# Modifications to the Gulf of Mexico Migratory Group Spanish Mackerel Catch Limits

## Draft Framework Amendment 14 under the Fishery Management Plan for Coastal Migratory Pelagics Resources in the Gulf of Mexico and Atlantic Region

## June 2024

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# ENVIRONMENTAL ASSESSMENT COVER SHEET

Draft Framework Amendment 14 to Modify Gulf of Mexico Migratory Group Spanish Mackerel Catch Limits

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**Type of Action**

( ) Administrative
(X) Draft

( ) Legislative
( ) Final

This Environmental Assessment applies CEQ's NEPA regulations currently in effect. See 50 C.F.R. § 1506.13.

# ABBREVIATIONS USED IN THIS DOCUMENT

| | |
|---|---|
| ABC | acceptable biological catch |
| ACL | annual catch limit |
| ACT | annual catch target |
| ALS | accumulated landings system |
| CMP | coastal migratory pelagics |
| CHTS | Coastal Household Telephone Survey |
| CS | consumer surplus |
| Councils | Gulf of Mexico and South Atlantic Fishery Management Councils |
| CVA | climate vulnerability analyses |
| DPS | distinct population segment |
| EA | environmental assessment |
| EEZ | exclusive economic zone |
| EFH | essential fish habitat |
| EIS | Environmental Impact Statement |
| EJ | environmental justice |
| E.O. | Executive Order |
| ESA | Endangered Species Act |
| F | fishing mortality |
| FES | (mail-based) fishing effort survey |
| FL | fork length |
| FMP | fishery management plan |
| GDP | gross domestic product |
| Gulf | Gulf of Mexico |
| Gulf Council | Gulf of Mexico Fishery Management Council |
| Gulf Spanish mackerel | Gulf of Mexico Migratory Group Spanish mackerel |
| gw | gutted weight |
| HAPC | habitat area of particular concern |
| IPCC | Intergovernmental Panel on Climate Change |
| IRFA | initial regulatory flexibility analysis |
| lw | landed weight |
| LDWF | Louisiana Department of Wildlife and Fisheries |
| Magnuson-Stevens | Magnuson-Stevens Fishery Conservation Act |
| MMPA | Marine Mammal Protection Act |
| Mp | million pounds |
| MRFSS | Marine Recreational Fishery Statistics Survey |
| MRIP | Marine Recreational Information Program |
| MSST | minimum stock size threshold |
| MSY | maximum sustainable yield |
| NMFS | National Marine Fisheries Service |
| NOAA | National Oceanic and Atmospheric Agency |
| OFL | overfishing limit |
| OY | optimum yield |
| ppt | parts per thousand |
| PS | producer surplus |

| | |
|---|---|
| pw | product weight |
| RFA | Regulator Flexibility Act |
| RFFA | reasonably foreseeable future actions |
| RIR | Regulatory Impact Review |
| RQ | regional quotient |
| SBA | Small Business Association |
| Secretary | Secretary of Commerce |
| SEDAR | Southeast Data, Assessment, and Review |
| SEFSC | Southeast Fisheries Science Center |
| SEFSC-SSRG | Southeast Fisheries Science Center Social Science Research Group |
| SERO | NMFS Southeast Regional Office |
| South Atlantic Council | South Atlantic Fishery Management Council |
| SPR | spawning potential ratio |
| SRHS | Southeast Regional Headboat Survey |
| SSB | spawning stock biomass |
| SSC | Scientific and Statistical Committee |
| TAC | total allowable catch |
| TPWD | Texas Parks and Wildlife Department |
| WTP | willing to pay |
| ww | whole weight |

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# CHAPTER 1. INTRODUCTION

## 1.1 Background

Framework Amendment 14 under the Fishery Management Plan (FMP) for Coastal Migratory Pelagic (CMP) Resources in the Gulf of Mexico (Gulf) and Atlantic Region (CMP FMP) is being developed by the Gulf of Mexico Fishery Management Council (Gulf Council) to address the results of the Southeast Data, Assessment, and Review (SEDAR) 81 (2023) stock assessment for the Gulf migratory group of Spanish mackerel (Gulf Spanish mackerel), and subsequent overfishing limit (OFL) and acceptable biological catch (ABC) recommendations from the Gulf Council's Scientific and Statistical Committee (SSC). Framework Amendment 14 to the CMP FMP (Framework 14) proposes revisions to the Gulf Spanish mackerel OFL, ABC, and stock annual catch limit (ACL).

Spanish mackerel is managed jointly by the Gulf Council and South Atlantic Fishery Management Council (South Atlantic Council; together: "Councils") under the CMP FMP. Two migratory groups of Spanish mackerel are managed in the southeastern U.S.: the Atlantic migratory group (Atlantic Spanish mackerel) and Gulf Spanish mackerel. The current stock and management boundaries were established in March 2015 in Amendment 20B to the CMP FMP (GMFMC and SAFMC 2014a), and are shown in Figure 1.1.1.

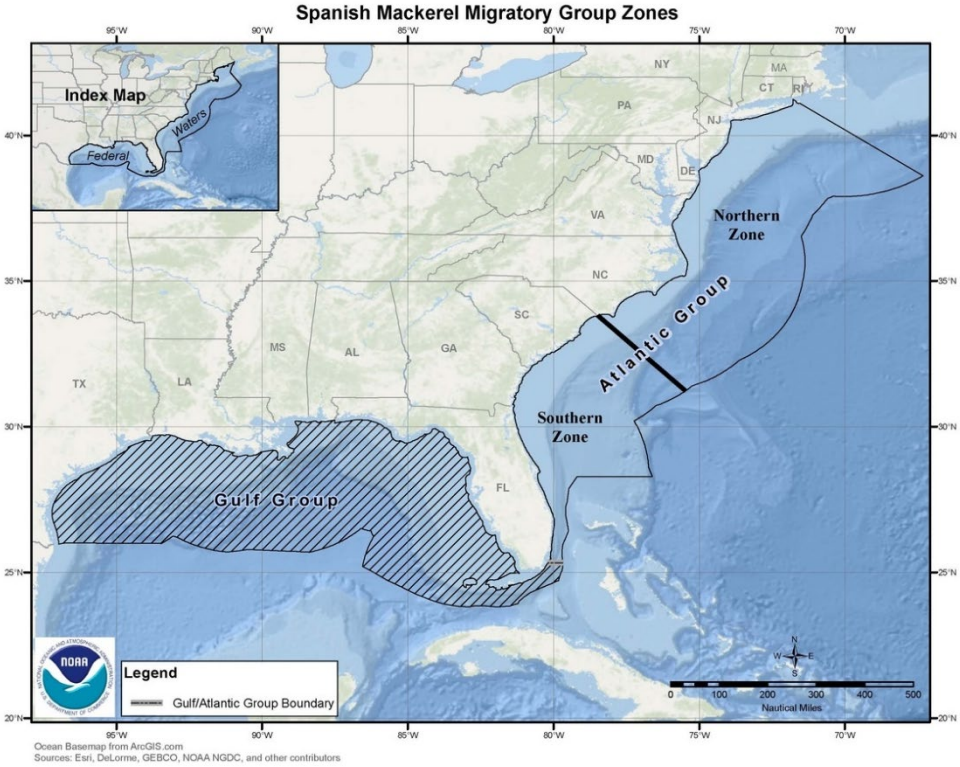


**Figure 1.1.1.** Gulf (hashed area) and Atlantic Spanish mackerel stock boundaries as currently used for management purposes by the Councils.

The Gulf Council is responsible for management of Gulf Spanish mackerel under the CMP FMP from Texas to the Miami-Dade/Monroe County line in southeastern Florida (Figure 1.1.1.), overlapping the jurisdiction of the South Atlantic Council in the Atlantic portion of the Florida Keys. Spanish mackerel landed north of the Miami-Dade/Monroe County line are considered Atlantic Spanish mackerel and managed by the South Atlantic Council. This framework amendment focuses only on Gulf Spanish mackerel; therefore, there will be no further discussion of Atlantic Spanish mackerel.

*Gulf Spanish Mackerel Management Measures and Landings*

The fishing year for Gulf Spanish mackerel is from April 1 to March 31. Gulf Spanish mackerel is managed without allocations between the commercial and recreational sectors (GMFMC and SAFMC 2011), does not have a scheduled seasonal closure, and has a minimum size limit of 12 inches fork length (FL) for both sectors. The commercial sector is not subject to possession or trip limits, while the recreational sector has a daily bag limit of 15 fish per person.

The Gulf Spanish mackerel stock ACL is monitored in pounds (lb) landed weight (lw); that is, combined whole and gutted weight. Gulf Spanish mackerel has an in-season accountability measure (AM), that if the ACL is reached or projected to be reached within a fishing year, the Assistant Administrator for Fisheries will file a notification with the Office of the Federal Register to close the harvest for the remainder of the fishing year. The recreational landings are currently monitored in the Marine Recreational Information Program's (MRIP) Coastal Household Telephone Survey (CHTS) data units. Recently, in SEDAR 81, estimates of recreational catch and effort were calibrated to MRIP's more contemporary Fishing Effort Survey (FES) data units; the SEDAR 81 stock assessment and resultant catch projections using these data are considered by the National Marine Fisheries Service (NMFS) to be consistent with the best scientific information available (BSIA). The landings provided in this document include recreational landings in both CHTS and FES data units for reference. A more detailed description of the recent changes to the collection of recreational catch and effort data can be found in Appendix A.

The results of a 2023 pilot study (NOAA 2023[1]) suggest that the order of the questions in the MRIP-FES survey may have led to an overestimation of fishing effort. A more comprehensive pilot study is ongoing in 2024, will be independently peer-reviewed in early 2025, and available for evaluation by data users (e.g., the Southeast Fisheries Science Center [SEFSC], Southeast Regional Office [SERO], and the Council) thereafter.

Gulf Spanish mackerel landings have been predominantly driven by the recreational sector, with one occurrence where the ACL was exceeded in the 2013/2014 fishing year (Table 1.1.1.). Landings after the last ACL modification via Framework Amendment 1 to the CMP FMP (GMFMC and SAFMC 2014b) have remained below 35% of the ACL.

[1] https://www.fisheries.noaa.gov/recreational-fishing-data/fishing-effort-survey-research-and-improvements

**Table 1.1.1.** Gulf Spanish mackerel landings and ACL (in million pounds landed weight) for the fishing years 2000/2001 to 2021/2022. FES equivalent landings are provided for reference only.

| Year | Rec. Landings | Rec. Landings FES | Comm. Landings | Total Landings | Total Landings FES | Stock ACL | % ACL | Units |
|---|---|---|---|---|---|---|---|---|
| **2000/01** | 2,787,759 | 7,134,661 | 1,054,259 | 3,842,018 | 8,188,920 | 9.10 | 42.2% | MRFSS |
| **2001/02** | 3,453,003 | 8,245,055 | 810,099 | 4,263,102 | 9,055,154 | 9.10 | 46.8% | MRFSS |
| **2002/03** | 3,171,267 | 8,183,802 | 1,745,064 | 4,916,331 | 9,928,866 | 9.10 | 54.0% | MRFSS |
| **2003/04** | 2,742,259 | 6,704,231 | 941,702 | 3,683,961 | 7,645,933 | 9.10 | 40.5% | MRFSS |
| **2004/05** | 2,665,254 | 7,014,438 | 1,986,512 | 4,651,766 | 9,000,950 | 9.10 | 51.1% | MRFSS |
| **2005/06** | 1,595,371 | 3,746,160 | 1,221,294 | 2,816,665 | 4,967,454 | 9.10 | 31.0% | MRFSS |
| **2006/07** | 2,845,319 | 5,004,288 | 1,534,040 | 4,379,359 | 6,538,328 | 9.10 | 48.1% | MRFSS |
| **2007/08** | 2,724,709 | 6,044,654 | 902,827 | 3,627,536 | 6,947,481 | 9.10 | 39.9% | MRFSS |
| **2008/09** | 2,525,545 | 6,687,581 | 2,360,043 | 4,885,588 | 9,047,624 | 9.10 | 53.7% | MRFSS |
| **2009/10** | 1,890,078 | 4,845,791 | 942,501 | 2,832,579 | 5,788,292 | 9.10 | 31.1% | MRFSS |
| **2010/11** | 2,964,208 | 7,484,430 | 1,248,711 | 4,212,919 | 8,733,141 | 9.10 | 46.3% | MRFSS |
| **2011/12** | 2,677,119 | 7,048,872 | 1,347,945 | 4,025,064 | 8,396,817 | 9.10 | 44.2% | MRFSS |
| **2012/13** | 3,578,421 | 7,858,124 | 1,413,904 | 4,992,325 | 9,272,028 | 5.15 | 96.9% | MRFSS |
| **2013/14** | 5,232,534 | 11,738,205 | 1,464,381 | 6,696,915 | 13,202,586 | 5.15 | 130.0% | MRFSS |
| **2014/15** | 1,946,040 | 4,307,213 | 924,490 | 2,870,530 | 5,231,703 | 12.70 | 22.6% | CHTS |
| **2015/16** | 2,616,377 | 6,669,809 | 1,219,634 | 3,836,011 | 7,889,443 | 11.80 | 32.5% | CHTS |
| **2016/17** | 2,607,122 | 6,850,152 | 1,094,568 | 3,701,690 | 7,944,720 | 11.30 | 32.8% | CHTS |
| **2017/18** | 2,184,055 | 7,900,308 | 700,383 | 2,884,438 | 8,600,691 | 11.30 | 25.5% | CHTS |
| **2018/19** | 1,922,494 | 6,059,628 | 1,065,335 | 2,987,829 | 7,124,963 | 11.30 | 26.4% | CHTS |
| **2019/20** | 3,251,330 | 9,887,158 | 989,648 | 4,240,978 | 10,876,806 | 11.30 | 37.5% | CHTS |
| **2020/21** | 1,883,604 | 7,219,120 | 523,578 | 2,407,182 | 7,742,698 | 11.30 | 21.3% | CHTS |
| **2021/22** | 1,445,107 | 5,509,628 | 352,847 | 1,797,954 | 5,862,475 | 11.30 | 15.9% | CHTS |

**Source:** SEFSC Commercial ACL data (August 25, 2023). SEFSC Recreational ACL data (September 18, 2023).

*SEDAR 81 Operational Assessment*

At its July 2023 meeting, the Gulf Council's SSC reviewed the results and projections from the SEDAR 81 (2023) stock assessment report, prepared by the SEFSC. SEDAR 81 updated the data from the previous model (SEDAR 28 2013) and calibrated recreational landings to MRIP-FES, which replaced MRIP-CHTS in 2018 (Appendix A). The Gulf Spanish mackerel stock assessment (SEDAR 81 2023) determined the stock is not overfished and not undergoing overfishing. The terminal year of data used in the assessment is 2021. The SSC accepted SEDAR 81 as consistent with BSIA. The SSC set the OFL for Gulf Spanish mackerel based on SEDAR 81 using a constant catch of 12.074 million pounds (mp) whole weight (ww) for 2025 – 2027, and subsequent years. The SSC then recommended an ABC using the yield at 75% of $F_{30\%SPR}$. The constant catch ABC for 2025 – 2027 and subsequent years is 9.630 mp ww. For the purposes of consistency in regulations, whole weight and landed weight are treated synonymously for Gulf Spanish mackerel.

*Proposed Management Modifications*

At its August 2023 meeting, the Gulf Council decided to consider modifying the OFL, ABC, and ACL for Gulf Spanish mackerel (Action 1), in MRIP-FES data units, based on the results from SEDAR 81 and the SSC's recommendations. Action 2 considers modifying the fishing closure accountability measure (AM) to account for data uncertainties and the likelihood of exceeding the ACLs proposed in Action 1. During the April 2024 meeting, the Gulf Council requested staff include Action 3 would modify the recreational bag limit for Gulf Spanish mackerel.

## 1.2 Purpose and Need

The purpose is to modify Gulf Spanish mackerel catch limits and management measures based on the results of the SEDAR 81 stock assessment.

The need is to update existing Gulf Spanish mackerel catch limits and management measures based on the best scientific information available for managing Gulf Spanish mackerel and to achieve optimum yield, in accordance with 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. Atlantic cobia is managed by the Atlantic States Marine Fisheries Commission. A history of management for all CMP species can be found in CMP **Amendment 18** (GMFMC and SAFMC 2011), **Amendment 20B** (GMFMC and SAFMC 2014a), and **Framework Amendment 1** (GMFMC and SAFMC 2014b) and are incorporated here by reference. The history of management included in this document focuses on changes to Gulf Spanish mackerel

catch levels. A complete history of management for CMP species can also be found on the Gulf Council website.[2]

A **May 1987 Regulatory Amendment**, with RIR, implemented in June 1987, set a total allowable catch (TAC) for Gulf Spanish mackerel at 2.5 million pounds (mp) with a commercial quota of 1.4 mp and recreational allocation for 1.1 mp.

**Amendment 2,** with an environmental assessment (EA), RIR, and Regulatory Flexibility Analysis (RFA), implemented in July 1987, recognized two migratory groups of Spanish mackerel, established allocations of TAC for the commercial and recreational sectors, and set commercial quotas and recreational bag limits.

A **May 1988 Regulatory Amendment**, with an EA and RIR, implemented in July 1988, set a TAC for Gulf Spanish mackerel at 5.0 mp allocated 43% to recreational sector and 57% to commercial sector.

A **May 1989 Regulatory Amendment**, with an EA and RIR, implemented in July 1989, set the TAC for Gulf Spanish mackerel at 5.25 mp.

A **May 1991 Regulatory Amendment**, with an EA and RIR, implemented in September 1991, increased the Gulf Spanish mackerel TAC to 8.6 mp,

A **May 1996 Regulatory Amendment**, with an EA and RIR, implemented in June 1997, reduced the Gulf Spanish mackerel TAC to 7.0 mp.

A **July 1999 Regulatory Amendment**, with an EA and RIR, implemented in September 1999, increased the TAC for Gulf Spanish mackerel to 9.1 mp.

**Amendment 18**, with an EA, RIR, and RFA, implemented in January 2012, established AMs and a single stock ACL for Gulf Spanish mackerel, thereby removing the previous sector allocation.

**Framework Amendment 1**, with an EA and RIR, implemented in December 2014, updated the ACLs for Gulf and Atlantic Spanish mackerel.

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

# CHAPTER 2. MANAGEMENT ALTERNATIVES

## 2.1 Action 1: Modify the Gulf of Mexico (Gulf) Migratory Group Spanish Mackerel (Gulf Spanish Mackerel) Overfishing Limit (OFL), Acceptable Biological Catch (ABC), and Stock Annual Catch Limit (ACL)

**Alternative 1:** No Action. Retain the current OFL, ABC, and stock ACL for Gulf Spanish mackerel as established in Framework Amendment 1 to the Fishery Management Plan (FMP) for Coastal Migratory Pelagic (CMP) Resources in the Gulf of Mexico and Atlantic Regions (CMP FMP). The Gulf Spanish mackerel total stock ACL is set equal to the ABC.

| Fishing Year | OFL | ABC | Stock ACL |
|---|---|---|---|
| **2016/2017+** | 11.5 | 11.3 | 11.3 |
| **2016/2017+ MRIP-FES equivalent** | 15.2 | 14.9 | 14.9 |

Note: Catch limit values are in million pounds (mp) landed weight (lw). Recreational data are in Marine Recreational Information Program (MRIP) Coastal Household Telephone Survey (CHTS) data units. The catch limits reflect the Scientific and Statistical Committee's (SSC) August 2013 recommendation.

**Preferred Alternative 2:** Modify the OFL and ABC as recommended by the Gulf Council's SSC, for 2025/2026 – 2027/2028 and subsequent fishing years. The stock ACL is set equal to the ABC.

| Fishing Year | OFL | ABC | ACL |
|---|---|---|---|
| **2025/2026 – 2027/2028 +** | 12.074 | 9.630 | 9.630 |

Note: Catch limit values are in mp lw. OFL and ABC as recommended by the Gulf Council's SSC in mp whole weight (ww). The recreational portion of the OFL, ABC, and ACL are based on MRIP-FES data. For management purposes, landed weight and whole weight are treated synonymously.

**Alternative 3:** Modify the OFL and ABC for Gulf Spanish mackerel as recommended by the Council's SSC for 2025/2026 – 2027/2028 and subsequent fishing years. Set the stock ACL using the Gulf Council's ACL/annual catch target (ACT) Control Rule for 2025/2026 – 2027/2028 and subsequent fishing years. This results in a 10% buffer between the ABC and stock ACL.

| Fishing Year | OFL | ABC | ACL |
|---|---|---|---|
| **2025/2026 – 2027/2028 +** | 12.074 | 9.630 | 8.667 |

Note: Catch limit values are in mp lw. OFL and ABC as recommended by the Gulf Council's SSC in mp ww. The recreational portion of the OFL, ABC, and ACL are based on MRIP-FES data. For management purposes, landed weight and whole weight are treated synonymously.

**Discussion:**

The alternatives in this action apply to Gulf Spanish mackerel, which refers to Spanish mackerel landed from the southern border of Texas to the Miami-Dade/Monroe County border on the east coast of Florida. Gulf Spanish mackerel does not have sector allocations. The fishing year is April 1 – March 31. The current OFL, ABC, and ACL were defined in Framework Amendment 1 to the CMP FMP (GMFMC and SAFMC 2014b).

The Southeast Data Assessment and Review (SEDAR) 81 stock assessment (2023) incorporated recreational landings data from MRIP-FES, and indicated that Gulf Spanish mackerel was not overfished or undergoing overfishing. The terminal year of data in the assessment is 2021. The Gulf Council's SSC determined SEDAR 81 to be consistent with the best scientific information available and recommended a constant catch OFL and ABC for the 2025/2026 – 2027/2028 fishing years, in MRIP-FES data units. To account for scientific uncertainty, the ABC is set lower than the OFL as the projected yield at 75% of $F_{SPR30\%}$. This buffer is much greater (i.e., ~20%) than the buffer between the OFL and ABC (i.e., ~2%) in **Alternative 1**. Although the SSC's recommendations only go through the 2027/2028 fishing year, the regulations would remain in effect until modified by a future management action.

**Alternative 1** (No Action) retains the existing OFL, ABC, and ACL, all of which are based on the previous Gulf Spanish mackerel stock assessment (SEDAR 28 2013). The stock ACL is equal to the ABC, as specified in Amendment 18 to the CMP FMP (GMFMC and SAFMC 2011). The OFL, ABC, and stock ACL in **Alternative 1** are based, in part, on MRIP-CHTS recreational landings data. One of the major changes between the SEDAR 28 (2013) and SEDAR 81 (2023) 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 (NMFS) to be consistent with the best scientific information available for Gulf Spanish mackerel. Therefore, retaining the OFL, ABC, and stock ACL under **Alternative 1**, which are based on MRIP-CHTS data, would be inconsistent with National Standard 2 of the Magnuson-Stevens Fishery Conservation and Management Act (2006). This discrepancy has led to a catch equivalency analysis to understand what the OFLs would have been in the previous SEDAR 28 assessment had MRIP-FES data been used. This catch equivalency analysis provides a basis for direct comparison between the new OFLs established in SEDAR 81, which utilizes MRIP-FES data, and the historical OFLs from SEDAR 28 which utilized MRIP-CHTS data, thus ensuring consistent and comparable management advice for Gulf Spanish mackerel. The catch equivalency analysis indicates that, despite recalibrating the SEDAR 28 OFLs using MRIP-FES, the catch limits set out in **Alternative 1** are greater than the more conservative recommendations provided by the SSC from SEDAR 81.

**Preferred Alternative 2** would modify the catch limits for Gulf Spanish mackerel based on the SSC OFL and ABC recommendations from SEDAR 81 and would be set using MRIP-FES landings data. The catch limits in **Preferred Alternative 2** are consistent with the transition to MRIP-FES in the recreational catch and effort data. **Preferred Alternative 2** would substantially reduce the Gulf Spanish mackerel ABC and stock ACL compared to the MRIP-FES estimates in **Alternative 1**. In this alternative, the ABC is set below the OFL to account for scientific uncertainty inherent in the stock assessment. This uncertainty includes, but is not limited to, uncertainty in life history traits, changes in habitat or environmental conditions, and

the precision of catch and effort data. Such uncertainties are not unique to Gulf Spanish mackerel but are common challenges in the assessment of many fish stocks. Recognizing these uncertainties, the reduction in the catch limit serves as a buffer, aiming to ensure the stock's sustainability by mitigating the risk of overfishing that might arise from unforeseen changes or data inaccuracies. While the majority of historic landings were below the stock ACL proposed in **Preferred Alternative 2** (Table 1.1.1), there is an increased probability of landing the stock ACL relative to **Alternative 1 (**No Action**)** assuming current fishing practices and catch rates continue in the coming years.

**Alternative 3**, like **Preferred Alternative 2**, would modify the OFL and ABC based on the SSC's recommendations, and would be set using MRIP-FES landings data. However, **Alternative 3** would use the Gulf Council's ACL/ACT Control Rule (Appendix B) to create a buffer of 10% between the ABC and ACL to account for management uncertainty. The control rule includes a set of criteria evaluating stock status, precision of data, and accountability measures (AM). It weighs these criteria, with scores given for each category, to determine the level of buffer necessary based on data from 2019-2022. **Alternative 3** results in a stock ACL that is approximately one million pounds less than **Preferred Alternative 2**. If harvest rates remain unchanged, total landings are expected to be closer to the stock ACL than that proposed in **Preferred Alternative 2**, therefore the likelihood of an in-season closure is increased (Table 1.1.1).

An analysis predicting the triggering of AMs, which would necessitate a fishing closure if the stock ACLs were reached or projected to be reached under **Preferred Alternative 2** and **Alternative 3**, suggests that the likelihood of a closure is minimal, although not zero (Appendix C). In the last decade, only the landings for fishing year 2019/2020 (in MRIP-FES data units) exceeded the stock ACLs proposed in **Preferred Alternative 2** and **Alternative 3** (Table 1.1.1).

At its February 2024 meeting, the CMP Advisory Panel recommended that the Gulf Council to select **Preferred Alternative 2** and encouraged the Gulf Council to consider options that would prevent a fishery closure. The majority of respondents to the Gulf Council's Fisherman Feedback tool reported negative sentiment and indicated the Gulf Spanish mackerel population is in decline. Some of the responses attributed the decline to increased shark depredation and a reduction in available prey species.

## 2.2 Action 2: Modify Gulf Spanish Mackerel Accountability Measures (AM)

**Alternative 1:** No Action. Retain the current AM, whereby the Regional Administrator will close the fishing season for Gulf Spanish mackerel for the commercial and recreational fishing sectors when the stock ACL is reached or projected to be reached.

**Preferred Alternative 2:** Modify the AM for Gulf Spanish mackerel. If the stock ACL is exceeded in a fishing year, then in the following fishing year, the Regional Administrator will close the fishing season for Gulf Spanish mackerel for the commercial and recreational fishing sectors if the stock ACL is reached or projected to be reached.

**Discussion:**

Amendment 18 to the CMP FMP set an in-season AM for Gulf Spanish mackerel, that if the stock ACL is reached or projected to be reached within a fishing year, the harvest would be subject to an in-season closure for the remainder of the fishing year. The changes to survey methodology for collecting recreational data, including for Gulf Spanish mackerel, may result in increased scientific and management uncertainty compared to previous estimates of precision. The recent stock assessment (SEDAR 81 2023) transitioned the recreational landings data from MRIP-CHTS to MRIP-FES; the latter, while thought to be a more accurate representation of recreational landings, also demonstrates greater, albeit more realistic, estimates of proportional standard error. In August 2023, a pilot study conducted by the NOAA Office of Science and Technology (OST), which administers MRIP, determined there to be discrete sampling bias for both the shore and private vessel modes of recreational harvest (i.e., scientific uncertainty). This bias was generalized in the August 2023 report; however, NOAA OST clarified that the fleet-specific levels of bias also varied by both species and region. These more specific levels of bias have not been made public, and as such, are not explicitly known for Gulf Spanish mackerel at this time. NOAA OST is currently conducting a region-wide (Maine through Mississippi) pilot study throughout 2024 to address some program inadequacies with a report expected in 2026. The pilot study focuses on examine effects of question order and reporting time frame on the program's mail effort survey. In the meantime, the continued use of MRIP-FES for Gulf Spanish mackerel requires an acknowledgement on behalf of resource management that the data inherently contain these issues, which affects both the point estimates of harvest for the recreational modes, and the precision (uncertainty) about those point estimates. Combined with the reduction in ACLs being proposed in Action 1, the ability of NMFS to precisely monitor and apply the current in-season AM (**Alternative 1**) may be more problematic for achieving management objectives for the stock (i.e., management uncertainty). By shifting from an in-season AM to a post-season AM (**Alternative 2**), the reduced precision of the available recreational landings data may be able to be mitigated with respect to social and economic effects, such as those associated with fishery access.

NMFS generated closure projections (Appendix C) by analyzing Gulf Spanish mackerel landings for the last five years. The analysis suggests that in fishing year (2019/2020) when the total landings were greater than the stock ACL included in Action 1 (Table 1.1.1), a closure would

have taken place in November or December. This would have resulted in a fishing season for Gulf Spanish Mackerel of 7 to 8 months (the fishing year runs from April 1 – March 31). Historically, Gulf Spanish mackerel landings have remained below the stock ACL and have been declining (Table 1.1.1). Due to the transition in recreational data to MRIP-FES, the stock ACLs proposed in Action 1 are lower compared to the current ACL, which could increase the probability of an overage if there is an unanticipated increase in landings. Though this instance of an overage and subsequent closure would only have occurred once in the last 10 years, that is not to say that other such instances would be unlikely in the future.

**Alternative 1** (No Action) would retain the current in-season closure AM, which is triggered based on the stock ACL chosen in Action 1. **Alternative 1** requires NMFS to monitor landings every year and implement an in-season closure when the stock ACL is reached or projected to be reached. Based on the most recent 10-year landings, the stock ACL in **Preferred Alternative 2** and **Alternative 3** in Action 1 would have been exceeded only once. During the 2019/2020 fishing year (Table 1.1.1), total landings in (MRIP-FES data units) were estimated at 10,876,806 lb lw. Landings for fishing years 2018/2019 and 2020/2021 were estimated at approximately 7,000,000 lb lw, which is lower than the stock ACL in **Preferred Alternative 2** and **Alternative 3** in Action 1.

**Preferred Alternative 2** would modify the AM to a post-season AM, requiring that NMFS, in the fishing year after the stock ACL was exceeded, monitors, and closes recreational and commercial harvest when the stock ACL is reached or projected to be reached. As a result, there may be no in-season closure for a single overage, providing more continuous fishing opportunity across seasons and resilience to anomalous overages. However, **Preferred Alternative 2** would delay a response to overages and might not address stock overexploitation as promptly as **Alternative 1.** Based on the most recent 10-year landings period, the stock ACLs in the alternatives in Action 1 would have been exceeded once (i.e., fishing year 2019/2020 in Table 1.1.1); yet under **Preferred Alternative 2**, a fishery closure would not have occurred during the following fishing year given that the landings in those subsequent years were below their respective ACLs. In summary, **Preferred Alternative 2** is a less conservative approach to management than **Alternative 1** but may insulate the fishery from unnecessary closures due to irregular landings or decreased precision in season duration projections.

## 2.3 Action 3: Modify Gulf Spanish Mackerel Bag Limits

**Alternative 1:** No Action. Retain the current bag limit of 15 fish per person per day for the recreational sector.

**Alternative 2:** Reduce the bag limit to 10 fish per person per day for the recreational sector.

**Alternative 3:** Reduce the bag limit to 7 fish per person per day for the recreational sector.

**Alternative 4:** Reduce the bag limit to 5 fish per person per day for the recreational sector.

**Alternative 5:** Reduce the bag limit to 3 fish per person per day for the recreational sector.

**Discussion:**

Gulf Spanish mackerel has a recreational bag limit of 15 fish per person per day (**Alternative 1**). Based on recreational landings data from the Texas Parks and Wildlife Department creel survey (TPWD), Louisiana Department of Wildlife and Fisheries creel survey (LA Creel), MRIP, and the Southeast Region Headboat survey (Headboat) from 2021 to 2023, the impact of various reduced bag limits was analyzed (Figure 2.3.1).

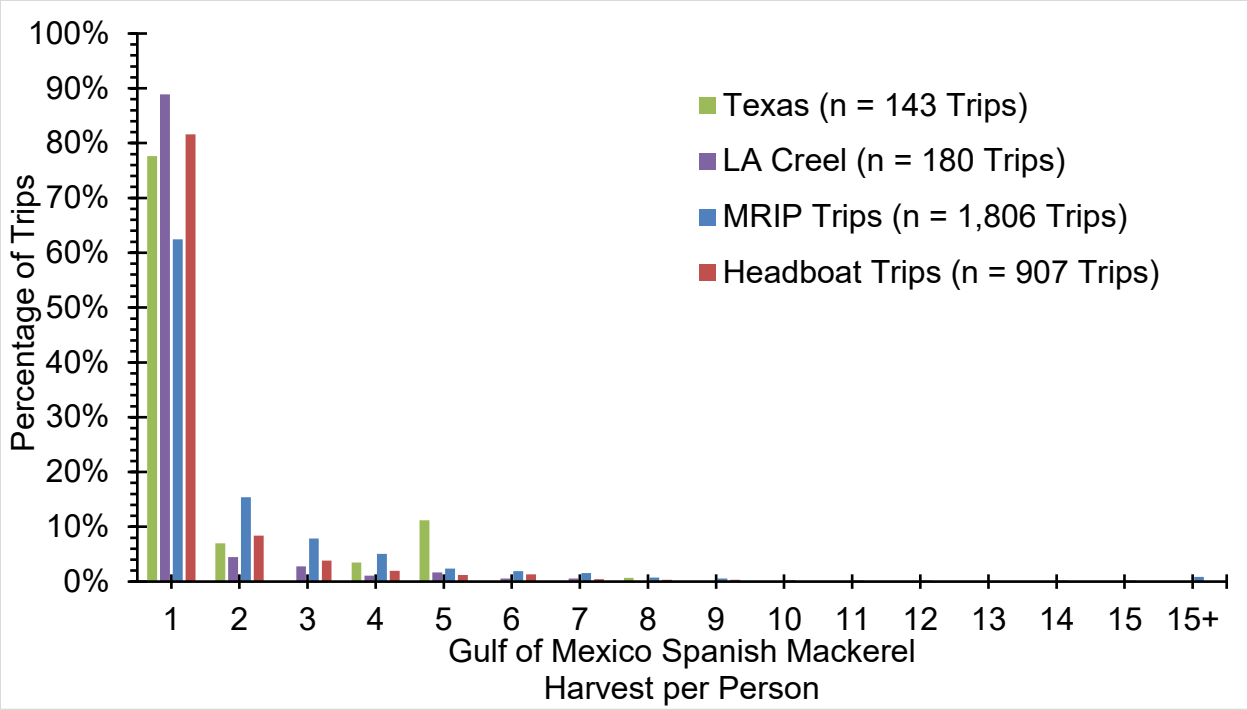


**Figure 2.3.1**. Distribution of Gulf Spanish mackerel recreationally harvested per person by dataset. The data are from 2021 through 2023.

The bag limit analysis estimated the impact on landings from decreasing the bag limit by modifying recent trips that harvested Spanish mackerel in the past 3 years (2021 through 2023).

Trips that harvested less than 15 Spanish mackerel per person or more than 15 Spanish mackerel per person were not modified. Trips that exceeded the bag limit under consideration were reduced to the bag limit under consideration. For example, if a reduced bag limit of 5 Spanish mackerel per person is considered, then trips that harvested 6 to 15 Spanish mackerel per person were reduced to have a harvest of 5 fish per person. Trips that harvested less than the bag limit were not modified. Then, a percent decrease in landings was determined from the following equation:

Percent Decrease = [(Harvest from Unmodified Trips – Harvest from Modified Trips for the Considered Bag Limit) / Harvest from Unmodified Trips] × 100.

**Table 2.3.1**. Percent decrease in Gulf Spanish mackerel recreational landings generated from data from the years 2021 through 2023. The percent decrease estimates were calculated by weighting the decrease in the daily bag limit for each dataset (Appendix D). The weighting was based on the percentage of landings each dataset contributed to the overall landings from 2021 through 2023 (Appendix D).

| Bag Limit | Percent Decrease in Landings |
|---|---|
| 3 Fish per Person | 17% |
| 5 Fish per Person | 7% |
| 7 Fish per Person | 2% |
| 10 Fish per Person | <1% |

The daily bag limit analysis indicates that most anglers do not catch anywhere near the current daily limit of 15 fish per person per day, with the majority catching fewer than 3 fish per trip (Figure 2.3.1). This suggests that only a substantial reduction in the recreational bag limit would make a meaningful difference in the overall harvest. Conversely, reducing bag limits is unlikely to affect the catch results of many anglers because most do not retain the current maximum allowed. Therefore, while substantial reductions in the bag limit could help protect the Spanish mackerel stock and address public concerns about its potential decline, such changes would have minimal impact on the typical angler's catch outcomes. Recently, Gulf Spanish mackerel landings have declined for both the commercial and recreational sector, reducing the recreational bag limit could demonstrate the Council's aim to consider more conservative management measures should the stock rebound to its future levels. However, it is important to recognize that even if most anglers do not typically catch and land the daily bag limit, reduction may still impact their perception of the recreational fishing experience. The potential to catch more fish, even if rarely realized, can be an important aspect of the recreational fishing experience.

Seasonal closures of Spanish mackerel are generally unlikely due to the overall projected landings remaining below the Action 1 catch limits (Appendix C, Table 1). The bag limit

reductions offer protection in a worst-case scenario, ensuring that even in seasons with exceptionally high landings, such as those observed in 2019-2020, closures would be avoided or delayed. However, on average, no closures are expected based on the analysis (Appendix C).

**Table 2.3.2**. Projected closure dates for the Gulf Spanish mackerel fishery based on 2019-2020 landings under different ACL and bag limit alternatives. The fishing year runs from April 1 to March 31. The table shows the impact of various bag limit reductions on delaying the potential closure dates for each ACL alternative. Note that alternative 1 of Action 1 is inconsistent with BSIA, and not a viable alternative. It is included here only for comparison purposes.

| Action 1 Alternatives | ACL | 3 Fish | 5 Fish | 7 Fish | 10 Fish | 15 Fish |
|---|---|---|---|---|---|---|
| **Alternative 1** | 14,900,000 | None | None | None | None | None |
| **Pref. Alternative 2** | 9,630,000 | None | 18-Feb | 23-Dec | 20-Dec | 18-Dec |
| **Alternative 3** | 8,667,000 | 4-Mar | 11-Dec | 29-Nov | 27-Nov | 25-Nov |

**Alternative 1** (No Action) would retain the current bag limit of 15 fish per person per day. This alternative does not introduce any new regulations. However, maintaining the status quo may not adequately address concerns about the perceived health and the long-term sustainability of the Gulf Spanish mackerel stock. Historical data suggest that annual landings have not frequently exceeded the stock ACL, but this alternative does not provide additional safeguards against the increasing likelihood of seasonal closures, considering the reductions in ACL proposed in Action 1.

**Alternative 2** would reduce the bag limit to 10 fish per person per day. This reduction is expected to have a minimal impact on overall landings, with an expected decrease in recreational landings of less than 1% based on recreational landings from 2021 through 2023 as compared to **Alternative 1**.

**Alternative 3** would reduce the bag limit to 7 fish per person per day. While this represents more than a 50% reduction in the bag limit, the analysis estimates a minimal decrease in landings of 2% based on recreational landings from 2021 through 2023. At the April 2024 Gulf Council meeting, some stakeholders expressed support for a reduction to 7 fish, noting a balance between maintaining viability and providing conservation benefits.

**Alternative 4** would reduce the bag limit to 5 fish per person per day. This alternative aims to further reduce landings while maintaining a level that might still be acceptable to a portion of the fishing community. According to the analysis, a daily bag limit of 5 fish per person could reduce landings by approximately 7% overall based on recreational landings from 2021 through 2023. This reduction offers better conservation benefits than higher limits but is less restrictive than the 3-fish option. This alternative could reduce the likelihood of seasonal closures more effectively than higher limits while balancing conservation and fishing interests. However, its overall impact on landings and projected closures is still modest.

**Alternative 5** would reduce the bag limit to 3 fish per person per day. According to the analysis, a daily bag limit of 3 fish per person could reduce landings by approximately 17% overall based on recreational landings from 2021 through 2023. This reduction is expected to have the most substantial impact on reducing total landings, thereby providing the greatest conservation benefit. While this alternative offers strong conservation benefits, it may face resistance from the recreational fishing community due to the optically highly restrictive nature of the limit, as well as the stock assessment not resulting in overfished or overfishing status, potentially impacting the economic and social aspects of the fishery. Although most anglers do not catch more than 3 Spanish mackerel per trip, removing the potential for a larger catch would likely influence them negatively. This reduction could diminish the appeal of fishing trips for some anglers, who might prioritize the opportunity to catch a larger number of fish as part of the recreational experience.

In summary, each alternative presents trade-offs between conservation benefits and stakeholder impacts. **Alternative 5** offers the strongest comparative conservation benefit but may not balance stakeholder preferences and may not allow the ACL to be harvested. **Alternatives 3** and **4** offer a more balanced approach, but, if current catch rates continue, their impacts on overall landings may be minimal. **Alternative 2** offers minimal conservation benefits at current catch rates but could provide some conservation benefit if the stock size and catch rate increase as expected from the reduction in catch limits in Action 1. **Alternative 1** maintains the current regulations and may not effectively address concerns over about a declining stock.

# CHAPTER 3. AFFECTED ENVIRONMENT

## 3.1 Description of the Physical Environment

A description of 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 Fishery Management Plan for the Coastal Migratory Pelagic (CMP) Resources in the Gulf of Mexico and Atlantic Regions (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 $km^2$), 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 Fechhelm 2005). The Gulf includes both temperate and tropical waters (McEachran and Fechhelm 2005). Gulf surface water temperatures range from 54º F to 84º F (12º C to 29º C) depending on time of year and depth of water. Mean annual sea surface temperatures ranged from 73º F through 83º F (23-28º C) including bays and bayous (Figure 3.1.1) between 1982 and 2009, according to satellite-derived measurements.[3] In general, mean sea surface temperature increases from north to south with large seasonal variations in shallow waters.

[3] http://accession.nodc.noaa.gov/0072888

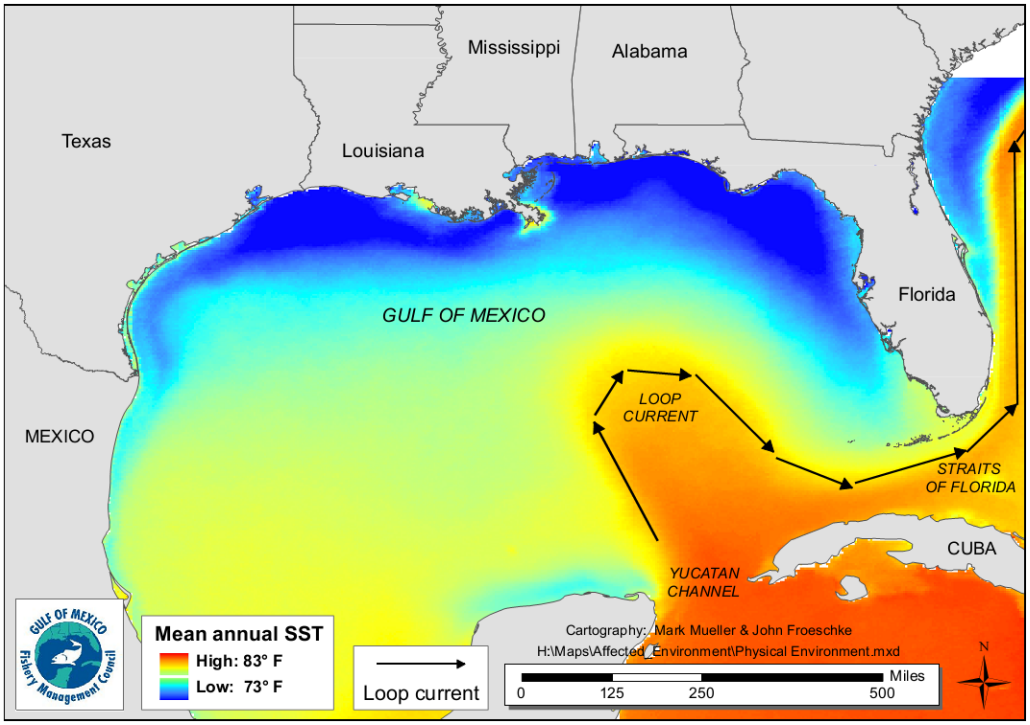


**Figure 3.1.1.** Mean annual sea surface temperature derived from the Advanced Very High-Resolution Radiometer Pathfinder Version 5 sea surface temperature data set.[4]

**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).

[4] http://pathfinder.nodc.noaa.gov

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.[5] 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 fishes, such as Spanish mackerel, can 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 3.1.1 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).

**Table 3.1.1.** 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 $N_2O$ | 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% |

[5] http://gulfhypoxia.net

| Emission source | $CO_2$ | Greenhouse $CH_4$ | Gas $N_2O$ | Total $CO_{2e}$** |
|---|---|---|---|---|
| **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 $CO_2$ equivalent ($CO_{2e}$) emission estimates represent the number of tons of $CO_2$ emissions with the same global warming potential as one ton of another greenhouse gas (e.g., $CH_4$ and $N_2O$). Conversion factors to $CO_{2e}$ are 21 for $CH_4$ and 310 for $N_2O$.

## 3.2 Description of the Biological and Ecological Environment

A description of the biological and ecological environment can be found in 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). Those descriptions are summarized in the following sections and incorporated herein by reference.

### 3.2.1 Gulf Spanish Mackerel Life History and Biology

Spanish mackerel (*Scomberomorus maculatus*) is migratory and moves into specific areas to spawn. It matures by age 2 years and can live up to 12 years. It primarily eats other fish species (herring, sardines, menhaden) and to a lesser extent crustaceans and squid at all life stages (larvae to adult). It is eaten primarily by larger pelagic predators like sharks, tuna, and bottlenose dolphin.

Spanish mackerel occurs throughout the coastal zones of the western Atlantic from southern New England to the Florida Keys and throughout the Gulf (Collette and Russo 1979). Adults usually are found from the low-tide line to the edge of the continental shelf, and along coastal areas. They inhabit estuarine areas (especially higher salinity areas) during seasonal migrations but are considered rare and infrequent in many Gulf estuaries. It may occur in depths up to 225 ft (75 m) but is primarily found in depths of 60 ft (20 m) or less.

Spawning occurs along the inner continental shelf from April to September. Eggs and larvae are most frequently found offshore over the inner continental shelf at temperatures between 68°F (20°C) and 89.6°F (32°C) and salinities between 28 and 37 ppt. Eggs and larvae are found frequently in water depths from 27 ft (9 m) to 252 ft (84 m) but are most common in <150 ft (50 m).

Juveniles are most often found in coastal and estuarine habitats and at temperatures greater than 77°F (25°C) and salinities greater than 10 ppt. Although they occur in waters of varying salinity, juveniles appear to prefer marine salinity levels and generally are not considered estuarine-dependent. Adult Spanish mackerel are migratory, generally moving from wintering areas of south Florida and Mexico to more northern latitudes in spring and summer (Powell 1975).

The Gulf Spanish mackerel stock biomass was estimated at 62,538,455.54 lb in 2011, according to a 2013 assessment (SEDAR 28). While the most recent total biomass estimate of Gulf Spanish mackerel was 35,966,170.68 lb in 2021 (SEDAR 81, 2023), the average biomass of the stock between 1995 and 2021 was 28,651,241.52 lb, with a minimum of 17,623,732.28 lb in 1995.

**Bycatch**

Details of previous bycatch estimates in the Spanish mackerel portion of the CMP fishery can be found in Appendix F (Bycatch Practicability Analysis) of Amendment 26 to the CMP FMP (GMFMC 2016) and is hereby incorporated by reference and summarized below.

Most Spanish mackerel are harvested using hook-and-line gear. Discards in the commercial sector are relatively low (less than 1%) for Spanish mackerel, including the gillnet component, while discards in the recreational charter (26%), and headboat (9%) are higher, with recreational private discards (47%) being much higher. Due to how the fishery is prosecuted for this species, little bycatch of other finfish species occurs.

For Spanish mackerel, SEDAR 28 (2013) used the following discard mortality rate of 10% 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%. There is no evidence that the Gulf Spanish mackerel portion of the CMP fishery is adversely affecting seabirds or marine mammals.

### 3.2.2 General Information

**Protected Resources**

The National Marine Fisheries Service (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.[6] 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.

Six of the marine mammals (sperm, sei, fin, blue, North Atlantic right whale, and Rice's[7]) protected under the MMPA are also listed as endangered under the ESA and may occur in the Gulf. 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.

[6] https://www.fisheries.noaa.gov/about/office-protected-resources

[7] 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).

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 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.[8] In a memorandum dated July 8, 2019, NMFS 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 Spanish mackerel for food, and they are not generally caught by fishermen harvesting Spanish mackerel. The primary gear in the Gulf CMP fishery used to harvest Spanish mackerel is hook-and-line. This gear is classified in the 2024 Marine Mammal Protection Act List of Fisheries as a Category III fishery (89 FR 12257), 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 a 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 Spanish mackerel portion of the CMP fishery as a whole is adversely affecting seabirds.

### *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

[8] 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.

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 in 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.[9]

**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).[10] 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 Portal[11] predicts the average sea surface temperature in the Gulf and South Atlantic will increase by 2-4ºF (1–3ºC) 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;

[9] https://www.fisheries.noaa.gov/news/deepwater-horizon-10-years-later-10-questions
[10] http://www.ipcc.ch/
[11] https://www.esrl.noaa.gov/psd/ipcc/

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.

## 3.3 Description of the Economic Environment

This action would affect both commercial and recreational harvest within CMP fishery. The CMP fishery is composed of three stocks, and each stock has two migratory groups. The Gulf king mackerel, Gulf Spanish mackerel and Gulf cobia migratory groups are managed by the Gulf of Mexico Fishery Management Council (Gulf Council). Atlantic king mackerel and Atlantic Spanish mackerel are managed by the South Atlantic Fishery Management Council. Atlantic cobia is managed by the Atlantic States Marine Fisheries Commission (ASMFC). This action pertains only to the harvest of Gulf Spanish mackerel, so its focus is on Gulf Spanish mackerel. For more information on Gulf cobia or Gulf king mackerel, see the Gulf States Marine Fisheries Commission report (March 2019), CMP Amendment 32 (GMFMC and SAFMC 2022), and CMP Framework Amendment 11 (GMFMC 2022), which are incorporated by reference. For information on the Atlantic migratory groups, see ASFMC (November 8, 2022), CMP 34 (SAFMC 2022), and CMP 27 (SAFMC 2021).

Gulf Spanish mackerel is managed without allocations between the commercial and recreational sectors. The fishing year runs from April 1 to March 31 for both sectors. Since the 2016/2017 fishing year, the stock annual catch limit (ACL) for Gulf Spanish mackerel has been 11,300,000 lb lw, and landings have not exceeded 37.5% of that ACL since that fishing year. Consequently, there have been no actions to reduce commercial and/or recreational harvest because of combined landings reaching or projecting to reach the stock ACL. If there were an overage or projected overage of landings, as estimated by the Science and Research Director, the Assistant Administrator would file a notification with the Office of the Federal Register to close the commercial and recreational sectors for the remainder of the fishing year. On and after the effective date of such a notification, the harvest, possession and sale of Gulf Spanish mackerel is prohibited. Gulf Spanish mackerel must be landed with heads and fins intact in both the commercial and recreational sectors; however, damaged Gulf Spanish mackerel can be landed by the commercial sector when damaged by natural predation.

The following description of the relevant economic environment includes both the commercial and recreational sectors as they pertain to fishing for Gulf Spanish mackerel. Note that all dollar figures in this section are in 2022 dollars.

### 3.3.1 Commercial Sector

Any fishing vessel that harvests Spanish mackerel in the exclusive economic zone (EEZ) off the Gulf or Atlantic in excess of the recreational bag limit and sells that harvest must have a valid

federal commercial Spanish mackerel (SM) permit on board.[12] The SM permit is an open-access permit. From 2018 through 2022, the number of commercial vessels with homeports in the Gulf and with a valid SM permit ranged from 922 to 1,052 (Table 3.3.1).[13] A substantial number of SM-permitted vessels do not report landings of Gulf Spanish mackerel in any given year. An annual average of approximately 87% of vessels with a valid Spanish mackerel permit and homeported in the Gulf (Alabama, West Florida, Louisiana, Mississippi and Texas) did not report landings of Gulf Spanish mackerel during the 5-year period.

**Table 3.3.1.** Number of valid SM-permitted vessels with a homeport in the Gulf, number of those vessels that reported Gulf Spanish mackerel landings, and percentage of valid SM-permitted vessels that reported Gulf Spanish mackerel landings, 2018 – 2022.

| Year | SM Permitted Vessels with Homeports in Gulf Region | SM Permitted Vessels with Gulf SM Landings | Percentage SM Permitted Vessels with SM Landings |
|---|---|---|---|
| 2018 | 1,052 | 157 | 14.92% |
| 2019 | 1,016 | 141 | 13.88% |
| 2020 | 953 | 156 | 16.37% |
| 2021 | 922 | 114 | 12.36% |
| 2022 | 985 | 83 | 8.43% |
| **Average** | **986** | **130** | **13.19%** |

Source: J. Dudley, NMFS SERO, pers. comm. October 2023, for number of permitted vessels and Southeast Fisheries Science Center (SEFSC) Socioeconomic Panel (July 23) accessed by the SEFSC Economic Query System (November 2023) for permitted vessels with reported landings.

From 2018 through 2022, Gulf Spanish mackerel landings represented, on average, 2.56% of SM-permitted vessels' total annual landings by weight and 1.30% by value (Tables 3.3.2 and 3.3.3). The average price per pound over the 5-year period was $1.58; however, it ranged annually from $1.39 to $2.36. The average SM-permitted vessel with Gulf Spanish mackerel landings had annual total revenue of $65,335. None of the vessels had annual revenue from all landings reaching or exceeding $11 million, which is the small business size standard for businesses operating primarily in the commercial fishing industry. Note that over the 5-year period all reported harvest of Gulf Spanish mackerel by SM-permitted vessels was landed in a Gulf state.

**Table 3.3.2.** Reported landings pounds (lb) gutted weight (gw) of Gulf Spanish mackerel, jointly caught species and other species by SM-permitted vessels that reported landings of Gulf SM, and percentage of their total landings from Gulf SM, 2018 – 2022.

| Year | Landings of SM (lb gw) | Landings of Jointly Caught Species (lb gw) | Landings of Other Species (lb gw) | Total Landings (lb gw) | Percentage of Total Landings from SM |
|---|---|---|---|---|---|
| 2018 | 67,643 | 488,163 | 2,479,109 | 3,034,915 | 2.23% |

[12] The captain/crew of a for-hire fishing vessel with a valid charter/headboat permit for king or Spanish mackerel can sell a bag limit quantity of king or Spanish mackerel, respectively.
[13] Valid permits for at least one day during the calendar year.

| | | | | | | |
|---|---|---|---|---|---|---|
| 2019 | 65,053 | 453,941 | 3,046,503 | 3,565,497 | 1.82% |
| 2020 | 98,614 | 417,425 | 2,459,446 | 2,975,485 | 3.31% |
| 2021 | 66,630 | 243,849 | 1,633,312 | 1,943,791 | 3.43% |
| 2022 | 32,323 | 125,229 | 1,440,296 | 1,597,848 | 2.02% |
| **Average** | **66,053** | **345,721** | **2,211,733** | **2,623,507** | **2.56%** |

Source: SEFSC Socioeconomic Panel (Jul 2023) accessed by the SEFSC Economic Query System (Oct 2023), and U.S. Bureau of Economic Analysis (BEA) Gross Domestic Product (GDP) Implicit Price Deflator (issued October 26, 2023).

**Table 3.3.3**. Ex-vessel revenue from landings of Gulf Spanish mackerel, jointly caught species and other species landed by SM-permitted vessels that reported landings of Gulf SM, and percentage of total annual ex-vessel revenue from Gulf SM landings, 2018 – 2022.

| Year | Revenue from SM | Revenue from Jointly Caught Species | Revenue from Other Species | Total Revenue | Percentage of Total Revenue from SM | Average Total Revenue per Vessel |
|---|---|---|---|---|---|---|
| 2018 | $101,352 | $1,340,990 | $8,405,390 | $9,847,731 | 1.03% | $62,724 |
| 2019 | $97,668 | $1,375,711 | $9,607,938 | $11,081,317 | 0.88% | $78,590 |
| 2020 | $136,769 | $1,113,706 | $8,833,823 | $10,084,298 | 1.36% | $64,642 |
| 2021 | $111,246 | $666,889 | $5,903,629 | $6,681,763 | 1.66% | $58,611 |
| 2022 | $76,238 | $316,320 | $4,445,518 | $4,838,076 | 1.58% | $58,290 |
| **Average** | **$104,655** | **$962,723** | **$7,439,259** | **$8,506,637** | **1.30%** | **$65,335** |

Source: SEFSC Socioeconomic Panel (Sep 2023) accessed by the SEFSC Economic Query System (Nov 2023), and BEA GDP Implicit Price Deflator (issued Oct. 26, 2023).

Trips with Gulf Spanish mackerel landings represented, on average, about 21.19% of all annual trips made by the SM-permitted vessels that reported Gulf Spanish mackerel landings from 2018 through 2022. The average Gulf SM trip landed 136 lb gw of Gulf Spanish mackerel, and the average SM-permitted vessel with reported Gulf SM landings harvested 499 lb ww of it annually (Table 3.3.4). Note that there is no commercial trip limit for Gulf Spanish mackerel.

**Table 3.3.4**. Annual Gulf SM trips and other trips by SM-permitted vessels, percentage of total trips with SM landings, average SM landings per trip, and average annual SM landings per SM-permitted vessel, 2018 – 2022.

| Year | Gulf SM Trips | Other Trips | Total Trips | Percentage SM trips | Average Gulf SM Landings per SM Trip (lb gw) | Average Annual Gulf SM Landings per Vessel |
|---|---|---|---|---|---|---|
| 2018 | 573 | 2,245 | 2,818 | 20.33% | 118 | 430 |
| 2019 | 702 | 2,239 | 2,941 | 23.87% | 92 | 461 |
| 2020 | 641 | 1,979 | 2,620 | 24.47% | 153 | 632 |
| 2021 | 478 | 1,648 | 2,126 | 22.48% | 139 | 584 |
| 2022 | 183 | 1,055 | 1,238 | 14.78% | 176 | 389 |
| **Average** | **515** | **1,833** | **2,349** | **21.19%** | **136** | **499** |

Source: SEFSC Socioeconomic Panel (Jul 2023) accessed by the SEFSC Economic Query System (Oct 2023).

The largest percentage of Gulf Spanish mackerel landed by SM-permitted vessels are harvested with gillnet, followed in turn by hand hook-and-line (H & L), trolling hook and line and other gear types (Table 3.3.5).[14] The average gillnet trip landed more Gulf Spanish mackerel than other gear types (Table 3.3.6); however, H & L gear were used more often (Table 3.3.7).

**Table 3.3.5**. Annual Gulf SM landings (lb gw) reported by SM-permitted vessels by gear, 2018 – 2022.

| Year | Gillnet | Hand H&L | H&L Troll | All Other | Total | Percent Gillnet | Percent Hand H&L | Percent H&L Troll | Percent All Other |
|---|---|---|---|---|---|---|---|---|---|
| 2018 | 25,143 | 19,861 | 21,406 | 1,232 | 67,642 | 37.17% | 29.36% | 31.65% | 1.82% |
| 2019 | 28,715 | 21,125 | 14,366 | 848 | 65,054 | 44.14% | 32.47% | 22.08% | 1.30% |
| 2020 | 70,008 | 16,515 | 10,736 | 1,355 | 98,614 | 70.99% | 16.75% | 10.89% | 1.37% |
| 2021 | 52,053 | 8,667 | 5,568 | 342 | 66,630 | 78.12% | 13.01% | 8.36% | 0.51% |
| 2022 | 19,519 | 8,154 | 4,192 | 457 | 32,322 | 60.39% | 25.23% | 12.97% | 1.41% |
| **Average** | **39,088** | **14,864** | **11,254** | **847** | **66,052** | **58.16%** | **23.36%** | **17.19%** | **1.29%** |

Source: SEFSC Socioeconomic Panel (Jul 2023) accessed by the SEFSC Economic Query System (Oct 2023).

**Table 3.3.6**. Average Gulf SM landings (lb gw) per trip by gear, 2018 – 2022.

| Year | Gillnet | Hand H&L | H&L Troll | All Gears |
|---|---|---|---|---|
| 2018 | 645 | 71 | 97 | 118 |
| 2019 | 532 | 59 | 59 | 93 |
| 2020 | 1,000 | 52 | 50 | 154 |
| 2021 | 777 | 40 | 32 | 139 |
| 2022 | 2,788 | 79 | 70 | 177 |

[14] The minimum allowable mesh size for a gillnet used to fish for Gulf Spanish mackerel is 3.5 inches stretched mesh (https://www.ecfr.gov/current/title-50/chapter-VI/part-622/subpart-Q/section-622.377). A vessel on a trip with a gillnet on board with a mesh size less than 3.5 inches (8.9 cm) stretched mesh cannot possess on that trip any Spanish mackerel.

| | | | | |
|---|---|---|---|---|
| **Average** | **1,148** | **60** | **62** | **128** |

Source: SEFSC Socioeconomic Panel (July 2023) accessed by the SEFSC Economic Query System (October 2023).

**Table 3.3.7**. Trips with Gulf SM landings by gear, 2018 – 2022.

| Year | Gillnet | Hand H&L | H&L Troll | All Other | Total | Percent H & L |
|---|---|---|---|---|---|---|
| 2018 | 39 | 278 | 221 | 35 | 573 | 87.09% |
| 2019 | 54 | 359 | 244 | 45 | 702 | 85.90% |
| 2020 | 70 | 315 | 215 | 41 | 641 | 82.68% |
| 2021 | 67 | 215 | 173 | 23 | 478 | 81.17% |
| 2022 | 7 | 103 | 60 | 13 | 183 | 89.07% |
| **Average** | **47** | **254** | **183** | **31** | **515** | 85.18% |

Source: SEFSC Socioeconomic Panel (Jul 2023) accessed by the SEFSC Economic Query System (Oct 2023).

Overstreet et al. (2019) provide annual vessel-level estimates of costs (as a percentage of revenue) and net revenue from operations for federally permitted vessels that harvested Spanish mackerel in the Gulf from 2014 through 2016 (Table 3.3.8); however, these cost estimates, although representing the best available scientific information, exhibit significant uncertainty because of small sample size and instability of federally permitted vessels that report landings of Gulf Spanish mackerel on a year to year basis. Therefore, the estimates in the table illustrate how the estimates of average annual net cash flow, producer surplus (PS), net revenue from operations, and economic return on asset value are generated for federally permitted vessels that harvested Gulf Spanish mackerel from 2014 through 2016. PS is annual gross revenue minus the annual costs for fuel, other supplies, hired crew, and the opportunity cost of an owner's time as captain. Net Cash Flow is annual gross revenue minus the annual costs for fuel, other supplies, hired crew, vessel repair and maintenance, insurance, overhead, loan payments, and individual fishing quota (IFQ) purchase. 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. Economic return on asset value is calculated by dividing the mean Net Revenue from Operations by the mean Vessel Value.[15]

[15] Practically, this return is shared between owners of vessel capital and IFQ shares. By purposefully ignoring the IFQ shareholder distribution, the focus is on the real productive capacity of the commercial fishing sector. All IFQ transactions are zero-sum in that they transfer wealth. The catch share management structure allows for the realization of resource rents that will, in all likelihood, accrue to the IFQ shareholders.

**Table 3.3.8**. Average annual cost, producer surplus, net cash flow and other estimates as percentages of total revenue for SM-permitted vessels that harvested Gulf Spanish mackerel, 2014 – 2016.

| Category | Cost Category | Percentage of revenue for federally permitted vessels with Gulf Spanish mackerel landings, 2014 –2016 |
|---|---|---|
| A | Fuel | 11.4% |
| B | Other Supplies (Bait, Ice, Groceries, Miscellaneous) | 11.2% |
| C | Hired Crew | 22.5% |
| D | Vessel Repair & Maintenance | 10.7% |
| E | Insurance | 1.0% |
| F | Overhead | 6.5% |
| G | Opportunity Cost of Owner-Captain Time | 10.2% |
| H | Loan Payment | 1.0% |
| I | IFQ Purchase | 4.1% |
| J | Sum of A, B, C, D and G | 66.0% |
| K | Sum of A, B, C, D, E, F, H and I | 68.4% |
| | **Producer Surplus (100% less J)** | **34.0%** |
| | **Net Cash Flow (100% less K)** | **31.6%** |
| L | Vessel Depreciation | 3.8% |
| M | Sum of A, B, C, D, E, F, G, I and L | 77.3% |
| | **Net Revenue for Operations (100% less M)** | **22.8%** |
| | **Economic Return on Asset Value** | **31.1%** |

Source: Overstreet et al. (2019).

PS for commercial vessels that harvested Spanish mackerel in the Gulf was estimated to be 34% of their annual gross revenue. Net revenue from operations was 22.8% of their average annual gross revenue during this period. Applying these percentages to the average annual total revenue per SM-permitted vessel that reported Gulf Spanish mackerel landings ($65,335 as shown in Table 3.3.3) would result in an estimated per vessel average annual PS of $22,214 and an average annual net revenue from operations of $14,896 per year.[16]

[16] Estimations of the full economic value of the commercial sector requires an assessment of multiple segments within the supply chain: from commercial fishers to dealer/processors, from dealers/processors to wholesalers and distributors, from wholesalers and distributers to retailers/grocers and restaurants, and from retailers/grocers and restaurants to consumers. First, there is the producer surplus of harvesters, which is described above, but that is followed by the producer surplus of dealers/processors, wholesalers, distributers, retailers/grocers and restaurants. Second, there is the consumer surplus of those who purchase Gulf Spanish mackerel to consume at their table (home and restaurant). Estimates of producer surplus of the non-harvesting segments of the supply chain and consumer surplus at the retail/restaurant level are not available.

**Imports**

Most of the seafood consumed in the U.S. is imported. In 2020, the U.S. imported 6.1 billion pounds of seafood products, valued at $21.4 billion (NOAA 2021).[17] The overall balance of trade in edible seafood products in 2020 was a deficit of $17.0 billion, essentially holding steady.

Import data for Spanish mackerel are not available; however, there are import data for mackerel. From 2018 through 2022, the Gulf Region imported, on average, almost 225 times as much mackerel than it exported out of the country by weight (NMFS Foreign Fishery Trade data). Imported seafood affects the ex-vessel prices that commercial fishermen receive for their landings and tend to set the price in domestic markets where imports dominate. Additional information on U.S. seafood trade can be found in NMFS (2022) or on imports of seafood products can be found in Ferreira et al. (2022) and are incorporated by reference.

**Associated Economic Impacts/Market Activity**

Estimations of the economic impacts of commercial fishing for Gulf Spanish mackerel requires an assessment of associated expenditures at multiple segments within the supply chain: from commercial Gulf Spanish mackerel fishers to dealers/processors, from dealers/processors to wholesalers and distributors, from wholesalers and distributers to grocers and restaurants, and from grocers and restaurants to consumers. As Gulf Spanish mackerel moves along the supply chain, its associated expenditures directly and indirectly generate jobs, sales, income, and value added.

From 2018 through 2022, SM-permitted vessels that reported Gulf Spanish mackerel landings collectively received $104,655 annually, on average, from the sales of their combined landings. In turn, those sold landings had associated expenditures along the supply chain as briefly explained above and generated economic impacts. Table 3.3.9 shows the economic impacts to the nation from commercial landings of Gulf Spanish mackerel.

[17] See NOAA's Fisheries of the United States 2020. Available at https://media.fisheries.noaa.gov/2022-05/Fisheries-of-the-United-States-2020-Report-FINAL.pdf.

**Table 3.3.9**. Average annual market activity/economic impacts associated with annual commercial landings of Gulf Spanish mackerel, 2018 – 2022.

| | |
|---|---|
| **Harvesters** | |
| Employment impacts (jobs) | 2,617 |
| Income impacts | $88,415 |
| Total value added impacts | $138,613 |
| Output impacts | $277,168 |
| **Primary dealers/processors** | |
| Employment impacts (jobs) | 885 |
| Income impacts | $51,497 |
| Total value added impacts | $71,587 |
| Output impacts | $163,175 |
| **Secondary wholesalers/distributors** | |
| Employment impacts (jobs) | 430 |
| Income impacts | $25,801 |
| Total value added impacts | $36,918 |
| Output impacts | $78,517 |
| **Grocers** | |
| Employment impacts (jobs) | 1,123 |
| Income impacts | $41,440 |
| Total value added impacts | $55,378 |
| Output impacts | $95,952 |
| **Restaurants** | |
| Employment impacts (jobs) | 6,443 |
| Income impacts | $170,032 |
| Total value added impacts | $233,210 |
| Output impacts | $426,137 |
| **Harvesters and Seafood Industry** | |
| Employment impacts (jobs) | 11,497 |
| Income impacts | $377,184 |
| Total value added impacts | $535,705 |
| Output impacts | $1,040,949 |

Source: Estimates of economic impacts calculated by NMFS SERO using model developed for NMFS (May 2023 version).

### 3.3.2 Recreational Sector

The recreational sector is composed of anglers (recreational fishers) and for-hire fishing vessels that take anglers off shore. Anglers who fish in the Gulf EEZ for any stock are not required to have a federal permit; however, they must have either an up-to-date state fishing license or be

enrolled in the National Saltwater Angler Registry, subject to appropriate exemptions.[18] As such, there is insufficient information to identify the number of anglers who target or catch Gulf Spanish mackerel.

Any for-hire fishing vessel that takes anglers into the Gulf EEZ to harvest CMP must have a valid limited-access (federal) charter/headboat permit for CMP issued to that vessel and the permit must be onboard. From 2018 through 2022, there were an annual average of 1,209 vessels with a valid charter/headboat permit for CMP (J. Dudley, NMFS SERO, pers. comm. 2023) (Table 3.3.10). As of September 26, 2023, there were 1,256 vessels with a valid or renewable charter/headboat permit for CMP.

**Table. 3.3.10**. For-hire fishing vessels homeported in the Gulf with a valid charter/headboat permit for CMP, 2018 – 2022.

| Year | AL | WFL | LA | MS | TX | Total |
|---|---|---|---|---|---|---|
| 2018 | 139 | 787 | 109 | 30 | 196 | 1,261 |
| 2019 | 147 | 790 | 106 | 29 | 186 | 1,258 |
| 2020 | 151 | 801 | 104 | 24 | 188 | 1,268 |
| 2021 | 127 | 627 | 82 | 19 | 145 | 1,000 |
| 2022 | 167 | 803 | 91 | 20 | 179 | 1,260 |
| **Average** | **146** | **762** | **98** | **24** | **179** | **1,209** |

Source: J. Dudley, NMFS SERO, pers. comm. October 2023.

The above standard charter/headboat permit for CMP is issued to a vessel, whereas the historical captain permit for CMP was issued to a person. In 2018, several stakeholders expressed concerns about the limitations of historical captain permits. They noted that the inability to transfer the permit and the requirement that the captain must be present on the vessel are impediments to the continued operation of the historical captain's business and are not necessary to meet conservation and management objectives of the reef fish and CMP fisheries. In response, the Gulf Council took action to provide eligible historical captains with an opportunity to voluntarily convert historical captain permits into standard for-hire permits. To allow for an orderly conversion of historical captain permits into standard for-hire permits, eligible permit owners had two years from May 21, 2020, to replace eligible historical captain permits with standard for-hire permits and associate the newly issued standard for-hire permits with a vessel. A total of 31 historical captain permits for CMP were eligible for conversion to the standard permit, and as of March 8, 2022, all eligible historical captain permits for CMP had been converted into standard for-hire permits for CMP (K. McIntosh, NMFS-SERO, pers. comm. March 2022).

Although the charter/headboat 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

[18] An angler with a saltwater recreational fishing license or registration from any state or U.S. territory, except Hawaii, Puerto Rico, or the U.S. Virgin Islands, is automatically registered and does not need to take further action.

are required to submit harvest and effort information directly to the Southeast Regional Headboat Survey (SRHS), and participation in the SRHS is based on determination by the SEFSC that the vessel primarily operates as a headboat. As of November 1, 2023, there are 67 Gulf headboats registered in the SRHS (K. Brennan, NMFS SEFSC, pers. comm. 2023). The majority of these headboats are located in Florida (40), followed by Texas (17), Alabama (7), and Mississippi/Louisiana (3).

All owners or operators of vessels issued Gulf federal charter/headboat permits have been required to comply with the new Southeast For-Hire Electronic Reporting Program since January 5, 2021. Under the new program, the owners or operators 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.

From 2018 through 2022, an annual average of about 7.07 mp of Gulf Spanish mackerel were landed by anglers on shore, private/leased vessels, charter vessels and headboats (Table 3.3.11). Anglers in Alabama and West Florida, combined, accounted for, on average, 98.2% Gulf Spanish mackerel recreational landings during that time. In turn, they were followed by anglers in Mississippi, Louisiana and Texas who harvested Gulf Spanish mackerel.[19]

**Table. 3.3.11**. Gulf Spanish mackerel in lb whole weight recreationally harvested (AB1) from Gulf EEZ by state/area, 2018 – 2022.

| Year | AL | WFL | LA | MS | TX | Total |
|---|---|---|---|---|---|---|
| 2018 | 1,333,523 | 3,997,156 | 17,594 | 301,408 | 14,398 | 5,664,079 |
| 2019 | 3,692,679 | 6,963,687 | 24,014 | 51,803 | 5,335 | 10,737,517 |
| 2020 | 805,547 | 5,322,454 | 19,263 | 50,087 | 2,904 | 6,200,255 |
| 2021 | 907,651 | 5,873,320 | 10,978 | 26,942 | 825 | 6,819,716 |
| 2022 | 1,026,299 | 4,894,020 | 7,574 | 14,776 | 1,862 | 5,944,529 |
| **Average** | **1,553,140** | **5,410,127** | **15,885** | **89,003** | **5,065** | **7,073,219** |

Source: M. Larkin, NMFS SERO LAPP, pers. com. November 2023.

Recreational fishing effort is described as the number of fishing trips. The number of angler trips that catch Gulf Spanish mackerel is one indicator of recreational effort, while the number of angler trips that target Gulf Spanish mackerel is another. From 2018 through 2022, an annual average of about 3.06 million angler trips targeted Gulf Spanish mackerel as the primary or secondary target (Table 3.3.12).[20] Most of these trips were by anglers in West Florida, where approximately 81.5% of the angler trips that targeted Spanish mackerel were made (Table 3.3.13).

[19] There is a recreational bag limit of 15 fish (Gulf Spanish mackerel) per person per day, and Gulf Spanish mackerel must be landed with heads and fins intact. The minimum size limit is 12 inches fork length, and there is no maximum size limit.

[20] Recreational fishing effort for Gulf Spanish mackerel is greater than for Gulf king mackerel or Gulf cobia as evidenced by it being more often the primary or secondary target of a Gulf angler trip. For example, in West Florida from 2018 through 2022, more angler trips (all areas and charter, private/leased and shore modes) targeted Gulf Spanish mackerel than angler trips targeting Gulf king mackerel or Gulf cobia.

**Table. 3.3.12**. Angler trips that targeted Gulf Spanish mackerel by mode, 2018 – 2022.

| Year | Private/Leased | Charter | Shore | Total |
|---|---|---|---|---|
| 2018 | 234,104 | 44,012 | 2,635,736 | 2,913,852 |
| 2019 | 254,844 | 31,814 | 3,259,525 | 3,546,183 |
| 2020 | 288,780 | 21,137 | 2,642,295 | 2,952,212 |
| 2021 | 514,088 | 25,563 | 1,905,029 | 2,444,680 |
| 2022 | 408,848 | 45,729 | 2,990,618 | 3,445,195 |
| **Average** | **340,133** | **33,651** | **2,686,641** | **3,060,425** |

Source: M. Larkin, NMFS SERO LAPP, pers. com. November 2023.

**Table. 3.3.13**. Angler trips that targeted Gulf Spanish mackerel by state, 2018 – 2022.

| Year | AL | WFL | MS | LA & TX | Total | Percentage WFL |
|---|---|---|---|---|---|---|
| 2018 | 749,242 | 2,133,878 | 29,987 | 746 | 2,913,853 | 73.23% |
| 2019 | 752,077 | 2,792,047 | 1,967 | 92 | 3,546,183 | 78.73% |
| 2020 | 252,897 | 2,695,114 | 4,119 | 82 | 2,952,212 | 91.29% |
| 2021 | 465,559 | 1,978,776 | 190 | 154 | 2,444,679 | 80.94% |
| 2022 | 577,469 | 2,864,480 | 3,197 | 49 | 3,445,195 | 83.14% |
| **Average** | **559,449** | **2,492,859** | **7,892** | **225** | **3,060,425** | **81.47%** |

Source: M. Larkin, NMFS SERO LAPP, pers. com. November 2023.

The money spent on the above angler trips that target Gulf Spanish mackerel generate economic impacts to the nation, such as jobs and income.[21] From 2018 through 2022, an annual average of about 3.06 million trips targeted Spanish mackerel and generated 2,581 jobs, $142.6 million in income impacts, $249.9 million in value-added impacts, and $432.0 million in sales impacts (Table 3.3.14).

**Table. 3.3.14**. Estimates of average annual economic impacts of angler trips that target Gulf Spanish mackerel, 2018 – 2022.

| Mode | Trips | Value Added (thousands) | Sales Impacts (thousands) | Income Impacts (thousands) | Jobs |
|---|---|---|---|---|---|
| Charter | 33,651 | $17,875 | $31,386 | $10,454 | 218 |
| Private/Rental | 340,340 | $25,098 | $44,212 | $13,872 | 230 |
| Shore | 2,686,434 | $206,894 | $356,360 | $118,312 | 2,132 |
| **Total** | **3,060,425** | **$249,867** | **$431,958** | **$142,639** | **2,581** |

Source: Estimates of economic impacts calculated by NMFS Southeast Regional Office (SERO) using model developed for NMFS (2023).

[21] Because SRHS data do not identify species that are targeted during a trip, the economic impacts of headboat trips that may target Council-managed species cannot be estimated. The multipliers used to estimate the economic impacts generated by target trips vary by mode (shore, private/leased, charter).

The headboat data does not contain information collected at the angler level, nor does it collect target intent information; however, recreational fishing effort of headboats is estimated in terms of angler days. Data on effort are provided as number of anglers on a given headboat trip. The numbers of anglers are standardized, depending on the type of trip (length in hours), by converting number of anglers to "angler days" (e.g., 30 anglers on a half-day trip would yield 15 angler days, while 30 anglers on a full-day trip would yield 30 angler days). From 2018 through 2022, there was an average annual total of 402,679 angler days in the Gulf (Table 3.3. 15).

**Table. 3.3.15**. Total angler days of Gulf headboats, 2018 – 2022.

| Year | TX | LA & MS | AL | FLW | Total |
|---|---|---|---|---|---|
| 2018 | 52,160 | 3,235 | 19,851 | 346,980 | 422,226 |
| 2019 | 52,456 | 2,632 | 18,607 | 343,901 | 417,596 |
| 2020 | 51,498 | 1,728 | 13,091 | 259,033 | 325,350 |
| 2021 | 71,344 | 3,197 | 13,844 | 369,626 | 458,011 |
| 2022 | 62,705 | 3,675 | 14,588 | 309,245 | 390,213 |
| **Average** | **58,033** | **2,893** | **15,996** | **325,757** | **402,679** |

Source: M. Larkin, NMFS SERO LAPP, pers. com. November 2023.

Participation, harvest, and effort are indicators of the economic value of saltwater recreational fishing. However, a more specific indicator of economic value is the satisfaction that anglers experience over and above their costs of fishing. The economic (monetary) value of this satisfaction is referred to as consumer surplus (CS). The value or benefit derived from the recreational fishing experience is dependent on several quality determinants, which include fish size, catch success rate, and the number of fish kept.[22] These variables help determine the value of a fishing trip and influence total demand for recreational fishing trips.

Estimates of marginal consumer surplus are based on estimates of anglers' average maximum willingness-to-pay (WTP) to experience the catching and keeping of an additional fish less their average cost of catching and keeping that additional fish. If it is assumed that there is no additional cost to the angler of catching and keeping an additional fish, such as if there were no changes in the costs of a fishing trip, the maximum WTP is equivalent to consumer surplus.[23] In 2003/2004, Carter and Liese (2012) surveyed willing anglers who engaged in southeast sports fishing to estimate their average WTP to catch and keep versus catch and release an additional sports fish, specifically grouper, red snapper, dolphinfish and king mackerel. The survey did not estimate average WTP for a Spanish mackerel. Moreover, it did not distinguish anglers by mode (who fish from private versus for-hire vessels or from shore),[24] nor did it distinguish fish released dead versus alive. Nonetheless, Carter and Liese (2012) estimate the average angler's

[22] These are not all of the factors that shape the quality of a recreational fishing experience. Other factors include fishing partners, aesthetics (such as the natural setting), access to fishing sites, and crowding/congestion to name a few.

[23] The length of the trip and any other inputs that affect the cost of that trip, such as more bait, would be assumed to be constant whether one catches and keeps an additional fish or not.

[24] Carter et al. (2020) estimated WTP that does distinguish anglers by mode (charter versus private boat trips).

WTP for a second, third, fourth, fifth and sixth caught and kept king mackerel are approximately $118.88, $79.24, $58.41, $46.04, and $37.91 (updated to 2022 dollars using BEA GDP deflator).[25] It is important to note that this WTP is for the experience of both catching and keeping an additional fish; it is not just for keeping a fish that has already been caught. In fact, Carter and Liese (2012) note that angler WTP to catch and release (dead or alive) a king mackerel above the bag limit was more than half the WTP to catch and keep a king mackerel. As such, more than half the value derived from catching and keeping a king mackerel was/is attributable to the sport of catching it. More recently, in 2013, Carter, Lovell and Liese (2020) surveyed Gulf anglers and estimated Gulf anglers are willing to pay $24.63 on average for the option to experience an opening of the offshore king mackerel season with a 1-fish bag limit (versus zero), $30.22 for the option of a 2-fish bag limit, and $32.46 for a 3-fish bag limit.[26] Carter et al. (2020) note that the bag limit for king mackerel had been 2 fish since 2000, and their results may indicate that king mackerel anglers are more interested in the sport of catching a king mackerel than its bag limit. There are no comparable estimates for either Spanish mackerel or cobia.

Those willingness to pay (consumer surplus) estimates should not be confused with angler expenditures or the economic activity (impacts) associated with their expenditures. While the money spent by an angler for a fishing trip may serve as a proxy or lower bound[27] of the total value to that angler, those expenditures do not represent the net value (benefits less cost) of the trip nor the change in value associated with a change in the fishing experience.[28] However, the economic impacts of their spending is important as that spending generates jobs, income and other economic benefits as was shown in Table 3.3.14.

While anglers receive economic value as measured by the consumer surplus (CS) associated with fishing, for-hire businesses receive value from the services they provide. PS associated with fishing trips are not available; however, proxy values in the form of net operating revenues (NOR) are available. For charter fishing vessels, the estimated NOR value is $189 per charter angler trip in the Gulf (Liese and Carter 2011); and the estimated NOR value per headboat angler trip in the Gulf is $65 (C. Liese, NMFS SEFSC, pers. comm.).[29] Estimates of NOR for for-hire trips that target specific species, such are king mackerel, are not available.

Estimates of average annual gross revenue for charter vessels in 2009 are provided in Savolainen et al. (2012). The average annual gross revenue for a Gulf headboat is approximately $306,232 ($229,830 in 2009 dollars), while the average annual gross revenue for a Gulf charter vessel is approximately $105,029 ($78,825 in 2009 dollars).[30] More recent estimates of average annual gross revenue for Gulf headboats are provided in Abbott and Willard (2017) and SEFSC (pers.

[25] Carter and Liese (2012) estimates in 2003 dollars are $77.59 for the second fish, $51.72 for the third, $38.12 for the fourth, $30.05 for the fifth fish, and $24.74 for the sixth.
[26] Carter et al.'s estimate was in 2013 dollars and is adjusted above in 2022 dollars.
[27] It is expected that an angler would not spend more for a trip than what they believe that trip is worth it to them.
[28] One example of a change in the experience is an increase in the maximum number of fish that can be kept.
[29] Both adjusted from 2013 dollars to 2022 dollars using BEA GDP deflator issued October 26, 2023.
[30] Adjusted to 2022 dollars using BEA Table 1.1.4 Price Indexes for Gross Domestic Product, issued October 26, 2023.

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 $541,594 ($406,471 in 2009 dollars). Further, their data suggests average annual gross revenue per vessel had increased to approximately $654,249 by 2014 ($534,706 in 2014 dollars). 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 Program may be economic highliners, in which case Abbott and Willard's estimates would overestimate average annual gross revenue for Gulf headboats. D. Carter (SEFSC, pers. com. 2018) recently estimated that average annual gross revenue for Gulf headboats in 2017 were approximately $427,515 ($362,313 in 2017 dollars). 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. The maximum annual gross revenue for a single headboat in the Gulf was about $1.38 million in 2017. On average, annual gross revenue for headboats in the Gulf is about three times greater than annual gross revenue for charter vessels, reflecting the fact that businesses that own charter vessels are typically smaller than businesses that own headboats.

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 2022 dollars, Savolainen, et al. (2012) estimated annual PS and annual economic profit for the average Gulf headboat is $215,257 and $89,807, respectively. Similarly, they estimated annual PS and economic profit for the average Gulf charter boat is $66,773 and $30,012, respectively. [31] Estimates of PS and economic profit for headboats are not available from Abbott and Willard (2017) or D. Carter (2018), as they did not collect comprehensive cost data at the vessel level.[32]

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. After accounting for transactions fees, supply costs, and labor costs, net revenue per trip was 42% of revenue for Gulf charter vessels and 55% of revenue for Gulf headboats, or $880 and $2,157,

[31] Savolainen, et al. (2012) account for all explicit variable and fixed costs, but they do not account for implicit costs. Consequently, they over-estimate actual economic profits for these vessels.
[32] Although Abbott and Willard (2017) report revenue net of fuel costs, they ignore important costs such as processing fees, commissions, ice, bait, tackle, and labor.

respectively[33]. Given the respective average number of anglers per trip for each fleet, PS per trip is estimated to be $160 for charter vessels and $76 for headboats.[34]

## 3.4 Description of the Social Environment

This framework amendment affects the commercial and recreational management of Gulf Spanish mackerel. This section provides community background and current descriptions of Gulf Spanish mackerel fishing for which the proposed actions will be evaluated in Chapter 4.

The following description includes commercial and recreational Spanish 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 Spanish mackerel are included, along with the top recreational fishing communities based on recreational engagement and reliance, top ranked Spanish mackerel communities by the number of commercial permits, and the top ranked CMP 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 Fishery Conservation and Management Act (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.

### 3.4.1 Commercial Sector

**Permits**

Federal commercial Spanish 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 40.7% of commercial Spanish mackerel permits (SERO permit office, 2020). Within the Gulf, the majority of commercial Spanish mackerel permits are held by individuals in Florida (35.9%, includes the west coast of Florida and the Florida Keys), followed by Louisiana (2.4%), Alabama (1.5%), Texas (0.5%), and Mississippi (0.4%). Commercial Spanish mackerel permits are held by individuals with mailing addresses in 351 communities, located in 20 states.

Communities in the Gulf with the most commercial Spanish mackerel permits are located in Florida and Louisiana (Table 3.4.1.1). The communities with the most commercial Spanish mackerel permits are Key West, Florida (8.4% of commercial Spanish mackerel permits); Marathon, Florida (3.4%); and Panama City, Florida (2.6%).

[33] Souza and Liese (2019) estimate the average gross revenues for a Gulf charter fishing trip and Gulf headboat trip are $2,094 ($1,775 in 2017 dollars) and $3,922 ($3,324 in 2017 dollars), respectively.
[34] Souza and Liese (2019) estimate an average of 28.2 angler passengers on a Southeast headboat trip and an average of 5.5 angler passengers on a Gulf charter boat trip.

**Table 3.4.1.1.** Top communities by number of federal commercial Spanish mackerel permits.

| State | Community | Permits |
|---|---|---|
| FL | Key West | 188 |
| FL | Marathon | 76 |
| FL | Panama City | 58 |
| FL | Key Largo | 27 |
| FL | Tarpon Springs | 27 |
| FL | St. Petersburg | 24 |
| FL | Naples | 22 |
| FL | Destin | 20 |
| FL | Islamorada | 18 |
| FL | Hernando Beach | 17 |
| FL | Cortez | 17 |
| FL | Madeira Beach | 16 |
| FL | Big Pine Key | 14 |
| LA | Grand Isle | 14 |
| FL | Panama City Beach | 13 |
| FL | Pensacola | 12 |
| FL | Summerland Key | 10 |
| FL | Clearwater | 10 |

Source: SERO permit office, 2020.

**Landings**

The majority of Gulf commercial Spanish mackerel landings are from waters adjacent to Alabama (average of approximately 71.7% from 2018-2022), followed by Florida (26.2%), Mississippi (1.9%), and Louisiana (0.2%, SEFSC Commercial ACL Data).

The descriptions of communities include information about the top communities based on a "regional quotient" (RQ) of commercial landings for Spanish mackerel. The RQ is the proportion of landings out of the total landings of that species for that region and that year, and is a relative measure. The RQ is reported individually only for the top 10 communities by total landings for the years of 2018 through 2022. All other communities that landed Spanish mackerel are grouped as "Other Communities." Figure 3.4.1.1 shows the RQ in percentage of pounds from 2018 to 2022. The top community of Bon Secour, Alabama has relatively stable landings by year; however, the landings of many communities fluctuate with no landings in some years for several communities. The top Spanish mackerel communities are located in Alabama, Florida, and Mississippi. About 70% of the total Spanish mackerel landings from 2018 to 2022 is landed in the top two communities of Bon Secour and Bayou La Batre, Alabama combined.

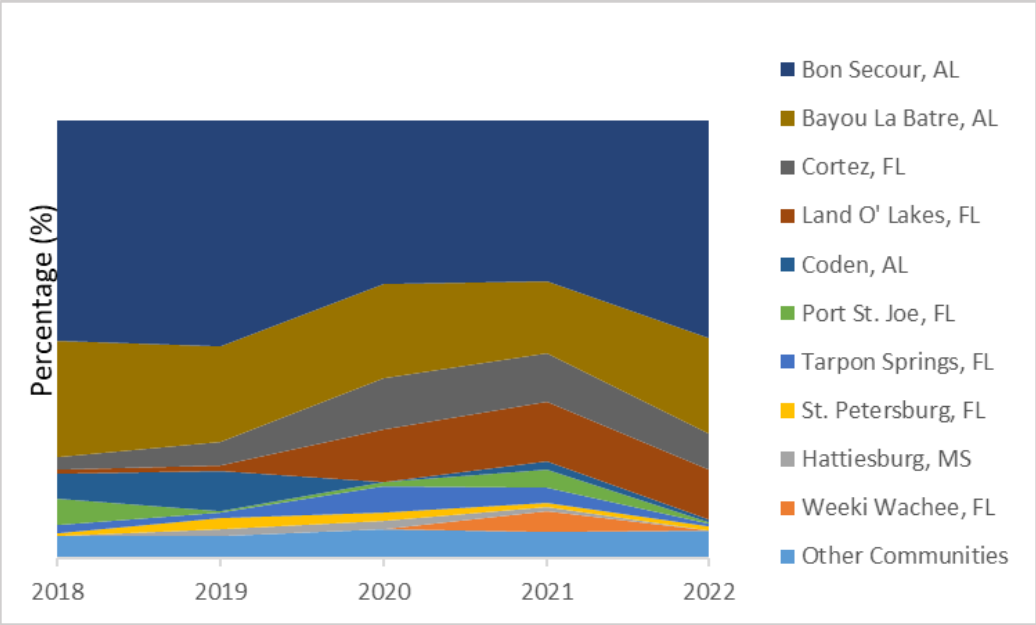


**Figure 3.4.1.1.** Regional Quotient (pounds) for top Gulf communities by Spanish mackerel landings from 2018 to 2022. The actual RQ values (y-axis) are omitted from the figure to maintain confidentiality.
Source: SERO, Community ALS.

**Engagement and Reliance**

Figure 3.4.1.2 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 Spanish mackerel as depicted in Figure 3.4.1.1. Hattiesburg, Mississippi and Weeki Wachee, Florida are not included because data are not available for these communities. The majority of the communities in Figure 3.4.1.2 would be considered to be highly or moderately engaged in commercial fishing, as several are at or above 1 standard deviation of the mean factor score and a few are at or above ½ standard deviation. Land O' Lakes and Port St. Joe, Florida show the least amount of engagement in commercial fishing overall. Bon Secour, Alabama; Bayou La Batre, Alabama; and Cortez, Florida demonstrate the highest level of commercial reliance.

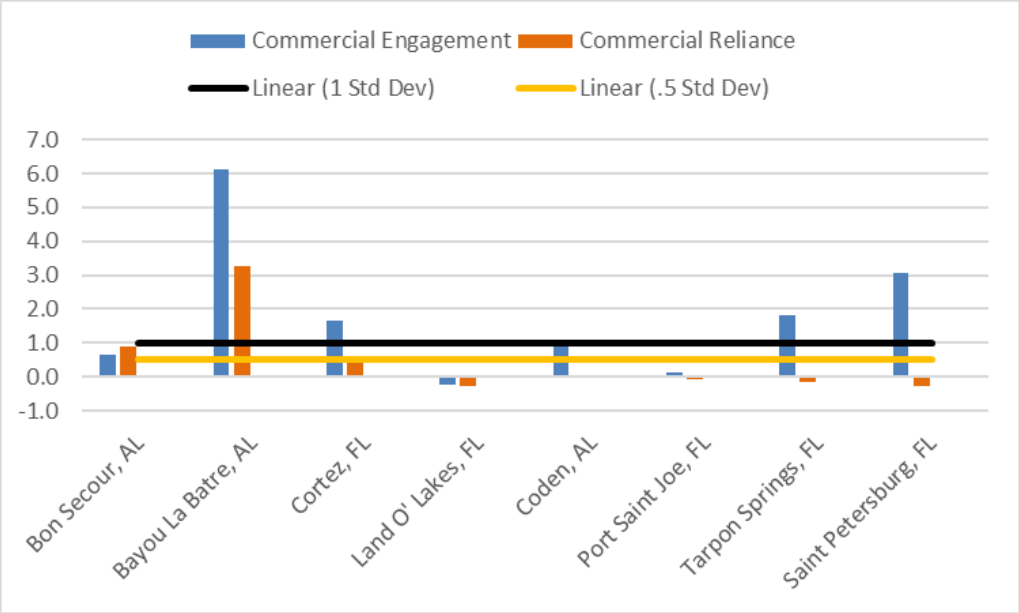


**Figure 3.4.1.2.** Commercial fishing engagement and reliance for top Spanish mackerel communities.
Source: SERO, Community Social Vulnerability Indicators Database 2019.

## 3.4.2 Recreational Sector

**Permits**

The majority of federal Gulf CMP for-hire permits are held by entities, such as individuals and businesses 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 entities 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 3.4.2.1). 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 3.4.2.1.** Top communities by number of federal Gulf CMP for-hire 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 Spanish mackerel landings are from waters adjacent to Florida (average of approximately 70.6% from 2018-2022), followed by Alabama (26.6%), Louisiana and Mississippi (2.6%), and Texas (0.2%, SEFSC Recreational MRIP-CHTS 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 Spanish 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 for-hire 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 3.4.2.1 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 Spanish 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. Four communities (Islamorada, Florida; Orange Beach, Alabama; Tavernier, Florida; and Venice Louisiana) demonstrate high levels of recreational reliance.

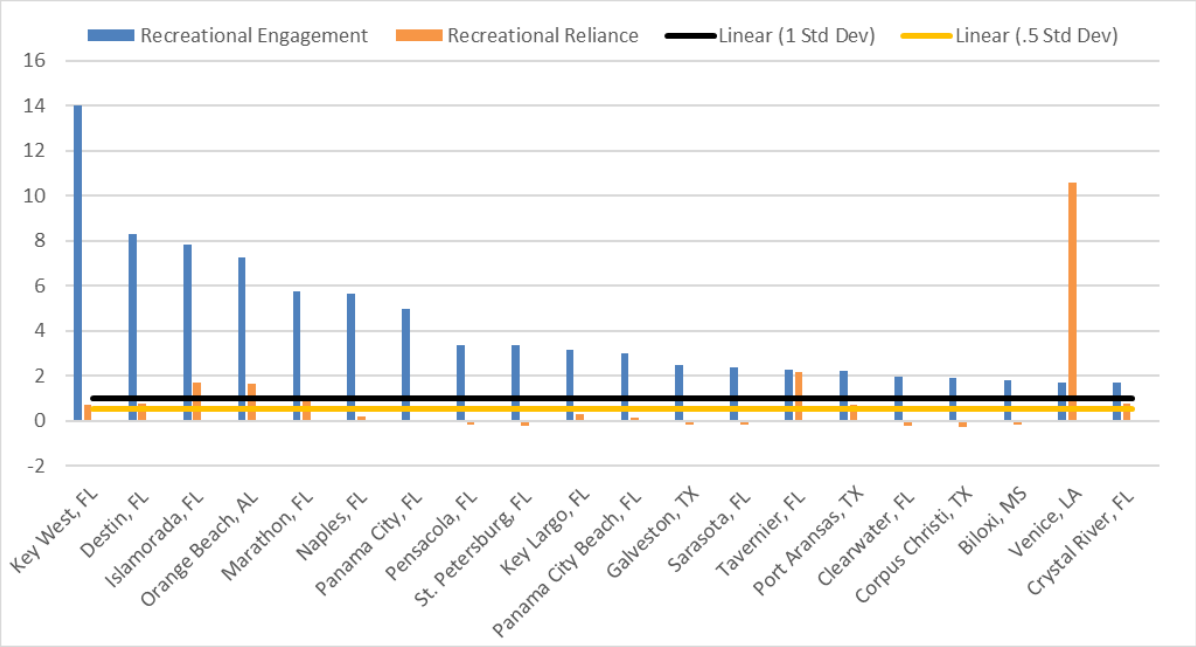


**Figure 3.4.2.1.** Top 20 communities by recreational fishing engagement and reliance.
Source: SERO, Community Social Vulnerability Indicators Database 2019.

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

## 3.4.3 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 Spanish 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. Indicators such as increased poverty rates for different groups, more single female-headed households and households with children under the age of five, disruptions such as higher separation rates, higher crime rates, and unemployment all 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 3.4.3.1 and 3.4.3.2 provide social vulnerability rankings for place-based communities identified in Section 3.4 as important to fishing for Spanish mackerel specifically (commercial sector) or fishing for coastal migratory pelagics or recreational fishing in general (recreational sector). Several communities exceed the threshold of one standard deviation above the mean for at least one indicator, Bayou La Batre, Alabama; Crystal River, Florida; Grand Isle, Louisiana; Venice, Louisiana; and Freeport, Texas. These communities would be the most likely to exhibit vulnerabilities to social or economic disruption resulting from regulatory change.

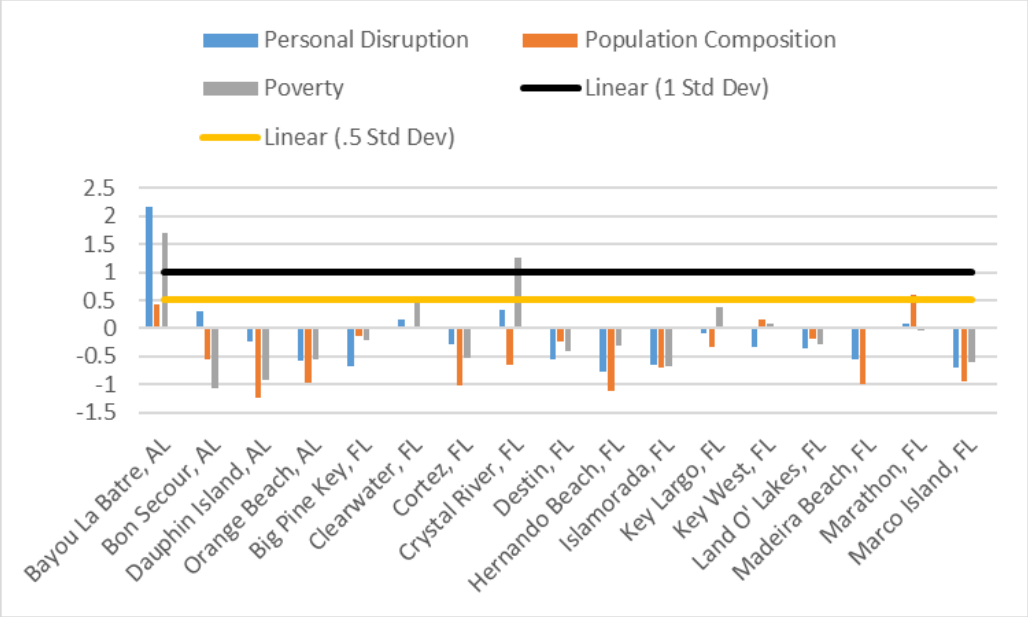


**Figure 3.4.3.1.** Social vulnerability indices for top commercial and recreational Spanish mackerel and CMP communities.
Source: SERO, Community Social Vulnerability Indicators Database 2020.

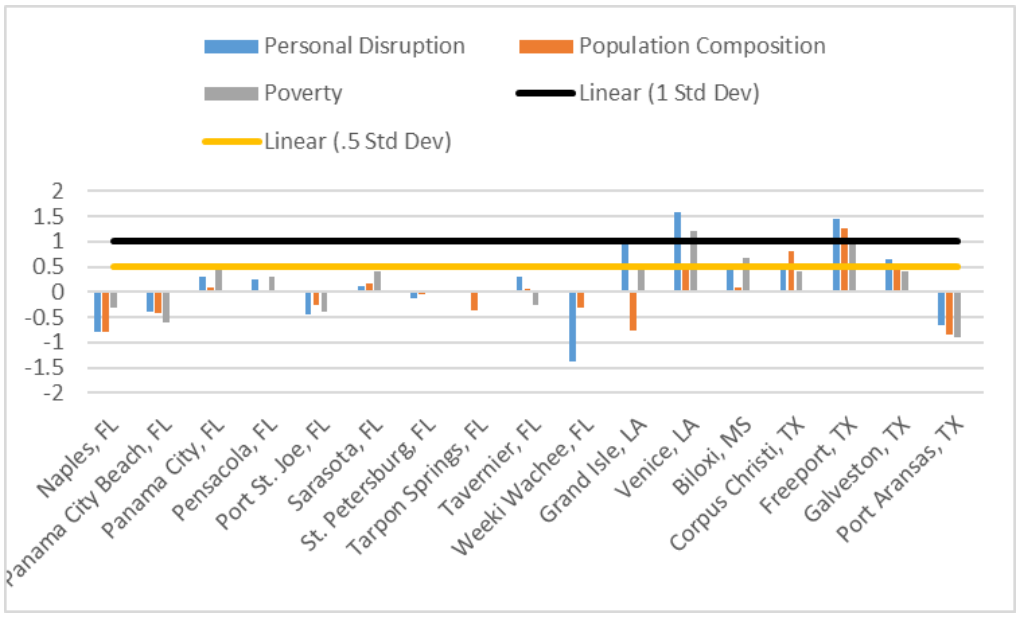


**Figure 3.4.3.2.** Social vulnerability indices for top commercial and recreational Spanish mackerel and CMP communities continued.
Source: SERO, Community Social Vulnerability Indicators Database 2020.

People in these communities may be affected by fishing regulations in two ways: participation and employment. Although the place-based communities identified in Figures 3.4.3.1 and 3.4.3.2 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 Spanish mackerel specifically (participation). The potential effects of the actions on non-place-based communities, such as commercial fishermen and recreational stakeholders will be discussed in the Social Effects. There are no known populations that rely on the consumption of Spanish mackerel for subsistence. Although no EJ issues have been identified, the absence of potential EJ concerns cannot be assumed.

## 3.5 Description of the Administrative Environment

### 3.5.1 Federal Fishery Management

Federal fishery management is conducted under the authority of the Magnuson-Stevens Act Fishery Conservation and Management Act (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.

### 3.5.2 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 3.5.2.1).

**Table 3.5.2.1.** 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. REFERENCES


Abbott, J.K. and D. Willard. 2017. Rights-Based Management for Recreational for-Hire Fisheries: Evidence from a Policy Trial. Fisheries Research 196: 106–16. Available online at https://gulfcouncil.org/wp-content/uploads/05.d.1-Background_Abbott-and-Willard-2017.pdf.

Atlantic States Fisheries Management Commission. November 8, 2022. Review of the Interstate Fishery Management Plan for Spanish Mackerel, Fishing Year 2021. Available online at https://asmfc.org/uploads/file/63efa8e0SpanishMackerelFMP_Review_FY2021_FinalBoardApproved11.2022.pdf.

Baustian, M.M. and N.N. Rabalais. 2009. Seasonal composition of benthic macroinfauna exposed to hypoxia in the northern Gulf of Mexico. Estuaries and Coasts 32:975–983.

Breitburg, D., L.A. Levin, A. Oschlies, M. Grégoire, F.P. Chavez, D.J. Conley, V. Garçon, D. Gilbert, D. Gutiérrez, K. Isensee, and G.S. Jacinto. 2018. Declining oxygen in the global ocean and coastal waters. Science 359:6371.

Burton, M.L. 2008. Southeast U. S. Continental Shelf, Gulf of Mexico and U. S Caribbean chapter. Pages 31-43 *in* K. E. Osgood, editor. Climate impacts on U. S. living marine resources: National Marine Fisheries Service concerns, activities, and needs. U. S. Dept. Commerce, NOAA Technical Memorandum NMFS-F/SPO-89. 118 pp.

Carls, M.G., S.D. Rice, and J.E. Hose. 1999. Sensitivity of fish embryos to weathered crude oil: Part I. low-level exposure during incubation causes malformations, genetic damage, and mortality in larval Pacific herring (*Clupea pallasi*). Environmental Toxicology and Chemistry 18(3):481–493.

Carter, D.W., 2018. Personal communication.

Carter, D.W. and C. Liese. 2012. The Economic Value of Catching and Keeping or Releasing Saltwater Sport Fish in the Southeast USA. North American Journal of Fisheries Management 32 (4): 613–25.

Carter, D.W., S.J. Lovell and C. Liese. 2020. Does Angler Willingness-to-Pay for Changes in Harvest Regulations Vary by State? Results from a Choice Experiment in the Gulf of Mexico. Marine Policy 121:104196.

Chagaris, D., S. Sagarese, N. Farmer, B. Mahmoudi, K. de Mutsert, S. VanderKooy, W. F. Patterson III, M. Kilgour, A. Schueller, R. Ahrens, and M. Lauretta. 2019. Management challenges are opportunities for fisheries ecosystem models in the Gulf of Mexico. Marine Policy 101:1-7.

Collette, B.B. and C.E. Nauen. 1983. FAO Species Catalogue. Scombrids of the world. An annotated and illustrated catalogue of tunas, mackerels, bonitos, united nations development programme food and agriculture organization of the united nations and related species known to date FAO Fish Synopsis. Rome. 125(2) 137 pp.

Craig, J.K. 2012. Aggregation on the edge: Effects of hypoxia avoidance on the spatial distribution of brown shrimp and demersal fishes in the Northern Gulf of Mexico. Marine Ecology Progress Series 445:75–95.

Ferreia, J., T. Garlock, C. Court, J.L. Anderson, F. Asche, K. McDaid, X. Oiao, and B. Yang. 2022. Economic Contributions of U.S. Seafood Imports – a value chain perspective. Report sponsored by National Fisheries Institute, Seafood Industry Research Fund. Available online at https://fred.ifas.ufl.edu/media/fredifasufledu/news/docs/FRE_Economic_Contributions_US_Seafood_Imports_Report_2022_Web.pdf

Fodrie, F.J., K.L. Heck Jr, S.P. Powers, W.M. Graham, and K.L. Robinson. 2010. Climate-related, decadal-scale assemblage changes of seagrass-associated fishes in the northern Gulf of Mexico. Global Change Biology 16(1):48-59.

GMFMC. 2004. Final environmental impact statement for the generic essential fish habitat amendment to the following fishery management plans of the Gulf of Mexico: Shrimp fishery of the Gulf of Mexico, red drum fishery of the Gulf of Mexico, reef fish fishery of the Gulf of Mexico, stone crab fishery of the Gulf of Mexico, coral and coral reef fishery of the Gulf of Mexico, spiny lobster fishery of the Gulf of Mexico and South Atlantic, coastal migratory pelagic resources of the Gulf of Mexico and South Atlantic. Gulf of Mexico Fishery Management Council. Tampa, Florida. 682 pp.https://gulfcouncil.org/wp-content/uploads/March-2004-Final-EFH-EIS.pdf

GMFMC. 2005. Generic amendment number 3 for addressing essential fish habitat requirements, habitat areas of particular concern, and adverse effects of fishing in the following fishery management plans of the Gulf of Mexico: shrimp fishery of the Gulf of Mexico, United States waters, red drum fishery of the Gulf of Mexico, reef fish fishery of the Gulf of Mexico, coastal migratory pelagic resources (mackerels) in the Gulf of Mexico and South Atlantic, stone crab fishery of the Gulf of Mexico, spiny lobster fishery of the Gulf of Mexico and South Atlantic, coral and coral reefs of the Gulf of Mexico. Gulf of Mexico Fishery Management Council. Tampa, Florida. 106 pp.https://gulfcouncil.org/wp-content/uploads/FISHERY%20MANAGEMENT/GENERIC/FINAL3_EFH_Amendment.pdf

GMFMC. 2022. Final framework amendment 11 under the fishery management plans for coastal migratory pelagic resources in the Gulf of Mexico and Atlantic region: Modification to the Gulf of Mexico group king mackerel catch limits, including environmental assessment, regulatory impact review and regulatory flexibility analysis. Gulf of Mexico Fishery Management Council. Tampa, Florida. 110 pp.
Modifications to the Gulf of Mexico Migratory Group King Mackerel CMP 11 (gulfcouncil.org)

GMFMC and SAMFC 1998. Amendment 9 to the fishery management plan for coastal migratory pelagic resources in the Gulf of Mexico and Atlantic region: Gulf of Mexico Fishery Management Council, Tampa, Florida; and South Atlantic Fishery Management Council, North Charleston, South Carolina. 102 pp. https://gulfcouncil.org/wp-content/uploads/CMP-Amend-09-Final-1998-11-1_508Compliant.pdf

GMFMC and SAFMC. 2011. Final amendment 18 to the fishery management plan for coastal migratory pelagic resources in the Gulf of Mexico and Atlantic regions including environmental assessment, regulatory impact review, and regulatory flexibility act analysis. Gulf of Mexico Fishery Management Council. Tampa, Florida; South Atlantic Fishery Management Council. North Charleston, South Carolina. 399 pp. http://www.gulfcouncil.org/docs/amendments/Final%20CMP%20Amendment%2018%20092311%20w-o%20appendices.pdf

GMFMC and SAFMC. 2014a. Final amendment 20B to the fishery management plan for the coastal migratory pelagic resources in the Gulf of Mexico and Atlantic Region, including environmental assessment, fishery impact statement, regulatory impact review, and regulatory flexibility act analysis: modifications to the coastal migratory pelagics zone management. Gulf of Mexico Fishery Management Council. Tampa, Florida; South Atlantic Fishery Management Council. North Charleston, South Carolina. 168 pp with appendices. http://gulfcouncil.org/wp-content/uploads/CMP-Amendment-20B.pdf

GMFMC and SAFMC. 2014b. Framework amendment 1 to the fishery management plan for coastal migratory pelagic resources in the Gulf of Mexico and South Atlantic Region: Spanish mackerel annual catch limits. Gulf of Mexico Fishery Management Council. Tampa, Florida; South Atlantic Fishery Management Council. North Charleston, South Carolina. 110 pp. http://gulfcouncil.org/wp-content/uploads/CMPFrameworkAmendment1_29May2014_FINAL-1.pdf

GMFMC and SAFMC. 2016. Amendment 26 to the fishery management plan for the coastal migratory pelagics fishery of the Gulf of Mexico and Atlantic region: Changes in allocations, stock boundaries and sale provisions for Gulf of Mexico and Atlantic migratory groups of king mackerel. Gulf of Mexico Fishery Management Council, Tampa, Florida; and South Atlantic Fishery Management Council, North Charleston, South Carolina. 254 pp. https://gulfcouncil.org/wp-content/uploads/Final-CMP-Amendment-26-070816.pdf

GMFMC and SAFMC. 2022. Modifications to the Gulf of Mexico migratory group cobia catch limits, possession limits, size limits, and framework procedure, Amendment 32 to the fishery management plan for coastal migratory pelagic resources of the Gulf of Mexico and Atlantic Region. Gulf of Mexico Fishery Management Council. Tampa, Florida and South Atlantic Fishery Management Council. North Charleston, South Carolina. 257 pp. https://gulfcouncil.org/wp-content/uploads/CMP-Amendment-32-Final-Draft-COMPLETE_508_02172022.pdf

Gobler, C.J. 2020. Climate change and harmful algal blooms: Insights and perspective. Harmful Algae 91:101731.

Gore, R.H. 1992. The Gulf of Mexico: A treasury of resources in the American Mediterranean. Pineapple Press. Sarasota, Florida.
Grüss, A., K.A. Rose, J. Simons, C.H. Ainsworth, E.A Babcock, D.D. Chagaris, K. De Mutsert, J. Froeschke, P. Himchak, I.C. Kaplan, and H. O'Farrell. 2017. Recommendations on the use of ecosystem modeling for informing ecosystem-based fisheries management and restoration outcomes in the Gulf of Mexico. Marine and Coastal Fisheries 9(1):281-295.

Heintz, R.A., J.W. Short, and S.D. Rice. 1999. Sensitivity of fish embryos to weathered crude oil: Part II. Increased mortality of pink salmon (*Oncorhynchus gorbuscha*) embryos incubating downstream from weathered *Exxon Valdez* crude oil. Environmental Toxicology and Chemistry 18(3):494–503.

Hollowed, A.B., M. Barange, R. Beamish, K. Brander, K. Cochrane, K. Drinkwater, M. Foreman, J. Hare, J. Holt, S-I. Ito, S. Kim, J. King, H. Loeng, B. MacKenzie, F. Mueter, T. Okey, M.A. Peck, V. Radchenko, J. Rice, M. Schirripa, A. Yatsu, and Y. Yamanaka. 2013. Projected impacts of climate change on marine fish and fisheries. ICES Journal of Marine Science 70:1023–1037.

Hose, J.E., M.D. McGurk, G.D. Marty, D.E. Hinton, E.D. Brown, and T.T. Baker. 1996. Sublethal effects of the (Exxon *Valdez*) oil spill on herring embryos and larvae: Morphological, cytogenetic, and histopathological assessments, 1989–1991. Canadian Journal of Fisheries and Aquatic Sciences 53:2355-2365.

Jacob, S., P. Weeks, B. Blount, and M. Jepson. 2013. Development and evaluation of social indicators of vulnerability and resiliency for fishing communities in the Gulf of Mexico. Marine Policy 37:86-95.

Jepson, M. and L. L. Colburn. 2013. Development of Social Indicators of Fishing Community Vulnerability and Resilience in the U.S. Southeast and Northeast Regions. U.S. Dept. of Commerce., NOAA Technical Memorandum NMFS-F/SPO-129, 64 pp.

Kennedy, V. S., R. R. Twilley, J. A. Kleypas, J. H. Cowan, and S. R. Hare. 2002. Coastal and marine ecosystems & global climate change: Potential effects on U.S. resources. Pew Center on Global Climate Change, Arlington, Virginia. 52 pp.
https://www.c2es.org/site/assets/uploads/2002/08/marine_ecosystems.pdf

King, J.R. and G.A. McFarlane. 2006. A framework for incorporating climate regime shifts into the management of marine resources. Fisheries Management and Ecology 13(2):93-102.

Liese, C. and D. W. Carter. 2011. Collecting economic data from the for-hire fishing sector: Lessons from a cost and earnings survey of the Southeast U.S. charter boat industry. 14 p. In Beard, T.D., Jr., A.J. Loftus, and R. Arlinghaus (editors). The Angler and the Environment. American Fisheries Society, Bethesda, MD.

Maynard, J., R. Van Hooidonk, C.M. Eakin, M. Puotinen, M. Garren, G. Williams, S.F. Heron, J. Lamb, E. Weil, B. Willis, and C.D. Harvell. 2015. Projections of climate conditions that increase

coral disease susceptibility and pathogen abundance and virulence. Nature Climate Change 5(7):688-694.
McEachran, J. D. and J. D. Fechhelm. 2005. Fishes of the Gulf of Mexico. Volume 2. University of Texas Press, Austin.

Mendelssohn, I.A., G.L. Andersen, D.M. Baltz, R.H. Caffey, K.R. Carman, J.W. Fleeger, S.B. Joye, Q. Lin, E. Maltby, E.B. Overton, and L.P. Rozas. 2012. Oil impacts on coastal wetlands: Implications for the Mississippi river delta ecosystem after the *Deepwater Horizon* oil spill. BioScience 62:562–574.

Morley, J.W., R.L. Selden, R.J. Latour, T.L. Frolicher, R.J. Seagraves, and M.L. Pinsky. 2018. Projecting shifts in thermal habitat for 686 species on the North American continental shelf. PLoS ONE 13(5): e0196127.

National Marine Fisheries Service. 2017. Amendment to the 2015 biological opinion on the continued authorization of the fishery management plan for coastal migratory pelagic resources in the Atlantic and Gulf of Mexico under the Magnuson-Stevens Fishery Management and Conservation Act. NMFS-SERO. 25 pp.

National Marine Fisheries Service (2022). Fisheries of the United States, 2020. U.S. Department of Commerce, NOAA Current Fishery Statistics No. 2020. Available online at: https://media.fisheries.noaa.gov/2022-05/Fisheries-of-the-United-States-2020-Report-FINAL.pdf.

Nuttall, Matthew A. 2022. General Recreational Survey Data for Spanish Mackerel in the Gulf of Mexico. SEDAR81-WP-02. SEDAR, North Charleston, SC. 51 pp.

Osgood, K. E. editor. 2008. Climate impacts on U.S. living marine resources: National Marine Fisheries Service concerns, activities and needs. U.S. Dep. Commerce, NOAA Technical Memo. NMFSF/SPO-89. NOAA Office of Science and Technology, Silver Spring, Maryland. 118 pp. https://spo.nmfs.noaa.gov/sites/default/files/tm89.pdf

Overstreet, E., L. Perruso, and C. Liese. 2019. Economics of the U.S. South Atlantic and Gulf of Mexico King Mackerel and Spanish Mackerel Fisheries -2016. NOAA Technical Memorandum NMFS-SEFSC-736. 67 p.

Pinsky, M.L. and N.J. Mantua. 2014. Emerging adaptation approaches for climate-ready fisheries management. Oceanography 27(4):146-159.

Rabalais, N.N. and R.E. Turner. 2019. Gulf of Mexico hypoxia: Past, present, and future. Limnology and Oceanography Bulletin 28(4):117-124.

Savolainen, M.A., R.H. Caffey, and R.F. Kazmierczak, Jr. 2012. Economic and Attitudinal Perspectives of the Recreational for-Hire Fishing Industry in the U.S. Gulf of Mexico. Center for Natural Resource Economics & Policy, LSU AgCenter and Louisiana Sea Grant College

Program, Louisiana State University, Baton Rouge, March 2012. Available online at https://repository.library.noaa.gov/view/noaa/45882.

SAFMC. August 2022. Amendment 34 to the Fishery Management Plan for Coastal Migratory Pelagic Resources in the Gulf of Mexico and Atlantic Region. Available online at https://safmc.net/documents/cmp-amendment-34/.

SAFMC. March 3, 2017. Amendment 27 to the Fishery Management Plan for Coastal Migratory Pelagic Resources of the Gulf of Mexico and Atlantic Region. Available online at https://safmc.net/documents/comprehensive-for-hire-electronic-reporting-amendment/.

SEDAR 17. 2008. South Atlantic Spanish mackerel stock assessment report. Southeast Data, Assessment, and Review. North Charleston, South Carolina. http://www.sefsc.noaa.gov/sedar/download/S17%20SM%20SAR%201.pdf?id=DO CUMENT

SEDAR 28. 2013. Gulf of Mexico cobia stock assessment report. Southeast Data, Assessment, and Review. North Charleston, South Carolina. 616 pp. http://sedarweb.org/docs/sar/S28_SAR_GoM.Cobia_4.29.2013.pdf

SEDAR 28. 2013b. South Atlantic Spanish mackerel benchmark stock assessment report. Southeast Data, Assessment, and Review. North Charleston, South Carolina. http://www.sefsc.noaa.gov/sedar/download/S28_SAR_SASpMack_FinalWithPStar_5%2016%202013.pdf?id=DOCUMENT

SEDAR 81. 2023. SEDAR 81 stock assessment report. Gulf of Mexico Spanish mackerel. Southeast Data, Assessment, and Review, North Charleston, South Carolina. 279 pp. https://sedarweb.org/documents/sedar-81-gulf-of-mexico-spanish-mackerel-final-stock-assessment/

Short, J. 2003. Long-term effects of crude oil on developing fish: Lessons from the *Exxon Valdez* oil spill. Energy Sources 25(6):509-517.

Sokolow, S. 2009. Effects of a changing climate on the dynamics of coral infectious disease: A review of the evidence. Diseases of Aquatic Organisms 87(1-2):5-18.

Souza, Philip M., Jr. and Christopher Liese. 2019. Economics of the Federal For-Hire Fleet in the Southeast - 2017. NOAA Technical Memorandum NMFS-SEFSC-740, 42 p. Available online at https://repository.library.noaa.gov/view/noaa/22717.

Tolan, J.M. and M. Fisher. 2009. Biological response to changes in climate patterns: population increases of gray snapper (*Lutjanus griseus*) in Texas bays and estuaries. Fishery Bulletin 107(1):36-43.

Wells, M.L., V.L. Trainer, T.J. Smayda, B.S. Karlson, C.G. Trick, R.M. Kudela, A. Ishikawa, S. Bernard, A. Wulff, D.M. Anderson, and W.P. Cochlan. 2015. Harmful algal blooms and climate change: Learning from the past and present to forecast the future. Harmful Algae 49:68-93.

Whitehead, A., B. Dubansky, C. Bodinier, T. Garcia, S. Miles, C. Pilley, V. Raghunathan, J. L. Roach, N. Walker, R.B. Walter, C. D. Rice, F. Galvez. 2012. Genomic and physiological footprint of the *Deepwater Horizon* oil spill on resident marsh fishes. Proceedings of the National Academy of Sciences Dec 2012, 109 (50) 20298-20302.

# 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 Spanish mackerel since 1981. The program included the Access Point Angler Intercept Survey (APAIS), which consists of onsite interviews at marinas and other points where recreational anglers fish, to determine catch. MRFSS also included Coastal Household Telephone Survey (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: Marine Recreational Information Program (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 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 CHTS to a new mail survey (Fishing Effort Survey, FES) beginning in 2015, and in 2018, FES replaced 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).

The results of a 2023 pilot study (NOAA 2023[35]) suggest that the order of the questions in the MRIP-FES survey may have led to an overestimation of fishing effort. A more comprehensive pilot study is ongoing in 2024, will be independently peer-reviewed in early 2025, and available for evaluation by data users (e.g., the Southeast Fisheries Science Center [SEFSC], Southeast Regional Office [SERO], and the Council) thereafter.

**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.

[1] https://www.fisheries.noaa.gov/recreational-fishing-data/fishing-effort-survey-research-and-improvements

# APPENDIX B. ACL/ACT CONTROL RULE

| | | | | | |
|---|---|---|---|---|---|
| As of 09/15/2023 | | | | Gulf Spanish Mackerel | |
| **ACL/ACT Buffer Spreadsheet** | | | version 4.1 - April 2011 | Sector: Both | |
| sum of points | 3 | | | Years: 2019-2022 | |
| max points | 7.0 | | Buffer between ACL and ACT (or ABC and ACL) | Unweighted | 8 |
| **Min. Buffer** | 0 | **min. buffer** | User adjustable | Weighted | 10 |
| Max Unw.Buff | 19 | max unwt. Buff | | | |
| **Max Wtd Buff** | 25 | **max wtd. buffe** | User adjustable | | |

| | Component | Element score | Element | Selection | Element result |
|---|---|---|---|---|---|
| | Stock assemblag | 0 | This ACL/ACT is for a single stock. | x | 0 |
| | | 1 | This ACL/ACT is for a stock assemblage, or an indicator species for a stock assemblage | | |
| | Ability to Constrain Catch | 0 | Catch limit has been exceeded 0 or 1 times in last 4 years | x | 0 |
| | | 1 | Catch limit has been exceeded 2 or more times in last 4 years | | |
| | | | For the year with max. overage, add 0.5 pts. For every 10 percentage points (rounded up) above ACL | 0.0 | |
| | | | Not applicable (there is no catch limit) | | |
| | | | Apply this component to recreational fisheries, not commercial or IFQ fisheries | | |
| | | 0 | Method of absolute counting | | 2 |
| | Precision of | 1 | MRIP proportional standard error (PSE) <= 20 | | |
| | Landings Data | 2 | MRIP proportional standard error (PSE) > 20 | x | |
| | Recreational | | Not applicable (will not be included in buffer calculation) | | |
| | | | Apply this component to commercial fisheries or any fishery under an IFQ program | | |
| | Precision of | 0 | Landings from IFQ program | | 1 |
| | | 1 | Landings based on dealer reporting | x | |
| | Landings Data | 2 | Landings based on other | | |
| | Commercial | | Not applicable (will not be included in buffer calculation) | | |
| | Timeliness | 0 | In-season accountability measures used or fishery is under an IFQ | x | 0 |
| | | 1 | In-season accountability measures not used | | |
| | | | | Sum | 3 |

| | Weighting factor | | | | |
|---|---|---|---|---|---|
| | | Element weight | Element | Selection | Weighting |
| | Overfished statu | 0 | 1. Stock biomass is at or above $B_{OY}$ (or proxy). | | 0.2 |
| | | 0.1 | 2. Stock biomass is below $B_{OY}$ (or proxy) but at or above $B_{MSY}$ (or proxy). | | |
| | | 0.2 | 3. Stock biomass is below $B_{MSY}$ (or proxy) but at or above minimum stock size threshold (M | x | |
| | | 0.3 | 4. Stock is overfished, below MSST. | | |
| | | 0.3 | 5. Status criterion is unknown. | | |

# APPENDIX C. PREDICTING CLOSURE DATES FOR THE GULF OF MEXICO SPANISH MACKEREL STOCK

## Introduction

In 2023, a stock assessment was conducted for Gulf of Mexico Spanish mackerel (SEDAR 81). Results from the assessment showed the Spanish mackerel Gulf of Mexico migratory group is not overfished and not experiencing overfishing. Following the results of SEDAR 81 the Gulf of Mexico Fishery Management Council is considering changing the annual catch limit (ACL) for the Spanish mackerel stock in Framework Amendment 14 to the Fishery Management Plan of Coastal Migratory Pelagics (Framework Amendment 14). The Gulf of Mexico Spanish mackerel ACL combines both the commercial and recreational landings (referred to as stock landings) and compares them to a single ACL (referred to as a stock ACL). Additionally, following SEDAR 81, the new ACLs proposed in Framework Amendment 14 were set with the recreational landings coming from the Marine Recreational Information Program Fishing Effort Survey (MRIP-FES) data instead of the previously used Marine Recreational Information Program Coastal Household Telephone Survey (MRIP-CHTS).

## Data Sources and Predicted Landings

Stock landings for Gulf of Mexico Spanish mackerel are a combination of commercial and recreational landings. The recreational landings are a combination of data from MRIP-FES and the Southeast Region Headboat Survey. These data were provided from the Southeast Fisheries Science Center with the commercial landings provided on September 18, 2023 and the recreational landings provided on December 20, 2023. At the present time the most recent full calendar year of finalized landings is 2022, therefore, 2022 landings are the final year used in this analysis. The commercial landings are organized by month and the recreational landings are organized by two-month wave. Framework Amendment 14 proposes a range of stock ACLs. An estimate of future landings are required to estimate if the Framework Amendment 14 stock ACLs will be met and then the Spanish mackerel sector will be closed. The Gulf of Mexico migratory group Spanish mackerel stock has a fishing year from April 1$^{st}$ to March 31$^{st}$. Three different scenarios were used for predicting future Gulf of Mexico Spanish mackerel stock landings for the fishing year: 1) Using the highest fishing year of Spanish mackerel stock landings in the past 5 years (fishing year 2019/2020 landings), 2) three-year average of landings for the past 3 fishing years (2019/2020, 2020/2021, and 2021/2022), and 3) five-year average of landings for the past 5 fishing years (2017/2018 to 2021/2022). Figure 1 provides the Gulf of Mexico migratory group Spanish mackerel stock landings for the past 5 fishing years, and also the three and five year average landings.

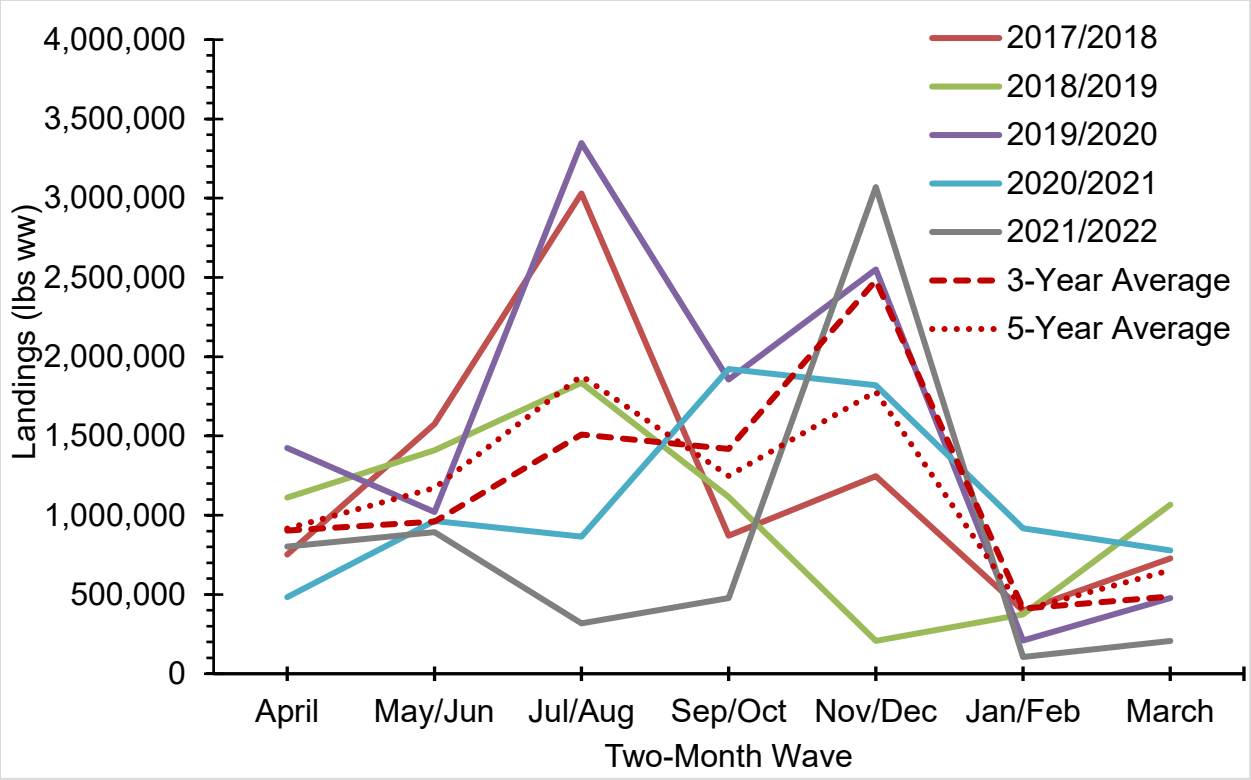


**Figure 1.** Gulf of Mexico migratory group Spanish mackerel stock landings for April, March, and the other monthly landings by two-month wave for the fishing years of 2017/2018 through 2021/2022. Also, the three and five year averages are provided. All landings are in pounds reported. The stock landings combine the commercial and recreational landings.

**Predicted Closure Dates**

Closure dates were predicted from assuming uniform landings for each day in a month for the three landings scenarios. Then the landings per day were cumulatively summed and compared to the stock ACL Alternatives in Framework Amendment 14. A closure date was determined as the day the cumulatively summed stock landings met or exceeded the ACL. Table 1 provides the predicted closure dates under the various proposed stock ACLs of Framework Amendment 14. The predicted closure dates range from November 24 to no closure.

**Table 1.** The projected closure dates for the stock ACLs proposed in Framework Amendment 14 for three different landings scenarios. Three different scenarios were used for predicting future Spanish mackerel stock landings: 1) Using the highest fishing year of stock landings in the past 5 years (fishing year 2019/2020), 2) three-year average of landings by two-month wave for the past 3 fishing years (2019/2020 to 2021/2022), and 3) five-year average of landings by two-month wave for the past 5 fishing years (2017/2018 to 2021/2022).

| | | Closure Dates | | |
|---|---|---|---|---|
| | ACL | Highest Landings | 3-Year Average | 5-Year Average |
| Alternative 1 | 14,900,000 | No Closure | No Closure | No Closure |
| Alternative 2 | 9,630,000 | December 18 | No Closure | No Closure |
| Alternative 3 | 8,667,000 | November 24 | No Closure | No Closure |

**References**

SEDAR 81. 2023. Gulf of Mexico Spanish mackerel stock assessment. Southeast Data, Assessment and Review. North Charleston, South Carolina. http://www.sefsc.noaa.gov/sedar/

# APPENDIX D. BAG LIMIT AND SEASON LENGTH ANALYSIS

**Gulf of Mexico Spanish Mackerel Bag Limit and Season Length Analysis**

The Gulf of Mexico Fishery Management Council is considering decreasing the Spanish mackerel bag limit for the recreational sector and implementing new catch limits, such as the Annual Catch Limit (ACL), in Framework Amendment 14 under the Fishery Management Plan for Coastal Migratory Pelagics Resources in the Gulf of Mexico and Atlantic Region (Framework Amendment 14). The current recreational sector bag limit is 15 fish per person and this analysis predicts the impact on recreational landings from decreasing the bag limit. The Gulf of Mexico Spanish mackerel fishery has a stock ACL that combines both the commercial and recreational landings against a single ACL. This analysis also explores if the stock ACL will be reached and result in a closure of the fishery.

***Bag Limit Analysis***

Gulf of Mexico recreational data from the Texas Parks and Wildlife Department creel survey (TPWD), Louisiana Department of Wildlife and Fisheries creel survey (LA Creel), Marine Recreational Information Program (MRIP), and the Southeast Region Headboat survey (Headboat) were explored to determine the current distribution of the numbers of Spanish mackerel harvested per person. Data from the most recent years of complete data (2021-2023) were used. Figure 1 provides the distribution of the number of Spanish mackerel harvested per person.

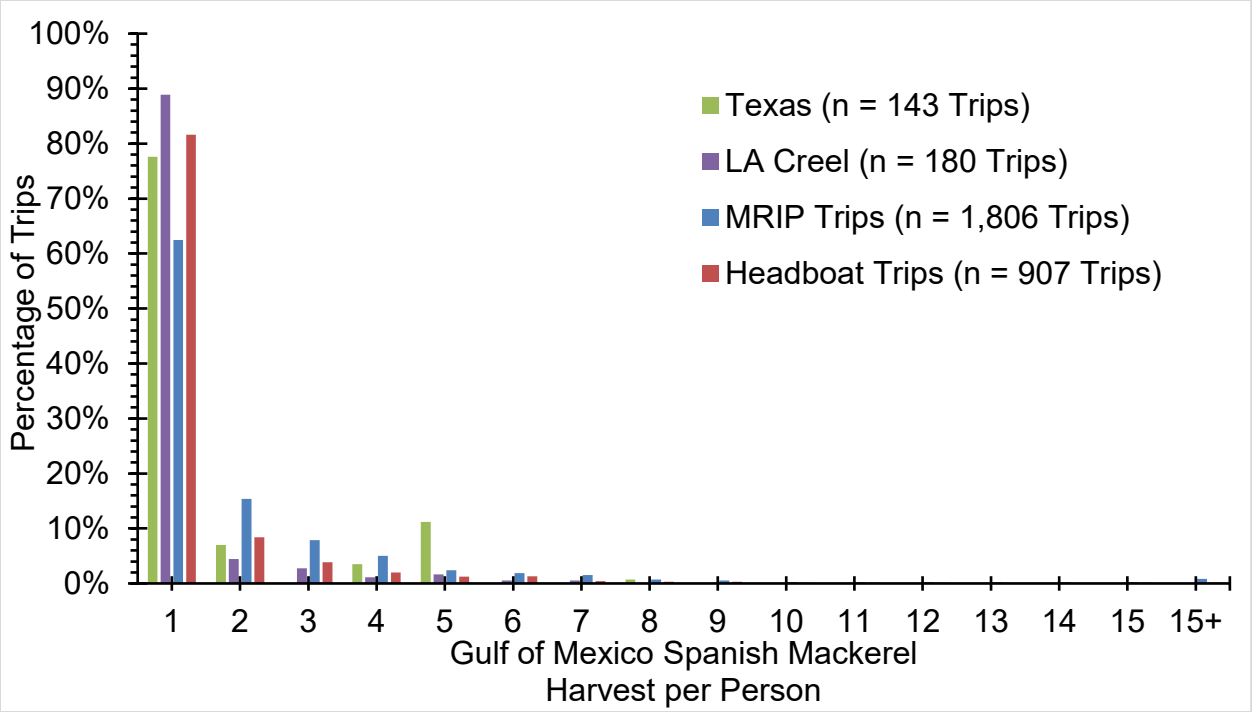


Figure 1. Distribution of Gulf of Mexico Spanish mackerel harvested per person by dataset. The data is from 2021 through 2023.

The current bag limit is 15 fish per person and the impact on the landings from decreasing the bag limit to 1, 2, 3, 5, 7, and 10 fish per person was estimated. This was done by modifying recent trips that harvested Spanish mackerel in the past 3 years (2021 to 2023). Trips that harvested less than 15 Spanish mackerel per person or more than 15 Spanish mackerel per person were not modified. Trips that exceeded the bag limit under consideration were reduced to fit the bag limit under consideration. For example, if a reduced bag limit of 5 Spanish mackerel per person is under consideration then trips that harvested 6 to 15 Spanish mackerel per person were reduced to have a harvest of 5 fish per person. Then a percent decrease in landings was determined from the following equation:

Percent Decrease = [(Harvest from Unmodified Trips – Harvest from Modified Trips for the Considered Bag Limit) / Harvest from Unmodified Trips] × 100.

The calculated percent decrease in landings by dataset is shown in Table 1.

Table 1. Calculated percent decrease in Gulf of Mexico Spanish mackerel recreational landings by dataset from decreasing the bag limit.

| Bag Limit | Texas | LA Creel | MRIP | Headboat |
|---|---|---|---|---|
| 1 Fish per Person | 40% | 21% | 48% | 31% |
| 2 Fish per Person | 27% | 12% | 29% | 18% |

| | | | | |
|---|---|---|---|---|
| 3 Fish per Person | 18% | 7% | 18% | 11% |
| 5 Fish per Person | 1% | 1% | 7% | 5% |
| 7 Fish per Person | 1% | 1% | 3% | 3% |
| 10 Fish per Person | <1% | <1% | <1% | <1% |

An overall percent decrease in recreational landings was calculated by weighting the percent decrease by dataset by the percentage of landings each dataset contributed to the overall Gulf of Mexico Spanish mackerel recreational landings. Additionally, the latest Spanish mackerel stock assessment (SEDAR 81 2023) used MRIP Fishing Effort Survey data (MRIP-FES). Therefore, MRIP-FES data was used for the MRIP landings. The pounds and percentage of Spanish mackerel recreational landings by dataset from 2021 to 2023 are shown in Table 2. The overall percent decrease is shown in Table 3.

Table 2. Gulf of Mexico Spanish mackerel landings by dataset from 2021 to 2023. The landings are in pounds whole weight (lbs ww).

| Dataset | Landings (lbs ww) | Percent of Total Landings |
|---|---|---|
| Texas | 5,261 | <1% |
| LA Creel | 26,472 | <1% |
| MRIP | 21,262,752 | 99% |
| SRHS | 8,663 | <1% |
| Total | 21,303,146 | 100% |

Table 3. Percent decrease in Gulf of Mexico Spanish mackerel recreational landings generated from data from the years 2021 to 2023. The percent decrease estimates were calculated by weighting the decrease in the bag limit for each dataset (Table 1). The weighting was based on the percentage of landings each dataset contributed to the overall landings from 2021 to 2023 (Table 2).

| Bag Limit | Percent Decrease in Landings |
|---|---|
| 1 Fish per Person | 47% |
| 2 Fish per Person | 28% |
| 3 Fish per Person | 17% |
| 5 Fish per Person | 7% |
| 7 Fish per Person | 2% |
| 10 Fish per Person | <1% |

***Season Length Prediction***

Framework Amendment 14 is also considering changes to the stock ACL. The Gulf of Mexico Spanish mackerel fishery has a fishing year of April 1 to March 31. An analysis of recent commercial and recreational landings were done to predict if the stock ACLs being considered in Framework Amendment 14 would be exceeded and cause a fishery closure. Framework Amendment 14 has three different stock ACLs and they are listed in Table 4. A review of recent commercial and recreational landings reveals that over 90% of the stock landings come from the recreational sector (Table 5). Also, only once in the past five years were the stock landings high enough to exceeded any of the ACLs being considered in Framework Amendment 14 (Table 5). The fishing year of 2019/2020 was the highest in the past five years and had stock landings over 10 million pounds. The high 2019/2020 landings were primarily from the recreational sector, and recent recreational landings by two-month wave are shown in Figure 2.

Table 4. Alternative stock ACLs listed in Framework Amendment 14.

| Alternatives | ACL |
|---|---|
| Alternative 1 | 14,900,000 |
| Alternative 2 | 9,630,000 |
| Alternative 3 | 8,667,000 |

Table 5. Gulf of Mexico Spanish mackerel commercial and recreational landings from 2018 through 2023 by fishing year. The fishing year is from April 1 through March 31. All commercial landings provided are "as reported" so these landings could have been weighed in either whole or gutted weight. The recreational landings were provided in MRIP-FES units, and are in pounds whole weight.

| Fishing Year | Commercial Landings | Recreational Landings | Total Landings |
|---|---|---|---|
| 2022/2023 | 389,956 | 7,352,316 | 7,742,272 |
| 2021/2022 | 352,847 | 5,509,628 | 5,862,475 |
| 2020/2021 | 523,578 | 7,219,120 | 7,742,698 |
| 2019/2020 | 989,648 | 9,887,158 | 10,876,806 |
| 2018/2019 | 1,065,335 | 6,059,628 | 7,124,963 |

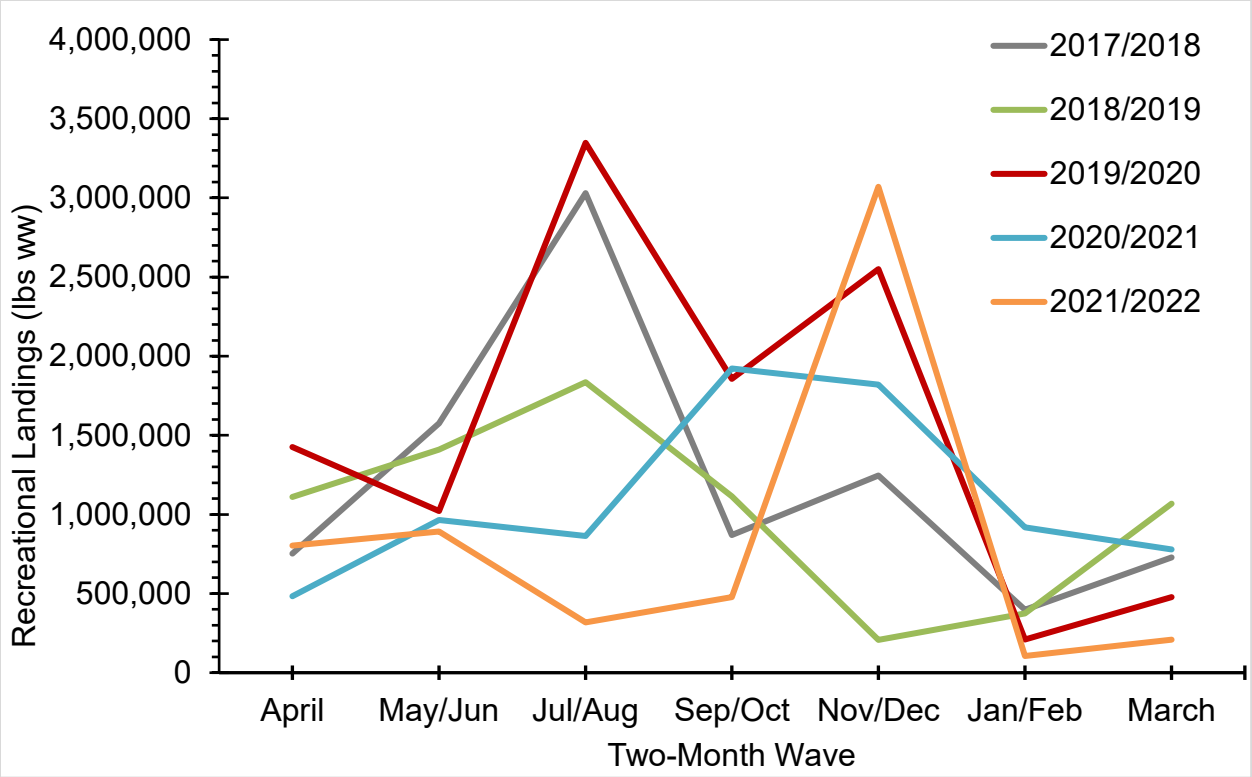


Figure 2. Gulf of Mexico Spanish mackerel recreational landings from the 2017/2018 through the 2021/2022 fishing year.

Since only the 2019/2020 landings were high enough to exceed the Framework Amendment 14 ACLs these 2019/2020 landings were used to explore potential closures. The 2019/2020 Spanish mackerel stock landings were cumulative summed from April 1 through March 31 until the different Framework Amendment 14 ACLs were met or the fishing year ended. Additionally, the percent reduction in recreational landings (Table 3) was applied to the recreational landings of the stock landings (commercial and recreational landings) to determine potential closure dates from the different bag limit options. Table 6 provides the results. The closures ranged from as early as November 25 to no closures.

Table 6. The projected closure dates from the 2019-2020 landings for the Gulf of Mexico Spanish mackerel ACLs being considered in Amendment 14 for a range of bag limit options. The Gulf of Mexico Spanish mackerel fishery follows a fishing year of April 1 to March 31.

| Alternatives | ACL | 1 Fish | 2 Fish | 3 Fish | 5 Fish | 7 Fish | 10 Fish | Status Quo |
|---|---|---|---|---|---|---|---|---|
| Alternative 1 | 14,900,000 | None | None | None | None | None | None | None |
| Alternative 2 | 9,630,000 | None | None | None | 18-Feb | 23-Dec | 20-Dec | 18-Dec |
| Alternative 3 | 8,667,000 | None | None | 4-Mar | 11-Dec | 29-Nov | 27-Nov | 25-Nov |

**References**

SEDAR 81. 2023. Stock assessment report Gulf of Mexico greater amberjack (*Seriola dumerili*). Southeast Data, Assessment and Review. North Charleston, South Carolina. http://www.sefsc.noaa.gov/sedar/.