RED SNAPPER RECREATIONAL DISCARD DATA QUALITY IMPROVEMENT WORKSHOP

PREPARED FOR
GULF STATES MARINE FISHERIES COMMISSION

JULY 30 - AUGUST 1, 2024

NEW ORLEANS DOUBLETREE
NEW ORLEANS, LOUISIANA

GSMFC Publication No. 332
March 2025

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Red Snapper Recreational Discard Data Quality Improvement Workshop
Gulf States Marine Fisheries Commission
New Orleans DoubleTree
New Orleans, Louisiana
July 30 - August 1, 2024

1.0 INTRODUCTION

The Department of Commerce (DOC) received financial support as part of the Inflation Reduction Act (IRA) to focus on modernization and investment in science and management programs in support of the nation's economy. National Oceanic and Atmospheric Administration (NOAA) Fisheries has allocated $349 million of these funds to support the Climate Ready Fisheries (CRF) initiative to strengthen NOAA's science and survey enterprise and to help support the nation's fishing industry and the states, communities, and tribes that depend on it.

As part of the CRF initiative, $20M has been allocated for red snapper and other reef fish in the Southeastern United States. The intention for the funding is that it be used in cooperation with the Gulf States, management council, and regional partners to explore and test improvements to state and federal recreational fisheries surveys. To develop workplans and budgets for these projects, the Gulf States Marine Fisheries Commission (GSMFC) planned two workshops throughout 2024. This report details the background, technologies, and conclusions discussed at the second IRA workshop on July 30 - August 1, 2024. The focus of this workshop was the improvement of recreational discard estimates from federal and state surveys.

1.1 PURPOSE AND OBJECTIVES

The purpose of the workshop was to develop a workplan and proposed budget to fund projects that would improve the quality of recreational released catch data, specifically data associated with discard rates in the private recreational sector. This included investigating new methods for collecting discard data from the private boat sector and considerations for expanding for-hire coverage of at-sea observer programs. Specific objectives included the following:

Review 2017 workshop findings and discuss recommendations.

Discuss surveys and methods being tested or implemented in the Southeast Region. Specifically, discuss the at-sea sampling program and expansion efforts into Louisiana and Texas for the for-hire sector; highlight the current surveys collecting data from private boats and identify strengths, weaknesses, and potential biases; and discuss the red snapper exempted fishing permit in the South Atlantic.

Identify parallel disciplines and non-traditional survey methods that may be used to measure the magnitude of recreational releases, including their applicability for use in U.S. recreational fisheries management.

Identify geographic areas in the Southeast region where new released catch research could be focused, giving special consideration to locations where:

high discard rates are observed and measurable,

gaps in released catch data currently exist, and

areas where multiple overlapping surveys utilizing similar methodologies indicate the potential presence of bias but the source is poorly understood.

Provide recommendations for priority research studies that achieve a balance innovation and risk, with studies that demonstrate a high probability of success in FY25 or FY26 being preferred.

For areas where the Marine Resource Information Program overlaps with other recreational surveys, identify methods to verify the potential presence of bias and quantify the magnitude in each survey, and identify methods to locate and understand the sources of potential bias in each survey.

For areas where there is no overlapping survey for comparison, identify survey design related components that can be evaluated to characterize sources of bias and implement improvements that reduce their impact on estimation.

Begin development of a Request for Proposals that includes project objectives, priorities, and criteria for reviewing, ranking, and selecting proposals for future funding. The call should focus on proposals that will provide improved estimates of recreational discards from private recreational vessels, and which can be implemented in 2025/26

1.2 PARTICIPANTS

The following list details pertinent information related to this specific project:

1.2.1 In-Person Attendees

Anson, Kevin	Alabama Marine Resources Division
Bauer, Hanna	Texas Parks and Wildlife Department
Bray, Gregg	Gulf States Marine Fisheries Commission
Cathey, Drew	NOAA Fisheries, SEFSC
Cheshire, Rob	NOAA Fisheries, SEFSC
Cody, Richard	NOAA Fisheries, OST
Conrad, Michelle	Oceanbeat Consulting
Crosson, Scott	NOAA Fisheries, SEFSC
DeCossas, Gary	NOAA Fisheries, SEFSC
DiJohnson, Alex	Atlantic Coastal Cooperative Statistics Program
Dolsky, Gavin	Air Hygiene
Donaldson, Dave	Gulf States Marine Fisheries Commission
Drymon, Marcus	Mississippi State University
Eckert, Cat	Texas Parks and Wildlife Department
Eguia, Leonardo	Florida Fish and Wildlife Conservation Commission
Ferrer, Joe	Gulf States Marine Fisheries Commission
Fischer, Andy	Louisiana Department of Wildlife and Fisheries
Gedamke, Todd	MER Consultants
Gentner, Brad	Genter Consulting Group
Gigli, Eric	Mississippi Department of Marine Resources
Giuliano, Angela	Maryland Department of Natural Resources
Gloeckner, David	NOAA Fisheries, SEFSC
Guyas, Martha	American Sportfishing Association
Hardy, Wade	Mississippi Department of Marine Resources

Head, Marie	Alabama Marine Resources Division
Heyman, Will	LGL Ecological Research
Hopper, Tiffany	Texas Parks and Wildlife Department
Huber, Jeanette	Florida Fish and Wildlife Conservation Commission
Karp, Brian	CI Solutions
Lazarre, Dominique	NOAA Fisheries, SERO
Lockfield, Konner	Louisiana Department of Wildlife and Fisheries
Netro, Rich	Florida Fish and Wildlife Conservation Commission
Nuttall, Matt	NOAA Fisheries, SEFSC
Petersen, Andrew	Bluefin Data
Poland, Stephen	NOAA Fisheries, SEFSC
Porch, Clay	NOAA Fisheries, SEFSC
Powell, Dalton	Gulf States Marine Fisheries Commission
Robertson, Charlie	Gulf States Marine Fisheries Commission
Sauls, Beverly	Florida Fish and Wildlife Conservation Commission
Scheffel, Trevor	Atlantic Coastal Cooperative Statistics Program
Schieble, Chris	Louisiana Department of Wildlife and Fisheries
Smith, Nicole	Louisiana Department of Wildlife and Fisheries
Topping, Tara	Harte Research Institute
White, Geoff	Atlantic Coastal Cooperative Statistics Program
Wilms, Sean	Florida Fish and Wildlife Conservation Commission
Yencho, Melissa	NOAA Fisheries, OST
Zhang, Adrian	Louisiana Department of Wildlife and Fisheries

1.2.2 Virtual Attendees

Addis, Dustin	Cvach, Sarah	Griffin, Aimee
Banks, Kesley	Dancy, Kiley	Haddad, Nick
Barger, Jeff	Denton, Ryan	Hansen, Justin
Bates, Sydney	Duca, Chelsea	Harrington, Katie
Benaka, Lee	Dunn, Russell	Helies, Frank
Bhuthimethee, Mary	Edwards, Jason	Herrick, Daniel
Bianchi, Alan	Ellis, Katherine M	Hollensead, Lisa
Binion-Rock, Samantha	Emory, Meaghan	Hornbeck, Joe
Brown, Trevor	Fitz-Gerald, Claire	Horton, Chris
Bruger, Catherine	Foss, Kristin	Hutt, Clifford
Bunting, Matthew	Franco, Dawn	Johnson, Amber
Byrd, Julia	Freeman, Mark	Johnson, Brad
Clydesdale, Jack	Gedamke, Rudi	Johnson, Jia
Corbett, Ellie	Gooding, Elizabeth	Johnson, Karen
Cross, Tiffanie	Gordon, Maryellen	Scott, Rebecca

Kean, Samantha
Kelley, Sean
Kipp, Jeff
Knowlton, Kathy
Lang, Erik
Lee, Max
Lovell, Sabrina
Lowther, Alan
Mareska, John
Matter, Vivian
McClair, Genine
McGuire, Chris
Moore, Jeff
Morgan, Jerry
Neidig, Carole
Palmisano, Ashley
Papacostas, Katherine
Patterson, Will
Pyle, Jennifer
Ramsay, Chloe
Reinhardt, Jamie
Richards, Stephanie
Rossi, Nichole
Sabine, Alexis
Salmon, Brandi
Sartwell, Tim
Simmons, Sean
Simpson, Julie
Smith, Matthew
Tucker, Dallis
Valmassoi, Andrew
Walsh, Jason
Walsh, Kym
Wilms, Olivia
Zales, Bob
Zuckerman, Zach

2.0 DAY 1 – JULY 30

2.1 OVERVIEW OF RECREATIONAL DISCARD RATES

For catch estimates used in regional assessments and management, total catch is calculated by multiplying the total fishing effort by a catch rate. This catch rate, specifically the discard rate, is dependent on several different factors. These factors may include season length and timing, angler behavior, and regulatory constraints such as bag limits.

Discards can have a large influence on stock assessments. Depending on the assumed discard mortality rate, the discard removals can have a greater contribution to overall fishing mortality than landings. Factors that increase encounter rates for discards such as regulatory season length and proximity and improved recruitment of fish to the fishery play an important role in reef fish discards are increasingly contributing to the total removal numbers over time. A considerable amount of research has been completed investigating post release mortality rates in reef fish in this region. The steering committee made a decision to focus on rates of release and not additional mortality rate studies as the focus of the RFP.

Recognizing the limitations of dockside surveys conducted after a fishing trip has been completed in collecting information on catch that was released on that trip, a starting point to improve the data quality for discard rates is to identify and address data gaps and data collection inconsistencies among the various surveys.to ensure that whatever information anglers can provide is collected. With greater data collection consistency among surveys, survey statisticians and stock assessment analysts have more options available to combine data from different surveys to improve the precision of discard estimates for use in the stock assessments and management.

2.2 STATE PRESENTATION - FLORIDA

The majority of reef fish caught in the eastern Gulf of Mexico are released. This fact combined with high fishing effort means that even a low mortality rate translates into a in a large proportion of removals for released catch. In addition, the Florida fishery is a multi-species fishery. During a study from 2015 to 2018, 90 percent of discards were comprised of twenty managed species (Citation). A solution for better characterizing discards and improving

discard estimates in Florida will need to address the multispecies nature of the reef fish fishery and impact of regulations on released catch and data collection.

There are two major dockside surveys used to estimate discard rates from the recreational fishery. The NOAA Fisheries Access Point Angler Intercept Survey (APAIS) and the State Reef Fish Survey (SRFS) are conducted at public access sites. Anglers report information on the species and numbers of fish released on their fishing trip. However, the two surveys differ in their scope and methodology when it comes to estimating and allocating fishing effort to catch rates and this is likely to influence the magnitude of total discard estimates between these surveys.

In order to monitor the impacts of discards, studies must account for the many variables that could contribute to differences in survey estimates of released catch and how mortality rates assigned outside the estimation process, can be better aligned with estimation domains to provide better tuned estimates of overall fishing related mortality. To this end, Florida has had their for-hire at-sea observer program in place since 2009. For--hire fishing trips are sampled at-sea where information on released catch can be recorded directly. By observing the discards, recording disposition and released condition, taking measurements, and tagging some of the returned fish, the Florida Fish and Wildlife Conservation Commission (FWC) is able to provide more detailed information on discards that can be used in the assessment process to better estimate fishing related mortality

2.3 STATE PRESENTATION - ALABAMA

To collect discard data, Alabama Department of Conservation and Natural Resources (ADCNR) conducts the NOAA Fisheries APAIS dockside surveys. The APAIS applies a time-space sampling method to public access fishing sites and the survey has a stratified multistage cluster sampling design to collect information form anglers about fishing trip characteristics that includes released fish information. In addition, an at-sea observer program is used to collect more detailed information. It is a voluntary program where charter vessels are randomly selected and offered payment to allow an observer to join a fishing trip. Observers collect data on trip characteristics that are used to determine discard rates, describe size distributions and inform mortality rates. Finally, Alabama has a mandatory reporting requirement through the Snapper Check program. The reporting does not have 100% reporting and operates during open seasons for select species. For landings of red snapper, gray triggerfish, and greater amberjack, one representative from a fishing vessel must provide for all members of the fishing party, the number of landed fish, dead discards, and, since 2023, the live releases. Since the reporting program was designed to monitor catch during relatively short seasons, monitoring live or total discards during the closed season would likely be probability based sampling survey approaches.

For Snapper Check, the landing reports are submitted through a cell phone app or the ADCNR website. This electronic reporting allows for weekly estimates of effort and catch. Since 2018, these red snapper harvest estimates have been used to Monitor ACLs.

There are a few areas for improvement with Snapper Check. Firstly, anglers have been found to have misinterpreted or misunderstood the questions on the number of dead discards. There has also been confusion with other surveys. These and potentially other factors have led to large numbers of dead discards reported (relative to the APAIS??). Additionally, participation in the program stays consistently around fifty percent and has dropped in recent years. To combat this, Alabama maintains consistent messaging on media platforms and publicizes results to the public. By highlighting the need for timely and accurate data to make sound management decisions and educating anglers on this responsibility, the program expects to maintain or improve support from anglers.

2.4 STATE PRESENTATION - MISSISSIPPI

MDMR staff stated there are approximately 100,000 licensed anglers and approximately 100 public and private access points in Mississippi. It is estimated that 25-30 percent of trips that target federally managed species are launched from private access points. Fisheries for federally managed species are generally prosecuted in federal waters, with the exception of cobia and mangrove snapper which can be found in state waters. Most Red snapper trips (75 percent) occur within the boundaries of the Mississippi Department of Marine Resources (MDMR) offshore artificial reefs of Fish Havens (FH)-1, FH-2, and FH-13. These are offshore artificial zones that occur 15-25 nautical miles from the mainland. The southeast corner of FH-13 is the deepest point red snapper are fished at 90 feet. The majority of red snapper are caught at 60-80 feet. Aside from red snapper, there is some bycatch of gray snapper, gray triggerfish, and mangrove snapper. The remaining 25 percent of red snapper fishing trips occur towards Alabama's waters or FH sites farther at sea. These are the only locations for Mississippi where greater amberjack, groupers, vermilions, and some other federally managed species are caught.

For discard information, Mississippi conducts an Access Point Angler Intercept Survey (APAIS) for multiple species. Tails n' Scales collects information on red snapper discards and is a mandatory reporting requirement for anglers that wish to target red snapper during the season. Currently, the program estimates 95 percent compliance. In 2025, the Mississippi Creel survey will be implemented to collect information on multiple species, except for inshore, minimally managed species. There is also an at-sea observer program similar to the Alabama program.

At present, there are no validation measures for discard numbers. Additionally, the minimal offshore trips outside of red snapper season leads to few out-of-season red snapper discards. As another point, the reported discards are frequently observed in multiples of five suggesting potential digit bias, and state agency staff suspect the private sector systematically overreport the discards which would result in an overestimate of released catch.

2.5 STATE PRESENTATION - LOUISIANA

Louisiana collects discard information through the LA Creel survey. This multi-species survey began in 2014 which includes a dockside intercept and effort survey components to generate estimates of catch and discards. There are five basins with 137 active sites where the Louisiana Department of Wildlife & Fisheries (LDWF) conducts dockside intercept surveys and collects discard information. The discard information collection for twelve species started in 2016, at the request of National Marine Fisheries Service (NMFS). Counted discard are characterized as releases under the legal size, used for bait, or another purpose. This information collected dockside is used with effort survey information to calculate the discards by area which in turn is summed to produce adjusted discard estimates.

As with all dockside surveys discard estimates are based on data reported by sampled anglers. Without validation it is difficult to characterize the direction and magnitude of bias and how representative estimates are of the population being sampled. Additionally, LDWF would like to collect length information of discards to better inform stock assessments. To help meet this challenge, LDWF plans to participate in at-sea observer sampling beginning in 2025.

2.6 STATE PRESENTATION - TEXAS

Texas Park and Wildlife (TPWD) divides the 367 miles of Texas coastline into eight bay ecosystems. This results in 4 million acres of coastal waters that must be managed along with the Economic Exclusion Zone (EEZ). There are an estimated 1.7 million saltwater anglers in the state. Additionally, there are 260 unique boat ramps included in the Coastal Creel surveys, initiated in 1974. Currently, these surveys do not collect information on catch released by anglers. Released catch data is instead collected through the voluntary Texas Hunt and Fish app (THF). The information collected includes trip information, counts of the species caught and discarded, and the fishing area. TPWD uses press releases, ads in TPWD magazine and social media and website information to encourage participation in THF.

Some challenges for survey approaches include the vast survey area as well as the differing ecologies and bathymetries across the eight bay regions. For discard data collection, the dependence on anglers to accurately report species and numbers discarded is less than ideal. Additionally, requiring paper or app-based tracking of discards sometimes results in low participation. The infrastructure exists for validation by conducting intercept surveys with anglers who self-report through THF, but low reporting rates leads to a difficulty in validating data. Finally, attempts by TPWD for onboard observers have run into issues of expense. GSMFC is in the process of deploying at-sea observers on Texas for-hire vessels with the help of IRA funding in 2025 and 2026 to better assess the numbers and sizes of released catch from offshore trips.

2.7 STATE AT-SEA SAMPLING PROGRAM

The at-sea program was established with the intention of obtaining lengths and weights for released catch. Dockside survey methods rely on recollections of captains and anglers to estimate discard numbers and are limited to observed harvest for the collection of lengths and weights. Because discard information is reported rather than observed dockside, data collection is limited to basic information on the numbers of fish released by species as recalled by anglers. The At-Sea sampling program, begun in Florida in 2009, allows observers to collect discard information as they occur. The program aims to provide detailed discard information, catch data for stock assessments, and fill data gaps in the for-hire fishery. Additionally, the data collected can show sizes of released catch among fish stocks.

The project relies on voluntary participation from for-hire vessels and utilizes a random selection process based on the universe of cooperative vessels. To limit the likelihood of displacement by a paying angler, captains are provided payment for the presence of observers. Engagement between the observers and the captains, crews, and anglers builds trust in the data and also provides education opportunities about fish data and tagging.

To collect data, Alabama uses electronic measuring systems. These systems allow for a quick turnaround of data for review and can be finalized within one to three months. Florida and Mississippi take manual recordings on weatherproof paper. The review process for these data sets finalizes in six to twelve months. Both states are converting to the electronic system.

The tagging portion of the program focuses on high interest species. The field samplers distribute tag reporting cards with instructions to the anglers on a participating vessel. Using rewards like t-shirts and catch information, in addition to advertising, FWC encourages participation in the tagging program.

Some considerations for the program are limitations in the trips samplers can join. For example, the seasonality of the fishery and available space on the boat can affect trip samplers from securing a trip. Currently, GSMFC is assisting in the expansion of the program into Louisiana and Texas, but additional funding would help be needed to expand the program further to be able to sample more trips in Florida and potentially extend the timeline for collecting these data. Except for Florida, work in the other states is operating on short term funding sources.

2.8 REMOTE ELECTRONIC MONITORING

There were two projects funded by the National Fish and Wildlife Foundation (NFWF). The first was focused on remote electronic monitoring of the recreational for-hire (charter) fishery in the Gulf of Mexico, which ran from 2022 to 2023. The second project, running from 2023 through 2025, focused on similar monitoring of headboats.

The first project was a pilot test on the viability of remote electronic monitoring compared to self-reported angler logbooks for discard data. Cameras were attached to the boat to record videos and upload the recordings and location data. The recordings were then reviewed to mark catch events for a reviewer to determine the fish species and whether it was kept or discarded. At the conclusion of the pilot test, it was found that self-reported catch was consistent with the electronic monitoring, but the number of fish released was underreported.

The objective of the second project was to pilot enhanced data collection on multi-passenger headboats. Due to the large number of passengers, video coverage of activity for the entire vessel can be difficult. To assist with this task, six cameras were installed on a headboat. Additionally, an AI image library to identify species is in development. To date, the project has presented challenges in reviewing multiple camera recordings without missing a catch.

The program could be integrated with onboard observers to support the data collection. With a larger expansion of the program, legal considerations for ownership of recordings and privacy of passengers will need to be evaluated. In addition, the effectiveness of camera placement or the use of a 360° camera to reduce the number of cameras could be explored.

2.9 ELECTRONIC MONITORING IN COMMERCIAL & RECREATIONAL FISHERIES

This program has primarily focused on the commercial reef fish fishery in the Gulf of Mexico but soon plans to expand into the recreational fishery in the region. The goal of the program is to leverage electronic monitoring video technology to enhance data accuracy, improve fishing practices, and promote sustainable fisheries management. By working with volunteer vessels, the electronic monitoring complements observer coverage to fill data gaps and provide accurate, timely data.

The use of AI to efficiently identify species is in development. At this point, there is still a need for human review in conjunction with AI to check the data. The sorting of fish species through an algorithm could be validated (and trained?) with onboard data collected by observers while the algorithm is developed. Additionally, a stern-facing camera was installed to document the immediate disposition of discarded fish.

In documenting each catch, there is a trip review where the fish are identified with dropdown menus to note conditions and the fate of each fish based on visual observation. The data undergoes manual and automatic error checks before it is uploaded to a database. Additionally, a secondary database for the environmental data can be correlated to the electronic monitoring data.

So far, the program has covered 225,000 catch events and identified 161 unique species. The data from each vessel is maintained as confidential by aggregating data in reports that are provided to fishery managers. In addition, further developments based on angler feedback are aimed at providing trends and maps so that they can reduce bycatch and discards and avoid high depredation areas. In order to maintain engagement with the anglers, rapid and regular responses to feedback is a priority.

The program is expanding in the Fall of 2024 to capture red snapper effort and discard data. It has been tested on a charter boat and two private recreational boats in the Gulf of Mexico. The cameras need to be cleaned and maintained, similar to how they do in the commercial fishery portion of the program. In addition, the cheaper camera system costs $1,500 to implement, but video quality is more limited with its framerates. Starting a test group will depend on volunteer interest, but the project would be ramped up based on angler feedback to maintain interest.

2.10 ELECTRONIC MONITORING IN THE NORTHEAST FISHERY

There is a catch share program in the northeast multispecies fishery where limited access permit holders can enter contracts to form groups, or sectors, to jointly harvest and manage their portion of the quota for each species under the Fishery Management Plan. In exchange for the flexibility of these sectors, they are required to develop, implement, and pay for at-sea monitoring programs to monitor catch and discards of groundfish species. Monitoring can utilize humans or cameras, but the program must be reviewed and approved by NOAA. The first electronic monitoring program was implemented May 1, 2021.

For the northeast program, electronic monitoring refers to the cameras, sensors, and control center used to record activity on the fishing vessel. These recordings are mailed to a monitoring entity at the conclusion of a trip for review. The goal of the electronic monitoring program is to validate the discards reported by the vessel logbook for the trip. To do this, cameras record the measurements the crew makes to determine if the caught fish are above the legal size. Some of the recordings are sampled, and a reviewer collects data on the species, lengths, and numbers of discards to calculate an estimate for discard rates. Any video footage sent to NOAA for review becomes federal record. Videos that are not reviewed are deleted after one year following the fishery closer. This process creates a higher lag in data entry for catch accounting than a human observer program.

For the electronic monitoring program, NOAA Fisheries solicits and reviews applications from third-party monitoring providers. They then announce the approved monitors for that fishing year. Vessels must adhere to the electronic monitoring program according to their vessel monitoring plan (VMP). This VMP acts as a cornerstone of the regulatory program. The VMP is specific to each vessel, is meant to work with the vessel, and it includes general vessel information as well as objectives, responsibilities, and instructions for catch handling and discarding.

2.11 ELECTRONIC MONITORING IN NEW ENGLAND FOR-HIRE FISHERIES

In the Northeast, for-hire captains are required to submit electronic trip reports with their catch that includes the fish species and their fates and fishing effort. This project used electronic monitoring to validate the information reported in the submitted trip reports. One headboat/party boat and one charter boat were outfitted with electronic monitoring systems. Data from 50 trips for each vessel was collected and reviewed.
For the charter boat, two cameras were placed on board; one overlooking the deck and another monitoring the measuring station. The footage was reviewed by a reviewer who noted catch events. The reviewer used a digital measurement tool to record fish length. This tool was calibrated using a standard within view of the camera to ensure the camera positioning had not changed. For this study, the vessel trip report and electronic monitoring agreed consistently.

For the headboat, four cameras were installed on board; one faced the bow, one overlooked the stern, and one camera was placed on either side of the vessel to view the railings. Due to the higher amount of fishing activity, the reviewer often watched the footage from one camera entirely, then had to repeat the process for the other three cameras in order to annotate all catch events. For this vessel, the captain often overreported numbers compared to the at-sea observer and the electronic monitors. No statistical difference was observed between lengths measured by the at-sea observer and electronic monitoring methods.

One concern before the study began was the reaction of the public to video monitoring. In the sample size of 5,000 passengers, there was one complaint. At the time of the study in 2019, the four-camera system cost $8,000 to install with a cost to review of $500 per trip, taking an average of 3.3 minutes to review each minute of fishing. The two-camera system cost $6,000 to install with a cost to review of $180/trip, taking 0.8 minutes of review for each minute of fishing. A machine learning algorithm could help in speeding up the review process. Combining a simpler AI program with a human reviewer would be a way to reduce the cost of development of the algorithm.

2.12 APP-BASED FISHING EVENTS TO COLLECT DATA

The project began with data collection and validation to determine if the survey in MyCatch was similar to the information collected by Fisheries and Oceans Canada (DFO) creel surveys. Close agreement was found between the MyCatch app and the creel survey data, but there was low participation from website users as well as a lack of QA/QC in the MyCatch data.

During the Covid pandemic, fishing tournaments were cancelled but fishing was still allowed. This led to an app-based tournament style with photos of fish lengths and releases of catches. This style lends itself to standardization of QA/QC processes and experimental data collection. Data is reviewed to prevent cheating. Multiple states have partnered with the program to assist management objectives. Through prize structures, they can motivate data collection and participation. Additionally, they have seen that anglers are excited to participate in conservation and management efforts through these events.

One challenge with this method is the data has an unknown bias and it is unknown how representative the data is. To address this, MyCatch is working with Oregon and California to test a capture-recapture method with e-Creel surveys. They are also testing live tracking to analyze trips to correct estimates for biases.

2.13 ESTIMATING MAGNITUDE OF RECREATIONAL DISCARDS IN THE ATLANTIC

The stock of Atlantic red snapper is estimated to have been overfished since the 1980s with some recovery in recent years. However, the fishing mortality rate remains above the overfishing threshold. It is estimated in recent years that red snapper have increasing levels of recruitment that is allowing the biomass to increase. With tighter restrictions, the landings have decreased for recreational and commercial fisheries. Since 2020, as the proportion of discards reported has increased, dead discard estimates have also increased, driving assessment conclusion that the stock continues to be overfished.

In 2021, Congress allocated funding for an estimation of the Atlantic red snapper population, independent of the Southeast Data, Assessment, and Review (SEDAR) assessment. The projects had to estimate absolute abundance of age-2+ Atlantic red snapper utilizing genetic close-kin mark-recapture, a genetic testing method. Some additional goals of the research program were to generate an estimate for distribution and density of red snapper across the US Atlantic shelf using underwater camera traps, to develop an abundance model to estimate red snapper population size using genetic testing, and to integrate the study results in the stock assessments. The project is also expanding to examine the effectiveness of tagging to estimate recreational red snapper discards and to implement a tagging program for recreational red snapper discard estimates. For this tagging program, 1,500 conventional tags are needed in northeast Florida each year for high estimate precision. For genetic tagging, it requires angler participation and training with materials.

The current method of estimating the magnitude of recreational discards is to multiply the discards per unit effort by the recreational effort. The uncertainty in the effort estimations leads to uncertainty or bias in the discard estimates. This study is attempting to find the exploitation rate for recreational discards to multiply it by the population size in order to avoid these uncertainties (associated with discard mortality).

The goal is to continue the project by seeking funding from the South Atlantic Red Snapper Research Program (SARSRP). The original funding received was $1.5M. The optical study was able to operate within this funding, but subsequent funding allowed the project to refine models and validate data. A similar study for close-kin mark-recapture and tagging program in the Gulf of Mexico could be implemented by 2026 or 2027 for $5M, but it would require a high level of participation across all gulf states to succeed.

3.0 DAY 2 – JULY 31

3.1 CITIZEN SCIENCE: REPORTS FROM THE FIELD

Citizen science is a tool where the public contributes to scientific efforts. It is a spectrum depending on volunteer involvement, ranging from data collection to co-creation projects. There has been an increasing interest in citizen science among the scientific community and regulatory agencies as both a cost saving measure but also to provide qualitative (and in some cases quantitative) data to address identified data gaps and needs. As with any tool,

consideration needs to be given to the application and whether a citizen science approach can effectively be used to enhance data collection and improve estimates. Ideally, a balance is struck between data rigor and the ease of collection. Listening to and addressing feedback from participants will help with program adjustments that keep participation high.

For the South Atlantic Fishery Management Council (SAFMC) citizen science approach, they aim to evaluate its use to address data gaps and to better inform the use of data from existing programs. The project focused on collecting released catch data from the anglers in the commercial, for-hire, and recreational sectors. These data included the fish species, the depth it was caught, length of fish, gear used, predation, and whether descending devices were used. The ultimate goal was to learn about released catch lengths and to provide more detailed disposition information to help inform mortality rates applied to survey estimates of released catch.

The Atlantic Coastal Cooperative Statistics Program (ACCSP) developed SciFish in order to consolidate the various citizen science apps their partners had developed. They also wanted to standardize the data collection. ACCSP also created the app to determine how the data would be used in management and stock assessments. Projects can be built through the SciFish program and distributed to recruited or volunteer users.

Challenges with citizen science include recruitment, contribution, and retention. To maintain engagement, outreach programs can expand the community that contributes to the program. Annual summaries are shared with participants so that they see the effect of their contributions. In addition, citizen science programs are not free of cost. The outreach and development of these programs requires funding.

3.2 LOUISIANA DISCARD PILOT STUDY

Recreational Fisheries Research Institute (RFRI) began as a tagging effort. There are different levels of angler involvement in RFRI programs. For the discard study design, the minimal key data points need to be identified. Then, designing an app that is user-friendly, quick, cross-platform, and incorporates data validation is the next step. For data entry, there should be a few mandatory fields with no optional fields. Most of the location data, fish identification, and fish length would come from photo files. Also, the instruction material needs to be accessible and easily understood. Furthermore, the data needs to upload to a central location where managers can pull data when it is needed. An important need for improving and maintaining interest from anglers is an effective forum to incorporate user feedback.

The RFRI app incorporates a tagging program and also links to collect weather data. The photographs of fish are used to assist with a fish identification machine learning algorithm. In addition, the app provides forecasts for fishing areas and harvests.

A discard study can be incorporated in the app. All inputs are standardized and can be recorded immediately. The participants in the study would be gathered through app messages and notifications. By keeping data current, management decisions and stock assessments would be more accurate. By engaging the anglers in the data collection, it creates a sense of responsibility in fishing practices. As a data collection tool, the app can be tailored for the needs of the managers using the data.

3.3 NONPROBABILITY SAMPLING

Advances in technology have resulted in improved accessibility of different data sources that in some cases can be more cost effective and timely. . The focus has shifted from formal design-based probability sampling to nonprobability sampling that uses readily accessible data to make inferences about populations. The data is more available, but the data collector loses control of sample selection and measurement. Additionally, there is not a well-developed framework for the incorporation of non-probability data, but framework approaches are evolving.

The standard probability approach to estimate total recreational catch is to use two independent surveys, such as the APAIS and the Fishing Effort Survey (FES) to estimate catch rates and overall fishing effort, respectively, the product of which is the estimate of total catch. The more recent interest is to use app based reports provided by anglers as an alternative to formal probability sampling. An issue with this approach is that the chance of selection for a given sample (fishing trip) is not known. The sample essentially selects itself which makes population inferences questionable and potentially inconsistent.

Another challenge is in maintaining user interest in an app past a few days, a problem for many apps. Probability samples collect data from those who made trips and those who did not. Adjustments are then made to reduce bias. In nonprobability samples, nonresponse adjustments are more difficult. Data are limited to those who voluntarily reported taking trips or catching fish, and a modeling approach is needed to adjust for non-responses, but rare events like fishing trips are difficult to model.

Volunteer surveys are most likely to be biased and underestimate fishing effort because there is no information provide by those that did not fish. Methods to increase participation are limited but improving. To be most effective, the volunteer samples should be used in conjunction with probability sampling. The population-level inferences based on volunteer samples should be viewed with caution due to risks and bias. It is best to consider volunteer information as qualitative. Use of probability surveys are well-defined and codified with bias adjustments.

Approaches are emerging that assign propensity scores to weight nonprobability samples using high quality, auxiliary information from probability survey samples. Doubly Robust (DR) estimation for example uses propensity score weights in combination with linear regression model so the estimator is not entirely reliant on either and under certain conditions produces reliable estimates. The assumption is that relevant auxiliary information is available from reference probability survey samples to develop sample weights. There are limited conditions for use of estimators if there are issues with validity. DR estimators are not valid if either or both model is incorrectly specified.

Current survey-centric methods will need to evolve to incorporate other informative sources of data and to stay relevant. Working on methods to minimize modeling assumptions will improve existing models and maximize utility of nonprobability data. Feasibility studies will also need to consider the availability of relevant auxiliary information to develop estimators. In addition to estimation methods when developing an apps to collect data, consideration needs to be given as to what data gaps are being filled as well as how to characterize, recruit and retain users. Researchers and app developers coordinating will improve the chances of success.

3.4 FISHERIES ASSISTED SAMPLING TECHNOLOGY (FAST) PLATFORMS

Until recently, the only harvest data available for fishery managers in the US Caribbean was self-reported without a secondary source to validate. Fish house sampling, and recently electronic monitoring, has provided a source of secondary validation of catch. During this catch validation project, observers identified 287 species in comparison to the self-reported logs which only identified 78 species. The electronic monitoring was developed because of a lack of trained samplers. It allowed for a rapid evaluation of data that was uploaded when the device was online. The addition of photographs meant that a species could be identified at any time.

A problem faced in the US Caribbean project was that the landings would be relatively small but had a large diversity of species. Originally, the fish were handled and sorted before weighing. To speed up the process, an integrated, simultaneous scale and camera setup was developed where a fish is placed on the balance scale, weighed, and a photo is taken to identify the fish. The benefit of the system is that it requires minimal training, and the data can be uploaded to Cloud storage.

Further developments to the system led to a portable setup that can be carried onboard vessels. The design was such that it can fit into the normal flow of the fishing operation without causing interruptions. Programs were also developed that could scrub videos and photos to identify lengths and mark the presence of fish. These marked sections of the video and photo would then be reviewed by a human reviewer. The program is being developed to automatically identify fish species. The algorithm can be tailored to flag images for manual review when AI confidence levels fall below a threshold. Curvature of fish also has to be corrected in the algorithm training. The estimated unit price is $1-2k, but the software licensing is unknown.

3.5 FWC ATLANTIC EXEMPTED FISHING PERMIT PROJECT

The red snapper stock is at record abundance, but a large estimated magnitude of recreational discards indicates the species is still overfished. This status has led to highly managed, short seasons that are frustrating to anglers. To address this issue, FWC is proceeding with a study to test innovative management strategies to improve angler satisfaction and reduce the magnitude of recreational discards.

The study is experimenting with an exemption license with mandatory reporting requirements before and after a trip. The experimental group fishes under an aggregate bag limit designed to reduce discards. The bag limit would be set to 15 fish on a list with specific numbers of each species allowed. The hope is that the bag limit will encourage anglers to switch to different target species. Additionally, the study includes a control group fishing under the new reporting requirements but with standard season restrictions. There will be a pre-study and post-study satisfaction survey. As an incentive, some participants will also be permitted to harvest red snapper. In addition, complete participation in the control group grants priority to join the experimental group if the angler wishes to continue with the study.

As an additional component of the study, there is another study fleet consisting of private boats and for-hire vessels that must be monitored with video electronic monitoring on all vessels and human observers on the for-hire boats. The purpose of the different fleets is to test the feasibility of trip reservations and willingness of anglers to self-report. The study fleets will act as validation for the accuracy of self-reports. It will also show the feasibility of video monitoring in place of human observers.

3.6 PROPOSAL OF RECREATIONAL RELEASED CATCH CARDS INTO MRIP APAIS

The idea for this project was developed over the past five years by the ACCSP Recreational Technical Committee (Rec Tec). The design was completed with involvement from the NOAA Office of Science and Technology (OST). The point of the pilot project is to utilize the probability-based sampling of APAIS or other surveys with the potential use in regional estimate calculations.

The current plan is to use catch cards to collect supplemental information on recreational discards along the Atlantic coast, with a target start of 2025. The focus is on the private and recreational fishing mode. It is a modified sampling design of APAIS to collect samples from randomly selected anglers. The goal is to fill the data gaps for stock assessments. Currently, the only validated discard data available is from headboats. An additional current data source is through volunteer logbooks. The increasing proportion of released catch has led to increased concern with uncertainty of released fish estimates. The APAIS asks anglers to remember information after a trip which introduces recall bias to the reported discard estimate.

For the first year of the study, they plan to use paper catch cards. The cards would be handed out at the start of a trip so anglers can record discards during the trip and hopefully reduce potential recall biases. The cards would not be part of MRIP during this pilot study, but they could be incorporated into estimations after a trial period. The potential benefit of the cards is they could be handed out before the official APAIS morning time as well as during the entire APAIS assignment. The catch card would then be handed to the interviewer at the conclusion of the trip or mailed in if the interviewer was no longer on the assignment. This information would then be submitted for entry into the ACCSP Assignment Tracking Application (ATA).

The cards include unique identifiers to tie the card to the interviewer. The cards also include areas to list released catches and the fish lengths. The plan is to include instructions and some outreach to encourage participation. A potential improvement is to include the collection of contact information for the ATA to reach out to anglers for the catch cards. For the target species of this project, the goal is to get at least 60 lengths for each subregion of the Atlantic coast. The expectation is they will receive around 25 percent of the catch cards back, but a similar program in Louisiana only receives 10 percent of the mail-in catch cards. The current hope is that the project will receive funding soon.

3.7 REVERSE STUDY FLEETS

Study fleets are thought of in two ways: a group of anglers following an experimental design or a panel of fishermen that represent a larger group. This concept would be for scientists to go fish like recreational fishermen using the same gear and fishing the same locations. This method could then be used to verify the information the scientists have been receiving. Some states have already tried similar programs. For Alabama, there is some previous work and data that could be accessed.

One sentiment was the need to match precise details of how anglers behave and fish. Anglers do not always target the same species, even among anglers on the same trip, so mimicking angler behavior would potentially require a survey to learn their behavior in order to make this a scientific approach. Additionally, there was a concern that the perception of scientists attempting to match angler behavior would lack credibility or that they could catch the full scope of behavior. There is also a difference between new and experienced anglers.

Another point was that this would not be a perfect representation, but that it could give a proportion of discard and landed rates. Potentially, the discard rates could be calibrated through this study and would help set ideas of proportions and biases.

3.8 MITRE PRESENTATION

MITRE is a not-for-profit organization that tackles complex challenges in public interest. They work with the government, but they do not compete for funding. MITRE operates six Federally Funded Research and Development Centers (FFRDCs). These FFRDCs are independent and act in an advisor role to bring broad, technical expertise to government challenges. For instance, the FFRDC can take on the development of models, technology, and algorithms to then be used in projects and studies.

Additionally, MITRE acts as a third-party data processor. Private data can go through them to be prepared for presentation and anonymity. The procedures for data processing are developed collaboratively. They are also transparent with how the data is managed and utilized. Gathering this data requires some technology investment, but the prices become more accessible over time.

3.9 DISCUSSION OF FEASIBILITY OF POTENTIAL NEW SURVEY APPROACHES

The short-term goal is to develop a request for proposals (RFP) that solicits applied research that attempts to address priorities identified during the effort and discard workshops. This goal of this workshop is to explore techniques and technologies that could improve estimates of discard rate in the region. Ideally, proposals could cover both issues with a focus on projects that validate effort estimates or identify and confirm bias in estimates of releases. In addition, the RFP will need to be designed so that it does not exclude technologies that were not seen at these workshops. The scope of the projects should cover multiple states, and they will ideally have potential for longevity. It will likely be multiple projects that address the issue. A review panel of unbiased and independent reviewers will evaluate the proposals based on the goals developed during the effort and discard workshops.

4.0 DAY 3 – AUGUST 1

4.1 DISCUSSION AND PLANNING OF NEW RESEARCH STUDIES

Workshop participants engaged in an open discussion about the merits of the approaches and examples presented to address the workshop objectives and potential integration and synergies with findings from the effort workshop. Key areas were identified for consideration of the RFP including a need for projects that have a broad enough scope to effectively characterize discard rates across the entire region, or at least where fishing effort is most representative of the Gulf of Mexico reef fish fishery, projects that will generate comparable discard estimates at the conclusion of the study, and methods that have the potential to be operationalized and provide transformational results for the management in the region.

Ideally, there will be large proposals that cover aspects of both effort and discard priorities. Electronic monitoring approaches appeared to have several benefits such as increased flexibility and quicker access to data for management purposes but there was a hope for a transformational change in our understanding and use of discard and effort information beyond adjustments to what is received from existing surveys. The effort proposals will have the advantage of having a number of existing survey methods and estimates for comparison on different scales. Discards do not have this due to the absence of overlapping parameters among surveys. The proposals will need to be examined for how they improve upon or validate existing information.

Hope was expressed for catch cards because of the simplicity of the approach and the potential for low costs. In addition, the inclusion of citizen science into projects was seen as a potential avenue for evaluation. The proposals could address how best to incorporate citizen science data for management and estimation purposes. These proposals will be reviewed by an independent panel to provide impartial judgement. Collaboration across states or regional scopes would be weighted more favorably, but they would likely come from academic circles to oversee these projects. Discussion about the total abundance studies centered on the risk of the price and the need to repeat periodically.

Due to the concern of loss of funding and the timeline, the process is moving more quickly. Smaller projects that can be easily brought into existing state programs would be less expensive. Language could be added to say a certain number of projects would be funded based on size. Ideally, a study would focus on effort and discards, but a great study that focuses on one issue will not be excluded. Scalability was a repeated theme that proposals would need to address alongside transition to full implementation.

Public comment received from Captain Bob Zales weighed in that the critical issue is the lack of accountability from the private recreational sector and the higher discard mortalities from that same sector. He felt the catch cards were a good plan that placed minimal burden on anglers. He also felt private recreational anglers that fish in the EEZ needed to carry permits so that they could be identified. He also said an app seemed like an easy method to garner information. He also expressed disillusionment with MRIP and felt voluntary information should replace it. He then explained there should be more punitive consequences against anglers who violate the enforcement measures.

Workshop participants agreed that there is a firm understanding of the problem, and the technology is available to answer it. The obstacles lie in how to use the data. The Steering Committee would need to formulate the RFP and proceed quickly.

4.2 CONCLUSIONS

- Generate the framework for an RFP. Decide what is eligible and what needs to have focus.
- Projects will be funded through 2026.
- The RFP will capture large proposals without excluding technologies that were not seen at the workshop.
- Electronic Monitoring programs look promising.
- Preference would be given to methods that validate current recreational discard estiamtes.
- Pre-trip catch cards showed promise. All states want to see projects about this.
- An independent panel will review the proposals since people at the workshop would likely submit proposals.
- Proposals with regional scopes across states are preferred. Ideally, academic institutions would oversee these projects.
- Ideally, the studies will answer questions on effort and discard information, but studies focused on one aspect will still be considered.
- The Steering Committee will need to define scoring criteria and weighting for proposals.
- Cooperation between GSMFC and ACCSP will require a proposal that coordinates between the agencies.
- Any project from the RFP will need to incorporate State partners.

APPENDIX A

WRITTEN COMMENTS

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end of report