and Landings

The Gulf king mackerel fishing year for the recreational sector, and for the commercial Western and Southern Zones, extends from July 1 to June 30, whereas the fishing year for the Northern Zone of the commercial sector extends from October 1 to September 30. The Gulf king mackerel total ACL is monitored in pounds (lbs) of landed weight (lw), that is, whole and gutted weight combined. The total Gulf king mackerel ACL has not been exceeded in the past 20 years (Table 1.1.1). The current recreational sector's ACL is consistent with landings estimates generated using the Marine Recreational Information Program's (MRIP) Coastal Household Telephone Survey (CHTS). However, CHTS was replaced by the MRIP Fishing Effort Survey (FES), which generally generates higher estimates of effort than CHTS. To compare current landings estimates to the current recreational ACL, the National Marine Fisheries Service (NMFS) must apply a calibration to convert the estimates generated using FES to an estimate that is consistent with CHTS. To signify that the CHTS and FES estimates use different scales, this document refers to estimates in "MRIP-CHTS units" and "MRIP-FES units." The landings provided in this document include recreational landings in both CHTS and FES units for reference; however, a direct comparison between units cannot be made. A more detailed description of the recent changes to the collection of recreational catch and effort data can be found in Appendix B.

The data describing the commercial harvest of Gulf king mackerel have been subject to changes in the mixing zone and management boundaries. To demonstrate this management change (see CMP Amendment 26, GMFMC and SAFMC 2016a), commercial landings from the 2001/2002 – 2015/2016 fishing years are compared to the commercial and total ACLs in effect for those fishing years, and include landings from the former Florida East Coast Subzone (Table 1.1.1). The Florida East Coast Subzone was removed in the 2016/2017 fishing year with the implementation of Amendment 26 to the CMP FMP, which changed the mixing zone and redefined the management boundary (GMFMC and SAFMC 2016). As a result, the total ACL was reduced in the 2016/2017 fishing year due to the mixing zone changing with fish being reallocated to the Atlantic king mackerel migratory group that were previously allotted to the Gulf king mackerel migratory group and due to the results of SEDAR 38 (2014). Commercial landings by zone since the 2001/2002 fishing year are provided in Table 1.1.2; landings for the Florida East Coast Subzone are referred to as East FL Handline in the table. For the past twenty years, on average, only 57.0% of the total ACL has been harvested due to low recreational landings while the commercial sector has landed 99% of their sector ACL.

Table 1.1.1. Gulf king mackerel recreational (lbs ww) and commercial landings (lbs lw), recreational landings in MRIP-CHTS and MRIP-FES, the recreational ACL in MRIP-CHTS, the commercial ACL, total landings using MRIP-CHTS and MRIP-FES units, and the total Gulf king mackerel ACL in MRIP-CHTS, for the fishing years 2001/2002 – 2019/2020. Only the Total Landings (CHTS) should be compared to the Total ACL (CHTS). FES equivalent landings are provided for reference only.

Year	Rec. Landings (CHTS)	Rec. Landings (FES)	Rec. ACL (CHTS)	Com. Landings	Com. ACL	Total Landings (CHTS)	Total Landings (FES)	Total ACL (CHTS)	% of Total ACL (CHTS) landed
2001/02	3,941,457	9,070,883	6,936,000	2,840,657	3,264,000	6,782,114	11,911,540	10,200,000	66.5%
2002/03	2,983,798	6,169,130	6,936,000	3,032,207	3,264,000	6,016,005	9,201,337	10,200,000	59.0%
2003/04	3,498,288	6,823,391	6,936,000	3,042,219	3,264,000	6,540,507	9,865,610	10,200,000	64.1%
2004/05	2,564,642	5,339,214	6,936,000	3,140,596	3,264,000	5,705,238	8,479,810	10,200,000	55.9%
2005/06	2,465,383	4,781,778	6,936,000	2,889,115	3,264,000	5,354,498	7,670,893	10,200,000	52.5%
2006/07	3,319,495	6,074,882	7,344,000	3,121,321	3,456,000	6,440,816	9,196,203	10,800,000	59.6%
2007/08	2,464,224	4,871,760	7,344,000	3,357,297	3,456,000	5,821,521	8,229,057	10,800,000	53.9%
2008/09	2,790,428	5,168,997	7,344,000	3,913,176	3,456,000	6,703,604	9,082,173	10,800,000	62.1%
2009/10	3,261,388	7,939,505	7,344,000	3,706,798	3,456,000	6,968,186	11,646,303	10,800,000	64.5%
2010/11	1,993,088	5,497,642	7,344,000	3,473,388	3,456,000	5,466,476	8,971,030	10,800,000	50.6%
2011/12	2,012,068	5,060,923	7,344,000	3,374,877	3,456,000	5,386,945	8,435,800	10,800,000	49.9%
2012/13	3,224,351	6,856,317	7,344,000	3,501,893	3,456,000	6,726,244	10,358,210	10,800,000	62.3%
2013/14	2,082,852	3,948,649	7,344,000	3,236,234	3,456,000	5,319,086	7,184,883	10,800,000	49.3%
2014/15	4,015,683	7,777,977	7,344,000	3,753,959	3,456,000	7,769,642	11,531,936	10,800,000	71.9%
2015/16	2,531,260	4,812,866	7,344,000	3,642,992	3,456,000	6,174,252	8,455,858	10,800,000	57.2%
2016/17	2,587,187	4,986,684	6,260,000	2,902,360	2,950,000	5,489,547	7,889,044	9,210,000	59.6%
2017/18	2,356,343	5,210,721	6,040,000	3,031,397	2,840,000	5,387,740	8,242,118	8,880,000	60.7%
2018/19	2,338,564	5,044,834	5,920,000	2,780,813	2,790,000	5,119,377	7,825,647	8,710,000	58.8%
2019/20	1,622,334	3,238,966	5,810,000	2,658,942	2,740,000	4,281,276	5,897,908	8,550,000	50.1%

Source: SEFSC Commercial ACL data (August 9, 2021). Recreational SEFSC Recreational ACL data (Accessed May 10, 2021).

Table 1.1.2. Gulf king mackerel commercial landings (lbs lw) by Zone.

Year	Northern Handline	East FL Handline	Southern Gillnet	Southern Handline	Western Handline	Com. Landings	Com. ACL	% ACL landed
2001/02	222,916	696,927	316,814	702,997	901,003	2,840,657	3,264,000	87.0%
2002/03	148,115	859,471	349,924	724,848	949,849	3,032,207	3,264,000	92.9%
2003/04	186,341	802,588	458,194	613,714	981,382	3,042,219	3,264,000	93.2%
2004/05	105,108	685,242	645,985	609,903	1,094,358	3,140,596	3,264,000	96.2%
2005/06	140,989	674,599	491,046	714,921	867,560	2,889,115	3,264,000	88.5%
2006/07	159,083	852,903	468,044	620,290	1,021,001	3,121,321	3,456,000	90.3%
2007/08	214,417	1,050,525	586,800	555,902	949,653	3,357,297	3,456,000	97.1%
2008/09	276,998	1,072,243	845,017	734,118	984,800	3,913,176	3,456,000	113.2%
2009/10	287,838	1,082,279	589,462	706,442	1,040,777	3,706,798	3,456,000	107.3%
2010/11	341,775	1,059,660	522,267	637,974	911,712	3,473,388	3,456,000	100.5%
2011/12	267,958	1,037,290	437,040	622,864	1,009,725	3,374,877	3,456,000	97.7%
2012/13	216,184	887,989	498,609	810,156	1,088,955	3,501,893	3,456,000	101.3%
2013/14	246,110	754,215	595,382	611,227	1,029,300	3,236,234	3,456,000	93.6%
2014/15	100,051	1,059,527	543,730	686,285	1,364,366	3,753,959	3,456,000	108.6%
2015/16	182,600	1,049,259	529,745	658,723	1,222,665	3,642,992	3,456,000	105.4%
2016/17	473,282		538,213	731,655	1,159,210	2,902,360	2,950,000	98.4%
2017/18	538,274		552,775	872,203	1,068,145	3,031,397	2,840,000	106.7%
2018/19	397,926		604,700	687,587	1,090,600	2,780,813	2,790,000	99.7%
2019/20	324,971		517,481	628,486	1,188,004	2,658,942	2,740,000	97.0%

Source: SEFSC Commercial ACL data (August 9, 2021). The East Florida handline component was included in the Gulf king mackerel commercial ACL through the 2015/16 fishing season and are now accounted for under the South Atlantic king mackerel commercial ACL.

SEDAR 38 Update Stock Assessment

At its September 2020 meeting, the Gulf Council's SSC reviewed the results and projections from the SEDAR 38 Update (2020) stock assessment report, prepared by the Southeast Fisheries Science Center (SEFSC). A key change in this stock assessment was the use of recreational catch and effort data calibrated to the MRIP-FES, which replaced MRIP-CHTS in 2018, and resulted in increased estimates of both recreational landings and fishing effort (see Appendix A). The SEDAR 38 Update determined that Gulf king mackerel is not overfished and not undergoing overfishing as of the 2017/2018 fishing year, but recruitment has been low in recent years. The SEDAR 38 Update predicted that current landings (i.e., the 2020/2021 total ACL of 8.55 million pounds [mp] whole weight [ww]) can be maintained with a low probability of overfishing in the short-term. The minimum stock size threshold (MSST) is equal to $(1-M) * SSB_{MSY}$, where M (natural mortality) = 0.174 and the spawning stock biomass at maximum sustainable yield (SSB_{MSY}) uses a proxy of the SSB at a 30% spawning potential ratio ($SSB_{SPR30\%}$, Amendment 16 to the CMP FMP; GMFMC and SAFMC 2003). As of the 2017/2018 fishing year, the stock was being harvested ($F_{Current}/F_{MSY}$) at 84% of the overfishing status determination criteria, the

maximum fishing mortality threshold (MFMT), and SSB was 112% of MSST. Upon review of the results, the Gulf Council's SSC determined the scientific uncertainty was not adequately captured by the buffer between the OFL and ABC using the Gulf Council's ABC Control Rule. The SEFSC also noted that the scientific uncertainty in the SEDAR 38 Update base model is likely considerably larger than estimated, and that a percentage of the MSY proxy may be more appropriate for determining the difference between the OFL and ABC. Therefore, the SSC used the projected yield at F_{OY} ($0.85 \times F_{SPR30\%}$) to determine the ABC. The Gulf Council's SSC determined the results to be consistent with the best scientific information available for Gulf king mackerel, noting that the stock is not overfished or undergoing overfishing as of the 2017/2018 fishing year. The updated catch advice by the SSC for the OFL and ABC for the 2021/2022 – 2023/2024 and subsequent fishing years is in MRIP-FES units, and increases annually through the 2023/24 fishing years (Table 1.1.3). These OFL, ABC, and resulting ACL values are addressed in Framework Amendment 11 under the CMP FMP, on which the Gulf Council took final action at its June 2022 meeting and for which, on October 7, 2022, NMFS published a proposed rule for implementation. With respect to the increase in the recommended catch limits compared to the current catch limits, that difference is largely attributable to converting the recreational catch and effort data to MRIP-FES units. Had MRIP-FES estimates been available to provide catch advice in SEDAR 38 in 2014, the current catch limit recommendations from SEDAR 38 Update would represent an average 16% decrease in allowable catch due to model correction of the virgin biomass estimate (see Appendix D) and decreased recruitment in recent years.

Table 1.1.3. OFL and ABC for Gulf king mackerel for 2021/2022 – 2023/2024 and subsequent fishing years, as recommended by the Gulf Council's SSC in September 2020 and resulting ACLs as determined by the Gulf Council. Values are in lbs ww and MRIP-FES units.

Fishing Year	OFL	ABC	Total ACL	Rec ACL	Comm ACL
2021/2022	10,890,000	9,370,000	9,370,000	6,371,600	2,998,400
2022/2023	11,050,000	9,720,000	9,720,000	6,609,600	3,110,400
2023/2024+	11,180,000	9,990,000	9,990,000	6,793,200	3,196,800

In previous discussions about sector allocations following reef fish stock assessments that have incorporated MRIP-FES estimates of recreational landings, the Gulf Council has considered reallocating from the commercial sector to the recreational sector to account for the increase in recreational catch and effort estimated by MRIP-FES. Typically, consideration of varying sector allocation scenarios would necessitate separate yield projections by scenario to account for differences in selectivity and retention by the directed fleets. Here, selectivity is loosely defined as the age and/or length of fish that is proportionally selected by a directed fleet, based on the fishing gear and practices used by that fleet. Likewise, retention is loosely defined as the age and/or length of fish that is proportionally selected by a directed fleet for harvest. In the case of Gulf king mackerel, both the commercial and recreational directed fleets have the same minimum size limit (24 inches total length), and harvest the fish in generally the same manner (hook and line via trolling at the surface). Because of these similarities, there are negligible differences in the selectivity and retention functions between the commercial and recreational directed fleets. Thus, as the Gulf Council considers different sector allocation scenarios, updated yield projections will not be required.

Proposed Modification of Sector Allocation

At October 2020 Gulf Council meeting and December 2020 South Atlantic Council meeting, the Councils began work on this amendment (Amendment 33 to the CMP FMP), to modify the OFL, ABC, and ACLs for Gulf king mackerel in response to the results of the SEDAR 38 Update and the Gulf Council SSC's subsequent catch recommendations. The Gulf Council also decided, through Amendment 33, to review the current commercial-recreational allocation and consider modifications to this allocation. As demonstrated in Tables 1.1.1 and 1.1.2, the recreational sector has not been fully harvesting its portion of the stock ACL for over 20 years, while the commercial sector has routinely been harvesting the majority (87% or greater) of its portion of the stock ACL over the same time period. Overages in commercial harvest are attributable to the differences between the projected commercial fishing season closures by fishing zone by NMFS, versus the actual reported landings that are later received by the Gulf states and NMFS via the commercial trip ticket program. Previously, at the March 2015 Gulf Council CMP Advisory Panel (Gulf CMP AP) meeting, AP members recommended that the Councils abstain from reallocating any Gulf king mackerel from the recreational sector to the commercial sector, based on a concern about the accuracy and precision of the recreational data and the probability of a recreational quota closure as a result of any reallocation from the recreational sector to the commercial sector. The Gulf CMP AP subsequently recommended an increase for the Gulf king mackerel recreational bag limit as a way to potentially increase utilization of the Gulf king mackerel recreational ACL. This increase to the recreational bag limit went into effect in May 2017 (CMP Amendment 26; GMFMC and SAFMC 2016a). Additionally, permit requirements changed in late 2017, and commercial permit holders were allowed to retain the recreational bag limit when the commercial season was closed (GMFMC and SAFMC 2016b). However, recreational landings are relatively unchanged since the implementation of the increased recreational bag limit as well as allowance for fishermen on commercial vessels to retain the recreational bag limit once the commercial season was closed (Table 1.1.1.). After reviewing the results of the SEDAR 38 Update stock assessment at its October 2020 meeting, the Gulf Council acknowledged that the change in recreational landings estimates from MRIP-CHTS units to MRIP-FES units represented greater than previously estimated historical recreational catch and effort. However, because the recreational sector has not harvested its ACL over such a considerable time period (over 20 years), despite the increase in the daily recreational bag limit from 2 to 3 fish per person and commercial allowances, the Gulf Council is not currently considering a reallocation scenario that would shift fish to the recreational sector. Rather, the Gulf Council thought it appropriate to only consider shifting allocation to the commercial sector, since that sector has been landing its ACL and appears capable of landing more fish, based on recent harvests (see Table 1.1.2). As noted above, the Gulf Council decided to address modifications to the OFL, ABC, and ACLs for Gulf king mackerel in a separate framework amendment under the CMP FMP. Thus, Amendment 33 is now focused on allocation only.

1.2 Gulf of Mexico Fishery Management Council and South Atlantic Fishery Management Council Joint Coastal Migratory Pelagic (CMP) Fishery Management Plan (FMP) Objectives

NMFS Procedural Directive 01-119-02 (NMFS 2016) provides recommended practices during an allocation review, which includes a Council re-assessing the FMP objectives, if they are not current, clear, or measurable. At its June 2022 meeting, the Gulf Council reviewed the goals and objectives of the Joint CMP FMP (Appendix C) and made modifications, and at its September 2022 meeting, the South Atlantic Council also reviewed the goals and objectives of the Joint CMP FMP and approved the modifications proposed by the Gulf Council. At that time, the Councils added Objective 9. Through this amendment to the Joint CMP FMP, the Councils are adopting the updated objectives as shown below.

1. The primary objective of this FMP is to stabilize yield at the maximum sustainable yield (MSY), allow recovery of overfished populations, and maintain population levels sufficient to ensure adequate recruitment.
2. To provide a flexible management system for the resource which minimizes regulatory delay while retaining substantial Council and public input in management decisions and which can rapidly adapt to changes in resource abundance, new scientific information, and changes in fishing patterns among user groups or by areas.
3. To provide necessary information for effective management and establish a mandatory reporting system for monitoring catch.
4. To minimize gear and user group conflicts.
5. To distribute the total allowable catch of Atlantic migratory group Spanish mackerel between recreational and commercial user groups based on the catches that occurred during the early to mid-1970s, which is prior to the development of the deep water run-around gillnet fishery and when the resource was not overfished.
6. To minimize waste and bycatch in the fishery.
7. To provide appropriate management to address specific migratory groups of king mackerel.
8. To optimize the social and economic benefits of the coastal migratory pelagic fisheries.
9. To achieve robust fishery reporting and data collection systems across all sectors for monitoring the coastal migratory pelagic fishery which minimizes scientific, management, and risk uncertainty.

1.3 Purpose and Need

The purpose of this amendment is to revise the Gulf king mackerel allocation between the commercial and recreational sectors in order to address the differences in sector landings relative to sector ACL and to continue to achieve optimum yield from the Gulf king mackerel stock.

The need for this amendment is to increase social and economic benefits for the king mackerel component of the CMP fishery through sustainable harvest in accordance with provisions set forth in the Magnuson-Stevens Fishery Conservation and Management Act.

1.4 History of Management

The **CMP FMP**, with environmental impact statement (EIS) and regulatory impact review (RIR), was approved in 1982 and implemented by regulations effective in February 1983 (GMFMC and SAFMC 1983). The management unit includes king mackerel, Spanish mackerel, and cobia. The CMP FMP treated king and Spanish mackerel as unit stocks in the Atlantic and Gulf. The original CMP FMP also established a Gulf king mackerel poundage allocation, which was approximately 75.7% recreational, 24.3% commercial, based on a total allowable catch (TAC) of 3.7 million pounds (mp). A history of management for all CMP species can be found in **CMP Amendment 18** (GMFMC and SAFMC 2011), **Amendment 20B** (GMFMC and SAFMC 2014), and **Amendment 26** (GMFMC and SAFMC 2016a) and are incorporated here by reference. A complete history of management for CMP species is provided on the Gulf Council website.¹ The following management actions relate specifically to allocations and catch limits for Gulf king mackerel.

Amendment 1, with EIS and RIR, implemented in September 1985, revised the Gulf king mackerel maximum sustainable yield (MSY) downward, recognized separate Atlantic and Gulf migratory groups of king mackerel, and established sector allocations of 32% commercial and 68% recreational for Gulf king mackerel. These allocations were based on the average commercial and recreational landings from 1975 – 1979; the years for which complete data for both sectors were available, and including a shift of 2% of the recreational allocation to the commercial sector to account for sales of king mackerel by the for-hire component of the recreational sector. Commercial allocations among gear users were eliminated. The Gulf commercial allocation for king mackerel was divided into eastern and western zones for the purpose of regional allocation.

A **May 1986 Regulatory Amendment**, with RIR, implemented in July 1986, set a TAC for Gulf king mackerel at 2.9 mp with 0.93 mp commercial quota and 1.97 mp recreational allocation for the 1986/87 season (July 1 – June 30). The commercial quota was allocated 6% for purse-seines, 64.5% for eastern zone (Florida) and 29.5% for western zone (AL-TX).

A **May 1987 Regulatory Amendment**, with RIR, implemented in June 1987, set a TAC for Gulf king mackerel at 2.2 mp with 0.7 mp commercial quota and 1.5 mp recreational allocation for the 1987/88 season. The commercial quota was set at zero for purse-seines.

A **May 1988 Regulatory Amendment**, with RIR, implemented in July 1988, set a TAC for Gulf king mackerel at 3.4 mp with 1.1 mp commercial quota and 2.3 mp recreational allocation for the 1988/89 season. The commercial quota was allocated 69% to eastern zone (FL) and 31% to western zone (AL-TX).

A **May 1989 Regulatory Amendment**, with RIR, implemented in July 1989, set a TAC for Gulf king mackerel at 4.25 mp with 1.36 mp commercial quota and 2.89 mp recreational allocation for the 1989/90 season.

¹ <https://gulfcouncil.org/fishery-management/implemented-plans/coastal-migratory-pelagics/>

Amendment 5, with environmental assessment (EA) and RIR, implemented in August 1990, provided that the Gulf Council will be responsible for managing the Gulf migratory groups of CMP species. The two recognized Gulf migratory groups of king mackerel continued to be managed as one until management measures appropriate to the eastern and western Gulf groups could be determined.

A **May 1990 Regulatory Amendment**, with RIR, implemented in August 1990, retained the TAC for Gulf king mackerel at 4.25 mp with 1.36 mp commercial quota and 2.89 mp recreational allocation for the 1990/91 season.

A **May 1991 Regulatory Amendment**, with RIR, implemented in September 1991, retained the TAC for Gulf king mackerel at 5.75 mp with 1.84 mp commercial quota and 3.91 mp recreational allocation for the 1991/92 season. The amendment also set the overfishing thresholds at 30% spawning potential ratio (SPR).

A **May 1992 Regulatory Amendment**, with RIR, implemented in September 1992, set the TAC for Gulf king mackerel at 7.8 mp with 2.5 mp commercial quota and 5.3 mp recreational allocation for the 1992/93 season.

Amendment 6, with EA and RIR, and regulatory flexibility analysis (RFA), implemented in December 1992, provided for rebuilding overfished stocks of mackerels within specific periods; provided for biennial assessments and adjustments; and, allowed for Gulf king mackerel stock identification and allocation when appropriate.

A **May 1993 Regulatory Amendment**, with RIR, implemented in November 1993, retained the TAC for Gulf king mackerel at 7.8 mp with 2.5 mp commercial quota and 5.3 mp recreational allocation for the 1993/94 season.

A **May 1994 Regulatory Amendment**, with RIR, implemented in November 1994, retained the TAC for Gulf king mackerel at 7.8 mp with 2.5 mp commercial quota and 5.3 mp recreational allocation for the 1994/95 season.

Amendment 7, with EA, RIR, and RFA, implemented in November 1994, equally divided the Gulf commercial allocation in the Eastern Zone at the Dade-Monroe County line in Florida. The sub-allocation for the area from Monroe County through Western Florida was equally divided between commercial hook-and-line and gillnet users.

A **May 1995 Regulatory Amendment**, with EA, RIR, and RFA, implemented in November 1995, retained the TAC for Gulf king mackerel at 7.8 mp with 2.5 mp commercial quota and 5.3 mp recreational allocation for the 1994/95 season.

A **May 1996 Regulatory Amendment**, with EA, RIR, and RFA, implemented in June 1997, retained the TAC for Gulf king mackerel at 7.8 mp with 2.5 mp commercial quota and 5.3 mp recreational allocation for the 1996/97 season.

A May 1997 Regulatory Amendment, with EA, RIR, and RFA, implemented in February 1998, set the TAC for Gulf king mackerel at 10.6 mp with 3.39 mp commercial quota and 7.21 mp recreational allocation for the 1997/98 season.

A May 1998 Regulatory Amendment, with EA, RIR, and RFA, implemented in February 1998, retained the TAC for Gulf king mackerel at 10.6 mp with 3.39 mp commercial quota and 7.21 mp recreational allocation for the 1998/99 season.

Amendment 8, with EA, RIR, and RFA, implemented in March 1998, established the Council's intent to evaluate the impacts of permanent jurisdictional boundaries between the Gulf Council and the South Atlantic Council and separate FMPs for CMP species in these areas; and set an optimum yield (OY) target at 30% static SPR.

A July 1999 Regulatory Amendment, with EA, RIR, and RFA, implemented in September 1999, retained the TAC for Gulf king mackerel at 10.6 mp with 3.39 mp commercial quota and 7.21 mp recreational allocation for the 1999/2000 season.

Amendment 9, with EA, RIR, and RFA, implemented in April 2000, reallocated the percentage of the commercial allocation of the TAC for the North Area (Florida east coast) and South/West Area (Florida west coast) of the Eastern Zone to 46.15% North and 53.85% South/West, as well as retain the recreational and commercial allocations of TAC at 68% recreational and 32% commercial; subdivided the commercial hook-and-line king mackerel allocation for the Gulf Eastern Zone, and South/West Area (Florida west coast) by establishing 2 subzones with a dividing line between the 2 subzones at the Collier/Lee County line; established regional allocations for the west coast of Florida based on the 2 subzones with 7.7% of the Eastern Zone allocation of TAC being allowed from Subzone 2 and the remaining 92.3% being allocated as follows: 50% – Florida east coast, 50% – Florida west coast, 50% – gillnet fishery, 50% – hook-and-line fishery.

A July 2000 Regulatory Amendment, with EA and RIR, implemented in April 2001, reduced the TAC for Gulf king mackerel to 10.2 mp with 3.26 mp commercial quota and 6.94 mp recreational allocation for the 2000/2001 season.

Amendment 16/July 2003 Regulatory Amendment, with EA, RIR, and RFA, implemented in April 2004, established definitions of MSY, OY, the overfishing threshold, and the overfished condition for Gulf king mackerel.

Amendment 18, with EA, RIR, and RFA, implemented in January 2012, established ACLs and accountability measures (AM) for Gulf king mackerel.

Framework Amendment 3, with EA, RIR, and RFA, implemented in January 2016, increased the commercial trip limit to 45,000 pounds, established a payback provision if the Southern subzone gillnet ACL is exceeded, and allowed commercial king mackerel gillnet permits to be renewed only if landings for a single year during 2006-2015 were greater than one pound (permits that do not qualify will be non-renewable and non-transferable).

Amendment 26, with EA, RIR, and RFA, implemented in May 2017, created a single year-round regulatory boundary between the Gulf and South Atlantic migratory groups of king mackerel at a line extending east from the Miami-Dade/Monroe County, Florida boundary. The amendment also removed the Gulf Florida East Coast subzone, renamed the zones in the Gulf, and revised the Gulf king mackerel ACLs and commercial zone quotas (Western Zone 40%, Northern Zone 18%, Southern Zone Handline component 21%; and Southern Zone Gillnet component 21%). Finally, the amendment increased the recreational bag limit to 3-fish per person.

Framework Amendment 5, with EA, RIR, and RFA, implemented in August 2017, removed the restriction on fishing for, or retaining the recreational bag and possession limits of king and Spanish mackerel on a vessel with a Federal commercial permit for king or Spanish mackerel when commercial harvest of king or Spanish mackerel in a zone or region is closed.

CHAPTER 2. MANAGEMENT ALTERNATIVES

2.1 Action: Modify the Sector Allocation for Gulf of Mexico (Gulf) Migratory Group King Mackerel (Gulf King Mackerel).

Alternative 1: No Action. Maintain the sector allocation of the total annual catch limit (ACL) for Gulf king mackerel between the commercial and recreational sectors. The sector allocation for Gulf king mackerel is 32% commercial and 68% recreational. This allocation was derived from the average of available landings data from the years 1975 through 1979, and established in Amendment 1 to the Fishery Management Plan (FMP) for Coastal Migratory Pelagic (CMP) Resources in the Gulf of Mexico and Atlantic Region (CMP FMP) in 1985.

Alternative 2: Modify the sector allocation for Gulf king mackerel by reallocating to the commercial sector 25% of the average difference between the total landings from the 2016/2017 through 2019/2020 fishing years using Marine Recreational Information Program's (MRIP) Fishing Effort Survey (FES) data and the total simulated annual catch limit (ACL) for Model 2 in Appendix D for the predicted total landings by sector and the total projected ACL. The resulting sector allocation for Gulf king mackerel is 42% commercial and 58% recreational.

Alternative 3: Modify the sector allocation for Gulf king mackerel by reallocating to the commercial sector 50% of the average difference between the total landings from the 2016/2017 through 2019/2020 fishing years using MRIP-FES data and the total simulated ACL for Model 2 in Appendix D for the predicted total landings by sector and the total projected ACL. The resulting sector allocation for Gulf king mackerel is 53% commercial and 47% recreational.

Fishing Year	Total Landings MRIP-FES (lbs lw)	Total Projected ACL from Model 2 of SEFSC Sim (lbs lw)	Difference (Landings and Projected ACL, lbs lw)	Average of the Difference for 4 years (lbs lw)
2016/2017	9,367,484	13,690,000	4,322,516	4,119,399
2017/2018	9,380,321	13,030,000	3,649,679	
2018/2019	9,054,434	12,530,000	3,475,566	
2019/2020	7,130,166	12,160,000	5,029,834	

The resulting commercial and recreational ACLs are shown below, and assume the first year of management to coincide with the start of the 2023/2024 fishing year; the total ACL for that fishing year as recommended by the SSC for Framework Amendment 11 under the CMP FMP is used to inform these calculations.

Alternative	Recreational ACL (lbs lw)	Recreational Allocation (%)	Commercial ACL (lbs lw)	Commercial Allocation (%)
Alt 1: 0%	6,793,200	68%	3,196,800	32%
Alt 2: 25%	5,763,350	58%	4,226,650	42%
Alt 3: 50%	4,733,501	47%	5,256,499	53%

Discussion:

Past actions to set allocations by the Gulf of Mexico Fishery Management Council (Gulf Council) have often relied on landings from a reference time period to inform how to divide the total ACL between the recreational and commercial sectors. In the case of Gulf king mackerel, the current sector allocations have been in effect since 1985 (Amendment 1), and are based on landings data collected before the advent of the more contemporary data collection programs (i.e., the commercial trip interviewer program, MRIP). This presents two atypical challenges in modifying the sector allocation for Gulf king mackerel. First, the entire time series for which contemporary data collection programs have been in place has been influenced by the current sector allocations. Thus, the respective sectors have not been able to operate unrestricted to determine the portion of the catch typical for a given fleet in over 30 years. Second, landings estimates prior to 1981 have not been calibrated so that they can be compared to the estimates produced by the contemporary data collection programs, particularly for the recreational sector. Thus, it is not possible to present an alternative that reallocates based on a calibration of the 1975 – 1979 time series, adjusted for MRIP-FES, as has been presented for the Gulf Council’s consideration for other species. The Gulf Council and South Atlantic Fishery Management Council did consider an alternative to modify the sector allocation by reallocating to the commercial sector a percentage of the average difference between the total landings from the 2010/2011 through 2019/2020 fishing years (Appendix E). This alternative was considered but rejected because the two councils determined it did not represent the contemporary management environment.

Over the past twenty years, the commercial sector has consistently harvested near or above the commercial ACL for Gulf king mackerel, while the recreational sector has landed low proportions of the recreational ACL. Increasing the recreational daily bag limit to three fish per person, per day (GMFMC and SAFMC 2016a) in May 2017 or making allowances for the commercial sector to retain the recreational bag limit in August 2017 does not appear to have increased recreational landings (Table 2.1.1). The commercial harvest of Gulf king mackerel has been subject to changes in the mixing zone and management boundaries, as illustrated in Figures 1.1.1 and 2.1.2. To demonstrate this management change (see Amendment 26 to CMP FMP, GMFMC and SAFMC 2016a), commercial landings from the 2001/2002 – 2015/2016 fishing years are compared to the commercial and total ACLs in effect for those fishing years, and include landings from the former Florida East Coast Subzone. The Florida East Coast Subzone

was removed in the 2016/2017 fishing year with the implementation of Amendment 26 to the CMP FMP, which changed the mixing zone and redefined the management boundary (GMFMC and SAFMC 2016a). Commercial landings since the 2001/2002 fishing year are provided in Table 2.1.1 and Figure 2.1.1. Table 2.1.2 provides the commercial landings and ACLs by zone for the four fishing years utilized for reallocation in **Alternatives 2 and 3**, and identifies the fishing year(s) in which there was payback of an overage of the ACL for the Southern zone gillnet fleet as established in Framework Amendment 3 to the CMP FMP (GMFMC 2015).

The current state of zone management for the Gulf king mackerel stock has been in place only since the 2016/2017 fishing year. Further, the data for the latter half of the 2019/2020 fishing season include the months during which the COVID-19 pandemic may have affected recreational fishing activity in the Gulf. It is unclear if COVID-19 affected commercial harvest during the latter half of the 2019/2020 fishing year, as only the Northern Zone did not meet its quota that year. However, the Northern Zone has typically not met its quota in recent years², but did meet it and was subsequently closed in the 2020/2021 fishing year. The Western Zone was the only commercial zone to not close in the 2020/2021 fishing year, even though this zone has typically met or exceeded its quota in recent years. Any associated impacts to these fishing fleets for Gulf king mackerel have not yet been fully characterized.

This action focuses on the Gulf king mackerel sector allocation between the commercial and recreational sectors. Since Amendment 26, the Gulf king mackerel commercial sector ACL is allocated in regional quotas per zone, with 40% allocated to the Western Zone, 18% to the Northern Zone, 21% to the Southern Zone Handline component, and 21% to the Southern Zone Gillnet component (see Figure 1.1.1 for a map of these Zones; GMFMC and SAFMC 2016a). Commercial quotas for these zones will be updated based on the overall commercial sector allocation. At this time, Councils are not considering modifying the commercial zone quota allocations of the commercial ACL.

As displayed in Table 2.1.1, from the 2016/2017 to 2019/2020 fishing years, the recreational sector has landed, in MRIP-CHTS units, a range of 27.9% to 41.3% of its sector ACL. For that same time series, the commercial sector has landed a range of 97.0% to 106.7% of its sector ACL, with the Southern zone handline component primarily contributing to the commercial sector overages, as shown in Table 2.1.2. For the 2001/2002 to 2019/2020 fishing years, the commercial sector has landed over 100% of its quota in seven of those fishing years. In contrast to the commercial sector, the recreational sector has only landed over 50% of its sector ACL in three of those fishing years, resulting in an average of only 58% of the total ACL being landed.

² [Southeast Regional Office Gulf of Mexico Historic Commercial Landings and Annual Catch Limit Monitoring page](#)

Table 2.1.1. Proportion of sector ACLs landed and proportion of total ACL landed for Gulf king mackerel in MRIP-CHTS for the 2001/2002 – 2019/2020 fishing years. The total ACL, commercial ACL, recreational ACL, recreational landings, and commercial landings are in lbs lw.

Fishing Year	Total ACL	Comm Sector ACL	Comm Landings	Rec Sector ACL	Rec Landings	% of Sector ACL Landed		% of Total ACL Landed
						Comm ¹	Rec ²	
2001/2002	10,200,000	3,264,000	2,840,657	6,936,000	3,941,457	87.0%	56.8%	66.5%
2002/2003	10,200,000	3,264,000	3,032,207	6,936,000	2,983,798	92.9%	43.0%	59.0%
2003/2004	10,200,000	3,264,000	3,042,219	6,936,000	3,498,288	93.2%	50.4%	64.1%
2004/2005	10,200,000	3,264,000	3,140,596	6,936,000	2,564,642	96.2%	37.0%	55.9%
2005/2006	10,200,000	3,264,000	2,889,115	6,936,000	2,465,383	88.5%	35.5%	52.5%
2006/2007	10,800,000	3,456,000	3,121,321	7,344,000	3,319,495	90.3%	45.2%	59.6%
2007/2008	10,800,000	3,456,000	3,357,297	7,344,000	2,464,224	97.1%	33.6%	53.9%
2008/2009	10,800,000	3,456,000	3,913,176	7,344,000	2,790,428	113.2%	38.0%	62.1%
2009/2010	10,800,000	3,456,000	3,706,798	7,344,000	3,261,388	107.3%	44.4%	64.5%
2010/2011	10,800,000	3,456,000	3,473,388	7,344,000	1,993,088	100.5%	27.1%	50.6%
2011/2012	10,800,000	3,456,000	3,374,877	7,344,000	2,012,068	97.7%	27.4%	49.9%
2012/2013	10,800,000	3,456,000	3,501,893	7,344,000	3,224,351	101.3%	43.9%	62.3%
2013/2014	10,800,000	3,456,000	3,236,234	7,344,000	2,082,852	93.6%	28.4%	49.3%
2014/2015	10,800,000	3,456,000	3,753,959	7,344,000	4,015,683	108.6%	54.7%	71.9%
2015/2016	10,800,000	3,456,000	3,642,992	7,344,000	2,531,260	105.4%	34.5%	57.2%
2016/2017	9,210,000	2,950,000	2,902,360	6,260,000	2,587,187	98.4%	41.3%	59.6%
2017/2018	8,880,000	2,840,000	3,031,397	6,040,000	2,356,343	106.7%	39.0%	60.7%
2018/2019	8,710,000	2,790,000	2,780,813	5,920,000	2,338,564	99.7%	39.5%	58.8%
2019/2020	8,550,000	2,740,000	2,658,942	5,810,000	1,622,334	97.0%	27.9%	50.1%

¹Commercial allocation = 32% ²Recreational allocation = 68%

Source: SEFSC Commercial ACL data (August 9, 2021). Recreational SEFSC Recreational ACL data (Accessed May 10, 2021).

Note: Numbers are highlighted in yellow for sector landings that exceeded the respective sector ACL. The Gulf king mackerel fishing year for the recreational sector and commercial sector Western and Southern Zone is July 1 – June 30. The fishing year for the commercial sector Northern Zone is October 1 – September 30. The total ACL was reduced in the 2016/17 fishing year due to the results of SEDAR 38 (2014) and the mixing zone changing with fish being reallocated to the Atlantic king mackerel migratory group that were previously allotted to the Gulf king mackerel migratory group.

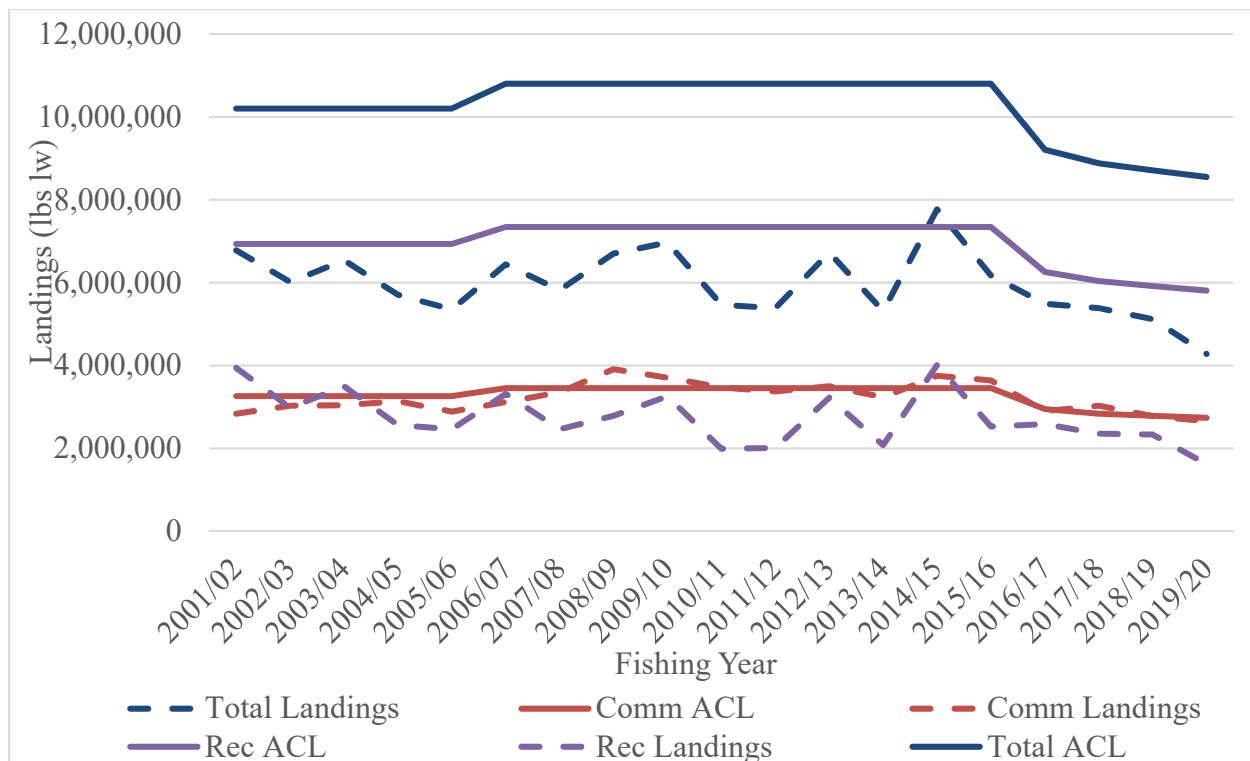


Figure 2.1.1. Trends in Gulf king mackerel total landings and by sector compared to the sector and total ACLs for the 2001/2002 – 2019/2020 fishing years. Recreational landings data are in MRIP-CHTS units to be comparable to the current sector and total ACL.

Table 2.1.2. Commercial landings and ACL for Gulf king mackerel by zone for the 2016/2017 – 2019/2020 fishing years. Landings and ACL are in lbs lw.

Fishing Year	Western Handline Landings	Western ACL	Northern Handline Landings	Northern ACL	Southern Handline Landings	Southern Handline ACL	Southern Gillnet Landings	Southern Gillnet ACL (Adjusted ACL)
2016/2017	1,159,210	1,180,000	473,282	531,000	731,655	619,500	538,213	619,500
2017/2018	1,068,145	1,136,000	538,274	511,200	872,203	596,400	552,775	596,400
2018/2019	1,090,600	1,116,000	397,926	502,200	687,587	585,900	604,700	585,900
2019/2020*	1,188,004	1,096,000	324,971	493,200	628,486	575,400	517,481	575,400 (530,043)

Source: SEFSC Commercial ACL data (August 9, 2021).

Note: Numbers are highlighted in yellow for commercial zone landings that exceeded the respective zone ACL. The Southern gillnet ACL for the 2019/2020 fishing year was adjusted from 575,400 to 530,043 to account for the reported overage in the 2018/2019 fishing year. The Southern gillnet ACLs for the 2017/2018 and 2018/2019 fishing years were not reduced, as the most current landings for the previous year did not show an overage at the time of publication of payback notices. Furthermore, due to the timing of publication of payback notices, and the request for the most current landings information for this document, total prior year overages based on landings presented in Table 2.1.2 and *Federal Register* noticed payback-adjusted ACLs may not match.

Previously in 2017, the Gulf Council considered Amendment 29 to the CMP FMP, which would have established an allocation sharing mechanism to shift allocation between the recreational and

commercial sectors for Gulf king mackerel. However, after hearing public comment, the Gulf Council chose not to proceed with Amendment 29. Recreational fishermen noted that the recreational ACL was not being harvested, but commented that leaving a portion of the recreational ACL in the water likely increased the probability of a recreational fisherman interacting with king mackerel while fishing, regardless of whether that fish was ultimately harvested or released. Commercial fishermen were divided for various reasons, among which was a desire to ascertain the effect of increasing the recreational daily bag limit on recreational harvest. This increase in the recreational daily bag limit from two to three fish per person, per day along with the allowance for fishermen on commercial vessels to retain the recreational bag limit when the commercial season was closed, implemented in 2017, does not appear to have resulted in an increase in recreational harvest (Table 2.1.1), nor in a shift in the bag limit distribution for king mackerel landed in the Gulf for the 2015/2016 through 2019/2020 fishing years (Figure 2.1.2), as the majority of trips in the Gulf observed recreational fishermen retaining 1 or fewer king mackerel per trip. The proportion of the total recreational catch of Gulf king mackerel that was reported as discarded alive between the calendar years of 2016 – 2020 is detailed in Figure 2.1.3.

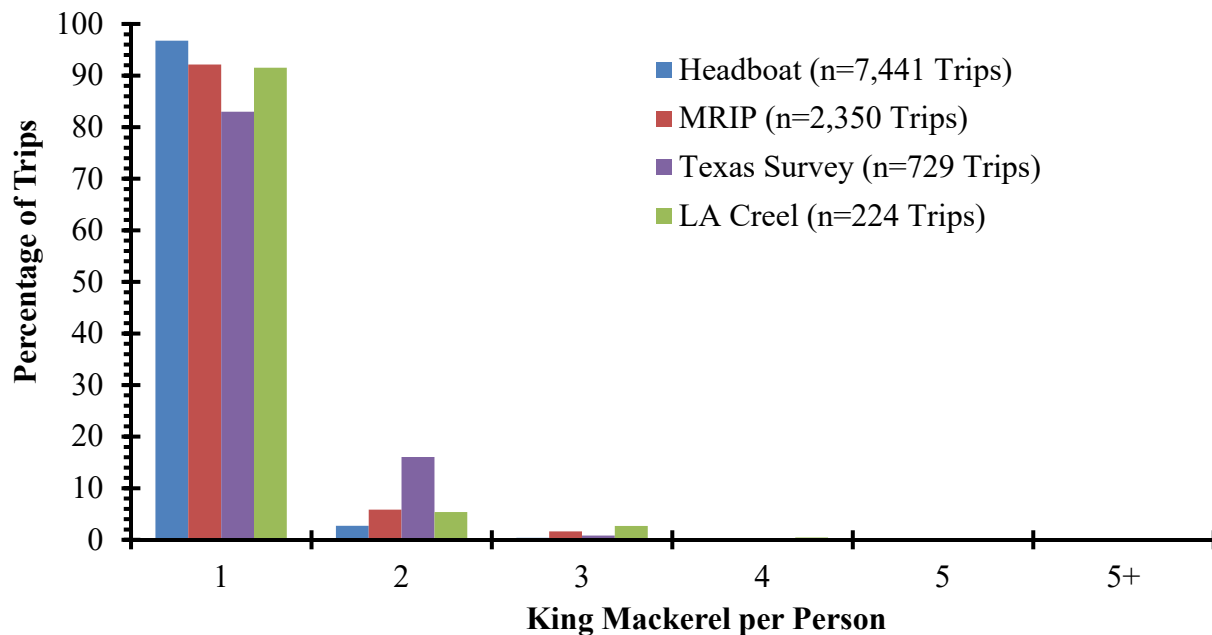


Figure 2.1.2. Gulf of Mexico king mackerel bag limit distribution from 2015/2016 through 2019/2020 fishing years.

Source: Marine Recreational Information Program, Southeast Region Headboat Survey, Texas Parks and Wildlife recreational survey, and Louisiana Department of Wildlife and Fisheries creel survey.

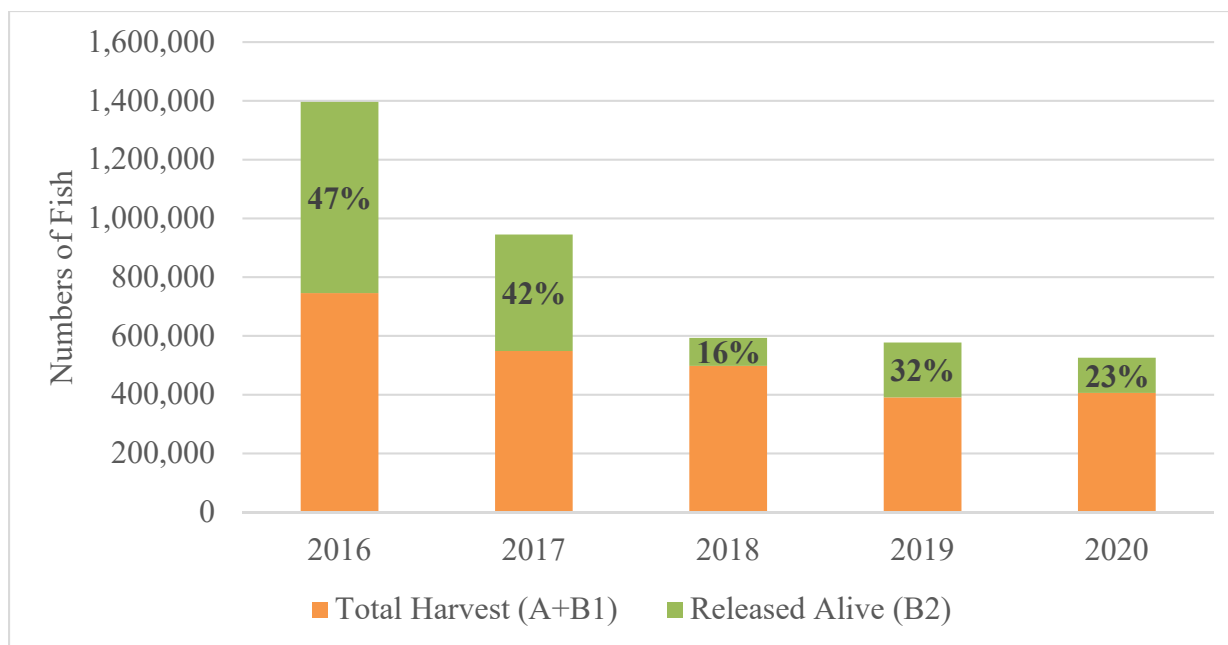


Figure 2.1.3. Total catch (A+B1+B2) of Gulf king mackerel divided into total harvest (A [retained catch] + B1 [observed dead discards]; orange) and fish reported as released alive (B2; green), with the proportion of the total catch comprised of fish released alive shown as a percentage for each calendar year for 2016 – 2020.

Source: NOAA Office of Science and Technology MRIP Catch Time Series Query, accessed 17 November 2021.

Alternative 1 (No Action) would maintain the sector allocations established in Amendment 1 to the CMP FMP (GMFMC and SAFMC 1985), with the recreational and commercial allocation of the Gulf king mackerel total ACL divided 68% and 32%, respectively. **Alternative 1** used the average sector landings from 1975 – 1979 to set the allocation. When Amendment 1 was developed, the resulting sector allocations were based on all available years during which both recreational and commercial landings data were available and complete. This sector allocation included a 2% shift from the recreational sector to the commercial sector to account for the sale of king mackerel by the for-hire component of the recreational sector at that time. The current OFL, ABC, and ACLs are based on an assessment that included recreational landings in estimates in MRIP-CHTS units. The Gulf Council developed Framework Amendment 11 under the CMP FMP that would revise the catch levels based the SEDAR 38 Update stock assessment, which included recreational landings estimates in MRIP-FES units. **Alternative 1** would retain the same sector allocation percentages but would result in a *de facto* reallocation to the commercial sector because the use of MRIP-FES data in assessing the stock and projecting future yields assumes that the historical recreational landings were greater than previously estimated, thereby assuming a larger biomass of Gulf king mackerel must have historically existed to support that harvest. Because this larger historical biomass estimate is attributable to this change in recreational landings estimation, it also assumes that the proportion of the stock ACL that would have historically been allocated to the recreational sector should have been greater than it currently is. However, it is not possible to estimate this difference, because the Gulf king mackerel sector allocation was established using landings data that predate contemporary recreational data collection methods and no calibration is available.

Alternative 2 and **Alternative 3** consider reallocation from the recreational sector to the commercial sector for Gulf king mackerel. Reallocation from the commercial sector to the recreational sector is not considered in this amendment, because the recreational sector has historically not landed its sector ACL while the commercial sector has met or exceeded its ACL (Table 2.1.1). In an effort to manage Gulf king mackerel towards achieving optimum yield while preventing overfishing, **Alternative 2** would reallocate to the commercial sector 25% of the average difference between the total landings from the 2016/2017 through 2019/2020 fishing years using MRIP-FES data and the total simulated ACL increase from Model 2 (Appendix B). **Alternative 3** would reallocate to the commercial sector 50% of the average difference between the total landings from the 2016/2017 through 2019/2020 fishing years using MRIP-FES data and the total simulated ACL increase from Model 2. The Gulf Council decided to use Simulation Model 2 (see Appendix D) because it shows what the catch limits would have been if MRIP-FES data been available and used in the original SEDAR 38 (2014) stock assessment. Using these parameters (assuming MRIP-FES landings through the 2014 terminal year for SEDAR 38, and the resultant projections) for **Alternative 2** and **Alternative 3**, the commercial and recreational ACLs are modified as if the simulated ACL from Model 2 were put into effect for the 2016/2017 fishing year. Further, the recreational landings are retained as reported, since the recreational sector did not harvest its ACL during that time period. Conversely, the commercial landings are assumed to be equal to the commercial ACL (32% of the total ACL) under Model 2, since the commercial sector has regularly harvested its ACL and has not been observed to be limited in this capability (Table 1.1.2). These assumptions would be expected to increase the likelihood that a greater proportion of the total ACL is landed. Table 2.1.3 demonstrates the following progression of analyses behind **Alternative 2** and **Alternative 3**.

Table 2.1.3. Stepwise progression of data treatment to generate information provided in Tables 2.1.4 and 2.1.5.

Step	Purpose
Fix commercial Gulf king mackerel landings at the annual value corresponding to the commercial ACL had MRIP-FES been used in SEDAR 38 (2015); see Model 2 in Appendix D.	Assumes commercial landings would have been equivalent to this hypothetical ACL; assumption justified based on historical commercial landings as a percentage of the historical commercial ACL.
Sum recreational Gulf king mackerel landings in MRIP-FES with commercial landings from Model 2 for each of the 2016/2017 - 2019/2020 fishing years.	Generate estimates of total landings by fishing year for the historical time series, assuming MRIP-FES data were used in SEDAR 38 (2015).
Average the difference between the total landings and the total ACL (assuming ACL = ABC, and assuming the Model 2 ABC was used).	Generate the average difference between the historical fishing years to inform the reallocation options in Alternative 2.
Reallocate to the commercial sector a percentage of the average difference between the total landings and the total ACL for Options 2a – 2b.	Demonstrate the effects of reallocation for each option in Alternative 2 on the predicted landings for each sector, relative to that sector's allocation of the 2023/2024+ total ACL as recommended by the SSC.

Using the last four fishing years, each year's total landings (i.e., recreational and commercial combined) is subtracted from the predicted total ACL from Simulation Model 2 (Appendix D). This simulation analyzed the effects of the incorporation of MRIP-FES recreational catch and effort data into the original SEDAR 38 (2015) base model, and then also analyzed the effects of the subsequent model modifications leading up to the SEDAR 38 Update (2020) base model. The resulting values for the 2016/2017 – 2019/2020 fishing years are averaged. This “average difference” provides an estimation of the amount of quota that could remain unharvested if past catch levels, calibrated for MRIP-FES *only*, approximate future landings. **Alternative 2** and **Alternative 3** would reallocate a percentage of this average difference to the commercial sector.

The time series in **Alternative 2** and **Alternative 3** correlates to the current mixing zone definition and management boundary (see Figure 1.1.1.). The sector allocations from **Alternative 2** and **Alternative 3** are then applied to the 2023/2024 ACL proposed in Framework Amendment 11 under the CMP FMP because, if implemented, those catch limits would be in place until changed by future management action, and the ACL for the 2023/2024 fishing year will likely be the first full fishing year under the revised allocation if implemented.

Percentages of this average difference between the total landings (using MRIP-FES for recreational data) and the projected ACL (assuming ACL = ABC) from Simulation Model 2 are used to reallocate to the commercial sector, and include 25% (**Alternative 2**) and 50% (**Alternative 3**). The row demonstrating an option to reallocate 0% of the difference in landings and the simulated ACL (from the table under **Alternative 3**) provides the sector ACLs for

Alternative 1 in 2023/2024. Table 2.1.4 shows the annual differences between the total landings and the recommended total ACLs for the 2023/2024+ fishing year as proposed in Framework Amendment 11 under the CMP FMP, both using MRIP-FES and simulated commercial landings from Simulation Model 2.

Table 2.1.4. Recreational landings, commercial landings, total landings (lbs lw), and comparisons of the annual difference between the total landings, and the predicted total ACL from Model 2 of the SEFSC Simulation (which assume the commercial landings equal the commercial ACL) for Gulf king mackerel for the 2016/2017 through 2019/2020 fishing years, the proposed 2023/2024 total ACL as recommended by the SSC, and the remaining proposed total ACL percentage.

Year	Rec Landings (FES)	Com Landings from Model 2	Total Landings (FES and Model 2)	Total ACL (FES and Model 2)	Proposed 2023/2024 Total ACL (FES)	% of Proposed Total 2023/2024 ACL Remaining (FES and Model 2)
2016/2017	4,986,684	4,380,800	9,367,484	13,690,000	9,990,000	6.23%
2017/2018	5,210,721	4,169,600	9,380,321	13,030,000	9,990,000	6.10%
2018/2019	5,044,834	4,009,600	9,054,434	12,530,000	9,990,000	9.37%
2019/2020	3,238,966	3,891,200	7,130,166	12,160,000	9,990,000	28.63%

¹Commercial allocation = 32% ²Recreational allocation = 68%

Source: Commercial: see Appendix B, assuming status quo sector allocation and ACL = ABC. Recreational SEFSC Recreational ACL data (Accessed May 11, 2021 [FES]).

Note: The Gulf king mackerel fishing year for the recreational sector and commercial sector Western and Southern Zone is July 1 – June 30. The fishing year for the commercial sector Northern Zone is October 1 – September 30.

Table 2.1.5 compares the average sector-specific landings from the 2016/2017 to 2019/2020 fishing seasons against the resultant sector ACL in pounds and allocation in percentages for **Alternative 2** and **Alternative 3**. It is not clear whether the ratio of the average commercial landings to the 2023/2024 commercial ACL for the years under **Alternative 2** and **Alternative 3** project that the commercial sector would not land these revised ACLs, because the commercial sector has been quota limited in the past and it is unknown how much fish the commercial sector would land if it had more quota. However, the commercial sector has regularly nearly met or exceeded its sector ACL for the last 20 years. Therefore, it is possible that the commercial sector may land an increased sector ACL as well. The breakdown of the sector-specific ACLs under **Alternative 2** and **Alternative 3** are demonstrated in Table 2.1.6. Compared with **Alternative 1**, 10% of the recreational sector's allocation would be directed to the commercial sector under **Alternative 2**, and 21% of the recreational sector's allocation would be directed to the commercial sector under **Alternative 3**. Commercial zone ACLs, based on the data in Table 2.1.6, are in Table 2.1.7. As the commercial sector's allocation and resulting ACL would increase under **Alternatives 2** and **3** in comparison to **Alternative 1**, the commercial zone ACLs would likewise increase under **Alternatives 2** and **3**.

Table 2.1.5. Comparison of **Alternative 2** and **Alternative 3** to the average of the sector-specific landings from the last four fishing years (2016/2017 – 2019/2020).

Average Rec Landings (FES)	2023/2024+ Rec ACL	
	Alternative 2	Alternative 3
4,620,301	5,763,350	4,733,501
<i>Percentage</i>	80.2%	97.6%
Average Com Landings (Sim 2)	2023/2024+ Com ACL	
	Alternative 2	Alternative 3
4,112,800	4,226,650	5,256,499
<i>Percentage</i>	97.3%	78.2%
Average Com Landings	2023/2024+ Com ACL	
	Alternative 2	Alternative 3
2,843,478	4,226,650	5,256,499
<i>Percentage</i>	67.3%	54.1%

Table 2.1.6. Resulting catch limits for Gulf king mackerel based on allocation of 68% recreational and 32% commercial, 58% recreational and 42% commercial, or 47% recreational and 53% commercial, compared to 2023/2024 recommended total ACL in MRIP-FES units. Catch limits are expressed as lbs lw for both fishing sectors.

Action 1	Fishing Year	Total ACL	Rec ACL	Com ACL	Rec/Com Allocation %
Current MRIP-FES equiv.	2019/2020+	11,540,000*	7,847,200*	2,740,000	68/32
Alt. 1	2023/2024+	9,990,000	6,793,200	3,196,800	68/32
Alt. 2	2023/2024+	9,990,000	5,763,350	4,226,650	58/42
Alt. 3	2023/2024+	9,990,000	4,733,501	5,256,499	47/53

*MRIP-FES equivalent

Table 2.1.7. Gulf commercial zone-specific catch limits for Gulf king mackerel in MRIP-FES units based on allocation of 68% recreational and 32% commercial, 58% recreational and 42% commercial, or 47% recreational and 53% commercial, compared to 2023/2024 recommended commercial ACL. Catch limits are expressed as lbs lw.

Fishing Year	Rec/Com Allocation	Com ACL	Western Zone Hook and Line Quota	Northern Zone Hook and Line Quota	Southern Zone Hook and Line Quota	Hook and Line ACL Total	Southern Zone Gillnet ACL and Quota
Current 2019/2020+	68/32	2,740,000	1,096,000	493,200	575,400	2,164,600	575,400
2023/2024+	68/32 (Alt. 1)	3,196,800	1,278,720	575,424	671,328	2,525,472	671,328
2023/2024+	58/42 (Alt. 2)	4,226,650	1,690,660	760,797	887,597	3,339,054	887,597
2023/2024+	47/53 (Alt. 3)	5,256,499	2,102,600	946,170	1,103,865	4,152,634	1,103,865

CHAPTER 3. AFFECTED ENVIRONMENT

3.1 Description of the Fishery

Descriptions of the Gulf of Mexico (Gulf) Migratory Group of king mackerel (Gulf king mackerel) component of the coastal migratory pelagic (CMP) fishery can be found in Amendments 18 (GMFMC and SAFMC 2011) and 26 (GMFMC and SAFMC 2016a) to the Fishery Management Plan for Coastal Migratory Pelagic Resources in the Gulf of Mexico and Atlantic Region (FMP). Those descriptions are summarized in the following sections and incorporated herein by reference. Additionally, Sections 3.4 and 3.5 provide information on the respective economic and social environments of the fishery. Management of the commercial and recreational sectors fishing for CMP species in federal waters began in 1983 with the implementation of the original CMP FMP. This FMP has been continuously updated through plan amendments (also known as regulatory amendments) and framework amendments. Resultant regulatory measures are codified at 50 CFR 622. A summary of CMP management actions can be found on the Gulf of Mexico Fishery Management Council's (Gulf Council) web page³ Management actions associated specifically with Gulf king mackerel can also be found in this document in Section 1.3.

3.1.1 Commercial Sector

For the commercial sector, the area occupied by Gulf king mackerel is divided into zones. The Western Zone extends from the southern border of Texas to the Alabama/Florida state line. The Northern Zone extends from the Alabama/Florida state line in the west to the Lee/Collier county line in Florida. The Southern Zone extends south of the Lee/Collier county line to the Monroe/Miami-Dade county line in Florida. The Southern Zone is split into hook-and-line and gillnet components. While part of the Southern Zone is in the South Atlantic jurisdiction, the Gulf Council is delegated authority of Gulf king mackerel in the South Atlantic jurisdiction (GMFMC and SAFMC 2014, 2016a). Gulf king mackerel harvest within these zones is managed using an annual catch limit (ACL), trip limit, minimum size limit, and in-season accountability measures (AM). Only the gillnet component in the Southern Zone is subject to a postseason payback AM (GMFMC 2015). Since 1985, commercial operators harvesting Gulf king mackerel from the Gulf exclusive economic zone (EEZ) must have a king mackerel permit (GMFMC and SAFMC 1985), which is currently a limited access permit (GMFMC and SAFMC 1996, 1999, 2005). Those operators using gillnet gear must also have a gillnet endorsement on their permit, which is also limited access (GMFMC and SAFMC 1998). In 2020, a total of 1,426 vessels held commercial king mackerel permits and 17 vessels also held a gillnet endorsement on their permit. Over 80% of these permits have the mailing recipient in a Gulf state, with all gillnet endorsements being on a commercial permit with a Florida address (Table 3.1.1.1).

³ <http://gulfcouncil.org/fishery-management/>

Table 3.1.1.1. Number and percentage of vessels with a king mackerel commercial permit and/or gillnet endorsement by state of mailing recipient (of permit) for 2020.

State	King Mackerel Commercial Permit		King Mackerel Commercial Gillnet Permit/Endorsement	
	Number	Percent	Number	Percent
AL	31	2.1	0	0
FL	1,030	72.2	17	100
GA	11	0.8	0	0
LA	45	3.2	0	0
MS	7	0.5	0	0
NC	229	16.1	0	0
SC	21	1.5	0	0
TX	30	2.1	0	0
Subtotal	1,404	98.5	17	100.0
Other	22	1.5	0	0
Total	1,426	100.0	17	100.0

Source: NMFS SERO SF Access permits database (2020).

Sector allocation and catch limits began in 1983 (GMFMC and SAFMC 1983). Commercial Gulf king mackerel has a fishing year July 1 through June 30 for the Western and Southern Zones (GMFMC and SAFMC 1985) and a fishing year of October 1 through September 30 for the Northern Zone (GMFMC and SAFMC 2014). The gillnet component has a fixed closed season from July 1 until the day after the Martin Luther King, Jr. holiday and is the only part of the fishery with a fixed closed season. Gillnet fishing is allowed during the first weekend after opening, but not on subsequent weekends and holidays (GMFMC 1999). The minimum commercial size limit in all zones is 24 inches fork length (FL) (GMFMC and SAFMC 1998). There is a trip limit of 3,000 lb in the Western Zone (GMFMC and SAFMC 1998), 1,250 lb in the Northern Zone (GMFMC and SAFMC 2014), 1,250 lb for the hook-and-line component in the Southern Zone (GMFMC and SAFMC 2014), and 45,000 lb for the gillnet component in the Southern Zone (GMFMC 2015). An in-season AM closes the commercial fishery in each zone for the remainder of the fishing year when the respective zone's ACL is met or projected to be met (GMFMC 1985, GMFMC and SAFMC 2011). For the gillnet component, any overage of the ACL triggers a postseason payback AM. If commercial gillnet landings exceed the ACL, the component ACL is reduced for the following fishing year by the amount of the overage in the prior fishing year (GMFMC 2015). All zones have routinely closed in all years since in-season closures were effective in the 1986/1987 fishing year. However, longer seasons have been seen in the Northern Zone since the fishing year was modified for the 2015/2016 fishing year and in all zones since the Florida East Coast Subzone was removed and that zone's allocation was split between the remaining zones in the 2016/2017 fishing year. Longer seasons have also been seen since the COVID-19 pandemic began. On average, the commercial sector has landed 98.7% of its total ACL (Table 1.1.2). Total commercial ACL overages have only occurred in 7 fishing years since 1986/1987 (2008/2009, 2009/2010, 2010/2011, 2012/2013, 2014/2015, 2015/2016, and 2017/2018 [Figure 3.1.1.1 and Table 3.1.1.2]). These total ACL overages have been avoided in part due to the change of the Northern Zone fishing year and removal of the Florida East Coast Subzone with only two total ACL overage occurring since these management changes have occurred. It can also be explained due to individual zones having inseason closure AMs that

tend to leave some additional quota on the table from one or more zones that offsets an overage that occurs in another zone. It is assumed if the commercial sector was not subject to an in-season closure, the zones would meet or exceed their ACL in most years. Further, it is assumed the commercial ACL would continue to be fully harvested or almost in its entirety if the ACL was increased. However, it is currently unclear why commercial landings were well below average in the 2021/2022 fishing year.

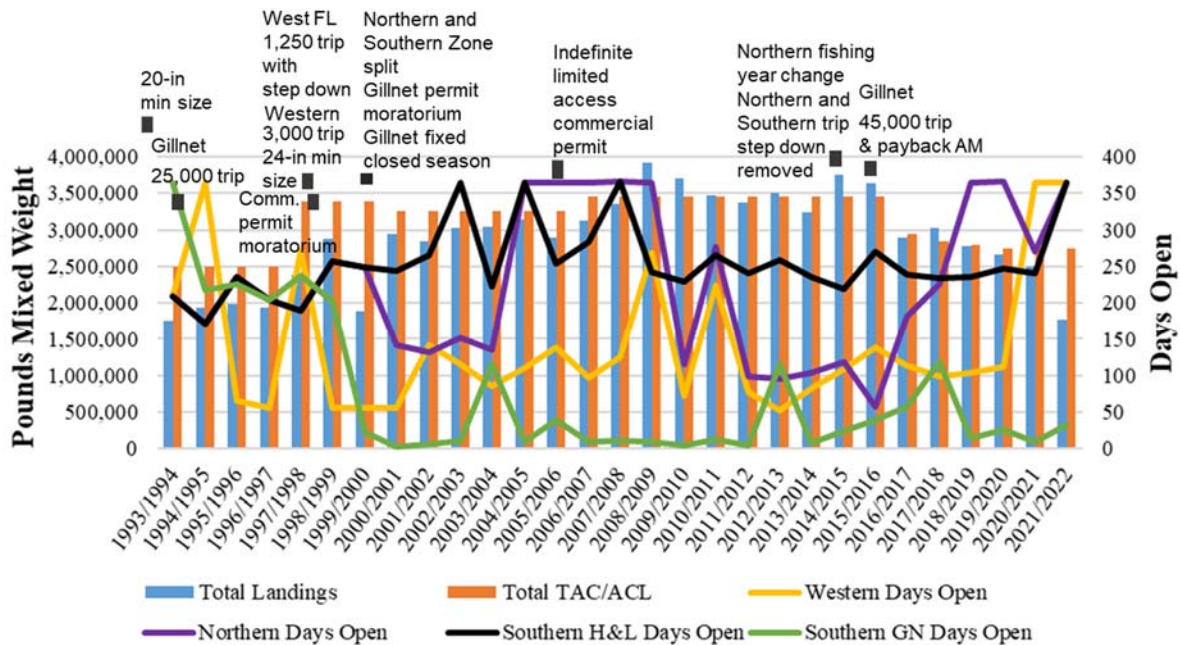


Figure 3.1.1.1. King mackerel commercial management measure implementations, total TAC/ACL, total landings, and season length by zone for 1993/1994-2021/2022.

Source: SEFSC Commercial ACL data (Accessed August 9, 2021 for 1993/1994-2019/2020 and August 17, 2022 for 2020/2021 and 2021/2022).

Note: While in-season closures have been effective since the 1986/1987 fishing year, federal register documents prior to the 1993/1994 fishing year are not available online and therefore those years are not presented. Total landings include the Florida East Coast subzone handline component through the 2015/2016 fishing year. Only landings for the current zones and components (Western, Northern, Southern hook and line, and Southern gillnet) are presented for 2016/2017 to present.

Table 3.1.1.2. Gulf king mackerel commercial landings, and ACLs by zone, gillnet payback-adjusted ACL, percent quota and ACL landed by zone, and closure dates for the fishing years 2000/2001 through 2021/2022. Units are in pounds lw. H&L = hook and line; GN = gillnet.

Year	Zone	Landings	Quota	Percent of Quota	ACL	Percent of ACL Landed	Closure Date	Days Open
2000/2001	Western	992,625	1,050,000	94.5			8/26/00 66 FR 52350	56
	Northern	184,218	175,500	105.0			11/19/00 66 FR 70317	141
	Southern H&L	624,563	541,125	115.4			3/2/01 66 FR 13440	244
	Southern Gillnet	434,681	541,125	80.3	541,125	80.3	1/19/01 66 FR 7591	3
2001/2002	Western	901,003	1,010,000	89.2			11/19/01 66 FR 58410	141
	Northern	222,916	168,750	132.1			11/10/01 66 FR 57396	132
	Southern H&L	702,997	520,312	135.1			3/23/02 67 FR 14660	265
	Southern Gillnet	316,814	520,312	60.9	520,312	80.3	1/28/02 67 FR 4677	7
2002/2003	Western	949,849	1,010,000	94.0			10/25/02 67 FR 65902	116
	Northern	148,115	168,750	87.8			11/30/02 67 FR 71901	152
	Southern H&L	724,848	520,312	139.3			None	365
	Southern Gillnet	349,924	520,312	67.3	520,312	67.3	2/4/03 68 FR 6360	12
2003/2004	Western	981,382	1,010,000	97.2			9/24/03 68 FR 55554	85
	Northern	186,341	168,750	110.4			11/13/03 68 FR 64820	135
	Southern H&L	613,714	520,312	118.0			4/9/04 69 FR 19346	223
	Southern Gillnet	458,194	520,312	88.1	520,312	88.1	None	116
2004/2005	Western	1,094,358	1,010,000	108.4			10/20/04 69 FR 62000	111
	Northern	105,108	168,750	62.3			None	365
	Southern H&L	609,903	520,312	117.2			None	365
	Southern Gillnet	645,985	520,312	124.2	520,312	124.2	1/28/05 70 FR 5061	10
2005/2006	Western	867,560	1,010,000	85.9			11/17/05 70 FR 69914	139
	Northern	140,989	168,750	83.5			None	365

	Southern H&L	714,921	520,312	137.4			3/12/06 71 FR 13304	254
	Southern Gillnet	491,046	520,312	94.4	520,312	94.4	3/7/06 71 FR 12148	40
2006/ 2007	Western	1,021,001	1,010,000	101.1			10/6/06 71 FR 59019	97
	Northern	159,083	168,750	94.3			None	365
	Southern H&L	620,290	520,312	119.2			4/10/07 72 FR 18134	283
	Southern Gillnet	468,044	520,312	90.0	520,312	90.0	1/25/07 72 FR 3955	9
2007/ 2008	Western	949,653	1,010,000	94.0			11/3/07 72 FR 62415	125
	Northern	214,417	168,750	127.1			None	366
	Southern H&L	555,902	520,312	106.8			None	366
	Southern Gillnet	586,800	520,312	112.8	520,312	112.8	2/5/08 73 FR 7223	12
2008/ 2009	Western	984,800	1,010,000	97.5			3/27/09 74 FR 13126	269
	Northern	276,998	168,750	164.1			None	365
	Southern H&L	734,118	520,312	141.1			2/28/09 74 FR 8879	242
	Southern Gillnet	845,017	520,312	162.4	520,312	162.4	1/30/09 74 FR 5623	10
2009/ 2010	Western	1,040,777	1,010,000	103.0			9/12/09 74 FR 46510	73
	Northern	287,838	168,750	170.6			10/24/09 74 FR 54490	115
	Southern H&L	706,442	520,312	135.8			2/15/10 75 FR 7402	229
	Southern Gillnet	589,462	520,312	113.3	520,312	113.3	1/23/10 75 FR 4307	4
2010/ 2011	Western	911,712	1,010,000	90.3			2/11/11 76 FR 7118	225
	Northern	341,775	168,750	202.5			4/4/11 76 FR 18415	277
	Southern H&L	637,974	520,312	122.6			3/23/11 76 FR 16547	265
	Southern Gillnet	522,267	520,312	100.4	520,312	100.4	2/2/11 76 FR 6364	13
2011/ 2012	Western	1,009,725	1,180,480	85.5			9/16/11 76 FR 56659	77
	Northern	267,958	197,064	136.0			10/7/11 76 FR 62309	98
	Southern H&L	622,864	607,614	102.5			2/26/12 77 FR 11411	240
	Southern Gillnet	437,040	607,614	71.9	607,614	71.9	1/21/12 77 FR 3636	4

2012/ 2013	Western	1,113,930	1,180,480	94.4			8/22/12 77 FR 50388	52
	Northern	319,696	197,064	162.2			10/5/12 77 FR 60946	96
	Southern H&L	795,724	607,614	131.0			3/17/13 78 FR 16817	259
	Southern Gillnet	509,883	607,614	83.9	607,614	83.9	None	116
2013/ 2014	Western	1,036,626	1,071,360	96.8			9/20/13 Reopened 11/1/13 Closed 11/3/13 78 FR 58248 78 FR 64888	83
	Northern	259,945	178,848	145.3			10/12/13 78 FR 61989	103
	Southern H&L	612,962	551,448	111.2			2/21/14 79 FR 9866	235
	Southern Gillnet	614,720	551,448	111.5	551,448	111.5	1/29/14 79 FR 5300	8
2014/ 2015	Western	1,364,366	1,071,360	127.3			10/17/14 79 FR 62358	108
	Northern	228,841	178,848	128.0			10/27/14 79 FR 64127	118
	Southern H&L	696,466	551,448	126.3			2/5/15 80 FR 6464	219
	Southern Gillnet	543,730	551,448	98.6	551,448	98.6	2/20/15 80 FR 9665	24
2015/ 2016	Western	1,222,665	1,071,360	114.1			11/17/15 80 FR 71973	139
	Northern	181,952	178,848	101.7			11/28/15 80 FR 74001 80 FR 77588	58
	Southern H&L	658,735	551,448	119.5			3/27/16 81 FR 17093	270
	Southern Gillnet	529,745	551,448	96.1	551,448	96.1	3/11/16 81 FR 12826	39
2016/ 2017	Western	1,159,210	1,180,000	98.2	2,330,500	101.4	10/14/16 Reopened 5/11/17 Closed 5/21/17 82 FR 21314 82 FR 23151	114

		473,282	531,000	89.1			11/10/16 Reopened 5/11/17 (did not reclose) 81 FR 78941 82 FR 21314	182
	Northern Southern H&L	731,655	619,500	118.1			2/25/17 82 FR 11825	239
	Southern Gillnet	538,213	619,500	86.9	619,500	86.9	2/10/17 Reopened 5/11/17 (did not reclose) 82 FR 10553 82 FR 21314	57
2017/ 2018	Western	1,068,145	1,136,000	94.0	2,243,600	110.5	10/7/17 82 FR 47162	98
	Northern	538,559	511,200	105.4			5/15/18 83 FR 22601	226
	Southern H&L	872,694	596,400	145.3			2/20/18 83 FR 7636	234
	Southern Gillnet	552,775	596,400	92.7	596,400	92.7	None	119
2018/ 2019		1,090,596	1,116,000	97.7	2,204,100	98.7	10/5/18 Reopened 11/12/18 Closed 11/19/18 83 FR 50295 83 FR 55975	103
	Western						None	365
	Northern	397,926	502,200	79.2			2/22/19 84 FR 5955	236
	Southern H&L	687,587	585,900	117.4				
	Southern Gillnet	604,700	585,900	103.2	585,900	103.2	2/8/19 84 FR 3723	15
2019/ 2020	Western	1,188,004	1,096,000	108.4	2,164,600	98.9	11/21/19 84 FR 64227	112
	Northern	324,971	493,200	65.9			None	366
	Southern H&L	628,486	575,400	109.2			3/4/20 85 FR 13070	247
	Southern Gillnet	517,481	575,400 (530,043 payback ACL)	89.9	575,400 (530,043 payback ACL)	89.9	2/25/20 84 FR 61568 85 FR 11861	26
2020/ 2021	Western	862,538	1,096,000	78.7	2,164,600	88.4	None	365
	Northern	544,816	493,200	110.5			6/28/21 86 FR 33911	270

	Southern H&L	505,708	575,400	87.9			2/22/21 Reopened 4/4/21 Closed 4/9/21 86 FR 10183 86 FR 17751	241
	Southern Gillnet	587,320	575,400	102.1	575,400	102.1	1/28/21 86 FR 7815	9
2021/ 2022	Western	465,799	1,096,000	42.5	2,164,600	54.7	None	365
	Northern	290,575	493,200	58.9			None	365
	Southern H&L	428,693	575,400	74.5			None	365
	Southern Gillnet	594,362	575,400 (563,480 payback ACL)	103.3	575,400 (563,480 payback ACL)	103.3	3/2/22 87 FR 11596	32

Source: SEFSC Commercial ACL data (Accessed August 9, 2021 for 2016/2017-2019/2020 fishing years and August 17, 2022 for 2020/2021 and 2021/2022 fishing years).

Note: On May 11, 2017 the commercial king mackerel zones were redefined and the Florida east coast subzone was removed. Therefore, prior to 2016/2017, no combined H&L ACLs for the Western, Northern, and Southern Zones and their percent landed are presented since Florida east coast subzone information is not provided. Due to the timing of publication of gillnet payback notices, total prior year overages based on landings and *Federal Register* noticed payback-adjusted ACLs may not match.

Commercial Gulf king mackerel fisheries operating off the west coast of Florida utilize both hook-and-line and gillnet gear. Those operating off Alabama, Mississippi, Louisiana, and Texas utilize only hook-and-line gear. The majority of Gulf king mackerel landings come from the western Gulf and off south Florida from November through March. A winter troll fishery operates along the east and south Gulf coast, and a run-around gillnet fishery operates north of the Florida Keys between January and June. However, the gillnet fishery quota is usually harvested by February. In 2020, the most prevalent gear for commercial king mackerel landings combined was hook-and-line (66%) followed by hook-and-line by trolling (22%), and gillnet (12%); longline and all other gears each accounted for less than 1% of the total catch and are typically bycatch gear (not gear types typically used to target king mackerel). Peak landings occurred in the 2008/2009 fishing year (3.9 mp), but have always been constrained with ACLs and inseason closures.

3.1.2 Recreational Sector

For the recreational sector, Gulf king mackerel harvest is managed using an ACL, bag limit, minimum size limit, and in-season AM. Recreational anglers fish through a variety of fishing modes which are classified generally as shore, private/rental, charter vessels, and headboats (party boats). The latter two comprise the for-hire component of the recreational sector. Although charter vessels tend to be smaller, on average, than headboats, the main distinction between the two types of operations is that charter vessels charge by the trip, regardless of how many passengers are carried, whereas headboats charge per individual angler. Since the 1986/1987 fishing year, for-hire operators harvesting Gulf king mackerel from the Gulf or South

Atlantic EEZ must have a charter vessel/headboat (for-hire) permit for CMP that is specifically assigned to that vessel (GMFMC and SAFMC 1985). The Gulf for-hire permit currently operates under a limited access system (GMFMC and SAFMC 2004). The South Atlantic for-hire permit has remained open-access since its implementation. The for-hire permit does not distinguish between charter vessels and headboats, though information on the primary method of operation is collected on the permit application form. Some vessels may operate as both a charter vessel and a headboat, depending on the season or purpose of a trip. For charter vessels and headboats, if federal regulations for Gulf king mackerel are more restrictive than state regulations, operators must comply with those federal regulations. In 2020, there were 1,300 for-hire fishing vessels with a valid or renewable/transferrable Gulf for-hire CMP permit and 792 for-hire fishing vessels with a valid or renewable/transferrable South Atlantic for-hire CMP permit (Table 3.1.2.1). A permit in renewable status is an expired limited access permit that may not be actively fished, but is renewable for up to one year after expiration. Approximately 54% (1,127) of the total 2,092 for-hire CMP permits have mailing recipients in Florida. Collectively, approximately 80% of the permits have mailing recipients in one of the Gulf States.

Table 3.1.2.1. Number and percentage of valid or renewable Gulf for-hire CMP and South Atlantic for-hire CMP permits by state of mailing recipient (of permit) for 2020.

State	Gulf For-Hire CMP Permit		South Atlantic For-Hire CMP Permit	
	Number	Percent	Number	Percent
AL	142	10.9	9	1.1
FL	799	61.5	328	41.4
GA	2	0.2	32	4.0
LA	109	8.4	14	1.8
MS	28	2.2	8	1.0
NC	7	0.5	115	14.5
SC	0	0.0	71	9.0
TX	204	15.7	26	3.3
Subtotal	1,291	99.4	603	76.1
Other	9	0.6	189	23.9
Total	1,300	100.0	792	100.0

Source: NMFS SERO SF Access permits database (2020).

Private recreational fishing vessels are not required to have a federal permit to harvest individual species in the CMP fishery from the Gulf EEZ. Anglers aboard these vessels, however, must be licensed in states that have a system to provide complete information on that state's saltwater anglers to the national registry.

The Gulf king mackerel recreational sector has undergone few management measure changes since the mid-1990s (Figure 3.1.2.1). Recreational Gulf king mackerel has a calendar fishing year of January 1 through December 31 (GMFMC and SAFMC 1992). However, for the purposes of ACL monitoring, NMFS uses the commercial fishing year of July 1 through June 30 (GMFMC and SAFMC 2011). The recreational minimum size limit is 24 inches FL (GMFMC and SAFMC 1998). There is a bag limit of three fish per person (GMFMC and SAFMC 2016a). An in-season AM closes the recreational fishery for the rest of the fishing year when the ACL is met or projected to be met (GMFMC and SAFMC 2011). The recreational sector for Gulf king

mackerel has not exceeded its TAC/ACL since the 1996/1997 fishing year and the fishing season has never closed (Table 3.1.2.2). On average, the recreational sector has only landed 30% of its ACL since the 1998/1999 fishing year. An increase to the bag limit from 2 to 3 fish occurred in the 2016/2017 fishing year to try and increase the recreational landings (GMFMC and SAFMC 2016a). Commercially permitted vessels were then allowed to keep the recreational bag limit after the commercial season was closed starting in the 2017/2018 fishing year (GMFMC and SAFMC 2016b). However, neither seem to have resulted in increasing recreational landings (Figure 3.1.2.1 and Table 3.1.2.2).

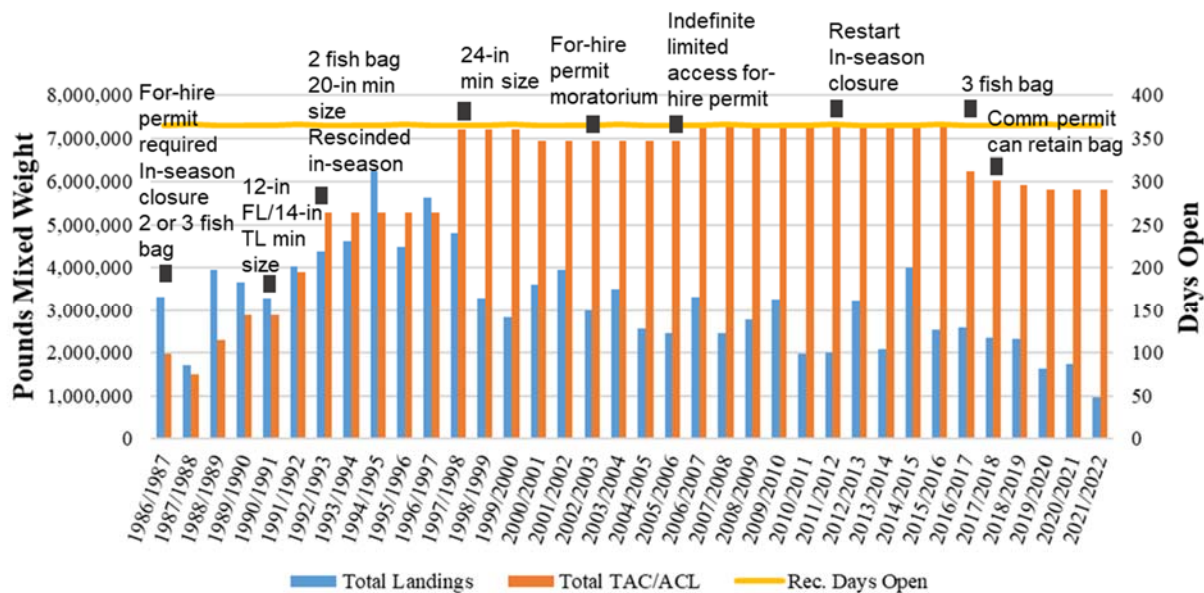


Figure 3.1.2.1. King mackerel recreational management measure implementations, total TAC/ACL, total landings, and season length for 1986/1987-2021/2022. Units are in MRIP Coastal Household Telephone Survey (CHTS).

Source: SEFSC Recreational ACL data (Accessed May 10, 2021 for 1986/1987-2019/2020 and August 17, 2022 for 2020/2021 and 2021/2022).

Table 3.1.2.2. Gulf king mackerel recreational landings in MRIP-CHTS and MRIP Fishing Effort Survey (FES), recreational ACL in MRIP-CHTS, percent of ACL landed, and closure dates for the fishing years 1986/1987 through 2019/2020. Units are in lbs lw.

Year	Landings MRIP- CHTS	Landings MRIP- FES	TAC/ ACL	Percent of ACL Landed	Closure Date	Days Open
1986/ 1987	3,303,880	6,888,855	1,970,000	167.7	None	365
1987/ 1988	1,719,525	3,195,820	1,500,000	114.6	None	366
1988/ 1989	3,948,659	3,667,029	2,300,000	171.7	None	365
1989/ 1990	3,657,342	7,616,589	2,890,000	126.6	None	365
1990/ 1991	3,281,701	8,780,069	2,890,000	113.6	None	365
1991/ 1992	4,029,052	7,405,610	3,910,000	103.0	None	366
1992/ 1993	4,380,699	5,887,572	5,300,000	82.7	N/A	N/A
1993/ 1994	4,632,854	8,018,533	5,300,000	87.4	N/A	N/A
1994/ 1995	6,246,263	9,140,649	5,300,000	117.9	N/A	N/A
1995/ 1996	4,496,494	5,325,483	5,300,000	84.8	N/A	N/A
1996/ 1997	5,623,857	10,829,297	5,300,000	106.1	N/A	N/A
1997/ 1998	4,813,475	6,980,657	7,208,000	66.8	N/A	N/A
1998/ 1999	3,284,779	6,775,346	7,208,000	45.6	N/A	N/A
1999/ 2000	2,845,960	5,965,918	7,208,000	39.5	N/A	N/A
2000/ 2001	3,600,140	7,445,968	6,936,000	51.9	N/A	N/A
2001/ 2002	3,941,457	9,070,883	6,936,000	56.8	N/A	N/A
2002/ 2003	2,983,798	6,169,130	6,936,000	43.0	N/A	N/A
2003/ 2004	3,498,288	6,823,391	6,936,000	50.4	N/A	N/A
2004/ 2005	2,564,642	5,339,214	6,936,000	37.0	N/A	N/A
2005/ 2006	2,465,383	4,781,778	6,936,000	35.5	N/A	N/A
2006/ 2007	3,319,495	6,074,882	6,936,000	45.2	N/A	N/A
2007/ 2008	2,464,224	4,871,760	7,344,000	33.6	N/A	N/A
2008/ 2009	2,790,428	5,168,997	7,344,000	38.0	N/A	N/A

2009/ 2010	3,261,388	7,939,505	7,344,000	44.4	N/A	N/A
2010/ 2011	1,993,088	5,497,642	7,344,000	27.1	N/A	N/A
2011/ 2012	2,012,068	5,060,923	7,344,000	27.4	None	366
2012/ 2013	3,224,351	6,856,317	7,344,000	43.9	None	365
2013/ 2014	2,082,852	3,948,649	7,344,000	28.4	None	365
2014/ 2015	4,015,683	7,777,977	7,344,000	54.7	None	365
2015/ 2016	2,531,260	4,812,866	7,344,000	34.5	None	366
2016/ 2017	2,587,187	4,986,684	6,260,000	41.3	None	365
2017/ 2018	2,356,343	5,210,721	6,040,000	39.0	None	365
2018/ 2019	2,338,564	5,044,834	5,920,000	39.5	None	365
2019/ 2020	1,622,334	3,238,966	5,810,000	27.9	None	366

Source: SEFSC Recreational ACL data (Accessed May 10, 2021 for 1986/1987-2019/2020).

Note: The recreational in-season closure (reduction of bag limit to zero when recreational quota was harvested) was rescinded from the 1992/1993 through the 2010/2011 fishing years. It was restarted in the 2011/2012 fishing year with the implementation of CMP Amendment 18.

The primary recreational gear type used to harvest Gulf king mackerel from 2011-2021 is hook-and-line (99.8%). The only other gear type reported for recreational harvest is spear (0.2%). For the years 2011-2021, the private angler fishing mode has been the dominant fishing mode, accounting for approximately 55.3% of total recreational landings of Gulf king mackerel, followed by shore (24.4%), charter boats (18.1%) and headboats (2.2%). From 2011-2021, the majority of Gulf king mackerel, 72.0%, were recreationally harvested in waters adjacent to west Florida. In the most recent five years (2017-2021), there has been a 3% increase in harvest by private anglers (58.6%) and a 2% increase by charter boats (20.6%) with shore harvest reducing by 6% (18.6%). Headboat harvest (2.2%) and where the majority of recreational Gulf king mackerel harvest occurs (west Florida), has remained unchanged.

Private recreational landings of Gulf king mackerel began being reported in 1979 with the Marine Recreational Fisheries Statistics Survey (MRFSS), although landings in 1979 and 1980 have been considered unreliable. In later years, recreational landings have been provided by MRIP, the Southeast Region Headboat Survey (SRHS), the Texas Parks and Wildlife Department (TPWD), and the Louisiana Creel Survey. Gulf king mackerel recreational landings steadily increased from the late eighties until the mid-1990s with peak landings of 6.2 mp MRIP-CHTS/9.1 mp MRIP-FES equivalent occurring in the 1994/1995 fishing year (Figure 3.1.2.1 and Table 3.1.2.2). Since that peak, landings have decreased and maintained an average of 2.8 mp MRIP-CHTS/6.0 mp MRIP-FES, approximately 30% of the recreational ACL. There is not a clear reason as to why recreational Gulf king mackerel harvest has maintained landings of approximately 30% of its ACL. However, stakeholders have mentioned that Gulf king mackerel

is a desirable catch and release species. As with the commercial sector, further declines in landings have been seen since the onset of the COVID-19 pandemic.

3.2 Description of the Physical Environment

The physical environment for coastal migratory pelagic (CMP) species is provided in the Generic Essential Fish Habitat (EFH) Amendment (GMFMC 2004), Generic Amendment 3 (GMFMC 2005), Amendment 18 to the CMP FMP (GMFMC and SAFMC 2011), Amendment 20B (GMFMC and SAFMC 2014), and Amendment 26 to the CMP FMP (GMFMC and SAFMC 2016a), which are hereby incorporated by reference, and are summarized below.

The Gulf of Mexico (Gulf) has a total area of approximately 600,000 square miles (1.5 million km²), including state waters (Gore 1992). It is a semi-enclosed, oceanic basin connected to the Atlantic Ocean by the Straits of Florida and to the Caribbean Sea by the Yucatan Channel (Figure 3.1.1). Oceanographic conditions are affected by the Loop Current, discharge of freshwater into the northern Gulf, and a semi-permanent, anti-cyclonic gyre in the western Gulf. The Gulf includes both temperate and tropical waters (McEachran and Fechtelm 2005). Mean annual sea surface temperatures ranged from 54° F to 84° F (12° C to 29° C) including bays and bayous (Figure 3.1.1) between 1982 and 2009, according to satellite-derived measurements.⁴ In general, mean sea surface temperature increases from north to south with large seasonal variations in shallow waters.

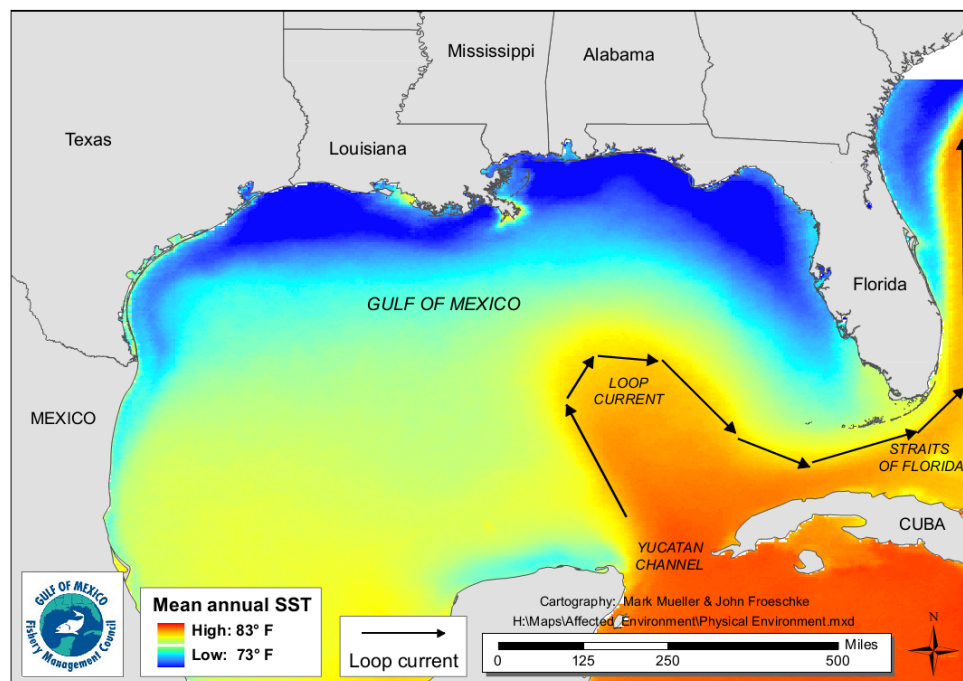


Figure 3.2.1. Mean annual sea surface temperature derived from the Advanced Very High-Resolution Radiometer Pathfinder Version 5 sea surface temperature data set.⁵

⁴ <http://accession.nodc.noaa.gov/0072888>

⁵ <http://pathfinder.nodc.noaa.gov>

Habitat Areas of Particular Concern (HAPC)

Detailed information pertaining to HAPCs is provided in Generic Amendment 3 for addressing EFH, HAPC (GMFMC 2005) and Amendment 9 to the Fishery Management Plan for the Coral and Coral Reefs of the Gulf of Mexico, U.S. Waters (GMFMC 2018). Detailed information pertaining to the Gulf area closures and marine reserves is provided in Amendment 32 to the Fishery Management Plan for the Reef Fish Resources in the Gulf of Mexico (GMFMC 2011). There are environmental sites of special interest that are discussed in the Generic EFH Amendment (GMFMC 2004) that are relevant to CMP management. These documents are hereby incorporated by reference.

Northern Gulf of Mexico Hypoxic Zone

Every summer in the northern Gulf, a large hypoxic zone forms. It is the result of allochthonous materials and runoff from agricultural lands resulting in increasing nutrient inputs to multiple rivers. These tributaries feed in to the Mississippi River, which disperses to the Gulf, and creates a temperature and salinity dependent layering of waters. The nutrient rich fresh waters from the Mississippi create seasonal, large algal blooms at the surface that eventually die, sink to the bottom, and decompose. This creates the oxygen-poor, hypoxic, bottom water layer unless front or storm events occur, which allows for mixing of the layers (Rabalais and Turner 2019). Mapping of the hypoxic zone began in 1985. For 2021, the extent of the hypoxic area was 6,334 square miles, almost triple what it was in 2020 (2,116 square miles), but still less than the extent of the 2017 hypoxic area (8,776 square miles). The changes in hypoxic area can be attributed to changing amounts of river discharge and its associated nutrient load and storm events. The major factor for the reduced size in 2020 was the active storm season with Hurricane Hanna passing right over the zone, allowing for mixing of the waters. The 2021 hypoxia area was higher than the 5-year hypoxic area average (5,408 square miles) and much larger than the 1,930 square mile goal set by the Interagency Mississippi River and Gulf of Mexico Hypoxia Task Force to be reached by 2035.⁶ The hypoxic conditions in the northern Gulf directly impact less mobile benthic macroinvertebrates (e.g., polychaetes) by influencing density, species richness, and community composition (Baustian and Rabalais 2009; Breitburg et al. 2018). However, more mobile macroinvertebrates and demersal fishes, such as king mackerel, are able to detect lower dissolved oxygen levels and move away from hypoxic conditions. Therefore, these organisms are indirectly affected by limited prey availability and constrained available habitat (Baustian and Rabalais 2009; Craig 2012).

Greenhouse gases

The Intergovernmental Panel on Climate Change (IPCC) has indicated greenhouse gas emissions are one of the most important drivers of recent changes in climate. Wilson et al. (2017) inventoried the sources of greenhouse gases in the Gulf from sources associated with oil platforms and those associated with other activities such as fishing. A summary of the results of the inventory are shown in Table 3.2.1 with respect to total emissions and fishing. Commercial fishing and recreational vessels make up a small percentage of the total estimated greenhouse gas emissions from the Gulf (2.04% and 1.67%, respectively).

⁶ <http://gulfhypoxia.net>

Table 3.2.1. Total Gulf greenhouse gas 2014 emissions estimates (in tons per year) from oil platform and non-oil platform sources, commercial fishing, and percent greenhouse gas emissions from commercial fishing vessels of the total emissions*.

Emission source	CO ₂	Greenhouse CH ₄	Gas N ₂ O	Total CO _{2e} **
Oil platform	5,940,330	225,667	98	11,611,272
Non-platform	14,017,962	1,999	2,646	14,856,307
Total	19,958,292	227,665	2,743	26,467,578
Commercial fishing	531,190	3	25	538,842
Recreational fishing	435,327	3	21	441,559
Percent commercial fishing	2.66%	>0.01%	0.91%	2.04%
Percent recreational fishing	2.18%	>0.01%	0.77%	1.67%

*Compiled from Tables 6–11, 6–12, and 6–13 in Wilson et al. (2017). **The CO₂ equivalent (CO_{2e}) emission estimates represent the number of tons of CO₂ emissions with the same global warming potential as one ton of another greenhouse gas (e.g., CH₄ and N₂O). Conversion factors to CO_{2e} are 21 for CH₄ and 310 for N₂O.

3.3 Description of the Biological and Ecological Environment

A description of the biological and ecological environment can be found in Amendments 18, (GMFMC and SAFMC 2011), 20B (GMFMC and SAFMC 2014), and 26 to the CMP FMP (GMFMC and SAFMC 2016a). Those descriptions are summarized in the following sections and incorporated herein by reference.

3.3.1 Gulf King Mackerel Life History and Biology

King mackerel is a marine pelagic species that is found throughout the western Atlantic from the Gulf of Maine to Brazil, including the Gulf and Caribbean Sea, and from the shore to 656 ft (200 m) depths (Collette and Nauen 1983). The habitat of adults is the coastal waters out to the edge of the continental shelf. Within the area, the occurrence of king mackerel is governed by temperature and salinity (Fable et al. 1981, Powers and Eldridge 1983, Trent et al. 1987, Sutter et al. 1991, Schaefer and Fable 1994; Arreguin-Sanchez et al. 1995). They are seldom found in water temperatures less than 68°F (20°C). Salinity preference varies, but they generally prefer oceanic salinities between 32-36 parts per thousand (ppt)

Adults are migratory and the CMP FMP recognizes two migratory groups, Gulf and Atlantic (Powers and Eldridge 1983, Sutter et al. 1991, GMFMC and SAFMC 2016a; Gold et al. 1997, Gold et al. 2002). Typically, adult king mackerel are found in the southern climates (south Florida and extreme south Texas/Mexico) in the winter and farther north in the summer. However, some king mackerel overwinter in deeper waters off the mouth of the Mississippi

River. Food availability and water temperature are likely causes of these migratory patterns. Gulf group king mackerel range from Texas to Florida, including Monroe County north of the Florida Keys, during all months of the year (SEDAR 38 Update 2020).

King mackerel are primarily piscivorous feeding mostly on schooling bait fish, but are also known to feed on cephalopods, shrimp, and crustaceans. (Saloman and Naughton 1983, Godcharles and Murphy 1986, Finucane et al. 1990). King mackerel have significant differences in growth and size at age between males and females (Shepard et al. 2010). King mackerel can weigh up to a record 97.8 lbs ww (44.4 kilograms [kg] ww), but are more common at weights of up to 50 lbs ww (23 kg ww). They reach average lengths of 26-32 inches fork length (FL) (700-800 millimeters [mm] FL) with a maximum of approximately double that. Maximum ages observed for king mackerel in the Gulf were 23 years for males and 24 years for females (Palmer et al. 2013).

Adults are known to spawn in areas of low turbidity, with salinity and temperatures of approximately 30 ppt and 80.6°F (27°C), respectively. In the Gulf, there are major spawning areas off Louisiana and Texas (McEachran et al. 1980). Spawning occurs generally from May through October, with peak spawning in September (Beaumariage 1973, Dwinell and Futch 1973, McEachran et al. 1980; Finucane et al. 1986, MacGregor et al. 1981). Eggs are believed to be released and fertilized continuously during these months. Females may mature first when they are 17.7 to 19.6 in (450 to 499 mm) in length and most are mature by the time they are 35.4 in (800 mm) in length, or by about age 4 (Finucane et al. 1986). Males are usually sexually mature at age 3, at a length of 28.3 in (718 mm) (Beaumariage 1973, Johnson et al. 1983). Larvae have a short developmental stage, which decreases its vulnerability and is related to the increased metabolism of this fast-swimming species. Juveniles are generally found closer to shore than adults and occasionally in estuaries.

Status of the Gulf King Mackerel Stock

See Chapter 1.1 Background. In summary, the most recent stock assessment conducted in 2020 (SEDAR 38 Update) estimated the stock is not overfished and not undergoing overfishing.

Bycatch

Most king mackerel are harvested using hook-and-line gear. Discards in the commercial sector are relatively low (less than 1%) for king mackerel, including the gillnet component, while discards in the recreational charter (19%), and headboat (7%) are higher, with recreational private discards (41%) being much higher. Due to how the fishery is prosecuted for this species, little bycatch of other finfish species occurs. This is due to the use of trolling or gillnet gear that is highly selective for king mackerel.

Since SEDAR 16 (2009), the SEDAR data workshop panel has recommended a Gulf king mackerel discard mortality rate of 25% for the commercial sector utilizing hook-and-line gear, 100% for commercial gillnet, 22% for the recreational headboat fishery, and 20% for the recreational private and charter. Commercial discard mortality recommended for shrimp trawl use is 100%. These discard mortality percentages were maintained in SEDAR 38 (2014) and

SEDAR 38 Update (2020). This amendment considers measures that could affect Gulf king mackerel discard mortality due to reducing catch limits. However, the catch limit reduction is minimal and previous reduced catch limits have not seemed to affect bycatch mortality rates for either sector as shown with retaining of percentages across SEDARs. There is no evidence that the Gulf king mackerel fishery is adversely affecting seabirds or marine mammals.

3.3.2 General Information

General Information on CMP Species

There currently are 3 species managed under the CMP FMP that are made up of 6 migratory groups. The National Marine Fisheries Service (NMFS) Office of Sustainable Fisheries updates its Status of U.S. Fisheries Report to Congress on a quarterly basis utilizing the most current stock assessment information. Stock assessments and status determinations have been conducted and designated for 3 stocks and can be found on the Council⁷ and SEDAR⁸ websites. Of the 6 migratory groups for which stock assessments have been conducted and accepted by the SSC, the second quarter 2022 Update Summary of Stock Status for non-FSSI stocks classifies none as overfished or undergoing overfishing.

Protected Species and Protected Species Bycatch

NMFS manages marine protected species in the Southeast region under the Endangered Species Act (ESA) and the Marine Mammal Protection Act (MMPA). A summary of these two laws and more information is available on NMFS Office of Protected Resources website.⁹ ESA-listed species or Distinct Population Segments (DPS) of marine mammals, sea turtles, fish, and corals occur in the EEZ of the Gulf and South Atlantic. There are numerous stocks of marine mammals managed within the Southeast region. All marine mammals in U.S. waters are protected under the MMPA.

The six whale species that may be present in the Gulf and South Atlantic (sperm, sei, fin, blue, North Atlantic right whale, and Rice's¹⁰) protected under the MMPA and listed as endangered under the ESA. Rice's whales are the only resident baleen whales in the Gulf. Manatees, listed as threatened under the ESA, also occur in the Gulf and South Atlantic and are the only marine mammal species in this area managed by the U.S. Fish and Wildlife Service.

Sea turtles, fish, and corals that are listed as threatened or endangered under the ESA and occur in the Gulf include the following: five species/DPS of sea turtles (Kemp's ridley, Northwest Atlantic DPS of loggerhead, North Atlantic DPS of green, leatherback, and hawksbill); five species/DPS of fish (Gulf sturgeon, U.S. DPS of smalltooth sawfish, Nassau grouper, oceanic

⁷ www.gulfcouncil.org

⁸ <http://sedarweb.org/>

⁹ <https://www.fisheries.noaa.gov/about/office-protected-resources>

¹⁰ Rice's whale was known at the time of listing as the Gulf Bryde's whale, but was later identified as morphologically and genetically distinct from other whales under the Bryde's whale complex. Therefore, NMFS revised the Enumeration of endangered marine and anadromous species accordingly (86 FR 47022, Aug. 23, 2021).

whitetip shark, and giant manta ray); and seven species of coral (elkhorn, staghorn, lobed star, mountainous star, boulder star, pillar, and rough cactus).

Additionally, critical habitat designated under the ESA for the Northwest Atlantic Ocean DPS of loggerhead sea turtle, sawfish, and Gulf sturgeon occurs in the Gulf, though only loggerhead critical habitat occurs in federal waters.

NMFS completed a biological opinion on June 18, 2015, evaluating the impacts of the CMP fishery on ESA-listed species. In the biological opinion (NMFS 2015), NMFS determined that the operation of the CMP fishery is not likely to adversely affect ESA-listed whales, corals, and have no effect on Gulf sturgeon. NMFS also determined that the CMP fishery is not likely to adversely affect designated critical habitat for elkhorn and staghorn coral or the Northwest Atlantic DPS of loggerhead sea turtle. The 2015 biological opinion concluded that the CMP fishery's continued authorization is likely to adversely affect, but is not likely to jeopardize, green, hawksbill, Kemp's ridley, leatherback, or the Northwest Atlantic DPS of loggerhead sea turtles, as well as smalltooth sawfish. An incidental take statement for sea turtles and smalltooth sawfish was issued. Reasonable and prudent measures to minimize the impact of these incidental takes were specified, along with terms and conditions to implement them.

On April 6, 2016, NMFS and the U.S. Fish and Wildlife Service published a final rule (81 FR 20057), effective May 6, 2016, listing 11 DPSs of green sea turtle. The final rule, which superseded the previous green sea turtle listing, listed eight DPSs as threatened and three DPSs as endangered. On June 29, 2016, NMFS published a final rule (81 FR 42268) to list Nassau grouper as threatened under the ESA, effective July 29, 2016. Because the range of both the North Atlantic and South Atlantic DPSs of green sea turtle and the Nassau grouper occur within the action area of the CMP fishery, NMFS reinitiated consultation on the CMP fishery in March 2017. NMFS completed an Amendment to the 2015 biological opinion on November 18, 2017. The amended biological opinion (NMFS 2017) concluded that the CMP fishery's continued authorization is not likely to adversely affect Nassau grouper and is likely to adversely affect, but is not likely to jeopardize, the North Atlantic and South Atlantic DPSs of green sea turtle. A revised incidental take statement was issued.

On January 22, 2018, NMFS published a final rule (83 FR 2916) listing the giant manta ray as threatened under the ESA. On January 30, 2018, NMFS published a final rule (83 FR 4153) listing the oceanic whitetip shark as threatened under the ESA. In a memorandum dated June 11, 2018, NMFS reinitiated consultation on the CMP FMP to address the listings of the giant manta ray and oceanic whitetip shark. The consultation memo determined that fishing under the CMP FMP during the reinitiation period is not likely to adversely affect oceanic whitetip sharks and will not appreciably reduce the likelihood of the giant manta ray's survival or recovery within its range.

On April 15, 2019, NMFS published a final rule listing the Gulf Bryde's whale (now Rice's whale) as endangered under the ESA.¹¹ In a memorandum dated July 8, 2019, NMFS

¹¹ The changes to the taxonomic classification of this species and its common name have no effect on NMFS's conclusion that the activities associated with the CMP FMP will not jeopardize the continued existence of the species during the revised reinitiation period.

determined that the very limited overlap between the CMP fishery and Gulf Bryde's whale habitat and the utilization of a gear type unlikely to pose an entanglement risk, the risk of adverse effects on the Gulf Bryde's whale from interactions with fishing under the CMP FMP were discountable. In that same July 8, 2019, memorandum, NMFS concluded that the activities associated with the CMP FMP were not likely to adversely affect the continued existence of the Gulf Bryde's whale during the revised reinitiation period.

There is no information to indicate marine mammals and birds rely on Gulf king mackerel for food, and they are not generally caught by fishermen harvesting king mackerel. The primary gear in the Gulf CMP fishery used to harvest king mackerel is hook-and-line. This gear is classified in the 2022 Marine Mammal Protection Act List of Fisheries as a Category III fishery (87 FR 23122), meaning the annual mortality and serious injury of a marine mammal resulting from the fishery is less than or equal to 1% of the maximum number of animals, not including natural mortalities, that may be removed from a marine mammal stock while allowing that stock to reach or maintain its optimum sustainable population. The Gulf CMP gillnet component of the CMP fishery is classified as Category II fishery. This classification indicates an occasional incidental mortality or serious injury of a marine mammal stock resulting from the fishery (1-50 % annually of the potential biological removal). The gillnet portion of the CMP fishery has no documented interaction with marine mammals; NMFS classifies the gillnet portion of the CMP fishery as Category II based on analogy (similar risk to marine mammals) with other gillnet fisheries. Additionally, there is no evidence that the Gulf king mackerel fishery as a whole is adversely affecting seabirds. Dolphins are the only species documented as interacting with the CMP fishery. Bottlenose dolphins prey upon bait, catch, and/or released discards of fish from the CMP fishery. They are also a common predator around CMP vessels, feeding on the discards.

Deepwater Horizon MC252 Oil Spill

The presence of polycyclic aromatic hydrocarbons, which are highly toxic chemicals that tend to persist in the environment for long periods of time, in marine environments can have detrimental impacts on marine finfish, especially during the more vulnerable larval stage of development (Whitehead et al. 2012). The future reproductive success of fish species may be negatively affected by episodic events resulting in high-mortality years or low recruitment. These episodic events could leave gaps in the age structure of the population, thereby affecting future reproductive output (Mendelssohn et al. 2012). Other studies have described the vulnerabilities of various marine finfish species, with morphological and/or life history characteristics similar to species found in the Gulf, to oil spills and dispersants (Hose et al. 1996; Carls et al. 1999; Heintz et al. 1999; Short 2003).

In addition to the crude oil, over a million gallons of the dispersant, Corexit 9500A®, was applied to the ocean surface and an additional hundreds of thousands of gallons of dispersant was pumped to the mile-deep wellhead (National Commission 2010). No large-scale applications of dispersants in deep water had been conducted until the *Deepwater Horizon* MC252 oil spill. Thus, no data exist on the environmental fate of dispersants in deep water. Twenty-first century dispersant applications are thought to be less harmful than their predecessors. However, the combination of oil and dispersants has proven to be more toxic to marine fishes than either dispersants or crude oil alone. Marine fish which are more active (e.g. a pelagic species versus a

demersal species) appear to be more susceptible to negative effects from interactions with weathered oil/dispersant emulsions. These effects can include mobility impairment and inhibited respiration (Swedmark et al. 1973). The effect of oil, dispersants, and the combination of oil and dispersants on fishes of the Gulf remains an area of concern. More information about the *Deepwater Horizon* MC252 oil spill is available on the NMFS Southeast Regional Office (SERO) website.¹²

Climate change

Climate change projections predict increases in sea-surface temperature and sea level; decreases in sea-ice cover; and changes in salinity, wave climate, and ocean circulation (IPCC).¹³ These changes are likely to affect plankton biomass and fish larvae abundance that could adversely impact fish, marine mammals, seabirds, and ocean biodiversity. Kennedy et al. (2002) and Osgood (2008) have suggested global climate change could affect temperature changes in coastal and marine ecosystems that can influence organism metabolism and alter ecological processes such as productivity and species interactions; change precipitation patterns and cause a rise in sea level which could change the water balance of coastal ecosystems; altering patterns of wind and water circulation in the ocean environment; and influence the productivity of critical coastal ecosystems such as wetlands, estuaries, and coral reefs. The National Oceanic and Atmospheric Association (NOAA) Climate Change Web Portal¹⁴ predicts the average sea surface temperature in the Gulf and South Atlantic will increase by 2–4°F (1–3°C) for 2010–2070 compared to the average over the years 1950–2010. For reef fishes and snapper-grouper species, Burton (2008) and Morley et al. (2018) speculated climate change could cause shifts in spawning seasons, changes in migration patterns, and changes to basic life history parameters such as growth rates.

The distribution of native and exotic species may change with increased water temperature, as may the prevalence of disease in keystone animals such as corals and the occurrence and intensity of toxic algae blooms (Sokolow 2009; Hollowed et al. 2013; Maynard et al. 2015; Wells et al. 2015; Gobler 2020). Some stocks have already shown increases in abundance in the northern Gulf (Fodrie et al. 2010) and Texas estuaries (Tolan and Fisher 2009). Integrating the potential effects of climate change into the fisheries assessment process is currently difficult due to the assessment rarely projecting through a time span that would include detectable climate change effects (Hollowed et al. 2013). However, there are ecosystem models available or being developed that incorporate future, potential, climate change effects (King and McFarlane 2006; Pinsky and Mantua 2014; Gruss et al. 2017; Chagaris et al. 2019). While complex, these factors do not change the reality of climate change impacts on managed species and the need to incorporate this information into stock assessments. Better planning and collaboration with managers are currently being pursued to include this type of data into the assessment process.

The Southeast Fisheries Science Center (SEFSC) has developed climate vulnerability analyses (CVA)¹⁵ that can be used to determine the vulnerability of Gulf king mackerel to climate changes stressors. According to the SEFSC CVA, and as is the case for many species in the

¹² <https://www.fisheries.noaa.gov/news/deepwater-horizon-10-years-later-10-questions>

¹³ <http://www.ipcc.ch/>

¹⁴ <https://www.esrl.noaa.gov/psd/ipcc/>

¹⁵ <https://www.fisheries.noaa.gov/national/climate/climate-vulnerability-assessments>

Gulf, king mackerel have very high climate exposures to sea surface temperatures, ocean acidification, dissolved oxygen, and salinity. However, Gulf king mackerel’s biological processes (Table 3.3.2.1) were projected to have low sensitivity. While king mackerel have certain life history requirements (biological traits were generally ranked moderate to low), they are a highly migratory species that is capable of extensive movement to find sufficient conditions, and therefore are considered to have a moderate overall climate vulnerability. Generally, the Gulf is projected by the SEFSC models used to become warmer, saltier, less oxygenated, and more acidic everywhere during the current fifty years. Conditions will have similar, but amplified, patterns in the 2056–2099 period (Quinlan et al. in press).

Table 3.3.2.1. Gulf king mackerel biological processes analyzed for climate change sensitivities.

<i>Scomberomorus cavalla</i>	
Sensitivity Attributes	Habitat Specificity
	Prey Specificity
	Adult Mobility
	Dispersal of Early Life Stages
	Early Life History Survival and Settlement Requirements
	Complexity in Reproductive Strategy
	Spawning Cycle
	Sensitivity to Temperature
	Sensitivity to Ocean Acidification
	Population Growth Rate
	Stock Size/Status
	Other Stressors

3.4 Description of the Economic Environment

Economic information pertaining to the CMP fishery and Gulf migratory group king mackerel (Gulf king mackerel), in particular, can be found in Vondruska (2010), Framework Amendment 5 (GMFMC and SAFMC 2016b), and Amendment 26 (GMFMC and SAFMC 2016a), and is incorporated herein by reference. The following section contains select updated information on the economic environment of the Gulf king mackerel portion of the CMP fishery, broken down by sector. Inflation adjusted revenues and prices are reported in 2021 dollars using the annual, non-seasonally adjusted Gross Domestic Product (GDP) implicit price deflator provided by the U.S. Bureau of Economic Analysis.

3.4.1 Commercial Sector

Permits

Any fishing vessel that harvests king mackerel from Atlantic and Gulf Federal waters must have a valid limited access commercial king mackerel permit. A separate and additional valid limited access commercial king mackerel gillnet endorsement is required to harvest the species using a

run-around gillnet in the Gulf migratory group Southern zone. During 2020, there were 1,426 valid or renewable¹⁶ king mackerel permits and 17 valid or renewable king mackerel gillnet endorsements.

Commercial harvest of CMP species in the Exclusive Economic Zone (EEZ) may only be sold to dealers with a federal dealer permit. As of August 26, 2021, there were 379 entities with a federal Gulf and South Atlantic Dealers (GSAD) permit.

Vessels, Trips, Landings, and Dockside Revenue

The following summaries of landings, revenue, and effort (Table 3.4.1.1, Table 3.4.1.2, Table 3.4.1.3, and Table 3.4.1.4) are based on logbook information and NMFS Accumulated Landings System (ALS) for prices. Therefore, the values contained in this section may not match exactly with landings and revenue values presented elsewhere in this document that used ACL monitoring data. In addition, the landings are presented in gutted weight (gw) rather than in landed weight (lw). Landings for all species in the SEFSC Social Science Research Group's (SEFSC-SSRG) Socioeconomic Panel data are expressed in gw to provide one unit for all species. This is because data summarizations, as presented in Table 3.4.1.1, Table 3.4.1.2, Table 3.4.1.3, and Table 3.4.1.4 below, generally involve a multitude of species. It is also important to note that federally-permitted vessels that are required to submit logbooks generally report their harvest of most species regardless of whether the fish were caught in state or federal waters.

The number of federally permitted commercial vessels that harvested Gulf king mackerel in the Gulf declined by approximately 15% from 2016 through 2020, with a peak in participation in 2017 (Table 3.4.1.1). Ex-vessel revenue from Gulf king mackerel increased for these vessels from 2016 through 2018, but then decreased through 2020 (Tables 3.4.1.2). The average annual price per lb gw for king mackerel harvested from the Gulf during this period was \$2.25 (2021 dollars). On average (2016 through 2020), vessels that landed king mackerel did so on approximately 59% of their Gulf trips and king mackerel comprised approximately a quarter of their annual revenue from all species (Tables 3.4.1.1 and 3.4.1.2). Average annual revenue per vessel for all species harvested by these vessels experienced a downward trend from 2016 through 2020, with an overall decrease of 44% (Table 3.4.1.2). Although not shown in the tables, on average from 2016 through 2020, gillnet landings accounted for approximately 21% of all Gulf king mackerel landings in Gulf jurisdictional waters. In addition, during this period there was no discernable difference in average price per lb gw between gillnet and hook and line landings except for in 2019.¹⁷

Liese and Overstreet (2021) provide annual vessel-level estimates of costs (as a percentage of revenue) and net revenue from operations for vessels that harvested king mackerel in the Gulf and South Atlantic. Estimates of producer surplus (PS) can be calculated from the cost information. PS is total annual revenue minus the costs for fuel, other supplies, hired crew, and

¹⁶ A renewable permit is an expired limited access permit that cannot be actively fished, but can be renewed for up to one year after expiration.

¹⁷ Average price by gear type (gillnet versus hook and line) varied by no more than approximately \$0.15 in all years except for 2019. In 2019, average price per lb gw was \$1.36 for gillnet landings, which was \$0.82 less than the average hook and line price of \$2.18.

the opportunity cost of an owner's time as captain. Net revenue from operations, which most closely represents economic profits to the owner(s), is total annual revenue minus the costs for fuel, other supplies, hired crew, vessel repair and maintenance, insurance, overhead, and the opportunity cost of an owner's time as captain, as well as the vessel's depreciation. According to Liese and Overstreet (2021), PS for commercial vessels that harvested king mackerel in the Gulf was 45.3% of their annual gross revenue, on average, from 2016 through 2018. Net revenue from operations was 21.6% of their average annual gross revenue during this period. Applying these percentages to the results provided in Table 3.4.1.2 would result in an estimated per vessel average annual PS of \$42,322 (2021 dollars) and an average annual net revenue from operations of \$20,180 per year.

Table 3.4.1.1. Number of vessels, number of trips, and landings (lbs gw) by year for Gulf king mackerel in Gulf jurisdictional waters.

Year	# of vessels that caught king mackerel (> 0 lbs gw)	# of trips that caught king mackerel	king mackerel landings (lbs gw)	Other species' landings jointly caught w/ king mackerel (lbs gw)	# of Gulf trips that only caught other species	Other species' landings on Gulf trips w/o king mackerel (lbs gw)	All species landings on South Atlantic trips (lbs gw)*
2016	259	2,309	2,358,758	548,609	1,986	4,959,703	1,048,186
2017	299	2,890	2,705,663	777,912	1,842	4,367,997	1,074,506
2018	256	2,385	2,601,258	352,638	1,483	3,246,143	865,972
2019	237	2,180	2,431,084	423,101	1,774	3,601,284	781,979
2020	220	1,950	1,876,673	324,409	1,147	1,902,426	780,292
Average	254	2,343	2,394,687	485,334	1,646	3,615,511	910,187

Source: SEFSC-SSRG Socioeconomic Panel (January 2022 version).

Note: Calendar estimates are provided here for all statistics; however, because the king mackerel fishing year does not align with the calendar year, these will differ from king mackerel fishing year landings estimates. Additionally, landings from state waters by vessels without federal permits are not included.

*Refers to all species landings on South Atlantic trips taken by those vessels that harvested Gulf king mackerel in the Gulf each year.

Table 3.4.1.2. Number of vessels and ex-vessel revenue by year (2021 dollars) for Gulf king mackerel in Gulf jurisdictional waters.

Year	# of vessels that caught king mackerel (> 0 lbs gw)	Dockside revenue from king mackerel	Dockside revenue from 'other species' jointly caught w/ king mackerel	Dockside revenue from 'other species' caught on Gulf trips w/o king mackerel	Dockside revenue from 'all species' caught on South Atlantic trips	Total dockside revenue	Average total dockside revenue per vessel
2016	259	\$5,554,359	\$2,083,366	\$20,074,858	\$2,592,609	\$30,305,192	\$117,008
2017	299	\$6,112,945	\$3,003,987	\$17,868,903	\$2,759,482	\$29,745,317	\$99,483
2018	256	\$6,385,299	\$1,424,872	\$12,752,663	\$2,190,928	\$22,753,762	\$88,882
2019	237	\$4,971,463	\$1,789,747	\$14,146,978	\$1,797,470	\$22,705,658	\$95,804
2020	220	\$3,980,336	\$1,218,252	\$7,504,494	\$1,806,301	\$14,509,384	\$65,952
Average	254	\$5,400,880	\$1,904,045	\$14,469,579	\$2,229,358	\$24,003,862	\$93,426

Source: SEFSC-SSRG Socioeconomic Panel (January 2022 version).

Note: Calendar estimates are provided here for all statistics; however, because the king mackerel fishing year does not align with the calendar year, these will differ from king mackerel fishing year landings estimates. Additionally, landings from state waters by vessels without federal permits are not included.

The Gulf king mackerel Southern Zone spans all of Monroe County, and therefore, comprises areas in both the South Atlantic and Gulf jurisdictional waters. Because the SEFSC-SSRG Socioeconomic Panel data are broken down by sub-region and operating characteristics among South Atlantic and Gulf vessels are not the same, Table 3.4.1.3 and Table 3.4.1.4 present results for South Atlantic vessels that harvested Gulf king mackerel in South Atlantic waters (i.e., king mackerel in Monroe County). King mackerel landed elsewhere in the South Atlantic are defined as belonging to the Atlantic king mackerel stock. The number of federally permitted commercial vessels that harvested Gulf king mackerel in the South Atlantic fluctuated from 2016 through 2020, with a peak in participation in 2017 (Table 3.4.1.3). Ex-vessel revenue from Gulf king mackerel increased for these vessels from 2016 through 2019, but then decreased sharply in 2020 (Tables 3.4.1.4). This decrease may be due in part to disruptions to the CMP fishery caused by COVID-19. The average annual price per lb gw for Gulf king mackerel harvested in the South Atlantic from 2016 through 2020 was \$2.31 (2021 dollars). On average (2016 through 2020), South Atlantic vessels that landed Gulf king mackerel did so on approximately 34% of their South Atlantic trips and Gulf king mackerel comprised approximately 14% of their annual revenue from all species (Tables 3.4.1.3 and 3.4.1.4). Average annual revenue per vessel for all species harvested by these vessels increased from 2016 through 2017, but then steadily decreased through 2020 (Table 3.4.1.4). Although not shown in the tables, on average from 2016 through 2020, gillnet landings accounted for approximately 3% of all Gulf king mackerel landings in South Atlantic jurisdictional waters. In addition, during this period there was no discernable

difference in average price per lb gw between Gulf king mackerel gillnet and hook and line landings in the South Atlantic.¹⁸

According to Liese and Overstreet (2021), annual PS for commercial vessels that harvested king mackerel in the South Atlantic was 38.4% of their annual gross revenue, on average, from 2016 through 2018. Net revenue from operations was 4.5% of their average annual gross revenue during this period. Applying these percentages to the results provided in Table 3.4.1.4 would result in an estimated per vessel average annual PS of \$15,373 (2021 dollars) and an average annual net revenue from operations of \$1,802 per year.

Table 3.4.1.3. Number of vessels, number of trips, and landings (lbs gw) by year for Gulf king mackerel in South Atlantic jurisdictional waters.

Year	# of vessels that caught Gulf king mackerel (> 0 lbs gw)	# of trips that caught Gulf king mackerel	Gulf king mackerel landings (lbs gw)	Other species' landings jointly caught w/ Gulf king mackerel (lbs gw)	# of South Atlantic trips that only caught other species	Other species' landings on South Atlantic trips w/o Gulf king mackerel (lbs gw)	All species landings on Gulf trips (lbs gw)*
2016	133	1,459	235,847	133,433	3,556	1,359,562	322,966
2017	137	1,715	304,316	162,546	3,596	1,546,441	403,480
2018	120	1,589	288,179	125,519	3,198	1,124,979	315,455
2019	133	1,910	370,046	121,653	3,077	1,033,184	255,644
2020	118	1,484	285,873	84,570	2,247	722,766	203,454
Average	128	1,631	296,852	125,544	3,135	1,157,386	300,200

Source: SEFSC-SSRG Socioeconomic Panel (January 2022 version).

Note: Calendar estimates are provided here for all statistics; however, because the king mackerel fishing year does not align with the calendar year, these will differ from king mackerel fishing year landings estimates. Additionally, landings from state waters by vessels without federal permits are not included.

*Refers to all species landings on Gulf trips taken by those vessels that harvested Gulf king mackerel in the South Atlantic each year.

¹⁸ Average price by gear type (gillnet versus hook and line) varied by no more than plus or minus \$0.23 from 2016 through 2020.

Table 3.4.1.4. Number of vessels and ex-vessel revenue by year (2021 dollars) for Gulf king mackerel in South Atlantic jurisdictional waters.

Year	# of vessels that caught Gulf king mackerel (> 0 lbs gw)	Dockside revenue from Gulf king mackerel	Dockside revenue from 'other species' jointly caught w/ Gulf king mackerel	Dockside revenue from 'other species' caught on South Atlantic trips w/o Gulf king mackerel	Dockside revenue from 'all species' caught on Gulf trips	Total dockside revenue	Average total dockside revenue per vessel
2016	133	\$572,098	\$382,642	\$4,192,459	\$990,406	\$6,137,606	\$46,147
2017	137	\$690,051	\$444,121	\$4,491,488	\$1,107,257	\$6,732,918	\$49,145
2018	120	\$713,758	\$297,928	\$3,302,944	\$801,325	\$5,115,954	\$42,633
2019	133	\$825,776	\$269,881	\$2,955,855	\$671,551	\$4,723,063	\$35,512
2020	118	\$617,526	\$200,599	\$1,864,884	\$472,095	\$3,155,104	\$26,738
Average	128	\$683,842	\$319,034	\$3,361,526	\$808,527	\$5,172,929	\$40,035

Source: SEFSC-SSRG Socioeconomic Panel (January 2022 version).

Note: Calendar estimates are provided here for all statistics; however, because the king mackerel fishing year does not align with the calendar year, these will differ from king mackerel fishing year landings estimates. Additionally, landings from state waters by vessels without federal permits are not included.

Imports

Imports of seafood products compete in the domestic seafood market and have in fact dominated many segments of the seafood market. Imports affect the price for domestic seafood products and tend to set the price in the market segments in which they dominate. Seafood imports have downstream effects on the local fish market. At the harvest level for mackerel species, imports affect the returns to fishermen through the ex-vessel prices they receive for their landings. As substitutes to the domestic production of mackerel species, imports tend to cushion the adverse economic effects on consumers resulting from a reduction in domestic landings. The following describes the imports of fish products that directly compete with the domestic harvest of mackerel species. Imports data for king mackerel, in particular, are not available.

Ninety-six and a half percent of mackerel imports¹⁹, on average (2016 through 2020), were comprised of frozen or prepared/preserved fish²⁰; the remaining 3.5% were fresh. Imports of mackerel increased steadily from 58.9 million lbs product weight (pw) in 2016 to 69.1 million lbs pw in 2020. During the period, total revenue from mackerel imports ranged from approximately \$75.6 million (2021 dollars) to \$93.3 million. Imports of mackerel primarily originated in China, Norway, and Thailand, and to a lesser extent, Vietnam, South Korea and Mexico. These imports primarily entered the U.S. through the ports of New York, Los Angeles,

¹⁹ NOAA Fisheries Service purchases fisheries trade data from the Foreign Trade Division of the U.S. Census Bureau. Data are available for download at <http://www.st.nmfs.noaa.gov/st1/trade/index.html>.

²⁰ Includes dried, salted and smoked mackerel.

and Baltimore. Mackerel imports were highest on average (2016 through 2020) during the months of January, November, and December.

Business Activity

The commercial harvest and subsequent sales and consumption of fish generate business activity as fishermen expend funds to harvest the fish and consumers spend money on goods and services, such as king mackerel purchased at a local fish market and served during restaurant visits. These expenditures spur additional business activity in the region(s) where the harvest and purchases are made, such as jobs in local fish markets, grocers, restaurants, and fishing supply establishments. In the absence of the availability of a given species for purchase, consumers would spend their money on substitute goods, such as other finfish or seafood products, and services, such as visits to different food service establishments. As a result, the analysis presented below represents a distributional analysis only; that is, it only shows how economic effects may be distributed through regional markets and should not be interpreted to represent the impacts if this species is not available for harvest or purchase.

Estimates of the U.S. average annual business activity associated with the commercial harvest of Gulf king mackerel by Council jurisdiction were derived using the model developed for and applied in NMFS (2021) and are provided in Table 3.4.1.5 and Table 3.4.1.6.²¹ This business activity is characterized as jobs (full- and part-time), output impacts (gross business sales), income impacts (wages, salaries, and self-employed income), and value-added impacts, which represent the contribution made to the U.S. GDP. These impacts should not be added together because this would result in double counting. It should be noted that the results provided should be interpreted with caution and demonstrate the limitations of these types of assessments. These results are based on average relationships developed through the analysis of many fishing operations that harvest many different species. Separate models to address individual species are not available. For example, the results provided here apply to a general “reef fish” category rather than just king mackerel, and a harvester job is “generated” for approximately every \$35,200 (2021 dollars) in ex-vessel revenue. These results contrast with the number of harvesters (vessels) with recorded landings of king mackerel presented in Table 3.4.1.1 and Table 3.4.1.3.

Table 3.4.1.5. Average annual business activity (2016 through 2020) associated with the commercial harvest of Gulf king mackerel in Gulf jurisdictional waters. All monetary estimates are in 2021 dollars.

Species	Average Ex-vessel Value (\$ thousands)	Total Jobs	Harvester Jobs	Output (Sales) Impacts (\$ thousands)	Income Impacts (\$ thousands)	Value Added (\$ thousands)
Gulf king mackerel	\$5,401	646	153	\$53,560	\$19,669	\$27,790

Source: Calculated by NMFS SERO using the model developed for and applied in NMFS (2022).

²¹A detailed description of the input/output model is provided in NMFS (2011).

Table 3.4.1.6. Average annual business activity (2016 through 2020) associated with the commercial harvest of Gulf king mackerel in South Atlantic jurisdictional waters. All monetary estimates are in 2021 dollars.

Species	Average Ex-vessel Value (\$ thousands)	Total Jobs	Harvester Jobs	Output (Sales) Impacts (\$ thousands)	Income Impacts (\$ thousands)	Value Added (\$ thousands)
Gulf king mackerel	\$684	82	19	\$6,782	\$2,490	\$3,519

Source: Calculated by NMFS SERO using the model developed for and applied in NMFS (2022).

3.4.2 Recreational Sector

The recreational sector is comprised of the private and for-hire modes. The private mode includes anglers fishing from shore (all land-based structures) and private/rental boats. The for-hire mode is composed of charter vessels and headboats. Charter vessels generally carry fewer passengers and charge a fee on an entire vessel basis, whereas headboats carry more passengers and payment is per person. The type of service, from a vessel- or passenger-size perspective, affects the flexibility to search different fishing locations during the course of a trip and target different species because larger concentrations of fish are required to satisfy larger groups of anglers.

Permits

For anglers to fish for or possess CMP species in or from the Gulf EEZ on for-hire vessels, those vessels are required to have a limited access Gulf Charter/Headboat for CMP permit (Gulf CMP for-hire permit). During 2020, there were 1,300 valid (non-expired) or renewable²² Gulf CMP for-hire permits and 15 valid or renewable Gulf CMP historical captain for-hire permits. For anglers to fish for or possess CMP species in or from the Mid-Atlantic or South Atlantic EEZ on for-hire vessels, those vessels are required to have an open access South Atlantic Charter/Headboat for CMP permit (South Atlantic CMP for-hire permit). During 2020, there were 2,204 valid South Atlantic CMP for-hire permits. Although the for-hire permit application collects information on the primary method of operation, the permit itself does not identify the permitted vessel as either a headboat or a charter vessel and vessels may operate in both capacities. However, only federally permitted headboats are required to submit harvest and effort information to the NMFS Southeast Region Headboat Survey (SRHS).²³ Participation in

²² A renewable permit is an expired permit that may not be actively fished, but is renewable for up to one year after expiration.

²³ All federal charter/headboat permit holders, including charter vessel owners or operators, are required to comply with the new Southeast For-Hire Electronic Reporting Program as of January 5, 2021. Under this program, vessels with Gulf permits must declare trips prior to departure and submit electronic fishing reports prior to offloading fish, or within 30 minutes after the end of a trip, if no fish are landed. Vessels with South Atlantic permits must submit logbooks weekly, by 11:59 pm, local time, the Tuesday following a reporting week (Monday-Sunday). Those vessels selected to report to the SRHS (i.e., federally permitted headboats) will continue to submit their reports under the new requirements directly to the SRHS program. For more information, see: https://www.fisheries.noaa.gov/southeast/recreational-fishing-data/southeast-hire-electronic-reporting-program?utm_medium=email&utm_source=govdelivery.

the SRHS is based on determination by the SEFSC that the vessel primarily operates as a headboat. As of February 22, 2022, 69 Gulf headboats and 66 South Atlantic headboats were registered in the SRHS (K. Brennan, NMFS SEFSC, pers. comm. 2022). As a result, of the 1,315 vessels with Gulf CMP for-hire permits (including historical captain permits), up to 69 may primarily operate as headboats and the remainder as charter vessels. Of the 2,204 vessels with South Atlantic CMP for-hire permits, up to 66 may primarily operate as headboats.

Information on Gulf charter vessel and headboat operating characteristics is included in Savolainen et al. (2012) and is incorporated herein by reference. Information on South Atlantic charter vessel and headboat operating characteristics is included in Holland et al. (2012) and is also incorporated by reference.

There are no specific federal permitting requirements for recreational anglers to fish for or harvest CMP species, including Gulf king mackerel. Instead, anglers are required to possess either a state recreational fishing permit that authorizes saltwater fishing in general, or be registered in the federal National Saltwater Angler Registry system, subject to appropriate exemptions. As a result, it is not possible to identify with available data how many individual anglers would be expected to be affected by this action.

Landings

Recreational landings of Gulf king mackerel were fairly stable from the 2015/2016 fishing year through the 2018/2019 fishing year and then experienced a substantial decrease in 2019/2020 (Figure 3.4.2.1). This decrease may be due in part to disruptions to the CMP fishery caused by COVID-19. Private mode landings consistently accounted for over half of all recreational Gulf king mackerel landings each year during the 2015/2016 through 2019/2020 fishing years.

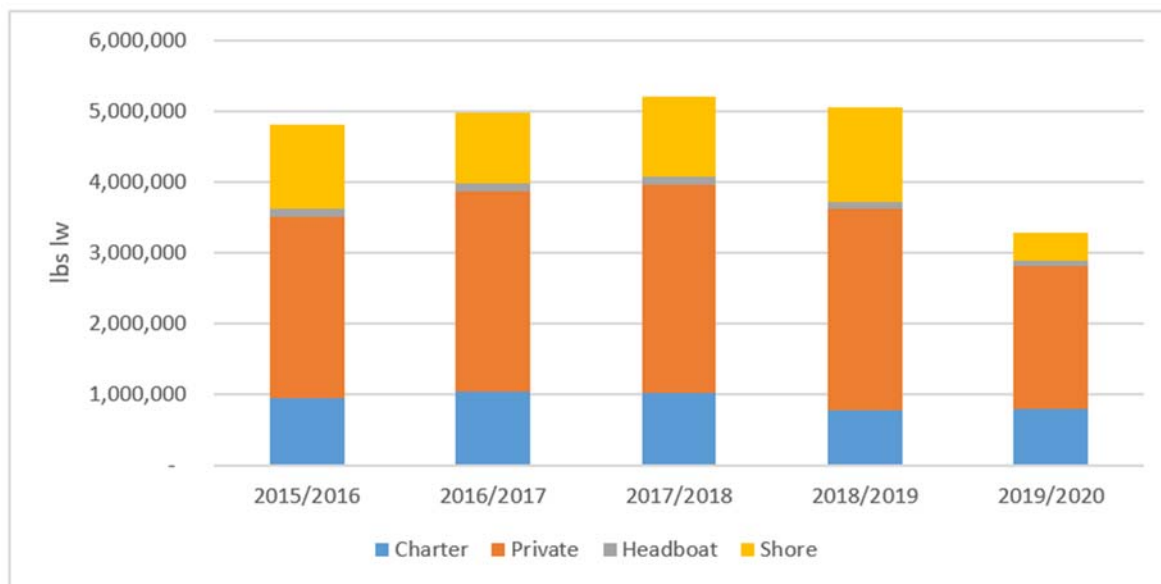


Figure 3.4.2.1. Recreational landings of Gulf king mackerel by mode and fishing year (2015/2016 – 2019/2020).

Source: SEFSC MRIP FES ACL data set (March 2022).

Note: The Gulf king mackerel fishing year runs from July 1 to June 30.

Angler Effort

Recreational effort derived from the Marine Recreational Information Program (MRIP) database can be characterized in terms of the number of trips as follows:

- Target effort - The number of individual angler trips, regardless of duration, where the intercepted angler indicated that the species or a species in the species group was targeted as either the first or the second primary target for the trip. The species did not have to be caught.
- Catch effort - The number of individual angler trips, regardless of duration and target intent, where the individual species or a species in the species group was caught. The fish did not have to be kept.
- Total recreational trips - The total estimated number of recreational trips in the Gulf, regardless of target intent or catch success.

Given the subject nature of this action, the following discussion focuses on target and catch trips for Gulf king mackerel. Data from MRIP, the Louisiana Department of Wildlife and Fisheries (LDWF) Recreational Creel Survey, and the TPWD Marine Sport-Harvest Monitoring Program were used to estimate these trips. It is important to note that in 2018, MRIP transitioned from the CHTS to the mail-based FES. The MRIP-based estimates presented for FL, AL, and MS in Table 3.4.2.1 and Table 3.4.2.2 are calibrated to the FES and may be greater than estimates that are non-calibrated.²⁴ In addition, the estimates for Florida include all Southern Zone king mackerel target and catch trips, including those that occur in the South Atlantic portion of Monroe County, in accordance with the MRIP sampling frame. Finally, effort estimates for Louisiana from the LDWF Recreational Creel Survey are not calibrated to MRIP and are therefore not directly comparable to the MRIP-based estimates.

Both target and catch trips for Gulf king mackerel experienced downward trends (with fluctuation) throughout most Gulf states from 2016 through 2020 (Table 3.4.2.1 and Table 3.4.2.2). Florida and Alabama recorded the most target and catch trips for king mackerel during this period (Table 3.4.2.1 and Table 3.4.2.2). In Florida, there were approximately twice as many Gulf king mackerel target trips as catch trips, on average from 2016 through 2020, and in Alabama there were almost three times as many (Table 3.4.2.1 and Table 3.4.2.2). This was mainly driven by the shore mode and suggests there is a relatively strong interest in catching king mackerel among recreational anglers in those states.

²⁴ As of August 2018, all directed trip estimate information provided by MRIP (public use survey data and directed trip query results) for the entire time series were updated to account for both the Access Point Angler Intercept Survey (APAIS) design change in 2013, as well as the transition from the CHTS to the FES in 2018. Back-calibrated estimates of directed effort are not available. For more information, see: <https://www.fisheries.noaa.gov/recreational-fishing-data/recreational-fishing-estimate-updates>.

Table 3.4.2.1. Gulf king mackerel recreational target trips, by mode, state, and calendar year.

	Alabama	Florida*	Louisiana**	Mississippi	Texas
Shore Mode					
2016	494,464	582,235	N/A	0	N/A
2017	323,406	421,973	N/A	0	N/A
2018	434,077	807,194	N/A	0	N/A
2019	402,915	317,459	N/A	0	N/A
2020	72,994	763,682	N/A	0	N/A
Average	345,571	578,509	N/A	0	N/A
Charter Mode					
2016	6,587	27,919	284	0	1,296
2017	4,833	44,190	0	22	948
2018	1,105	41,120	0	614	3,003
2019	2,756	35,538	0	0	1,895
2020	3,496	37,396	0	0	1,356
Average	3,755	37,233	57	127	1,699
Private/Rental Mode					
2016	80,423	417,714	1,435	0	8,499
2017	46,150	448,027	2,170	2,078	6,957
2018	63,097	327,617	1,785	10,128	11,608
2019	51,224	353,664	269	0	8,813
2020	32,669	243,013	679	0	7,014
Average	54,713	358,007	1,268	2,441	8,578
All Modes					
2016	581,474	1,027,868	1,719	0	9,795
2017	374,389	914,190	2,170	2,100	7,905
2018	498,280	1,175,931	1,785	10,741	14,611
2019	456,896	706,661	269	0	10,708
2020	109,160	1,044,091	679	0	8,370
Average	404,040	973,748	1,324	2,568	10,278

Source: MRIP database, SERO, NMFS (March 2022) for AL, FL and MS. LDWF Recreational Creel Survey for LA. TPWD Marine Sport-Harvest Monitoring Program for TX.

*Includes all trips that targeted Gulf king mackerel, including throughout Monroe County, FL.

**These data are not currently calibrated with the MRIP data and are therefore not directly comparable to the MRIP-based estimates. Additionally, the private and shore modes are combined in the LDWF Recreational Creel Survey and are presented here together under the Private/Rental Mode.

Note 1: The estimates for AL, FL, and MS are based on MRIP FES.

Note 2: Headboat information is unavailable.

Note 3: Texas shore mode data are not available.

Table 3.4.2.2. Gulf king mackerel recreational catch trips, by mode, state, and calendar year.

	Alabama	Florida*	Louisiana**	Mississippi	Texas
Shore Mode					
2016	107,513	143,692	N/A	0	N/A
2017	28,432	70,048	N/A	0	N/A
2018	58,543	92,400	N/A	0	N/A
2019	43,612	34,389	N/A	0	N/A
2020	6,734	88,841	N/A	0	N/A
Average	48,967	85,874	N/A	0	N/A
Charter Mode					
2016	30,097	128,733	1,380	4,874	3,480
2017	18,840	124,689	882	1,449	3,459
2018	14,504	120,595	390	1,639	7,061
2019	15,998	129,672	489	36	5,225
2020	17,975	133,905	327	52	3,927
Average	19,483	127,519	694	1,610	4,631
Private/Rental Mode					
2016	83,052	313,896	5,220	990	9,659
2017	79,330	402,306	5,355	0	10,082
2018	79,927	194,872	3,757	14,892	13,772
2019	33,033	233,360	6,698	1,684	11,300
2020	78,079	153,993	2,053	233	6,592
Average	70,684	259,685	4,617	3,560	10,281
All Modes					
2016	220,662	586,321	6,600	5,864	13,139
2017	126,602	597,043	6,237	1,449	13,541
2018	152,974	407,866	4,147	16,531	20,832
2019	92,643	397,420	7,187	1,720	16,526
2020	102,788	376,738	2,380	285	10,519
Average	139,134	473,078	5,310	5,170	14,912

Source: MRIP database, SERO, NMFS (March 2022) for AL, FL and MS. LDWF Recreational Creel Survey for LA. TPWD Marine Sport-Harvest Monitoring Program for TX.

*Includes all trips that caught Gulf king mackerel, including throughout Monroe County, FL.

**These data are not currently calibrated with the MRIP data and are therefore not directly comparable to the MRIP-based estimates. Additionally, the private and shore modes are combined in the LDWF Recreational Creel Survey and are presented here together under the Private/Rental Mode.

Note 1: The estimates for AL, FL, and MS are based on MRIP FES.

Note 2: Headboat information is unavailable.

Note 3: Texas shore mode data are not available.

Similar analysis of recreational effort is not possible for the headboat mode because headboat data are not collected at the angler level. Estimates of effort by the headboat mode are provided in terms of angler days, or the total number of standardized full-day angler trips.²⁵ Headboat angler days were fairly stable across the Gulf states from 2016 through 2019 (Table 3.4.2.3). There was, however, a downward trend in reported angler days in Florida from 2016 on and a substantial dip in all states in 2020, likely due to the impacts of COVID-19 closures and disruptions. On average (2016 through 2020), Florida accounted for the majority of headboat angler days reported, followed by Texas and Alabama; whereas, Mississippi and Louisiana combined accounted for only a small percentage (Table 3.4.2.3). Headboat effort in terms of angler days for the entire Gulf tended to be concentrated most heavily during the summer months of June through August (Table 3.4.2.4).

Table 3.4.2.3. Gulf headboat angler days and percent distribution by state (2016 - 2020).

	Angler Days				Percent Distribution			
	FL	AL	MS-LA*	TX	FL	AL	MS-LA	TX
2016	183,147	16,831	2,955	54,083	71.3%	6.5%	1.1%	21.0%
2017	178,816	17,841	3,189	51,575	71.1%	7.1%	1.3%	20.5%
2018	171,996	19,851	3,235	52,160	69.6%	8.0%	1.3%	21.1%
2019	161,564	18,607	2,632	52,456	68.7%	7.9%	1.1%	22.3%
2020	126,794	13,091	1,728	51,498	65.7%	6.8%	0.9%	26.7%
Average	164,463	17,244	2,748	52,354	69.3%	7.3%	1.1%	22.3%

Source: NMFS SRHS (March 2022).

*Headboat data from Mississippi and Louisiana are combined for confidentiality purposes.

Note: 2020 estimates reflect closures and disruptions to service as a result of COVID-19.

²⁵ Headboat trip categories include half-, three-quarter-, full-, and 2-day trips. A full-day trip equals one angler day, a half-day trip equals .5 angler days, etc. Angler days are not standardized to an hourly measure of effort and actual trip durations may vary within each category.

Table 3.4.2.4. Gulf headboat angler days (in thousands) and percent distribution by month (2016 - 2020).

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Headboat Angler Days (in thousands)												
2016	8.0	13.2	21.8	18.7	21.7	50.3	49.9	21.8	13.6	15.8	11.8	10.4
2017	9.0	14.0	21.0	19.4	19.2	47.7	54.0	23.0	10.3	11.1	11.3	11.5
2018	5.5	13.7	20.8	17.6	16.9	54.3	53.3	24.8	13.2	10.6	8.2	8.4
2019	2.3	12.8	21.8	16.3	18.3	46.0	47.6	24.2	11.4	13.7	10.4	10.4
2020	8.1	10.9	11.4	0.4	11.1	43.9	42.0	20.6	12.2	14.5	8.7	9.1
Avg	6.6	12.9	19.4	14.5	17.4	48.4	49.4	22.9	12.1	13.1	10.1	10.0
Percent Distribution												
2016	3.1%	5.1%	8.5%	7.3%	8.4%	19.6%	19.4%	8.5%	5.3%	6.2%	4.6%	4.0%
2017	3.6%	5.6%	8.4%	7.7%	7.6%	19.0%	21.5%	9.1%	4.1%	4.4%	4.5%	4.6%
2018	2.2%	5.5%	8.4%	7.1%	6.8%	21.9%	21.6%	10.0%	5.4%	4.3%	3.3%	3.4%
2019	1.0%	5.4%	9.3%	6.9%	7.8%	19.6%	20.2%	10.3%	4.8%	5.8%	4.4%	4.4%
2020	4.2%	5.6%	5.9%	0.2%	5.8%	22.7%	21.8%	10.7%	6.3%	7.5%	4.5%	4.7%
Avg	2.8%	5.5%	8.1%	5.8%	7.3%	20.6%	20.9%	9.7%	5.2%	5.6%	4.3%	4.2%

Source: NMFS SRHS (March 2022).

Note: 2020 estimates reflect closures and disruptions to service as a result of COVID-19.

From 2016 through 2019, headboat effort in the South Atlantic, in terms of angler days, decreased substantially in Florida through Georgia (39% decline) and in North Carolina (28% decline). In South Carolina, there were modest fluctuations in headboat effort during this time period (Table 3.4.2.5). In 2020, all South Atlantic states experienced 5-year lows, likely as a result of COVID-19 closures and disruptions. Headboat effort was the highest, on average, during the summer months of June through August (Table 3.4.2.6).

Table 3.4.2.5. South Atlantic headboat angler days and percent distribution by state (2016 - 2020).

	Angler Days			Percent Distribution		
	FL/GA*	NC	SC	FL/GA	NC	SC
2016	196,660	21,565	42,207	75.5%	8.3%	16.2%
2017	126,126	20,170	36,914	68.8%	11.0%	20.1%
2018	120,560	16,813	37,611	68.9%	9.6%	21.5%
2019	119,712	15,546	41,470	67.7%	8.8%	23.5%
2020	84,005	14,154	34,080	63.5%	10.7%	25.8%
Average	129,413	17,650	38,456	68.9%	9.7%	21.4%

Source: NMFS SRHS (March 2022).

*East Florida and Georgia are combined for confidentiality purposes.

Note: 2020 estimates reflect closures and interruptions to service as a result of COVID-19.

Table 3.4.2.6. South Atlantic headboat angler days and percent distribution by month (2016 through 2020).

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Headboat Angler Days (in thousands)												
2016	9.8	12.2	23.9	22.2	27.4	37.5	45.7	29.2	17.1	9.2	12.8	13.4
2017	7.7	10.1	13.4	17.4	19.4	27.1	33.4	21.0	6.7	8.9	8.9	9.3
2018	4.4	9.9	14.1	15.2	13.3	29.0	30.2	26.2	9.7	8.1	7.7	7.2
2019	7.7	8.5	15.2	15.6	19.4	26.6	32.9	20.2	6.7	9.0	8.6	6.4
2020	6.9	7.8	8.4	0.4	8.7	23.3	26.6	16.3	11.0	9.9	6.3	6.7
Avg	7.3	9.7	15.0	14.2	17.6	28.7	33.8	22.6	10.2	9.0	8.9	8.6
Percent Distribution												
2016	3.8%	4.7%	9.2%	8.5%	10.5%	14.4%	17.6%	11.2%	6.6%	3.5%	4.9%	5.1%
2017	4.2%	5.5%	7.3%	9.5%	10.6%	14.8%	18.2%	11.5%	3.6%	4.9%	4.9%	5.1%
2018	2.5%	5.6%	8.0%	8.7%	7.6%	16.6%	17.3%	15.0%	5.6%	4.6%	4.4%	4.1%
2019	4.4%	4.8%	8.6%	8.8%	11.0%	15.0%	18.6%	11.4%	3.8%	5.1%	4.9%	3.6%
2020	5.2%	5.9%	6.4%	0.3%	6.6%	17.6%	20.1%	12.3%	8.3%	7.5%	4.7%	5.1%
Avg	4.0%	5.3%	7.9%	7.2%	9.2%	15.7%	18.4%	12.3%	5.6%	5.1%	4.8%	4.6%

Source: NMFS SRHS (March 2022).

Note: 2020 estimates reflect closures and interruptions to service as a result of COVID-19.

Economic Value

Participation, effort, and harvest are indicators of the value of saltwater recreational fishing. However, a more specific indicator of value is the satisfaction that anglers experience over and above their costs of fishing. The monetary value of this satisfaction is referred to as consumer surplus (CS). The value or benefit derived from the recreational experience is dependent on several quality determinants, which include fish size, catch success rate, and the number of fish kept. These variables help determine the value of a fishing trip and influence total demand for recreational fishing trips. The estimated values of the CS per fish for a second²⁶, third, fourth, and fifth king mackerel kept on a trip are approximately \$111, \$74, \$55, and \$43, respectively (Carter and Liese 2012; values updated to 2021 dollars).²⁷

The foregoing estimates of economic value should not be confused with economic impacts associated with recreational fishing expenditures. Although expenditures for a specific good or service may represent a proxy or lower bound of value (a person would not logically pay more for something than it was worth to them), they do not represent the net value (benefits minus cost), nor the change in value associated with a change in the fishing experience.

Estimates of average annual gross revenue for Gulf charter vessels and headboats in 2009 are provided in Savolainen, et al. (2012). In 2021 dollars, the average annual gross revenue for a Gulf headboat is approximately \$286,000 while the average annual gross revenue for a Gulf

²⁶ The study only considered trips with at least one fish caught and kept in its experimental design; thus, an estimated value for the first caught and kept fish is not available.

²⁷ Converted to 2021 dollars using the annual, not seasonally adjusted GDP implicit price deflator provided by the U.S. Bureau of Economic Analysis.

charter vessel is approximately \$94,000. More recent estimates of average annual gross revenue for Gulf headboats are provided in Abbott and Willard (2017) and D. Carter (NMFS, pers. comm., 2018). Abbott and Willard (2017) suggest that Savolainen, et al.'s estimate of average annual gross revenue for headboats may be an underestimate as data in the former suggest that average gross revenue in 2009 for the vessels in their sample was approximately \$506,000 (2021 dollars). Further, their data suggests average annual gross revenue per vessel had increased to approximately \$611,000 (2021 dollars) by 2014. However, Abbott and Willard's estimates are based on a sample of 17 headboats that chose to participate in the Headboat Collaborative Program in 2014, while Savolainen, et al.'s are based on a random sample of 20 headboats. The headboats that participated in the Collaborative may be economic highliners, in which case Abbott and Willard's estimates would overestimate average annual gross revenue for Gulf headboats. D. Carter (NMFS, pers. comm., 2018) recently estimated that average annual gross revenue for Gulf headboats was approximately \$451,000 (2021 dollars) in 2017. This estimate is likely the best current estimate of annual gross revenue for Gulf headboats as it is based on a relatively large sample of 63 boats, or more than 90% of the active fleet, and is more recent.

Estimates of average annual gross revenue for South Atlantic charter vessels and headboats in 2009 are provided in Holland et al. (2012). In 2021 dollars, the average annual gross revenue for a South Atlantic headboat was approximately \$234,000, while the average annual gross revenue for a South Atlantic charter vessel was approximately \$132,000. However, a more recent estimate of average annual gross revenue for South Atlantic headboats is available from D. Carter (NMFS, pers. comm., 2018). D. Carter (NMFS, pers. comm., 2018) recently estimated that average annual gross revenue for South Atlantic headboats was approximately \$320,560 (2021 dollars) in 2017. This estimate is likely the best current estimate of annual gross revenue for South Atlantic headboats, as it is based on a relatively large sample and is more recent. The difference in the Holland et al. (2012) and D. Carter (NMFS, pers. comm., 2018) estimates for headboats suggests that the estimate for charter vessels based on Holland et al. (2012) is likely an underestimate of current average annual revenue for charter vessels in the South Atlantic.

However, gross revenues overstate the annual economic value and profits generated by for-hire vessels. Economic value for for-hire vessels can be measured by annual producer surplus (PS). In general, PS is the amount of money a vessel owner earns in excess of variable (trip) costs. Economic profit is the amount of money a vessel owner earns in excess of variable and fixed costs, inclusive of all implicit costs, such as the value of a vessel owner's time as captain and as entrepreneur, and the cost of using physical capital (i.e., depreciation of the vessel and gear). In 2021 dollars, Savolainen, et al. (2012) estimated the annual PS for Gulf headboats and charter vessels was approximately \$200,000 and \$62,000, respectively. Their best estimates of economic profit were \$84,000 and \$28,000 (2021 dollars), respectively.²⁸ Estimates of PS and economic profit for headboats are not available from Abbott and Willard (2017) or D. Carter (NMFS, pers. comm., 2018), as they did not collect comprehensive cost data at the vessel level.²⁹ Comparable estimates of annual PS and economic profit for South Atlantic charter vessels and headboats are not available either.

²⁸ Although Savolainen, et al. (2012) account for all explicit variable and fixed costs, they do not account for implicit costs, and thus they over-estimate actual economic profits for these vessels.

²⁹ Abbott and Willard (2017) do report revenue net of fuel costs, but this ignores important costs such as processing fees, commissions, ice, bait, tackle, and labor.

With regard to for-hire trips, economic value can be measured by PS per angler trip, which represents the amount of money that a vessel owner earns in excess of the cost of providing the trip. Estimates of revenue, costs, and trip net revenue for trips taken by charter vessels and headboats in 2017 are available from Souza and Liese (2019). They also provide estimates of trip net cash flow per angler trip, which are an approximation of PS per angler trip. According to Table 3.4.2.7, after accounting for transactions fees, supply costs, and labor costs, net revenue per trip was 42% of revenue for Gulf charter vessels, 40% of revenue for South Atlantic charter vessels, and 54% of revenue for Southeast headboats, or \$823, \$583, and \$1,912 (2021 dollars), respectively. Given the respective average number of anglers per trip for each fleet, PS per trip is estimated to be \$150 for Gulf charter vessels, \$124 for South Atlantic charter vessels, and \$72 for Southeast headboats.

Table 3.4.2.7. Trip-level economics for offshore trips by Gulf and South Atlantic charter vessels and Southeast headboats in 2017 (2021 dollars).

	<u>Gulf Charter Vessels</u>	<u>South Atlantic Charter Vessels</u>	<u>Southeast Headboats*</u>
Revenue	100%	100%	100%
Transaction Fees (% of revenue)	3%	3%	6%
Supply Costs (% of revenue)	27%	29%	19%
Labor Costs (% of revenue)	27%	28%	22%
Net Revenue per trip including Labor costs (% of revenue)	42%	40%	54%
Net Revenue per Trip	\$823	\$583	\$1,912
Average # of Anglers per Trip	5.5	4.7	26.6
Trip Net Cash Flow per Angler Trip	\$150	\$124	\$72

Source: Souza and Liese (2019).

*Although Souza and Liese (2019) break headboats out by sub-region, the South Atlantic sample size is small and thus estimates for Southeast headboats in general (Gulf and South Atlantic combined) are presented here.

Business Activity

The desire for recreational fishing generates economic activity as consumers spend their income on various goods and services needed for recreational fishing. This spurs economic activity in the region where recreational fishing occurs. It should be clearly noted that, in the absence of the opportunity to fish, the income would presumably be spent on other goods and services, and these expenditures would similarly generate economic activity in the region where the expenditures occur. As such, the analysis below represents a distributional analysis only.

Estimates of the business activity (economic impacts) associated with recreational angling for Gulf king mackerel were calculated using average trip-level impact coefficients derived from the 2019 Fisheries Economics of the U.S. report (NMFS 2022) and underlying data provided by the NOAA Office of Science and Technology. Economic impact estimates in 2019 dollars were

adjusted to 2021 dollars using the annual, not seasonally adjusted GDP implicit price deflator provided by the U.S. Bureau of Economic Analysis.

Business activity (economic impacts) for the recreational sector is characterized in the form of value-added impacts (contribution to the GDP in a state or region), output impacts (gross business sales), income impacts (wages, salaries, and self-employed income), and jobs (full- and part-time). Estimates of the average annual economic impacts (2016-2020) resulting from Gulf king mackerel target trips are provided in Table 3.4.2.8. The average impact coefficients, or multipliers, used in the model are invariant to the “type” of effort (e.g., target or catch) and can therefore be directly used to measure the impact of other effort measures such as king mackerel catch trips. To calculate the multipliers from Table 3.4.2.8, simply divide the desired impact measure (sales impact, value-added impact, income impact, or employment) associated with a given state and mode by the number of target trips for that state and mode.

The estimates provided in Table 3.4.2.8 only apply at the state-level. Addition of the state-level estimates to produce a regional (or national) total may underestimate the actual amount of total business activity, because state-level impact multipliers do not account for interstate and interregional trading. It is also important to note that these economic impacts estimates are based on trip expenditures only and do not account for durable expenditures. Durable expenditures cannot be reasonably apportioned to individual species. As such, the estimates provided in Table 3.4.2.8 may be considered a lower bound on the economic activity associated with those trips that targeted Gulf king mackerel.

Estimates of the business activity associated with headboat effort are not available. Headboat vessels are not covered in MRIP in the Southeast, so, in addition to the absence of estimates of target effort, estimation of the appropriate business activity coefficients for headboat effort has not been conducted.

Table 3.4.2.8. Estimated annual average economic impacts (2016-2020) from recreational trips that targeted Gulf king mackerel, by state and mode, using state-level multipliers. All monetary estimates are in 2021 dollars in thousands.

	FL*	AL	MS	LA	TX
	Charter Mode				
Target Trips	37,233	3,755	127	57	1,699
Value Added Impacts	\$13,568	\$1,629	\$59	\$28	\$716
Sales Impacts	\$22,784	\$2,963	\$112	\$53	\$1,190
Income Impacts	\$7,928	\$929	\$34	\$17	\$401
Employment (Jobs)	201	31	1	1	10
	Private/Rental Mode				
Target Trips	358,007	54,713	2,441	1,268	8,578
Value Added Impacts	\$13,443	\$2,576	\$56	\$197	\$1,529
Sales Impacts	\$20,835	\$3,986	\$92	\$337	\$2,520
Income Impacts	\$7,054	\$1,003	\$29	\$106	\$782
Employment (Jobs)	183	35	1	3	17
	Shore Mode				
Target Trips	578,509	345,571	0	N/A	N/A
Value Added Impacts	\$22,073	\$25,404	\$0	N/A	N/A
Sales Impacts	\$34,495	\$43,751	\$0	N/A	N/A
Income Impacts	\$11,627	\$13,073	\$0	N/A	N/A
Employment (Jobs)	304	429	0	N/A	N/A
	All Modes				
Target Trips	973,748	404,039	2,568	1,324	10,278
Value Added Impacts	\$49,083	\$29,609	\$115	\$225	\$2,246
Sales Impacts	\$78,114	\$50,700	\$204	\$390	\$3,710
Income Impacts	\$26,610	\$15,004	\$63	\$123	\$1,184
Employment (Jobs)	688	495	2	3	27

Source: Effort data from MRIP, LDWF Recreational Creel Survey, and TPWD Marine Sport-Harvest Monitoring Program; economic impacts results calculated by NMFS SERO using NMFS (2022) and underlying data provided by the NOAA Office of Science and Technology.

*Includes impacts from all trips that targeted Gulf king mackerel, including throughout Monroe County, FL.

Note1: Headboat information is unavailable.

Note2: TX shore mode data are not available.

Note3: Private and shore modes are combined in the LDWF Recreational Creel Survey and are presented here together under the Private/Rental Mode for LA. This may bias the estimated economic impacts associated with shore trips upwards.

3.5 Description of the Social Environment

This amendment affects the commercial and recreational management of Gulf king mackerel. This section provides descriptions of Gulf King mackerel fishing for which the proposed actions will be evaluated in Chapter 4.

The following description includes commercial and recreational king mackerel landings and commercial and federal for-hire permits by state in order to provide information on the geographic distribution of fishing involvement. Descriptions of the top communities involved in commercial fishing for king mackerel are included, commercial engagement and reliance for the top communities based on commercial landings of king mackerel, local quotient for top communities based on commercial king mackerel landings, top recreational fishing communities based on recreational engagement and reliance, top ranking communities by the number of commercial permits, and the top ranking communities by the number of federal for-hire permits. Community level data are presented in order to meet the requirements of National Standard 8 of the Magnuson-Stevens Act, which requires the consideration of the importance of fishery resources to human communities when changes to fishing regulations are considered. Lastly, social vulnerability data are presented to assess the potential for environmental justice concerns.

Additional detailed information about communities in the following analysis can be found on the SERO Community Snapshots website.³⁰

3.5.1 Commercial Sector

Permits

Commercial king mackerel permits are held by individuals in the Gulf, South Atlantic, and Mid-Atlantic, New England, and other states. Individuals in the Gulf hold approximately 37.7% of commercial king mackerel permits (SERO permit office, 2020). Within the Gulf, the majority of commercial king mackerel permits are held by individuals in Florida (29.7%, includes the west coast of Florida and the Florida Keys), followed by Louisiana (3.2%), Alabama (2.2%), Texas (2.1%), and Mississippi (0.5%). Individuals in South Atlantic states hold approximately 60.7% of commercial king mackerel permits, including 42.4% on the east coast of Florida. Commercial king mackerel permits are held by individuals with mailing addresses in 256 communities, located in 16 states. Commercial king mackerel gillnet endorsements are held by individuals located in four communities (Hernando Beach, Key West, Marathon, and Suwannee) along the west coast of Florida and in the Florida Keys.

A portion of the commercial king mackerel fleet travels from the east coast of Florida to fish in the Gulf of Mexico and therefore the following description of communities includes communities on both Florida coasts, as well as the rest of the Gulf of Mexico. Communities in the Gulf and along the east coast of Florida with the most commercial king mackerel permits are located in Florida and Texas (Table 3.5.1.1). The communities with the most commercial king mackerel permits are Key West, Florida (7% of commercial king mackerel permits); Cape Canaveral, Florida (5.5%); and Jupiter, Florida (4.1%).

³⁰ <https://www.fisheries.noaa.gov/southeast/socioeconomics/snapshots-human-communities-and-fisheries-gulf-mexico-and-south-atlantic>

Table 3.5.1.1. Top communities by number of commercial king mackerel permits in the Gulf and along the east coast of Florida.

State	Community	Permits
FL	Key West	100
FL	Cape Canaveral	78
FL	Jupiter	58
FL	Sebastian	54
FL	Fort Pierce	51
FL	Panama City	42
FL	Port Salerno	36
FL	Miami	35
FL	Destin	31
FL	Stuart	21
FL	Boynton Beach	19
FL	Ponce Inlet	18
FL	West Palm Beach	17
FL	Marathon	16
FL	Pompano Beach	16
TX	Galveston	16
FL	Naples	15
FL	St. Petersburg	15

Source: SERO permit office, 2020.

Landings

The majority of Gulf commercial king mackerel landings are from waters adjacent to Florida (average of approximately 81.1% from 2016-2020), followed by Louisiana (13.3%), Alabama (3.7%), Texas (1.7%), and Mississippi (0.2%, SEFSC Commercial ACL Data).

Regional Quotient

The regional quotient (RQ) is the proportion of landings out of the total landings of that species for that region, and is a relative measure. These communities would be most likely to experience the effects of the proposed actions. If a community is identified as a king mackerel community based on the RQ, this does not necessarily mean that the community would experience significant impacts due to changes in the fishery if a different species or number of species were also important to the local community and economy. The RQ is reported individually only for the top 10 communities by total landings for the years of 2016 through 2020. All other communities that landed king mackerel are grouped as “Other Communities.” Figure 3.5.1.1 shows the RQ in pounds from 2016 to 2020.

The top Gulf king mackerel communities are located in Florida, Louisiana, and Alabama (Figure 3.5.1.1). The consistently dominant community for king mackerel pounds landed is Destin, Florida, followed by the communities of Key West, Florida; Naples, Florida; and Land O' Lakes, Florida.

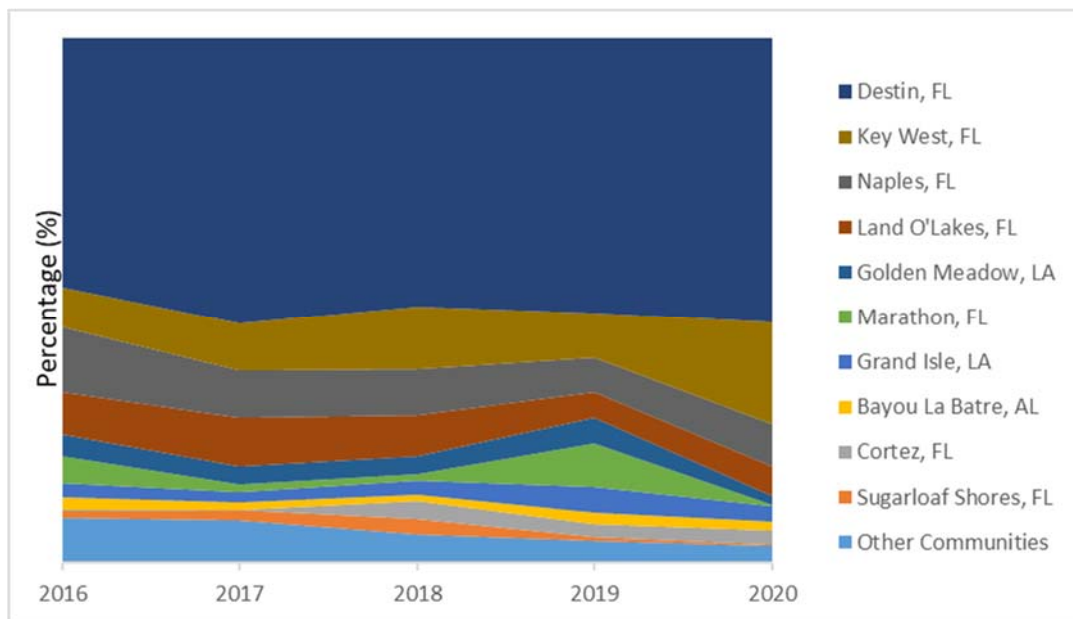


Figure 3.5.1.1. Regional Quotient (pounds) for top communities ranked by Gulf king mackerel landings from 2016 through 2020. The actual RQ values (y-axis) are omitted from the figure to maintain confidentiality.

Source: SERO, Community ALS 2016-2020.

Engagement and Reliance

In addition to examining the RQs to understand how Gulf communities are engaged and reliant on fishing, indices were created using secondary data from permit and landings information for the commercial sector (Jepson and Colburn 2013, Jacob et al. 2013). Fishing engagement is primarily the absolute numbers of permits, landings, and value. For commercial fishing, the analysis used the number of vessels designated commercial by homeport and owner address, value of landings, and total number of commercial permits for each community. Fishing reliance includes the same variables as fishing engagement divided by population to give an indication of the per capita influence of this activity.

Using a principal component and single solution factor analysis, each community receives a factor score for each index to compare to other communities. Taking the communities with the highest RQs, factor scores of both engagement and reliance for commercial fishing were plotted. Two thresholds of one and $\frac{1}{2}$ standard deviation above the mean are plotted onto the graphs to help determine a threshold for significance. The factor scores are standardized; therefore, a score above 1 is also above one standard deviation. A score above $\frac{1}{2}$ standard deviation is considered engaged or reliant, with anything above one standard deviation to be very engaged or reliant.

Figure 3.5.1.2 is an overall measure of a community's commercial fishing engagement and reliance and includes the communities with the strongest relationship to the commercial sector

for king mackerel as depicted in Figure 3.5.1.1. Most communities in Figure 3.5.1.2 would be considered to be highly engaged in commercial fishing, as most are at or above 1 standard deviation of the mean factor score. Land O’ Lakes, Florida and Sugarloaf Shores, Florida show the least amount of engagement in commercial fishing overall. Bayou La Batre, Alabama; Golden Meadow, Louisiana; and Grand Isle, Louisiana demonstrate a high level of commercial reliance and Marathon, Florida demonstrates a moderate level of commercial reliance.

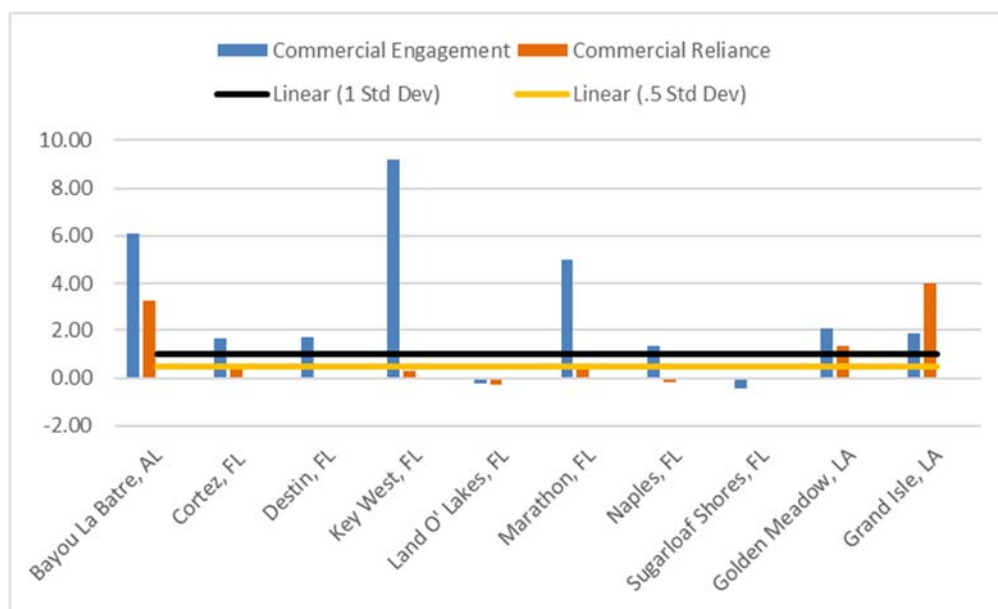


Figure 3.5.1.2. Commercial fishing engagement and reliance for top king mackerel communities.

Source: SERO, Community Social Vulnerability Indicators Database 2019.

Local Quotient

The community Local Quotient (LQ) is the proportion of Gulf king mackerel landings out of the total landings for all species for the community and that year, and is a relative measure. It is an indicator of the contribution in pounds or value of king mackerel to the overall landings in a community. The LQ is reported for communities with the greatest commercial landings of king mackerel in Figure 3.5.1.1. Figure 3.5.1.3 shows the LQ in both pounds and value for 2020. The community of Sugarloaf Shores, Florida ranks first for LQ pounds and includes the greatest proportion of king mackerel landings out of the community’s total landings, and makes up the majority of the landings for the community. Destin, Florida ranks second for LQ pounds and value of king mackerel.

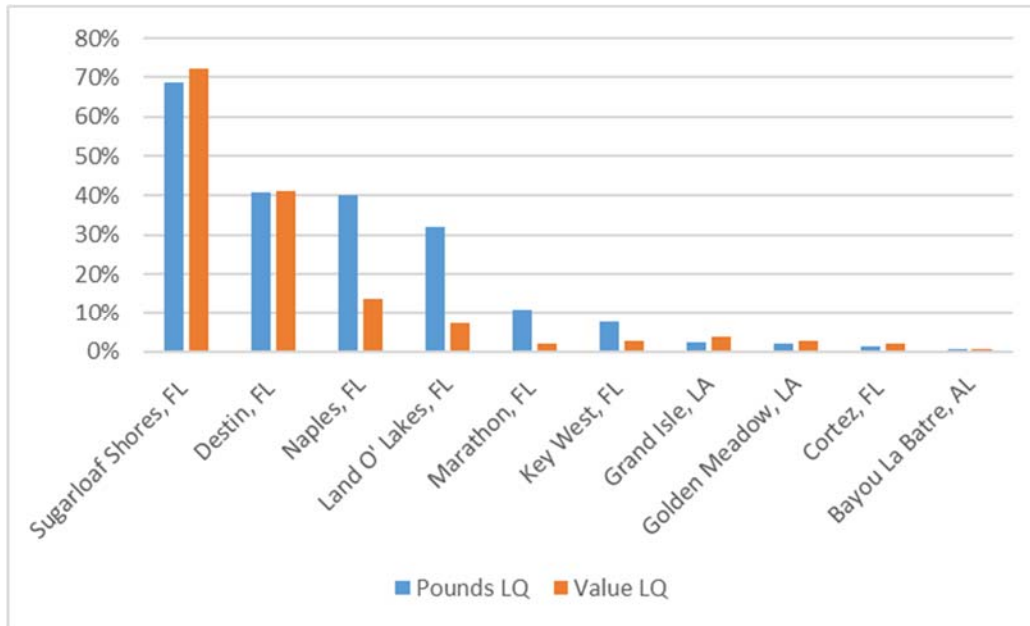


Figure 3.5.1.3. Local Quotient for top king mackerel communities.

Source: SERO, Community ALS 2019.

3.5.2 Recreational Sector

Permits

The majority of Gulf CMP for-hire permits are held by individuals in Florida (61.3%), followed by Texas (15.7%), Alabama (11%), Louisiana (8.4%), Mississippi (2.2%), and other states (1.4%, SERO permit office, 2020). Gulf CMP for-hire permits are held by individuals with mailing addresses in 213 communities, located in 15 states.

Communities with the most Gulf CMP for-hire permits are located in Florida, Alabama, Texas, and Louisiana (Table 3.5.2.1). The communities with the most Gulf CMP for-hire permits are Destin, Florida (4.6% of Gulf CMP for-hire permits); Panama City, Florida (4.3%); and Orange Beach, Alabama (4%).

Table 3.5.2.1. Top communities by number of federal Gulf CMP for-hire permits, including historical captain permits.

State	Community	Permits
FL	Destin	102
AL	Orange Beach	100
FL	Panama City	53
TX	Galveston	49
FL	Key West	48
LA	Venice	46
FL	Naples	44
TX	Freeport	38
TX	Port Aransas	32
FL	Clearwater	31
FL	Panama City Beach	31
FL	Pensacola	27
FL	St. Petersburg	26
FL	Sarasota	20
FL	Madeira Beach	19
AL	Dauphin Island	18
MS	Biloxi	18
FL	Crystal River	17
FL	Marco Island	17

Source: SERO permit office, 2020.

Landings

The greatest proportion of Gulf recreational king mackerel landings are from waters adjacent to Florida (average of approximately 72.3% from 2016-2020), followed by Alabama (19.9%), Texas (5.6%), and Louisiana and Mississippi (2.2%, SEFSC Recreational MRIP-FES Data)

Engagement and Reliance

Landings for the remainder of the recreational sector are not available by species at the community level, making it difficult to identify communities as dependent on recreational fishing for king mackerel. Because limited data are available concerning how recreational fishing communities are engaged and reliant on specific species, indices were created using secondary data from permit and infrastructure information for the southeast recreational fishing sector at the community level (Jepson and Colburn 2013, Jacob et al. 2013). Recreational fishing engagement is represented by the number of recreational permits and vessels designated as “recreational” by homeport and owners address. Fishing reliance includes the same variables as fishing engagement, divided by population. Factor scores of both engagement and reliance were plotted by community.

Figure 3.5.2.1 identifies the top Gulf communities that are engaged and reliant upon recreational fishing in general. Two thresholds of one and one-half standard deviation above the mean were plotted to help determine a threshold for significance. Communities are presented in ranked order by fishing engagement and all 20 included communities demonstrate high levels of recreational engagement, although this is not specific to fishing for king mackerel. Because the analysis used discrete geo-political boundaries, Panama City and Panama City Beach had separate values for the associated variables. Calculated independently, each still ranked high enough to appear in the top 20 list suggesting a greater importance for recreational fishing in that area.

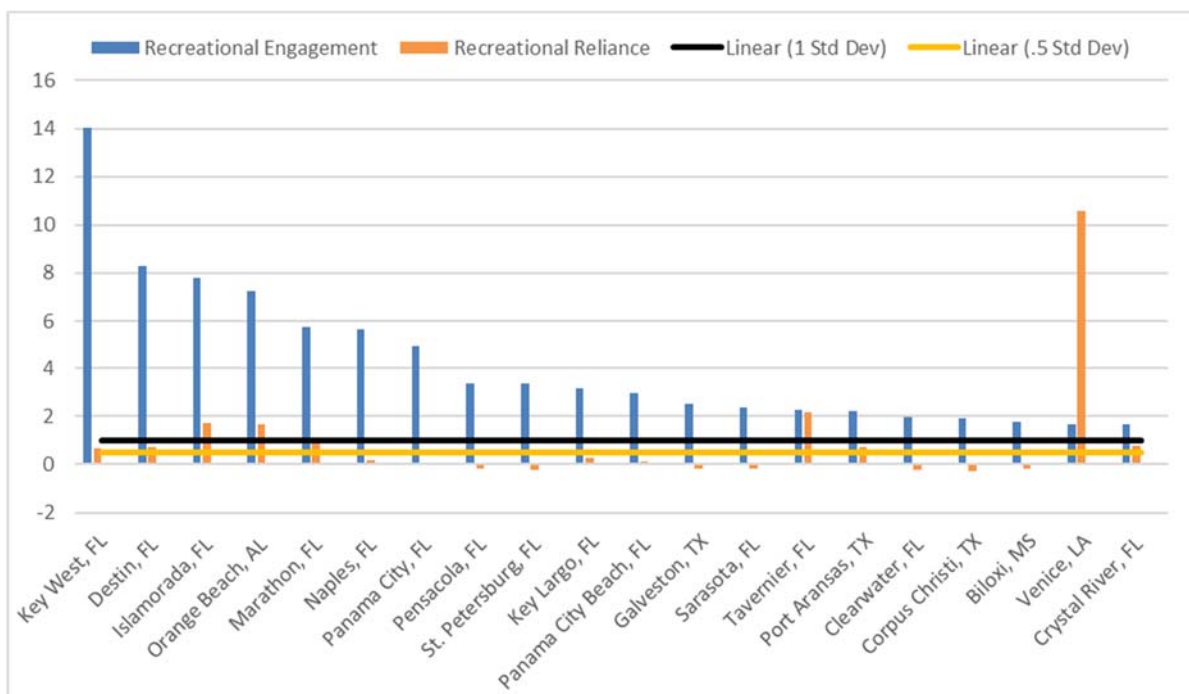


Figure 3.5.2.1. Top 20 Gulf recreational fishing communities' engagement and reliance.
Source: SERO, Community Social Vulnerability Indicators Database 2019.

The brief description of fishing activities presented above highlights which communities may be most involved in Gulf king mackerel fishing. It is expected that the impacts from the regulatory action in this amendment, whether positive or negative, will most likely affect those communities identified above.

3.5.3 Environmental Justice, Equity, and Underserved Communities

Federal agencies are required to consider the impacts and/or address the inequalities of their policies on minority populations, low-income populations, disadvantaged communities, and/or underserved communities. These requirements are outlined in the following Executive Orders (E.O.).

E.O. 12898 requires federal agencies conduct their programs, policies, and activities in a manner to ensure individuals or populations are not excluded from participation in, or denied the benefits of, or subjected to discrimination because of their race, color, or national origin. In addition, and specifically with respect to subsistence consumption of fish and wildlife, federal agencies are required to collect, maintain, and analyze information on the consumption patterns of populations who principally rely on fish and/or wildlife for subsistence. The main focus of E.O. 12898 is to consider “the disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations in the United States and its territories...” This E.O. is generally referred to as environmental justice (EJ).

E.O. 13985 requires federal agencies to recognize and work to redress inequalities in their policies and programs that serve as barriers to equal opportunity, including pursuing a comprehensive approach to advancing equity for all, including people of color and others who have been historically underserved, marginalized, and adversely affected by persistent poverty and inequality. Federal agencies must assess how programs and policies perpetuate systemic barriers to opportunities and benefits to people of color and other underserved groups in order to equip agencies to develop policies and programs that deliver resources and benefits equitably to all.

E.O. 13985 provides definitions for equity and underserved communities, which expand the definition of a community from being geographically situated, or place-based, as defined through the Magnuson-Stevens Act, to also include communities that share a particular characteristic (e.g., crew of commercial king mackerel fishing vessels). Equity means the consistent and systematic fair, just, and impartial treatment of all individuals, including individuals who belong to underserved communities that have been denied such treatment, such as Black, Latino, and Indigenous and Native American persons, Asian Americans and Pacific Islanders and other persons of color; members of religious minorities; lesbian, gay, bisexual, transgender, and queer (LGBTQ+) persons; persons with disabilities; persons who live in rural areas; and persons otherwise adversely affected by persistent poverty or inequality. The term “underserved communities” refers to populations sharing a particular characteristic, as well as geographic communities, that have been systematically denied a full opportunity to participate in aspects of economic, social, and civic life, as exemplified by the list in the preceding definition of “equity.”

E.O. 14008 calls on agencies to make achieving EJ part of their missions “by developing programs, policies, and activities to address the disproportionately high and adverse human health, environmental, climate-related and other cumulative impacts on disadvantaged communities, as well as the accompanying economic challenges of such impacts.” Census data are available to examine the status of communities with regard to minorities and low-income populations. These data describe geographically based communities (e.g., Panama City, Florida) and are descriptive of the total population, not limited to the fishing components of the community. Information is not available at this time to examine the status of underserved populations engaged in Gulf fisheries. To help assess whether EJ concerns may be present within regional place-based communities, a suite of indices were created using census data to examine the social vulnerability of coastal communities. The three indices are poverty,

population composition, and personal disruptions. The variables included in each of these indices have been identified through the literature as being important components that contribute to a community's vulnerability. Poverty includes poverty rates for different groups; population composition includes more single female-headed households, households with children under the age of five, minority populations, and those that speak English less than well; and personal disruption includes disruptions such as higher separation rates, higher crime rates, and unemployment. Increased rates in the indicators are signs of populations experiencing vulnerabilities. Again, for those communities that exceed the threshold it would be expected that they would exhibit vulnerabilities to sudden changes or social disruption that might accrue from regulatory change.

Figures 3.5.3.1 and 3.5.3.2 provide social vulnerability rankings for commercial and recreational place-based communities identified in Section 3.5 as important to fishing for king mackerel specifically (commercial sector) or fishing for coastal migratory pelagics in general (recreational sector). Two communities exceed the threshold of one standard deviation above the mean for all three indices, Fort Pierce, Florida and Freeport, Texas. Several communities exceed the threshold of one standard deviation above the mean for at least one of the indices, Bayou La Batre, Alabama; Miami, Florida; Pompano Beach, Florida; West Palm Beach, Florida; Golden Meadow, Louisiana; and Venice, Louisiana. These communities would be the most likely to exhibit vulnerabilities to social or economic disruption resulting from regulatory change.

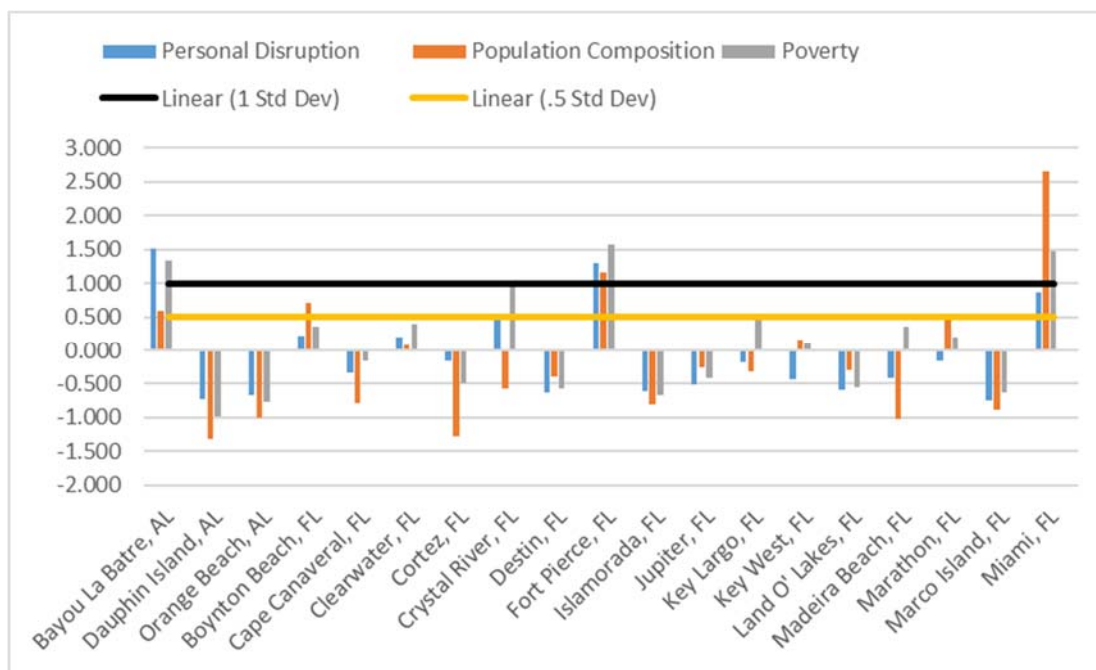


Figure 3.5.3.1. Social vulnerability indices for top commercial and recreational king mackerel and CMP communities.

Source: SERO, Community Social Vulnerability Indicators Database 2019.

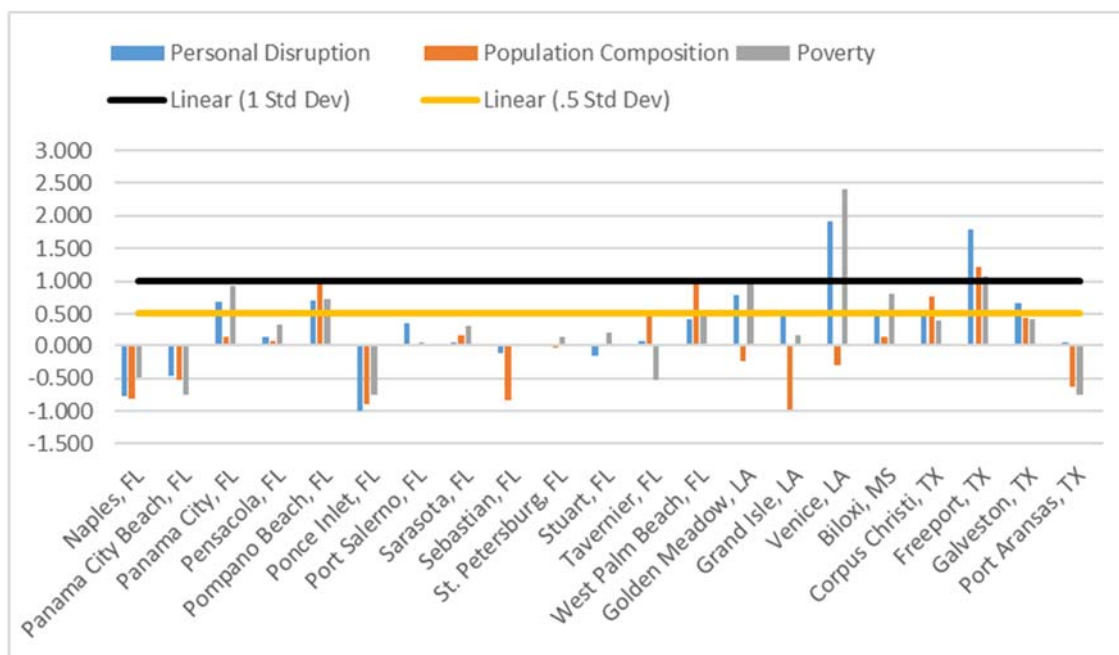


Figure 3.5.3.2. Social vulnerability indices for top commercial and recreational king mackerel and CMP communities continued.

Source: SERO, Community Social Vulnerability Indicators Database 2019.

People in these communities may be affected by fishing regulations in two ways: participation and employment. Although the place-based communities identified in Figures 3.5.3.1 and 3.5.3.2 may have the greatest potential for EJ concerns, complete data are not available on the race and income status for those involved in the local fishing industry (employment), or for their dependence on king mackerel specifically (participation). The potential effects of the actions are discussed in Sections 4.1.5. There are no known populations that rely on the consumption of king mackerel for subsistence. Although no EJ issues have been identified, the absence of potential EJ concerns cannot be assumed.

3.6 Description of the Administrative Environment

3.6.1 Federal Fishery Management

Federal fishery management is conducted under the authority of the Magnuson-Stevens Act (16 U.S.C. 1801 *et seq.*), originally enacted in 1976 as the Fishery Conservation and Management Act. The Magnuson-Stevens Act claims sovereign rights and exclusive fishery management authority over most fishery resources within the EEZ. The EEZ is defined as an area extending 200 nautical miles from the seaward boundary of each of the coastal states. The Magnuson-Stevens Act also claims authority over U.S. anadromous species and continental shelf resources that occur beyond the EEZ.

Responsibility for federal fishery management decision-making is divided between the Secretary of Commerce (Secretary) and eight regional fishery management councils that represent the expertise and interests of constituent states. Regional councils are responsible for preparing,

monitoring, and revising management plans for fisheries needing management within their jurisdiction. The Secretary is responsible for promulgating regulations to implement proposed plans and amendments after ensuring management measures are consistent with the Magnuson-Stevens Act and with other applicable laws summarized in Section 10. In most cases, the Secretary has delegated this authority to NMFS.

The Gulf of Mexico Fishery Management Council (Gulf Council) is responsible for fishery resources in federal waters of the Gulf. These waters extend 9 to 200 nautical miles offshore from the seaward boundaries of Alabama, Florida, Louisiana, Mississippi, and Texas, as those boundaries have been defined by law. The length of the Gulf coastline is approximately 1,631 miles. Florida has the longest coastline extending 770 miles along its Gulf coast, followed by Louisiana (397 miles), Texas (361 miles), Alabama (53 miles), and Mississippi (44 miles).

The Gulf Council consists of seventeen voting members: 11 public members appointed by the Secretary; one each from the fishery agencies of Texas, Louisiana, Mississippi, Alabama, and Florida; and one from NMFS. The public is also involved in the fishery management process.

3.6.2 State Fishery Management

The purpose of state representation at the Gulf Council level is to ensure state participation in federal fishery management decision-making and to promote the development of compatible regulations in state and federal waters. The state governments of Texas, Louisiana, Mississippi, Alabama, and Florida have the authority to manage their respective state fisheries. Each of the five Gulf states exercises legislative and regulatory authority over their states' natural resources through discrete administrative units. Although each agency is the primary administrative body with respect to the states' natural resources, all states cooperate with numerous state and federal regulatory agencies when managing marine resources. A more detailed description of each state's primary regulatory agency for marine resources is provided on their respective web pages (Table 3.6.2.1).

Table 3.6.2.1. Gulf state marine resource agencies and web pages.

State Marine Resource Agency	Web Page
Alabama Marine Resources Division	http://www.outdooralabama.com/
Florida Fish and Wildlife Conservation Commission	http://myfwc.com/
Louisiana Department of Wildlife and Fisheries	http://www.wlf.louisiana.gov/
Mississippi Department of Marine Resources	http://www.dmr.ms.gov/
Texas Parks and Wildlife Department	http://tpwd.texas.gov/

CHAPTER 4. ENVIRONMENTAL CONSEQUENCES

4.1 Action 1: Modify the Sector Allocation for Gulf of Mexico (Gulf) Migratory Group King Mackerel (Gulf King Mackerel).

4.1.1 Direct and Indirect Effects on the Physical Environment

King mackerel are usually caught near the ocean surface and therefore neither hook-and-line nor run-around gillnet gear typically come in contact with bottom habitat. However, these gear types have the potential to snag and entangle bottom structures and cause tear-offs or abrasions (Barnette 2001). If gear is lost or improperly disposed of, it can entangle marine life. Entangled gear often becomes fouled with algal growth. If fouled gear becomes entangled on corals, the algae may eventually overgrow and kill the coral. Furthermore, physical impacts to the environment could occur when gear such as weights, hooks, and anchors hit and damage the substrate and surrounding habitat.

Amendment 1 (GMFMC and SAFMC 1985) to the Fishery Management Plan for the Coastal Migratory Pelagic Resources of the Gulf of Mexico and Atlantic Region (CMP FMP) set the current allocation between the commercial and recreational sectors based on historic landings from 1975-1979. **Alternative 1** retains this allocation. **Alternatives 2** and **3** would modify the allocation between the sectors with more going to the commercial sector.

Modifications to the sector allocation is not expected to result in significant effects on the physical environment as the same gear types would continue to be used by both sector for the majority of harvest (hook and line). Despite the sector allocations proposed under **Alternatives 2** and **3** shifting more allocation to the commercial sector, the effects on the physical environment are not expected to be measurably different from **Alternative 1** due to no change to the fishing methods used or altering the execution of the CMP fishery as a whole occurring under any alternative. Even though the recreational fishery will be operating under a reduced quota (GMFMC 2022), it is assumed recreational fishermen would continue to take trips, just target Gulf king mackerel as a catch and release species if the ACL is met and the fishing season is closed. Commercial fishermen would shift to other species for harvest if Gulf king mackerel is closed.

4.1.2 Direct and Indirect Effects on the Biological Environment

Management actions that affect the biological environment mostly relate to the impacts of fishing on a species' population size, life history, and the role of the species within its habitat. Removal of fish from the population through fishing can reduce the overall population size if harvest is not maintained at sustainable levels. Indirect impacts of these alternatives on the biological environment would depend on the resulting reduction or increases in the level of fishing as a result of each alternative.

Modifications to the Gulf king mackerel sector allocation could result in changes to the biological/ecological effects, as changing these allocations determined the amount of fish that

can be harvested along with the subsequent discards associated with that catch by each sector. Shifting more allocation to the commercial sector could result in a decrease in Gulf king mackerel discards as they are lower for the commercial sector (1%) than they are for the recreational sector (headboat - 7%, charter - 19%, private angler - 41%). Discard mortality is similar for both sectors when using hook-and-line gear (25% commercial, 22% headboat, and 20% private and charter). **Alternatives 2 and 3** would shift more allocation to the commercial sector. It is expected the potential to reach the recreational ACL increases under both, with **Alternative 3** being higher than **Alternative 2**. However, since stakeholder comments have described a shift to Gulf king mackerel being a popular recreational catch and release species, discards under **Alternatives 2 and 3** may be similar to what they are currently under **Alternative 1**. Therefore, **Alternatives 2 and 3** are not expected to be significantly different from **Alternative 1**, but may result in slightly less positive benefits to the resource. The allocation under **Alternative 1** could have beneficial effects to the Gulf king mackerel stock, as the spawning stock biomass and recruitment would be expected to increase if the majority of the recreational ACL remains unharvested. If the underharvest of the recreational ACL is assumed to continue under **Alternative 1**, the likelihood of exceeding the OFL is minimized, allowing further protection of the stock against overfishing. However, landings have not exceeded the OFL since it was established in Amendment 18 to the CMP FMP and, as mentioned in Section 3.1, the commercial sector has only exceeded its ACL 7 times since the 1986/1987 fishing year and only once since the Florida East Coast Subzone was removed in the 2016/2017 fishing year. Further, the total ACL is consistent with the Council's definition of optimum yield for Gulf king mackerel and the current allocation under **Alternative 1** has not allowed harvest of the total ACL

The relationships among species in marine ecosystems are complex and poorly understood, making the nature and magnitude of ecological effects difficult to predict with any accuracy. It is possible that forage species and competitor species could increase or decrease in abundance in response to a decrease or increase in Gulf king mackerel abundance. However, the relationships between Gulf king mackerel and non-target species caught on trips where Gulf king mackerel are directly targeted are not fully understood. Overall, any effects of modifying the Gulf king mackerel allocation are not expected to be significant because the overall prosecution of the CMP fishery is not expected to change and gear types used for harvest will remain the same. For this same reason, no additional impacts to Endangered Species Act (ESA)-listed species or introduction of invasive species are anticipated as a result of this action.

4.1.3 Direct and Indirect Effects on the Economic Environment

Commercial Sector

Alternative 1 (No Action) would maintain the sector allocation of the total ACL for Gulf king mackerel between the commercial and recreational sectors as 32% commercial and 68% recreational. Based on the earliest potential implementation of Amendment 33 to the CMP FMP, these economic analyses use the 2023/2024 fishing year as the initial year, and the expected effects of any modifications to the sector allocation would be observed through changes in the sector ACLs as well as the resulting sector landings. As such, using the sector ACLs included in Framework Amendment 11 under the CMP FMP, **Alternative 1** would maintain the Gulf king mackerel commercial ACL of 3,196,800 lbs landed weight (lw). No changes to the commercial

sector would be expected to result under **Alternative 1**.³¹ In comparison to the sector allocation from **Alternative 1**, **Alternative 2** would modify the sector allocation for Gulf king mackerel to result in 42% commercial and 58% recreational. The sector allocation in **Alternative 2** would increase the commercial ACL to 4,226,650 lbs lw. In comparison to the sector allocation from **Alternative 1**, **Alternative 3** would modify the sector allocation for Gulf king mackerel to result in 53% commercial and 47% recreational. The sector allocation in **Alternative 3** would increase the commercial ACL to 5,256,499 lbs lw. The commercial zone-specific ACLs would therefore change as well under **Alternatives 2** and **3**; these changes are displayed in Table 4.1.3.1. Since the Southern Handline component ACL and Southern Gillnet component ACL are each 21% of the commercial sector's ACL, those two zones would experience identical increases.

Table 4.1.3.1. Changes in the Gulf commercial sector ACL and in the Gulf commercial zone-specific ACLs, as the difference between **Alternatives 2** and **1** and between **Alternatives 3** and **1**. Catch limits are expressed as lbs lw.

Difference	Fishing Year	Change in Comm ACL	Change in Western Handline ACL	Change in Northern Handline ACL	Change in Southern Handline ACL	Change in Southern Gillnet ACL
Alt 2 – Alt 1	2023/2024+	1,029,850	411,940	185,373	216,269	216,269
Alt 3 – Alt 1	2023/2024+	2,059,699	823,880	370,746	432,537	432,537

In order to calculate expected changes in commercial consumer surplus (CS), own-price flexibility³² for the Gulf king mackerel commercial sector would be required to derive the expected average price change. Otherwise, price is assumed constant with changes in the commercial ACL. To our knowledge, information on own-price flexibility for the Gulf king mackerel commercial fishery does not currently exist. If the expected average price change is zero, then multiplying that by the change in the commercial ACL to arrive at the expected change in commercial CS would result in a value of zero.

To determine the respective expected changes in ex-vessel revenue as a result of the proposed changes to the sector allocation and its effects on the commercial ACL, the average annual price per lb gutted weight (gw) of \$2.25 for Gulf king mackerel from 2016-2020 (2021 dollars) is multiplied by the change in the commercial sector ACL and by the change in the zone-specific ACLs. These expected changes in revenue are displayed in Table 4.1.3.2. As noted in the discussion for the commercial CS, if an expected average price change were available, it would also be used in determining the expected changes in revenue. The percentage of ACL landed by the commercial sector, shown in Table 1.1.2, has ranged from 98.4% to 106.7% for the 2015/2016 to 2019/2020 fishing years, with an average of 101.4%. The commercial landings over those same fishing years average to 3,003,301 lbs lw, which is 241,600 lbs lw below the commercial ACL to be set in Framework Amendment 11 under the CMP FMP and what would

³¹ **Alternative 1** presumably results in a de facto reallocation to the commercial sector under the transition to MRIP-FES in Framework Amendment 11 under the CMP FMP, as undercounting of recreational sector landings was likely when initial sector allocations were set.

³² The own-price flexibility is the percentage change in a product's price relative to the percentage change of a product's quantity sold. This shows the responsiveness of a product's price to the quantity being sold.

result under **Alternative 1** in this Action. Therefore, it may be reasonable to assume, given the ACL constraint the commercial sector faced over the 2015/2016 to 2019/2020 fishing years, that the commercial sector will harvest all of the commercial ACL under **Alternative 1**, whereas the increases to the commercial ACL resulting from the sector allocation modifications under **Alternatives 2** and **3** are much larger and the extent to which the commercial sector will fully harvest the increased sector ACL is less certain. Furthermore, the individual commercial zones may vary with respect to the percentage of zone-specific ACL landed. For the purpose of calculating expected changes in sector revenue and in zone-specific revenue, the analysis also assumes that landings would not exceed the sector ACL or the zone-specific ACL under any of the alternatives.

Table 4.1.3.2. Expected changes in the commercial sector revenue and commercial zone-specific revenues, as the difference between **Alternatives 2** and **1** and between **Alternatives 3** and **1**. Values are in 2021 dollars.

Difference	Fishing Year	Expected Change in Comm Revenue	Expected Change in Western Handline Revenue	Expected Change in Northern Handline Revenue	Expected Change in Southern Handline Revenue	Expected Change in Southern Gillnet Revenue
Alt 2 – Alt 1	2023/2024+	\$2,317,163	\$926,865	\$417,089	\$486,604	\$486,604
Alt 3 – Alt 1	2023/2024+	\$4,634,323	\$1,853,729	\$834,178	\$973,208	\$973,208

The commercial producer surplus (PS) for vessels that harvested king mackerel in the Gulf is estimated as 45.3% of the ex-vessel value (Section 3.4.1; Liese and Overstreet 2021). The expected change in commercial PS is shown in Table 4.1.3.3. Gulf king mackerel commercial landings have been, on average, 101.4% of the commercial sector's ACL across the 2015/2016 to 2019/2020 fishing years, as shown in Table 1.1.2. Therefore, it is expected that the commercial sector will have both its revenue and PS impacted in the short-term by the increased ACL, resulting from the sector allocation modifications under **Alternatives 2** and **3**. As the increased commercial ACL may lead to a lengthened fishing season for commercial vessels harvesting king mackerel in the Gulf, some vessels may delay switching to harvest other species, until Gulf king mackerel is closed for the fishing year.

Table 4.1.3.3. Expected changes in the commercial sector PS and in the commercial zone-specific PS, as the difference between **Alternatives 2** and **1** and between **Alternatives 3** and **1**. Values are in 2021 dollars.

Difference	Fishing Year	Expected Change in Comm PS	Expected Change in Western Handline PS	Expected Change in Northern Handline PS	Expected Change in Southern Handline PS	Expected Change in Southern Gillnet PS
Alt 2 – Alt 1	2023/2024+	\$1,049,675	\$419,870	\$188,941	\$220,432	\$220,432
Alt 3 – Alt 1	2023/2024+	\$2,099,348	\$839,739	\$377,883	\$440,863	\$440,863

Recreational Sector

Alternative 1 (No Action) would maintain the sector allocation of the total ACL for Gulf king mackerel between the commercial and recreational sectors as 32% commercial and 68% recreational. Based on the earliest potential implementation of Amendment 33 to the CMP FMP, these economic analyses use the 2023/2024 fishing year as the initial year, and the expected effects of any modifications to the sector allocation would be observed through changes in the sector ACLs as well as the resulting sector landings. As such, using the sector ACLs included in Framework Amendment 11 under the CMP FMP, **Alternative 1** would maintain the Gulf king mackerel recreational ACL of 6,793,200 lbs landed weight (lw) in MRIP-FES. No changes to the recreational sector would be expected to result under **Alternative 1**. In comparison to the recreational ACL from **Alternative 1**, **Alternative 2** would modify the sector allocation for Gulf king mackerel to result in 42% commercial and 58% recreational. The sector allocation in **Alternative 2** would decrease the recreational ACL to 5,763,350 lbs lw in Marine Recreational Information Program's (MRIP) Fishing Effort Survey (FES) units. In comparison to the sector allocation from **Alternative 1**, **Alternative 3** would modify the sector allocation for Gulf king mackerel to result in 53% commercial and 47% recreational. The sector allocation in **Alternative 3** would decrease the recreational ACL to 4,733,501 lbs lw in MRIP-FES. These reductions are shown in Table 4.1.3.4.

Table 4.1.3.4. Changes in the recreational sector ACL, as the difference between **Alternatives 2** and **1** and between **Alternatives 3** and **1**. Catch limits are expressed as lbs lw.

Difference	Fishing Year	Change in Rec ACL
Alt 2 – Alt 1	2023/2024+	-1,029,850
Alt 3 – Alt 1	2023/2024+	-2,059,699

According to the economic law of diminishing marginal utility, willingness-to-pay (WTP) decreases for each additional fish retained by recreational fishermen. Therefore, it is useful to consider the bag limit distribution for king mackerel landed in the Gulf when selecting an appropriate WTP value to use for economic effects analysis. Figure 4.1.3.1 shows this distribution for the 2015/2016 through 2019/2020 fishing years. The majority of trips in the Gulf had recreational fishermen retaining 1 king mackerel or fewer per trip.

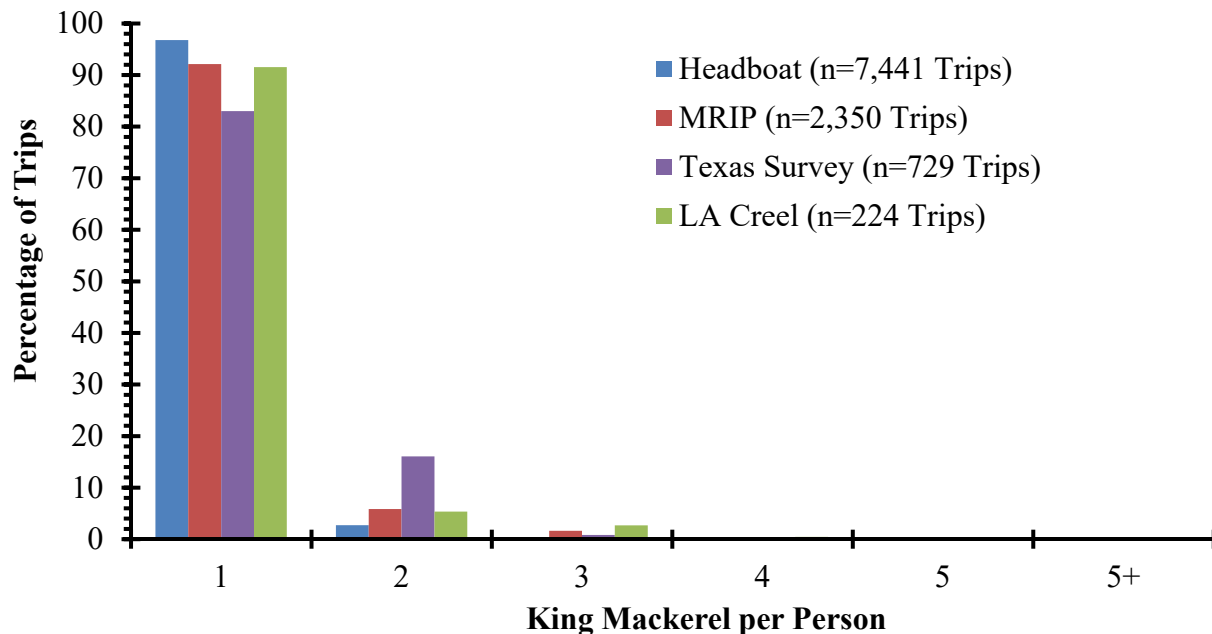


Figure 4.1.3.1 Gulf of Mexico king mackerel bag limit distribution from 2015/2016 through 2019/2020 fishing years.

Source: Marine Recreational Information Program, Southeast Region Headboat Survey, Texas Parks and Wildlife recreational survey, and Louisiana Department of Wildlife and Fisheries creel survey.

The estimated values of the CS for a second king mackerel kept on a recreational fishing trip is \$111 (Carter and Liese 2012; values updated to 2021 dollars),³³ which reflects recreational WTP for that second fish. This might underestimate the WTP for Gulf recreational fishermen as a whole, since WTP decreases as additional fish are retained and the majority of Gulf recreational fishermen are retaining 1 king mackerel or fewer per trip. Estimated increases in economic value are approximated by multiplying the expected change in the number of fish harvested by this CS estimate. The expected change in the number of fish harvested is calculated by dividing the change in the recreational sector's ACL by 8.795 lbs ww, which is the average weight of a recreationally landed king mackerel in the Gulf from the 2015/2016 to 2019/2020 fishing years.³⁴ Of note, the expected changes in CS displayed in Table 4.1.3.5 account for historical landings averaged over the 2015/2016 to 2019/2020 fishing years, which are 2,287,138 lbs lw in MRIP Coastal Household Telephone Survey units or 4,658,814 lbs lw (MRIP-FES). These average landings³⁵ are less than the ACLs that would result from the proposed reallocations in **Alternatives 2** and **3**. Therefore, in the short-term, the recreational sector is not expected to experience changes in its season duration or resulting economic effects. Regarding the recreational sector's PS, the number of for-hire trips is not expected to be impacted, as there is

³³ Converted to 2021 dollars using the annual, not seasonally adjusted Gross Domestic Product implicit price deflator provided by the U.S. Bureau of Economic Analysis.

³⁴ Data for average weights of a recreationally landed king mackerel in the Gulf were pooled from the Marine Recreational Information Program, Southeast Region Headboat Survey, Texas Parks and Wildlife recreational survey, and Louisiana Department of Wildlife and Fisheries creel survey.

³⁵ While the landings for each individual fishing year from 2015/2016 to 2019/2020 are below the recreational ACL that would result from **Alternative 2**, the landings for each individual fishing year from 2015/2016 to 2019/2020 are not below the recreational ACL that would result from **Alternative 3**; however, the average of the landings from the 2015/2016 to 2019/2020 fishing years are below the recreational ACL that would result from **Alternative 3**.

no expected change in recreational season duration. However, in the future, if fishing season closures result due to the reduced recreational ACL, this may result in some level of trip cancellations and lost for-hire trip net revenue. Had the recreational sector been landing its sector ACL under **Alternative 1**, then the sector ACLs from the proposed reallocation under **Alternatives 2** and **3** would be expected to result in changes in CS, respectively, of -\$12,997,246 and -\$25,994,480 (2021 dollar).

Table 4.1.3.5. Expected change in the recreational sector’s CS, based on the difference between the sector ACLs under **Alternatives 2** and **3** and the MRIP-FES equivalent for **Alternative 1** while accounting for historical landings averaged over the 2015/2016 to 2019/2020 fishing years. Catch limits are expressed as lbs lw. CS values are in 2021 dollars.

Difference	Fishing Year	Change in Rec Sector ACL as Number of Fish	Expected Change in Rec Sector CS
Alt 2 – Alt 1	2023/2024+	-117,092	\$0
Alt 3 – Alt 1	2023/2024+	-234,185	\$0

Net economic benefits from the commercial and recreational sectors combined from **Alternatives 2** and **3**, relative to **Alternative 1**, would be expected to increase, respectively, by \$1,049,675 and by \$2,099,348 in the 2023/2024 and subsequent fishing years.

4.1.4 Direct and Indirect Effects on the Social Environment

This action would reallocate the Gulf king mackerel ACL between the commercial and recreational sectors. A sector allocation is a policy designation of the rights to access that also carries socio-cultural significance. Allocation is an inherently controversial topic as competing user groups strive to obtain the largest share for their group. The current 32% commercial to 68% recreational sector allocation reflects a greater historical engagement with the Gulf king mackerel stock in the 1970s by the recreational sector compared to the commercial sector. However, the recreational sector has not landed more than 57% of its sector ACL for at least the last 19 fishing years (Table 2.1.1), despite a recent daily bag limit increase. However, the commercial sector regularly lands greater than 90% of its sector ACL and has exceeded its ACL 7 times in the last 19 fishing years. For other fish managed by the Gulf Council with a sector allocation such as gag grouper and red snapper, the sector ACL generally functions to constrain landings by both sectors, which means landings would not be an appropriate indicator of change in cultural preference. That the recreational sector routinely harvests less than 60% of its ACL suggests that engagement with the Gulf king mackerel stock by participants in the recreational sector has not increased at the same pace as the popularity for retaining other recreationally targeted species. While Gulf king mackerel continues to be a popular fish to target, it is fairly uncommon to keep more than one fish, despite the increased daily bag limit (Figure 2.1.2).

This analysis assumes that the proposed change to the Gulf king mackerel ACLs have been implemented through Framework Amendment 11 under the CMP FMP (FA). Additional effects would not usually be expected under **Alternative 1**, however, applying the current sector allocation (32% commercial to 68% recreational) to the Gulf king mackerel ACL adopted through the FA alongside the updated data units results in less fish going to the recreational

sector, termed a *de facto* reallocation (see Section 2.1). This means that while additional direct effects may not be expected from retaining the sector allocation in terms of its socio-cultural significance, less fish are available to the recreational sector under **Alternative 1**, which could result in some negative indirect effects to the recreational sector. However, because the recreational sector is not currently harvesting its ACL and thus, would not be expected to be affected by having its fishing opportunities constrained, these negative effects would not be expected to occur.

Table 4.1.4.1 provides the sector allocations, sector ACLs, and information to compare the sector ACLs under **Alternatives 1-3** with average landings for recent years. The *difference from average landings* column subtracts the 4-year average landings for the 2016/2017 through 2019/2020 fishing years (Table 2.1.5) for the recreational (4,620,301 lbs lw) and commercial (2,843,378 lbs lw) sectors, from its sector ACL for each alternative. For both sectors, the resulting sector ACLs are greater than the 4-year average landings for that sector. This means that if fishing effort remains the same as recent years, it would not be likely for current fishing practices to be curtailed as a result of this action.

Table 4.1.4.1. Comparison of the sector allocations, sector ACLs for the 2023/2024+ fishing year, difference between the sector ACL and its 4-year average landings (2016/2017-2019/2020), and percent greater than the average landings for each sector ACL under **Alternatives 1-3**.

Alt.	Sector & Fishing Year	Sector Allocation (%)	Sector ACL (lbs lw)	Difference from Avg Landings (lbs lw)	Change (%) from 4-yr Avg Landings
1	Commercial 2023/2024+	32%	3,196,800	353,422	12.4%
1	Recreational 2023/2024+	68%	6,793,200	2,172,899	47.0%
2	Commercial 2023/2024+	42%	4,226,650	1,383,272	48.6%
2	Recreational 2023/2024+	58%	5,763,350	1,143,049	24.7%
3	Commercial 2023/2024+	53%	5,256,499	5,256,499	84.9%
3	Recreational 2023/2024+	47%	4,733,501	113,200	2.5%

Alternatives 2 and 3 would reallocate 10% and 21%, respectively, of the new Gulf king mackerel ACL from the recreational sector to the commercial sector, resulting in positive effects for the commercial sector and negative effects for the recreational sector in terms of the designation of access to the resource. These effects would vary in scope and strength relative to the reallocation and associated change in quota, such that the effects directly relate to the cultural significance of the designation of access to the resource, and indirectly to the amount of fish allowed to be harvested by each sector under current harvest restrictions. Compared to **Alternative 1**, **Alternative 3** would result in the greatest positive effects for the commercial sector, and the greatest negative effects for the recreational sector, and would invert the sector

with the majority share of access to the Gulf king mackerel stock, from the recreational sector to the commercial sector. Intermediary effects would be expected for each sector under **Alternative 2**.

This analysis focuses on comparing the effects of a reasonable range of alternatives to comply with the National Environmental Policy Act. As discussed above, the alternatives would be expected to affect participants of the commercial sector in similar ways and affect participants in the recreational sector in similar ways. Fishing communities are identified in Chapter 3 to meet the requirements of National Standard 8 of the Magnuson-Stevens Fishery Management and Conservation Act, which calls for examination of linkages between fishery resources and human communities when regulatory changes are under consideration. The effects of this action would most likely be felt in direction and magnitude in those communities most engaged in Gulf king mackerel fishing. Many of the identified communities are important to both the commercial and recreational sectors, suggesting effects could be greater in those communities.

4.1.5 Direct and Indirect Effects on the Administrative Environment

Changing the sector allocation under **Alternatives 2** or **3** would change the sector ACLs, requiring NMFS to engage in rulemaking. This would result in a short-term minimal increase in the administrative burden. There is no effect on the administrative burden for law enforcement as law enforcement officers do not monitor sector allocation and resulting catch limits, but would only continue to monitor compliance with any established closed season. Some administrative burden is anticipated under **Alternatives 2** and **3** with respect to outreach as it relates to notifying stakeholders of the changes to the ACLs resulting from modifying the sector allocation. None of the expected effects are thought to be significant.

4.2 Cumulative Effects Analysis (CEA)

Cumulative effects are those effects that result from incremental impacts of a proposed action when added to other past, present, and reasonably foreseeable future actions (RFFA), regardless of which agency (federal or non-federal) or person undertakes such actions. Cumulative effects can result from individually minor but collectively significant actions that take place over a period of time (40 C.F.R. 1508.1(g)(3)). Below is our five-step cumulative effects analysis that identifies criteria that must be considered in an EA.

1. *The area in which the effects of the proposed action will occur* - The affected area of this proposed action encompasses the state and federal waters of the Gulf as well as Gulf communities that are dependent on CMP fishing. Most relevant to this proposed action is king mackerel and those who fish for them. For more information about the area in which the effects of this proposed action will occur, please see Chapter 3, Affected Environment, which describes these important resources as well as other relevant features of the human environment.

2. *The impacts that are expected in that area from the proposed action* - The proposed action would modify Gulf king mackerel sector allocation. The environmental consequences of the proposed action are analyzed in Sections 4.1.1, 4.1.2, 4.1.3, and 4.1.4, and are not expected to be significant. Modifying sector allocation is not expected to have any effects on the physical

environment as this change is not expected to alter the manner in which the king mackerel portion of the CMP fishery is prosecuted (Sections 4.1.1). While discards are expected to remain the same under all of the alternatives, there could be some negative effects on the biological environment as more allocation is shifted to the commercial sector as more fish are expected to be harvested, which leaves less fish in the population to be able to reproduce (Section 4.1.2). However, the total ACL is derived from Scientific and Statistical Committee recommendations that are based on the level of harvest the stock can sustain. Thus, even if the commercial sector harvests more fish, negative effects should be minimal. Further, bycatch mortality is expected to remain the same for both sectors and any effects are not expected to be significant. This action is expected to have positive effects on the social and economic environments for the commercial sector under alternatives 1 and 2 selected as these alternatives shift allocation to the commercial sector (Sections 4.1.3 and 4.1.4). It is expected that the commercial sector will have positive impacts to both revenue and producer surplus by the increased ACL. The increased commercial ACL may also lead to a lengthened fishing season for commercial vessels harvesting king mackerel in the Gulf. This may result in some vessels delaying a shift to harvesting other species, until Gulf king mackerel is closed for the fishing year. No effect on the social and economic environment for the commercial sector under Alternative 1 or for the recreational sector as the recreational sector is not projected to harvest its entire ACL under any alternative and the commercial ACL would remain the same under Alternative 1. Therefore, in the short-term, the recreational sector is not expected to experience changes in its season length or resulting economic or social effects. However, if effort increases and the recreational fishing season closes, there could be some negative social and economic effects for those that prefer to keep a fish. This effect would be reduced if Gulf king mackerel continues to be a popular catch and release species and recreational fishermen continue to target it whether they can keep it or not.

The action is not expected to significantly affect the administrative environment (Section 4.1.5), adversely or beneficially.

3. *Other past, present and reasonably foreseeable future actions (RFFA) that have or are expected to have impacts in the area* - There are numerous actions under development in the Gulf annually. Many of these activities are expected to have impacts associated with them and are listed below.

Other fishery related actions - Other pertinent actions are summarized in the history of management (Section 1.4). Currently, there are a few present actions and RFFAs that are being developed by the Councils or considered for implementation by NMFS that could affect CMP stocks. These include: a Gulf generic framework, which would modify the Gulf Council's ABC Control Rule, a framework that would modify the Gulf commercial king mackerel gillnet seasonal closure; and a framework that would modify Gulf migratory group cobia sale provisions.³⁶

Non-fishery related actions - Actions affecting the CMP fishery have been described in previous cumulative effect analyses (e.g., Amendment 26). Three important events include impacts of the *Deepwater Horizon* MC252 oil spill, the Northern Gulf Hypoxic Zone, and climate change (See Sections 3.2 and 3.3). Impacts from the *Deepwater Horizon* MC252 oil spill are still being

³⁶ <http://gulfcouncil.org>

examined; however, as indicated in Section 3.3.2, the oil spill had some adverse effects on fish species. Further, the impacts on the food web from phytoplankton, to zooplankton, to mollusks, to top predators may be significant in the future. Impacts to king mackerel from the oil spill may similarly affect other species that may be preyed upon by king mackerel. However, since the majority of the spawning biomass for king mackerel occurs outside the main areas affected by the *Deepwater Horizon* MC252 oil spill plume, it is less likely that a direct effect on either species will be detected. CMP fish species are mobile and are able to avoid hypoxic conditions, so any effects from the Northern Gulf Hypoxic Zone on CMP species are likely minimal.

There is a large and growing body of literature on past, present, and future impacts of global climate change induced by human activities. Some of the likely effects commonly mentioned are sea level rise, increased frequency of severe weather events, and change in air and water temperatures. The Environmental Protection Agency's climate change web page provides basic background information on these and other measured or anticipated effects. In addition, the Intergovernmental Panel on Climate Change has numerous reports addressing their assessments of climate change.³⁷ Global climate changes could affect the Gulf fisheries as discussed in Section 3.3. In addition, the distribution of native and exotic species may change with increased water temperature, as may the prevalence of disease in keystone animals such as corals and the occurrence and intensity of toxic algae blooms. Climate change may significantly impact Gulf CMP species in the future, but the level of impacts cannot be quantified at this time, nor is the time frame known in which these impacts would occur. The proposed action is not expected to significantly contribute to climate change through the increase or decrease in the carbon footprint from fishing, as this action should not change how the fishery is prosecuted. As described in Section 3.2, the contribution to greenhouse gas emissions from fishing is minor compared to other emission sources (e.g., oil platforms).

4. The impacts or expected impacts from these other actions - The cumulative effects associated with modifying king mackerel sector allocations were analyzed in the Environmental Impact Statement for Amendment 1 (GMFMC and SAFMC 1985) to the CMP FMP. In addition, cumulative effects related to broader CMP management have been recently analyzed in the Environmental Assessments for Amendment 20B (GMFMC and SAFMC 2014), Amendment 26 (GMFMC and SAFMC 2016a), and Amendment 31 (GMFMC and SAFMC 2018). These cumulative effects analyses are incorporated here by reference. They include detailed analysis of the CMP fishery, cumulative effects on non-target species, protected species, and habitats in the Gulf. Overall, bycatch of protected species in the king mackerel portion of the CMP fishery are negligible and effects to habitat are minimized due to the gear types used for harvest (Section 3.3). The effects of this action are positive, as they ultimately act to maintain the stocks at a level that will allow the maximum benefits in yield and increased fishing opportunities to be achieved. Some negative impacts on the social and economic environments may continue to occur despite the change to the commercial allocation if in-season closures occur. However, these effects would be reduced, compared to taking no action, as both alternatives shift more allocation to the commercial sector and are expected to allow harvest to continue later in the year before an in-season closure is triggered. No social or econ effects are expected for the recreational sector. It is assumed that fishing trips would occur regardless of whether king mackerel is open for harvest, as king mackerel have become a popular recreational catch and

³⁷ http://www.ipcc.ch/publications_and_data/publications_and_data.shtml

release fish and commercial fishermen typically switch to targeting other species when king mackerel harvest is closed.

5. The overall impact that can be expected if the individual impacts are allowed to accumulate:

This action, combined with other past actions, present actions, and RFFAs, is not expected to have significant beneficial or adverse effects on the physical and biological environments. Overall, the effects are expected to be positive even though the commercial sector is expected to remove more fish from the population. Harvest levels proposed by the SSC are considered optimum yield for the stock. Further, fishing changes to the allocation are not expected to substantially change the manner in which the CMP fishery is prosecuted (Sections 4.1.1 and 4.1.2). For the social and economic environments, positive effects are expected to result for fishing communities from increasing the season length for the commercial sector due to increased catch limits (Sections 4.1.3 and 4.1.4). No effects are expected for the recreational sector as participants are not expected to harvest the ACL and be subject to a closure under any alternative. Therefore, the proposed action, along with other past actions, present actions, and RFFAs, are not expected to alter the manner in which the fishery is prosecuted. Because it is unlikely there would be any changes in how the fishery is prosecuted, this action, combined with past actions, present actions, and RFFAs, is not expected to have significant adverse effects on public health or safety.

6. Summary: The proposed action is not expected to have individual significant effects to the physical, biological, economic, or social environments. Any effects of the proposed action, when combined with other past actions, present actions, and RFFAs are not expected to be significant. The effects of the proposed action are, and will continue to be, monitored through collection of landings data by NMFS, individual state programs, stock assessments and stock assessment updates, life history studies, economic and social analyses, and other scientific observations. Landings data for the commercial sector in the Gulf are collected through trip ticket programs, port samplers, and logbook programs. Landings data for the recreational sector in the Gulf are collected through the Marine Recreational Information Program, Louisiana Creel Survey, Southeast Region Headboat Survey, and Texas Parks and Wildlife Department. The cumulative social and economic effects of past, present, and future amendments may be described as increasing fishing opportunities, resulting in positive social and economic impacts. The proposed action in Amendment 33 is expected to result in important long-term benefits to the commercial and for-hire fishing fleets, fishing communities and associated businesses. While no additional benefits are expected for private recreational anglers, they will maintain status quo. This analysis found minimal negative effects on the biophysical and positive effects on the socioeconomic environments because it would allow more commercial fish to be harvested while current recreational harvest could be maintained.

CHAPTER 5. LIST OF PREPARERS

PREPARERS

Name	Expertise	Responsibility	Agency
Matthew Freeman	Economist	Co-Team Lead – Amendment development, economic analyses, Regulatory Impact Review	GMFMC
Kelli O'Donnell	Fishery Biologist	Co-Team Lead – Amendment development, physical/biological environment and analyses, administrative analyses, cumulative effects	SERO
Christina Wiegand	Anthropologist	Co-Team Lead – SAFMC	SAFMC
Ava Lasseter	Anthropologist	Social analyses	GMFMC
Christina Package-Ward	Anthropologist	Social environment	SERO
David Records	Economist	Economic environment	SERO

REVIEWERS (Preparers also serve as reviewers)

Name	Expertise	Responsibility	Agency
Manny Antonaras	Deputy Special Agent in Charge	Review	NOAA OLE
David Carter	Economist	Review	SEFSC
John Froeschke	Fishery Biologist	Review	GMFMC
Karla Gore	Fishery Biologist	Review	SERO
Mike Larkin	Fishery Biologist/Data Analyst	Review	SERO
Matthew Laurretta	Fishery Biologist	Review	SEFSC
Jennifer Lee	Protected Resources	Review	SERO
Mara Levy	General Counsel	Legal review	NOAA GC
Natasha Mendez-Ferrer	Fishery Biologist	Review	GMFMC
Ryan Rindone	Fishery Biologist	Review	GMFMC
Scott Sandorf	Technical Writer Editor	Regulatory writer and review	SERO
Michael Schirripa	Research Fishery Biologist	Stock Assessment	SEFSC
Carrie Simmons	Fishery Biologist	Review	GMFMC
Matthew Walia	Compliance Liaison Analyst	Review	NOAA OLE

GMFMC = Gulf of Mexico Fishery Management Council; SAFMC = South Atlantic Fishery Management Council
 NOAA=National Oceanic and Atmospheric Administration, SERO = Southeast Regional Office, SEFSC=Southeast Fisheries Science Center, GC = General Counsel

CHAPTER 6. REFERENCES

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APPENDIX A. OTHER APPLICABLE LAWS

The Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) (16 U.S.C. 1801 et seq.) provides the authority for management of stocks included in fishery management plans (FMP) in federal waters of the exclusive economic zone. However, management decision-making is also affected by a number of other federal statutes designed to protect the biological and human components of U.S. fisheries, as well as the ecosystems that support those fisheries. Major laws affecting federal fishery management decision-making include the Endangered Species Act (Section 3.3.3), Executive Order (E.O.) 12866 (Regulatory Planning and Review, Chapter 5) and E.O. 12898 (Environmental Justice, Section 3.5). Other applicable laws are summarized below.

Administrative Procedure Act

All federal rulemaking is governed under the provisions of the Administrative Procedure Act (5 U.S.C. Subchapter II), which establishes a “notice and comment” procedure to enable public participation in the rulemaking process. Under the Act, the National Marine Fisheries Service (NMFS) is required to publish notification of proposed rules in the *Federal Register* and to solicit, consider, and respond to public comment on those rules before they are finalized. The Act also establishes a 30-day waiting period from the time a final rule is published until it takes effect. Proposed and final rules will be published before implementing the actions in this amendment.

Coastal Zone Management Act

Section 307(c)(1) of the federal Coastal Zone Management Act of 1972 (CZMA), as amended, requires federal activities that affect any land or water use or natural resource of a state’s coastal zone be conducted in a manner consistent, to the maximum extent practicable, with approved state coastal management programs. The requirements for such a consistency determination are set forth in the National Oceanic and Atmospheric Administration (NOAA) regulations at 15 CFR part 930, subpart C. According to these regulations and CZMA Section 307(c)(1), when taking an action that affects any land or water use or natural resource of a state’s coastal zone, NMFS is required to provide a consistency determination to the relevant state agency at least 90 days before taking final action.

Upon submission to the Secretary of Commerce, NMFS will determine if this plan amendment is consistent with the Coastal Zone Management programs of the states of Alabama, Florida, Louisiana, Mississippi, and Texas to the maximum extent possible. Only these states are applicable to the Gulf of Mexico Migratory Group of king mackerel. Their determination will then be submitted to the responsible state agencies under Section 307 of the CZMA administering approved Coastal Zone Management programs for these states.

Data Quality Act

The Data Quality Act (Public Law 106-443) effective October 1, 2002, requires the government

to set standards for the quality of scientific information and statistics used and disseminated by federal agencies. Information includes any communication or representation of knowledge such as facts or data, in any medium or form, including textual, numerical, cartographic, narrative, or audiovisual forms (includes web dissemination, but not hyperlinks to information that others disseminate; does not include clearly stated opinions).

Specifically, the Act directs the Office of Management and Budget to issue government wide guidelines that “provide policy and procedural guidance to federal agencies for ensuring and maximizing the quality, objectivity, utility, and integrity of information disseminated by federal agencies.” Such guidelines have been issued, directing all federal agencies to create and disseminate agency-specific standards to: (1 ensure information quality and develop a pre-dissemination review process; (2 establish administrative mechanisms allowing affected persons to seek and obtain correction of information; and (3 report periodically to Office of Management and Budget on the number and nature of complaints received.

Scientific information and data are key components of FMPs and amendments and the use of best available information is the second national standard under the Magnuson-Stevens Act. To be consistent with the Magnuson-Stevens Act, FMPs and amendments must be based on the best information available. They should also properly reference all supporting materials and data, and be reviewed by technically competent individuals. With respect to original data generated for FMPs and amendments, it is important to ensure that the data are collected according to documented procedures or in a manner that reflects standard practices accepted by the relevant scientific and technical communities. Data will also undergo quality control prior to being used by the agency and a pre-dissemination review.

National Historic Preservation Act

The National Historic Preservation Act (NHPA) of 1966, (Public Law 89-665; 16 U.S.C. 470 *et seq.*) is intended to preserve historical and archaeological sites in the United States of America. Section 106 of the NHPA requires federal agencies to evaluate the impact of all federally funded or permitted projects for sites on listed on, or eligible for listing on, the National Register of Historic Places and aims to minimize damage to such places.

Historical research indicates that over 2,000 ships have sunk on the Federal Outer Continental Shelf between 1625 and 1951; thousands more have sunk closer to shore in state waters during the same period. Only a handful of these have been scientifically excavated by archaeologists for the benefit of generations to come.³⁸

The proposed action does not adversely affect districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places nor is it expected to cause loss or destruction of significant scientific, cultural, or historical resources. In the Gulf of Mexico (Gulf), the *U.S.S. Hatteras*, located in federal waters off Texas, is listed in the National Register of Historic Places. Fishing activity already occurs in the vicinity of this site, but the

³⁸ <http://www.boem.gov/Environmental-Stewardship/Archaeology/Shipwrecks.aspx>

proposed action would have no additional adverse impacts on listed historic resources, nor would they alter any regulations intended to protect them.

Paperwork Reduction Act (PRA)

The PRA of 1995 (44 U.S.C. 3501 et seq.) regulates the collection of public information by federal agencies to ensure that the public is not overburdened with information requests, that the federal government's information collection procedures are efficient, and that federal agencies adhere to appropriate rules governing the confidentiality of such information. The PRA requires NMFS to obtain approval from Office of Management and Budget (OMB) before requesting most types of fishery information from the public. This action would not invoke the PRA.

Executive Orders (E.O.)

E.O. 12630: Takings

The E.O. on Government Actions and Interference with Constitutionally Protected Property Rights that became effective March 18, 1988, requires each federal agency prepare a Takings Implication Assessment for any of its administrative, regulatory, and legislative policies and actions that affect, or may affect, the use of any real or personal property. Clearance of a regulatory action must include a takings statement and, if appropriate, a Takings Implication Assessment. The NOAA Office of General Counsel will determine whether a Taking Implication Assessment is necessary for this amendment.

E.O. 12898: Environmental Justice

The E.O. on Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations that became effective in 1994, requires federal agencies to examine the human health and socioeconomic implications of federal actions among low-income and minority groups and populations around the nation. E.O. 12898 requires that such agencies conduct programs, policies, and activities in a manner that ensures no individuals or populations are excluded, denied the benefits of, or subjected to discrimination due to race, color, or nation of origin. Of particular relevance in the context of marine fisheries, federal agencies are further required to collect, maintain, and analyze data regarding patterns of consumption of fish and wildlife among persons who rely on such foods for purposes of subsistence. In sum, the principal intent of E.O. 12898 is to require assessment and due consideration of any “disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations in the United States and its territories.”

E.O. 12962: Recreational Fisheries

This E.O. requires federal agencies, in cooperation with states and tribes, to improve the quantity, function, sustainable productivity, and distribution of U.S. aquatic resources for increased recreational fishing opportunities through a variety of methods including, but not limited to,

developing joint partnerships; promoting the restoration of recreational fishing areas that are limited by water quality and habitat degradation; fostering sound aquatic conservation and restoration endeavors; and evaluating the effects of federally-funded, permitted, or authorized actions on aquatic systems and recreational fisheries, and documenting those effects. Additionally, it establishes a seven-member National Recreational Fisheries Coordination Council (NRFCC) responsible for, among other things, ensuring that social and economic values of healthy aquatic systems that support recreational fisheries are considered by federal agencies in the course of their actions, sharing the latest resource information and management technologies, and reducing duplicative and cost-inefficient programs among federal agencies involved in conserving or managing recreational fisheries. The NRFCC also is responsible for developing, in cooperation with federal agencies, States and Tribes, a Recreational Fishery Resource Conservation Plan - to include a five-year agenda. Finally, the E.O. requires NMFS and the United States Fish and Wildlife Service to develop a joint agency policy for administering the ESA.

E.O. 13089: Coral Reef Protection

The E.O. on Coral Reef Protection requires federal agencies whose actions may affect U.S. coral reef ecosystems to identify those actions, utilize their programs and authorities to protect and enhance the conditions of such ecosystems, and, to the extent permitted by law, ensure actions that they authorize, fund, or carry out do not degrade the condition of that ecosystem. By definition, a U.S. coral reef ecosystem means those species, habitats, and other national resources associated with coral reefs in all maritime areas and zones subject to the jurisdiction or control of the United States (e.g., federal, state, territorial, or commonwealth waters).

Regulations are already in place to limit or reduce habitat impacts within the Flower Garden Banks National Marine Sanctuary. Additionally, NMFS approved and implemented Generic Amendment 3 for Essential Fish Habitat (GMFMC 2005), which established additional habitat areas of particular concern (HAPCs) and gear restrictions to protect corals throughout the Gulf. There are no implications to coral reefs by the actions proposed in this amendment.

E.O. 13132: Federalism

The E.O. on Federalism requires agencies in formulating and implementing policies, to be guided by the fundamental Federalism principles. The E.O. serves to guarantee the division of governmental responsibilities between the national government and the states that was intended by the framers of the Constitution. Federalism is rooted in the belief that issues not national in scope or significance are most appropriately addressed by the level of government closest to the people. This E.O. is relevant to FMPs and amendments given the overlapping authorities of NMFS, the states, and local authorities in managing coastal resources, including fisheries, and the need for a clear definition of responsibilities. It is important to recognize those components of the ecosystem over which fishery managers have no direct control and to develop strategies to address them in conjunction with appropriate state, tribes and local entities (international too).

No Federalism issues were identified relative to the king mackerel action. Therefore, consultation with state officials under Executive Order 12612 was not necessary. Consequently, consultation with state officials under Executive Order 12612 remains unnecessary.

E.O. 13158: Marine Protected Areas

This E.O. requires federal agencies to consider whether their proposed action(s) will affect any area of the marine environment that has been reserved by federal, state, territorial, tribal, or local laws or regulations to provide lasting protection for part or all of the natural or cultural resource within the protected area. There are several marine protected areas, HAPCs, and gear-restricted areas in the eastern and northwestern Gulf. The existing areas are entirely within federal waters of the Gulf. They do not affect any areas reserved by federal, state, territorial, tribal or local jurisdictions.

APPENDIX B. CHANGES TO RECREATIONAL DATA COLLECTION

Changes to the Recreational Data Collection Survey

The Marine Recreational Fisheries Statistics Survey (MRFSS) was created in 1979 by NMFS. In the Gulf, MRFSS collected data on catch and effort in recreational fisheries, including king mackerel since 1981. The program included the APAIS, which consists of onsite interviews at marinas and other points where recreational anglers fish, to determine catch. MRFSS also included CHTS, which used random-digit dialing of homes in coastal counties to contact anglers to determine fishing effort. In 2000, the For-Hire Survey (FHS) was implemented to incorporate for-hire effort due to lack of coverage of charter boat anglers by the CHTS. The FHS used a directory of all known charter boats and a weekly telephone sample of the charter boat operators to obtain effort information.

MRFSS included both offsite telephone surveys and onsite interviews at marinas and other points where recreational anglers fish. In 2012 a new design was certified and subsequently implemented in 2013: MRIP replaced MRFSS to meet increasing demand for more precise, accurate, and timely recreational catch estimates. MRIP is a more scientifically sound methodology for estimating catch because it reduces some sources of potential bias as compared to MRFSS resulting in more accurate catch estimates. Specifically, CHTS was improved to better estimate private angling effort. Instead of random telephone calls, MRIP-CHTS used targeted calls to anglers registered with a federal or state saltwater fishing registry. The MRIP Access Point Angler Intercept Survey (APAIS) began incorporating a new survey design in 2013. This new design addressed concerns regarding the validity of the survey approach, specifically that trips recorded during a given time period are representative of trips for a full day (Foster et al. 2018). The more complete temporal coverage with the new survey design provides for consistent increases or decreases in APAIS angler catch rate statistics, which are used in stock assessments and management, for at least some species (NOAA Fisheries 2019).

MRIP also transitioned from the legacy Coastal Household Telephone Survey (CHTS) to a new mail survey (Fishing Effort Survey, FES) beginning in 2015, and in 2018, the FES replaced the CHTS. Both survey methods collect data needed to estimate marine recreational fishing effort (number of fishing trips) by shore and private/rental boat anglers on the Atlantic and Gulf coasts. The CHTS used random-digit dialing of homes in coastal counties to contact anglers. The new mail-based FES uses angler license and registration information as one way to identify and contact anglers (supplemented with data from the U.S. Postal Service, which includes virtually all U.S. households). Because the FES and CHTS are so different, NMFS conducted side-by-side testing of the two methods from 2015 to 2018 and developed calibration procedures to convert the historical catch estimates (MRFSS, MRIP-CHTS, MRIP-APAIS [collectively MRFSS]) into MRIP-FES. In general, landings estimates are higher using the MRIP-FES as compared to the MRFSS estimates. This is because the FES is designed to more accurately measure fishing activity than the CHTS, not because there was a sudden rise in fishing effort. NMFS developed a calibration model to adjust historic effort estimates so that they can be accurately compared to new estimates from the FES. The new effort estimates alone do not lead

to definitive conclusions about stock size or status in the past or at current. NMFS determined that the MRIP-FES data, when fully calibrated to ensure comparability among years and across states, produced the best available data for use in stock assessments and management (NOAA Fisheries 2019). Table 1 reports Gulf king mackerel landings for 1986 through 2020 fishing years comparing MRIP-CHTS harvest data to MRIP-FES harvest data.

Table A1. Gulf king mackerel recreational (lbs ww) and commercial landings in pounds (lbs lw) using MRIP-CHTS and MRIP-FES units, and stock TAC/ACL in MRIP-CHTS by fishing year.

Fishing Year	Rec. Landings (CHTS)	Rec. Landings (FES)	Rec. ACL (CHTS)	Total Com. Landings	Com. ACL	Total Landings (CHTS)	Total Landings (FES)	Total stock TAC/ACL (CHTS)
1986/87	3,303,880	6,888,855		1,027,599		4,331,479	7,916,454	
1987/88	1,719,525	3,195,820		617,094		2,336,619	3,812,914	
1988/89	3,948,659	3,667,029		950,290		4,898,949	4,617,319	
1989/90	3,657,342	7,616,589		1,211,364		4,868,706	8,827,953	
1990/91	3,281,701	8,780,069		1,015,591		4,297,292	9,795,660	
1991/92	4,029,052	7,405,610		1,520,190		5,549,242	8,925,800	
1992/93	4,380,699	5,887,572		2,322,797		6,703,496	8,210,369	
1993/94	4,632,854	8,018,533		1,756,151		6,389,005	9,774,684	
1994/95	6,246,263	9,140,649		1,939,672		8,185,935	11,080,321	
1995/96	4,496,494	5,325,483		1,992,162		6,488,656	7,317,645	
1996/97	5,623,857	10,829,297		1,935,503		7,559,360	12,764,800	
1997/98	4,813,475	6,980,657		2,377,416		7,190,891	9,358,073	
1998/99	3,284,779	6,775,346		2,870,245		6,155,024	9,645,591	
1999/00	2,845,960	5,965,918		1,887,907		4,733,867	7,853,825	
2000/01	3,600,140	7,445,968		2,936,845		6,536,985	10,382,813	
2001/02	3,941,457	9,070,883	6,936,000	2,840,657	3,264,000	6,782,114	11,911,540	10,200,000
2002/03	2,983,798	6,169,130	6,936,000	3,032,207	3,264,000	6,016,005	9,201,337	10,200,000
2003/04	3,498,288	6,823,391	6,936,000	3,042,219	3,264,000	6,540,507	9,865,610	10,200,000
2004/05	2,564,642	5,339,214	6,936,000	3,140,596	3,264,000	5,705,238	8,479,810	10,200,000
2005/06	2,465,383	4,781,778	6,936,000	2,889,115	3,264,000	5,354,498	7,670,893	10,200,000
2006/07	3,319,495	6,074,882	7,344,000	3,121,321	3,456,000	6,440,816	9,196,203	10,800,000
2007/08	2,464,224	4,871,760	7,344,000	3,357,297	3,456,000	5,821,521	8,229,057	10,800,000
2008/09	2,790,428	5,168,997	7,344,000	3,913,176	3,456,000	6,703,604	9,082,173	10,800,000
2009/10	3,261,388	7,939,505	7,344,000	3,706,798	3,456,000	6,968,186	11,646,303	10,800,000
2010/11	1,993,088	5,497,642	7,344,000	3,473,388	3,456,000	5,466,476	8,971,030	10,800,000
2011/12	2,012,068	5,060,923	7,344,000	3,374,877	3,456,000	5,386,945	8,435,800	10,800,000
2012/13	3,224,351	6,856,317	7,344,000	3,501,893	3,456,000	6,726,244	10,358,210	10,800,000
2013/14	2,082,852	3,948,649	7,344,000	3,236,234	3,456,000	5,319,086	7,184,883	10,800,000
2014/15	4,015,683	7,777,977	7,344,000	3,753,959	3,456,000	7,769,642	11,531,936	10,800,000
2015/16	2,531,260	4,812,866	7,344,000	3,642,992	3,456,000	6,174,252	8,455,858	10,800,000
2016/17	2,587,187	4,986,684	6,260,000	2,902,360	2,950,000	5,489,547	7,889,044	9,210,000
2017/18	2,356,343	5,210,721	6,040,000	3,031,397	2,840,000	5,387,740	8,242,118	8,880,000
2018/19	2,338,564	5,044,834	5,920,000	2,780,813	2,790,000	5,119,377	7,825,647	8,710,000
2019/20	1,622,334	3,238,966	5,810,000	2,658,942	2,740,000	4,281,276	5,897,908	8,550,000

¹Commercial allocation = 32%

²Recreational allocation = 68%

Source: SEFSC Commercial ACL data (August 9, 2021). Recreational SEFSC Recreational ACL data (Accessed May 10, 2021 [CHTS] and May 11, 2021 [FES]).

Note: The Gulf king mackerel fishing year for the recreational sector and commercial sector Western and Southern Zone is July 1 – June 30. The fishing year for the commercial sector Northern Zone is October 1 – September 30. The total ACL was reduced in the 2016/17 fishing year due to the results of SEDAR 38 (2014) and the mixing zone changing with fish being reallocated to the Atlantic king mackerel migratory group that were previously allotted to the Gulf king mackerel migratory group.

References

NOAA Fisheries. 2019. Recommended use of the current Gulf of Mexico surveys of marine recreational fishing in stock assessments. Office of Science & Technology; Southeast Fisheries Science Center; Southeast Regional Office. 32 pp.

APPENDIX C. GULF OF MEXICO FISHERY MANAGEMENT COUNCIL AND SOUTH ATLANTIC FISHERY MANAGEMENT COUNCIL JOINT COASTAL MIGRATORY PELAGIC FISHERY MANAGEMENT PLAN OBJECTIVES, PRE-JUNE 2022 GULF COUNCIL MEETING

1. The primary objective of this FMP is to stabilize yield at the maximum sustainable yield (MSY), allow recovery of overfished populations, and maintain population levels sufficient to ensure adequate recruitment.
2. To provide a flexible management system for the resource which minimizes regulatory delay while retaining substantial Council and public input in management decisions and which can rapidly adapt to changes in resource abundance, new scientific information, and changes in fishing patterns among user groups or by areas.
3. To provide necessary information for effective management and establish a mandatory reporting system for monitoring catch.
4. To minimize gear and user group conflicts.
5. To distribute the total allowable catch of Atlantic migratory group Spanish mackerel between recreational and commercial user groups based on the catches that occurred during the early to mid-1970s, which is prior to the development of the deep water run-around gillnet fishery and when the resource was not overfished.
6. To minimize waste and bycatch in the fishery.
7. To provide appropriate management to address specific migratory groups of king mackerel.
8. To optimize the social and economic benefits of the coastal migratory pelagic fisheries.

APPENDIX D. GULF KING MACKEREL ABC PROJECTIONS ANALYSIS

Southeast Fisheries Science Center, Sustainable Fisheries Division

Addressing the request made by John Froeschke, Gulf of Mexico Fisheries Management Council
March 16, 2021

Disclaimer: The results presented in this work are intended for within model comparisons only and not the purposes of management advice of any kind.

The SEFSC was requested to communicate to the GMFMC a comparison of the Gulf of Mexico King Mackerel stock assessment models towards helping to understand the effects of various changes. Changes were made to the recreational catch/discard data (CHTS vs. FES) and shrimp bycatch (2013 estimate vs. 2020 estimate). These changes represented the “best available data” at the time of the SEDAR 38U assessment. The requests made are given Appendix 1 and Appendix 2.

Four models were configured to address this request. Each model isolates a particular model and/or data set in order to evaluate the effect of each change (Table 1).

Model_1. Baseline model. The SEDAR 38 model used for management advice:

- Use the original SEDAR 38 projection and the resulting OFL and ABC through FY2027.

Model_2. To evaluate any changes due only to the switch from CHTS to FES data:

- Use the SEDAR 38U model, truncated to 2012
- Replace the SEDAR 38 headboat landings/discards series with that used in SEDAR 38U
- Replace the SEDAR 38 CHTS series with the SEDAR 38U FES series
- Retain the SEDAR 38 shrimp bycatch estimate
- Project exactly as was done for the original SEDAR 38 model.

Model_3. To evaluate the effect of the new data inputs (FES and shrimp bycatch, combined) while retaining the old terminal year:

- Use the SEDAR 38U model, truncated to 2012
- Use the FES series and the updated SEDAR 38U shrimp estimate.
- Project exactly as you did for the original SEDAR38 model.

Model_4. To evaluate the effect of the new data series and population change since 2012.

- Use the accepted projections from SEDAR 38U

The same P* value (0.43) used in both SEDAR 38 and 38U was applied to the OFL to calculate ABC. The resulting retained yield (mt) with 10% and 90% confidence intervals, Over Fishing Limit (OFL) and Allowable Biological Catch (ABC) resulting from the four model configurations shown in Table 2.

Model_2 projections for 2015-2027 resulted in an average ABC of 12.08 mp vs. 7.96 mp for the baseline model, an average annual difference of 52% (Table 3). This comparison reflects changes in the ABC due to changing from CHTS to FES landings/discards time series. Trends in the projections are shown in Figure 1. Similar to Model_1, Model_2 projections show a near term increase in ABC with a gradual decrease over the years. The shapes of the projection trends are very similar however they differ by a scaling factor that changes over time.

Model_3 projections for 2015-2027 resulted in an average ABC of 11.57 mp vs 7.96 for the baseline model, an average difference across years of 46% (Table 3). This comparison reflects changes due to both the migration from CHTS to FES time series, as well as the changes in the shrimp fishery bycatch. The changes in the projection due to using the new shrimp fishery bycatch resulted in the stock assessment model estimating a larger starting population size to account for the increase mortality of juveniles.

Model_4 (the model that was used to provide SEDAR 38U management advice) resulted in an average ABC of 10.81 mp vs. 7.96 for the baseline model, a difference of 40% (Table 3). This difference reflects all changes in the data (i.e. FES and shrimp fishery bycatch) as well as the updates in the length compositions and CPUE time series that changed the model terminal year from 2012 to 2017. These updated data, specifically the headboat CPUE, resulted in reduced estimates of the most recent recruitment (Figures 1 and 2).

Table 1. Data and model combinations used to configuration the four King Mackerel models used for comparisons.

DATA / Model Used	Model 1	Model 2	Model 3	Model 4
Terminal Year	2012	2012	2012	2017
SEDAR 38	X			
SEDAR 38U		X	X	X
CHTS	X			
FES		X	X	X
Shimp 2012	X	X		
Shrimp 2020			X	X

Table 2. Retained yield (mt) with 10% and 90% confidence intervals, Over Fishing Limit (OFL) and Allowable Biological Catch (ABC) resulting from the four model configurations shown in Table 1

Model 1

P* = 0.43 YEAR	LCI	Retained Yield (mt)	UCI	ABC in MT	OFL (million lbs)	ABC (million lbs)
2015	3520	4261	5001	4159	9.39	9.17
2016	3229	4087	4945	3969	9.01	8.75
2017	3038	3956	4873	3830	8.72	8.44
2018	2908	3851	4794	3721	8.49	8.20
2019	2814	3767	4721	3636	8.31	8.02
2020	2744	3702	4660	3570	8.16	7.87
2021	2690	3651	4611	3519	8.05	7.76
2022	2650	3612	4573	3479	7.96	7.67
2023	2620	3581	4543	3449	7.90	7.60
2024	2597	3558	4520	3426	7.84	7.55
2025	2579	3541	4502	3408	7.81	7.51
2026	2566	3527	4488	3395	7.78	7.48
2027	2555	3517	4478	3384	7.75	7.46

Model 2

P* = 0.43 YEAR	LCI	Retained Yield (mt)	UCI	ABC in MT	OFL (million lbs)	ABC (million lbs)
2015	5550	6774	7998	6605	14.93	14.56
2016	5040	6396	7752	6209	14.10	13.69
2017	4690	6106	7522	5911	13.46	13.03
2018	4446	5884	7321	5686	12.97	12.53
2019	4269	5713	7158	5514	12.60	12.16
2020	4137	5583	7030	5384	12.31	11.87
2021	4038	5485	6931	5286	12.09	11.65
2022	3965	5410	6856	5211	11.93	11.49
2023	3909	5354	6798	5155	11.80	11.36
2024	3867	5311	6754	5112	11.71	11.27
2025	3835	5278	6721	5079	11.64	11.20
2026	3811	5253	6695	5055	11.58	11.14
2027	3793	5234	6676	5036	11.54	11.10

Model 3

P* = 0.43 YEAR	LCI	Retained Yield (mt)	UCI	ABC in MT	OFL (million lbs)	ABC (million lbs)
2015	4445	5512	6579	5365	12.15	11.83
2016	4234	5458	6682	5290	12.03	11.66
2017	4120	5432	6743	5251	11.97	11.58
2018	4060	5421	6782	5234	11.95	11.54
2019	4030	5425	6820	5233	11.96	11.54
2020	4013	5431	6849	5236	11.97	11.54
2021	4002	5433	6865	5236	11.98	11.54
2022	3994	5432	6870	5234	11.98	11.54
2023	3988	5429	6871	5231	11.97	11.53
2024	3983	5427	6870	5228	11.96	11.53
2025	3980	5424	6869	5226	11.96	11.52
2026	3977	5422	6868	5224	11.95	11.52
2027	3976	5421	6866	5222	11.95	11.51

Model 4

P* = 0.43 YEAR	LCI	Retained Yield (mt)	UCI	ABC in MT	OFL (million lbs)	ABC (million lbs)
2018		5196				
2019		5096				
2020		5104				
2021	3559	4941	6323	4751	10.89	10.47
2022	3523	5014	6504	4809	11.05	10.60
2023	3524	5070	6617	4857	11.18	10.71
2024	3535	5111	6687	4894	11.27	10.79
2025	3548	5141	6733	4921	11.33	10.85
2026	3560	5162	6765	4942	11.38	10.89
2027	3569	5178	6786	4956	11.41	10.93
2028	3577	5189	6801	4967	11.44	10.95
2029	3584	5198	6812	4976	11.46	10.97
2030	3589	5204	6820	4982	11.47	10.98

Table 3. Allowable Biological Catch (ABC) and percent difference from the SEDAR 38 resulting from the four model configurations shown in Table 1 above.

YEAR	Model 1	Model 2	Model 3	Model 4	Model 1	Model 2	Model 3	Model 4
	ABC (million lbs)	ABC (million lbs)	ABC (million lbs)	ABC (million lbs)	% Diff from SEDAR 38	% Diff from SEDAR 38	% Diff from SEDAR 38	% Diff from SEDAR 38
2015	9.17	14.56	11.83		0%	59%	29%	
2016	8.75	13.69	11.66		0%	56%	33%	
2017	8.44	13.03	11.58		0%	54%	37%	
2018	8.20	12.53	11.54	10.47	0%	53%	41%	28%
2019	8.02	12.16	11.54	10.60	0%	52%	44%	32%
2020	7.87	11.87	11.54	10.71	0%	51%	47%	36%
2021	7.76	11.65	11.54	10.79	0%	50%	49%	39%
2022	7.67	11.49	11.54	10.85	0%	50%	50%	41%
2023	7.60	11.36	11.53	10.89	0%	49%	52%	43%
2024	7.55	11.27	11.53	10.93	0%	49%	53%	45%
2025	7.51	11.20	11.52	10.95	0%	49%	53%	46%
2026	7.48	11.14	11.52	10.97	0%	49%	54%	47%
2027	7.46	11.10	11.51	10.98	0%	49%	54%	47%
Average	7.96	12.08	11.57	10.81	0%	52%	46%	40%

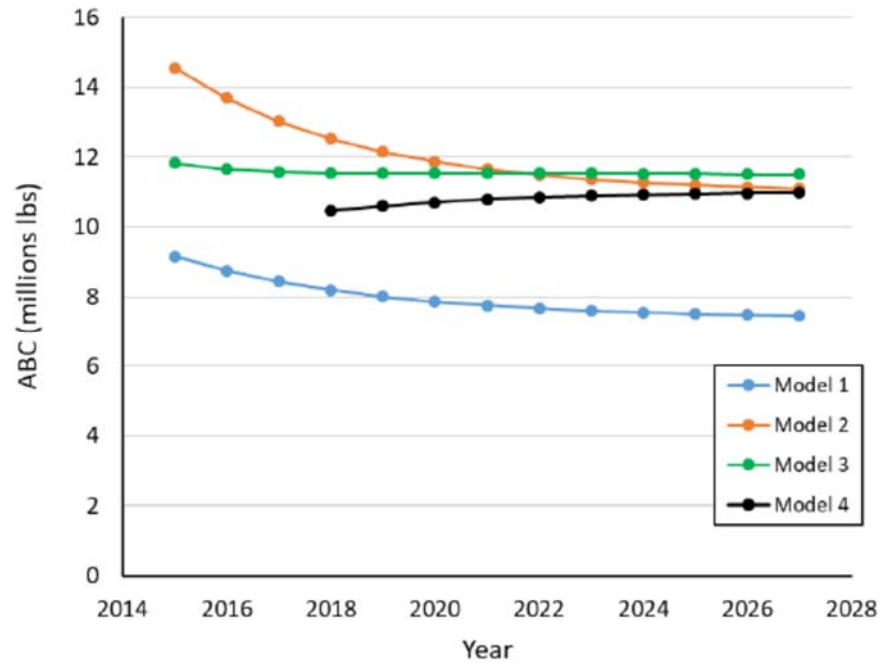


Figure 1. ABC projections for Gulf of Mexico King Mackerel from the four-model configuration considered in this study.

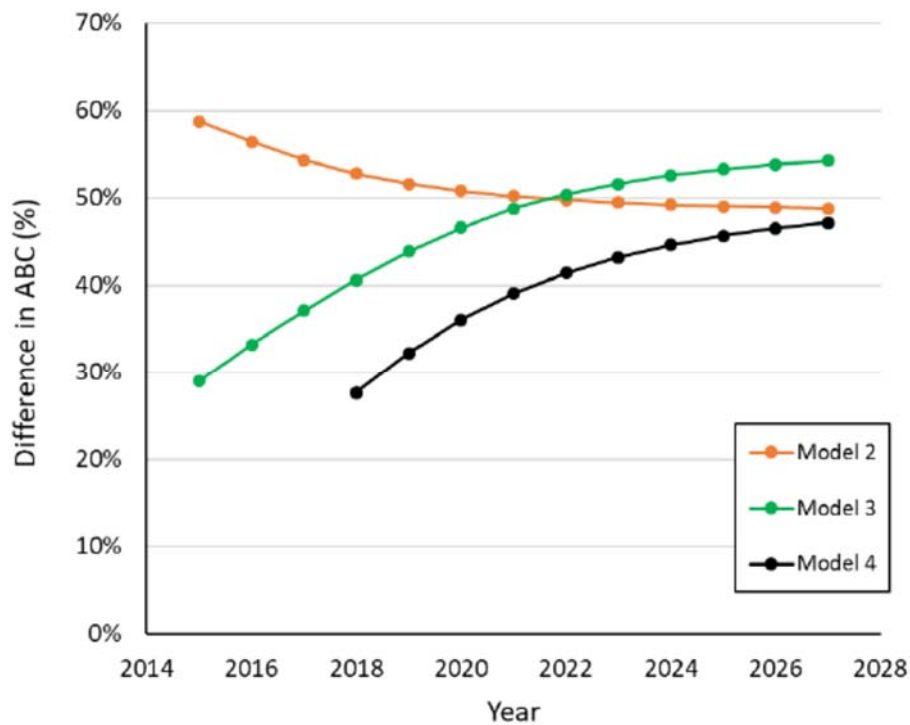


Figure 2. Percent differences between the baseline model (SEDAR 38) ABC projections and the ABCs for the three other model configurations considered in this study for Gulf of Mexico King Mackerel from.

Gulf of Mexico Fishery Management Council

Managing Fishery Resources in the U.S. Federal Waters of the Gulf of Mexico

4107 W. Spruce Street, Suite 200, Tampa, Florida 33607 USA
Phone: 813.348.1630 • Toll free: 888.833.1844 • Fax: 813.348.1711
www.gulfcouncil.org

006888NOV2020

MEMORANDUM

DATE: November 6, 2020

TO: Dr. Clay Porch, SEFSC Science and Research Director

FROM: Dr. John Froeschke, Deputy Director

RE: King Mackerel Acceptable Biological Catch (ABC) conversion from historical data

During the October 2020 meeting, the Council reviewed the results of the recently completed Gulf king mackerel SEDAR 38 update stock assessment. As part of their deliberation, the Council has requested additional information that may be necessary to modify catch levels and sector allocations based on the use of Marine Recreational Information Program (MRIP)-Fishing Effort Survey (FES) data in the most recent stock assessment. Specifically, the Council is requesting an analysis that would re-estimate the overfishing limit (OFL) and ABC for the fishing years from 2016/2017 through the 2019/2020. The OFL and ABC recommendations that resulted from SEDAR 38 were originally based on MRIP-Coastal Household Telephone Survey (CHTS) recreational data while the SEDAR 38U assessment uses MRIP-FES data. The requested analysis would use MRIP-FES recreational data in the SEDAR 38 assessment to generate the harvest advice in the MRIP-FES currency. No other modifications to the SEDAR 38 model are requested. I have discussed this requested previously with your staff and they have indicated this work could be completed within approximately two weeks (November 20, 2020).

Please contact me directly if you have any concerns.

cc: John Walter, Ph.D., Shannon Cass-Calay, Ph.D., Craig Brown, Ph.D., Michael Schirripa, Ph.D., Natasha Mendez-Ferrer, Ph.D., Carrie Simmons, Ph.D., Peter Hood

Appendix 2

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Marine Fisheries Service Southeast Fisheries Science Center 75 Virginia Beach Drive
Miami, Florida 33149 U.S.A.
(305) 361-4200 Fax: (305) 361-4499

006891NOV2020
November 20, 2020

Dr. Carrie M. Simmons, Ph.D.,
Executive Director
Gulf of Mexico Fishery Management Council
4107 W. Spruce Street, Suite 200
Tampa, Florida 36607

Dear Dr. Simmons:

During the October 2020 meeting of the Gulf of Mexico Fisheries Management Council (the Council), the Council reviewed the report of the SSC meeting (Standing, Reef Fish, Mackerel, Ecosystem, and Socioeconomic SSC Webinar Meeting Summary, September 14, 2020) and the recently completed Gulf King Mackerel SEDAR 38U update stock assessment. On November 6, 2020, the Council requested additional information to facilitate comparisons between catch levels and sector allocations based on the use of MRIP-Coastal Household Telephone Survey (MRIP-CHTS) and MRIP-Fishing Effort Survey (MRIP-FES) data in the King Mackerel stock assessment. Specifically, the Council requested an analysis that would re-estimate the overfishing limit (OFL), acceptable biological catch (ABC) and annual catch limit (ACL) for the fishing years from 2016/2017 through 2019/2020. To accomplish this request, the Center was directed to:

Replace the MRIP-CHTS landings and discard estimates in the SEDAR 38 (2014) base model with estimates derived from MRIP-FES in order to generate management advice in MRIP-FES currency.

Compare the original OFL, ABC and ACL in MRIP-CHTS currency to the revised estimates in MRIP-FES currency.

To facilitate comparison, the Council requested no further modifications to the SEDAR 38 base model.

The Center attempted the work outlined above but discovered that a simple replacement of the recreational time series resulted in a model that did not converge and produced unstable results.

This is always a potential problem when making substantive changes to input data. Attempts to stabilize this particular model required changes that make invalidated the desired comparisons (i.e. between catch levels and sector allocations based on the use of MRIP-CHTS and MRIP-FES data). For this reason, the Center was not able to produce useful results using the methods outlined above. Although other approaches are possible, they require additional consideration as to how to best proceed. The Center is willing to continue to work with Council staff to address this issue.

Sincerely,

John F. Walter, III
Deputy Director for Science and Council Services

cc: Clay Porch, Shannon Cass-Calay, Michael Schirripa, Peter Hood, John Froeschke Craig
Brown Larry Massey

APPENDIX E. CONSIDERED BUT REJECTED

In October 2021, the Gulf Council chose to move Alternative 3 to Considered but Rejected. In December 2021, the South Atlantic Council agreed with the Gulf Council's October 2021 decision.

Alternative 3: Modify the sector allocation of the total ACL between the recreational and commercial sectors by reallocating to the commercial sector a percentage of the average difference between the total landings from the 2010/2011 through 2019/2020 fishing years using MRIP-FES data and the total projected ACL for 2023/2024 from Action 1.

Option 3a: 25% of the average difference

Option 3b: 50% of the average difference

Option 3c: 75% of the average difference

Option 3d: 100% of the average difference

Fishing Year	Total Landings MRIP-FES (lbs lw)	Total Projected ACL for 2023/2024 (lbs lw)	Difference (Landings and Projected ACL) (lbs lw)	Average the Difference for 10 years (lbs lw)
2010/2011	8,971,030	9,990,000	1,018,970	1,510,757
2011/2012	8,435,800	9,990,000	1,554,200	
2012/2013	10,358,210	9,990,000	-368,210	
2013/2014	7,184,883	9,990,000	2,805,117	
2014/2015	11,531,936	9,990,000	-1,541,936	
2015/2016	8,455,858	9,990,000	1,534,142	
2016/2017	7,889,044	9,990,000	2,100,956	
2017/2018	8,242,118	9,990,000	1,747,882	
2018/2019	7,825,647	9,990,000	2,164,353	
2019/2020	5,897,908	9,990,000	4,092,092	

Option	Recreational ACL (lbs)	Recreational Allocation (%)	Commercial ACL (lbs)	Commercial Allocation (%)
(Alt 1) 0%	6,793,200	68%	3,196,800	32%
3a: 25%	6,415,511	64%	3,574,489	36%
3b: 50%	6,037,822	60%	3,952,178	40%
3c: 75%	5,660,133	57%	4,329,867	43%
3d: 100%	5,282,443	53%	4,707,557	47%

Justification:

The Councils determined that Alternative 3 did not represent the contemporary management environment, as it included data from fishing years prior to the 2016/2017 fishing year during which the Gulf of Mexico migratory group of king mackerel was subject to different spatial management than in the more recent years. As such, analysis of this alternative would be

unnecessarily complicated by a previous management paradigm that no longer applies to the stock.

In January 2022, the Gulf Council chose to move Options 2c and 2d of Alternative 2 to Considered but Rejected.

Alternative 2: Modify the sector allocation for Gulf king mackerel by reallocating to the commercial sector a percentage of the average difference between the total landings from the 2016/2017 through 2019/2020 fishing years using MRIP-FES data and the total simulated ACL for Model 2 in Appendix B for the predicted total landings by sector and the total projected ACL.

Option 2c: 75% of the average difference

Option 2d: 100% of the average difference

Justification:

The Councils determined that Options 2c and 2d of Alternative 2 were likely to constrain recreational harvest, resulting in a recreational season closure due to the ACL being met. This result is not desirable; thus, the Gulf Council chose to eliminate these options from further consideration.