

Proposal for an alternative Red Snapper calibration ratio for federal and Alabama data collection programs

Submitted by: Alabama Department of Conservation and Natural Resources, Marine Resources Division

Background

The Gulf of Mexico Fishery Management Council (Council) approved a Framework Action (FA) to the Fishery Management Plan for Reef Fish Resources in the Gulf of Mexico titled “*Gulf of Mexico Red Snapper Recreational Data Calibration and Recreational Catch Limits*” at its August 2022 meeting and forwarded to NOAA Fisheries for final approval. Upon implementation, the FA will codify the use of a calibration ratio to adjust Alabama’s private recreational Red Snapper annual catch limit (ACL) to account for Red Snapper harvest using a relatively new state data collection program. The state’s ACL was derived from the most recent Red Snapper stock assessment which included private angler catch data from NOAA Fisheries’ Marine Recreational Information Program (MRIP) Coastal Household Telephone Survey (CHTS). Harvest monitoring, however, has been accomplished using Alabama’s data collection program, referred to as Snapper Check, and significant differences in harvest were observed between these two programs. Therefore, Snapper Check estimates needed to be calibrated to CHTS harvest estimates for ACL monitoring.

In 2020, a workshop attended by state marine fisheries agency staff and NOAA Fisheries staff and consultants was held where a simple ratio method was determined as the best way to calibrate state red snapper harvest estimates to the federal estimates. The SSC reviewed and approved the simple ratio method used to calculate the original calibration ratio during its MRIP-FES Workshop Webinar in July 2020. The calibration ratio in the FA was calculated as a ratio of the means using the average harvest from both for 2018 and 2019. Alabama’s calibration ratio was calculated as 0.4875.

At a recent Council meeting the Council requested review of potential implementation and use of an updated calibration ratio(s) by the Scientific and Statistical Committee (SSC). This document will offer information related to three calibration options. The three options will follow the simple ratio method previously accepted for management; however, each option will be different from one another based on varying time periods. In addition, each option will contain several sub-options which account for inconsistencies in data collection and/or exclusion of years of data to account for changes in sampling or changes in the fishery.

Data Sources

The data used in the analysis and accompanying information was derived from the MRIP CHTS and Alabama’s Snapper Check program. Prior to 2018, the MRIP CHTS utilized a phone survey of coastal households to estimate fishing effort and a dockside survey of randomly selected, public-accessible fishing sites to estimate catch (landed fish, dead

discards and released fish, fish weights and lengths). After 2018, effort estimates are model derived from data collected via a mail survey. Effort (angler trips) is assigned to a defined area of water (inland, Gulf of Mexico state waters, Gulf of Mexico federal waters) based on the proportion of residence provided by anglers intercepted during the dockside sampling events.

The Snapper Check program utilizes reported harvest information provided by anglers and a random dockside survey of the same sites in the MRIP CHTS survey to gather biological information. Since Snapper Check's implementation in 2014, Alabama has had a regulation requiring that a vessel representative is required to report Red Snapper landed in the state. To account for non-response to the reporting provision, the dockside survey also gathers a vessel's registration number and uses it along with other identifying information (trip date, number of anglers, number of fish harvested and report submission within 3.5 hours of sampler contact). The trip characteristics are used in an algorithm to determine the proportion of vessels that were observed in the field that did or did not submit a landing report. The Snapper Check program received MRIP certification but only after updates to survey protocols were implemented which allowed for complete weighting of samples. The changes were implemented prior to the start of the 2017 Red Snapper season. Snapper Check data for 2014-2016 was not certified.

Calibration ratio options

The three calibration update options included in this document include ratios calculated as the ratio of the mean harvest of all years combined or ratio of the means. This method was used to calculate the approved calibration ratio. A second method to calculate the ratio and provided in sub-options used the mean of the annual calculated ratios or a mean of the ratios. An additional sub-option removes harvest estimates for 2020. Alabama submitted a draft calibration proposal for review by staff with NOAA Fisheries' Southeast Regional Office, Southeast Science Center and office of Science and Technology staff and Council staff. Removing 2020 was suggested by reviewers to be included in sub-options for each of the three options as there was a concern that estimates may have been impacted because of reduced dockside sampling during COVID-19.

Although sampling activities in Alabama were temporarily impacted immediately after pandemic restrictions were imposed in March 2020 sampling activities using safe social distancing practices resumed in May. During the April 2021 Council meeting, Dr. Richard Cody from NOAA Fisheries provided a summary of Access Point Angler Intercept Sampling (APAIS) sampling performance during 2020. As provided in the presentation, intercept sampling performance in Alabama beginning in May 2020 was similar to the mean intercept sampling performance for May during the previous three-year period. Alabama's private recreational Red Snapper season began May 22nd of 2020. Dr. Cody also provided performance of fish length and weight collection. Length collection didn't reach comparable levels until mid-June, but fish weights were collected at rates similar to the previous period beginning in May. APAIS samplers were given instructions to maintain safe distances during interviewing activities; however, samplers were instructed

to collect fish weights over fish lengths if an opportunity allowed and the interviewed angler agreed. Based on the review of Alabama APAIS sampling performance Alabama does not support removing 2020 in any sub-option to determine the calibration ratio.

Calibration Update Options

Option #1: Update the calibration ratio using harvest data from 2018-2021

	Year	Snapper Check	MRIP CHTS	Ratio
	2018	973,652	1,947,713	0.4999
	2019	1,091,424	2,259,154	0.4831
	2020	1,106,679	1,847,874	0.5989
	2021	937,280	1,443,056	0.6495
Approved Calibration Ratio (mean harvest for 2018-2019)*		1,032,538	2,103,434	0.4909
Sub-option 1a: Ratio of Mean Harvest for 2018-2021		1,000,785	1,883,308	0.5314
Sub-option 1b: Mean of Annual Ratios for 2018-2021				0.5579
Sub-option 1c: Ratio of Mean Harvest for 2018-2021 removing 2020		1,000,785	1,883,308	0.5314
Sub-option 1d: Mean of Annual Ratios for 2018-2021 removing 2020				0.5442

* - Snapper Check harvest estimates were updated since the original calibration ratio was calculated (0.4875)

Option #2: Update the calibration ratio using 2020 and 2021 harvest data only – Alabama's preferred option with sub-option 2a

	Year	Snapper Check	MRIP CHTS	Ratio
	2020	1,106,679	1,847,874	0.5989
	2021	937,280	1,443,056	0.6495
Current Calibration Ratio (mean harvest for 2018-2019)				0.4910
Sub-option 2a: Ratio of Mean Harvest for 2020-2021*		1,021,980	1,645,465	0.6211
Sub-option 2b: Mean of Annual Ratios for 2020-2021				0.6242

* - Snapper Check harvest estimates were updated since the original calibration ratio was calculated (0.4875)

Option #3: Update calibration ratio using state survey data over a longer period

	Year	Snapper Check*	MRIP CHTS	Ratio
	2014	327,119	934,843	0.3499
	2015	688,608	1,717,626	0.4009
	2016	815,394	1,719,288	0.4743
	2017	742,829	3,054,327	0.2432
	2018	973,652	1,947,713	0.4999
	2019	1,091,424	2,259,154	0.4831
	2020	1,106,679	1,847,874	0.5989
	2021	937,280	1,443,056	0.6495
Current Calibration Ratio (mean harvest for 2018-2019)**				0.4909
Sub-option 3a: Ratio of Mean Harvest for 2014-2021		835,373	1,865,485	0.4478
Sub-option 3b: Mean of Annual Ratios for 2014-2021				0.4625
Sub-option 3c: Ratio of Mean Harvest for 2014-2021 removing 2020		796,615	1,868,001	0.4265
Sub-option 3d: Mean of Annual Ratios for 2014-2021 removing 2020				0.4430
Sub-option 3e: Ratio of Mean Harvest for 2015-2021		907,981	1,998,434	0.4543
Sub-option 3f: Mean of Annual Ratios for 2015-2021				0.4785
Sub-option 3g: Ratio of Mean Harvest for 2015-2021 removing 2020		874,865	2,023,527	0.4323
Sub-option 3f: Mean of Annual Ratios for 2015-2021 removing 2020				0.4585

* - Snapper Check harvest estimates for 2014-2016 not MRIP-certified

** - Snapper Check harvest estimates were updated since the original calibration ratio was calculated (0.4875)

Discussion

The Alabama Department of Conservation and Natural Resources, Marine Resources Division, (ADCNR) **supports selection of Option 2, sub-option 2a (0.6211)**. The recent trend is for increasing convergence of both estimates. This trend may be temporary or due to other considerations such as changes in the Red Snapper population off Alabama (reduced sizes/abundance, “localized depletion”), angler behavior (reduced demand), weather or other reasons. Although the exact cause for reduced harvests is yet to be determined the current calibration ratio of 0.4875 will restrict the amount of ACL to a point that if it were applied to the 2018 and 2019 fishing season would have resulted in a season of less than 20 days. The following information is provided as commentary on the scale and trend in harvest estimates to provide some rationale for the preferred calibration update option by ADCNR.

A summary of the number of Red Snapper private recreational season days during federal (federal and state waters were open), state management and a recent alternative management strategy using a NOAA Fisheries Exempted Fishing Permit and Council recommended Regional Management (EFP/RM) management structure for the years 2011-2021 is provided in Figure 1. The federal season was the sole season Alabama anglers could access Red Snapper in 2011, 2012 and 2013 with 49, 46 and 42 days,

respectively. Beginning in 2014, a short state season was added after the closure of the federal season which was the shortest season implemented in the Gulf of Mexico for the species. In 2018, the Gulf of Mexico recreational Red Snapper fishery was managed under an EFP where the states had the ability to effectively close federal and state waters to

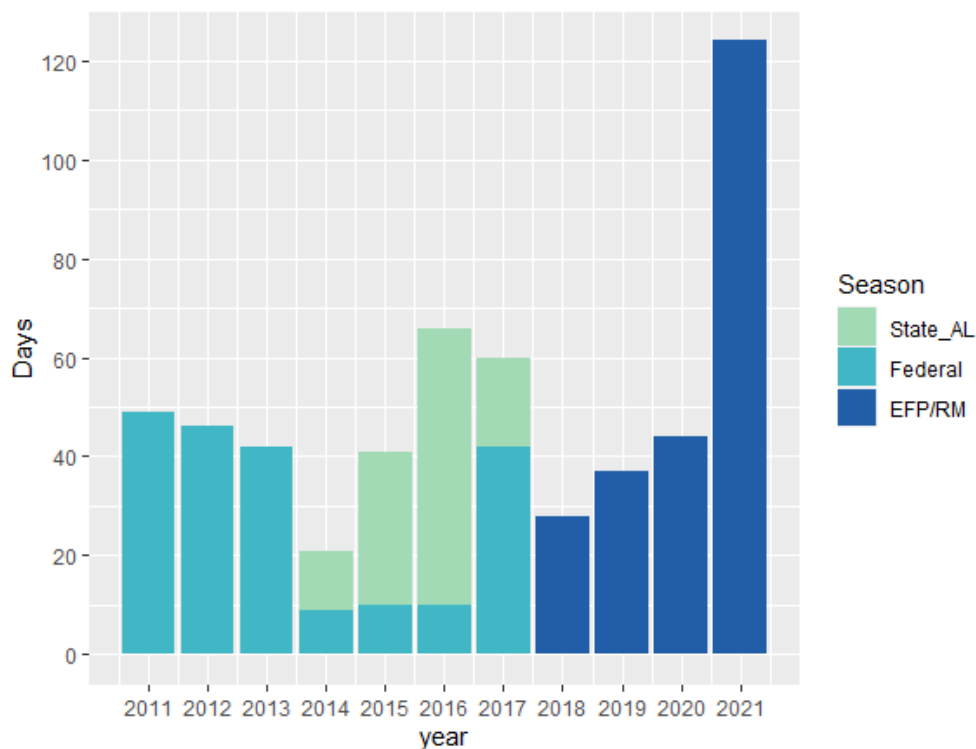


Figure 1. Number of private recreational red snapper season days by state, federal and Exempted Fishing Permit/Regional Management season structures, 2011-2021.

private recreational harvest to stay within a state-specific ACL. In Alabama, the seasons for 2018 and 2019 consisted of three-day weekends (Fri-Sun) and four-day weekends (Fri-Mon) in 2020 and 2021. The season duration for 2018 and 2019, as well as preceding years identified in Option #3, include a period when the fishery was experiencing heavy volumes of anglers throughout the season but particularly during the first two to three weekends approaching derby-style effort levels. The increase in season duration for 2021 was the result of reduced harvest rates and fish size and possibly due to expanded recreational opportunities resulting from relaxing COVID-19 travel restrictions.

Mean daily wind speed during daylight hours (6am-6pm) for each day of the open Alabama Red Snapper season and mean annual season wind speed for the same 12-hour period for each fishing year for 2011-2021 is provided in Figure 2. Mean season wind speed varied slightly over the selected period which could indicate angler effort was not affected by wind/ (sea state) and would not be a contributing factor to explain differences in harvests within each survey and between the two surveys.

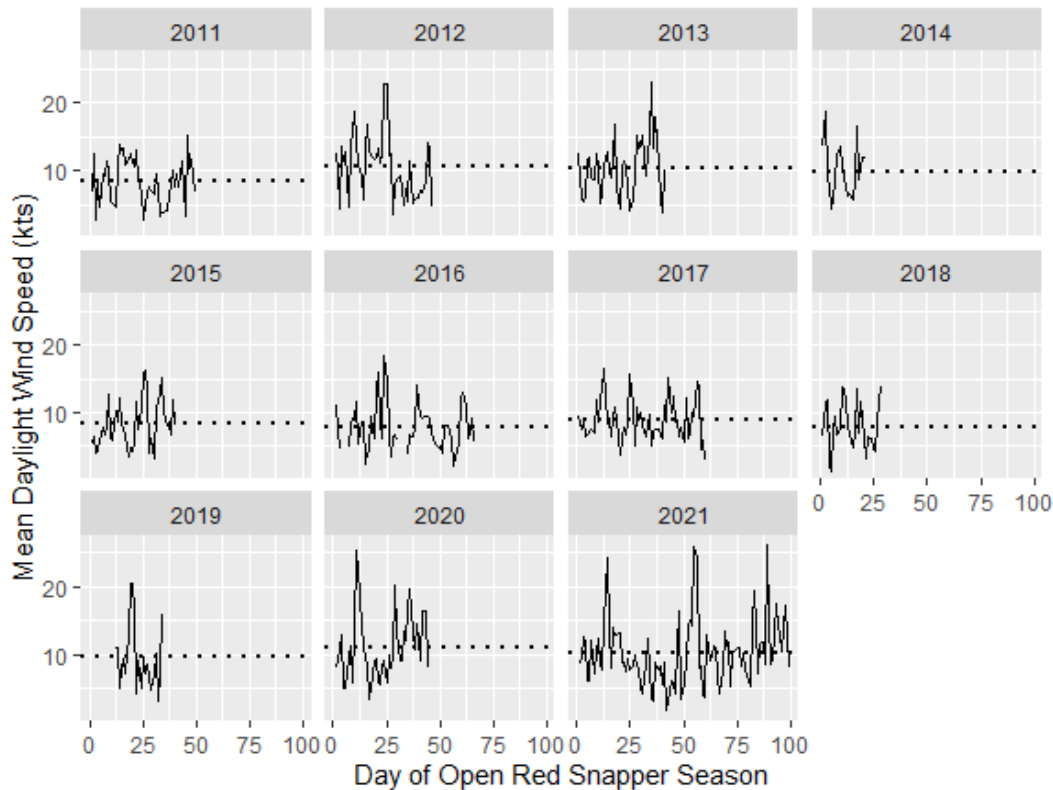


Figure 2. Mean 12-hour (6am-6pm) wind speed during open Red Snapper season days (federal and state combined) for 2011-2021. The dotted lines indicate mean wind speed for the fishing year. Data source: NOAA National Data Buoy Center, Buoy #42012, Orange Beach.

Annual Red Snapper harvest estimates from MRIP CHTS and Snapper Check, the Gulf recreational ACL and Alabama's state ACL provided in the EFP/RM management framework is provided in Figure 3. Generally, MRIP CHTS harvests were highest in 2011-2013. MRIP CHTS and Snapper Check estimates were lowest during 2014-2016 when the federal recreational season was either 9 or 10 days in duration. Snapper Check harvest increased in similar proportions to the increase the state received from a Gulf ACL increase. The third highest MRIP CHTS harvest of the time series occurred in 2017. This anomaly in the recent time series may be due to the unusual process of how the fishing season transpired. A three-day season beginning June 1st was announced at the beginning of May. Less than two weeks after the first season concluded a second 39-day season was announced. A short three-day federal season was announced prior to the June 1 start and after it concluded an additional 39-day federal season consisting of three-day weekends (Fri-Sun) was announced. The announcement of the short season could have affected angler fishing behavior and demand.

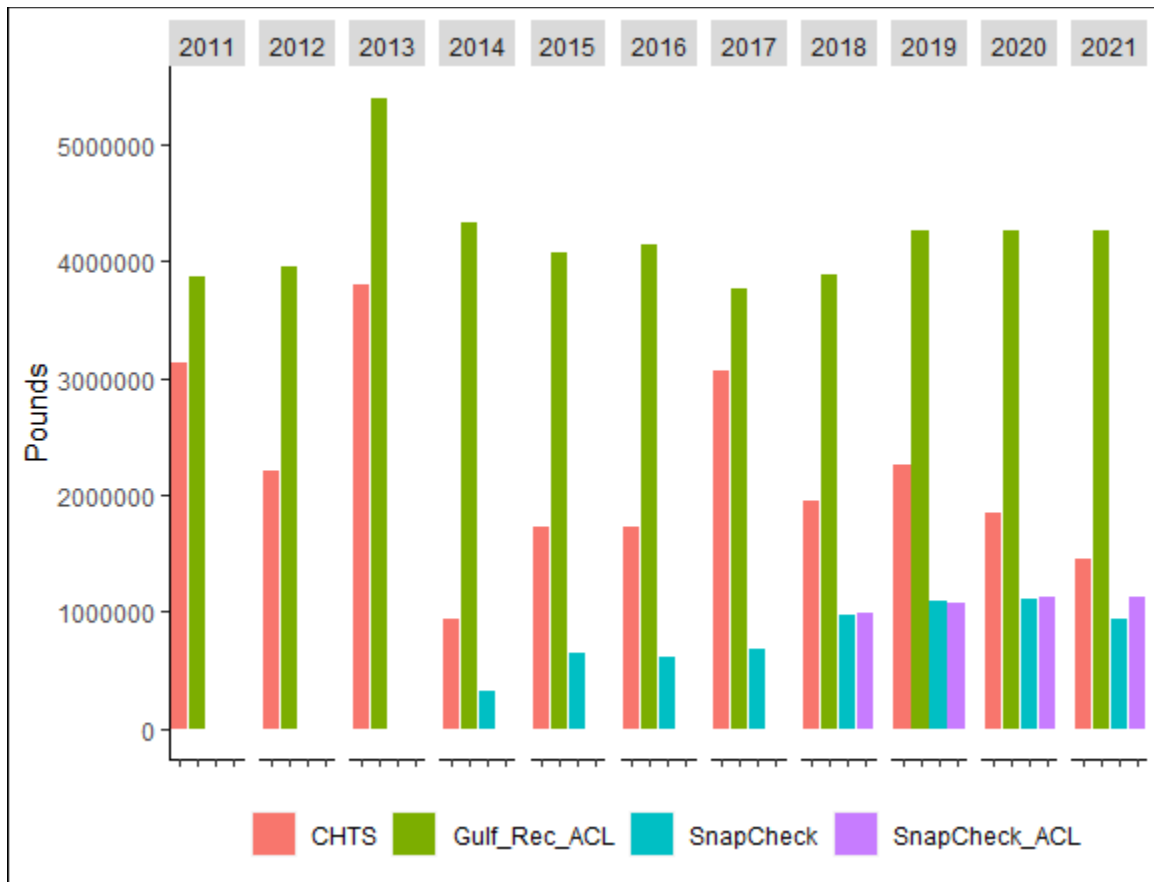


Figure 3. Estimates of red snapper harvest from the CHTS and Snapper Check, the Gulf red snapper private recreational ACL and Alabama ACL as provided in the Gulf of Mexico Fishery Management Council's Reef Fish Amendment 50 for 2011-2021.

Issues related to the field sampling component of the MRIP CHTS could affect the number of fishing trips during periods of high fishing activity. States with a small coastline and large pulses of angler activity could gather data that is not proportional to fishing activity which could lead to significant differences in effort estimates. Concerns among anglers and fisheries managers about the level of Red Snapper catch associated with Alabama by MRIP CHTS have been present for some time. The demographics and infrastructure of Alabama could lend to overestimation of non-coastal resident and out-of-state angler participation.

The MRIP CHTS effort survey was conducted in all covered states using a telephone survey of coastal households prior to 2018 while a mail survey is sent to households throughout each state beginning in 2018 and during subsequent years. In each survey, fishing trips (shore and private vessel) are adjusted to account for segments of the population not covered in the survey. In both surveys an adjustment is made for angler trips made by non-residents of the state and in the MRIP CHTS an adjustment is made for in-state residents not living in coastal counties. The adjustment of fishing trips is determined from residency status provided by anglers sampled during field assignments.

Generally, increasing proportions of anglers sampled from non-coastal and out-of-state areas will increase the number of trips estimated.

In Alabama's two coastal counties the composition of participation among coastal and non-coastal residents and out of state visitors may be significantly different. Temporary housing in the form of condominiums, hotels, and rental homes in Baldwin County (Gulf Shores and Orange Beach far exceeds those available in Mobile County (Dauphin Island) and although this isn't a concern if anglers are interviewed proportional to level of fishing activity. Beginning in 2013, MRIP CHTS field sampling protocols required samplers to visit specific site(s) and remain on site for six hours. Prior to 2013, samplers could move to alternate sites based on activity and leave the site if 30 interviews were collected. Assignment summary data compiled by samplers during the assignment was reviewed. A summary of the mean number of Alabama recreational anglers observed during field assignments by county and open or closed Red Snapper season during MRIP assignments completed in waves 3 and 4 (June – August) is provided in Figure 4. Statewide, most anglers were counted during assignments completed when the Red Snapper season was open. In recent years, the mean number of anglers counted during Red Snapper season is 4-5 times higher than the mean number of anglers counted out of season.

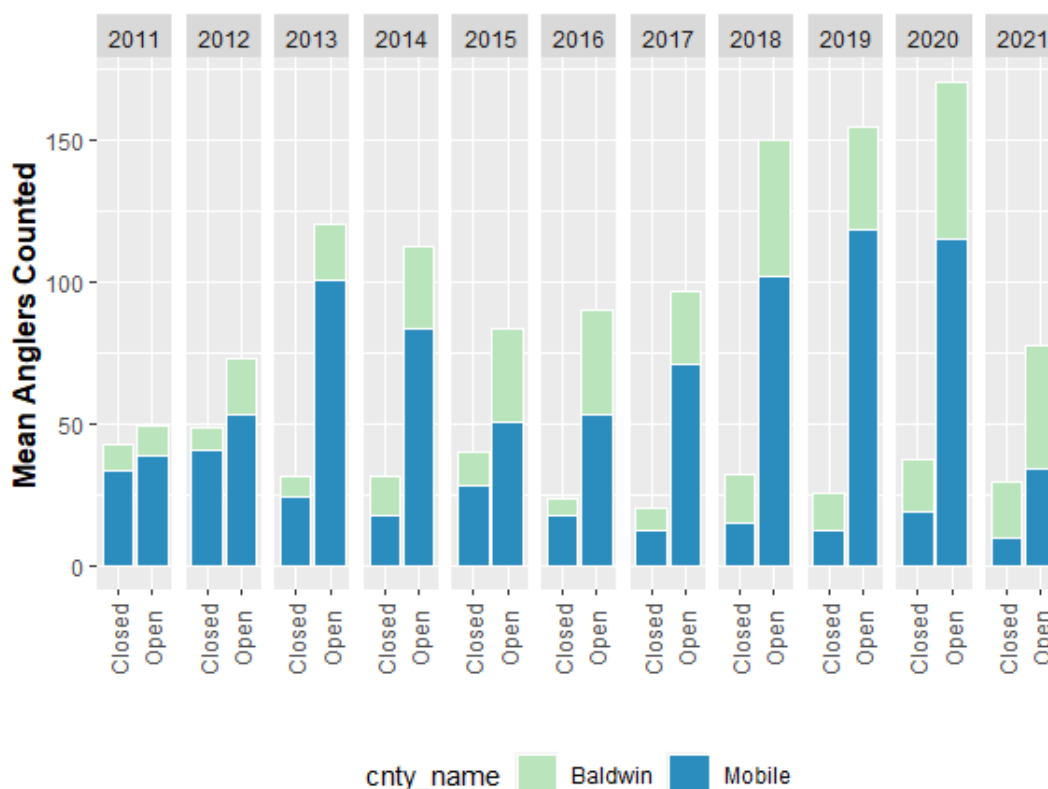


Figure 4. Mean number of Alabama recreational anglers observed during MRIP CHTS assignments completed during Waves 3 and 4 by county and open/closed red snapper season, 2011-2021.

Angler activity in Mobile County was supported by one fishing site; Billygoat Hole Boat Launch, where several hundred anglers could be observed during an assignment.

The number of anglers intercepted during MRIP assignments completed in Waves 3 and 4 by county and residency status is provided in Figure 5. Years with the highest number of anglers interviewed included 2017, 2019, 2020 and 2021. Similar increases were observed for the mean number of anglers counted per assignment except for 2021 when intercepts were comparable to 2020 yet the mean number of anglers observed in 2021 was nearly half of those observed in 2020. This may be influenced by the much longer fishing season which provided anglers an opportunity to distribute trips throughout the year to best fit their needs. It also could be explained by the survey protocols for field

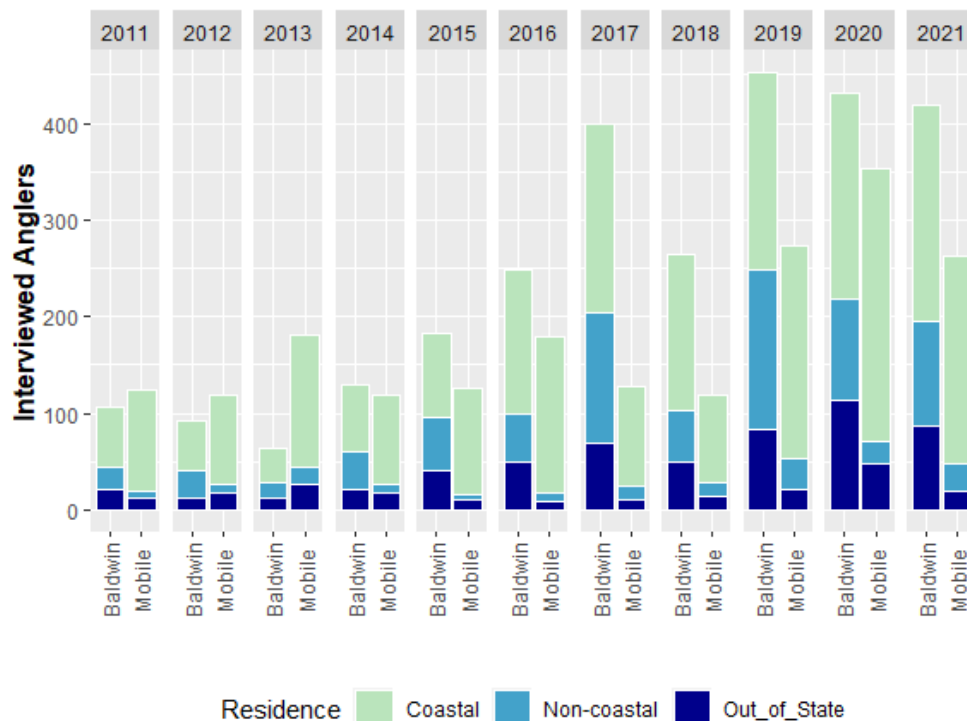


Figure 5. Number of anglers MRIP CHTS intercepted by county and residency status, 2011-2021.

sampling used by MRIP. Samplers are instructed that the primary activity while onsite is to count the number of anglers accessing the site. When activity is slow enough to count and conduct interviews samplers are instructed to do so. The Billygoat Hole Boat Launch is the largest marine boat launch in Alabama and may be one of the busiest public access points used by private recreational anglers in the Gulf. The launch contains eight boat ramps and is adjacent to a public road which makes ingress and egress to the ramp difficult. There is limited area close to the ramp where anglers with a trailered vessel can

pull out of the launch area and allow the sampler to conduct an interview and maintain a clear view of the ramps to count anglers. Therefore, during periods of high angler activity, the sampler often cannot interview at all or, if they are able to interview anglers, they may not collect interviews in proportions equal to the level of angler activity. This situation leads to more Baldwin County anglers being interviewed than Mobile County anglers which may result in overrepresenting the proportion of non-coastal residents and out-of-state visitors. The frequency of intercepted anglers intercepted by the MRIP survey by residency for Waves 3 and 4 for 2011-2021 is provided in Figure 6. Higher proportions of non-coastal anglers in 2017 and 2019 correspond to higher harvests in those years. Higher number of anglers were interviewed in Baldwin County compared to Mobile County in the same years. The effects of sampling inefficiency may be affecting harvest estimates and further investigation is needed. NOAA Fisheries has established a group of individuals representing state marine fisheries agencies, the Gulf States Marine Fisheries Commission, and the Council to investigate issues such as this to improve the survey.

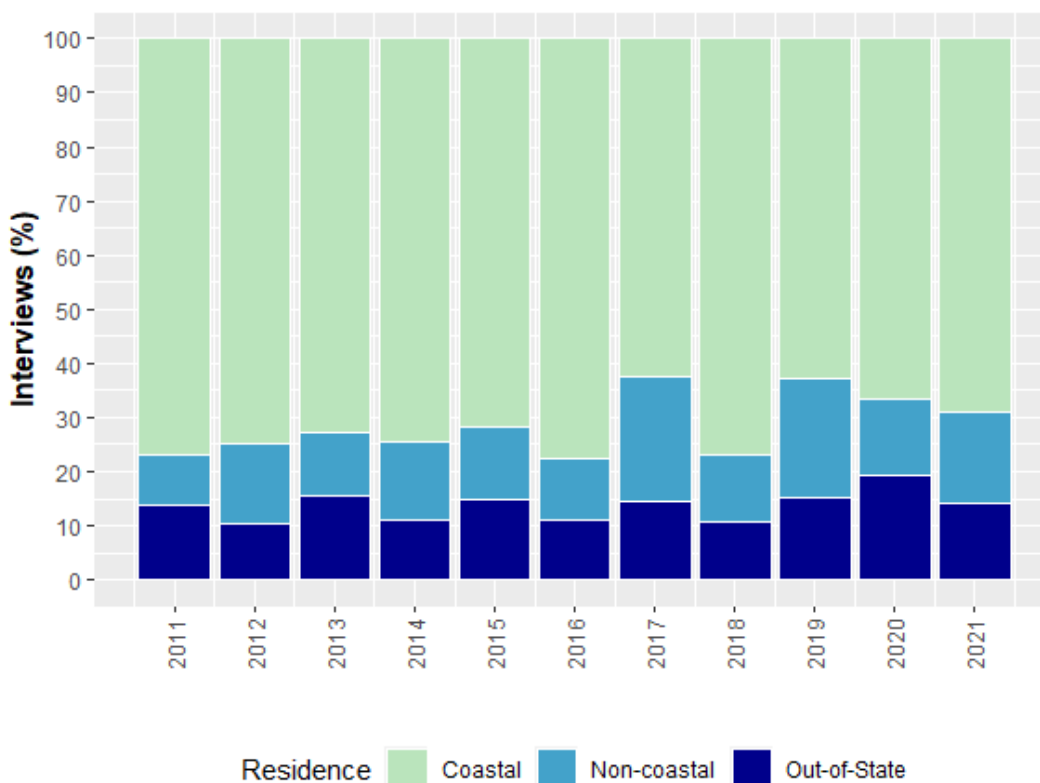


Figure 6. Frequency of anglers intercepted in the MRIP survey by residency during Waves 3 and 4, 2011-2021.

The issue of reduced abundance, also referred to as localized depletion, was an issue brought up in the review of the draft calibration proposal. The idea is that fish are harder

to find in the last few years Some data collected during Snapper Check dockside surveys related to distance from shore is available to describe where fishing has occurred. From 2016 to 2018, the Snapper Check dockside vessel validation survey had a question to determine depth of water (choices were 60' increments from 0' to 360' feet of water) where most fish that were landed were caught. Figure 7 includes summarized depth information from private vessel anglers interviewed during the three years the question was included in the survey. The majority of harvested Red Snapper were caught in 60-120' of water each year. Over the period, the number of harvested fish decreased in the 0-60' depth zone while increases in the number of harvested fish were observed in the 60-120' and 120-180' depth zones. This trend aligns with recent comments made by some Alabama anglers that fish have become less abundant closer to shore, and they must make longer trips to maintain similar levels of harvest than compared to a few years earlier.

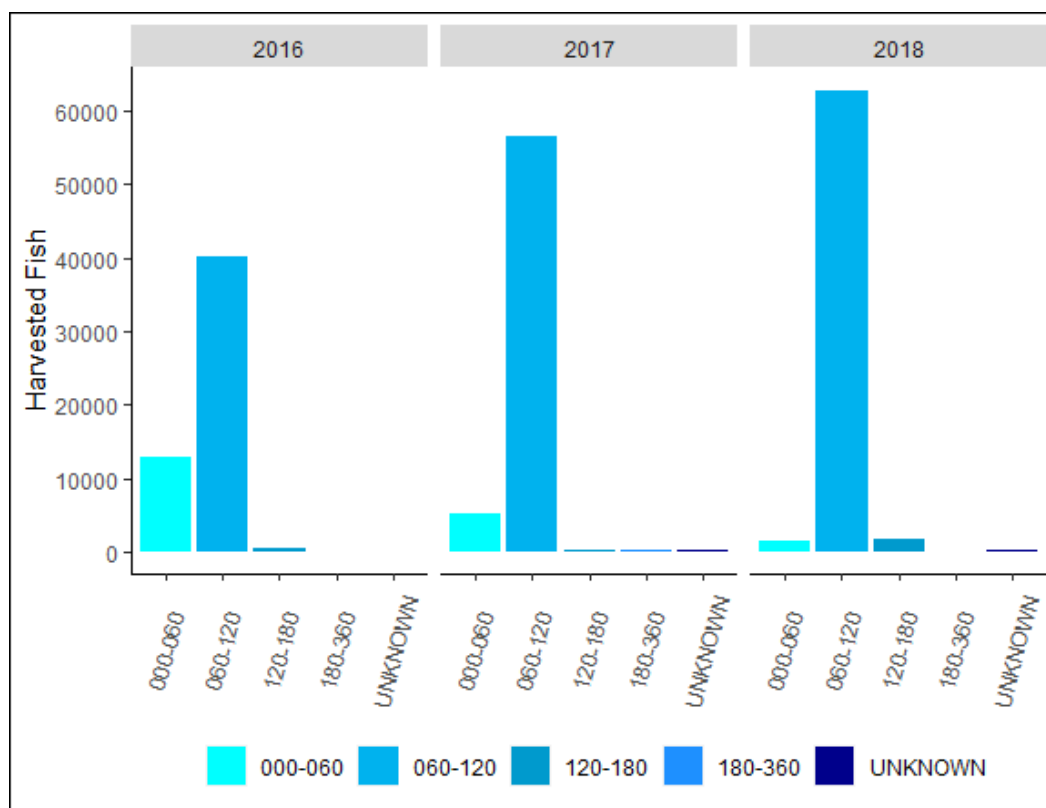


Figure 7. Number of Snapper Check estimated harvested Red Snapper by depth zone from private vessels, 2016-2018.

Another consideration related to localized depletion is the harvest from other sources. Alabama is the home state to many federally permitted charter vessels primarily located in Orange Beach, Baldwin County. The harvest from these vessels must be considered when discussing trends in harvest from year to year as federal charter vessels remove a significant number of fish from the Alabama population of red snapper. Figure 8 depicts the percentage of harvest by 60' increments for the entire recreational fishery (private and

for-hire) in 2017. Over 90% of harvested fish were estimated to have been harvested within waters up to 120' in depth. Most waters with depths up to 120' are located within 30 nautical miles from shore.

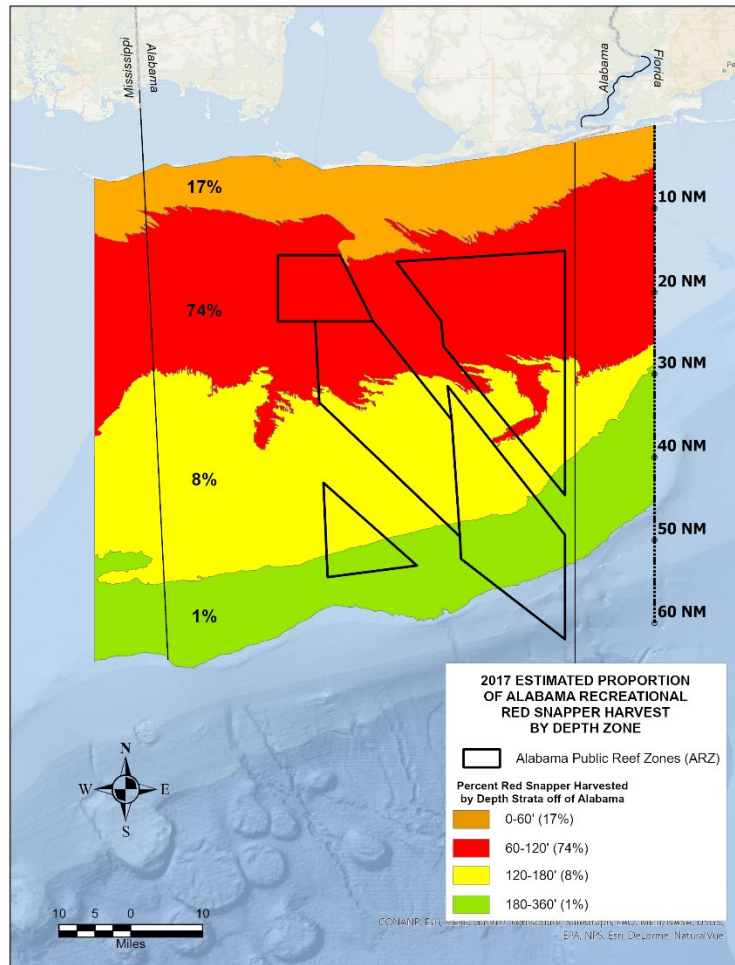


Figure 8. Proportion of Red Snapper harvested by Alabama private and federal for-hire anglers by 60' depth zones in 2017 from Snapper Check.

Note that Snapper Check was MRIP-certified for the 2017 fishing season. Prior to 2017, the survey did not collect missed and non-red snapper anglers during field assignments. Because of this and the issue of extreme fishing effort in the short seasons in 2014 -2016 the sub-options offered in Option #3 are not considered viable for Alabama.

Calibration ratio update conclusion

Option #1 - not preferred by ADCNR

Use of 2018 and 2019 data is problematic when considering potential issues with MRIP CHTS dockside sampling in years of high angler activity that may result in overweighting fishing effort from non-coastal and out-of-state anglers and arbitrarily increase harvest.

Option # 2, sub-option 2a -preferred by ADCNR.

The difference between the harvest estimates of the two survey sources is decreasing in the most recent years. Several factors to account for this trend include MRIP CHTS sampling issues in years with high fishing activity. A significant reduction in the ACL available for establishing the season will have a negative impact on angler's access to the resource. Use of the approved calibration ratio could result in a season of 20 days or less. Researchers investigating fishing effort at public boat ramps in Alabama during decreasing federal red snapper fishing seasons from 2012-2017 found that daily fishing effort increased at higher proportions than the reductions made to fishing seasons (Powers and Anson, 2019). The authors suggested reducing the length of recreational fishing seasons may significantly increase daily fishing effort creating more intense derby-like fishing conditions. Conversely, their research indicated that under increasing ACLs effort compression decreases allowing for longer seasons. Sub-option 2a was selected as it was calculated using the same method as the current calibration ratio.

Option #3 - not preferred by ADCNR.

This option was not selected because Snapper Check data prior to 2017 is not MRIP-certified. Use of the data in a decision of this importance could be problematic.

References cited:

Powers, S. P., and K. Anson. 2019. Compression and relaxation of fishing effort in response to changes in length of fishing season for red snapper (*Lutjanus campechanus*) in the northern Gulf of Mexico. Fish. Bull. 117:1–7.

“Status Update on the NOAA Fisheries' MRIP 2020 Recreational Fisheries Catch Estimation Process”. Richard Cody, PhD. <https://gulfcouncil.org/wp-content/uploads/B-4-Gulf-Council-Apr-2021-Status-of-MRIP-2020-estimates.pdf> Status Update on the NOAA Fisheries' MRIP 2020 Recreational Fisheries Catch Estimation Process

Additional Tables and Figures

Tables

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Table A-2. MRIP CHTS harvest estimates (pounds) for private and state charter anglers by year, by two-month sampling period (wave).

Table A-3. Snapper Check harvest estimates (pounds) for private and state charter anglers by year, season (for private vessels only).

Table A-4. Snapper Check effort estimates (angler trips) for private and state charter anglers by year, season (for private vessels only).

Table A-5. Private recreational Red Snapper (numbers of fish) harvest estimates by two-month sampling period (wave) from Snapper Check.

Table A-6. Private recreational Red Snapper (numbers of fish) harvested by two-month sampling period (wave) from Snapper Check.

Table A-1. Snapper Check harvest estimates (pounds) for private and state charter anglers by year, season (for private vessels only).

Year	Mode	Season	Harvest	PSE
2014	Private	Federal	306,606	8.8
2015	Private	Federal	617,392	9
2016	Private	Federal	553,975	19.3
2017	Private	Federal	564,590	19.3
2018	Private	Federal	934,984	21
2019	Private	Federal	1,000,980	21.6
2020	Private	Federal	1,050,040	20.5
2021	Private	Federal	801,922	15.2
2014	Private	State	13,558	31.2
2015	Private	State	39,880	51.2
2016	Private	State	209,263	29.7
2017	Private	State	61,622	22.2
2018	Private	State	.	.
2019	Private	State	.	.
2020	Private	State	.	.
2021	Private	State	.	.
2014	Charter		14,088	28.8
2015	Charter		31,336	39.5
2016	Charter		52,156	34.8
2017	Charter		116,617	58.1
2018	Charter		38,667	45.0
2019	Charter		90,443	63.4
2020	Charter		56,639	50.8
2021	Charter		135,358	67.7
Private vessels are assigned to fishing seasons				

Table A-2. MRIP CHTS harvest estimates (pounds) for private and state charter anglers by year, by two-month sampling period (wave).

Year	Wave						Total
	Jan/Feb	Mar/Apr	May/Jun	Jul/Aug	Sep/Oct	Nov/Dec	
2014	0	0	796,971	137,872	0	0	934,843
2015	0	20,792	1,587,771	68,869	40,193	0	1,717,626
2016	0	976	1,453,721	261,268	3,323	0	1,719,288
2017	0	0	1,688,805	952,526	412,995	0	3,054,327
2018	0	0	1,279,207	668,506	0	0	1,947,713
2019	0	0	1,339,051	475,403	444,219	481	2,259,154
2020	0	0	1,393,420	159,630	229,358	65,467	1,847,874
2021	0	0	891,012	280,500	262,487	9,058	1,443,056

Table A-3. Snapper Check harvest estimates (pounds) for private and state charter anglers by year, season (for private vessels only).

Year	Wave						Total
	Jan/Feb	Mar/Apr	May/Jun	Jul/Aug	Sep/Oct	Nov/Dec	
2014	0	0	325,305	1,814			327,119
2015	0	0	653,218	33,069	2,321		688,608
2016	0	0	700,019	111,079	3,225	1,071	815,394
2017	0	0	336,238	365,866	40,725		742,829
2018	0	0	689,087	284,565			973,652
2019	0	0	357,511	651,370	82,543		1,091,424
2020	0	0	969,537	52,695	53,523	30,924	1,106,679
2021	0	16	503,153	352,714	44,392	37,005	937,280

Table A-4. Snapper Check effort estimates (angler trips) for private and state charter anglers by year, season (for private vessels only).

Year	Mode	Season	Angler Trips	PSE
2014	Private	Federal	19,634	7.1
2015	Private	Federal	40,052	7.7
2016	Private	Federal	32,447	8.6
2017	Private	Federal	49,705	18.9
2018	Private	Federal	69,633	21.5
2019	Private	Federal	79,453	17.6
2020	Private	Federal	90,095	20.5
2021	Private	Federal	68,105	14.4
2014	Private	State	2,052	27.7
2015	Private	State	5,760	47.1
2016	Private	State	18,992	21.3
2017	Private	State	9,414	23.5
2018	Private	State	.	.
2019	Private	State	.	.
2020	Private	State	.	.
2021	Private	State	.	.
2014	Charter		1,453	26.4
2015	Charter		2,789	36.8
2016	Charter		3,521	31.1
2017	Charter		8,519	53.6
2018	Charter		2,823	38.7
2019	Charter		7,949	60.0
2020	Charter		4,544	32.6
2021	Charter		10,180	60.0
Private vessels are assigned to fishing seasons				

Table A-5. Private recreational Red Snapper (numbers of fish) harvested by two-month sampling period (wave) from the MRIP CHTS.

Year	Wave						Total
	Jan/Feb	Mar/Apr	May/Jun	Jul/Aug	Sep/Oct	Nov/Dec	
2014	0	0	91,740	23,415	0	0	115,155
2015	0	2,439	203,769	8,690	11,633	0	226,531
2016	0	110	188,905	41,728	477	0	231,220
2017	0	0	223,090	132,473	53,568	0	409,131
2018	0	0	171,774	81,572	0	0	253,346
2019	0	0	206,161	79,968	86,543	77	372,749
2020	0	0	206,893	25,932	44,574	12,186	289,585
2021	0	0	122,223	46,867	50,287	1,241	220,618

Table A-6. Private recreational Red Snapper (numbers of fish) harvested by two-month sampling period (wave) from Snapper Check.

Year	Wave						Total
	Jan/Feb	Mar/Apr	May/Jun	Jul/Aug	Sep/Oct	Nov/Dec	
2014	0	0	40,513	1,562			42,075
2015	0	0	78,715	5,270	378		84,363
2016	0	0	81,154	19,101	469	159	100,883
2017	0	0	52,093	52,410	6,686		111,189
2018	0	0	80,034	41,503			121,537
2019	0	0	56,082	82,490			138,572
2020	0	0	144,750	7,347	6,826	4,575	163,498
2021		2	71,988	40,686	8,121	5,019	125,816

Figures

Figure A-1. Number of private recreational APAIS angler intercepts and Snapper Check vessels intercepted during open season days with and without red snapper harvest (A+B1 fish) by year, 2011-2021. Snapper Check protocols did not require samplers to collect information from vessels without landed red snapper during 2014-2016.

Figure A-2. Frequency of Snapper Check of angler submitted red snapper landing reports and dockside vessel interviews (validations) by year and county, 2014-2021.

Figure A-3. Frequency of Snapper Check intercepted private recreational and state charter vessels with red snapper landings that were matched to a landing report. Private vessels are provided for federal and state fishing seasons.

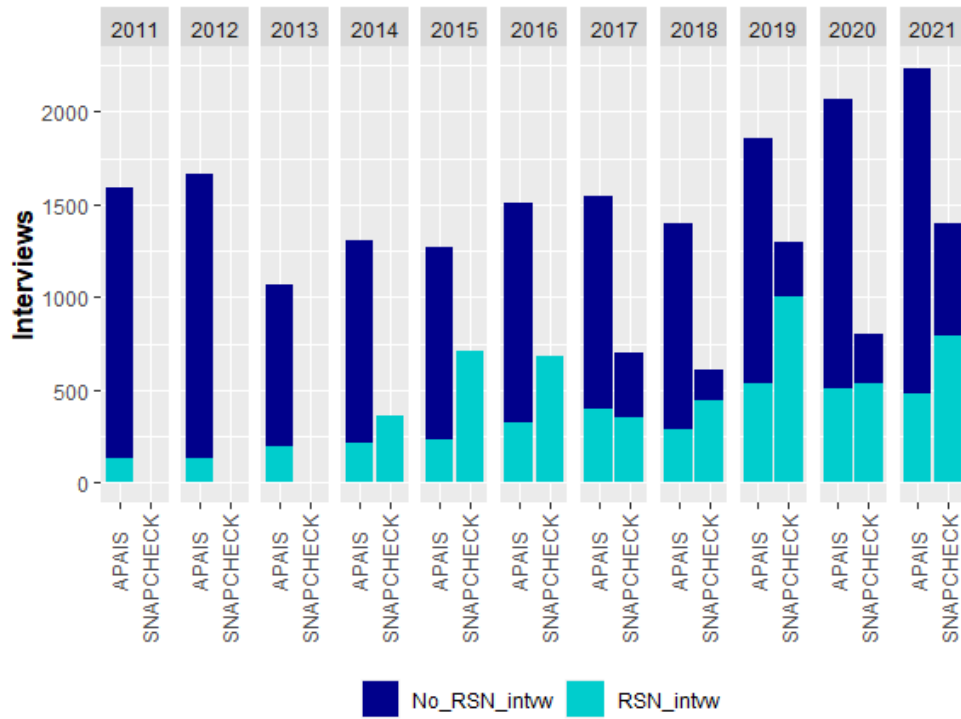


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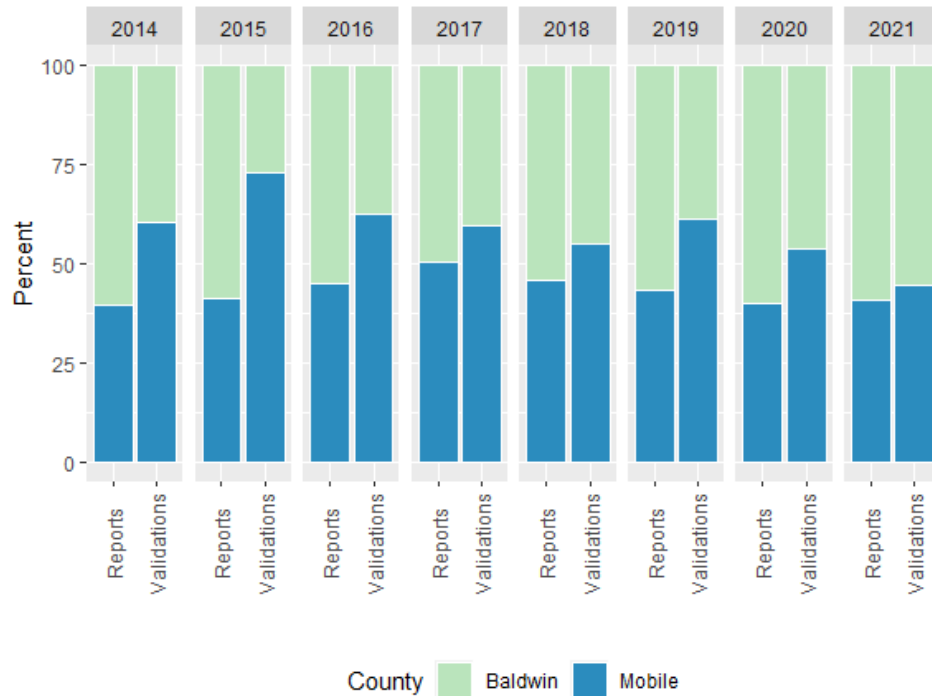


Figure A-2. Frequency of Snapper Check landing reports and vessel interviews (validations) by year and county, 2014-2021.

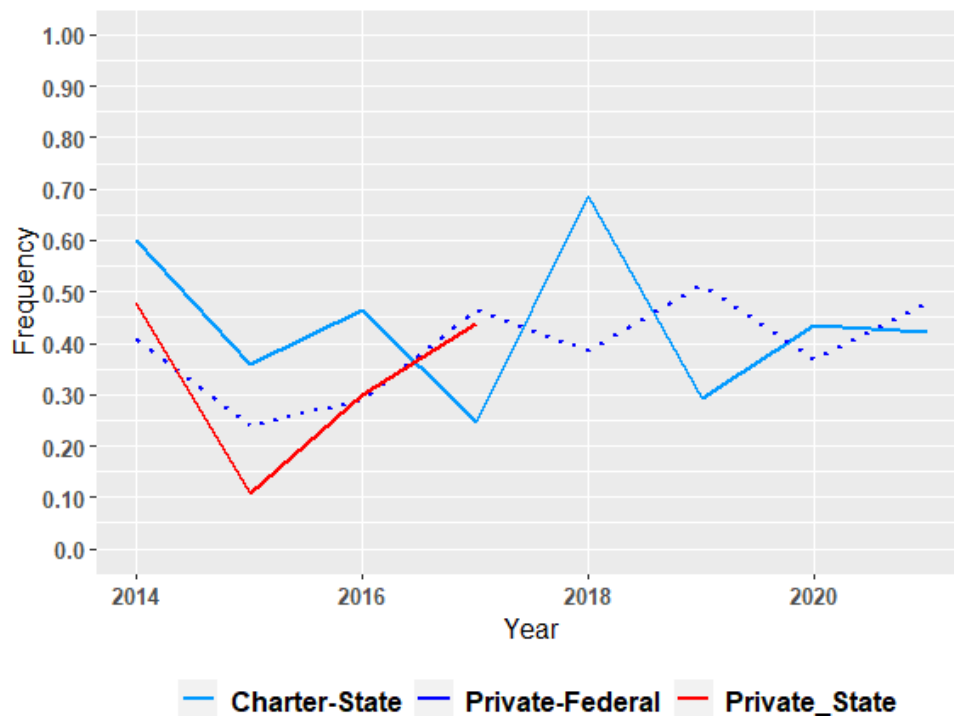


Figure A-3. Frequency of Snapper Check intercepted private recreational and state charter vessels with red snapper landings that were matched to a landing report. Private vessels are provided for federal and state fishing seasons.