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

Amendment 33

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

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AMENDMENT 33 TO THE FISHERY MANAGEMENT PLAN FOR COASTAL MIGRATORY PELAGIC RESOURCES IN THE GULF OF MEXICO AND ATLANTIC REGION

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Type of Action

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(X) Draft	( ) Final

ABBREVIATIONS USED IN THIS DOCUMENT

ABC	acceptable biological catch
ACL	annual catch limit
AM	accountability measure
CMP	coastal migratory pelagics
CHTS	coastal household telephone survey
Councils	Gulf of Mexico and South Atlantic Fishery Management Councils
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
lw	landed weight
MFMT	maximum fishing mortality threshold
mp	million pounds
MRIP	Marine Recreational Information Program
MSY	maximum sustainable yield
OFL	overfishing limit
OY	optimum yield
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
SSC	Scientific & Statistical Committee
TAC	total allowable catch
ww	whole weight

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CHAPTER 1. INTRODUCTION

1.1 Background

Amendment 33 to the Fishery Management Plan (FMP) for Coastal Migratory Pelagic (CMP) Resources of 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 address the results of the Southeast Data Assessment and Review (SEDAR) 38 Update (2020) stock assessment and subsequent overfishing limit (OFL) and acceptable biological catch (ABC) recommendations from the Gulf Council's Scientific and Statistical Committee (SSC). Amendment 33 proposes revisions to the Gulf migratory group of king mackerel allocation between the commercial and recreational sectors and modifies the OFL, ABC, and the total and sector annual catch limits (ACL).

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 the Gulf migratory group (Gulf king mackerel). The management of the stock, prior to the 2016/2017 fishing season, was subject to spatial shifts depending on the time of year in recognition of a seasonal mixing zone between the Gulf and Atlantic king mackerel stocks (Figure 1.1.1). The current stock and management boundaries were established in May 2017 in Amendment 26 to the CMP FMP (GMFMC and SAFMC 2016), and are shown in Figure 1.1.2.

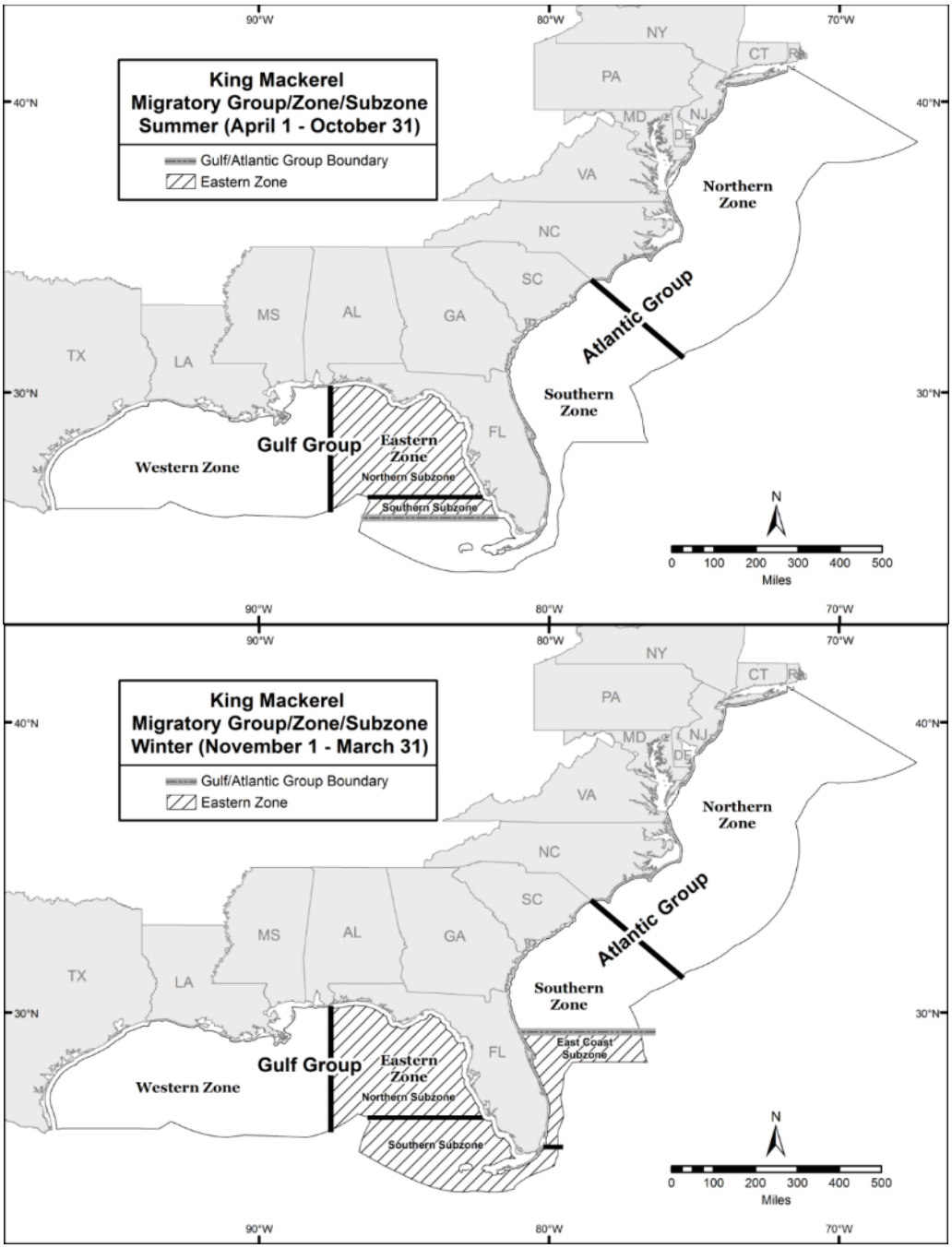

Figure 1.1.1. Gulf king mackerel management boundaries prior to the 2016/2017 fishing season.

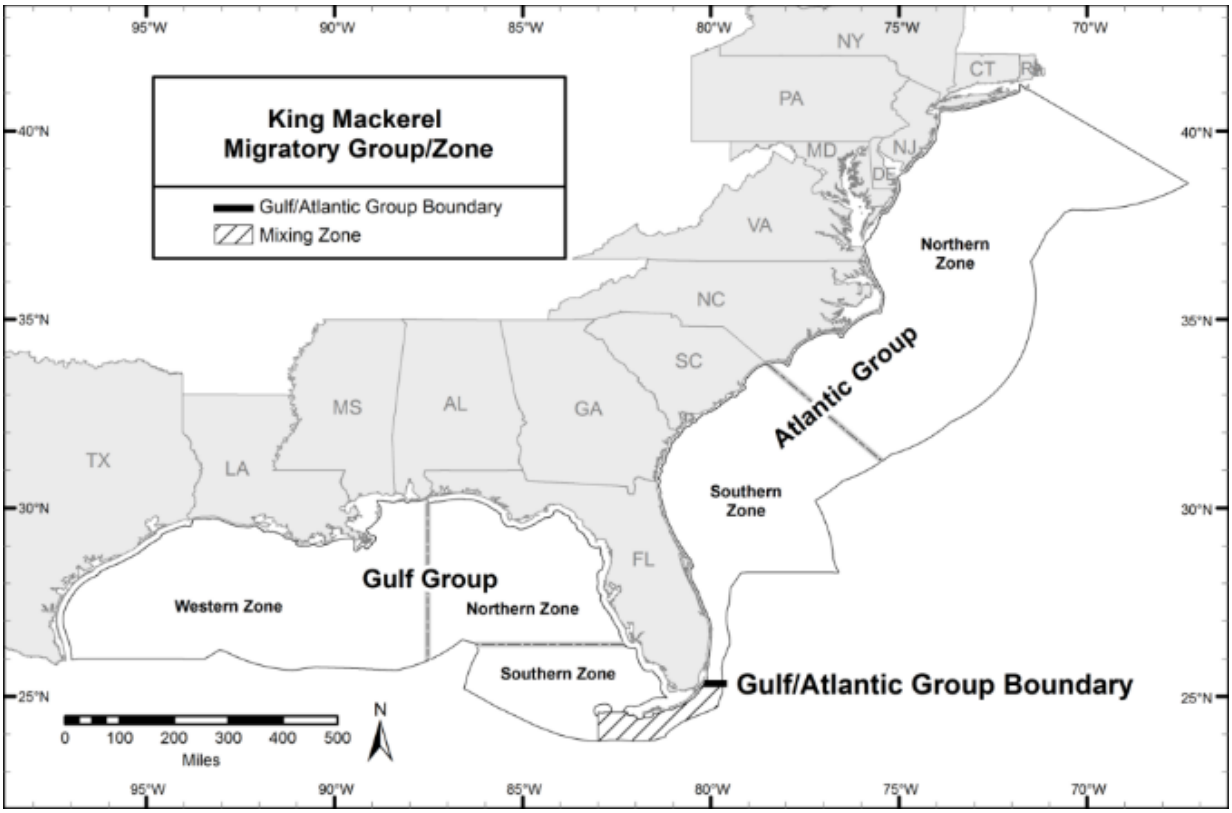

Figure 1.1.2. Gulf and Atlantic king mackerel stock boundaries as currently used for management purposes by the Councils. The Gulf is divided into commercial management Zones, which are managed by the Gulf Council, and includes the mixing zone (hashed area). The South Atlantic Council management area is divided into a Northern and Southern Zone, extending north to the easternmost tip of Long Island, New York.

Migratory Groups

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). Management authority over this region was designated to the Gulf Council by the Councils in Amendment 26 (GMFMC and SAFMC 2016). The Gulf Council is responsible for establishing management measures for Gulf king mackerel within its jurisdiction and the mixing zone; the South Atlantic Council is responsible for establishing management measures for Atlantic king mackerel within its jurisdiction excluding the mixing zone. This amendment focuses only on Gulf king mackerel; therefore, there will be no further references to Atlantic king mackerel.

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, Gulf king mackerel is jointly managed between the Gulf and South Atlantic Councils.

Sector Allocations

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

Commercial Zones

Three management zones are established for 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

Within the Gulf, king mackerel is managed with sector allocations, dividing the total stock ACL with 32% going to the commercial sector and 68% going to 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 allow for 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 commercial zone allocations are divided between three zones across two fishing fleets. The three commercial fishing zones are the Western, Northern, and Southern Zones (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.

Gulf King Mackerel Landings

The Gulf king mackerel total ACL is monitored in pounds (lbs) of landed weight (lw), that is, combined whole and gutted weight. The total Gulf king mackerel ACL has not been exceeded in the past 20 years (Table 1.1.1). The ACL is currently monitored using the Marine Recreational

Information Program's (MRIP) Coastal Household Telephone Survey (CHTS) data currency. Recently, estimates of recreational catch and effort are being calibrated to MRIP's more contemporary Fishing Effort Survey (FES) data currency, which is currently considered to be the best scientific information available. The landings provided in this document include recreational landings in both 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 A.

The data describing the commercial harvest of Gulf king mackerel have been subject to changes in the mixing zone and management boundaries, as illustrated in Figures 1.1.1 and 1.1.2. To demonstrate this management change (see CMP Amendment 26, GMFMC and SAFMC 2016), 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). Commercial landings by zone for the commercial sector since the 2001/2002 fishing year are provided in Table 1.1.2.

Table 1.1.1. Gulf king mackerel recreational (lbs ww) and commercial landings (lbs lw) under the current sector allocation (32% commercial, 68% recreational), the recreational ACL in MRIP-CHTS and MRIP-FES, the commercial ACL, total landings using MRIP-CHTS and MRIP-FES units, and the total Gulf migratory group 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)
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

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

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.

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 until the 2016/17 fishing season.

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 formally replaced MRIP CHTS in 2018, and results in increased estimates of both recreational landings and fishing effort (see Appendix A). SEDAR 38 Update estimated that Gulf king mackerel is not overfished and not undergoing overfishing as of the 2017/2018 fishing year. The SEDAR 38 Update predicted that the current level of landings (i.e., the 2020/2021 total ACL of 8.55 million pounds [mp] whole weight [ww] in MRIP-CHTS) can be maintained with a low probability of overfishing occurring in the short-term. The stock status determination criteria are defined as: minimum stock size threshold (MSST) = (1-M) * SSB_{MSY}, where M (natural mortality) = 0.174 and the spawning stock biomass at maximum sustainable yield (SSB_{MSY}) = $SSB_{SPR30\%}$ (Amendment 16 to the CMP FMP; GMFMC and SAFMC 2003). As of the 2017/2018 fishing year, the stock was being

harvested at 84% of the maximum fishing mortality threshold (MFMT), and SSB was 112% of MSST. Gulf Council SSC members discussed discomfort with the narrow buffers produced using the probability density functions (PDFs) in the projections. The SEFSC also noted that the scientific uncertainty in the SEDAR 38 Update base model is larger than that produced by the PDFs, and that a percentage of the MSY proxy may be more appropriate for determining the difference between the OFL and ABC. As such, the Gulf Council's SSC determined the results to be the best scientific information available for Gulf king mackerel. The 2020/2021 landings and total ACL are recorded and monitored, respectively, in MRIP-CHTS units. The updated catch advice by the SSC for the OFL and ABC for the 2021/2022 – 2023/2024 and subsequent fishing years is set in MRIP-FES units, and increases annually through the 2023/24 fishing years (Table 1.1.3). 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 the MRIP-FES data currency. Had MRIP-FES recreational data been available for use in SEDAR 38 in 2014, the current catch limit recommendations would represent an average 16% decrease in yield from SEDAR 38 Update (see Appendix B).

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

Fishing Year	OFL	ABC
2021/2022	10,890,000	9,370,000
2022/2023	11,050,000	9,720,000
2023/2024+	11,180,000	9,990,000

Proposed Management Modifications

At its October 2020 meeting, the Gulf Council 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 findings of SEDAR 38 Update and the Gulf Council SSC's subsequent catch recommendations. The Gulf Council also decided to consider modifications to the allocations between the commercial and recreational fishing sectors. Historically, the commercial sector has met or exceeded the commercial ACL (Table 1.1.2) while the recreational sector has landed low proportions of the recreational ACL (Table 1.1.1). At the March 2015 Gulf Council CMP Advisory Panel (Gulf CMP AP) meeting, members recommended that the Councils abstain from reallocating any Gulf king mackerel 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 (Amendment 26; GMFMC and SAFMC 2016). Recreational landings are relatively unchanged since the implementation of the increased recreational bag limit (Table 1.1.1.).

1.2 Purpose and Need

The purpose of this amendment is to revise the catch limits for Gulf migratory group king mackerel; and, to review recreational and commercial allocations in response to new information on the stock provided in the SEDAR 38 Update stock assessment.

The need for this amendment is to ensure catch limits are based on the best scientific information available, to prevent overfishing while achieving optimum yield, and 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.

1.3 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 37 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 2016) 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.

[1] https://gulfcouncil.org/fishery-management/implemented-plans/coastal-migratory-pelagics/

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.

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.

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.

CHAPTER 2. MANAGEMENT ALTERNATIVES

2.1 Action 1 – Modify the Gulf of Mexico (Gulf) Migratory Group King Mackerel (Gulf King Mackerel) Overfishing Limit (OFL), Acceptable Biological Catch (ABC), and Annual Catch Limit (ACL).

Alternative 1: No Action. Retain the current OFL, ABC, and total ACL for Gulf king mackerel as established in Amendment 26 to the Fishery Management Plan (FMP) for Coastal Migratory Pelagic (CMP) Resources in the Gulf of Mexico and Atlantic Regions (CMP FMP). The Gulf king mackerel total ACL is equal to the ABC recommended by the Gulf Scientific and Statistical Committee (SSC) for 2015/2016 – 2019/2020 and subsequent fishing years. Catch limit values are in millions of pounds (mp), landed weight (lw):

Fishing Year	OFL	ABC	Total ACL
2019/2020+	8.95	8.55	8.55
2019/2020+ MRIP-FES equivalent	N/A	11.54	11.54

Note: The recreational portion of the current OFL, ABC, and ACL is based on Marine Recreational Information Program (MRIP) Coastal Household Telephone Survey (CHTS) data. The recreational portion of the MRIP Fishing Effort Survey (FES) equivalent was calculated in 2021 by the SEFSC and is provided for comparison only.

Alternative 2: Revise the OFL and ABC for Gulf king mackerel as recommended by the Gulf SSC for 2021/2022 – 2023/2024 and subsequent fishing years. The total ACL is set equal to the ABC. An annual catch target is not used. Catch limit values are in millions of pounds (mp), whole weight (ww):

Fishing Year	OFL	ABC	Total ACL
2021/2022	10.89	9.37	9.37
2022/2023	11.05	9.72	9.72
2023/2024+	11.18	9.99	9.99

Note: Catch limits are recommended by the Gulf SSC in mp ww. The recreational portion of the OFL, ABC, and ACL are based on MRIP-FES data.

Note: Landings are reported in landed weight, meaning whole weight and gutted weight are combined. Therefore, while the OFL, and ABC were recommended by the Gulf Council SSC in lbs ww, ACLs and quotas will be in landed weight consistent with current regulations.

<u>Discussion</u>:

Alternatives in Action 1 apply to the Gulf king mackerel stock, which refers to the king mackerel that would be landed from the Texas/Mexico border to the Miami-Dade/Monroe County line in southeastern Florida.

The Southeast Data Assessment and Review (SEDAR) 38 Update assessment (2020) indicated that Gulf king mackerel was not overfished or undergoing overfishing. The Gulf of Mexico Fishery Management Council's (Gulf Council) SSC determined SEDAR 38 Update to be the best scientific information available and recommended increasing yields for the OFL and ABC based on the assessment for the 2021/2022 – 2023/2024 fishing years using Marine Recreational Information Program's (MRIP) Fishing Effort Survey (FES) units. A buffer between the OFL and the ABC remains due to scientific uncertainty, and was fixed at 85% of the fishing mortality rate (F) at maximum sustainable yield (MSY) which, in the case of Gulf king mackerel, is set at the proxy value of 30% of the spawning potential ratio (i.e., the projected yield at 85% of $F_{SPR30\%}$). This value also corresponds to the definition of optimum yield (OY) for Gulf king mackerel. Amendment 18 to the CMP FMP defined the ACL as equal to ABC (GMFMC and SAFMC 2011) with Amendment 26 to the CMP FMP retaining this definition (GMFMC and SAFMC 2016).

The actions in Amendment 26 provided the definition for the Gulf king mackerel total ACL being set equal to the ABC (GMFMC and SAFMC 2016) with no buffer, because: 1) it was highly improbable that the Gulf king mackerel stock ACL would be met and unlikely the recreational ACL would be reached; 2) there was no indication at the time that Gulf king mackerel was overfished or experiencing overfishing; and, 3) setting the ACL equal to the ABC would provide the commercial sector with the greatest opportunity to increase their catch with the associated benefits. The Gulf king mackerel OFL has not been exceeded in the past 20 years.

The Gulf Council has not used an ACT as a management measure for Gulf king mackerel, since combined sector landings have regularly been below the total ACL. Thus, an ACT is not considered herein, in keeping with the Gulf Council's determination that managing to the ACL would provide the greatest economic and social benefits to both sectors and to the Nation with negligible biological consequences.

Alternative 1 (No Action) retains the existing OFL, ABC, and ACLs, all of which are based on the previous Gulf king mackerel stock assessment (SEDAR 38 2014). The ACL is equal to the ABC, as specified in Amendment 26 to the CMP FMP (GMFMC and SAFMC 2016). The OFL, ABC and total ACL in **Alternative 1** are based, in part, on the MRIP Coastal Household Telephone Survey (MRIP-CHTS) data. One of the major changes between the SEDAR 38 (2014) and SEDAR 38 Update (2020) base models is the incorporation of the MRIP-FES adjustments to the recreational catch and effort estimates, which are considered by the National Marine Fisheries Service to be is the best scientific information available. Therefore, retaining the OFL, ABC and total ACL under **Alternative 1**, which are based on MRIP-CHTS data, makes **Alternative 1** not viable Under National Standard 2 and the Magnuson-Stevens Fishery Conservation and Management Act. The catch limits in **Alternative 1** also do not reflect the Gulf Council SSC's OFL and ABC recommendation based on SEDAR 38 Update.

Alternative 2 would modify the catch limits for Gulf king mackerel based on the recommendations of the Gulf Council's SSC from the SEDAR 38 Update. The revised Gulf king mackerel total ACL is consistent with the MRIP-FES transition in the recreational catch and effort data. The Gulf Council requested an analysis of the SEDAR 38 and SEDAR 38 Update base models to determine what the ABC would have been projected as, assuming MRIP-FES data had been used in both stock assessments (Appendix B). A summary comparison of this analysis against the published total ABC (which is equal to the total ACL) is shown in Table 2.1.1. This table compared the third model iteration from the analysis in Appendix B, which demonstrates the ABC from the SEDAR 38 Update base model, had that model used a terminal year of 2012, MRIP-FES recreational catch and effort data, and the updated median estimate of shrimp fishery bycatch. Model 3 represents a scenario which would have generated the catch limits for the 2015/2016 – 2019/2020 and subsequent fishing years, had those updated data been available for the SEDAR 38 (2014) stock assessment. Table 2.1.1 demonstrates that, had MRIP-FES data and the updated median estimate of shrimp bycatch been used to set catch limits for the 2015/2016 and subsequent fishing seasons, those catch limits would have been higher than both the catch limits recommended by the SSC for the 2015/2016 – 2019/2020 and subsequent fishing years, and those in **Alternative 2** of Action 1.

Table 2.1.1. Analysis of SEDAR 38 Update (2020) model performance by the Southeast Fisheries Science Center for the Gulf Council. Model 3 represents the SEDAR 38 Update base model, with a terminal fishing year of 2012/2013, using MRIP-FES recreational catch and effort data and the 2020 median shrimp bycatch estimate used in the original SEDAR 38 Update (2020) base model.

Fishing Year	Model 3 ABC (lbs ww) MRIP-FES	SEDAR 38U ABC (lbs ww) MRIP-CHTS	M3 - S38U (lbs ww) MRIP-CHTS	SEDAR 38U ABC (lbs ww) MRIP-FES	M3 - S38U (lbs ww) MRIP-FES
2015/2016	11,830,000	10,800,000	1,030,000		
2016/2017	11,660,000	9,210,000	2,450,000		
2017/2018	11,580,000	8,880,000	2,700,000		
2018/2019	11,540,000	8,710,000	2,830,000		
2019/2020	11,540,000	8,550,000	2,990,000		
2020/2021	11,540,000	8,550,000	2,990,000		
2021/2022	11,540,000	8,550,000	2,990,000	9,370,000	2,170,000
2022/2023	11,540,000	8,550,000	2,990,000	9,720,000	1,820,000
2023/2024	11,530,000	8,550,000	2,980,000	9,990,000	1,540,000

Alternative 2 sets the total ACL equal to the Gulf Council's SSC's recommendation for the ABC for the 2021/2022 – 2023/2024 fishing years, and then maintains the ABC and total ACL at the 2023/2024 level for subsequent years until changed by future management action. Historical Gulf king mackerel landings that are adjusted to MRIP-FES currency using the current sector allocation of 32% commercial and 68% recreational have exceeded the recommended 2021/2022 OFL in **Alternative 2** (the lowest of the 2021/2022 – 2023/2024 SSC-recommended catch limits (Table 2.1.2) 3 times, and the 2021/2022 ABC and total ACL 5 times, in the last 20 years. However, none of the recommended catch limits have been exceeded since the commercial

Florida East Coast Subzone was removed and the mixing zone and management boundary was updated in the 2016/2017 fishing year. If sector allocations remain unchanged, future fleet selectivity and harvest rates are expected to remain similar, resulting in the total ACL not being harvested.

Table 2.1.2. Gulf king mackerel recreational (in MRIP-CHTS and MRIP-FES units) and commercial (Zones combined) landings in lbs lw using current sector allocation (32% commercial, 68% recreational), total landings using MRIP-CHTS or MRIP-FES units, and the total Gulf migratory group proposed ACLs for 2021/2022 and 2023/2024+ in MRIP-FES, for the fishing years 2001/2002 – 2019/2020.

Year	Rec. Landings (CHTS)	Rec. Landings (FES)	Com. Landings	Total Landings (CHTS)	Total Landings (FES)	Proposed 2021/2022 ACL (FES)	Proposed 2023/2024+ ACL (FES)
2001/2002	3,941,457	9,070,883	2,840,657	6,782,114	11,911,540	9,370,000	9,990,000
2002/2003	2,983,798	6,169,130	3,032,207	6,016,005	9,201,337	9,370,000	9,990,000
2003/2004	3,498,288	6,823,391	3,042,219	6,540,507	9,865,610	9,370,000	9,990,000
2004/2005	2,564,642	5,339,214	3,140,596	5,705,238	8,479,810	9,370,000	9,990,000
2005/2006	2,465,383	4,781,778	2,889,115	5,354,498	7,670,893	9,370,000	9,990,000
2006/2007	3,319,495	6,074,882	3,121,321	6,440,816	9,196,203	9,370,000	9,990,000
2007/2008	2,464,224	4,871,760	3,357,297	5,821,521	8,229,057	9,370,000	9,990,000
2008/2009	2,790,428	5,168,997	3,913,176	6,703,604	9,082,173	9,370,000	9,990,000
2009/2010	3,261,388	7,939,505	3,706,798	6,968,186	11,646,303	9,370,000	9,990,000
2010/2011	1,993,088	5,497,642	3,473,388	5,466,476	8,971,030	9,370,000	9,990,000
2011/2012	2,012,068	5,060,923	3,374,877	5,386,945	8,435,800	9,370,000	9,990,000
2012/2013	3,224,351	6,856,317	3,501,893	6,726,244	10,358,210	9,370,000	9,990,000
2013/2014	2,082,852	3,948,649	3,236,234	5,319,086	7,184,883	9,370,000	9,990,000
2014/2015	4,015,683	7,777,977	3,753,959	7,769,642	11,531,936	9,370,000	9,990,000
2015/2016	2,531,260	4,812,866	3,642,992	6,174,252	8,455,858	9,370,000	9,990,000
2016/2017	2,587,187	4,986,684	2,902,360	5,489,547	7,889,044	9,370,000	9,990,000
2017/2018	2,356,343	5,210,721	3,031,397	5,387,740	8,242,118	9,370,000	9,990,000
2018/2019	2,338,564	5,044,834	2,780,813	5,119,377	7,825,647	9,370,000	9,990,000
2019/2020	1,622,334	3,238,966	2,658,942	4,281,276	5,897,908	9,370,000	9,990,000

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.

2.2 Action 2 – Modify the Sector Allocation and Commercial Zone Quotas for Gulf King Mackerel.

Alternative 1: No Action. Maintain the sector allocation of the total 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 landings using available landings data from the years 1975 through 1979, and established in Amendment 1 to the CMP FMP in 1985.

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 projected ACL for 2023/2024 from Action 1.

Option 2a: 25% of the average difference
Option 2b: 50% of the average difference
Option 2c: 75% of the average difference
Option 2d: 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 4 years (lbs lw)
2016/2017	7,889,044	9,990,000	2,100,956	2,526,321
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 lw)	Recreational Allocation (%)	Commercial ACL (lbs lw)	Commercial Allocation (%)
(Alt 1) 0%	6,793,200	68%	3,196,800	32%
2a: 25%	6,211,229	62%	3,778,771	38%
2b: 50%	5,629,258	56%	4,360,743	44%
2c: 75%	5,047,286	51%	4,942,714	49%
2d: 100%	4,465,315	45%	5,524,685	55%

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%

NOTE: Action 2 assumes Alternative 2 is selected as preferred in Action 1, in order to demonstrate how changes in the sector allocation affect the recreational and commercial ACLs.

Discussion:

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 2016) in May 2017 does not appear to have increased recreational landings (Table 2.2.1). The data describing the commercial harvest of Gulf king mackerel have been subject to changes in the mixing zone and management boundaries, as illustrated in Figures 1.1.1 and 1.1.2. To demonstrate this management change (see CMP Amendment 26, GMFMC and SAFMC 2016), 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 2016). Commercial landings by zone for the commercial sector since the 2001/2002 fishing year are provided in Table 2.2.1 and Figure 2.2.1.

Past actions to modify allocations by the 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, and also within those 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 reality presents two atypical challenges in modifying the allocation for Gulf king mackerel. First, the entirety of the time series for which contemporary data collection programs have either been in place, or those landings so calibrated (i.e., 1986 to present), has been biased by the current sector allocations. Thus, the respective fisheries have not been able to operate otherwise unrestricted to determine the portion of the catch typical for a given fleet. Second, contemporary data collection programs have not been calibrated back further than 1986; this means that landings data prior to 1986 cannot be compared to current data, particularly for the recreational sector. Thus, it will not be possible to present as an option for reallocation 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.

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, with some in favor of the measure and some opposed, 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, does not appear to have resulted in an increase in recreational harvest (Table 2.2.1).

Action 2 focuses on the Gulf king mackerel sector allocation between the commercial and recreational sectors. For the commercial sector, the Gulf king mackerel ACL is apportioned in regional quotas, with 40% apportioned 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 1.1.2 for a map of these Zones; GMFMC and SAFMC 2016). Commercial quotas for these zones will be updated based on the commercial sector allocation selected in this action.

Table 2.2.1. 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 TAC/ACL, commercial ACL, and recreational ACL are in lbs landed weight (lw). Recreational landings and commercial landings are in lbs lw.

Fishing Year	Total TAC/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%

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

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

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.

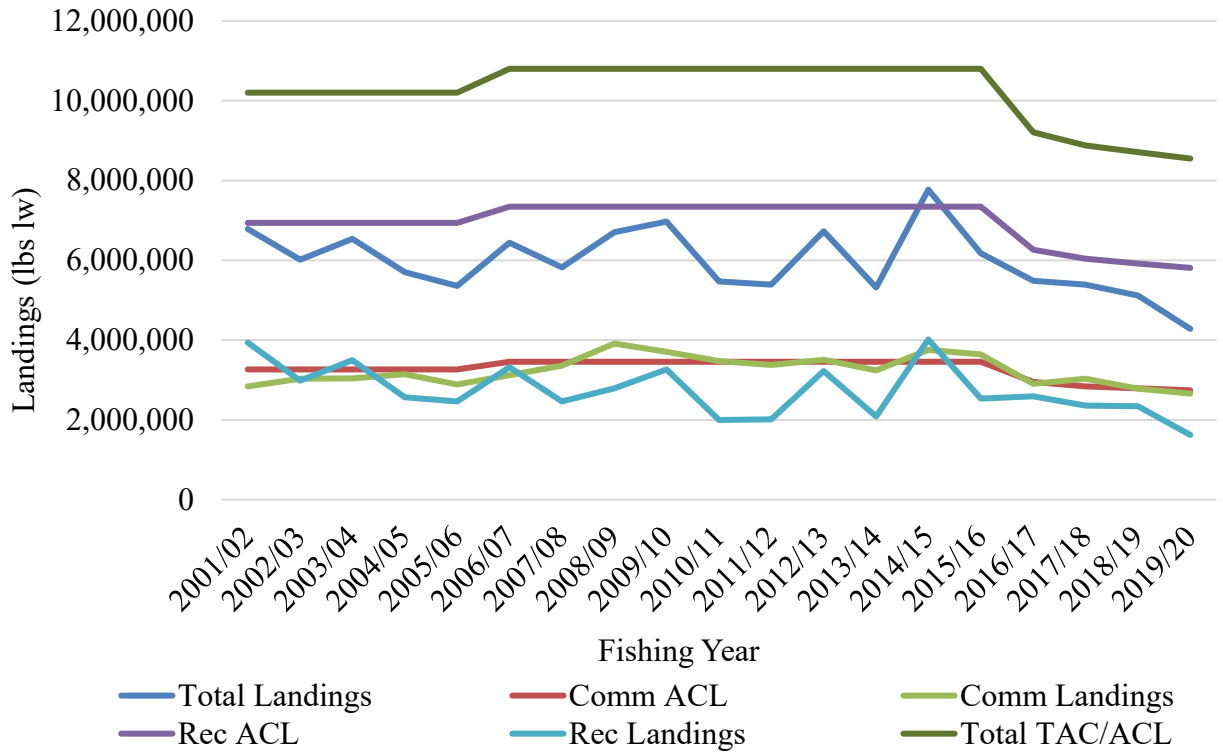

Figure 2.2.1. Trends in Gulf king mackerel total landings and by sector compared to the sector and total ACLs for the 2001/2002 – 2019/2020 fishing years. Recreational landings data are in MRIP-CHTS units to be comparable to the current sector and total ACL.

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. The recreational portion of the current OFL, ABC, and ACLs are based on MRIP-CHTS data. Despite the percentages associated with the sector allocation remaining the same, **Alternative 1** would result in a *de facto* increase to the commercial ACL under the transition to MRIP-FES associated to Action 1 Alternative 2.

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 presently 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 2.2.1). In an effort to manage Gulf king mackerel towards achieving optimum yield from the resource without harming the stock, **Alternative 2** and **Alternative 3** would reallocate to the commercial sector a portion of the projected ACL increase under Action 1. This would be expected to increase the likelihood that a greater proportion of the ACL is landed.

Using the last four fishing years (**Alternative 2**) or the last 10 years (**Alternative 3**), each year's total landings (i.e., recreational and commercial combined) is subtracted from the 2023/2024 total ACL proposed under Action 1, and the resulting values are averaged. This "average difference" provides a rough estimation of the amount of quota that could remain unharvested if past catch levels approximate future landings. The options under **Alternatives 2** and **3** would reallocate a percentage of this average difference to the commercial sector.

The time series in **Alternative 2** correlates to the current mixing zone definition and management boundary (see Figure 1.1.2), while **Alternative 3** considers a longer time series. However, by including the 2010/2011 – 2015/2016 fishing years in calculations for **Alternative 3**, data corresponding to differing perceptions of stock boundaries between the Atlantic and Gulf migratory groups of king mackerel are being considered, which may not be comparable to the data for the 2016/2017 – 2019/2020 fishing years due to temporal differences in the spatial application of the catch limits. Both **Alternatives 2** and **3** are applied to the recommended 2023/2024 ACL from Action 1, as this catch limit 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 proposed management measures, should these management modifications be enacted.

Percentages of this average difference between the total landings (using MRIP-FES for recreational data) and the 2023/2024 fishing year ACL to reallocate to the commercial sector include 25% (**Options 2a** and **3a**), 50% (**Options 2b** and **3b**), 75% (**Options 2c** and **3c**), and 100% (**Options 2d** and **3d**). The row providing an option for 0% provides the sector ACLs for **Alternative 1** in 2023/2024. The average difference is calculated using the 2016/2017 – 2019/2020 fishing years for **Alternative 2**, and the 2010/2011 – 2019/2020 fishing years for **Alternative 3**. Table 2.2.2 shows the annual differences between the total landings and the recommended total ACLs for the 2023/2024+ fishing year from Action 1, both using MRIP-FES.

Table 2.2.2. Recreational landings, commercial landings, total landings (lbs lw), and comparisons of the annual difference between the total landings and the proposed 2023/2024 ACL from Action 1 Alternative 2 for Gulf king mackerel for the 2010/2011 through 2019/2020 fishing years. Percentages shown in ORANGE indicate where the total landings would have exceed the ACL under Action 1 Alternative 2 .

Year	Rec. Landings (FES)	Com. Landings	Total Landings (FES)	Proposed 2023/2024+ ACL (FES)	% of 2023/2024 ACL Remaining
2010/2011	5,497,642	3,473,388	8,971,030	9,990,000	10.2%
2011/2012	5,060,923	3,374,877	8,435,800	9,990,000	15.6%
2012/2013	6,856,317	3,501,893	10,358,210	9,990,000	-3.7%
2013/2014	3,948,649	3,236,234	7,184,883	9,990,000	28.1%
2014/2015	7,777,977	3,753,959	11,531,936	9,990,000	-15.4%
2015/2016	4,812,866	3,642,992	8,455,858	9,990,000	15.4%
2016/2017	4,986,684	2,902,360	7,889,044	9,990,000	21.0%
2017/2018	5,210,721	3,031,397	8,242,118	9,990,000	17.5%
2018/2019	5,044,834	2,780,813	7,825,647	9,990,000	21.7%

2019/2020	3,238,966	2,658,942	5,897,908	9,990,000	41.0%

[1]Commercial allocation = 32% [2]Recreational 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.

Table 2.2.3 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**. Only **Option 2d** of **Alternative 2** is predicted to result in the recreational sector exceeding the 2023/2024 projected recreational ACL, based on the average of the last 4 years of landings in MRIP-FES currency. The ratio of the average commercial landings to the 2023/2024 commercial ACL for the years under the options for **Alternative 2** do not project the commercial sector would land these revised ACLs; 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.

Table 2.2.3. Comparison of **Options 2a-2d** of **Alternative 2** to the average of the sector-specific landings from the last four fishing years (2016/2017 – 2019/2020). Percentages shown in ORANGE indicate where the average landings for that sector would be predicted to exceed the ACL for that option.

Average Landings: Alternative 2 time series	**Average Rec Landings (FES)**	**2023/2024+ Rec ACL**			
2016/2017 - 2019/2020		**Option 2a**	**Option 2b**	**Option 2c**	**Option 2d**
	4,620,301	6,158,790	5,524,380	4,889,970	4,255,561
	Percentage	75.0%	83.6%	94.5%	108.6%
	Average Com Landings	**2023/2024+ Com ACL**			
		Option 2a	**Option 2b**	**Option 2c**	**Option 2d**
	2,843,378	3,831,210	4,465,620	5,100,030	5,734,439
	Percentage	74.2%	63.7%	55.8%	49.6%

Table 2.2.4 compares the average sector-specific landings from the 2010/2011 to 2019/2020 fishing seasons against the resultant allocations in pounds and percentages for **Alternative 3**. Both **Option 3c** and **Option 3d** of **Alternative 3** are predicted to result in the recreational sector exceeding the 2023/2024 projected recreational ACL, based on the average of the last 10 years of landings in MRIP-FES currency. As for **Alternative 2**, the ratio of the average commercial landings to the 2023/2024 commercial ACL for the years under the options for **Alternative 3** do

not project the commercial sector will land these revised ACLs; 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.

Table 2.2.4. Comparison of **Options 3a-3d** of **Alternative 3** to the average of the sector-specific landings from the last 10 fishing years (2010/2011 – 2019/2020). Percentages shown in ORANGE indicate where the average landings for that sector would be predicted to exceed the ACL for that option.

Average Landings: Alternative 3 time series	**Average Rec Landings (FES)**	**2023/2024+ Rec ACL**			
2010/2011 - 2019/2020		**Option 3a**	**Option 3b**	**Option 3c**	**Option 3d**
	5,243,558	6,158,790	5,524,380	4,889,970	4,255,561
	Percentage	85.1%	94.9%	107.2%	123.2%
	Average Com Landings	**2023/2024+ Com ACL**			
		Option 3a	**Option 3b**	**Option 3c**	**Option 3d**
	3,235,686	3,831,210	4,465,620	5,100,030	5,734,439
	Percentage	84.5%	72.5%	63.4%	56.4%

A consideration for the time series used in **Alternative 3** (Table 2.2.4) is that the data for the 2010/2011 – 2015/2016 fishing years includes commercial landings from, and allocations for, an area off the east coast of Florida which is no longer thought to represent the Gulf king mackerel stock (SEDAR 38 2014; GMFMC and SAFMC 2016). Thus, only the 2016/2017 and subsequent fishing years represent the current state of management for the Gulf king mackerel stock. 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; any associated impacts to these fishing fleets for Gulf king mackerel have not yet been fully characterized. 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.

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APPENDIX A. 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

[1]Commercial allocation = 32% [2]Recreational 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.

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APPENDIX B. 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 shape 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%

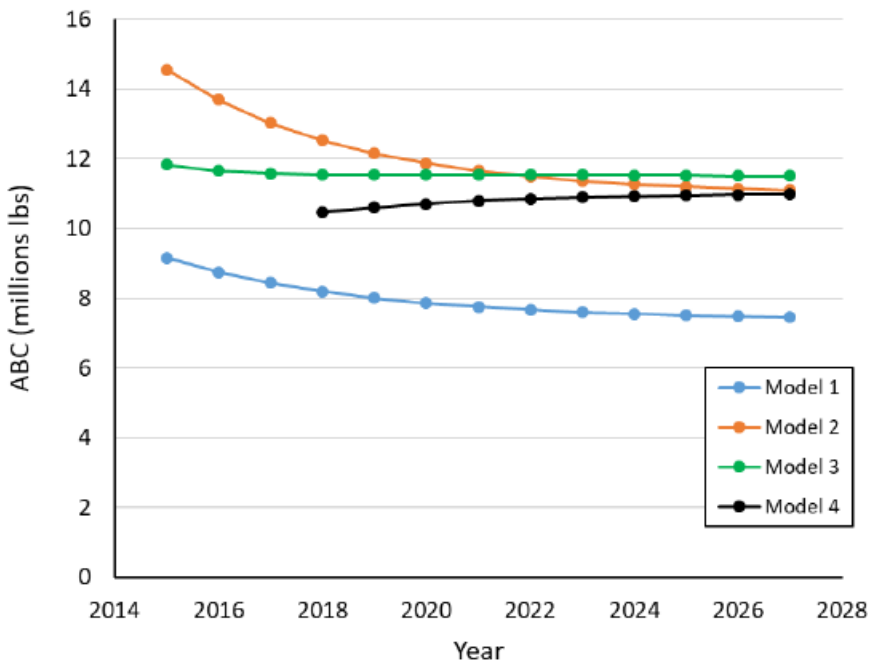

Figure 1. ABC projections for Gulf of Mexico King Mackerel from the four model configuration considered in this study.

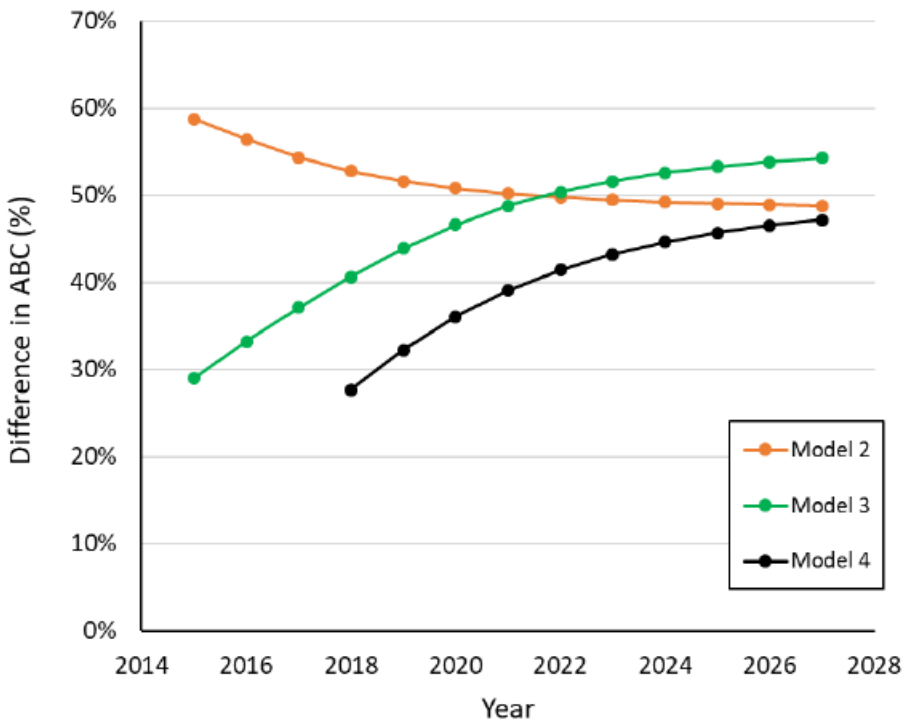

Figure 2. Percent differences between the baseline model (SEDAR 38) ABC projections and the ABCs for the three other model configurations considered in this study for Gulf of Mexico King Mackerel from.

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

UNITED STATES DEPARTMENT OF COMMERCE
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National Marine Fisheries Service Southeast Fisheries Science Center 75 Virginia Beach Drive
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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