



To: Hon. Brian J. Feldman
Chair, Senate Education, Energy, and the Environment Committee
2 West
Miller Senate Office Building
Annapolis, MD 21401

Re: Senate Bill 1053 – Fisheries – Striped Bass – Closed Season

Position: Letter of Information

Date: 2/27/2024

Chairman Feldman, Vice Chair Kagan, and Honorable Members of the Maryland State Senate Education, Energy, and the Environment Committee,

My name is Chris Horton, and I am the Senior Director of Fisheries Policy for the Congressional Sportsmen's Foundation (CSF), as well as a fisheries biologist. This is an informational document that you may use for this hearing on Senate Bill 1053 (SB 1053).

Science-based natural resource management has been the cornerstone of the highly successful North American Model of Wildlife Conservation for more than a century. The management of Maryland's public trust fish and wildlife resources is vested in the Department of Natural Resources (DNR) and their science-based expertise in developing regulations that both conserve Maryland's natural resources and fosters the state's outdoor heritage. Inherent in the MD DNR's management process is the opportunity for stakeholders to provide input and work directly with the DNR on the formulation and implementation of any fish and wildlife regulations. The combination of using population-level science and the opportunity for direct public involvement in managing natural resources is the reason why our country has the most abundant fish and wildlife resources in the world. To continue this success, it is important that decisions regarding natural resource management remain at the state agency level.

Senate Bill 1053 seeks to statutorily establish regulations already in place by the DNR. However, debate around the need for seasonal striped bass targeting closures at the center of the bill highlights a fundamental challenge with striped bass management in general, which is the lack of reliable estimates of angler catch and harvest of the species. Currently, the DNR relies on the National Marine Fisheries Service's (NMFS) Marine Recreational Information Program (MRIP)¹ for striped bass catch estimates by two-month waves in Maryland waters. Unfortunately, though not surprising to many state fisheries managers, it was recently discovered that the fishing effort survey (FES)² component of MRIP currently in place, which estimates

¹ <https://www.fisheries.noaa.gov/insight/marine-recreational-information-program>

² <https://www.fisheries.noaa.gov/recreational-fishing-data/fishing-effort-survey-glance>

total effort by fishery, has led to an overestimate of angler catch by as much as 30-40%³. Thus, current estimates of recreational striped bass catch and discards are unreliable.

It is virtually impossible to effectively manage any fishery to a poundage-based quota or harvest rate without reliable estimates of catch. Everyone who purchases a saltwater fishing license is not likely to fish for every species of fish available for harvest. Likewise, Maryland's Consolidated Chesapeake Bay & Coastal Sport Boat License only requires the boat to be licensed and does a poor job of capturing the number of anglers fishing from such licensed boats in any given year. Yet, a fundamental requirement for obtaining accurate estimates of angler catch is the ability to sample from the actual "universe of anglers" who participated in the fishery during a given amount of time. Because the general nature of the MRIP surveys cannot effectively define the universe of anglers for any given fishery, all five states in the Gulf of Mexico, for example, have developed their own recreational harvest data collection programs for important reef fish species in order to supplement or replace MRIP and with great success.

Sharing similar concerns with the need for better recreational catch data from Maryland waters, this legislative body established the Chesapeake Bay and Coastal Sport Fishing License and Recreational Fishing – Pilot Program and Task Force that became effective on June 1, 2022.⁴ In less than 6 months, the Task Force produced the attached report, which offers several angler-supported recommendations to significantly improve the accuracy of recreational catch data among Maryland's saltwater anglers.

Effective fisheries management requires good estimates of both population abundance and harvest. In the case of recreational catch estimates, Maryland and many other states rely too heavily on a federal survey that is known to be inaccurate. It is difficult to truly evaluate the need for seasonal targeting closures, and when those closures should occur, to maximize sustainability when we do not have reliable estimates of the number of fish being caught or anglers targeting them.

We believe the attached recommendations of the Task Force, if implemented, provide the pathway for obtaining the data necessary to manage Maryland's striped bass fishery more efficiently and effectively.

Sincerely,



Chris Horton

³ <https://www.fisheries.noaa.gov/recreational-fishing-data/fishing-effort-survey-research-and-improvements>

⁴ https://mgaleg.maryland.gov/2022RS/chapters_noln/Ch_409_sb0455T.pdf

**REPORT OF THE
MARYLAND TASK FORCE ON RECREATIONAL
FISHING DATA COLLECTION AND LICENSING**

DECEMBER 1, 2022

Presented to:
Larry Hogan
Governor

Boyd K. Rutherford
Lt. Governor

William C. Ferguson IV
President of the Senate

Adrienne A. Jones
Speaker of the House

Jeannie Haddaway-Riccio
Secretary of the Maryland Department of Natural Resources

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Executive Summary

Responding to constituent concerns with the perceived lack of accuracy in the collection of data for managing recreational fisheries in Maryland, the General Assembly and Governor established a Task Force on “Recreational Fishing Data Collection and Licensing.” The charge was “to study specified methods and information, and develop specified plans, related to improving recreational fishing data collection for fisheries management.” In addition to providing significant social and cultural benefits to Maryland residents and visitors, recreational fishing in Maryland is a significant economic force in the state, with anglers spending \$487.5 million while fishing in the state, generating \$765.3 million in economic impact and providing more than 5,000 full time equivalent jobs. Having sound data for properly managing these fisheries is essential to the social, cultural, and economic well-being of the state.

The Task Force is concerned that current coastwide interstate fishery resource assessment systems do not meet the needs of ensuring the health and sustainability of some of Maryland’s most important fishery resources, especially in a time when climate change impacts on fish distribution, habitat and reproduction success continue to complicate the ability to manage our shared fisheries resources in the Chesapeake Bay and beyond. A clear need exists for additional data elements such as length and weight to be collected, more timely and angler-generated data to avoid recall biases, increasing angler acceptance of data collection, and improving outreach, marketing, and education programs directed to anglers. Improving the accuracy and precision of catch and effort data currently collected through the federal Marine Recreational Information Program (MRIP) for specific fisheries through increased access point intercept surveys specifically tailored to sample Maryland fisheries and supplementing data through Maryland-specific data collection are discussed in the report.

The Task Force’s concerns and recommendations focus on ways to enhance, or supplement data currently collected through MRIP rather than a wholesale call to replace it. General concerns related to MRIP detailed in this report center on:

- Low confidence by many in the angling community that MRIP is accurately capturing the targeted effort, number of fish harvested, size of fish, number of fish released, etc., particularly when used to develop in-season, fishing sector, or sub-sector (ie recreational for-hire) specific regulations consistent with achieving conservation and sustainability goals.
- Fishery managers using MRIP for what it is not designed for in lieu of developing the right tools.
- That a lack of consistency of the data collected across all programs comprising MRIP complicates the analysis.
- Uncertainty that the various non-Maryland state approved data collection programs that make up MRIP are sufficiently consistent and reliable as needed.
- That current surveys do not collect sufficient length/ weight data on many species.

Specific recommendations to begin to rectify some of these deficiencies, include:

- The Maryland DNR should investigate and report on the potential to increase the number of interviews conducted during the Access Point Intercept Survey (APAIS) at the state level, specifically targeting under-represented and emerging fisheries. Work should include the trade-offs between the cost of the increased number of intercepts conducted and the increase in expected statistical accuracy.
- The Fishing Effort Survey (FES) portion of MRIP should be enhanced by using a state questionnaire (compatible with FES). The supplemental questionnaire could be accessible to anglers through electronic means allowing them to submit the supplemental data electronically through a properly implemented mobile app or email, which would result in more timely responses, a greater sample size, and less recall bias.
- The Maryland DNR should comprehensively examine its license structure to ensure the most rigorous sampling framework. This would include identifying the extent to which individual recreational anglers are exempted from licenses, including individual fishers and groups (e.g., boat licenses) and report how those exemptions can be better integrated into the sampling framework.
- The Maryland DNR should consider a requirement that anyone fishing for or catching certain intensively managed species and/or rare event/newly emerging species (e.g., striped bass, cobia and bluefish), have an endorsement on their license to assist in better defining the universe of anglers pursuing such species, and provide the ability to survey participants or require a report by anyone with such an endorsement.
- The Maryland DNR should consider integrating an app within their data collection programs to capture information from the broadest range of anglers. A questionnaire modeled after the FES could be pushed through a Maryland DNR mobile app weekly to randomly selected license holders, with a protocol set up to compare and validate responses collected from the app to those collected through the mail-based FES during the same time. The Atlantic Coastal Cooperative Statistics Program is launching the Scifish program to provide standards-based app development for agencies who are embarking on such initiatives.
- The eight web-based voluntary reporting programs managed by the Maryland DNR to collect data on specific species (estuarine and freshwater) are only utilized by a small number of anglers. The Task Force recommends that a workgroup of fisheries professionals, academic partners and recreational fishery stakeholders be established to evaluate the potential to develop a Chesapeake Bay wide web-based survey that elicits responses from anglers rather than waiting for them to voluntarily connect and enter their information.
- To provide a better understanding of the catch and effort of the growing recreational fishery for cobia, the Task Force recommends that a workgroup of fisheries professionals, academic partners and recreational fishery stakeholders be established between the two jurisdictions to develop a common reporting pilot program with a consistent survey or census methodology. This should include collecting length, biological data, harvest, and discards among other attributes.

The Task Force is concerned that there is a critical lack of trust among recreational anglers regarding how current fisheries data collection efforts drive management decisions and the sustainability of species about which they care deeply. Based on evidence presented to it, the Task Force offers the following broad recommendations:

- Working with partner agencies, stakeholders and academic partners, the Maryland DNR should initiate the development of a Chesapeake Bay Fishery Management Plan. The Plan should include an overview of the Chesapeake Bay Fishery Ecosystem, status of each species, the status of essential habitat for key species, specific improvements in data collection, research to fill gaps in key biological information needed to improve management and/or implementation of new technologies and other elements.
- The Maryland DNR should develop a Fisheries Improvement Engagement Program to enhance the engagement of user groups in fisheries management and data collection to increase acceptance, compliance and motivation of stakeholders in fisheries management.
- The Maryland DNR should improve outreach to the recreational angling community about the importance of recreational data collection and the ways to effectively participate in the collection. Communicating with anglers about reporting requirements, options, and needs is vital to the success of any data collection program while balancing this with the potential effect of introducing biases into the results as compared to previous procedures.

Rather than recommend an entirely new multi-year plan to implement these recommendations the Task Force believes that most of them can be implemented in coordination with some of the existing goals of the Maryland DNR’s “Angler Recruitment, Retention, and Reactivation Plan” by 2025.

These, along with additional recommendations and detail are provided in this report.

Findings and Recommendations from the Maryland Task Force on Recreational Fishing Data Collection and Licensing

Introduction and Background

Responding to constituent concern with the perceived lack of accuracy in the collection of data for managing recreational fisheries in Maryland, Maryland Senate Bill 455/House Bill 601 titled “The Chesapeake Bay and Coastal Sport Fishing License and Recreational Fishing - Pilot Program and Task Force” established a Task Force on Recreational Fishing Data Collection and Licensing effective June 1, 2022. The Task charge was “to study specified methods and information, and develop specified plans, related to improving recreational fishing data collection for fisheries management” with a report of findings and recommendations to be submitted to the Governor and the General Assembly on or before December 1, 2022. The legislation established the following membership for this Task Force:

- (1) at least eight representatives of tidal and nontidal recreational fisheries, designated by the Sport Fisheries Advisory Commission;
- (2) one representative of Morgan State University’s Patuxent Environmental and Aquatic Research Laboratory (PEARL), designated by the Director of PEARL;
- (3) one representative of the University of Maryland Center for Environmental Science (UMCES), designated by the President of UMCES;
- (4) one representative of St. Mary’s College of Maryland, designated by the President of St. Mary’s College of Maryland;
- (5) one representative of the University of Maryland Eastern Shore, designated by the President of the University of Maryland Eastern Shore; and
- (6) the following members, appointed by the Secretary of Natural Resources:
 - (i) at least one resource assessment statistician; and
 - (ii) at least one technical expert on coastal fisheries.

The Secretary of Natural Resources was to designate the chair of the Task Force and provide staff for the Task Force.

Secretary Jeannie Haddaway-Riccio appointed David Sikorski as chair of this Task Force and appointment of members by the Sport Fisheries Advisory Commission and Maryland Department of Natural Resources was completed in July 2022.

Task Force Charge

The legislation requires the task force to:

1. Study specified methods and information, related to improving recreational fishing data collection for fisheries management.
2. Develop specified plans, related to improving recreational fishing data collection for fisheries management.
 - a. Develop a multiyear plan for increasing the frequency of State and regional recreational fisheries surveys that are conducted in a manner that is equitable, inclusive, and statistically valid to all participants, such as online surveys, surveys mailed to a physical address, and telephone surveys;
 - b. study methods for improving surveying participants who are not frequently surveyed under current methods, including:
 - i. anglers fishing from a private boat on private access points;
 - ii. shore-based anglers; and
 - iii. anglers for whom English is a second language;
 - c. develop a multiyear outreach plan for increasing participation in public and private volunteer angler data capture systems utilized by fisheries managers; and
 - d. study additional information that may be collected in recreational surveys to improve fisheries management data, knowledge, or models, such as:
 - i. fish length;
 - ii. fish disposition; and
 - iii. biological data.

Task Force Membership

David Sikorski, (Task Force Chair) Sport Fish Advisory Commission

Brett Fitzgerald, Angler Action Foundation

Dr. Sean Hitchman, St. Mary's College of Maryland

Chris Horton, Congressional Sportsmen's Foundation

Dr. Scott Knoche, Morgan State University Patuxent Environmental & Aquatic Research Lab

Richard Kuhlman, Tidal & Coastal Recreational Fisheries Committee, Recreational Angler

Mike Laguna, fisheries biologist and angler

Scott Lenox, Sport Fish Advisory Commission

Dr. Eric May, University of Maryland Eastern Shore

Kevin McMenamin, Tidal and Coastal Recreational Fisheries Committee; Annapolis Anglers

Emily Mendenhall, Recreational Angler

Dr. Tom Miller, University of Maryland Center for Environmental Science

Eric Packard, Sport Fish Advisory Commission Member

Lenny Rudow, FishTalk magazine, Tidal and Coastal Recreational Fisheries Committee Member

Glenn Shultz, Sport Fish Advisory Commission Member

David Sutherland, Sport Fish Advisory Commission Member

Felipe Urquilla, Recreational Angler

Process

The overall Task Force objective was to study specified methods and information, and develop specified plans, related to improving recreational fishing data collection for fisheries management. The Task Force conducted the entirety of its business through virtual meetings and email. Four virtual meetings were held, publicized on the Maryland DNR Meetings Calendar and open to the public. Meetings were focused on providing Task Force members with information on various fisheries data collection programs currently in use in Maryland or in other areas that were potentially applicable to addressing the issues identified in the legislation. An additional work session for purposes of developing the report was held virtually with report compilation conducted through electronic communication.

Meetings were recorded. Meeting recordings and presentations given during each meeting will be provided to Maryland DNR for future access by the public.

The focus of each Task Force Meeting is presented in Table 1.

Table 1. Objectives and Issues Addressed in Meeting of the Maryland Task Force on Recreational Fisheries Data and Licensing.

	Objectives	Issues to Address
Meeting 1 . August 29, 2022	<ol style="list-style-type: none"> 1. Review Task Force charge 2. Identify issues/problems that need to be addressed by each Task Force member 3. Provide <u>baseline</u> information on current surveys and techniques used for management. 	<ol style="list-style-type: none"> 1. Background 2. Issues on each panel member's mind
Meeting 2 August 31, 2022	<ol style="list-style-type: none"> 1. Comprehensive understanding of MRIP design, applications, and limitations 2. Gather feedback on perceptions, misunderstanding, etc. 	<ol style="list-style-type: none"> 1. Focus on primary survey in use for collecting saltwater recreational fisheries data in Maryland
Meeting 3 October 12, 2022	<ol style="list-style-type: none"> 1. Provide information on use of current recreational data use in management and research in other jurisdictions. 	<ol style="list-style-type: none"> 1. Voluntary/mandatory fishing logs 2. App-based data collection
Meeting 4 November 10, 2022	<ol style="list-style-type: none"> 1. Discuss ways to fill in gaps in data collection 	<ol style="list-style-type: none"> 1. Provide applications of survey techniques in use for sampling under-represented populations (private boat/private access points. 2. Sampling shore-based anglers; 3. Sampling anglers for whom English is a second language. 4. Filling in gaps in survey elements needed for fisheries management

Presentations during each of these meetings were:

Meeting 1

David Sikorski, Task Force Chair

- Background of legislation
- Objectives of Task Force
- Deliverables
- Timeline
- Expectations of members
- Chair and Contractor roles
- DNR role

Task Force Members - Round Robin – self introduction and identify 3 issues that to be addressed with recreational fisheries data collection in Maryland.

Background on Recreational Fisheries Data Collection and Uses - Angela Giuliano, Research Statistician, Maryland DNR Analysis and Assessment Program

Meeting 2

NOAA Fisheries' Marine Recreational Information Program – Richard Cody, Chief, Fisheries Statistics Division (ST1), Office of Science & Technology, National Marine Fisheries Service

Meeting 3

Using Mississippi Tails n' Scales for Managing Red Snapper Fisheries: Pros, Cons, Costs and Considerations for Other Fisheries - Trevor Moncrief, Director, Finfish Bureau, Mississippi Department of Marine Resources

Using Mandatory App-Based Reporting for Recreational Tilefish Monitoring for a “Rare Event” Fishery in the Mid-Atlantic - Hannah Hart, Fishery Management Specialist, Mid-Atlantic Fishery Management Council

Overview of “Release App” (South Atlantic Fishery Management Council, scamp) and “CatchULater” (North Carolina) for voluntarily Reporting Catches or Landings and Potential Use of SciFish for Future Recreational Species Reporting - Julie DeFilippi Simpson, ACCSP Deputy Director, Atlantic States Marine Fisheries Commission

Meeting 4

Application of the Florida Reef Fish Survey for Supplementing MRIP - Beverly Sauls, Research Scientist, Florida Fish and Wildlife Conservation Commission

The Highly Migratory Species Catch Card Program and Large Pelagic Survey - Clifford Hutt, Ph.D. Fisheries Management Specialist, Atlantic HMS, NOAA Fisheries

Comparative Analysis of the Current and Potential Application of the Eight Maryland Volunteer Angler Surveys - Angela Giuliano, Research Statistician, Fishing and Boating Services, Maryland Department of Natural Resources

Update on Chesapeake Bay and Coastal Sport Fishing License Pilot Program
Angela Giuliano, Research Statistician, Fishing and Boating Services, Maryland Department of Natural Resources

Additional background resources were made available to Task Force members to assist in the development of their recommendations.

Importance of Recreational Fishing to Maryland

Social and Cultural Benefit

As an outdoor recreational opportunity - which exists in all of Maryland's 24 local jurisdictions - recreational fishing provides numerous benefits to the health and well-being of the public, as well as access to food. In general, Maryland benefits from having broad and diverse fishing opportunities, which benefit both residents and visitors from numerous states. From freshwater streams to the Chesapeake Bay and beyond into the waters of the Atlantic, Maryland's fisheries resources truly reflect those which exist throughout the country, consistent with common opinion that Maryland is a representation of America in miniature. Given the value of Maryland's fishery resources and many deep cultural connections to our fisheries, public access to recreational fishing opportunities and the sustainable management of them is of the utmost importance to current and future residents of the state.

Recreational fishing is most commonly understood to be the act of angling, or using a hook, line, rod, reel, bait, lure and/or attractant to catch a fish. Beyond this simple definition, recreational fishing occurs on both private and public lands and waters, and is generally defined as occurring from shore, on a boat or other vessels. Recreational fishery participation is further defined as occurring by anglers on private vessels or under the guidance of a guide or for-hire captain on their vessel or immediate supervision fishing from shore or on an individual vessel (i.e., kayak, stand-up paddle board..etc).

Economic Benefit

Recreational fishing is a significant economic driver in the state of Maryland. In 2020, 706,700 anglers spent \$487.5 million while fishing in Maryland, generating \$765.3 million in economic impact. More than 5,000 full time equivalent jobs are supported through this activity, providing \$240 million in wages to Marylanders¹ with the economic benefits spreading throughout the state (Appendix A). Maryland received nearly \$4 million in Federal Aid in Sport Fish Restoration funds for fisheries management and research, generated through the sales of sport fishing

¹ Southwick Associates. 2020. Sportfishing in America: A Reliable Economic Force. American Sportfishing Association, Multistate Grant #F20AP00183 of the Wildlife and Sport Fish Restoration Programs of the U.S. Fish and Wildlife Service. 2020.

equipment and the portion of federal excise taxes attributable to motorboat fuels². In Maryland, the total revenues generated for fisheries management through sport fishing activities in FY21 were \$34,743,302, broken down as: 44% Special Fund, 12% Federal Fund, 23% General Fund, and 21% Reimbursable Fund.³

Given the importance of recreational fishing to the economy and funding fisheries management, connecting recreational fishing customers to Maryland DNR and other management agencies, as well as providing necessary special fund revenue, a renewed effort to implement strategies to recruit, retain and reactivate license holders is under way by staff at Maryland DNR, termed the R3 program.

Starting in 2020, Maryland DNR staff began the initial development of an R3 plan. In early 2022, the *Angler Recruitment Retention and Reactivation Plan* was completed as a living document which includes a number of actions that can be implemented to achieve specific R3 outcomes. The plan focuses on 2022-2025 and actions within the plan must be:

1. Feasible in a three-year timeframe;
2. Able to be evaluated or measured;
3. Support movement along the pathway of the Outdoor Recreation Adoption Model; and
4. Fit the Maryland DNR fisheries mission and/or capability.

The goals and objectives of the plan are: ⁴

Fishing Goal: Increase Angler Participation in Maryland

- Objective 1. Increase the number of new fishing recruits.
- Objective 2. Promote the inclusion of all Maryland anglers.
- Objective 3. Increase family participation.
- Objective 4. Increase retention of current license holders.
- Objective 5. Increase annual reactivation of lapsed anglers.

Agency Goal: Encourage Participation in Maryland Outdoor Recreation

- Objective 1. Improve customer relationship management and the customer buying experience.
- Objective 2. Connect audiences to outdoor recreational activities.
- Objective 3. Develop programs and content focused on how Maryland Department of Natural Resources (DNR) customers contribute to conservation and management.

The Task Force feels that most of the recommendations in this report can be effectively implemented in coordination with the goals and timeline of the R3 plan.

² U.S. Fish and Wildlife Service. 2022. Amended Final Apportionment of Dingell-Johnson Sport Fish Restoration Funds For Fiscal Year 2022.
https://www.fws.gov/sites/default/files/documents/SFR%20FY22%20Certificate%20of%20Final%20Apportionment%202022Feb3_508.pdf

³ Maryland DNR 2021. Fishing and Boating Services FY21 Budget Report to the Sport Fisheries Advisory Commission.

⁴ https://dnr.maryland.gov/fisheries/Documents/FABSR3Plan_2021.pdf

Uncertainties or Special Considerations of Fisheries Management

Management of most natural resources – particularly those that are transitory and cross jurisdictional boundaries – comes with a myriad of uncertainties. Many of Maryland’s coastal and estuarine fisheries are, at some stage of their life cycle, subject to management regulations of multiple jurisdictions. Until the 1993 passage of the Atlantic Coastal Fisheries Cooperative Management Act (ACFCMA), state and federal management of such species was often uncoordinated and in some instances contradictory. Although interstate fishery management plans were developed under the auspices of the Atlantic States Marine Fisheries Commission (ASMFC), implementation of these plans at the state level was voluntary. Passage of the Atlantic Coast Striped Bass Act of 1983, which contained provisions to enforce implementation at the state level, demonstrated that such an enforceable approach made a drastic difference in the impact of interstate management. The ACFCMA was based on a “carrot and stick” approach to fostering state implementation of interstate fishery management plans developed under the auspices of ASMFC. The carrot is in the form of federal funding to assist in the management and enforcement of fishery management plans. The “stick” is in the form of a potential federal moratorium on fishing for species when a state is found out of compliance with the plan.

Difficulties with Recreational Fisheries Statistics

The passage of ACFCMA, highlighted even more the need for better and more robust data for management of interjurisdictional fisheries. For recreational fisheries, the most consistent “best available data” across state and federal boundaries comes from the Marine Recreational Information Program (MRIP). The foundations of MRIP began in 1979 with a consistent coastwide collection of recreational catch, harvest, and effort data. At its core, MRIP involves two components: an effort survey that seeks to estimate the number of angler trips that have occurred during a specific interval, and an intercept survey that estimates the catch per trip. The early decades of the program used a coastal household telephone survey to collect information on fishing effort. However, as the use of landline telephones decreased and other complexities of sampling became evident, changes were made in 2008 based on recommendations from the National Research Council⁵ to improve the program, resulting in the current-day MRIP. MRIP (and its predecessor) was designed to provide estimates of recreational fishing statistics on an *annual coastwide* (or at best, regional) basis. MRIP is designed neither to provide guidance to managers for management of specific fish stocks on the state level, nor for within-season management of individual species

Despite the best intentions of state and federal agencies that have led to changes in program design, the recreational fishing harvest and effort estimates for many species do not provide a sufficient degree of precision and accuracy for state -specific fishery management. In many cases, precision, a measure of consistency in data, can be improved by increasing the sampling within both phases of the survey. Increases in the number of people interviewed in the effort phase of the survey can be achieved with little cost. However, increases in the number of

⁵ National Research Council. 2006. Review of recreational fisheries survey methods. National Academies Press, Washington, DC. 188p.

intercepts in the MRIP Access Point Angler Intercept Survey (APAIS) are extremely costly, particularly for species that are caught at lower frequencies in the state (so-called “rare event fisheries”). For example, angler site interviews were increased in the 1990s to improve the statistics for the recreational striped bass fishery, but this action came at a considerable cost that may be difficult to justify for other fisheries. Despite the uncertainty in current MRIP effort and intercept estimates, they are still utilized for making fisheries decisions as they represent the “best scientific information available” to support management actions that cross state and federal jurisdictional boundaries (and are therefore consistent and comparable from jurisdiction to jurisdiction).

Complexities of Data Collection

Collecting data from a large, diverse universe such as recreational anglers is challenging. Ensuring that the data collected are statistically valid to the degree needed for fisheries management adds to the complexities. Good data collection needs to incorporate several primary aspects:

- A sampling “frame” that provides efficient and accurate identification of the audience from whom information is collected. In recreational fisheries, this often comes from a solid licensing structure that helps to identify individuals to target for information. Exceptions to licensing requirements, such as special exemptions for specific groups (e.g., under 16 years old), group licenses (e.g., pier licenses, boat licenses etc.) or non-participation in licensing, complicate the use of licenses or registrations as a sampling frame.
- Anglers in the sampling frame must be sampled proportionately if resultant estimates are to be statistically valid. Voluntary reporting programs, such as provided by some mobile phone apps, often fail to meet these criteria if not implemented correctly. Consequently, widespread use of voluntary reporting programs for *core* estimates of catch and effort is not advised. However, voluntary reporting programs likely have an important role relative to rare event species, spatial and temporal distribution of effort on the water, and some biological characteristics of the catch.
- Ample and consistent angler participation is essential. A sampling method must be chosen that is rigorous enough to collect the data needed but which is accepted by the target audience to the degree that they will provide accurate data. Building trust among recreational stakeholders is an important element of sampling for estimation of catch and effort in recreational fisheries. The number of recreational anglers is sufficiently large that some frequent anglers may not get selected in surveys by chance alone. These anglers may consider the survey untrustworthy as a result. Understanding and accepting the need for data collection, by the fishing community, is important as is the ease of providing the data. Most recreational anglers are simply on the water for relaxation and enjoyment. The greater the burden of providing the data, the less acceptance will be from them.
- A minimum standard of data fields, including field definitions, precision and other attributes is essential to promote the quality and applicability of data that are collected.

- In some cases, enforcement will be key to a valid data collection program. For example, some fisheries, such as for-hire operators on the Atlantic coast, require submission of Vessel Trip Reports which must be enforced to ensure sufficient compliance. However, enforcement must not unduly influence the quality and accuracy of the data provided through such programs.

Complexities of Management

In addition to the interjurisdictional management of many of Maryland fisheries, several other factors that are outside of the control of fisheries managers also complicate management. Habitat conditions (including water quality) have been the area of major attention for several decades but additional stressors including climate change (impacting water temperatures and therefore species distribution), invasive species (including blue catfish, snakehead and others), changes in forage fish distribution and abundance (particularly menhaden), disease (e.g., mycobacteria impacting striped bass), and other factors must be taken into consideration to the degree possible when establishing fishery management goals for the future. However, the uncertainty created by all these factors highlight even more the need for robust data needed to manage what is most under our control – effort and harvest of specific fish species.

Past Efforts to Improve Fishery Management in Maryland

The need to improve fishery management in Maryland is not a new concept. Over the years, the Maryland Legislature, the Governor's Office and numerous state offices, especially the Maryland DNR, have led efforts or been involved to help improve, modernize and streamline fishery management in the state. One of the most successful and comprehensive efforts to date was the *Report of the Task Force on Fishery Management*, 12/1/2008⁶, that was developed in accordance with The Fisheries Management Reform Act (Senate Bill 1012) enacted in April 2007. The report contained 33 recommendations, including 7 recommendations related to the work of the current Task Force. The scope of the Fishery Management Report included: habitat preservation and restoration; stock monitoring and assessment; data management; fishery management; alternative management; legal issues and enforcement.

While many of the recommendations in the report have been implemented, thoughtful review of the report, with an eye towards continuing to improve Maryland's fishery management would help continue the progress already underway.

Overall Statement of Concern

The Task Force has concerns that current coastwide interstate fishery resource assessment systems do not meet the needs of ensuring the health and sustainability of some of Maryland's most important fishery resources. While the Task Force has concerns about specific applications of MRIP, the reality is that this system will likely remain the best data source of recreational

⁶https://dnr.maryland.gov/fisheries/documents/MSAR6490CompletedLegislativeReportwithappendices2_112408.pdf

fisheries that is available coastwide and that can be utilized for the basis for interjurisdictional fisheries. Recognizing this reality, the Task Force's concerns and recommendations focus on ways to enhance, or supplement the data collected through MRIP, rather than a wholesale call to replace it. Our focus on improvements center on several areas:

- Improving the accuracy and precision of MRIP for specific fisheries
 - Accuracy of catch and effort estimates through increased MRIP access point intercept surveys specifically tailored to sample Maryland fisheries.
 - Need for additional data elements such as length and weight to be collected.
 - Need for timelier and angler-generated data to avoid recall biases
- Increasing angler acceptance of data collection
- Improving outreach, marketing, R3 and education programs by:
 - Actively engaging recreational anglers in data collection efforts
 - Partnering with recreational anglers in improving angler acceptance and understanding of recreational fisheries data collection.
 - Fully implement R3 actions and objectives in the current DNR plan in partnership with stakeholder groups and leaders.

Findings and Recommendations

Chesapeake Bay Fishery Management Plan

There is a critical lack of trust among recreational anglers in how current fisheries data collection efforts drive management decisions and the sustainability of species about which they care deeply. Based on evidence presented to it, and on its internal deliberations, the taskforce offer the following broad recommendations:

- 1) Working with partner agencies, stakeholders and academic partners, the Maryland DNR should initiate the development of a Chesapeake Bay Fishery Management Plan. The Plan should include the following elements:
 - a) An overview of the Chesapeake Bay Fishery Ecosystem. This could be derived from one of several published ecosystem-based models that define relationships among fishes and other key natural resources in the Chesapeake Bay and related coastal waters.
 - b) The status of each species. Status specification should include whether or not the species is subject to a fishery, or whether it is an ecosystem component. The listing should include information on the status of each species. For exploited species, this should include its management status (overfished, experiencing overfishing, undergoing rebuilding or unknown). For all species, any status of concern (e.g., threatened or endangered) should be noted. This information could be derived from existing coastwide assessments for the overall species status, regionally specific assessments and state specific assessments as appropriate.
 - c) The status of and forecasted status of essential habitat for key species and as a component of fisheries assessment and subsequent access to fisheries. For many species, habitat includes water temperature, salinity, water quality and the availability of suitable levels of dissolved oxygen throughout their life cycle.

- 2) The Department should develop a prioritized list of actions that could be undertaken to improve management for each species. These actions could include specific improvements in data collection, research to fill gaps in key biological information needed to improve management and/or implementation of new technologies. The expected benefits and costs should be identified for each action.
- 3) The Department should integrate the Fishery Ecosystem Plan and the prioritized list of action items for each species to develop a Fisheries Improvement Implementation Plan that identifies actions the Department proposes for the next five years.
- 4) The Department should develop a Fisheries Improvement Engagement Program that will support the Fisheries Improvement Implementation Plan. The Taskforce believes that a sizable fraction of the actions identified in the Fishery Improvement Implementation Plan will involve or will benefit from behavior changes among commercial watermen and recreational anglers. The Taskforce acknowledges that these behavior changes rely upon increased acceptance, compliance and motivation for stakeholder participation.

The taskforce further acknowledges that increasing acceptance, compliance and motivation of stakeholders are some of the most challenging problems in fisheries. As a result, the Taskforce believes that development and effective implementation of a Fisheries Improvement Engagement Program in coordination with ongoing R3 efforts, is one of the single most important improvements that can be made to the management of Maryland's fisheries.

Increasing Angler Participation in Data Collection

It is important to recognize that increasing angler acceptance of, and participation in, fisheries data collection is not simply about increasing the volume of data collected. Just as important, if not more, is increasing the accuracy of data collected and the social support for robust data collection programs.

Angler participation in data collection needs to focus on three key areas:

- 1) Acceptance
- 2) Compliance
- 3) Motivation

These three elements all relate to developing trust between managers and anglers such that anglers develop more understanding, ownership and trust of the data used to manage fisheries in which they are a major source of catch. As many of the professionals who presented to the Task Force noted, solutions for these key areas can be highly beneficial to supporting effective data collection and thus appropriate fisheries management by increasing the participation of anglers and the accuracy of the data they offer.

Acceptance is the first step in the participation relationship between the fisheries managers and the anglers. The goal is to create a foundation of knowledge/expectation among anglers about the data collection methods that support fisheries management so that it is simply a part of being an angler. Working to remove the stigma around the practice of data collection for fisheries management that might make it appear like policing or extra, laborious disruption to a day on the water can help transition the process (in whatever method is employed) into a state of acceptance

within the minds of anglers. Data collection should be as integrated into an angler's routine as stopping to grab coffee at the quickshop and bait at the tackle shop prior to heading out, expecting that this trip and its details need to be/could be/will be logged/reported back should be just another part of the day and one that the angler is looking forward to engaging with as much as anything else they enjoy about their fishing experience.

To support acceptance among anglers:

- Make participation easy:
 - Utilize stakeholder and community leaders and influencers to ensure meaningful connection to known and potential Maryland anglers.
 - Provide free digital logbooks through online portal/apps
 - Free physical logbooks that can be submitted regularly which they can grab at tackle shops where they get catch cards or request online to be sent to them
 - Provide options in their language of choice (non-English options also)
 - Online video tutorial of how to use software/format that is adopted.
- Demonstrate how it matters to them
 - Accessible data/dashboards/reports support by the data they supply from trip, including locations of current fishing opportunities
 - Feedback forums/opportunities for anglers to ask questions/work with researchers outside of just taking surveys
- Incorporate it into every aspect of the angling experience
- Reminders on newsletters (weekly, monthly, etc.)
- Verbiage on signage at public access points
- Verbiage on permits
- Information at all tackle shops/quick shops/etc.
- Include Angler benefits in DNR publications, license mailings, website etc.

Compliance follows the acceptance stage. If work in the arena of acceptance is successful, anglers will get to a place where they habitually understand the data collection to just another enjoyable part of fishing, they will likely, with very little encouragement/enforcement needed, comply with either mandatory or voluntary compliance requirements.

Motivation plays into the process generally in two ways 1) as an initiator to begin the habit or acceptance when behavior change wouldn't be plausible otherwise or 2) as a reminding mechanism to nudge an already accepting participant when intermittent timing or other competing factors cause them to forget to participate. Both are very important to recognize and support acceptance and, ultimately, compliance stages.

It's important to be reflective on the various motivators for people including these mentioned by our presenters:

- 1) improve the quality of the fishery
- 2) improve the health of exploited fish populations
- 3) educate themselves on the fisheries data, research, methods, etc
- 4) maintain personal record or history of their trips for their own record-keeping

Thinking through these and incorporating them into the methods the Task Force recommends to encourage acceptance (initiator) and compliance (reminder) stages to support our goals in encouraging better angler participation no matter what the method and frequency of our data collection.

Improve accuracy and Precision for Specific Fisheries

The Task Force felt one downfall of MRIP Data is that the data are not sufficient for managing some Maryland Fisheries. As opposed to a single survey, MRIP has evolved into a national network of recreational fishing surveys to estimate total recreational catch. This network consists of 10 programs administered by NOAA Fisheries, 18 programs administered by states or territories, and 8 specialized programs designed to collect data for a specific target species. Maryland saltwater recreational fisheries are sampled through the standard Access Point Intercept Survey (APAIS)/mail-based Fishing Effort Survey (Chesapeake Bay and Atlantic), federal Greater Atlantic For-Hire Electronic Logbooks (Atlantic), and federal Highly Migratory Species/Large Pelagics Surveys, including the Catch Card Program (Atlantic mainly). To be certified as an MRIP survey, programs must balance standards related to scale (census vs statistical sampling), data management (compatibility and comparability), methodology (are the methods used within a region compatible and are catch estimates comparable), and data standards (MRIP recreational data standards). The APAIS component of MRIP captures catch per trip information at the dock on a particular day/time based on probability sampling. While the Fishing Effort Survey (FES) is a mail survey (over several weeks that inherently has recall bias) that is used to estimate total effort over a two-month wave. The catch per trip estimated from APAIS is then multiplied by the total effort estimated by FES to develop the total catch and discard estimates by wave. Maryland anglers fishing in the Chesapeake Bay and Atlantic coast are subject to being interviewed at the dock as part of APAIS and receiving a mail survey as part of the FES.

The Task Force shares several concerns including:

- A general concern that consistency of the data collected across all programs comprising MRIP complicates the analysis.
- Uncertainty that the various non-Maryland state approved data collection programs that make up MRIP are sufficiently consistent and reliable as needed.
- Many in the angling community have low confidence that MRIP is accurately capturing the targeted effort, number of fish harvested, size of fish, number of fish released, etc., particularly when used to develop in-season or sector specific regulations. This is using MRIP for what it is not designed for in lieu of developing the right tools.

Coordination within MRIP is extremely important. MRIP data are utilized for stock assessments of coastal fisheries as well as allocation and establishment of regulations guided by the coastwide management process. If certain methods such as APAIS, FES, and the HMS/LPS sampling are sufficiently performed, then the Task Force recommends that the state of Maryland *supplement* those already effective by either enhancing current efforts (e.g., increasing the number of APAIS

interviews to better capture specific fisheries) or filling in the gaps where the MRIP efforts are lacking.

Create Data Collection Streams for Additional Metrics for Maryland-Specific Fisheries

Length/Weight

The APAIS component of MRIP focuses on collecting data on fishing location, date, fishing mode (shore, private or rental boat, or for-hire vessel), general fishing area (inland, state territorial sea, or federal Exclusive Economic Zone), Species, number, and disposition of the angler's catch (harvest, or released) and only collects length and weight information of the fish if the opportunity allows. Consequently, MRIP does not collect length/weight data on many species. While the traditional fisheries management is predicated on biomass (weight of fish) which is better suited to commercial harvest statistics, recreational fisheries are much more oriented on number and size of fish. Having accurate weight data for recreational catch/harvest is vital to converting the data into biomass for inclusion in the fisheries management process. Additionally, length/weight data are crucial to understanding angler preference, changes in fish population structure, and other fisheries statistics. The Task Force recommends that data programs be developed specifically to collect this information directly from Maryland anglers to improve management and particularly improve statistics for rare event or emerging fisheries in the state.

Account For Harvest and Discards (Both In and Out of Season)

In general, additional information is required for management specific to the type of fishing used to catch fish and the impact on released fish. For example, live lining, chumming, trolling, jigging, top water, etc. along with released fish hooking location (deep or shallow hooked), dead or alive release all produce varying levels of discard mortality and need to be accounted for in the data collection protocols. Initially, research collected in the past should be reanalyzed as a start to gleaning this type of information. Additionally, more information on the location of where the fish were caught (not just Chesapeake Bay and tributaries, Atlantic Ocean and Coastal Bays) is needed. While it would be simplistic to recommend that these data elements be integrated into existing APAIS interviews, this realistically will not happen. Therefore, the Task Force recommends that additional data elements be included in supplementary data collection programs (discussed later) specifically targeting Maryland recreational anglers.

“Rare Event” and Intensively Managed Species.

Three important species to consider for supplementing current data shortfalls for management are striped bass (currently overfished), cobia (an emerging fishery), and bluefish (currently overfished). All of these species fall under the interstate management process and support recreational and commercial fisheries throughout the coast.

Since MRIP is a broad-based sampling of all marine recreational fisheries, species that are caught at lower frequencies than more popular species are underrepresented in APAIS. This can result in extrapolating from unrepresentative samples of a few observations in APAIS, combined with effort estimates from FES to produce catch and harvest estimates that, while having significantly large confidence intervals (high variability) are nonetheless sometimes introduced

into the management deliberations. NOAA has implemented the Large Pelagic Survey (coastwide) and the Large Pelagic Catch Card Program (in Maryland and North Carolina) to address this issue for tuna, sharks, and billfish but the problem still exists with other popular fisheries such as have been seen with black sea bass and emerging fisheries such as cobia.

Even if a species is not a “rare event” fishery, the intensity of management and chances of in-season adjustment to recreational regulations (e.g., seasons, lengths, etc.) creates a situation where data collection beyond the 2-month wave sampling/reporting of MRIP is not sufficient.

In recent management actions for striped bass which aimed to set new regulations to reduce coastwide mortality by 18% (Addendum VI to Amendment 6), Maryland DNR used MRIP at a day by day and week by week resolution to craft reductions in catch that were applied differently across the recreational sector. This action also reset the allocation between the recreational and commercial sectors, causing a great deal of frustration amongst stakeholders and uncertainty in the efficacy of the conservation value of the regulations. This was not the correct use of MRIP data, but with no alternatives, the Maryland DNR crafted current striped bass regulations which leave different participants in the recreational fishery with different limits, an outcome largely driven by politics and economics which has caused a great deal of frustration by stakeholders.

Better Identify the Universe of Anglers Targeting Each Species

Having information on the known universe of anglers targeting a particular species would significantly increase both precision and accuracy of data collected. Therefore, the Task Force recommends that:

1. The Maryland DNR should comprehensively examine its license structure to ensure it has the most rigorous sampling framework. This would include identifying the extent to which individual recreational anglers are exempted from licenses, including individual fishers and groups (e.g., boat licenses) and report how those exemptions can be better integrated into the sampling framework.
2. The Maryland DNR should consider a requirement that anyone fishing for or catching certain intensively managed species (ie: striped bass, bluefish, etc.) and/or rare event/newly emerging species (ie: cobia, spanish mackerel, sheepshead, etc), have an endorsement on their license to assist in better defining the universe of anglers pursuing such species, and provide the ability to survey participants or require a report by anyone with such an endorsement.

Such endorsements, stamps, or tags and accompanying reporting systems are common in wildlife and fisheries management throughout the world. These can assist with a stronger understanding of the participants in a fishery, and their overall impact in a timely and defined way. As an example, Florida reef fish (state) and Mid-Atlantic recreational tilefish (federal) each require an endorsement (or permit) added to the license free of charge. While this no-cost option is attractive to the recreational community, a free permit commonly results in an overestimation of the universe of anglers fishing for those species as people with little interest in those species opt for the endorsement simply because it is free. This complicates surveys of those anglers as time, effort, and money is spent on trying to contact individuals who never fished for those species, let alone harvested them. Therefore, the Task Force recommends that a nominal fee be considered

with these endorsements to dissuade the acquisition of the permits for those not fishing for the species.

A variation of a fee-based endorsement/permit is issuing a “trophy or bonus tag” for a fee. Anglers would still be able to obtain the species endorsement for no fee but would have an option (for a nominal fee) to pursue the privilege of harvesting an additional fish or some other incentive. This hybrid approach, if implemented correctly, could provide a stable framework for identifying the universe of anglers for a particular species but also circumvent the potential for allowing only those with financial means to fish for that species. While it still might result in people getting the base permit simply because it is free, the bonus option would result in a sampling framework of anglers most likely to pursue the fish.

Develop a Chesapeake Bay Cobia Data Collection System

Over the last few years, Maryland anglers are experiencing an increased seasonal abundance of cobia in state waters of the Chesapeake Bay and the Atlantic Coast. A southern species which ranges from the Gulf of Mexico through the mid-Atlantic, cobia arrive in our region to spawn during the warm months of the year. As a migratory species, cobia are managed through the interstate fishery management process. Due to the increase of cobia abundance in the northern portion of their range and an expansion of that range, efforts to assess their population status and corresponding fishery regulations have continued to evolve.

To provide a better understanding of the catch and effort of cobia in recreational fisheries, Virginia implemented a mandatory permit and reporting system in 2016. This reporting program included a permit for anglers pursuing cobia in Virginia waters and required certain reports to be completed before anglers could obtain future cobia permits in subsequent years. After a multi year review of this program, Virginia fishery managers are currently revisiting this effort and have initiated plans to remove the mandatory requirement for anglers starting in 2023.

Likely, Maryland will be required to comply with additional provisions of the interstate fishery management plan for cobia in upcoming seasons, requiring that data on this fishery be more robust than what MRIP currently provides. Since both states are currently assessing ways to acquire data needed to better manage this fishery, a cooperative approach may be in our best interest.

The Task Force recommends that a workgroup of fisheries professionals, academic partners and recreational fishery stakeholders be established between the two jurisdictions to develop a common reporting pilot program with a consistent survey or census methodology. This should include collecting length, biological data, harvest, and discards among other attributes

Revamp of Chesapeake Bay-wide Volunteer Angler Reporting Systems

Given the lack of participation in current volunteer angler reporting systems, Maryland DNR should work with stakeholders, academic partners and other Chesapeake Bay fisheries management agencies to develop a workgroup to revamp volunteer angler reporting systems to improve the quantity and quality of biological data, including but not limited to, age, length and weight of specific fish harvested or released by anglers.

Collection Methodologies

Survey

As opposed to a census where efforts are made to collect information from all members of a population (such as recreational anglers), a survey collects information from a representative sample of that population to provide extrapolated estimates of statistics such as catch and effort. MRIP is the survey most widely used to collect data related to saltwater recreational fisheries. Enhancing, not replacing, MRIP to be more attune to Maryland fisheries should be a goal. Several adjustments and enhancements should be considered:

1. Access Point Intercepts: The Maryland DNR should investigate and report on the potential to increase the number of APAIS conducted at the state level, specifically targeting under-represented and emerging fisheries. Work should include the trade-offs between the cost of the increased number of intercepts conducted and the increase in expected statistical accuracy.
2. The FES portion of MRIP should be enhanced by using a state questionnaire (compatible with MRIP FES). The supplemental questionnaire potentially could be accessible to anglers through electronic means (e.g., a QR code on the FES paper form that they receive) allowing them to submit the supplemental data electronically (potentially through a mobile app discussed later) or email, which would result in more timely responses, a greater sample size, and less recall bias.

Mobile App

The use of electronic mobile Apps compatible with smartphones and tablets, often combined with a means for electronic reporting for anglers without such devices, has increased dramatically in the past decade. For example, recreational anglers fishing for or catching tilefish in the Greater Atlantic region are required to report their catch and targeted effort (even if they do not catch a tilefish) to NOAA within 48 hours of concluding their trip. Mississippi utilizes an app as one part of their comprehensive reporting mechanism for red snapper in the Gulf of Mexico. However, apps must be designed and implemented correctly to provide accurate reporting; simply developing one and pushing it to the angling community will not be sufficient.

The Maryland DNR should consider integrating an app within their data collection programs for recreational angler to capture information from the broadest range of anglers. Only 27% of Americans still use mail to pay their bills, under a third of households still have a landline telephones, and the use of both are steadily declining. Meanwhile, the average American checks their mobile phone once every 10 to 12 minutes and app use shows a year-over-year growth rate of 10.56-percent from 2016 to 2021.⁷ Continuing to pursue solely mail or telephone surveys will

⁷ Bill payment methods - [paymentsjournal.com](https://www.paymentsjournal.com/7-ways-consumers-are-paying-bills/#:~:text=27%25%20of%20consumers%20pay%20by,of%20consumers%20pay%20in%20person) citing Mercantor Advisory Group Report - <https://www.paymentsjournal.com/7-ways-consumers-are-paying-bills/#:~:text=27%25%20of%20consumers%20pay%20by,of%20consumers%20pay%20in%20person>.

Landline use - CDC data - <https://www.cdc.gov/nchs/data/nhis/earlyrelease/wireless202111.pdf> in paragraph 2 Overview section App use - [zippia.com](https://www.zippia.com), Mobila App Industry Statistics - <https://www.zippia.com/advice/mobile-app-industry->

be utilizing obsolete methodology, increasingly costly, and miss a large swath of recreational anglers.

Critical investment must be made in a recreational angler data collection app sooner rather than later. To smooth the integration of the data collected from an app into the current MRIP, a questionnaire modeled after the MRIP FES survey could be pushed through a Maryland DNR mobile app weekly to random license holders with a protocol set up to compare and validate responses collected from the app to those collected through the FES during the same time.

Should an App be Mandatory or Voluntary?

Both mandating that anglers report using electronic technologies such as an app as well as voluntary reporting using an app have advantages and disadvantages. Mandated reporting is likely to capture anglers across a broad spectrum but could result in poor data if anglers disgruntled about the requirement provide inaccurate data. A requirement could also be a waste of resources from a data collection standpoint. For a simple “yes/no” question to be +/- 3% margin of error requires approximately 1,000 responses. Mandatory electronic reporting is in place for all for-hire and commercial vessels in the Mid-Atlantic and New England fishing under federal permits, and for recreational tilefish anglers in those regions.

Voluntary/opt-in for use of electronic reporting could be combined with incentives (as previously discussed) to encourage participation. Voluntary reporting could provide valuable real time data to supplement specific data needs at any specific time interval or geographic scale. However, the current Maryland DNR volunteer angler data reporting programs that utilize internet-based survey forms are very poorly used. An incentive-based approach may help to address this. For example, a representative sample of anglers could be recruited to participate for a given period. Those participating would be eligible for an incentive (e.g., gift card) at the end of the period. At the end of the period, another set of anglers would be selected randomly for participation. This could be supplemented with the engagement of a consistent set of users to provide data from those willing to report over longer periods and on a consistent basis.

We know from the current Maryland Fishing Activity and Catch Tracking System (FACTS) pilot program for striped bass that a hybrid approach that offers a voluntary opt-in program with mandatory electronic reporting is effective and enforceable. Note that FACTS has a carrot along with the stick – twice the rockfish limit for anglers who fish on recreational for-hire vessels. One serious challenge with this current program is the allocation of more fish to certain individuals in the recreational fishery, creating a lack of equity amongst participants, and subsequent social and political division amongst stakeholders

Development of an App

Numerous apps exist and are currently being used to collect data, so development of an app for the state of Maryland should take advantage of those already in existence. The Atlantic Coastal Cooperative Statistics Program (ACCSP) is launching the Scifish program to provide standards-

statistics/#:~:text=That%20might%20seem%20like%20a,year%20growth%20rate%20of%2010.56%25.(Cites Statistia),

based app development for agencies who are embarking on such initiative. The Scifish umbrella provides several advantages for app development, including:

- Established data standards
- Data confidentiality
- Data provided directly into the hands of assessment teams

Already mentioned in this report are the Mississippi app-based reporting element (Scales 'n Tail) as well as the recreational tilefish reporting and for-hire reporting on the Atlantic coast. Maryland should take advantage of the work that has already been done in developing both the mechanics (app) and protocols of implementing those various data collection programs.

Web Survey

The Maryland DNR currently utilizes eight web-based voluntary reporting programs to collect data on specific species (estuarine and freshwater). These are only utilized by a small number of anglers. The Task Force recommends that these be evaluated for potential conversion to a web-based survey that elicits responses from anglers rather than waiting for them to voluntarily connect and enter their information.

A framework for such an annual survey could include mailing emailing contacts asking them to take online survey, followed by a snail mail. Approximately 75% of license-holders have an email address. A random sampling would be chosen from the sample frame of license holders who have held any Maryland fishing license (3-day, 7-day, boat, annual, senior, etc.) during the previous calendar year, and have an email address on file with Maryland DNR. For individuals who have not responded to the first email, up to two additional email contacts would occur. Typical response rates for these types of contacts is 25%-30% so between 5,000 and 10,000 license holders would be drawn from the random sample, which would provide good statistical precision for a range of analyses given the above response rate. Because basic demographic data is known (age, region of residence, gender) from fishing license purchases (across both respondents/non-respondents and email address/no email), response bias across these characteristics could be explored and corrective weighting procedures used. This survey would capture a range of information, including participation, effort, locations fished, species targeted, preferences, satisfaction, motivations, and expenditures. To reduce recall issues, the survey could instead be released quarterly, with above topics explored across the previous quarter rather than the previous year.

A more frequent web survey could be conducted utilizing the same sample frame as above, but with fewer recipients per survey (~ 500-750). However, this more frequent survey would collect trip-level information at a high level of resolution. The survey would first ask about whether a fishing trip was taken in the previous week (or 2-week period). In months with limited fishing activity (Jan-March), surveys could be done monthly instead. If yes, the respondent would be asked to provide details about that fishing trip. Location, hours fished, # of fish caught, species targeted, species caught, expenditures, fishing method used, etc.

The combination of an annual (or quarterly) survey and a weekly (or biweekly) survey would enable the acquisition of trip-specific information with limited recall bias and permit the

application of this trip-specific information to data collected through the annual (or quarterly) survey to construct annual estimates. A benefit of the above email survey - approach relative to the “App” approach - is coverage. Despite the widespread use of Apps, there may be selective use of the App, perhaps based on the size of fish caught, so these factors need to be taken into consideration.

Frequency, Precision and Accuracy of Data Collection

The combination of the existing MRIP survey (enhanced through increased coverage of the APAIS and Maryland-specific FES components), App-based data collection, and Web-based data collection would dramatically increase the accuracy and precision of the data collected for all species from all fisheries. App reporting provides real time data collection and minimizes issues related to recall bias. Web-based survey reporting – during the spring, summer, fall and winter – provides information while “fresh in mind.”

Outreach and Marketing-How to Get the Word Out

Understanding the Customer Base

Maryland DNR needs to better understand their angler customer base in a way that most businesses understand and engage their customers. Outreach and social science professionals or partners with a specific marketing budget, and corresponding goals should be considered as a key element in the total budget of the effort for recreational data collection enhancement.

Peer-to-Peer Communication

A special “group” or designation of anglers could be randomly selected each year to participate on a special “team” for reporting their trips/landings/lengths/ releases/ through an app, and/or for consistently responding to any MRIP FES-like survey sent from the DNR, Incentives could be provided to publicly recognize them for their service to conservation.

Communicating Reporting Requirements and Surveys

Communicating with anglers about reporting requirements, options, and needs is vital to the success of any data collection program. At the outset of additional outreach/marketing to promote participation in surveys, it will be important to evaluate increased awareness and support for the potential effect of introducing biases into the results as compared to previous procedures.

Several areas of improvement were noted during the discussions of the Task Force. In general, a variety of methods exist to reach anglers about the importance of recreational data collection and the ways to participate:

- Email Blasts Quarterly specifically about the programs, applications, and data
- Consistent reminders as header or footer to Maryland DNR Fisheries Report email newsletters
- Permanent sections on the Maryland DNR websites pertaining to the programs including links to surveys deployed online if those methods are recommended

- Outreach to local retail shops, non-profit partners, bloggers, fisheries enthusiasts, travel journals and magazines, etc. to educate them so they can educate their patrons and constituents about the programs and ways to participate
- Including encouraging contact information and links to online surveys on partner sites, etc.
- Regular (weekly at minimum) social media posts reminding anglers to participate or look out for survey efforts in the variety of methods
- Physical mailers to addresses: Annually/bi-annually/quarterly depending on budget and effectiveness of marketing effort
- Incorporate a question (in appropriate methods) about how an angler came to report their data (i.e. How did you learn about the (app survey) that you are using today? Options: Referral from another angler; Recommendation from shop owner; QR Code on access point; Maryland DNR Website; Email; Newsletter; etc.). Questions such as these can guide the decisions we make about how and when to invest in our marketing efforts by giving us some knowledge of which efforts are most effective.
- Monitor response rates (i.e., open rates to emails, website visits, mailer responses, etc.) and track them alongside the data collection and responses to methods to best manage the effect of increased marketing efforts on the responses and reporting of data to our methods. It is a risk that more marketing and awareness causes more participation in reporting rather than more fishing effort causing more participation, and we want to understand which is causing the changes so that our management response can be qualified accordingly.
- Invest in marketing and outreach efforts that are available in languages other than just English and take steps to partner with businesses, non-profits, and other organizations that are frequented by under-represented anglers so they can support the work of engaging those anglers and building trust and knowledge of the programs.
- When Maryland DNR mails boat licenses to boaters, literature should be included explaining the reporting requirements and the fact that any unlicensed fisherman on board must also complete a free saltwater registry. Additionally, an updated fishing guide that all anglers receive when purchasing a license should highlight the importance of participating in data collection efforts.

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Appendix A. Economic Impacts of Recreational Fishing by Maryland Congressional District

Economic Impacts of Recreational Fishing by Maryland Congressional District				
Maryland Congressional District	Number of Recreational Anglers	Expenditures on Recreational Fishing (million)	tatewide Economic Output by Congressional District Anglers (million)	tatewide Jobs Supported by Congressional District Anglers
1	91,000	\$67.1	\$104.9	670
2	76,900	\$56.7	\$88.6	570
3	75,300	\$55.5	\$86.8	560
4	66,800	\$49.3	\$77.0	490
5	81,200	\$59.9	\$93.7	600
6	80,800	\$59.6	\$93.2	600
7	64,600	\$47.7	\$74.5	480
8	71,998	\$50.8	\$79.1	510

Source: Southwick Associates. 2020. Economic Contributions of Recreational Fishing in Maryland, 2018. Prepared for the American Sportfishing Association.