

# **Modifications to Vermilion Snapper Overfishing Limit, Allowable Biological Catch and Annual Catch Limits**



## **Framework Action to the Fishery Management Plan for Reef Fish Resources of the Gulf of Mexico Including Environmental Assessment**

**October 2021**



*This is a publication of the Gulf of Mexico Fishery Management Council Pursuant to National Oceanic and Atmospheric Administration Award No. NA20NMF4410011.*

This page intentionally blank

# ENVIRONMENTAL ASSESSMENT COVER SHEET

## Name of Action

Framework Action to the Fishery Management Plan for Reef Fish Resources in the Gulf of Mexico: Modification to Vermilion Snapper Catch Levels including Environmental Assessment.

## Responsible Agencies and Contact Persons

Gulf of Mexico Fishery Management Council (Council) 813-348-1630  
4107 W. Spruce Street, Suite 200 813-348-1711 (fax)  
Tampa, Florida 33607 [gulfcouncil@gulfcouncil.org](mailto:gulfcouncil@gulfcouncil.org)  
Assane Diagne ([Assane.Diagne@gulfgouncil.org](mailto:Assane.Diagne@gulfgouncil.org)) [Gulf Council Website](#)

National Marine Fisheries Service (Lead Agency) 727-824-5305  
Southeast Regional Office 727-824-5308 (fax)  
263 13<sup>th</sup> Avenue South [SERO Website](#)  
St. Petersburg, Florida 33701  
Rich Malinowski ([rich.malinowski@noaa.gov](mailto:rich.malinowski@noaa.gov))

## Type of Action

Administrative  
 Draft

Legislative  
 Final

## ABBREVIATIONS USED IN THIS DOCUMENT

ABC	acceptable biological catch
ACL	annual catch limit
ACT	annual catch target
AM	accountability measures
AP	Advisory Panel
APAIS	Access Point Angler Intercept Survey
CHTS	Coastal Household Telephone Survey
Council	Gulf of Mexico Fishery Management Council
EA	environmental assessment
EIS	environmental impact statement
F	fishing mortality
FES	Fishing Effort Survey
FHS	For-Hire Survey
FL	fork length
FMP	fishery management plan
Gulf	Gulf of Mexico Fishery
MFMT	maximum fishing mortality threshold
mp	million pounds
MRFSS	Marine Recreational Fisheries Statistics Survey
MRIP	Marine Recreational Information Program
MSST	minimum stock size threshold
MSY	maximum sustainable yield
NEPA	National Environmental Policy Act
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NS1	National Standards 1 Guidelines
OFL	overfishing limit
OY	optimum yield
Reef Fish FMP	Fishery Management Plan for the Reef Fish Resources of the Gulf of Mexico
RFA	Regulatory Flexibility Analysis
RIR	Regulatory Impact Review
SDC	status determination criteria
SEAMAP	Southeast Area Monitoring and Assessment Program
SEDAR	Southeast Data Assessment and Review
SEFSC	Southeast Fishery Science Center
SFA	Sustainable Fisheries Act
SPR	spawning potential ratio
SSB	spawning stock biomass
SSC	Scientific and Statistical Committee
TL	total length
ww	whole weight

## TABLE OF CONTENTS

Environmental Assessment Cover Sheet .....	i
Abbreviations Used in this Document .....	ii
Table of Contents .....	iii
List of Tables .....	iv
Chapter 1. Introduction .....	6
1.1 Background .....	6
1.2 Purpose and Need .....	9
1.3 History of Management .....	9
1.3.1 Vermilion Snapper .....	9
Chapter 2. Management Alternatives .....	11
2.1 Action 1 – Modify the Gulf of Mexico (Gulf) Vermilion Snapper Overfishing Limit (OFL), Acceptable Biological Catch (ABC), and Annual Catch Limit (ACL). .....	11
Chapter 3. References .....	13
Appendix A. Changes to recreational data collection.....	15
Appendix B. Vermilion Snapper Recreational Landings by State .....	17

## LIST OF TABLES

<b>Table 1.1.1.</b> Vermilion snapper landings by sector, stock ACL and percent ACL landed (2012 – 2020). Landings are in pounds whole weight (lbs ww) using MRIP-CHTS data units.....	7
<b>Table 1.1.2.</b> Vermilion snapper recreational landings by mode (2012-2020). Landings are in lbs ww using MRIP-FES data units.....	8
<b>Table 2.1.1.</b> Summary of projections at $F_{SPR30\%}$ completed using the original SEDAR 45 base model, the SEDAR 45 base model with the recreational data updated to the FES values, and the SEDAR 67 base model in FES. ....	12

# CHAPTER 1. INTRODUCTION

## 1.1 Background

Vermilion snapper is managed under the Fishery Management Plan (FMP) for the Reef Fish Resources of the Gulf of Mexico (Reef Fish FMP). This framework action would modify the overfishing limit (OFL), acceptable biological catch (ABC), and annual catch limit (ACL) for the vermilion snapper stock consistent with recommendations from the Gulf of Mexico Fishery Management Council's (Council) Scientific and Statistical Committee (SSC).

A recent stock assessment for *vermilion snapper* was completed in 2020 (SEDAR 67). After review by the SSC, the assessment was determined to represent the best scientific information available and was deemed suitable for management advice. The SSC determined that the stock was not overfished or experiencing overfishing, and could support higher catch levels. The SSC provided new catch recommendations to the Council, which are detailed in Chapter 2. Vermilion snapper is currently not overfished and is not experiencing overfishing.

### *Establishment of vermilion snapper catch limits*

In 2012, the Generic Annual Catch Limits and Accountability Measures Amendment (Generic ACL/AM Amendment) for the Gulf established catch limits for vermilion snapper including the OFL, ABC, and ACL (GMFMC 2011). Amendment 47 (GMFMC 2017) to the Reef Fish FMP decreased the OFL, ABC, and ACL based on the results of the SEDAR 45 (2016) stock assessment, and the subsequent OFL and ABC recommendations from the Council's SSC. SEDAR 45 identified a proxy for fishing mortality at maximum sustainable yield ( $F_{MSY}$ ) as 30% of the fishing mortality at a spawning potential ratio of 30% ( $F_{SPR30\%}$ ). SEDAR 45 used a statistical catch-at-age model to evaluate vermilion snapper, and represented a more data-rich assessment of the stock than was previously performed under the SEDAR 9 (2006) and SEDAR 9 Update (2012) stock assessments. The preferred alternative set a constant catch ACL of 3.11 mp ww based on the F30% SPR proxy. Vermilion snapper annual landings have been below this ACL since implementation in 2012. Therefore, this preferred alternative was not expected to have any change to the impact on vermilion population.

### *Vermilion snapper management and landings*

Vermilion snapper is subject to a 10-inch total length (TL) minimum size limit for both commercial and recreational fishermen. The recreational bag limit is 10-fish per person per day within the 20-reef fish aggregate bag limit for vermilion snapper, lane snapper, gray triggerfish, almaco jack, and tilefishes (golden, blueline, and goldface). There is no commercial trip limit. The fishing season for vermilion snapper is open year-round from January 1 – December 31 and harvest is monitored as a single stock with no sector allocation. When the combined commercial and recreational catch reaches the stock ACL, or is projected to reach the stock ACL, the season is closed for both sectors for the remainder of the year. There is no post-season AM, such as an overage adjustment, for vermilion snapper.

Table 1.1.1 provides commercial and recreational landings for vermilion snapper from 2012 to 2019. The vermilion snapper stock ACL has been exceeded once, by approximately 3% in 2018, since implementation of the vermilion snapper stock ACL in 2012. 2018 was also the first year a reduced ACL was implemented by Amendment 47 (GMFMC 2017). The fishing season for vermilion snapper has never been closed in-season, prior to the end of the fishing year, due to the stock ACL being met. Vermilion snapper harvest data are presented in Table 1.1.1. The National Marine Fisheries Service (NMFS) transitioned from monitoring the catch limit using the Marine Recreational Fisheries Statistics Survey (MRFSS) to the Marine Recreational Information Program’s Coastal Household Telephone Survey (MRIP-CHTS) in 2018 following the implementation of catch limits based on SEDAR 45 (2016). The current stock ACL is monitored in MRIP-CHTS (presented in Table 1.1.1); however, recreational landings as currently recorded in the new MRIP Fishing Effort Survey (FES) data currency and are provided in Table 1.1.2; these MRIP-FES landings are currently calibrated back to the MRIP-CHTS data currency for quota monitoring purposes, since it is in the MRIP-CHTS data currency that the catch limits were established. A more detailed description on the recent changes to recreational catch and effort data, and historical landings comparisons from 1986 to 2019 can be found in Appendix B.

**Table 1.1.1.** Vermilion snapper landings by sector, stock ACL and percent ACL landed (2012 – 2020). Landings are in pounds whole weight (lbs ww) using MRIP-CHTS data units.

Year	Recreational	Commercial	Total Landings	Stock ACL	Total Landings (% ACL)
2012	719,926	2,441,360	3,161,286	3,420,000	92.4%
2013	1,131,054	1,418,401	2,549,455	3,420,000	74.5%
2014	1,147,574	1,745,222	2,892,796	3,420,000	84.6%
2015	1,053,269	1,352,934	2,406,203	3,420,000	70.4%
2016	1,118,252	1,565,364	2,683,616	3,420,000	78.5%
2017	1,479,681	1,612,859	3,092,540	3,420,000	90.4%
2018	1,797,815	1,398,445	3,196,260	3,110,000	102.8%
2019	1,355,763	1,283,633	2,639,396	3,110,000	84.9%
2020	1,058,136	860,613	1,918,750	3,110,000	61.7%

Source: MRIP data from MRIPACLspec\_rec81\_21wv3\_01Sep21w2014to2020LACreel.xlsx; Commercial landings from M. Larkin (NMFS-SERO). September 24, 2021.



**Table 1.1.2.** Vermilion snapper recreational landings by mode (2012-2020). Landings are in lbs ww using MRIP-FES data units.

Year	Charter	Headboat	Private	Total
2012	170,651	283,132	925,125	1,378,908
2013	302,959	302,328	1,220,917	1,826,204
2014	466,349	330,088	947,619	1,744,056
2015	367,276	338,865	836,032	1,542,173
2016	529,907	311,779	685,455	1,527,140
2017	660,805	430,518	1,355,116	2,446,438
2018	741,305	541,200	1,657,706	2,940,211
2019	458,612	409,294	1,393,872	2,261,779
2020	515,246	328,792	703,432	1,547,470

Source: FES data from MRIP\_FES\_rec81\_21wv3\_01Sep21w2014to2020LACreel.xlsx.  
September 24, 2021

### *Recent vermilion snapper stock assessments*

In 2012, the vermilion snapper ABC and ACL were set at 3.42 million pounds (mp) ww based on Tier 3a of the Council’s ABC Control Rule (GMFMC 2011). This data-poor method set the ABC based on the mean landings from 1999 through 2008, plus one standard deviation. An update assessment (SEDAR 9 Update 2012) determined the stock was neither overfished nor undergoing overfishing. Projections for the OFL and ABC conducted under Tier 1 of the ABC Control Rule, with a probability of overfishing ( $P^*$ ) = 39.8%, resulted in ABC yields higher than the existing 3.42 mp, suggesting that the ACL could be increased. However, members of the Council’s Reef Fish Advisory Panel (AP), as well as fishermen who testified to the Council suggested that, based on their personal observations, the vermilion snapper stock was not as healthy as the assessment suggested. As a result, the 3.42 mp ww ACL was maintained in a 2013 framework action (GMFMC 2013).

In 2016, an assessment for vermilion snapper was conducted with data through 2014 (SEDAR 45 2016). Stock status was evaluated using an MSY proxy of 30% spawning potential ratio (SPR) for spawning stock biomass ( $SSB_{30\% SPR}$ ) and fishing mortality ( $F_{SPR30\%}$ ), under which the stock was deemed not overfished and not experiencing overfishing.

Projections were made for the OFL and ABC. However, the SSC considered the ABCs calculated under Tier 1 of the ABC Control Rule to be too close to the OFLs, and instead provided ABC projections based on the yield when fishing at 75% of  $F_{SPR30\%}$ . This is the yield corresponding to optimum yield (OY) for vermilion snapper. Based on the results, the SSC offered two recommendations for ABC yield streams for the 5-year projection period from 2017 through 2021. The first was a declining yield stream from 3.21 mp ww in 2017 to 3.03 mp ww in 2021, and the second was a constant catch ABC of 3.11 mp ww for the entire 5-year period.

These two yield streams were considered biologically equivalent. The Council selected the constant catch scenario (GMFMC 2017).

In 2020, an assessment for vermilion snapper was completed (SEDAR 67 2020) using data through the 2017 fishing year. This assessment considers new data sources, including recreational catch and effort data in the FES data currency, and reconsidered previous decisions regarding discards and shrimp bycatch estimates. Based on results from SEDAR 67, the stock is not overfished and not experiencing overfishing. When reviewing SEDAR 67, the Council's SSC determined that the results of the model represented the best scientific information available for vermilion snapper and were suitable for management advice. An OFL recommendation of 8.6 mp ww (in the MRIP-FES data currency) was made based on the yield at  $F_{SPR30\%}$ . The SSC also provided a constant catch ABC recommendation of 7.27 mp ww (in the MRIP-FES data currency) for 2021 through 2025 based on the yield when fishing at 75% of  $F_{SPR30\%}$  with the ABC equal to OY.

## 1.2 Purpose and Need

The purpose of the proposed actions is to modify the OFL, ABC, and ACL, as applicable, consistent with the most recent stock assessment for Gulf vermilion snapper, and SSC and Reef Fish AP recommendations.

The need for the proposed actions is to establish catch limits that achieve OY consistent with the requirements of the Magnuson-Stevens Fishery Conservation and Management Act, while preventing overfishing.

## 1.3 History of Management

This history of management covers events pertinent to the management of vermilion snapper in the Gulf. A complete history of management for the Reef Fish FMP is available on the Council's website<sup>1</sup>. The original Reef Fish FMP [with its associated Environmental Impact Statement (EIS)] (GMFMC 1981) was implemented November 8, 1984.

### 1.3.1 Vermilion Snapper

**Amendment 1** [with its associated environmental assessment (EA), regulatory impact review (RIR), and regulatory flexibility analysis (RFA)] to the Reef Fish FMP, implemented in 1990, established a minimum size limit of 8 inches TL for vermilion snapper.

**Amendment 12** (with its associated EA and RIR), implemented in January 1997, created an aggregate bag limit of 20 reef fish for all reef fish species not having a bag limit (including vermilion snapper).

---

<sup>1</sup> <http://gulfcouncil.org/fishery-management/implemented-plans/reef-fish/>

**Amendment 15** (with its associated EA, RIR, and RFA), implemented in January 1998, increased the vermilion snapper minimum size limit from 8-inches TL to 10-inches TL.

**Amendment 23** [with its associated supplemental environmental impact statement ((EIS), RIR, and RFA)], implemented in July 2005, established a rebuilding plan for vermilion snapper, increasing the minimum size limit to 11-inches TL, implementing a 10-fish vermilion snapper bag limit within the 20-reef fish aggregate bag limit, and established an April 22 through May 31 closed season for the commercial sector. Furthermore, it established MSY for vermilion snapper as the yield associated with  $F_{MSY}$  when the stock is at equilibrium. It also established a maximum fishing mortality threshold (MFMT) where  $MFMT = F_{MSY}$ , and a MSST, where  $MSST = (1-M)*B_{MSY}$  or  $B_{MSY}$  proxy.

A **February 2007 Framework Action** (with its associated EA, RIR, and RFA), revised management measures for vermilion snapper to those prior to implementation of Reef Fish Amendment 23 by reducing the minimum size limit from 11-inches TL to 10-inches TL; eliminating the 10-fish bag limit for vermilion snapper, but retaining the 20-fish aggregate bag limit for those reef fish species without a species-specific bag limit, and eliminating the April 22 through May 31 commercial closed season.

The **Generic ACL/AM Amendment** (with its associated EIS, RIR, and RFA), implemented in January 2012, established an OFL and ACL; an ACT is not used for management purposes. It also established an in-season closure authority for when vermilion snapper landings reach or are projected to reach the ACL.

A **September 2013 Framework Action** (with its associated EA, RIR, and RFA) re-established a 10-vermilion snapper recreational bag limit within the 20-reef fish aggregate bag limit.

**Amendment 44** (with its associated EA), implemented in 2017, re-defined MSST for seven reef fish species including vermilion snapper. MSST was re-defined to be 50% of the BMSY proxy.

**Amendment 47** (with its associated EA, RIR, and RFA), implemented in 2018, decreased the ABC and ACL as a constant catch. An ACT was not set. MSY was updated to be the yield when fishing at  $F_{30\% SPR}$ .

## CHAPTER 2. MANAGEMENT ALTERNATIVES

### 2.1 Action 1 – Modify the Gulf of Mexico (Gulf) Vermilion Snapper Overfishing Limit (OFL), Acceptable Biological Catch (ABC), and Annual Catch Limit (ACL).

**Alternative 1:** No Action. Retain the OFL, ABC, and ACL for the vermilion snapper stock as implemented in 2018 by Reef Fish Amendment 47.

Year	OFL	ABC	ACL
<b>2021+ (MRIP-CHTS)</b>	3,580,000	3,110,000	3,110,000

Note: Values are in lbs whole weight (ww).

**Alternative 2:** Modify the OFL, ABC, and ACL for vermilion snapper based on the recommendation of the Scientific and Statistical Committee (SSC) for a constant catch yield for 2021 to 2025, and then maintains the ACL at the 2025 level for subsequent fishing years or until changed by management. The stock ABC equals OY and the ACL equals the ABC.

Year	OFL	ABC	ACL
<b>2021-2025+ (MRIP-FES)</b>	8,600,000	7,270,000	7,270,000

Note: Values are in pounds whole weight. Units are in MRIP-FESit values in MRIP-

#### Discussion

**Alternative 1** (No Action) retains the existing OFL, ABC, and ACL that were based on the previous vermilion snapper stock assessment (SEDAR 45 2016). The ACL is equal to the ABC implemented in 2018 under Amendment 47 (GMFMC 2017c) to the Fishery Management Plan for Reef Fish Resources in the Gulf of Mexico (Reef Fish FMP), which set the ACL for vermilion snapper for the years 2017 – 2021+ (“+” denotes: “and subsequent years”) as the constant catch average of the 5-year annual ACLs when fishing at 75% of the maximum sustainable yield (MSY) proxy of fishing mortality at 30% spawning potential ratio ( $F_{SPR30\%}$ ). The OFL, ABC and ACL in **Alternative 1** are presented in the Marine Recreational Information Program’s Coastal Household Telephone Survey (MRIP-CHTS) data currency, which no longer represents best scientific information available based on the recommendations given by the SSC from the most recent SEDAR 67 (2020) stock assessment. Furthermore, one of the major changes between the SEDAR 45 (2016) and SEDAR 67 base models is the incorporation of the MRIP Fishing Effort Survey (FES) adjustments to the recreational catch and effort estimates, which are generally twice as large as those generated by MRIP-CHTS. SEDAR 67 used MRIP-FES for yield projections; due to this transition in data currency, retaining the OFL, ABC and ACL in MRIP-CHTS units as presented in **Alternative 1** would require recreational landings monitored in MRIP-FES units to be converted to MRIP-CHTS units. Because the catch limits in **Alternative 1** do not represent the best scientific information available, **Alternative 1** is not a viable alternative under National Standard 2 of the Magnuson-Stevens Fishery Conservation and Management Act.

The SEDAR 67 stock assessment determined that vermilion snapper was neither overfished nor experiencing overfishing. The SSC determined SEDAR 67 to be the best scientific information available and, based on the assessment, recommended an OFL and ABC yield stream for 2021 – 2025 and beyond. The SSC thought it more appropriate to recommend average (constant catch) yields as opposed to annual yields, as constant catch may help account for year-to-year variability while also providing consistency for stakeholders. A buffer between the OFL and the ABC would remain in place to account for scientific uncertainty, and is determined using the Gulf of Mexico Fishery Management Council’s (Council) ABC Control Rule.

An alternative that contains a buffer between the ABC and ACL is not considered herein because the vermilion snapper stock is not overfished and is not experiencing overfishing. Further, landings of vermilion snapper have only exceeded the stock ACL once (in 2018; see Table 1.1.1). As such, accounting for additional management uncertainty in the form of a buffer between the ACL and the ABC has not been determined to be necessary by the Council. Accountability measures (AM) for vermilion snapper are based on the ACL, and apply to all fishing activity on the stock (recreational and commercial). This AM was adopted in the Generic ACL/AM Amendment (GMFMC 2011) and states that if the ACL is reached or projected to be reached within a fishing year, the fishing season is to close for the remainder of the fishing year.

**Alternative 2** sets a constant catch ACL, which is equal to the ABC, for 2021 – 2025, and then maintains the ACL at the 2025 level for subsequent years until changed by future management action. The ABC, which equals the optimum yield (OY), is currently equal to the ACL. The ABC in this alternative is set lower than the OFL to account for scientific uncertainty. The catch limits proposed in **Alternative 2** also differ from **Alternative 1** because of the recreational survey data currency used to generate the catch limits. Catch limits for **Alternative 2** are calculated using the MRIP-FES data currency; landings data for vermilion snapper are currently collected in MRIP-FES and then must be back-calibrated to MRIP-CHTS for quota monitoring purposes under **Alternative 1**. Table 2.1.1 was generated within the most recent stock assessment (SEDAR 67 2020) to show the effect of the MRIP-FES data on the equilibrium yield, which is shown in millions of lbs (mp) ww. The increase in projected biomass is due largely to the transition from MRIP-CHTS to MRIP-FES, and partly due to exceptional recruitment in 2015 and 2016.

**Table 2.1.1.** Summary of projections at  $F_{SPR30\%}$  completed using the original SEDAR 45 base model, the SEDAR 45 base model with the recreational data updated to the FES values, and the SEDAR 67 base model in FES.

Model	Terminal Year	SSB	$F_{SPR30\%}$	SSB <sub>0</sub>	SSB <sub><math>F_{SPR30\%}</math></sub>	Equilibrium Yield
SEDAR 45 (CHTS)	2014	1.91E+14	0.103	6.56E+14	1.97E+14	3.35
SEDAR 45 (if in FES)	2014	2.28E+14	0.14	6.51E+14	1.96E+14	5.19
SEDAR 67 (FES)	2017	2.22E+14	0.135	6.73E+14	2.02E+14	5.91

Note: Equilibrium yield is shown in millions of pounds whole weight.

## CHAPTER 3. REFERENCES

- Foster, J., F.J. Breidt, and J.D. Opsomer. 2018. APAIS data calibration methodology report. 10 pp. <https://www.fisheries.noaa.gov/webdam/download/68183814>
- GMFMC. 1981. Environmental impact statement and fishery management plan for the reef fish resources of the Gulf of Mexico. Gulf of Mexico Fishery Management Council, Tampa, Florida. 328 pp. <https://gulfcouncil.org/wp-content/uploads/FISHERY%20MANAGEMENT/REEF%20FISH/RF%20FMP%20and%20EIS%201981-08.pdf>
- GMFMC. 2011. Final generic annual catch limits/accountability measures amendment for the Gulf of Mexico fishery management council's red drum, reef fish, shrimp, coral and coral reefs fishery management plans, including environmental impact statement, regulatory impact review, regulatory flexibility analysis, and fishery impact statement. Gulf of Mexico Fishery Management Council. Tampa, Florida. 378 pp. [http://www.gulfcouncil.org/docs/amendments/Final%20Generic%20ACL\\_AM\\_Amendment-September%209%202011%20v.pdf](http://www.gulfcouncil.org/docs/amendments/Final%20Generic%20ACL_AM_Amendment-September%209%202011%20v.pdf)
- GMFMC. 2013 Framework action to set the annual catch limit and bag limit for vermilion snapper, set annual catch limit for yellowtail snapper, and modify the venting tool requirement. Including environmental assessment, regulatory impact review, and regulatory flexibility act analysis. Gulf of Mexico Fishery Management Council, Tampa, Florida. 171 pp. <http://gulfcouncil.org/docs/amendments/2013%20Vermilion-Yellowtail-Venting%20Tool%20Framework%20Action.pdf>
- GMFMC. 2017a. Final amendment 44 (revised) to the fishery management plan for the reef fish resources of the Gulf of Mexico: Minimum stock size threshold (MSST) revision for reef fish stocks with existing status determination criteria, including environmental assessment and fishery impact statement. Gulf of Mexico Fishery Management Council, Tampa, Florida. 124 pp. <http://gulfcouncil.org/wp-content/uploads/Final-Amendment-44-revised-MSST-GOM-Reef-Fish-update-2.pdf>
- GMFMC. 2017b. Final amendment 47 to the fishery management plan for the reef fish resources of the Gulf of Mexico: Establish a vermilion snapper MSY proxy and adjust the stock annual catch limit, including environmental assessment, fishery impact statement, regulatory impact review, and regulatory flexibility act analysis. Gulf of Mexico Fishery Management Council, Tampa, Florida. 146 pp. <http://gulfcouncil.org/wp-content/uploads/Final-Amendment-47-Vermilion-snapper-ACL-and-MSY-proxy.pdf>
- NOAA. 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.

Pollack, A.G., G. W. Ingram, Jr., M.D. Campbell, D.A. DeVries, C. L. Gardner and T. S. Switzer. 2015. Vermilion snapper reef fish video index for the eastern Gulf of Mexico: A combined index from three fishery-independent surveys. SEDAR45-WP-09. SEDAR, North Charleston, South Carolina. 23 pp.

SEDAR 9 Update. 2011a. An alternative SSASPM stock assessment of Gulf of Mexico vermilion snapper that incorporates the recent decline in shrimp effort. Southeast Fisheries Science Center, Miami. 87 pp.

<http://sedarweb.org/docs/suar/Final%20Vermilion%20Snapper%20Update%20with%20addendum.pdf>

SEDAR 9 Update. 2012. Revised projections to the SEDAR update stock assessment of vermilion snapper in the Gulf of Mexico. NMFS, Southeast Fisheries Science Center, Miami. 24 pp. <http://sedarweb.org/sedar-9>

SEDAR 45. 2016. Stock assessment report Gulf of Mexico vermilion snapper. Southeast Data, Assessment, and Review, North Charleston, South Carolina. 188 pp.

[http://sedarweb.org/docs/sar/S45\\_Final\\_SAR.pdf](http://sedarweb.org/docs/sar/S45_Final_SAR.pdf)

SEDAR 67. 2020. Stock assessment report Gulf of Mexico Vermilion Snapper. Southeast Data, Assessment, and Review, North Charleston, South Carolina. 199 pp.

[http://sedarweb.org/docs/sar/S67\\_Final\\_SAR\\_v2.pdf](http://sedarweb.org/docs/sar/S67_Final_SAR_v2.pdf)

## 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 vermilion snapper and gray triggerfish; the first recreational fishing estimates became available in 1981. The program included the Access Point Angler Intercept Survey (APAIS), which consisted of onsite interviews at marinas and other points where recreational anglers fish, to determine catch. MRFSS also included the 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 2008, the Marine Recreational Information Program (MRIP) was established to replace MRFSS to meet increasing demand for more precise, accurate, and timely recreational catch estimates. After the National Academies of Sciences identified potential sources of bias in the sampling process, catch survey protocols were revised. This led to a new design for the APAIS that was certified and subsequently implemented in 2013 to measure recreational catch on the Atlantic and Gulf coasts. This significantly improved how intercepts were conducted. This new design addressed concerns regarding the validity of the survey approach, specifically that trips recorded during a given time period were representative of trips for a full day (Foster et al. 2018). The more complete temporal coverage with the new survey design provided 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 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. Subsequently, MRIP transitioned from the CHTS to a new mail-based Fishing Effort Survey, (FES) beginning in 2015, and in 2018, replaced the CHTS. Both survey methods collect data needed to estimate marine recreational fishing effort (number of fishing trips) by shore and private/rental boat anglers on the Atlantic and Gulf coasts. The CHTS used random-digit dialing of homes in coastal counties to contact anglers. The new mail-based FES uses angler license and registration information as one way to identify and contact anglers (supplemented with data from the U.S. Postal Service, which includes virtually all U.S. households). Because the FES and CHTS are so different, NMFS conducted side-by-side testing of the two methods from 2015 to 2018 and developed calibration procedures to convert the historical catch estimates (MRFSS, MRIP-CHTS, MRIP-APAIS [collectively MRFSS]) into MRIP-FES. In general, landings estimates are higher using the MRIP-FES as compared to the



MRFSS estimates. This is because the FES is designed to more accurately measure fishing activity than the CHTS, not because there was a sudden rise in fishing effort. NMFS developed a calibration model to adjust historic effort estimates so that they can be accurately compared to new estimates from the FES. The new effort estimates alone do not lead to definitive conclusions about stock size or status in the past or currently. 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).

## APPENDIX B. VERMILION SNAPPER RECREATIONAL LANDINGS BY STATE

**Table C1.** Vermilion snapper recreational landings by state in MRIP-FES. Landings are in pounds whole weight.

Year	AL	AL/FLW	FLW	LA	LA/MS	MS	TX	Total
1986	66759	261887	426178	5089	1645	0	35208	796767
1987	108427	248378	638794	1910	157	0	35338	1033004
1988	337757	299202	620598	0	730	0	33981	1292267
1989	114839	165018	503293	0	615	0	63182	846946
1990	298275	208218	503795	971	614	213	110862	1122948
1991	318577	215735	910932	11732	1377	1110	80113	1539575
1992	626599	288268	687179	103282	5737	1304	96119	1808489
1993	448152	235796	775791	3672	7383	5935	66043	1542772
1994	415183	219480	352499	2883	2623	59	115253	1107981
1995	231512	189850	584594	3450	3004	0	119260	1131670
1996	148422	126805	110310	2320	1002	0	102851	491711
1997	249385	110851	268745	12611	605	1508	122806	766510
1998	170639	74121	133667	11182	209	0	82410	472228
1999	413621	104948	378487	11642	1467	2995	63193	976353
2000	67491	100639	154296	0	941	0	75034	398400
2001	345330	103920	549510	19215	1065	0	78119	1097160
2002	421289	110963	671039	18730	755	0	100183	1322960
2003	147742	171872	662732	39806	824	1745	123313	1148033
2004	178650	179768	486967	70321	0	6040	125535	1047281
2005	220577	158493	262991	1827	0	0	105081	748969
2006	104184	172956	499969	33688	0	1766	64221	876784
2007	51871	116194	563896	20437	106	0	130654	883159
2008	101492	162457	288737	60710	612	0	24791	638799
2009	109468	262692	645589	111	228	0	39070	1057158
2010	120645	154610	416996	0	3	0	53485	745740
2011	276732	401545	1156462	0	366	0	49701	1884806
2012	42619	232842	1053110	0	528	0	49810	1378908
2013	308412	0	1443835	2104	234	0	71600	1826184
2014	441085	0	1236427	3822	86	0	62654	1744076
2015	323329	0	1133002	7308	2733	0	75802	1542174
2016	173367	0	1119890	10812	787	167007	55278	1527140
2017	639526	0	1716197	19115	784	0	70817	2446438
2018	534896	0	2306633	22429	647	9295	66311	2940211
2019	406439	0	1717236	57452	2669	2040	75942	2261778

Source: SEFSC MRIP-FES Recreational ACL data (May 8, 2020).

**Table C2.** Vermilion snapper recreational landings in MRIP-CHTS units. Landings are in pounds whole weight.

Year	AL	AL/FLW	FLW	LA	LA/MS	MS	TX	Total
1986	67999	261887	320576	2888	1645	0	35208	690204
1987	52654	248378	311405	2215	157	0	35338	650147
1988	79977	299202	409152	0	730	0	33981	823041
1989	94183	165018	298367	0	615	0	63182	621366
1990	463101	208218	212565	2402	614	757	110862	998518
1991	296212	215735	457640	11811	1377	14138	80113	1077026
1992	455983	288268	324314	36398	5737	631	96119	1207451
1993	446300	235796	449031	1597	7383	1534	66043	1207684
1994	239661	219480	235490	7231	2623	439	115253	820176
1995	239663	189850	398064	5971	3004	0	119260	955812
1996	181308	126805	91412	2089	1002	0	102851	505468
1997	318078	110851	147378	8021	605	1722	122806	709460
1998	183024	74121	65282	4191	209	0	82410	409237
1999	248620	104948	126267	3771	1467	1171	63193	549436
2000	45407	100639	115944	0	941	0	75034	337965
2001	226033	103920	226599	7919	1065	0	78119	643657
2002	151974	110963	206554	7898	755	0	100183	578327
2003	106906	171872	214840	19937	824	886	123313	638578
2004	128845	179768	291286	78254	0	2106	125535	805794
2005	84511	158493	171968	2487	0	0	105081	522541
2006	80522	172956	245926	35234	0	643	64221	599503
2007	38016	116194	307061	22138	106	0	130654	614170
2008	89961	162457	192836	50571	612	0	24791	521228
2009	57601	262692	325519	132	228	0	39070	685242
2010	47475	154610	214598	0	3	0	53485	470171
2011	173871	401545	518957	0	366	0	49701	1144439
2012	30822	232842	405924	0	528	0	49810	719926
2013	210578	0	847132	1492	234	0	71600	1131035
2014	240265	0	857239	3822	86	0	62654	1164066
2015	181524	0	707130	7308	2733	0	75802	974497
2016	125353	0	779898	10812	787	38250	55278	1010377
2017	261733	0	1127232	19115	784	0	70817	1479681
2018	360035	0	1344814	22429	647	3579	66311	1797815
2019	263813	0	955321	57452	2669	564	75942	1355761

Source: SEFSC MRIP-CHTS Recreational ACL data (May 18, 2020).