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Modification of the Gulf of Mexico Lane Snapper Catch Limits and Accountability Measures

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

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ENVIRONMENTAL ASSESSMENT COVER SHEET

Name of Action

Modification of the Gulf of Mexico Lane Snapper Catch Limits and Accountability Measures: Framework Action to the Fishery Management Plan for Reef Fish Resources in the Gulf of Mexico.

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ABBREVIATIONS USED IN THIS DOCUMENT

ABC	acceptable biological catch
ACL	annual catch limit
ACT	annual catch target
AM	accountability measure
APAIS	Access Point Angler Intercept Survey
CHTS	coastal household telephone survey
CI	confidence interval
Council	Gulf of Mexico Fishery Management Council
CPUE	catch per unit
DLMTool	Data-Limited Methods Toolkit
ESA	Endangered Species Act
FES	Fishing Effort Survey
FHS	For-Hire Survey
FMP	Fishery Management Plan
Gulf	Gulf of Mexico
LA Creel	Louisiana Department of Wildlife and Fisheries creel survey
Magnuson-Stevens Act	Magnuson-Stevens Fishery Conservation and Management Act
MRFSS	Marine Recreational Fisheries Statistics Survey
MRIP	Marine Recreational Information Program
MSY	maximum sustainable yield
NMFS	National Marine Fisheries Service
OFL	overfishing limit
PDF	probability density function
Reef Fish FMP	Fishery Management Plan for Reef Fish Resources in the Gulf of Mexico
SEDAR	Southeast Data, Assessment, and Review process
SEFSC	Southeast Fisheries Science Center
SRHS	Southeast Region Headboat Survey
SSBR	spawning stock biomass
SSC	Scientific and Statistical Committee
TPWD	Texas Parks and Wildlife
ww	whole weight

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CHAPTER 1. INTRODUCTION

1.1 Background

Gulf of Mexico (Gulf) Lane snapper is managed under the Fishery Management Plan (FMP) for Reef Fish Resources in the Gulf of Mexico (Reef Fish FMP) and harvest is monitored as a single stock with no allocation between the commercial and recreational sectors. In 2012, the Generic Annual Catch Limits and Accountability Measures Amendment for the Gulf of Mexico (Generic ACL/AM Amendment; GMFMC 2011) defined the catch limits for lane snapper including the overfishing limit (OFL), acceptable biological catch (ABC), and ACL. Additionally, the Generic ACL/AM Amendment established AMs for lane snapper by defining an annual catch target (ACT) and an in-season closure for the following year should the ACL be exceeded (GMFMC 2011). A more detailed description of the establishment of catch limits and AMs specific to lane snapper as defined in the Generic ACL/AM Amendment (GMFMC 2011) are outlined in the next two sections. This framework action evaluates modifications of the lane snapper catch limits, ACT, and seasonal closure AM in response to the latest stock assessment, changes to the collection of recreational data, and recent overharvest of the stock ACL.

Establishment of lane snapper catch limits

In the Generic ACL/AM Amendment, catch limits for lane snapper were defined using the Gulf of Mexico Fishery Management Council's (Council) ABC Control Rule, which employs a tiered approach in setting harvest thresholds for species based on factors such as stock status and scientific uncertainty (GMFMC 2011). Tier 3a of this control rule was used to establish the OFL and ABC for lane snapper. Tier 3a is used for species when no stock assessment is available, but landings data exist, and the probability of exceeding the OFL in a given year can be approximated from the variance about the mean of recent landings. Using this control rule, the OFL for lane snapper was set at the mean of landings for a defined 10-year reference period (1999-2008) plus two standard deviations, which equaled 358,000 lbs whole weight (ww; Table 1.1.1). The ABC, which must be set at or below the OFL and accounts for scientific uncertainty was set at the mean of landings for the reference period plus one standard deviation, equal to 301,000 lbs ww (Table 1.1.1). The ACL was set equal to the ABC (Table 1.1.1).

Establishment of lane snapper AMs

An ACT was established for lane snapper; however, it is not currently used to trigger the seasonal closure AM. Instead, landings are monitored relative to the ACL (GMFMC 2011). The ACT is calculated as a fraction of the ACL and provides a buffer to account for management uncertainty and reduces the probability of meeting or exceeding the ACL. For lane snapper, the ACT was set at 14% below the ACL at 259,000 lbs ww (Table 1.1.1) and was calculated using the Council's ACL/ACT Control Rule (GMFMC 2011; Appendix A). The Generic ACL/AM Amendment (GMFMC 2011) also implemented a seasonal closure AM. In the event the ACL is exceeded in a given year, an in-season closure is triggered if the ACL is met or estimated to be met in the following year (Table 1.1.1).

Table 1.1.1. Current catch limits and AMs for lane snapper as defined in the Generic ACL/AM Amendment. The 1999-2008 fishing seasons were used to compute the 10-year average. All values for catch limits and the ACT are in pounds whole weight.

Catch limits		
Type	**Value**	**Calculation method**
OFL	358,000	10-year average + 2 standard deviations
ABC	301,000	10-year average + 1 standard deviations
ACL	301,000	Set equal to ABC
Accountability Measures		
ACT	Set at 259,000 lbs ww based on the Council's ACL/ACT Control Rule (A 14% reduction from the ACL)	
Seasonal closure	In the year following an overage of the ACL, an in-season closure will occur if harvest meets or is predicted to meet the ACL within that fishing year.	

Recent lane snapper landings and seasonal closure implementation

The lane snapper fishing season runs from January 1 – December 31. The ACL is based on the total catch and is not allocated between the commercial and recreational sectors. Lane snapper is subject to an 8-inch total length size limit (commercial and recreational) and is included within the 20-reef fish aggregate recreational bag limit. Lane snapper harvest has exceeded the ACL each year from 2016 – 2019 (2019 data are preliminary; Table 1.1.2). In 2017, lane snapper harvest exceeded the ACL by 188%. In early 2019, the National Marine Fisheries Service (NMFS) notified the Council that landings in 2017 exceeded the OFL, resulting in overfishing. NMFS stated that preliminary 2018 data indicated that landings would not exceed the OFL in 2018, but likely exceeded the ACL, and that a closure in 2019 may be necessary[1]. In December 2019, a seasonal closure AM was implemented upon projection that the ACL would be met[2]. While 2019 landings data are preliminary, as of August 2020, lane snapper harvest for the 2019 fishing year was 382,398 lbs (127 percent of ACL).[3] Lane snapper recreational, commercial, and total landings for 1999 through 2019 are presented in Table 1.1.2. Recreational harvest data in Table 1.1.2 are presented in the Marine Recreational Fisheries Statistics Survey (MRFSS) units so that they are directly comparable to the current catch limit. A more detailed description on the recent changes to the collection of recreational data collection can be found in the "*Changes to the Recreational Data Collection Survey*" section.

Currently, private recreational landings data are collected from the following fishery-dependent surveys: the Marine Recreational Information Program (MRIP) Fishing Effort Survey (FES), the Access Point Angler Intercept Survey (APAIS), the Southeast Region Headboat Survey (SRHS), Louisiana Department of Wildlife and Fisheries creel survey (LA Creel), and the Texas Parks

[1] Later in 2019, NMFS determined that 2018 landings had exceeded the OFL. However, the SEFSC then revised the 2018 recreational landings estimates to reflect more precise weight estimates within sample areas. This resulted in a decreased estimate of the recreational landings for Gulf lane snapper, and a subsequent determination that this stock was not subject to overfishing in 2018 (i.e., OFL was not exceeded).
[2] https://www.fisheries.noaa.gov/bulletin/recreational-and-commercial-harvest-lane-snapper-federal-waters-gulf-mexico-will-close
[3] https://www.fisheries.noaa.gov/southeast/2018-2020-preliminary-gulf-mexico-stock-annual-catch-limit-landings

and Wildlife Department creel survey (TPWD). Charter vessel landings estimates are generated through the For-Hire Survey (FHS) and APAIS. Headboat catch estimates are from the SRHS, which incorporates data from approximately 65 to 70 permitted headboats in the Gulf. Once landings are received by the Southeast Fisheries Science Center (SEFSC), they are checked for errors, any necessary weight estimates are generated, and the landings are combined into an ACL dataset for monitoring landings. The availability of recreational landings for monitoring is survey-dependent. For example, MRIP-FES landings are generated in two-month waves, and are typically provided within 45 days after a wave ends (e.g., May – June landings are usually provided by August 15). SRHS landings for species with in-season closures are typically available within one month of landing, and an annual summary of headboat landings for all stocks is available by March of the following year. However, NMFS recently published a final rule (85 FR 44005, effective Jan. 5, 2021) that will require trip level electronic reporting for all federally permitted charter and headboats in the Gulf. This is expected to increase the accuracy and timeliness of data from the SRHS, but may take longer for landings for charter vessels to be used for management. TPWD provides landings twice a year for low-use (November 21 – May 14) and high-use (May 15 – November 20) waves. TPWD low-use wave landings are available by fall (approximately October) and TPWD high-use wave landings are available in spring (approximately March). LA Creel landings are available approximately two weeks after landing.

Table 1.1.2. Lane snapper landings for the recreational (in MRFSS) and commercial sectors in pounds whole weight for the years 1999 through 2018.

Year	Recreational Sector (MRFSS)	Commercial Sector	Total	Total ACL	% Total ACL
1999	176,052	49,233	225,285		
2000	122,287	47,684	169,971		
2001	276,414	48,782	325,196		
2002	166,543	52,970	219,513		
2003	179,742	50,584	230,326		
2004	283,281	50,772	334,053		
2005	249,983	39,951	289,934		
2006	184,446	49,340	233,786		
2007	205,793	29,222	235,015		
2008	179,013	25,475	204,488		
2009	207,468	35,848	243,316		
2010	94,697	17,262	111,959		
2011	92,172	14,365	106,537		
2012	154,787	28,928	183,715	301,000	61%
2013	222,713	23,189	245,902	301,000	82%
2014	246,996	30,249	277,245	301,000	92%
2015	207,243	46,163	253,406	301,000	84%
2016	272,247	34,913	307,160	301,000	102%
2017	523,878	42,831	566,709	301,000	188%
2018	312,882	26,600	339,482	301,000	113%
2019*	382,398	23,716	358,682	301,000	127%

*2019 data are preliminary (current as of August, 2020)
Source: SEFSC Commercial ACL data (Nov 2019) and SEFSC MRFSS Recreational ACL data (Apr 2020).

Stock Assessment

In 2016, the Southeast Data, Assessment, and Review (SEDAR) process completed a stock assessment on Gulf lane snapper (SEDAR 49 2016). Lane snapper was assessed using the iTarget model from NOAA's Data-Limited Methods Toolkit (DLMtool).[4] The iTarget model is not specifically designed to provide a stock status determination; however, it can be used to infer stock condition based on historical data. The harvest data time series for the assessment encompassed the 1986 through 2014 fishing years. When reviewing SEDAR 49, the Council's Scientific and Statistical Committee (SSC) determined that the results of the model (OFL = 364,082 lbs, ABC = 355,501 lbs) represented the best scientific information available for lane snapper and were suitable for management advice. Because the 2016 SEDAR 49 results were

[4] DLMtool available at http://www.datalimitedtoolkit.org/.

similar to what had been established in the 2011 Generic ACL/AM Amendment, the Council determined that it was not necessary to implement the SSC recommendations and previous harvest thresholds established by the Generic ACL/AM Amendment remained in place (Table 1.1.1).

On June 6, 2019, in response to the notification from NMFS that lane snapper experienced overfishing in 2017 and exceeded the ACL in 2018, the Council requested that the SEFSC provide an update to the most recent lane snapper assessment to include the additional landings data from the 2015-2018 fishing years in the data time series. The SEFSC completed the update to SEDAR 49 and recreational landings data reported by participants in the SRHS from 1986-2018 were used to update an index of abundance for lane snapper (SEDAR 49 Update 2019) .[5]

At the September 2019 SSC meeting, the SEFSC presented the results of the SEDAR 49 update. The SSC determined that this update represented the best scientific information available. However, the recreational data used in the assessment update and presented to the SSC was in APAIS-adjusted MRIP values, and the effort portion of this survey has been replaced by the MRIP Fishing Effort Survey (MRIP-FES; see section below). The SSC requested that the recreational data used to calculate the estimated catch limits be converted to values directly comparable to those collected in the MRIP-FES as recommended by NMFS (NOAA Fisheries 2019). At the January 2020 SSC meeting, the SEFSC presented the updated catch limits using the MRIP-FES converted recreational landings. However, the January 2020 update provided estimates of catch limits for total removals including dead discards rather than landings that are used in quota monitoring. Thus, the SSC requested additional projections based on landings rather than total removals. The SEFSC provided these projections and resulting catch limit projections in a March 2020 memo.[5] At the March 2020 SSC meeting, the SSC determined that the most recent methods used to generate catch limits for lane snapper represented the best scientific information available and were suitable for management advice. Since catch limit estimates were generated based on the March 2020 SEDAR 49 assessment update, the SSC recommended modifying the justification for setting lane snapper catch limits from the Tier 3a approach to the Tier 2 approach outlined in the Generic ACL/AM Amendment (GMFMC 2011).

The Tier 2 approach for setting management thresholds is appropriate for species where a stock assessment exists but does not provide an estimate of maximum sustainable yield (MSY) or its proxy. Instead, the assessment provides a measure of OFL based on a probability density function (PDF) that can be calculated to estimate scientific uncertainty in the model-derived OFL measure. This PDF can be used to approximate the probability of exceeding the OFL, thus providing a buffer between the OFL and ABC (GMFMC 2011). The SSC recommended establishing an ABC with a 30% probability of overfishing and an OFL with a 50% probability of overfishing for lane snapper.

Changes to the Recreational Data Collection Survey

MRFSS was started by NMFS in 1979. In the Gulf, MRFSS collected data on catch and effort in recreational fisheries, including lane snapper, and the first recreational estimates derived from

[5] https://drive.google.com/open?id=1kXvp8ejSAxt1XKQLTv9YCrQt4UKPmrVj

the program were available in 1981. The program included the APAIS, which consists of on-site 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 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 (i.e., for-hire vessels that do not participate in the SRHS) and a weekly telephone sample of the charter boat operators to obtain effort information.

MRFSS was phased out and replaced by the MRIP in 2013. 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. MRIP also began incorporating improved survey methods for MRIP-APAIS to estimate recreational catch in 2013. The improvements to APAIS addressed concerns regarding the validity of the previous 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 MRIP-APAIS provides for improved angler catch-rate estimates, which are used in stock assessments and management (NOAA Fisheries 2019).

MRIP began transitioning from the legacy CHTS to a new mail FES beginning in 2015. In 2018, FES completely replaced the CHTS to estimate private recreational effort. 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 use different methodology, 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. NMFS determined that the MRIP-FES data, when fully calibrated to ensure comparability among years and across states, produced the best available data for use in stock assessments and management (NOAA Fisheries 2019). Table 1.1.3 reports lane snapper landings for the 1999 through 2018 fishing years using the MRIP-FES harvest data for the recreational sector.

Table 1.1.3. Lane snapper landings for the recreational (in MRIP-FES) and commercial sectors in pounds whole weight for the years 1999 through 2018.

Year	Recreational Sector (MRIP-FES)	Commercial Sector	Total
1999	476,545	48,782	525,327
2000	221,657	52,970	274,627
2001	829,636	48,782	878,418
2002	434,789	52,970	487,759
2003	501,227	50,584	551,811
2004	606,849	50,772	657,621
2005	509,985	39,951	549,936
2006	513,265	49,340	562,605
2007	531,427	29,222	560,649
2008	354,497	25,475	379,972
2009	535,177	35,848	571,025
2010	178,745	17,262	196,007
2011	151,383	14,365	165,748
2012	423,289	28,928	452,217
2013	456,629	23,189	479,818
2014	468,017	30,249	498,266
2015	400,237	46,163	446,400
2016	612,604	34,913	647,517
2017	1,272,225	42,831	1,315,056
2018	791,572	26,600	818,172

Source: SEFSC Commercial ACL data (Nov 2019), and SEFSC MRIP FES Recreational ACL data (Jan 2020).

Summary of background and considerations for future lane snapper management

In summary, changes to lane snapper management are being considered due to an increase in stock biomass as documented in the latest stock assessment, changes to the collection of recreational data, and recent overages of the stock OFL and ACL. The SSC has recommended an increase to catch limits based on the most recent assessment update and has also recommended that catch limits for lane snapper be monitored using recreational data collected from the MRIP-FES to align with the current protocol used by SEFSC for recreational catch estimation. Action 1 considers updates to the lane snapper stock catch limits and ACT based on the SSC's recommendations (Table 1.1.4). Lastly, given the recent observed overharvest of the ACL, a modification to the seasonal closure AM is considered in Action 2 (Table 1.1.4).

Table 1.1.4. Actions considered in this framework action to update the catch limits and ACT of lane snapper along with potential considerations for modifying the seasonal closure AM.

Action 1 – Updating Catch Limits and ACT					
Alternative	**OFL**	**ABC**	**ACL**	**ACT**	**Description**
Alternative 1	*358,000*	*301,000*	*301,000*	*259,000*	Retains current values. Does not account for stock assessment update or changes in recreational data collection
Alternative 2	1,053,834	1,028,973	1,028,973	Not set	Updates catch limits only (not ACT) to account for stock assessment and changes in recreational data collection
Alternative 3	1,053,834	1,028,973	1,028,973	864,337	Updates catch limits and ACT to account for stock assessment and changes in recreational data collection

Action 2 – Modification of seasonal closure AM	
Alternative	**Description**
Alternative 1	Retains current seasonal closure AM: In the year following a harvest exceeding the **ACL**, the stock is monitored to the **ACL** and an in-season closure will occur if harvest meets or is predicted to meet the **ACL** within that fishing year.
Alternative 2	Modifies seasonal closure AM: In the year following a harvest exceeding the **ACL**, the stock is monitored to the **ACT** and an in-season closure will occur if harvest meets or is projected to meet the ACT within that fishing year.
Alternative 3: Option a	Modifies seasonal closure AM to an in-season closure should the **ACL** be projected to be met or exceeded during the fishing year
Alternative 3: Option b	Modifies seasonal closure AM to an in-season closure should the **ACT** be projected to be met or exceeded during the fishing year

Notes: Values for the catch limits and ACT are in pounds whole weight. Non-italicized values represent catch limits and the ACT calculated using recreational data in MRIP-FES. Italicized values represent catch limits and the ACT calculated using recreational data in MRFSS.

1.2 Purpose and Need

The purpose is to modify the OFL, ABC, and ACL based on recently updated yield projections for Gulf lane snapper and to consider updating the current AMs to account for management uncertainty.

The need is to update existing lane snapper catch limits and AMs based on the best scientific information available and to achieve optimum yield consistent with the requirements of the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act), while preventing overfishing.

1.3 History of Management

The **Reef Fish FMP** was implemented November 8, 1984. The original list of species included in the management unit consisted of snappers, groupers, and sea basses. This summary focuses on management actions pertinent to the harvest of lane snapper. A complete history of management for the **Reef Fish FMP** is available on the Council's website.[6]

Amendment 1 to the Reef Fish FMP was implemented February 21, 1990, and was a major revision of the original Reef Fish FMP. It set as a primary objective of the FMP the stabilization of long-term population levels of all reef fish species by establishing a survival rate of biomass into the stock of spawning age to achieve at least 20% spawning stock biomass per recruit (SSBR), relative to the SSBR that would occur with no fishing. The target date for achieving the 20% SSBR goal was set at January 1, 2000. Amendment 1 also set an 8-inch total length minimum size limit on lane snapper for both the commercial and recreational sectors.

Amendment 12, implemented in January 1997, created an aggregate bag limit of 20 reef fish for all reef fish species not having a bag limit (including lane snapper).

The **Generic ACL/AM Amendment** was implemented on January 30, 2012, and addressed a requirement in the Reauthorized Magnuson-Stevens Act of 2006 to establish ACLs and AMs for federally managed species. The amendment established an OFL of 358,000 lbs, and an ABC of 301,000 lbs for lane snapper based on Tier 3a of the Council's ABC Control Rule. The lane snapper ACL was set equal to the ABC. This action also established a control rule to set an ACT for several species including lane snapper.

[6] https://gulfcouncil.org/wp-content/uploads/FISHERY%20MANAGEMENT/REEF%20FISH/RF%20FMP%20and%20EIS%201981-08.pdf

CHAPTER 2. MANAGEMENT ALTERNATIVES

2.1 Action 1 – Modify Catch Limits and Annual Catch Target for Lane Snapper

Alternative 1: No Action. The lane snapper overfishing limit (OFL), acceptable biological catch (ABC), annual catch limit (ACL), and annual catch target (ACT) will remain the same as implemented in 2012 by the Generic ACL and Accountability Measures (ACL/AM) Amendment.

Year	OFL	ABC	ACL	ACT
2020+	358,000	301,000	301,000	259,000

Note: Values presented in the Marine Recreational Fisheries Statistical Survey (MRFSS) in pounds whole weight.

Alternative 2: Modify the lane snapper OFL, ABC, and ACL based on the recommendation of the Scientific and Statistical Committee (SSC) for 2020 and subsequent years from the updated yield projections, as presented to the SSC in March 2020. Do not set an ACT.

Year	OFL	ABC	ACL
2020+ (MRIP-FES)	1,053,834	1,028,973	1,028,973
2020+ (MRFSS)	592,941	578,953	578,953

Note: Catch limit values in MRFSS are provided for comparison only.

Alternative 3: Modify the lane snapper OFL, ABC, and ACL based on the recommendation of the SSC for 2020 and subsequent years from the updated yield projections, as presented to the SSC in March 2020. Set an ACT using the Gulf of Mexico Fishery Management Council's (Council) ACL/ACT Control Rule, which would result in a 16% buffer between the ACL and the ACT.

Year	OFL	ABC	ACL	ACT
2020+ (MRIP-FES)	1,053,834	1,028,973	1,028,973	864,337
2020+ (MRFSS)	592,941	578,953	578,953	486,321

Note: Catch limit values in MRFSS are provided for comparison only.

Discussion:

Action 1 would update the catch limits (OFL, ABC, and ACL) and ACT for lane snapper based on the update to the March 2020 SEDAR 49 assessment update[7] and OFL and ABC recommendations from the SSC. Additionally, **Alternatives 2** and **3** would also update the catch limits to reflect that recreational landings data are now provided by Marine Recreational Information Program Fishing Effort Survey (MRIP-FES) as opposed to MRFSS (See Chapter 1).

Alternative 1 (No Action) would maintain the current catch limits and ACT defined in the Generic ACL/AM Amendment (GMFMC 2011). These catch limits were calculated using tier 3a of the ABC Control rule adopted by the Council in the Generic ACL/AM Amendment (GMFMC 2011) using average landings from 1999 through 2008 (See Chapter 1). The catch limits in **Alternative 1** do not reflect the SSC's recent OFL and ABC recommendations. In addition, the current catch limits under **Alternative 1** were derived using recreational data from MRFSS and recreational harvest data are now collected and monitored using MRIP-FES. Although there is an ACT set at 14% below the ACL under **Alternative 1**, it is not currently used for management purposes.

Alternative 2would modify catch limits for 2020 and subsequent years based on the recommendation of the Council's SSC from the updated yield projections. In comparison to **Alternative 1**, **Alternative 2** would increase the OFL, ABC, and ACL and would not set an ACT. The increase in catch limits in **Alternative 2** results from harvest projections generated by the March 2020 SEDAR 49 assessment update[7]. The recent stock assessment update relied on recreational landings data reported in the Southeast Region Headboat Survey (SRHS) up through 2018. This index indicated an increase in stock abundance[5]. Therefore, the model projected that the stock could sustain higher catch levels.

The catch limits proposed in **Alternative 2** also differ from **Alternative 1** because of the recreational survey data used to generate those limits. In **Alternative 1**, the catch limits are calculated using recreational data from the MRFSS, while **Alternative 2** can be compared directly to the recreational data generated from the MRIP-FES. Conversions from MRFSS to MRIP-FES have generally resulted in higher recreational catch and effort values because MRIP-FES is accounting for more recreational fishing effort than previously estimated.[7] This pattern is similarly observed in the conversion of catch limits for lane snapper. The proposed lane snapper ACL in **Alternative 2** is 1,028,973 lbs ww when using MRIP-FES recreational data. While the ACL proposed in **Alternative 2** is over three times higher than the current ACL, much of that increase is related to the adjustment in the recreational data collection from MRFSS to MRIP-FES. However, the difference is much less (about double) when not factoring in the adjustments and presenting using recreational data from MRFSS (See catch limit tables for **Alternatives 1** and **2**).

Alternatives 2 and **3** differ based on the ACT. The ACT would be removed under **Alternative 2**, and would be modified under **Alternative 3**. The current ACT is set at 259,000 lbs ww (14% below the ACL), but it is not used as a management measure for lane snapper. The current seasonal closure AM for lane snapper is triggered such that when the ACL is exceeded in a given

[7] https://drive.google.com/open?id=1kXvp8ejSAxt1XKQLTv9YCrQt4UKPmrVj

year, a harvest closure will occur in the next fishing year upon projection that the ACL will be met. The current ACT is only 25% of the ACL proposed in **Alternative 2**. Because the ACT is not currently used for management purposes and a seasonal closure would remain in place, **Alternative 2** proposes to eliminate the ACT. However, retaining an ACT and using it as a management target may provide a more conservative approach for harvest monitoring that would increase the probability of not exceeding the ACL (See Action 2).

Alternative 3 would modify the OFL, ABC, and ACL for lane snapper as well as modify the ACT. These proposed catch limits are identical in both **Alternative 2** and **Alternative 3**. However, **Alternative 3** would retain an ACT but modify it based on the Council's ACL/ACT Control Rule (Appendix A) applied to the proposed catch limits under **Alternative 3**. Applying the ACL/ACT Control Rule results in a 16% buffer between the ACL and the ACT in **Alternative 3**. Projections from the March 2020 SEDAR 49 update[8] and subsequent SSC recommendations recommended higher catch limits than those currently in place, including the ACL. Increasing the ACL (**Alternatives 2 and 3)** may be substantial enough to allow current management and harvest patterns to continue without exceeding the ACL for the stock. The ACL for lane snapper was exceeded from 2016-2019 and an in-season closure was implemented in December 2019.[9] However, including an ACT may provide a more conservative management target for harvest monitoring that would increase the probability of keeping harvest under the ACL if the ACT is associated with an additional AM (See Action 2).

[8] https://drive.google.com/open?id=1kXvp8ejSAxt1XKQLTv9YCrQt4UKPmrVj
[9] https://www.fisheries.noaa.gov/bulletin/recreational-and-commercial-harvest-lane-snapper-federal-waters-gulf-mexico-will-close

2.2 Action 2 – Modify the Fishing Season Closure AM for Lane Snapper

Note: Alternative 2 and Alternative 3b are not valid if Alternative 2 is selected in Action 1.

Alternative 1: No Action. If the ACL is exceeded in a given fishing year, National Marine Fisheries Service (NMFS) will prohibit harvest of lane snapper in the recreational and commercial sectors in the subsequent fishing year if landings meet or are projected to meet the stock ACL.

Alternative 2: Modify the seasonal closure AM such that an overage of the ACL in a fishing year would trigger a closure to harvest of lane snapper by the recreational and commercial sectors in the following fishing year when the ACT is met or is projected to be met.

Alternative 3: Modify the seasonal closure AM such that if annual landings in a given year meet or are projected to meet the prescribed trigger, NMFS would prohibit harvest of lane snapper by the recreational and commercial sectors for the remainder of the fishing year.

Option a: Prescribed trigger is the ACL.
Option b: Prescribed trigger is the ACT.

Discussion:

Action 2 would modify the seasonal closure AM for lane snapper. **Alternative 2** and **Alternative 3 Option b** are only valid if an ACT is retained in Action 1 because these alternatives **would** establish the ACT as the AM trigger. In Action 1, and ACT is retained in Alternatives 1 and 3, but not in Alternative 2. Table 2.2.1 summarizes the relationship between the two action alternatives.

Table 2.2.1. Relationships between the alternatives in Action 1 and Action 2.

Action 2 Alternatives Valid?	Action 1 Alternative 1: Retains ACT.	Action 1 Alternative 2: Drops ACT.	Action 1 Alternative 3: Modifies ACT.	Rationale
Alternative 1	Yes	Yes	Yes	Action 2 Alt. 1 retains ACL trigger
Alternative 2	Yes	No	Yes	Action 2 Alt. 2 requires setting ACT to modify trigger
Alternative 3 Option a	Yes	Yes	Yes	Action 2 Alt. 3 Option a retains ACL trigger
Alternative 3 Option b	Yes	No	Yes	Action 2 Alt. 3 Option b requires setting ACT to modify trigger

NMFS generated projections of future catch (Appendix B) by analyzing recent lane snapper landings. Monthly commercial and recreational lane snapper landings were averaged from 2016 – 2018 to generate these estimates. All projected landings were then used to produce daily recreational and commercial landings estimates to determine if or when a catch limit is expected to be met for each alternative in Action 2 (Table 2.2.2). These estimates assumed that effort levels in future years would be similar to that of 2016 - 2018. Additionally, this analysis included results from a range of possible fishing catch levels. For example, if catch per unit effort (CPUE) in the future is lower than that observed from 2016 – 2018 (lower 95% confidence interval [CI]), then the timing of reaching or exceeding a catch limit would be later in the fishing year than if CPUE remained the same (prediction) or was greater than expected (upper 95% CI). If CPUE is lower than what was observed in 2016 – 2018, the forecasting analysis suggests that neither the ACL nor the ACT would be met for any alternatives (Table 2.2.2). However, if CPUE remains unchanged or increases relative to what was observed in 2016 – 2018, the ACL or ACT may be met before the end of the fishing year (Table 2.2.2).

Table 2.2.2. Results of forecasting analysis to determine if or when lane snapper harvest would meet or exceeded the trigger described for each alternative. All trigger values are in pounds whole weight.

Action 1 Alternatives	Trigger	Recreational data collection survey	Value	Prediction	Upper 95% Confidence Interval	Lower 95% Confidence Interval
Alternative 1	ACL	MRFSS	301,000	Aug 19	Jun 6	No Closure (209,810)
Alternative 2	ACL	MRIP-FES	1,028,973	No Closure (926,915)	Sep 16	No Closure (439,361)
Alternative 3	ACT	MRIP-FES	864,337	Dec 8	Aug 2	No Closure (439,361)

Source: MRFSS SEFSC Recreational, MRIP FES SEFSC Recreational, and Commercial ACL dataset (January 2020; November 2019).

Alternative 1 (No Action) would retain the current seasonal closure AM, which would be triggered based on the ACL chosen in Action 1. NMFS projects that if catch rate and effort in future years are the same as 2016-2018, selecting **Alternative 1** in Action 1 would result in harvest meeting the ACL on August 19. If future catch and/or effort is greater than from 2016-2018, then selecting **Alternative 1** in Action 1 is projected to result in meeting the ACL by June 6. If Action 1 **Alternative 3** is selected and future catch and effort remains the same as estimated, the ACL would be met on December 8, and if catch and/or effort is greater than estimated, the ACL is projected to be met on August 2. This would trigger the seasonal closure AM. **Alternative 1** is a less a conservative approach to management than **Alternative 3**, as it does not restrict catch in the first year of catch exceeding the ACL, and only restricts catch in subsequent years upon meeting or a projection of meeting the ACL. Recent efforts to prohibit harvest prior to exceeding the ACL have been unsuccessful, as the ACL was exceeded in 2017, 2018, and 2019 in spite of a seasonal closure AM allowing for closure to further harvest upon projection of reaching the ACL.

Like **Alternative 1**, the AM in **Alternative 2** would be triggered based on exceeding the ACL. However, in the year following an ACL overage, **Alternative 2** would restrict further harvest when the ACT (rather than the ACL) is met or projected to be met. **Alternative 2** is only valid if either Alternative1 or Alternative 3 in Action 1 is selected as preferred because these alternatives retain the ACT. Harvest projections indicate that the ACT would be met December 8 if future catch rate and/or effort remained the same, or August 2 if future catch rate and/or effort increased relative to 2016 – 2018 (Table 2.2.2).

The modification of the seasonal closure AM in **Alternative 2** is intended to reduce the likelihood that an ACL would be exceeded 2 years in a row. The ACT would be used to monitor landings and to trigger a closure in the year following a fishing year when the ACL is exceeded. An AM that triggers a closure in the year following an overage may be less suitable for stocks where there is a high likelihood of exceeding the ACL within a fishing year, which may include lane snapper, where ACLs have been exceeded each year since 2016. It is possible that this could result in an annual alternating of the seasonal closure, which could be confusing for the public. However, the proposed ACL for lane snapper presented in Action 1 is an increase from

the current ACL, which may reduce the risk of an ACL overage. Nevertheless, in future years where this AM may be been triggered, **Alternative 2** would be expected to reduce the likelihood of exceeding the ACL and limit any ACL overages that do occur.

The ACL was exceeded in 2017, 2018, and 2019 in spite of an AM requiring a closure when NMFS projected that the ACL would be reached. Managing to the ACT would provide a buffer that may reduce the likelihood of consecutive ACL overages and limit any overages that may occur in a year in which the AM is implemented. However, if this measure was effective in preventing ACL overages in years when the AM is triggered, it could result in greater overages in the alternating years because no monitoring would be required, which could potentially mitigate the more conservative approach of this alternative.

While **Alternatives 1** and **2** would result in a seasonal closure in the year following an ACL overage, **Alternative 3** would modify the seasonal closure AM to require NMFS monitor landings every year and implement an in-season closure when either the stock ACL (**Alternative 3 Option a**) or the stock ACT (**Alternative 3 Option b**) is met or projected to be met. **Alternative 3** differs from **Alternative 2** by requiring monitoring every year and a closure whenever the AM trigger is met or projected to be met. Under **Alternative 3 Option a**, NMFS projects that an in-season closure would only occur if future catch rate and/or effort increases relative to that observed from 2016 – 2018 (Table 2.2.2). For **Alternative 3 Option b**, NMFS projects that an in-season closure would occur if future catch rate and/or effort remained the same or increased relative to 2016 – 2018 (Table 2.2.2). The results reflect the difference between the two options in **Alternative 3** with **Alternative 3 Option b** using the stock ACT as the trigger, which is lower than the stock ACL. However, catch limits presented in Alternatives 2 and 3 in Action 1 are reflected in **Alternative 3**, and these values have increased from current catch limits (see Section 2.1). Even in a scenario when future catch rate and/or effort may increase (95% upper CI) relative to 2016 – 2018, NMFS projects that an in-season closure would not occur until August (**Alternative 3 Option a)** or September (**Alternative 3 Option b)** (Table 2.2.2). Likewise, if future catch rate and/or effort levels are similar to 2016 – 2018, NMFS projects that an in-season closure would not occur (**Alternative 3 Option a**) or would not occur until December (**Alternative 3 Option b**). It is possible that updating catch limits in Action 1 will provide an increase in the ACL substantial enough such that future harvest may not meet or exceed the AM trigger. However, the projections rely on assumptions about catch and effort, and these predictions are uncertain. Results from these analyses should be interpreted carefully.

Alternative 3 Option b is predicted to result in a closure of lane snapper fishing in early December. If previous catch rates and effort remain the same, a December closure would impact both commercial and recreational fisheries. Monthly landings from recent years (see Appendix B) indicate that lane snapper landings in December have fluctuated. With the exception of 2017, December landings were at or below the yearly average, but were also higher in most years than landings from September through November. Estimates of lane snapper catch in December 2017 (Figure B2) were the highest of all months in the 2016-2018 time series, indicating that the fishery has the potential to land large quantities of lane snapper late in the year. Most of the increase in December landings from 2016 – 2018 is attributable to the recreational sector, as commercial landings accounted for less than 14% of December landings from 2016-2018 (compared to no more than 12% of landings for all months in the time period).

Both **Alternatives 2 and 3** would require NMFS to monitor landings each fishing year and implement an in-season closure if warranted. Therefore, the timeliness of landings reporting is imperative. The time between when a fish is caught and when estimates of the harvest can be made must be short enough so that fishery managers can put in place measures to prevent an overage of the ACL or ACT, as appropriate. Currently, there are lags between when fish are landed and when commercial and recreational landings data are available for use in tracking and estimating harvests. Regulations require that commercial fishermen report landings weekly, which allows for accurate and current accounting of commercial catch to be made. However, recreational data are not available for use in management until several months after the fish are landed (although charter an headboats will be required to submit electronic trip level reports as of January 5, 2021; See Section 1.1 above). To mitigate for this lag, projections based on historical observation of the fishery can be used to inform fishing season length relative to a monitoring goal.

CHAPTER 3. REFERENCES

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APPENDIX A. ACL/ACT CONRTROL RULE FOR LANE SNAPPER

The Gulf of Mexico Fishery Management Council's (Council) Annual Catch Limit/Annual Catch Target (ACL/ACT) Control Rule applies a buffer to the ACL to account for management error (GMFMC 2011). To calculate the buffer, a tabulation spreadsheet uses a point system and series of components to represent various aspects of management uncertainty to derive a percent buffer between the ACL and ACT. The Council determines the minimum and maximum buffer (usually between 0 and 25) and points are adjusted to the appropriate values between those limits. A weighted buffer is calculated using:

$$Weighted\ buffer = \left[\left(\frac{\text{sum of points}}{\max possible\ points} * range\ between \min and \max buffer\right) + \min buffer\right] * (1 + weighting\ factor)$$

The Control Rule table consists of several additive components representing management uncertainty with a weighting factor. Most of the components are simple yes/no-type evaluations with either 0 or 1 point assigned. The components were selected to represent proxies for various sources of management uncertainty.

Component: Stock Assemblage

The ACL or ACT can be applied to either a single stock or to an assemblage of stocks (including an indicator species used to represent an assemblage). When an ACL/ACT applies to an assemblage of stocks, there is an implicit assumption that the stocks in the assemblage have similar biological characteristics and selectivities. It is unlikely, however, that the stocks have exactly the same characteristics and selectivities. Since it is likely that not all stocks in an assemblage will react to management actions in the same way, an assemblage of stocks has more management uncertainty than a single stock.

Component: Ability to Constrain Catch

This component evaluates past management success as an indicator of uncertainty of future success. Both frequency and magnitude of past overages relative to catch limits are examined. The National Standard 1 guidelines recommend that the system of ACLs and accountability measures be reviewed if catch limits are exceeded more than once in the past four years. Based on this guidance, the frequency of overages is divided into two levels, 1 or less times, or 2 or more times. In addition, if there have been any overages, an additional 0.5 points are added for each 10 percentage points (rounded up to the nearest 10%) above the catch limit for the year with the greatest overage of the past four years. If there were no catch limits during any of the past four years, a "not applicable" selection can be made which removes this component from the calculations.

Component: Precision of Landings Data - Recreational

If a stock has sector allocations, and an ACT is being considered for each sector, then one iteration of the ACL/ACT Control Rule should be performed for each sector. The sector not being included in a particular iteration should have "not applicable" marked for that sector. If an ACT is being considered for a stock that does not have sector allocations, select the appropriate setting for each sector. For recreational fisheries, although there is not currently an absolute method of counting recreational catches, the spreadsheet allows for one to potentially exist in the future, and to keep the point system for recreational precision comparable to the point system for commercial precision. Otherwise, the proportional standard error (PSE) calculated by the Marine Recreational Information Program (MRIP) is used as a proxy to represent overall precision of the recreational harvest estimates. A PSE of 20 is used as the transition point between good and poor precision, since this is used by several other stock assessments and studies (e.g., Vaughan and Carmichael 2000). An average of the most recent 3 years is used to avoid transient spikes in the data. Note: If the for-hire sector is separated out and the MRIP For-hire Survey was used to estimate non-headboat for-hire landings, then this section will be applicable to the for-hire sector.

Component: Precision of Landings Data - Commercial

For commercial fisheries, the method used to monitor catches represents the level of precision for the commercial harvest estimates. Individual fishing quota (IFQ) systems monitor all commercial landings and are considered the most precise form of quota monitoring. Non-IFQ systems are monitored through dealer reporting, but not all dealers are surveyed. The National Marine Fisheries Service (NMFS) attempts to survey dealers who account for 95% of the landings (personal communication, NMFS Southeast Regional Office staff). Therefore, this form of monitoring is less precise than IFQ systems. Finally, if some other method of monitoring commercial landings is used (e.g., self-reported logbook records), the lowest level of precision is assigned. Note: If the for-hire component of the recreational sector is separated out and placed under an IFQ system, then this section will be applicable to the for-hire component of the recreational sector.

Component: Timeliness

This component is related to the ability of management to respond to changes in fishing pressure. This is partly a function of how timely the landings are reported, and partly a function of how quickly changes in management measures can be implemented. Both of these components are implicitly incorporated in the decision whether or not to use in-season accountability measures. Therefore, the use or non-use of in-season accountability measures is used as a proxy for timeliness. Since IFQ fisheries report landings almost real-time, they are considered to have a high level of timeliness and are ranked with in-season accountability measures.

Weighting Factor: Stock Status

Stock status is not included in the initial calculation of the buffer, but is applied to the final result to adjust the buffer. The status of the stock is a function of the stock assessment's outputs relative to management benchmarks. A stock that is in relatively poor condition may require a more precautionary approach in the form of a larger buffer between ACL and ACT (or between

ABC and ACL). If a stock biomass is at or above its optimum yield (B_{OY}) level, then no adjustment is needed for the unweighted buffer. For stocks at lower biomass levels, a weighting adjustment is made to the buffer to account for the stock status. For example, a stock that is below B_{OY} but above the biomass at maximum sustainable yield (B_{MSY}) will have the buffer increased by 10%.

ACL/ACT Control Rule Calculation for Lane Snapper

Calculation of the ACL/ACT Control Rule for lane snapper resulted in an additional buffer of 16% between the ACL and the ACT using recreational landings collected in the Marine Recreational Fisheries Statistics Survey (MRFSS) for 2015 – 2018 as the reference period (Table A1).

Table A1. Lane snapper recreational landings (collected from the MRFSS) for the reference period of 2015-2018 used to inform the ACT/ACL Control Rule.

Year	Recreational Sector (MRFSS)	Commercial Sector	Overall Total	Total ACL	% Total ACL
2015	207,243	46,163	253,406	301,000	84%
2016	272,247	34,913	307,160	301,000	102%
2017	523,878	42,831	566,709	301,000	188%
2018	312,882	26,600	339,482	301,000	113%

Source: SEFSC MRFSS Recreational ACL data (Jan 2020).

Lane snapper is assessed as a single stock, so the stock assemblage element score is 0. Harvest of the stock exceeded the ACL in 2016 through 2018, with a maximum overage of 88% in 2017. As a result, the Ability to Constrain Catch element was set at 4.5 (88% rounded up to 90%, divided by 10, and multiplied by 0.5). The PSE of recreational landings was either equal to or less than 20 for the reference period, resulting in a value of 1 for the Precision of Landings Data – Recreational. Commercial landings for lane snapper are collected based on dealer reporting, resulting in a value of 1 for the Precision of Landings Data – Commercial. The lane snapper fishery is subject to in-season closures if harvest exceeds the ACL, so the Timeliness element was set to 0. Lastly, since the stock status criteria is unknown for lane snapper, the Weighting Factor element was set to 0.3 (Figure A1).

As of 02/11/2020				Lane Snapper	
ACL/ACT Buffer Spreadsheet			version 4.1 - April 2011	Sector: Combined	
sum of points	7.5			Years: 2015-2018	
max points	11.5		Buffer between ACL and ACT (or ABC and ACL)	Unweighted	13
Min. Buffer	0	**min. buffer**	User adjustable	Weighted	16
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	0	Catch limit has been exceeded 0 or 1 times in last 4 years		5.5
	Constrain Catch	1	Catch limit has been exceeded 2 or more times in last 4 years	x	
			For the year with max. overage, add 0.5 pts. For every 10 percentage points (rounded up) above ACL	4.5	
			Not applicable (there is no catch limit)		
			Apply this component to recreational fisheries, not commercial or IFQ fisheries		
		0	Method of absolute counting		1
	Precision of	1	MRIP proportional standard error (PSE) <= 20	x	
	Landings Data	2	MRIP proportional standard error (PSE) > 20		
	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	7.5
	Weighting factor				
		Element weight	Element	Selection	Weighting
	Overfished statu	0	1. Stock biomass is at or above B_{OY} (or proxy).		0.3
		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 (MSST).		
		0.3	4. Stock is overfished, below MSST.		
		0.3	5. Status criterion is unknown.	x	

Figure A1. Using the Council's ACL/ACT Control Rule for lane snapper results in a 16% buffer between the ACL and the ACT.

References:

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://gulfcouncil.org/wp-content/uploads/Final-Generic-ACL-AM-Amendment-September-9-2011-v.pdf

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APPENDIX B. GULF OF MEXICO LANE SNAPPER FISHERY SEASON PROHIBITION ANALYSIS

Gulf of Mexico (Gulf) lane snapper are managed in federal waters under the Fishery Management Plan for the Reef Fish Resources of the Gulf of Mexico (Reef Fish FMP). In 2011, the Generic Annual Catch Limits/Accountability Measures Amendment to the Reef Fish FMP established a stock (combined recreational and commercial) annual catch limit (ACL) for lane snapper. The stock ACL was set at 301,000 pounds (lbs) whole weight (ww) using Marine Recreational Fisheries Statistics Survey (MRFSS) data and established the current ACL.

This Framework Action to the Reef Fish FMP, which addresses lane snapper in the Gulf, proposes to modify the ACL consistent with the best scientific information available for Gulf lane snapper using Marine Recreational Information Program's (MRIP) Access Point Angler Intercept Survey and recreational effort data from the MRIP Fishing Effort Survey (FES; Table B1). The analyses investigate whether the stock ACL and the annual catch target (ACT) can be expected to be reached or exceeded using the most recent three years of observed landings (Table B2) from 2016 through 2018 to predict future landings.

Table B1. Gulf lane snapper stock ACL alternatives.

Action Alternatives:	Stock ACL/ACT
Alternative 1: MRFSS data	301,000 lbs ww (ACL)
Alternative 2: MRIP-FES data	1,028,841 lbs ww (ACL)
Alternative 3: MRIP-FES data	864,337 lbs ww (ACT)

Table B2. Annual recreational and commercial Gulf lane snapper landings from 2016 -2018.

Year	MRFSS Rec. Landings (lbs ww)	MRIP FES Rec. Landings (lbs ww)	Com. Landings (lbs ww)
2016	272,247	612,604	34,913
2017	523,878	1,272,225	42,831
2018	312,882	791,572	26,600

Source: SEFSC Recreational and Commercial ACL dataset [January 2, 2020; November 15, 2019].

Final commercial landings were provided from the Southeast Fisheries Science Center (SEFSC) on November 15, 2019. Recreational data were provided from the SEFSC on January 2, 2020 and included Texas Parks and Wildlife Department recreational creel survey (TPWD), Louisiana Department of Wildlife and Fisheries creel survey (LA Creel), Southeast Region Headboat Survey (SRHS), MRFSS, and MRIP-FES. Monthly commercial and recreational Gulf lane snapper landings were averaged from 2016 through 2018 to project future landings (Figures B1

and B2). All projected landings were then used to produce daily recreational and commercial landing estimates to determine if the ACL would be met for each alternative. Cumulative landings for the fishing year were compared against the current ACL using MRFSS recreational ACL data and the proposed ACL using MRIP-FES recreational ACL data to project a closure date.

Figure B1. Observed projected monthly commercial and recreational Gulf lane snapper landings. Source: SEFSC Commercial and MRFSS Recreational ACL data (November 15, 2019; January 2, 2020).

Figure B2. Observed and projected monthly commercial and recreational Gulf lane snapper landings. Source: SEFSC Commercial and MRIP FES Recreational ACL data (November 15, 2019; January 2, 2020).

Landings in recent fishing years (2016 through 2018) have exceeded the ACL (Figure B3). Similar landings are predicted for future fishing years. The predicted closure date for Alternative 1 in Action 2 is August 19 (Table B3). There is no closure date predicted for Alternative 2,

which uses MRIP-FES recreational ACL data, but landings are expected to exceed the ACT set by Alternative 3, on December 8. However, there is considerable uncertainty evident by the wide confidence interval that spans from a closure on June 6 to no closure if the stock ACL is modified, or if the season is set to close on the ACT.

Figure B3. Annual commercial and recreational Gulf lane snapper landings. Source: SEFSC Commercial ACL Database (November 15, 2019) and MRFSS SEFSC Recreational ACL Dataset (January 2, 2020).

Table B3. The predicted closure dates with 95% confidence interval for each stock ACL (lbs ww).

Action Alternatives	Trigger	Recreational data collection survey	Value	Prediction	Upper 95% Confidence Interval	Lower 95% Confidence Interval
Alternative 1	ACL	MRFSS	301,000	Aug 19	Jun 6	No Closure (209,810)
Alternative 2	ACT	MRIP-FES	864,337	Dec 8	Aug 2	No Closure (439,361)
Alternative 3a	ACL	MRIP-FES	1,028,973	No Closure (926,91)	Sep 16	No Closure (439,361)
Alternative 3b	ACT	MRIP-FES	864,337	Dec 8	Aug 2	No Closure (439,361)

Source: MRFSS SEFSC Recreational, MRIP FES SEFSC Recreational, and Commercial ACL dataset (January 2, 2020; November15, 2019).

As with most predictions, the reliability of the results is dependent upon the accuracy of the underlying data and input assumptions. A realistic baseline has been created as a foundation for comparisons, under the assumption that projected future landings will accurately reflect actual future landings. Uncertainty exists in this projection, as economic conditions, weather events, changes in catch-per-unit effort, fisher response to management regulations, and a variety of

other factors may cause departures from this assumption.