



UNITED STATES DEPARTMENT OF COMMERCE  
Chief Financial Officer  
Assistant Secretary for Administration  
Washington, D.C. 20230

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The Honorable Jeanne Shaheen  
Ranking Member  
Subcommittee on Commerce, Justice,  
Science, and Related Agencies  
Committee on Appropriations  
United States Senate  
Washington, DC 20510

Dear Senator Shaheen:

Enclosed is the National Oceanic and Atmospheric Administration's (NOAA) report to Congress, *Electronic Reporting Options for the Marine Recreational Information Program's Fishing Effort Survey*. This report was requested in Senate Report 115-139, accompanying the Consolidated Appropriations Act, 2018 (P.L. 115-141).

This report responds to the Committee's request by reporting on: 1) actions NOAA's National Marine Fisheries Service has taken to date to develop, test, evaluate, and implement electronic reporting options for recreational fisheries; 2) current research on development of a web-based option for responding to the Fishing Effort Survey; 3) planned next steps for addressing the potential for electronic reporting of angler catch and effort; and 4) conducting communications and outreach to raise awareness among stakeholders of the requirements, challenges, and costs associated with angler electronic reporting surveys.

If you have any further questions, please contact me at (202) 482-4951. Thank you for your continued support of the Department of Commerce and its programs.

Sincerely,

A handwritten signature in blue ink, appearing to read "TF Gilman".

Thomas F. Gilman  
Chief Financial Officer and  
Assistant Secretary for Administration

Enclosures



## **REPORT TO CONGRESS**

### **ELECTRONIC REPORTING OPTIONS FOR THE MARINE RECREATIONAL INFORMATION PROGRAM'S FISHING EFFORT SURVEY**

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*Developed pursuant to: Senate Report (115-139) accompanying the Consolidated  
Appropriations Act, 2018 (Public Law 115-141)*

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THE SENATE REPORT (115-139) ACCOMPANYING THE CONSOLIDATED  
APPROPRIATIONS ACT, 2018 (PUBLIC LAW 115-141) INCLUDED  
THE FOLLOWING LANGUAGE

*“Marine Recreational Information Program [MRIP].—The Committee recognizes the ongoing improvements being made to MRIP, but is concerned that these changes will be insufficient to meet management requirements for many offshore recreational fisheries, such as reef fish. Significant advances in technology, such as smartphone apps, allow anglers to electronically record their catch. The recent adoption of mobile electronic records technologies by State fish and wildlife agencies has demonstrated that these programs can provide comparable and compatible data to current MRIP estimates with faster collection and analyses. However, additional studies are needed to fully understand the suitability of angler-provided electronic data as a supplement to MRIP. Not later than 1 year after enactment of this act, NOAA shall provide a report to the Committee on electronic data collection as an option for the Fishing Effort Survey, including through use of smartphone apps, electronic diaries for prospective data collection, and an online option for anglers. The study should list specific actions the agency has taken to date and identify additional steps to be taken in the future, including pilot studies to explore the suitability of electronic data collection as a supplement to MRIP.”*

THIS REPORT RESPONDS TO THE COMMITTEE’S REQUEST.

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## **I. Executive Summary**

This report describes actions by the Marine Recreational Program (MRIP), in response to directed language in the Consolidated Appropriations Act, 2018 (Public Law (P.L.) 115-141), to develop and evaluate electronic reporting options for the MRIP Fishing Effort Survey (FES), as well as actions taken to develop, support, and evaluate electronic reporting in marine recreational fisheries data collection programs more generally. Specifically, NMFS has completed the following:

- Development of an MRIP Electronic Reporting Action Plan to serve as a strategic guide for program actions related to electronic reporting;
- Development and implementation of a “web-push” pilot test, which allows anglers to respond electronically to the FES using internet-accessible devices including personal computers, tablets, and smart phones; and
- Collaborative design support and certification for state mandatory reporting programs that include electronic reporting options for red snapper landings in Alabama and Mississippi.

The report also includes a summary of designs and results from evaluations of voluntary electronic reporting; pilot studies that used the iSnapper and iAngler smart phone apps and were supported through MRIP pilot projects; and a NOAA commissioned report by Westat, Inc., an internationally recognized leader in survey research that evaluates electronic reporting and associated data collection designs for use with marine recreational fisheries.

NMFS acknowledges the recommendations in the Consolidated Appropriations Act, 2019 (P.L. 116-6) and are working to implement the National Academy of Sciences (NAS) MRIP recommendations.

In 2008, the National Oceanic and Atmospheric Administration (NOAA) established MRIP to address the recommendations of a 2006 National Academy of Sciences (NAS)/National Research Council (NRC) review of recreational fishing survey methods that NOAA had commissioned. Amendments included in the 2007 reauthorization of the Magnuson-Stevens Fishery Conservation and Management Act (MSA) required NOAA to establish a program to improve surveys of recreational fishing catch and effort addressing as many of the NAS recommendations as feasible. Among the key NAS recommendations were that NOAA’s National Marine Fisheries Service (NMFS) should develop an alternative to the random-digit-dial household telephone survey that has been in use to obtain estimates of fishing effort, including use of angler registries as a sample frame. NAS also recommended that internet surveys should be considered for potential use as a way for anglers to submit information.

Under MRIP, NMFS conducted a series of pilot studies designed to develop and test alternative modes and methods of sampling anglers to produce estimates of the number of recreational fishing trips. Ultimately, MRIP completed and certified a new mail survey, namely the FES, which has replaced the former telephone survey for the Atlantic and Gulf coasts as well as Hawaii. MRIP also commenced a number of projects to explore the utility and limitations of electronic reporting of catch information by anglers.

In 2015, NOAA again contracted with NAS to evaluate progress to date in addressing the 2006 recommendations. Relevant findings of the 2017 NAS report included the following:

- The methodologies associated with the current FES, including the address-based sampling mail survey design, are "...major improvements from the original Coastal Household Telephone Survey that employed random-digit-dialing to contact anglers. This is a reflection of an immense amount of effort on the parts of the NMFS staff, contractors, and consultants."
- "...electronic data collection should be evaluated further as an option for the Fishing Effort Survey, including smartphone apps, electronic diaries for prospective data collection and a web option for all or just panel members."
- "The MRIP has made progress in evaluating and testing the use of new technologies (i.e., smartphones, tablets, and other electronic data-capture platforms) as ways to implement electronic reporting, avoid or decrease data transcription errors, and increase the timeliness and reliability of recreational fisheries data collection. Still, the impression among many private anglers and the for-hire sector is that implementation of these technologies is not occurring quickly enough."
- "The MRIP should develop a strategy to better articulate the complexities, costs, and timelines associated with implementing new and emerging technologies in recreational fisheries data collection and monitoring."

MRIP addressed the NAS recommendation to explore electronic reporting options for FES by designing and conducting a four-state pilot of a push-to-web option. This option enables recipients of the FES mail survey to respond via the internet. The study will be completed and the results evaluated for broader application in mid-2019.

MRIP conducted several studies to assess the potential for angler electronic reporting of trip and catch information. In 2018, MRIP certified supplemental survey designs in Alabama ("Snapper Check") and Mississippi ("Tails n' Scales"). Both surveys rely on a census of angler reports of red snapper catch on each trip, with electronic reporting options including via smartphone app. Also in 2018, MRIP received three final project reports evaluating different aspects of angler-based electronic reporting (ER). A full assessment of the challenges, benefits, and cost-effectiveness of implementing angler-based ER based on the results of these studies is in preparation and will be used in an expanded communications effort. Preliminary assessment of the studies indicates that:

- Angler ER methods using smartphones, tablets, and web-based reporting are feasible and may allow for more timely preliminary estimates of catch and effort.

However, attention to the sample design and angler participation is necessary to help ensure statistically valid results.

- Supplemental on-site or other in-person sampling is required to validate the self-reported data. This adds cost and time to the development of estimates.
- It is necessary that participating anglers follow design assumptions (i.e., reporting prior to landing, reporting all catch for all trips, and reporting for the full duration of the sampling program). In practice, it has proven difficult to achieve such performance and new methods to recruit, retain, and secure compliance of anglers may be necessary.

## **II. Introduction**

This report outlines the process NOAA followed for responding to the recommendations of the 2006 NAS review of recreational fishing survey methods and to the provisions of the 2007 amendments to the Magnuson-Stevens Fishery Conservation and Management Act that required the agency to implement as many of the recommendations as practicable. The report describes how the process led directly to development of a new mail survey to replace the previously used telephone survey to estimate the number of fishing trips taken by anglers in shore and private boat fisheries. It also describes efforts of NOAA's MRIP to explore electronic reporting of catch by anglers and for-hire vessel operators.

NMFS contracted with NAS to conduct a follow-up review of MRIP's progress. In its 2015 report, NAS made recommendations to pursue electronic reporting options for the new mail survey and to continue development and outreach regarding application of electronic angler-based reporting. This report describes progress NOAA has made in studying a push-to-web design to allow web-based reporting as an option for the recipients of the mail survey, in response to the 2015 NAS recommendation. It also addresses NOAA's efforts to study and evaluate electronic angler reporting methods and to expand outreach to stakeholders about the requirements and limitations of these methods.

## **III. Background: The Marine Recreational Fisheries Statistics Survey and the Marine Recreational Information Program**

The Marine Recreational Fisheries Statistics Survey (MRFSS) was the primary source for national marine recreational fishery catch statistics in the United States from 1979 to 2002, and it continued to be the primary source for the Atlantic coast, Gulf of Mexico, Hawaii, and Puerto Rico from 2003 to 2012. MRFSS was a complemented surveys design that included the Coastal Household Telephone Survey (CHTS) and the Access Point Angler Intercept Survey (APAIS). CHTS collected data on angler fishing effort from a random sample of coastal residential households. APAIS was a shoreside survey that used probability sampling of fishing access points and days to collect catch data from anglers who had completed a day of fishing. Data from the two independent surveys were combined to estimate total fishing effort and catch of different finfish species.

CHTS was originally used to estimate total angler fishing effort in all modes of fishing, including shore fishing, fishing on private boats, and fishing on for-hire boats. However, a new For-Hire



Survey (FHS) was implemented in the Gulf of Mexico in 2000 and on the Atlantic coast in 2004 to replace CHTS for estimating total angler fishing effort on charter boats (and headboats in the northeast region). FHS is a weekly telephone survey of the operators of listed for-hire boats, and it has been paired with APAIS to provide estimates of angler catches of different finfish species on for-hire boats.

In 2005, in response to the growing demand for an improved recreational fishing data collection program, NMFS commissioned NRC of NAS to conduct a high-level scientific review of the existing survey methods used by NMFS and its state agency partners to monitor catch, effort, and participation in marine recreational fisheries throughout the United States. A final report<sup>1</sup> of the NRC findings (*Review of Recreational Fisheries Survey Methods*) was published in April 2006. The report identified a number of potential problems with the sampling and estimation methods used by MRFSS and state agency surveys that had replaced MRFSS and questioned the adequacy of all existing surveys in providing the statistics needed to support stock assessments, as well as the kinds of fishery management decisions required by current law and practice. The report included recommendations to redesign current surveys to improve: their effectiveness; the appropriateness of their sampling procedures; their applicability to various kinds of management decisions; and their usefulness for social and economic analyses.

In response to the NRC report, the 2006 Magnuson-Stevens Reauthorization Act (MSRA), P.L. 109-479 (January 12, 2007), included new requirements for improving recreational fisheries data collection:

- “Within 24 months after the date of enactment of the [MSRA], the Secretary, in consultation with representatives of the recreational fishing industry and experts in statistics, technology, and other appropriate fields, shall establish a program to improve the quality and accuracy of information generated by the Marine Recreational Fishery Statistics Survey, with a goal of achieving acceptable accuracy and utility for each individual fishery.” 16 U.S.C. § 1881(g)(3)(A).
- “The program shall take into consideration and, to the extent feasible, implement the recommendations of the National Research Council in its report *Review of Recreational Fishing Survey Methods* (2006), including...redesigning the survey to improve the effectiveness of sampling and estimation procedures, its applicability to various kinds of management decisions, and its usefulness for social and economic analyses...”  
*Id.* § 1881(g)(3)(B)

#### **A. Response to the 2006 National Academy of Sciences Review of the Marine Recreational Fisheries Statistics Survey**

In its report, *Review of Recreational Fisheries Survey Methods* (2006), NRC expressed several specific findings and recommendations regarding the design of MRFSS CHTS:

- The existing random digit dialing (RDD) survey suffers in [in]efficiency from the low proportion of fishing households among the general population and may allow bias in estimation from its restriction to coastal counties only.

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<sup>1</sup> <https://www.nap.edu/catalog/11616/review-of-recreational-fisheries-survey-methods>

- Offsite sampling methods that rely on telephone interviews are complicated by the increasing use of cell phones, especially in surveys of residents of coastal counties.
- This frame (the MRFSS RDD list frame of all working landline telephone numbers in coastal counties) suffers from over-coverage since not all households contain anglers, under-coverage since some anglers do not live in coastal counties or live in coastal counties but have no landline telephones, and duplications since some anglers live in households with more than one working landline.
- A comprehensive, universal sampling frame with national coverage should be established.
- Dual-frame procedures should be used whenever possible to reduce sample bias.

NRC also shared findings and recommendations regarding the design of MRFSS APAIS:

- The onsite sampling frame for MRFSS [APAIS] should be re-designed. The estimation procedure depends critically on the assumption that catch rate does not vary according to the nature of the access point. In particular, small or private access points that most likely are missed might have different catch rates than larger access points, which would lead to bias in the resulting estimators. In addition, the sampling process requires greater quality control (less latitude on the part of the samplers) than it has at present.

Recognizing that high-quality estimates of catch and effort are fundamental to ensuring the health of our ocean resources, safeguarding the future of recreational fishing, and supporting millions of lives and livelihoods connected to the sport, NMFS initiated MRIP in 2006 to address the findings and recommendations of the NRC report and to carry out the requirements of the MSA reauthorization. MRIP was formally established upon adoption of an Implementation Plan in October 2008. It is a collaborative effort among NMFS, regional and state fisheries science and management partners, data customers, and the recreational fishing community to develop and implement an improved recreational fisheries statistics program. The mission of the new program is to establish a system of regional surveys that provides the best possible scientific information available for use in the assessment and management of the Nation's marine fisheries. Decisions to implement new data collection methods have been informed by a technically sound scientific process that includes testing of new or enhanced survey methods; independent peer reviews of survey methods and project results; reviews by stakeholder groups; and development and execution of transition plans. These plans ensure an orderly and scientifically sound process for incorporating the catch and effort estimates derived from new methods into catch history databases as necessary for fisheries stock assessments and management.

## B. Development and Certification of the Fishing Effort Survey

Beginning in 2007, MRIP initiated a series of pilot projects to develop and test methods that addressed NRC findings and recommendations, including incorporation of angler registries into effort survey designs for private boat and shore fishing. The core members of the project team that conducted this work included two expert consultants, Dr. Michael Brick of Westat and Dr. Nancy Mathiowetz of the University of Wisconsin-Milwaukee, both internationally recognized experts in survey design. The projects also tested alternative modes of data collection, including use of both telephone and mail sampling frames. A complete listing of the pilot projects, with links to the project reports, is available on the agency's website.<sup>2</sup> These projects resulted in the development of a preferred mail survey design that was pilot tested over 16 months in four states. Based on the results of the pilot study, the project team concluded that:

- Mail survey designs are a feasible alternative to telephone surveys for collecting recreational fishing data.
- Final mail survey response rates were nearly three times higher than CHTS response rates, and preliminary estimates, derived from partial data collected within 2 weeks from the end of the reference wave (2-month sampling period), were not significantly different from final estimates.
- Accordingly, a mail survey can generate stable fishing effort estimates within the current estimation schedule for CHTS.
- The sampling design, which supplements address samples with state saltwater fishing license data, is more efficient for collecting fishing data than simple random sampling currently used for CHTS.
- Differences between mail survey and CHTS estimates can largely be attributed to differences in fishing prevalence; households in the mail survey sample were more likely to report fishing than households in the CHTS sample.
- The mail survey design is less susceptible than CHTS to bias resulting from household nonresponse and undercoverage of fishing households, and the nature of the mail survey mode results in more accurate responses to questions about fishing activity than CHTS.
- The mail survey design is a superior approach for monitoring recreational shore and private boat fishing effort.
- Continued testing and evaluation are recommended to assess additional sources of survey error and ensure that evolving advancements in survey methodology are considered and customer needs are satisfied.

The final project report<sup>3</sup> for the pilot project, *Development and Testing of Recreational Fishing Effort Surveys, Testing a Mail Survey Design, Final Report*, sets forth the tested survey design description and findings in detail for the design of a new FES.

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<sup>2</sup> <https://www.st.nmfs.noaa.gov/Assets/recreational/pdf/MRIP%20Project%20Tree%2011-24-15%20FINAL%20website.pdf>

<sup>3</sup> [https://www.st.nmfs.noaa.gov/Assets/recreational/pdf/2012-FES\\_w\\_review\\_and\\_comments\\_FINAL.pdf](https://www.st.nmfs.noaa.gov/Assets/recreational/pdf/2012-FES_w_review_and_comments_FINAL.pdf)

The project report was subject to a two-stage peer-review process. Three peer reviewers were independently selected by the Research Methods Section of the American Statistical Association. In addition, five members of an MRIP expert consultant team (external to NOAA), who had not been involved in the effort survey methods studies, provided reviews. The peer-review process was submitted for publication to the *Peer Review Bulletin* on December 29, 2014. Given the results of the independent review, the FES survey design was certified by NMFS as a method that has been appropriately developed and peer-reviewed and that is considered scientifically valid.

### **C. Modification of the Design of the Access Point Angler Intercept Survey**

Beginning in 2009, MRIP initiated a series of two major projects to redesign the estimation and sampling methods for APAIS. The first project developed a new estimation method that more appropriately accounted for the complex multi-stage cluster sampling design of MRFSS APAIS. The new method developed weights for all intercepted angler trips that better reflected their actual sample inclusion probabilities and used those weights in the estimation process to greatly reduce the potential for bias in APAIS estimates of mean catch rates. This new method was applied to produce revised catch estimates for the 1981–2012 MRFSS time series. The second project developed a new sampling design for APAIS that provided more complete coverage of angler trips ending within different time intervals (daytime and nighttime), utilized an improved onsite sampling frame; eliminated sampler latitude to make decisions on when and where to collect data; and included much stricter quality control protocols. The new MRIP APAIS sampling design was developed and tested in a pilot study prior to full implementation in 2013.

## **IV. 2015 National Academy of Sciences Review**

By 2015, NMFS had made substantial progress in addressing the findings and recommendations of the 2006 review. Given MRIP certification of the new FES and improvements to both the design of APAIS and its estimation methods, the agency determined that it was time to obtain an independent assessment of how well it had incorporated and acted upon the recommendations in the 2006 review. NOAA again contracted with NAS for another independent expert analysis to assess progress and evaluate improvements made since the previous review, as well as identify areas for continued improvements in order to provide NOAA's partners and stakeholders with the best available information. NAS released the results of its review in January 2017. In general, NAS concluded that NMFS has made "impressive progress" with its saltwater recreational fishing information collection efforts, including "major improvements" to survey designs. They highlighted some remaining challenges and offered a series of recommendations for continued improvements to MRIP surveys. The review included a comprehensive review of the new FES, which concluded that the methodologies associated with the current FES, including the address-based sampling mail survey design, are "...major improvements from the original Coastal Household Telephone Survey that employed random-digit-dialing to contact anglers. This is a reflection of an immense amount of effort on the parts of the NMFS staff, contractors, and consultants."

The review report also included recommendations relating to the advancement of electronic reporting in recreational fisheries surveys and noted the interest expressed by recreational stakeholders in this subject during the outreach phase of the review. Specifically, the report included the following conclusion and recommendation:

**“Conclusion:** Collecting data for fishing effort estimates through electronic modes (e.g., web questionnaire, smartphone app) may reduce study costs associated with keying and processing the questionnaires. Additionally, these vehicles may be a viable option to increase release of fishing effort estimates with data that is evaluated in real-time.

**Recommendation:** As recommended in the 2006 report, electronic data collection should be evaluated further as an option for the FES, including smartphone apps, electronic diaries for prospective data collection and a web option for all or just panel members.”

NAS review also contained a second significant conclusion and recommendation regarding MRIP’s progress in developing ER options and stakeholder perceptions:

**“Conclusion:** MRIP has made progress in evaluating and testing the use of new technologies (i.e., smartphones, tablets, and other electronic data-capture platforms) as ways to implement electronic reporting, avoid or decrease data transcription errors, and increase the timeliness and reliability of recreational fisheries data collection. Still, the impression among many private anglers and the for-hire sector is that implementation of these technologies is not occurring quickly enough.

**Recommendation:** MRIP should develop a strategy to better articulate the complexities, costs, and timelines associated with implementing new and emerging technologies in recreational fisheries data collection and monitoring. This communication strategy should not only focus on regional partners but also address questions and concerns expressed by private anglers and for-hire operators. It should involve both the MRIP communications team and the NMFS Office of Communications.”

## **V. MRIP Initiatives to Develop Electronic Reporting Options**

Consistent with NRC and NAS recommendations, MRIP has undertaken numerous research/pilot projects, reviews, and communications focused on advancement of electronic reporting of recreational catch and effort data. In 2016, NMFS adopted Procedural Directive 04-115-01<sup>4</sup> that described MRIP actions to date and identified future MRIP priorities for ER development. The Procedure identified the following as a MRIP ER priority: “Collaborate with partners to examine the utility of supplemental angler reporting applications. This includes working with partners to develop and set standards for third parties to use in development of their own applications. All MRIP-supported work on supplemental angler reporting applications must: Meet the needs of MRIP partners, as expressed in the MRIP regional implementation plans; Identify and address any limitations of data that are collected through nonprobability sampling designs.”

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<sup>4</sup> <https://www.fisheries.noaa.gov/national/laws-and-policies/science-and-technology-policy-directives>

In 2018, NMFS adopted an MRIP ER Action Plan<sup>5</sup> that lays out four current priority areas and actions in support of advancing ER options:

- Examine New Private Angler Electronic Reporting Options;
- Advance For-Hire Electronic Reporting;
- Develop Electronic Reporting Options for the Fishing Effort Survey; and
- Strengthen Stakeholder Engagement.

#### **A. Status of Actions to Develop an Electronic Reporting Option for the Fishing Effort Survey**

In 2018, as called for by the NAS 2017 review, the Senate Appropriations Committee Report language, and the NMFS MRIP ER Action Plan, MRIP initiated a study of an online reporting option for the FES. With support from Westat, an internationally recognized survey research firm, MRIP staff have developed a “web-push”<sup>6</sup> design in which households randomly selected to receive FES mailings are asked to complete an online survey that can be accessed through either a personal computer or mobile device. After two failed attempts to encourage online reporting—an initial survey request and a postcard reminder—a paper survey is provided as a last resort. If residents of the sampled households do not respond using the web application after receiving the initial request and a subsequent postcard reminder, a paper survey is provided that can be returned by mail. The web-push design<sup>7</sup> incorporates the benefits of electronic reporting, including timely data submission, built-in logic checks, and reduced costs, but also provides a reporting option for those who are unlikely or unwilling to respond to an online survey. MRIP has implemented a test of the web-push design in Massachusetts, New York, North Carolina, and Florida that will be completed during spring 2019. The pilot study will evaluate the web-push design in terms of response rates, representativeness of survey respondents, reported shore and private boat angler fishing activity, timeliness, and cost. Because the web-push design is an adaptation of the existing FES approach, the methodology can be implemented quickly, at minimal additional cost.

#### **B. MRIP Engagement in Development of Angler ER Technology**

Consistent with NRC and NAS recommendations, MRIP is committed to the advancement of electronic reporting opportunities for fishing participants. To date, research efforts have focused on three categories of electronic reporting: 1) mandatory reporting by licensed or permitted fishing participants (for-hire boat operators and/or private anglers) through online or smartphone applications; 2) voluntary reporting by private anglers through smartphone applications; and 3) as noted above, online reporting as an option for responding to the ongoing FES. Results from these studies have identified strengths and limitations of the different data collection designs and will identify future research priorities. A brief summary of the results and findings is provided below. However, as called for by the MRIP ER Action Plan, a more thorough review and assessment of future ER research and development

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<sup>5</sup> <https://www.fisheries.noaa.gov/sites/default/files/images/ER%20Action%20Plan%20-%202003-09-2018.pdf>

<sup>6</sup> Refer to Appendix 1.

<sup>7</sup> Refer to Appendix 2.

potential will be prepared, based on the results of the iSnapper, iAngler, and Westat studies referenced below. NMFS expects to complete that review in the third quarter of calendar year 2019.

MRIP partnered with natural resource agency staff in Alabama and Mississippi to develop and evaluate mandatory reporting programs for charter boat operators and private boat anglers permitted to target Gulf of Mexico red snapper. Referred to as Alabama Snapper Check<sup>8</sup> and Mississippi Tails n' Scales<sup>9</sup>, these programs require reporting for all fishing vessels landing red snapper in order to provide catch estimates that supplement the estimates derived from the MRIP general surveys (FES, FHS, and APAIS). Mississippi charter boat operators and private boat anglers must report through a smartphone application, while Alabama charter boat operators and private boat anglers can report through a smartphone application, a reporting website, or paper forms. In both states, mandatory reporting is combined with a dockside sampling survey in a "capture-recapture" design that measures reporting compliance, validates a sample of landings reports, and allows accurate accounting for both reported and unreported trips and catch.

While mandatory reporting is a key component of the Mississippi and Alabama programs, differences in other design aspects as well as fishery characteristics contribute to varying compliance rates between the two states. In Mississippi, where the red snapper fishery is relatively small, enforcement efforts can be more targeted, and the state has added a requirement to register each snapper trip and to deny a trip number to delinquent reporters, in which compliance rates are generally at or above 80 percent for both charter boat operators and private boat anglers. The red snapper fishery in Alabama is substantially larger, making regulatory compliance measures such as trip registration prohibitively expensive and enforcement more challenging, with resulting compliance rates for charter boat operators near 50 percent and for private boat anglers closer to 30 percent.

Both Snapper Check and Tails 'n Scales have been reviewed by MRIP consultants and certified as valid, unbiased data collection designs for monitoring red snapper landings. Even so, a critical consideration with implementing these designs is a requirement for dockside validation sampling to account for underreporting or misreporting by anglers. To ensure unbiased estimates, validation requires accurate matching to angler reports and adherence to survey design related assumptions that may be difficult to achieve, including the assumption that the anglers' self-reports are independent of, and not influenced by, the intercept survey. Dockside validation sampling can also be costly and increase the overall time needed to produce final estimates.

MRIP has also evaluated the effectiveness of smartphone applications for voluntary landings reporting. Voluntary reporting through smartphone applications is often categorized as "citizen science" and is popular for activities such as bird watching and identifying new planets. Partnering with Texas Sea Grant, Texas Parks and Wildlife, Texas A&M University's Harte Research Institute, and the National Fish and Wildlife Foundation

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<sup>8</sup> Refer to Appendix 3.

<sup>9</sup> Refer to Appendix 4.

(NFWF), MRIP tested the effectiveness of a smartphone application, iSnapper<sup>10</sup>, for monitoring red snapper landings in Texas. Unlike Snapper Check and Tails n' Scales, Texas anglers were not required to submit red snapper landings reports. However, iSnapper reporting was complemented by dockside sampling conducted by Texas Parks and Wildlife.

Results from iSnapper demonstrated that the application is a viable platform for collecting recreational fishing data. However, reporting rates were extremely low, ranging from 2.5 to 4.1 percent, despite extensive outreach and a relatively engaged population of anglers. The project identified mandatory reporting as a logical next step to improve reporting rates. Without a dramatic increase in reporting, iSnapper reporting rates are likely insufficient to support cost-effective, sufficiently precise estimation of red snapper landings.

Similar results were observed for iAngler<sup>11</sup>, a voluntary reporting application developed by the Snook and Gamefish Foundation and evaluated through a partnership, supported by MRIP funding, with the University of Florida and the Florida Fish and Wildlife Conservation Commission. Like iSnapper, the iAngler application can collect a substantial amount of information about recreational fishing trips. The project achieved favorable comparisons under certain conditions between MRIP and iAngler catch rates for three bag-limited species frequently encountered in MRIP; comparisons were geographically constrained and it was considered necessary to combine iAngler data from more than 1 year to achieve sample sizes sufficient for those comparisons. Indicated in the report was the use of geographically restricted released catch size information provided through iAngler in state stock assessments for two of those species. However, the evaluation also demonstrated a general unwillingness of anglers to submit trip reports. Of the relatively small number of anglers who participated in the study, only 10 percent continued to use the application after 1 year, and most anglers reported catch for only a single trip. Despite a widely held perception that anglers prefer app reporting to more traditional survey methods, there is little evidence from either the iSnapper or iAngler study of the potential of app-based reporting to solicit a large number of volunteer anglers or provide multiple reports from the same angler (the ability to track anglers over time is often touted as an advantage over traditional data collection methods). Of the small number of participating anglers, most fail to provide more than two reports and there is almost 100 percent turnover in users occurring within 2 years.

MRIP has also provided technical input to a NFWF-funded study of a volunteer-based reporting program for Snapper-Grouper complex species by the South Atlantic Fishery Management Council ("my Fish Count"). This project uses the capture-recapture sampling design developed by MRIP consultants and utilized in the above-cited projects in the Gulf coast region.

In 2017, as called for in the MRIP ER Action Plan, MRIP commissioned a review<sup>12</sup> of electronic reporting options for recreational fishing surveys, including citizen science monitoring, by Westat. The review identified low participation rates, which are ubiquitous in smartphone fishing applications, as a significant challenge to broad implementation. The

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<sup>10</sup> Refer to Appendix 5.

<sup>11</sup> Refer to Appendix 6.

<sup>12</sup> Refer to Appendix 7.



review also noted that smartphone applications, as well as other non-probability data collection designs, are likely to experience selection or avidity bias (a tendency for more avid anglers to report), which can result in overestimates of fishing activity.

The review recommended that MRIP consider alternatives to non-probability designs such as voluntary app reporting, and noted that electronic technologies could easily be incorporated into more reliable probability-based survey designs. The review identified two specific survey approaches that could include online or mobile reporting: 1) cross sectional designs, such as that currently used by the MRIP FES; and 2) prospective data collection methodologies, such as longitudinal or panel designs, in which panelists are randomly selected and asked to participate in the survey for multiple reporting periods. There are several theoretical benefits to probability panel designs, including an ability to encourage panelists to respond electronically; potential for more accurate responses as panelists become familiar with survey questions; and reduced costs. However, panel designs may also experience panel attrition and low response rates, and panel designs are more complex than cross-sectional designs, requiring additional resources for analysis and communication of survey results. Panelists may also alter their behavior as a result of panel participation. For example, participants in a recreational fishing panel may decide to start fishing more so they have more relevant information to report or they may fish less to reduce the burden of responding to the survey. In either case, behavior of the panelists may no longer be representative of the full angler population and, therefore, more information about and from participants may be required to account for behavioral changes. Additional research and resources are required to fully evaluate the benefits and limitations of a panel approach for monitoring recreational fishing activity.

### **C. MRIP ER-Related Communications Actions**

As noted above, in its 2017 independent review of MRIP, the National Academy of Sciences recommended MRIP develop a strategy to better articulate the complexities, costs, and timelines associated with implementing new and emerging technologies in recreational fisheries data collection and monitoring, and that such a strategy focus on regional partners and address questions and concerns expressed by private anglers and for-hire operators.

MRIP's Communications and Education Team (CET) has been promoting and supporting the dissemination of the ER Action Plan since its adoption in early 2018. With assistance from CET, the agency's chief scientist delivered a presentation in March at the fourth National Saltwater Recreational Fisheries Summit<sup>13</sup> that summarized methods in development for angler smartphone/tablet catch reporting, as well as the associated requirements and challenges. CET also developed an ER Action Plan poster that was prominently displayed at the summit. Approximately 100 leaders in the recreational fishing community participated in this high-profile event. In addition, CET added a page on the ER Action Plan to a new MRIP brochure. It has also been incorporating information on the Plan in presentations to a variety of partners and stakeholders including, but not limited to: 1) the Marine Fisheries Advisory Committee; 2) new regional fishery management council members; 3) New York's Marine Resources Advisory Council; 4) Massachusetts Division of Marine Fisheries; and 5) the

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<sup>13</sup> <https://www.fisheries.noaa.gov/national/recreational-fishing/2018-saltwater-recreational-fisheries-summit>

Rhode Island Department of Environmental Management. Many of these organizations have recreational fishermen as members. Furthermore, CET has been socializing the ER Action Plan to recreational anglers and for-hire owners and operators through small group meetings and focus groups.

This past summer, NMFS certified survey designs for Mississippi's Tails n' Scales and Alabama's Snapper Check. Both surveys rely on ER technologies to collect red snapper catch information from recreational anglers. Members of the CET coordinated with the states on earned, digital, and social media outreach efforts to promote the certification announcements among recreational fishermen and the general public, with an emphasis on the ER components of both surveys.

MRIP CET is also currently developing a strategy to communicate with partners, anglers, and the general public about the results of pilot testing of the FES push-to-web pilot project.

## **VI. Next Steps**

As noted above, MRIP will complete an assessment of the potential challenges, benefits, and cost-effectiveness of implementation of angler-based ER in 2019. This assessment will be initiated via preparation of a summary and review of the three above-referenced, recently-completed MRIP reports, including key findings and takeaways as well as challenges, opportunities, and recommended next steps based on the assessment of the reports along with other recent technical reports and relevant published papers as appropriate.

Also moving forward, MRIP will continue to collaborate with regional partners—consistent with the partners' priorities as expressed in MRIP Regional Implementation Plans—to evaluate electronic reporting programs for anglers. In addition, MRIP will complete testing of the web-push design for the FES during spring 2019, after which a decision will be made regarding expansion of the method to additional states.

MRIP ER-related communications initiatives will include the following:

- Finalize and execute an updated MRIP Strategic Communications Plan, including actions that address MRIP ER development status and findings of the assessment referenced above.
- Continue to coordinate communications efforts with expanded MRIP CET, which includes NMFS regional representatives with regional working groups for the Southeast and Greater Atlantic regions, which include external partners.
- Work with MRIP Regional Implementation Council to ensure regional ER-related needs are fully assessed and a national perspective is developed based on the collective regional needs.

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