



Atlantic Coastal Cooperative Statistics Program

1050 N. Highland Street, Suite 200A-N | Arlington, VA 22201
703.842.0780 | 703.842.0779 (fax) | www.accsp.org

Geoff White, Director
Atlantic Coastal Cooperative Statistics Program
1050 N. Highland Street, Suite 200 A-N
Arlington, VA 22201

June 16, 2024

Dear Mr. White,

The Atlantic Coastal Cooperative Statistics Program (ACCSP) Recreational Technical Committee is pleased to submit the proposal titled, 'Pilot test of recreational released catch cards into the sampling design of the MRIP APAIS' for your review. This proposal offers a novel approach to both validate existing released catch from the MRIP APAIS and to also increase the numbers of lengths from released fishes from a variety of recreational fishing modes.

Please let me know if you have any questions or require further assistance with this request.

Sincerely,

Dawn Franco
Marine Biologist 2
Georgia Department of Natural Resources
Coastal Resources Division
1 Conservation Way
Brunswick, GA 31520
Dawn.Franco@dnr.ga.gov
(912) 266-4156

Angela Giuliano
Research Statistician IV
Maryland Department of Natural Resources
Fishing and Boating Services
580 Taylor Avenue, B-2
Annapolis, MD 21401
angela.giuliano@maryland.gov
(410) 260-8284

Proposal for FY2025 ACCSP Funding

Applicant Name: ACCSP Recreational Technical Committee

Project Title: Pilot test of recreational released catch cards into the sampling design of the MRIP APAIS

Project Type: New

ACCSP Program Priorities: Catch and Effort

Principal Investigator: Dawn Franco, dawn.franco@dnr.ga.gov
Angela Giuliano, angela.giuliano@maryland.gov

Project Staff: Dave Martins, dave.martins@mass.gov
John Lake, john.lake@dem.ri.gov
Greg Wojcik, gregory.wojcik@ct.gov
Rachel Sysak, rachel.sysak@dec.ny.gov
Jeff More, jeffrey.n.moore@deq.nc.gov
Brad Floyd, floydb@dnr.sc.gov
Alex DiJohnson, alex.dijohnson@accsp.org
Trevor Scheffel, trevor.scheffel@accsp.org
Full-time, part-time, and seasonal staff

Requested Award Amount: \$202,486.83

Requested Award Period: May 1 – December 31, 2025

Submission Date: June 16, 2024
Resubmitted as of 8/19/2024

Highlighted text indicates changes from the first submission
Underlined text identifies key details that meet ranking criteria

Objectives

This proposal will be a pilot project for calendar year 2025 offering use of a catch card as a supplementary sampling design to enhance the understanding of discard information in recreational fisheries along the Atlantic Coast. Private/rental boat mode will be the main focus but collection from multiple modes will be possible at the discretion of participating state partners. This proposal will pilot a modified sampling design to the Marine Recreational Information Program (MRIP) Access Point Angler Intercept Survey (APAIS) to collect information from randomly selected anglers about their discarded fish during a recreational fishing trip. The specific objectives include:

- Requesting prior to the start of a fishing trip that anglers record traditional discard information that is currently collected through the APAIS (e.g., species, count, hours fished, fishing area).
- Collecting additional fields relevant to discard mortality (e.g., depth and lengths of discarded fish). This would be beneficial for the private/rental boat mode which comprises the majority of recreational discards for several key species (Figure 1).
- Using the same stratified random sample design, or probability-based sampling, as the APAIS will allow comparison to existing APAIS discard data collection and explore if bias exists.
- Compare data collected via catch cards to existing headboat and dockside sampling or other data sources.
- Educate the recreational fishing community on the importance of accurate discard information in fisheries management and stock assessment.
- Educate the recreational fishing community on discard mortality, barotrauma and safe fish handling techniques.

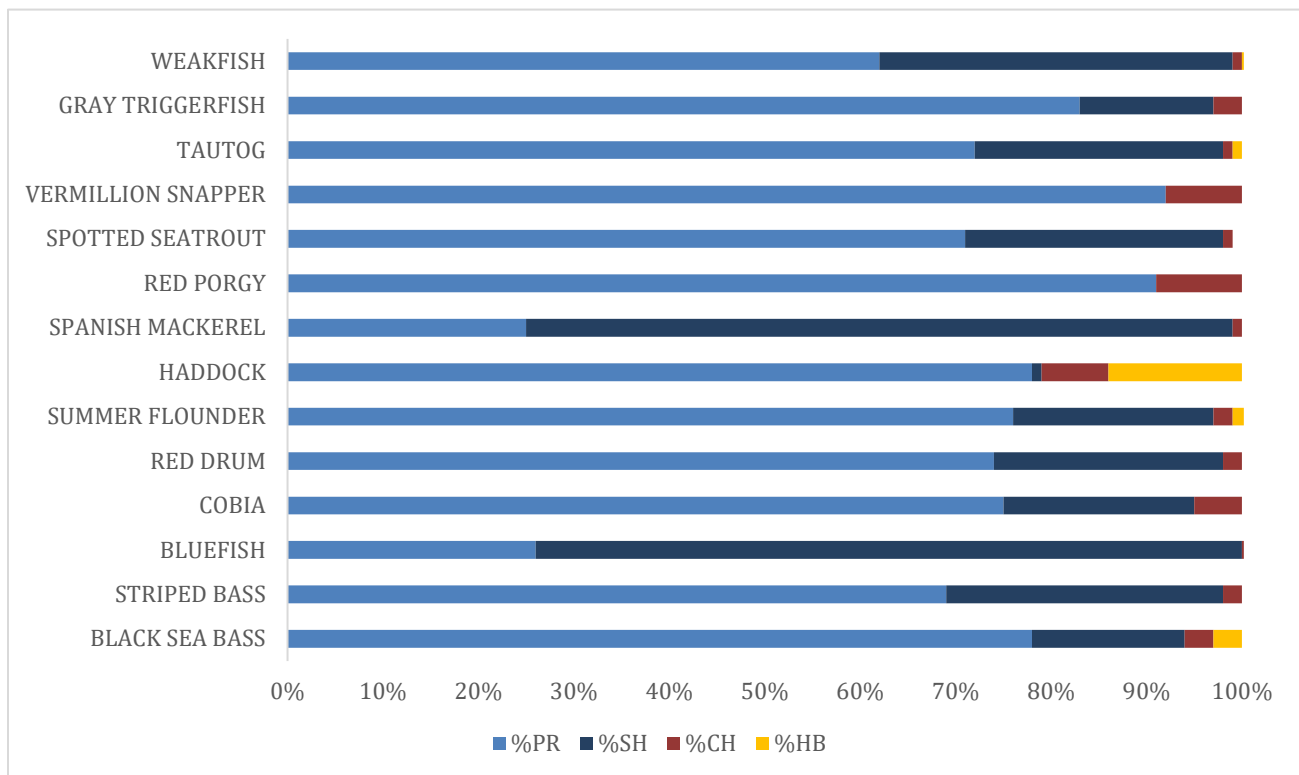


Figure 1. Percent discards of select species from ME to FL by mode, averaged for 2013 - 2022.

Need

In recent years, recreational fishing practices have shifted towards releasing a larger proportion of the estimated catch, rather than harvesting it. This shift is due to several reasons including but not limited to increasingly stringent regulations, such as shorter seasons, higher size limits, and smaller bag limits, as well as the growing popularity of catch and release angling. For example, on the Atlantic Coast from Maine through Florida, a significant number of striped bass are caught and released by recreational anglers compared to those that are harvested (Figure 2). Approximately 84% to 95% of the striped bass catch are released alive. Similar patterns are seen in other recreationally important fish species such as black sea bass and summer flounder (Figures 3 and 4). From 2000 through 2022, approximately 90% of black sea bass and summer flounder were released alive, compared to less than 40% at the beginning of the time series. In recent years (2000-2022), an average of approximately 85% of all striped bass, black sea bass, and summer flounder were released alive (Figure 5).

According to MRIP, the total number of live black sea bass discards along the Atlantic coast from Maine to Florida was 45.1 million fish in 2022 (Figure 3). Considering a 15% hook and release mortality rate, an estimated 6.8 million fish were lost due to recreational discard mortality in 2022. In the same year, black sea bass harvest was 4.9 million fish, which means discard mortality alone accounted for 58% of the total recreational removals (harvest plus dead discards).

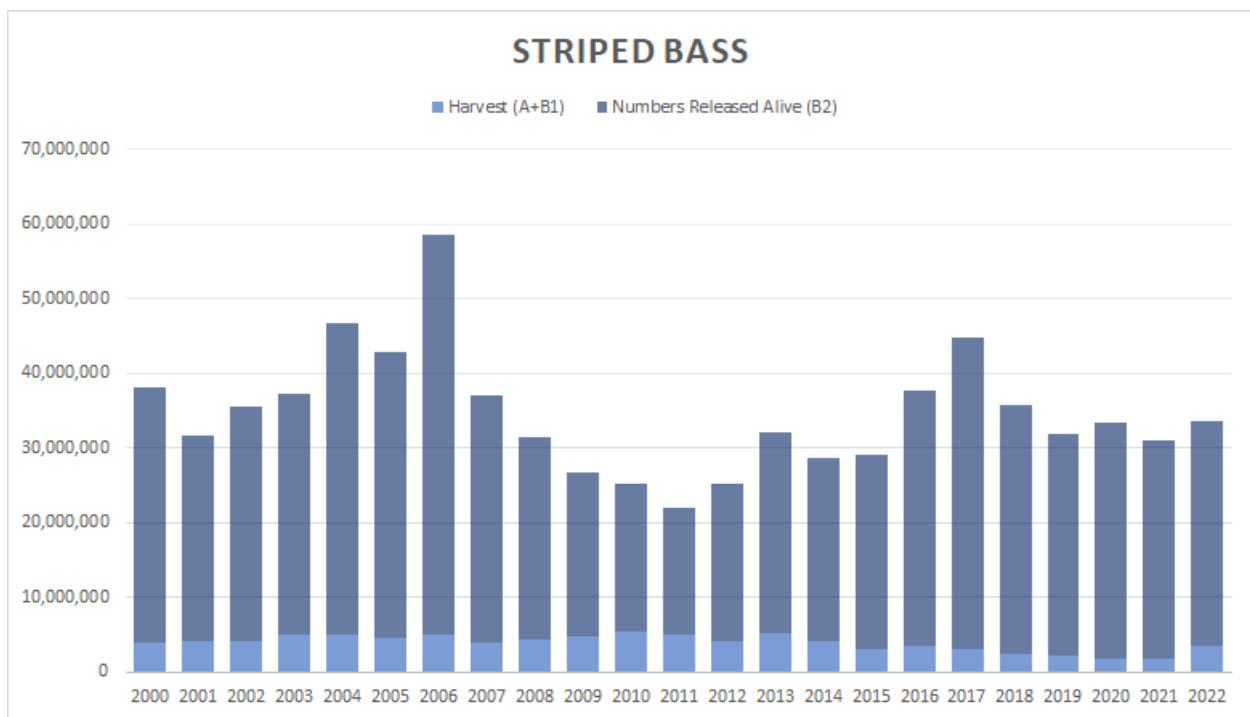


Figure 2. Catch trends in number of Striped Bass released from ME to FL, compared with harvest, illustrating released fish make up a majority of Striped Bass catch.

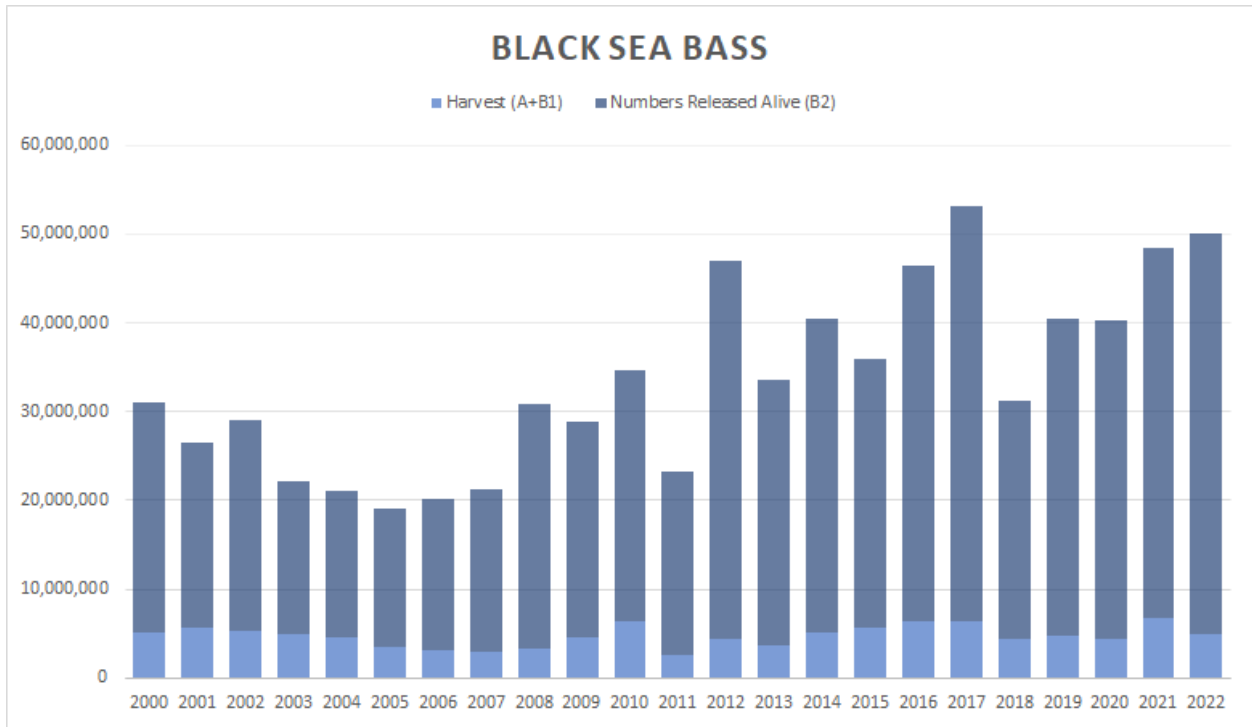


Figure 3. Catch trends in number of Black Sea Bass released from ME to FL, compared with harvest, illustrating released fish make up a majority of Black Sea Bass catch.

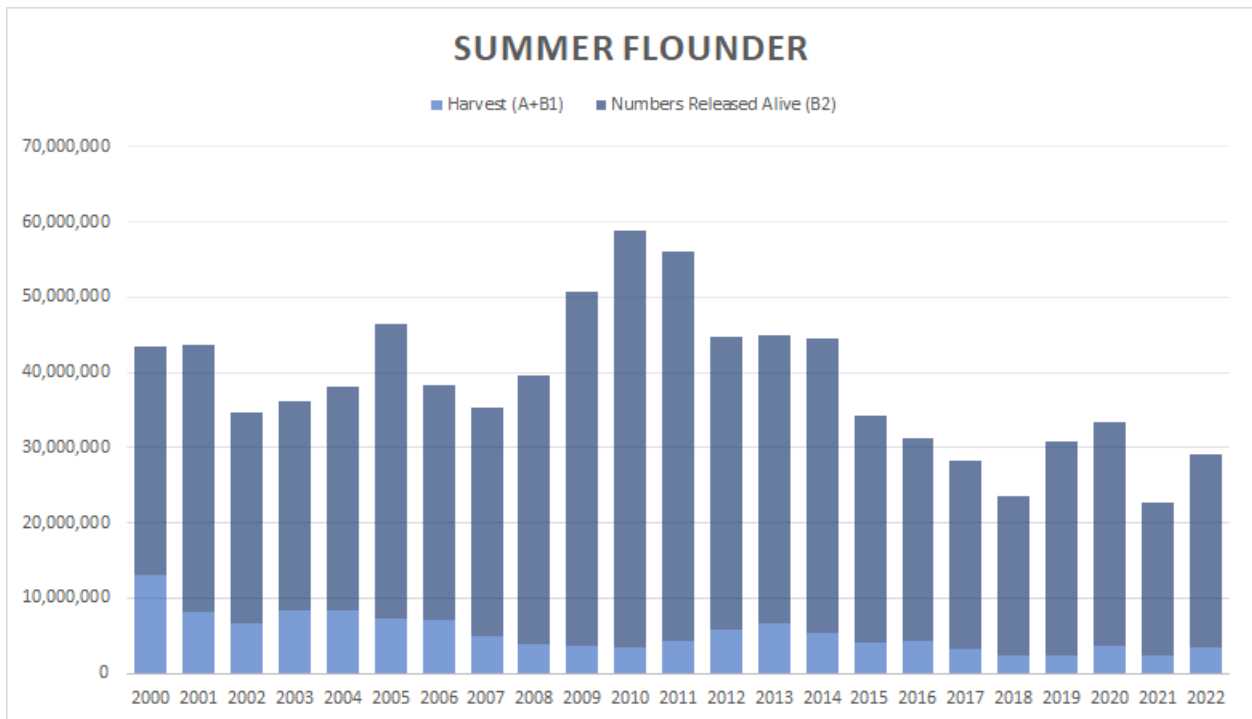


Figure 4. Catch trends in number of summer flounder released from ME to FL, compared with harvest, illustrating released fish make up a majority of summer flounder catch.

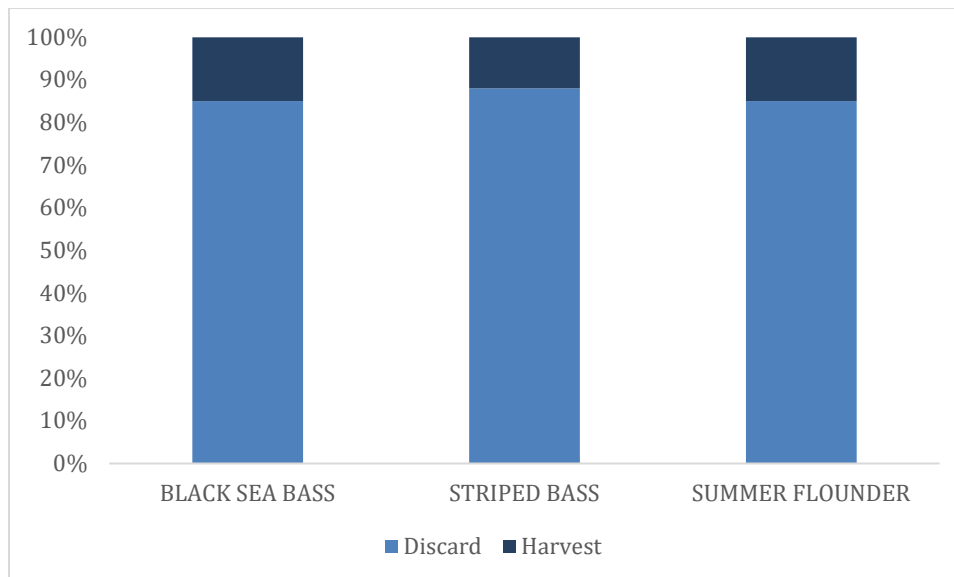


Figure 5. Percent of fish released, compared with harvest, averaged from 2000 to 2022 from ME to FL.

MRIP acknowledges that the accuracy and precision of information on released fish could be improved, especially since discarded fish represent an increasingly larger proportion of total removals from many fish populations.

The need for improved discard information in recreational fishing arises from several factors:

- **Regulatory requirements:** Recreational fishing regulations have become more stringent, with shorter seasons, higher size limits, and smaller bag limits. These regulations aim to protect fish populations and promote sustainable fishing practices. As a result, there is an increased number of fish being released.
- **Catch and release angling:** Catch and release has gained popularity among recreational anglers. Many anglers now prefer to release fish rather than harvest them. This shift in fishing practices is driven by a desire to conserve fish populations and promote their long-term sustainability.
- **High release rates:** A significant proportion of the estimated catch in recreational fishing may be released back into the water. For example, species like striped bass, black sea bass, and summer flounder have high rates of live releases, ranging from 84% to 95% of the catch. This indicates that a large number of fish are being released, and it is important to ensure accuracy of these data.
- **Discard mortality:** When fish are released after being caught, there is a risk of mortality. Factors such as handling stress, injuries from hooks or fishing gear, and post-release predation can contribute to the mortality of released fish. It is crucial that discard estimates are accurate so that the mortality associated with discards reflects the impact of catch and release practices on fish populations.
- **Data gaps:** The current monitoring and data collection systems for discards in recreational fishing are limited. The validated discard monitoring primarily focuses on the headboat fishery, while other fishing modes such as shore, private/rental, or charter boats have limited or no length data for discards. Using headboat data as a proxy for other fishing modes may not provide accurate length characterization due to differences in fishing methods. To improve discard estimates and mortality assessments, there is a need for mode-specific data collection.

Currently, the only source of **discard** length data for the recreational fleet, available coastwide in the Atlantic and used in stock assessments, is limited to the headboat fishery. Trained APAIS observers ride along on headboats to observe and record information on all fish caught by a limited number of anglers, including the species caught, lengths, quantity, and disposition of released fish. This information is extremely valuable in stock assessment models to evaluate discard mortality and total removals from a fishery, as well as the sizes of fish released in size- or age-based statistical models.

There is a lack of directly observed discard quantity and length information for other fishing modes such as shore, private/rental, or charter boats. In the absence of such data, headboat data is sometimes used as a proxy. However, applying headboat discard rates and size composition to other recreational fishery modes may not be entirely accurate due to differences in areas fished (offshore vs. inshore), depths fished (shallow vs. deep), and angler behavior (fishing method, hook type, bait type). The size composition of the fish population can vary between offshore and inshore areas. To obtain accurate characterization of each mode and estimate discard mortality, it is essential to use mode-specific data. Although some size information is available from external programs, such as state volunteer angler logbook or fish tagging programs, not all states have these programs and none currently have a statistically rigorous, peer-reviewed methodology. This study will test a method for collecting quality discard information for states that do not have a logbook or tagging program using a standardized, random sampling design.

To address these needs, our proposed solution is to pilot test an updated sampling design that increases focus on discards and expands discard length data collection to other fishing modes besides headboat mode. This can be achieved through the use of catch cards to collect release information. By obtaining more accurate discard estimates and mortality data, fisheries managers can make informed decisions to ensure the sustainable management of fish populations in recreational fishing and provide valuable data that is currently unavailable to stock assessments.

Results and Benefits

Recent management actions for several recreationally important species have resulted in reduced seasons, changing size limits, and reduced bag limits, highlighting the increasing numbers of fish being discarded and management's need for more information on this sector of the fishery. Stock assessment and management advice are likely to improve if better data can be collected about released fish. By handing out catch cards before the trip begins, anglers would be notified ahead of time that they will be asked about their discards, offering them the opportunity to record discarded catch numbers and lengths while fishing. We can compare these data to the existing APAIS, hopefully helping to provide more accurate discard numbers (i.e., less rounding) and reporting of all species discarded (i.e., including all species rather than just managed species).

One of the largest uncertainties in stock assessments is the size composition of discards, particularly from the private boat fleet which contributes the largest proportion of the catch for many important recreational species. As noted previously, data on discard lengths from this fishing sector have been difficult to observe and assessments often use data from various logbook or volunteer angler surveys to fill this data gap or sometimes must use data from other sources, such as various tagging datasets or the MRIP headboat observations. While these data represent the best data currently available, there are questions on how representative they are of the private recreational fleet. This project presents an opportunity to collect important discard length data. Data collected in a randomized, statistically valid manner is considered one of the best ways to obtain a more representative sample of discard lengths from the private/rental boat sector. In addition, getting the data directly from mode specific anglers will ensure that the data most representative of their recreational fishing fleet is being used to describe their fishing activities.

Anglers will be asked to record the lengths of discarded fish for up to fourteen regionally important recreational species (Table 1). These important recreational species were selected in consultation with state partners, Atlantic States Marine Fisheries Commission, and Councils based on the importance of length data in stock assessment processes and having a high discard to harvest ratio.

Table 1. Select list of managed species which will have length information requested on catch cards.

Black Sea Bass	Gray Triggerfish	Red Porgy	Striped Bass	Vermilion Snapper
Bluefish	Haddock	Spanish Mackerel	Summer Flounder	Weakfish
Cobia	Red Drum	Spotted Sea Trout	Tautog	

The catch card program would be voluntary and design aspects would focus on methods to reduce potential biases. These catch cards would be handed out to anglers at sites selected using the random survey design of the APAIS. It is anticipated that this method will result in a more representative sample of discard catch length information than may be obtained from a purely opt-in volunteer angler survey. Data will be collected at the individual fishing trip level so that these data can be better aligned with how data are collected in the APAIS.

The catch cards will also provide an opportunity to collect data needed for stock assessments that are not usually collected in the APAIS but are needed to improve estimates of discard mortality such as the depth fished. Improved data on this field would provide more accurate estimates of the number of fish that die after being released, improving estimated fishing mortality rates, an important metric used to manage fish stocks sustainably.

Data Delivery Plan

Waterproof cards will be provided a unique identification number to prevent fraudulent submissions. Additionally, field interviewers will indicate on every card when (e.g., date/time) and where (e.g., MRIP site number) it was distributed. Data from catch cards will be processed and manually keyed into a section on the ACCSP ATA. ACCSP will create standardized data tables formatted across all fields to ensure that state staff along the coast are entering the data the same way. Unique fields for each card will be checked for quality assurance (QA) during the data entry process to the ATA and quality control (QC) checks will be run periodically to review data issues, including outliers, after each submission via automated processes.

While electronic data submission options were discussed, physical catch cards were chosen as the preferred submission method. Previous MRIP studies for the Fishing Effort Survey (FES) have shown that having more than one data submission method (i.e., paper- vs. electronic-based) tends to produce lower overall response rates than having a single submission method. These studies have also found that anglers exhibited higher response rates through the mail rather than the web-based surveys. Additionally, electronic data collection could result in anglers who were not randomly encountered at the sites during the specific sample times being able to submit data. While anglers could still pass the paper form to someone else or collect data from a trip not within the sampling time frame, the use of physical cards with unique identification fields will reduce this issue. Appendix B summarizes the data processing.

After anglers complete their trips and record their discarded catch data on the distributed paper catch cards, anglers can submit their catch card to the associated state partner by:

- Mail using pre-paid postcards,
- Return directly to the APAIS interviewer if still on site when the angler completes their trip.

Anglers who return from their trip and hand in their catch card to an APAIS interviewer will be asked to complete an APAIS interview and the unavailable catch question will be asked. That is, the catch card will not replace the APAIS interview as this will help with the eventual comparison between current APAIS methodology and that of the catch card. Completing interviews on site with anglers, whether given the card or not, will provide opportunity to use data from

these overdrawn assignments for MRIP estimates, pending evaluation with the help of NOAA Fisheries MRIP staff. Completed interviews as part of overdrawn assignments will be uploaded to the ACCSP Assignment Tracking Application (ATA) using the same procedure as standard APAIS assignments. The total number of catch cards provided to anglers will be recorded to determine how many cards were returned for each assignment. This data will be used to assess non-response to gauge the rate of angler participation.

Approach

Assignments will be created using the same draw process as the APAIS to ensure a probability-based sampling design but will be treated as a separate draw of private/rental boat sites. These assignments will be labeled as ‘Overdrawn’ assignments. In coordination with NOAA Fisheries MRIP staff, this pilot proposes to conduct overdrawn APAIS assignments as if the assignment is an actual APAIS assignment in order to standardize approaches for eventual data analyses. Overdrawn assignments will not initially be a part of the existing MRIP estimation process in order to ensure that the project doesn’t affect current interviewer productivity and ongoing efforts to improve PSEs along the Atlantic Coast. However, MRIP has indicated that overdrawn assignments could potentially be used in estimates, pending analyses after the sampling season if there are no significant biases between the catch card and regular APAIS assignments.

The number of overdrawn assignments will be predetermined in advance of the draw and will be state specific. The number of assignments per region was selected based on the average number of anglers that may be given a card each day (5.24), return rate of catch cards (25%) from a different pilot project in Connecticut together with APAIS results from 2022 (e.g., number of 0-interview assignments, private/rental anglers sampled with released catch), using a list of managed species by region on the Atlantic (see Appendix C). The total assignment goal (485) by region/state is as follows with sampling months described in Table 2:

- North Atlantic: 205 assignments total, 60 in MA, 70 in RI, and 75 in CT
- Mid-Atlantic: 130 assignments total, 65 in NY and 65 in MD
- South Atlantic: 150 assignments total, 50 in NC, 50 in SC, and 50 in GA

Table 2. Months of sampling overdrawn APAIS assignments for pilot project.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Massachusetts					X	X	X	X	X	X		
Rhode Island					X	X	X	X	X	X		
Connecticut					X	X	X	X	X	X		
New York					X	X	X	X	X	X		
Maryland					X	X	X	X	X	X		
North Carolina					X	X	X	X	X	X	X	
South Carolina					X	X	X	X	X	X	X	
Georgia					X	X	X	X	X	X	X	

Catch cards will be printed and distributed to anglers by APAIS field interviewers. Catch cards will be handed out mainly to private/rental boat anglers but interviewers could hand out cards to shore anglers, as encountered. In 2022, the majority (78%) of anglers interviewed started their fishing trip between the hours of 6am and noon (see Table 1 in Appendix C). Therefore, assignments will have a buffer time before the 6-hour APAIS where catch cards will be handed out for two common APAIS intervals: 0800-1400 and 1100-1700 to maximize potential of encountering anglers before

they begin their trip. This will default to a 1-hour buffer time but could potentially be extended to 2- or 3-hour buffers depending on staff availability and assignment specifics. During this buffer time, interviews cannot be conducted as the purpose of the buffer is specifically for distributing catch cards to anglers beginning their fishing trips. During the APAIS assignment interval, field interviewers will hand out catch cards to anglers departing on their trips as well as complete intercepts with anglers finishing their trips with angler intercepts taking precedence during the assignment interval.

Anglers will be given cards as they are departing the access point to begin their fishing trip, along with a brief explanation from field staff on how to fill out the card and why the information is important. A small (golf) pencil will be provided as well as a tape measure. The unit of measurement on the tape measure will include inches since that is the unit of measure most anglers are familiar with.

Data Collection

Catch cards will include data fields for the following basic fisheries information:

- Date
- Fishing mode
- Target species
- Hours fished
- Area fished (ocean ≤ 3 miles, ocean > 3 miles, or inland)
- Depth fished
- Trip end time

Catch information questions will include:

- Number of fish released per species
- Disposition (thrown back alive, thrown back dead)
- Discard lengths for fourteen regionally important/managed species (see Table 1)

Note: There are two examples provided for catch cards. Focus groups or field testing will be planned in mid- to late-2024 to gauge how easily the catch card can be understood and filled in by anglers.

Measuring Procedures

Anglers will be asked to measure up to 15 individual released fish, if included in the list of 14 species, on the catch card in the order in which each fish is caught. That is, the fish are not to be measured based on size or every 'nth' individual. The recommendation for 15 is to limit angler burden or fatigue and anglers can record more than 15 individuals if desired.

Anglers would be asked to measure the total length (TL) of each fish rounded up to the nearest quarter-inch to reduce error. This measurement was selected because 0.25 inches is equal to .635 cm, which is at least ± 1 cm consistent with lengths reported in scientific fisheries literature. Cards will be returned to the participating state that distributed the card, either by mail or to the field interviewer if they're still at the site. Field interviewers will fill in the location and date the card was given to the angler and track the total number of cards distributed each day to determine response rate.

There is limited space on the card for instructions so each card will include a link (via QR code) to provide outreach and education materials plus more complete instructions such as:

“We are conducting a study to collect information about any fish you may catch and release on your fishing trip today. Please fill out this card in its entirety, and only for fish that you specifically caught and released. Do not include any other angler’s information in your party on this card. Please tell us more information about your trip in “Trip Information”. We would like to know what fish were you targeting, what depth most of your fishing occurred, number of hours you were fishing, if you were fishing from a boat or the shore, how far from shore you were fishing, and time your trip ended. In “Angler’s released Catch for total trip”, track all species released by writing in each species name and record the total number of each species released using tally marks. You can overwrite the box with the example if you need the extra space. For the length section, only record lengths for priority species (see list below). If you release a priority species, write in the name of the species on the top line and record one total length (rounded up to the nearest quarter inch) in each box under the applicable species name. You can have multiple columns for a single species if you need more space for lengths (e.g., 2 columns for Spanish mackerel). If you did not release any fish on your trip, please check the box “I did not release any fish today”.

Coastwide list of priority species for lengths:

Black Sea Bass, Bluefish, Cobia, Gray Triggerfish, Haddock, Red Drum, Red Porgy, Spanish Mackerel, Spotted Seatrout, Striped Bass, Summer Flounder, Tautog, Vermilion Snapper, and Weakfish.”

In addition to the QR code, half-sheets of paper will be printed and available to hand out to anglers or for use by field interviewers at the state’s discretion.

Potential Analysis Approaches and Future Validation

Direct validation of angler reported discards through observation or video recording is not practical due to the number and size of private and rental recreational fishing vessels. There are, however, various approaches to compare data collected through this catch card pilot project to other data sources. A validation component would highlight potential biases in the data collected by various methods and elucidate whether the discard lengths collected are accurate and reasonable.

Additionally, an examination of differences in the number of discarded species reported between APAIS intercepts and catch cards tests the hypothesis that anglers are more likely to report greater species diversity via catch card including less valued (infrequently targeted) species, compared with the APAIS. Data can also be analyzed to evaluate if there are fewer instances of rounding in catch card data.

One of the most important aspects of this catch card pilot project is the ability to collect length information on released fish to better describe the size composition of discarded catch. The composition of discard length frequencies from the catch cards can be compared with data sources external to APAIS such as volunteer angler logbook programs or fish tag and release data sets, or with the headboat discard data currently collected through APAIS to evaluate if differences exist.

In the future, a separate proposal could be developed to determine the efficacy of a catch card approach by directly observing shore or headboat anglers who simultaneously self-report their discards on the card as an alternative way to validate catch card data, Hawthorne effect notwithstanding. It would be interesting and important to examine whether catch card discard length data align with data from other programs as comparing the various data streams may tell us something about potential biases between the different data types (randomly distributed cards, opt-in data collection, fish tagging data sets, and APAIS headboat sampling).

Funding Transition Plan

This pilot project is intended to test several hypotheses in the initial year of conduct, including the methods of increasing discard information. If the results of the first year indicate major benefits for another year's pilot testing, additional funding would be requested. However, if this pilot proves to be successful and does not require additional testing, funding to continue or merge this methodology with the APAIS would instead be covered under the MRIP general survey's cooperative agreement on the Atlantic.

Outreach and Education

Educational outreach materials will be created to standardize data collection and explain the needs and benefits of the project. Primary program outreach will occur during initial contact a field interviewer has with an angler prior to the start of any fishing activity. At this stage, field interviewers will provide potential participating anglers with a brief overview of the project, the survey card, a measuring tape, and a pencil.

Materials created for anglers will provide card instructions, general information, and a region-specific section. Instructions will include detailed information on how to fill out the survey card, how to measure fish of varying body types, and how anglers can submit their data. The general information section will contain broad information about the purpose of the project, the importance of recreational discard information in fisheries management, and best practices for releasing fish (e.g., safe handling, circle hooks, descending devices). There is a wealth of knowledge online regarding best fish handling practices and barotrauma and educational videos and links for these will be provided on the website as angler resources. The region-specific section will include information about species frequently encountered in the region in which the fishing trip is occurring as well as information to help anglers accurately identify species that are commonly mis-identified. As a secondary form of outreach, the materials will provide links to direct anglers to more program-specific information, to websites of participating agencies, and to other sources related to recreational anglers and recreational fishing data collection.

Outreach materials will also emphasize that the release cards are meant to compliment MRIP data, not replace it, and will highlight the importance of continued participation in the MRIP APAIS surveys. The survey card, pencil, and measuring tape will ensure that anglers have the appropriate tools needed to collect the discard data, while the additional materials will describe the importance of discard information in the fishery management process and how collected data can be beneficial. Informing anglers of the importance of the data they collect prior to beginning their fishing activity has potential to 1) motivate them to participate in the program through increased awareness, and 2) increase an angler's focus on discard information during that fishing trip, in turn encouraging more accurate data.

Small items such as towels, hooks, measuring tapes, etc. can be handed out with the card to incentivize and thank anglers for their participation. The incentives are not a required part of the project but can be used at the discretion of the participating state.

Geographic Location

Broadly, this project will cover the Atlantic coast from Maine through Georgia. During the first year of the pilot project, regional coverage will be accomplished by Massachusetts, Rhode Island, and Connecticut in the North, New York and Maryland in the Mid, and North Carolina, South Carolina, and Georgia in the South.

Milestone Schedule

Date	Event
Jun 17, 2024	Proposal Submitted to ACCSP RFP
Aug 8, 2024	Pilot Partner Meeting
Aug 19, 2024	Revisions to Proposal Due
Sep-Nov, 2024	Pilot Partner Meetings
Dec 5, 2024	Full RTC Meeting - Virtual
Jan, 2025	Finalize Catch Card, arrange for printing
Jan, 2025 - Mar, 2025	Pilot Partner Meetings
Mar, 2025	Overdrawn Assignment Allocation request to MRIP
Mar-Apr, 2025	Training sessions for Pilot states, order supplies, ship to states
May, 2025	Pilot Project Conduct begins (Table 2)
Jun 15, 2025	Deadline for card data entry and data review for May
Jun, 2025	Pilot Partner Meeting – check in on process
Jul 15, 2025	Deadline for card data entry and data review for Jun
Jul, 2025	Pilot Partner Meeting – Wave review (May-Jun)
Aug 15, 2025	Deadline for card data entry and data review for Jul
Aug, 2025	Pilot Partner Meeting – Mid Season review (May to July)
Sep 15, 2025	Deadline for card data entry and data review for Aug
Sep, 2025	Pilot Partner Meeting – Wave review (Jul-Aug)
Oct 15, 2025	Deadline for card data entry and data review for Sep
Nov 15, 2025	Deadline for card data entry and data review for Oct
Nov, 2025	Pilot Partner Meeting – Wave review (Sep-Oct)
Dec 15, 2025	Deadline for card data entry and data review for Nov
Dec 31, 2025	Deadline for final data review for May-Nov
Jan 1, 2026	Data available for analysis

Project Accomplishments Measurement

Project Goals	Metrics
Discard length data collection	- 60 length measurements for each priority species by relevant spatial (e.g., state, region) and temporal (e.g., month, wave, year) category for use in stock assessments
Discard rate analyses	- Better understanding of potential recall/measurement bias to APAIS released catch by moving request for discards from after-trip to before-trip. Field staff will track and report how many cards are distributed. Interviewers could potentially distribute up to 15,000 catch cards.

Cost Summary (Budget)

Description	Calculation	Cost	In-kind
MASSACHUSETTS			
Personnel (a)			
Interviewers (seasonal)	60 (9 hours) @ \$22.00 per hour	\$ 11,880.00	\$ -
Data entry clerk (seasonal)	60 * .5 Hours/Assign * \$22/Hour	\$ 660.00	\$ -
Program Staff time (2 hrs per week)	30 weeks (2hrs per week)	\$ -	\$ 2,709.60
Fringe (b)			
Interviewer (seasonal)	Fringe = 0.0162 * personnel (a)	\$ 192.46	\$ -
Data entry clerk (seasonal)	Fringe = 0.0162 * personnel (a)	\$ 10.69	\$ -
Program Staff time	Fringe = 0.4505 * personnel (a)	\$ -	\$ 1,220.67
Travel (c)			
Vehicle Mileage	\$0.67/mile (60 assignments @ 70 miles average roundtrip)	\$ 2,814.00	\$ -
Other expenses	Parking, tolls, etc.	\$ 500.00	\$ -
Supplies (d)			
Printing + Angler supplies	Printing paper (60 assignments w/ avg anglers per assignment: \$1.00/sheet of write-in-rain paper, \$0.50/pencil, \$1.00/measuring tape)	\$ 4,500.00	\$ -
Other (e)			
Other	Pre-paid mailing for catch cards (60 assignments w/ avg anglers per assignment: \$0.80 per pre-paid expense)	\$ 1,440.00	\$ -
	Handout materials / reward	\$ 1,200.00	\$ -
Totals (c+d+e)		\$ 7,844.00	\$ -
Total direct charges			
Indirect charges (f)	Indirect (25.59% of Salary)	\$ 4,057.04	\$ 693.39
Sum of direct and indirect		\$ 27,254.19	\$ 4,623.66

Description	Calculation	Cost	In-kind
<u>RHODE ISLAND</u>			
Personnel (a)			
Interviewers	Staff Hours @ 7 Hours w/ 2hr travel @ \$22.00	\$ 13,860.00	\$ -
Date entry	Staff Hours @ 0.1 Hours @ \$22.00 @ 15 Intercepts/Assignments	\$ 2,310.00	\$ -
Supervisor	Supervisor Salary	\$ -	\$ 2,391.00
Fringe (b)			
Interviewer (seasonal)	Fringe = 0.10 * personnel (a)	\$ 1,386.00	\$ -
Data entry clerk (seasonal)	Fringe = 0.10 * personnel (a)	\$ 231.00	\$ -
Program Staff time	Fringe = 0.10 * personnel (a)	\$ -	\$ 239.10
Travel (c)			
Vehicle Mileage	60 mile per assignment .67/miles	\$ 2,814.00	\$ -
Other expenses	Parking, Tolls, etc.	\$ 500.00	\$ -
Supplies (d)			
Printing + Angler supplies	Printing paper (70 assignments w/ avg anglers per assignment), pencils (\$0.50), and measuring tapes (\$1.00)	\$ 5,250.00	\$ -
Other (e)			
Other	Pre-paid mailing for catch cards (70 assignments w/ avg anglers per assignment: \$0.80 per pre-paid expense)	\$ 1,680.00	\$ -
Totals (c+d+e)		\$ 7,199.00	\$ -
Total direct charges			
Indirect charges (f)	Indirect (22.32% of TDC)	\$ 4,348.83	\$ 533.67
Sum of direct and indirect		\$ 32,379.83	\$ 3,163.77

Description	Calculation	Cost	In-kind
<u>CONNECTICUT</u>			
Personnel (a)			
Interviewers	Staff hours (75 assignments total: 85% w/ 1-hour buffer, 15% w/o buffer) w/ 2 hours of travel time per assignment @ \$16/hour)	\$ 10,620.00	\$ -
Data entry clerk	Staff hours (75 assignments total, 0.5 hours per assignment for review/entry * \$20/hour)	\$ 750.00	\$ -
Supervisor	37.5 hours over 30 weeks including fringe		\$ 4,454.20
Fringe (b)			
Interviewer (seasonal)	Fringe = 0.6722 * personnel (a)	\$ 7,138.76	\$ -
Data entry clerk (FTE)	Fringe = 0.9047 * personnel (a)	\$ 678.53	\$ -
Travel (c)			
Vehicle Mileage	\$0.67/mile (75 assignments @ 50 miles average roundtrip)	\$ 2,512.50	\$ -
Other expenses	Parking, tolls, etc.	\$ 500.00	\$ -
Supplies (d)			
Printing + Angler supplies	Printing paper (75 assignments w/ avg anglers per assignment: \$1.00 per sheet of write-in-rain paper, \$0.50 per pencil, \$1.00 per measuring tape)	\$ 5,625.00	\$ -
Other (e)			
Other	Pre-paid mailing for catch cards (75 assignments w/ avg anglers per assignment: \$0.80 per pre-paid expense)	\$ 1,800.00	\$ -
	Handout materials / reward	\$ 1,200.00	
Totals (c+d+e)		\$ 8,375.00	\$ -
Total direct charges			
Indirect charges (f)	Indirect (36.93% of personnel (a))	\$ 4,198.94	\$ 1,644.94
Sum of direct and indirect		\$ 35,023.73	\$ 6,099.14

Description	Calculation	Cost	In-kind
<u>NEW YORK</u>			
Personnel (a)			
Interviewers	Staff hours (65 assignments total: 85% w/ 1-hour buffer, 15% w/o buffer) w/ 3 hours of travel time per assignment @ \$21.664/hour)	\$ 13,870.38	\$ -
Data entry clerk	Staff hours (65 assignments total, 0.5 hours per assignment for review/entry * \$21.664/hour)	\$ 704.08	\$ -
Supervisor		\$ -	\$ 1,200.00
Fringe (b)			
Interviewer (seasonal)	Fringe = 0.10 * personnel (a)	\$ 1,387.04	\$ -
Data entry clerk (seasonal)	Fringe = 0.35 * personnel (a)	\$ 246.43	\$ -
		\$ -	\$ 420.00
Travel (c)			
Vehicle Mileage	\$0.67/mile (65 assignments @ 75 miles average roundtrip)	\$ 3,266.25	\$ -
Other expenses	Parking, tolls, etc.	\$ 500.00	\$ -
Supplies (d)			
Printing + Angler supplies	Printing paper (65 assignments w/ avg anglers per assignment: \$1.00 per sheet of write-in-rain paper, \$0.50 per pencil, \$1.00 per measuring tape)	\$ 4,875.00	\$ -
Other (e)			
Other	Pre-paid mailing for catch cards (65 assignments w/ avg anglers per assignment: \$0.80 per pre-paid expense)	\$ 1,560.00	\$ -
Totals (c+d+e)		\$ 7,373.75	\$ -
Total direct charges			
Indirect charges (f)	Indirect (0.00% of TDC)	\$ -	\$ -
Sum of direct and indirect		\$ 26,409.17	\$ 1,620.00

Description	Calculation	Cost	In-kind
MARYLAND			
Personnel (a)			
Interviewers	Staff hours (65 assignments total: 85% w/ 1-hour buffer, 15% w/o buffer) w/ 2 hours of travel time per assignment @ \$17.66/hour)	\$ 10,158.92	\$ -
Data entry clerk	Staff hours (65 assignments total, 0.5 hours per assignment for review/entry * \$19.26/hour)	\$ 625.95	\$ -
Project Manager	Scheduling/printing/data entry/etc. (1/2 month)	\$ -	\$ 2,500.00
Fringe (b)			
Interviewer (seasonal)	Fringe = 0.10 * personnel (a)	\$ 1,015.89	\$ -
Data entry clerk (seasonal)	Fringe = 0.35 * personnel (a)	\$ 219.08	\$ -
		\$ -	\$ 875.00
Travel (c)			
Vehicle Mileage	\$0.67/mile (65 assignments @ 50 miles average roundtrip)	\$ 2,177.50	\$ -
Other expenses	Parking, tolls, etc.	\$ 500.00	\$ -
Supplies (d)			
Printing + Angler supplies	Printing paper (65 assignments w/ avg anglers per assignment: \$1.00 per sheet of write-in-rain paper, \$0.50 per pencil, \$1.00 per measuring tape)	\$ 4,875.00	\$ -
Other (e)			
Other	Pre-paid mailing for catch cards (65 assignments w/ avg anglers per assignment: \$0.80 per pre-paid expense)	\$ 1,560.00	\$ -
Totals (c+d+e)		\$ 6,285.00	\$ -
Total direct charges			
Indirect charges (f)	Indirect (10.00% of TDC)	\$ 1,881.74	\$ 250.00
Sum of direct and indirect		\$ 23,014.08	\$ 3,625.00

Description	Calculation	Cost	In-kind
<u>NORTH CAROLINA</u>			
Personnel (a)			
Interviewers	Staff hours (50 assignments total: 85% w/ 1-hour buffer, 15% w/o buffer) w/ 2 hours of travel time per assignment @ \$18/hour)	\$ 7,965.00	\$ -
Data entry clerk	Staff hours (50 assignments total, 0.5 hours per assignment for review/entry * \$18/hour)	\$ 450.00	\$ -
Supervisor	General staff management for 37 weeks	\$ -	\$ 2,000.00
Fringe (b)			
Interviewer (seasonal)	Fringe = 0.10 * personnel (a)	\$ 796.50	\$ -
Data entry clerk (FTE)	Fringe = 0.53 * personnel (a)	\$ 238.50	\$ -
Supervisor	Fringe = 0.53 * personnel (a)	\$ -	\$ 1,060.00
Travel (c)			
Vehicle Mileage	\$0.67/mile (50 assignments @ 50 miles average roundtrip)	\$ 2,010.00	\$ -
Other expenses	Parking, tolls, etc.	\$ 100.00	\$ -
Supplies (d)			
Printing + Angler supplies	Printing paper (50 assignments w/ avg anglers per assignment: \$1.00 per sheet of write-in-rain paper, \$0.50 per pencil, \$1.00 per measuring tape)	\$ 4,375.00	\$ -
Other (e)			
Other	Pre-paid mailing for catch cards (50 assignments w/ avg anglers per assignment: \$0.80 per pre-paid expense)	\$ 1,400.00	\$ -
	Incentives	\$ 600.00	
Totals (c+d+e)		\$ 5,935.00	\$ -
Total direct charges			
Indirect charges (f)		\$ 1,785.00	\$ 518.00
Sum of direct and indirect		\$ 19,720.00	\$ 3,578.00

Description	Calculation	Cost	In-kind
<u>SOUTH CAROLINA</u>			
Personnel (a)			
Interviewers	50 assignments, 100% w/ 1-hour buffer, 2 hours of travel time per assignment = 2 months of FI	\$ 7,603.43	\$ -
Supervisor	scheduling/printing/data entry/etc. (1 month salary *.46 fringe)	\$ -	\$ 5,690.42
Fringe (b)			
Interviewer (seasonal)	Fringe = 0.46* personnel (a)	\$ 3,497.58	\$ -
Supervisor	Fringe = 0.46* personnel (a)	\$ -	\$ 2,617.59
Travel (c)			
Vehicle Mileage	\$0.67/mile (50 assignments @ 50 miles average roundtrip)	\$ 1,675.00	\$ -
Supplies (d)			
Printing + Angler supplies	Printing paper (50 assignments w/ avg anglers per assignment: \$1.00 per sheet of write-in-rain paper, \$0.50 per pencil, \$1.00 per measuring tape)	\$ 3,750.00	\$ -
Other (e)			
Other	Pre-paid mailing for catch cards (50 assignments w/ avg anglers per assignment: \$0.80 per pre-paid expense)	\$ 1,200.00	\$ -
Totals (c+d+e)		\$ 4,450.00	\$ -
Total direct charges			
Indirect charges (f)	Indirect (10.00% of TDC)	\$ 1,110.10	\$ 830.80
Sum of direct and indirect		\$ 18,836.11	\$ 9,138.81

Description	Calculation	Cost	In-kind
GEORGIA			
Personnel (a)			
Interviewers (PTE)	Staff hours (30 assignments total : 8h (inc 1-2 hr buffer) plus 2 hours of travel time per assignment)	\$ 4,500.00	\$ -
Interviewers (FTE)	Staff hours (20 assignments total: 8h (inc 1-2 hr buffer) plus 2 hours of travel time per assignment)	\$ 3,960.00	\$ -
Data entry clerk	Staff hours (50 assignments total, 0.5 hours per assignment for review/entry)	\$ 495.00	\$ -
Manager	Staff hours (16 hours)	\$ -	\$ 430.90
Fringe (b)			
Interviewers (PTE)	Fringe = 0.0145* personnel (a)	\$ 65.25	\$ -
Interviewers (FTE)	Fringe = 0.68114* personnel (a)	\$ 3,034.48	\$ -
		\$ -	\$ 293.50
Travel (c)			
Vehicle Mileage	\$0.67/mile (50 assignments @ 70 miles average roundtrip)	\$ 2,345.00	\$ -
Other expenses	Parking, tolls, etc.	\$ 500.00	\$ -
Supplies (d)			
Printing + Angler supplies	Printing paper (50 assignments w/ avg anglers per assignment: \$1.00 per sheet of write-in-rain paper, \$0.50 per pencil, \$1.00 per measuring tape)	\$ 3,750.00	\$ -
Other (e)			
Other	Pre-paid mailing for catch cards (50 assignments w/ avg anglers per assignment: \$0.80 per pre-paid expense)	\$ 1,200.00	\$ -
Totals (c+d+e)		\$ 5,620.00	\$ -
Total direct charges			
Indirect charges (f)		\$ -	\$ -
Sum of direct and indirect		\$ 19,849.73	\$ 724.40

Description	Calculation	Cost	In-kind
<u>ASMFC</u>			
Personnel (a)			
Data coordinator(s)	In-kind staff hours (520 assignments coastal total: 0.25 hours per assignment for review)	\$ -	\$ 6,500.00
Fringe (b)			
Interviewers (PTE)	Fringe = 0.35* personnel (a)	\$ -	\$ 2,275.00
Travel (c)			
-	-	\$ -	\$ -
Supplies (d)			
Printing	Printing paper catch cards (525 assignment w/ avg anglers per assignment) - Does not include postage cost	\$ -	\$ 5,000.00
Other (e)			
Other	In-kind staff hours (DIA, database, APEX programming) for Catch-Card APAIS assignments	\$ -	\$ 15,000.00
Totals (c+d+e)		\$ -	\$ 20,000.00
Total direct charges			
Indirect charges (f)	Indirect (8.00% of personnel (a))	\$ -	\$ 520.00
Sum of direct and indirect		\$ -	\$ 29,295.00
<i>*DIA Updates will require contractor development time and centralized printing of catch cards, covered under the existing MRIP budget.</i>			
Grand Total:		Cost	In-kind
		\$ 202,486.83	\$ 61,867.79

Budget Narrative

- a. **Personnel (\$90,412.75 Requested; \$27,876.12 In-Kind):** Part-time, full-time, and sometimes as combination of employee types will be utilized to cover assignment completion. For the most part, full-time staff will be used to convert catch cards into electronic data via the ATA. Both assignment completion and data entry are estimates based on the number of assignments and therefore number of interviews/catch cards. In-kind contributions cover supervisor time to cover project logistics (e.g., scheduling, QC and data review, etc.).
- b. **Fringe (\$20,138.18 Requested; \$9,000.87 In-Kind):** Fringe for part-time and full-time staff are associated with personnel funds. Requested funds are to cover assignment completion and data entry while in-kind funds are associated with supervisor time.
- c. **Travel (\$22,714.25 Requested; \$0 In-Kind):** Coast-wide mileage cost of \$0.67/mile for the individual state number of assignments. Most states also an estimated amount to cover parking and tolls.
- d. **Supplies (\$37,000.00 Requested; \$5,000.00 In-Kind):** Paper for catch cards (either by page or by box of write-in-rain paper), pencils and measuring tapes to collect released catch information and lengths. Estimates were based on the average number of anglers expected to encounter per assignment. The ASMFC portion of in-kind contribution is for the centralized printing of coastal catch cards.
- e. **Other (\$14,840.00 Requested; \$15,000.00 In-Kind):** Pre-paid postage per estimates number of catch cards makes up the majority of requested funds. Some states are also considering outreach materials. In-kind funds cover development of database structures and updates to the existing dockside application via Harbor Light Software, used to conduct the APAIS to link catch cards to the APAIS. The latter was an estimate based on the hours required to develop, QC, and distribute application updates, both for ACCSP and Harbor Light Software staff.
- f. **Indirect (\$17,381.65 Requested; \$4,990.80 In-Kind):** Indirect rates range from 0 to ~37% for state partners and ASMFC/ACCSP. Percentages are mostly applied to only personnel and fringe but sometimes also to the travel, supplies, and other expenses – this is dependent on state policies.

Summary of Proposal for Ranking

Proposal Type: New

Primary Program Priority:

Catch and Effort (100%)

- Proposal will provide data to investigate differences in angler responses using pre-trip recreational catch card versus current APAIS data collected after a fishing trip is completed. Data can be used to analyze if there are differences in species diversity or number of fish reported (i.e., rounding bias) when using a pre-trip catch card.
- New data source for discard lengths and average depth fished, using stratified random probability-based sampling design, that would be informative for calculating discard mortality for private boat fleet or shore anglers.

Data Delivery Plan

- Completed catch cards will be manually keyed into a section on the ACCSP ATA on weekly basis. Completed interviews conducted as part of overdrawn assignments will be submitted and checked for errors using same timeline as APAIS assignment data. Data will be available for NOAA Fisheries to evaluate potential use in MRIP estimates no later than January 2026.

Project Quality Factors:

Partners

- **Multi-Partner/Regional impact including broad applications** – Catch data will be collected in 2-3 representative states in each of the three subregions on the Atlantic Coast (North, Mid, and South) for the pilot project. There has been broad support for the project from the ACCSP Recreational Technical Committee, including state partners from Maine through Florida, regional Councils, NOAA Fisheries, US Fish and Wildlife Service, and ASMFC members. All species will have released fish numbers and a broad, coastal list of managed species will have released lengths collected.

Funding

- **Contains funding transition plan** – This proposal contains a transition to funding plan on p.10.
- **In-kind contribution** – 30.6% of this project is funded by the ASMFC, state, and NOAA Fisheries cooperative agreement for the conduct of the MRIP.

Data

- **Improvement in data quality/quantity/timeliness** – Recreational released catch cards provide a completely unique data stream into an already existing data set, as a part of the MRIP APAIS. Since the catch cards are collected as a part of the APAIS, the overdrawn catch card assignments follow the same timeline of weekly submission to the ACCSP, potential delivery to NOAA Fisheries every month as well. Since the APAIS relies on recall, the pre-trip catch cards offer the ability to work around recall bias, improving overall quality of the APAIS if implemented more broadly.
- **Impact on stock assessment** – The list of 14 species and number of assignments per state/subregion were chosen to help bolster species stock assessments which use recreational length information, with the input from state and

Commission stock assessment scientists. The ability to collect private/rental and shore discard information creates additional data sources for the stock assessment process which has traditionally relied heavily on headboats only. At a minimum, this project will help stock assessments by increasing the overall sample sizes of **discard** lengths of managed species.

Appendix A: Catch Card Examples

Marine Angler Released Catch Card (MARC)

Only ONE angler's released fish per card and for this trip only.

Control Number:

12345

Trip Information

Fishing Mode

Boat

Shore

Targeted Species

Average Depth Fished (ft)

Distance from Shore

Inland

3 Miles or less (ocean)

3 Miles or more (ocean)

Released Catch: For ALL fish released: Record the species name and track the number released alive or dead using tally marks below.

Trip End Time (return to shore)

Species	# Released Alive	# Released Dead
<i>Spot (example)</i>		

Hours Fished (nearest 1/2 hour)

I did not release any fish today

Length of Fish Released (Inches)

(Total length rounded up to the nearest 1/4 inch)

Species	Total Length (1/4 Inch)	Species	Total Length (1/4 Inch)

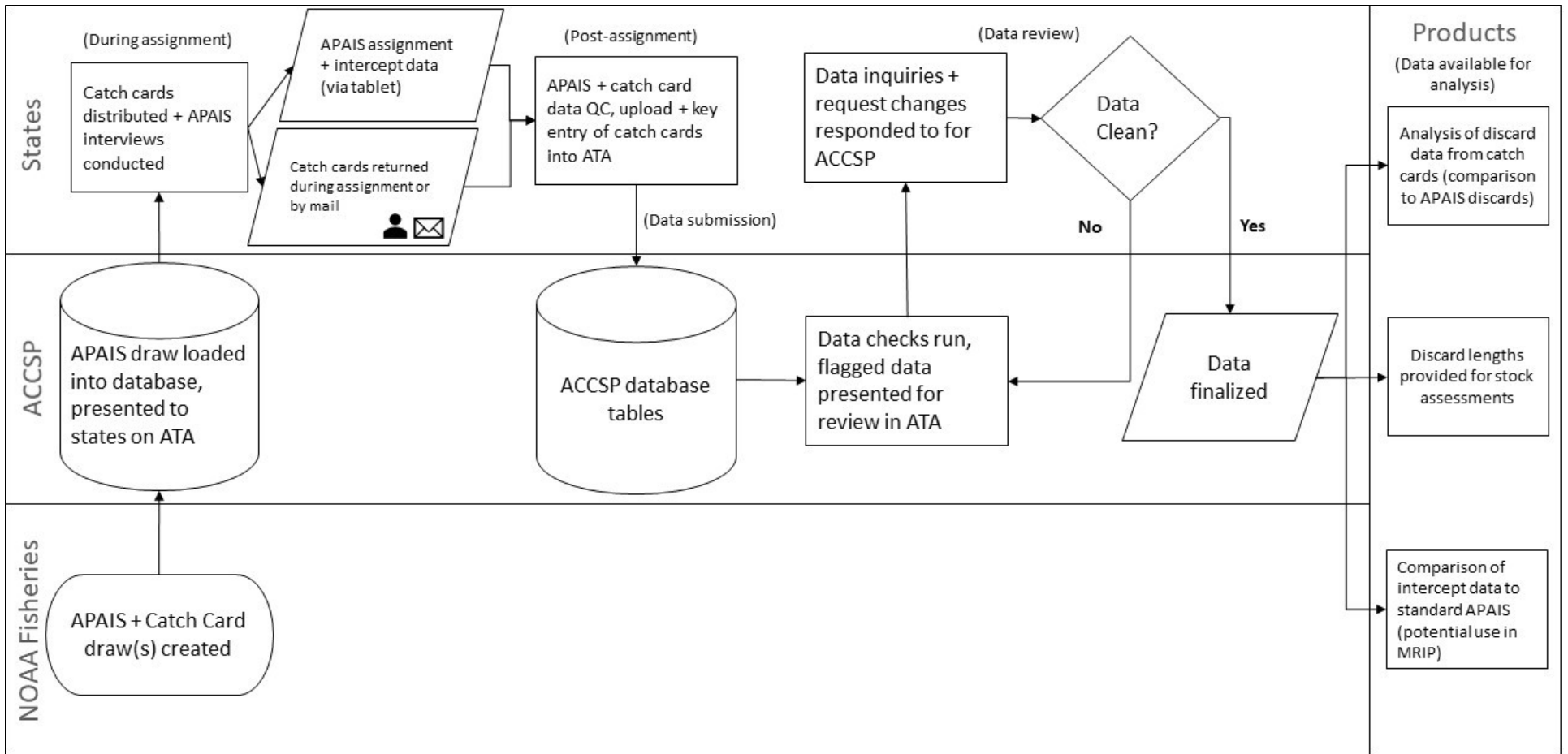
For detailed instructions on how to fill out this card, please scan QR code.



List of priority species for lengths:

- | | | |
|------------------|-----------------|-------------------|
| Black Sea Bass | Weakfish | Spotted Seatrout |
| Bluefish | Cobia | Gray Triggerfish |
| Haddock | Red Drum | Red Porgy |
| Spanish Mackerel | Tautog | Vermilion Snapper |
| Striped Bass | Summer Flounder | |

Appendix B: Data Flow Diagram



Appendix C: Determination of the Species of Interest and Calculation of the Number of Sampling Assignments Needed for the Released Catch Card Project

Determination of the Species of Interest for the Released Catch Card Project

Given the number of species an angler may encounter on the water and could potentially provide length information on, the Discards Subcommittee felt that it was important to focus on the species that would most benefit from the collection of discard length data. While information on non-managed species may be interesting, the subcommittee wanted to make sure the length data collected would make the most impact on species being managed and assessed by the various entities along the Atlantic coast.

To do this, a Marine Recreational Information Program (MRIP) query was initially done to identify species sampled on the Atlantic coast which had positive harvest values and where live releases (B2s) exceeded harvest (A+B1). Due to the high levels of discards, these species were thought to be ones where additional discard length information would likely be useful. Additional prioritization was chosen for those species with PSEs < 50% as those were assumed to be species that were more frequently encountered by the MRIP surveys. This analysis, however, still resulted in over 40 species being potentially identified as being of management importance.

To further refine this analysis, additional outreach was done to staff with the Atlantic States Marine Fisheries Commission (ASMFC) as well as the New England, Mid-Atlantic, and South Atlantic Fisheries Management Councils. Each was asked about the species they manage, specifically whether the species is primarily a recreationally caught species and whether or not the species is assessed using a length- or age-based assessment which would benefit from additional discard length data. Based on these answers, they were asked to select the ones that should be prioritized for the released catch card project.

The Discards Subcommittee reviewed the list of species provided in the initial analysis as well as submitted by the Commission and Councils. We first selected those that spanned multiple regions along the coast. Additional species were also selected that were regionally important (e.g., haddock in the North Atlantic, red drum in the South Atlantic). The South Atlantic species were further reduced so as not to overlap with those species that are already a focus of the South Atlantic Fishery Management Council's Release app. In total, fourteen species were selected as the focus of this project.

Calculation of the Number of Sampling Assignments Needed for the Released Catch Card Project

After the species of interest for the project were determined, a couple of members from the ASMFC Assessment Science Committee were consulted on how many discard lengths would be needed for the data to be useful for assessment and management. Based on analysis conducted for the bluefish stock assessment, a sample size of approximately 30 sample lengths was suggested as a minimum. Specific assessment needs will vary by species, depending on the geographic scale of the assessment (e.g., regional vs. coastwide) and the time scale used for the length composition data (seasonal vs. annual), so a goal was set to collect 60 lengths per year to allow for the potential development of biannual length composition data. Within an assessment, the effective sample size, or number of sampling events, is calculated for length data. This is done to account for the individual fish lengths likely not being collected independently of each other, particularly given angler behavior and the possibility of an angler fishing on a single school of fish which are likely similar in size. While this analysis did estimate the number of catch cards we expected to be returned, which would equate to the number of angler trips we would expect to get data back from, the subcommittee decided to focus on the length target, rather than a catch card target, in the pilot as it was more easily achievable to reach the 60-length goal.

Initial number of sampling assignments were set at 50, 100, 150, and 200 assignments. However, from running the Access Point Angler Intercept Survey (APAIS), we know that not all assignments will have anglers when the field interviewers are there. Based on 2022 data from the ACCSP Annual Report to MRIP, we estimated that approximately 36% of our assignments will be 0-intercept assignments coastwide. After accounting for that, we then had to calculate how many catch cards we may be able to hand out during APAIS assignments. While the APAIS design is focused on the time intervals when anglers will be completing their trips, we instead needed to determine when they usually leave on their private/rental boat trips. In the public MRIP trip dataset, there are fields for the time the intercept was collected as well as the number of hours the anglers were away from the dock. Using 2022 trip data from Maine to Florida, private/rental boat mode only, we calculated the one-hour time intervals that people leave for their fishing trips along the Atlantic coast and demonstrated that most trips (78%) leave in the 6 am-12 pm interval (Table 1). However, even sampling in the 8 am-2 pm interval would allow us to still intercept approximately 60% of the trips leaving in a day. These trips start data could also be aggregated to align with the APAIS sampling intervals and used to estimate the average number of eligible anglers we anticipate leaving on their trips per assignment (Table 2). Similar to before, we anticipate that we'll intercept the most anglers leaving for their trips during the 8 am-2 pm interval and the fewest during the 2 pm-8 pm interval (of the daytime intervals). As this project will mainly be conducted during the daytime intervals, an average of 5.24 anglers/assignment was calculated over the three intervals and was assumed to be representative of most assignments that would be conducted for the project.

Table 1. Frequency of raw APAIS fishing trips beginning within assignment intervals.

Interval	# Anglers Starting trip
00-59	29
100-159	27
200-259	75
300-359	163
400-459	531
500-559	1616
600-659	3448
700-759	4615
800-859	4839
900-959	3950
1000-1059	3280
1100-1159	2337
1200-1259	1688
1300-1359	1019
1400-1459	486
1500-1559	242
1600-1659	157
1700-1759	92
1800-1859	13
1900-1959	6
2000-2059	3
2100-2159	5
2200-2259	0
2300-2359	0

Total	28744
600-1200	22469
600-1200	78%
800-1400	17113
800-1400	60%
1100-1700	5929
1100-1700	21%
1400-2000	996
1400-2000	3.5%

Table 2. Number of raw APAIS fishing trips (interviews + eligible) per APAIS assignment with trips starting within 0800-1400, 1100-1700, and 1400-2000 intervals

800-1400		1100-1700		1400-2000	
AVG	5.11	AVG	3.08	AVG	2.29
MAX	45	MAX	30	MAX	13
SUM	17131	SUM	5931	SUM	996
ALL ELIG	25696.5	ALL ELIG	8896.5	ALL ELIG	1494
EST AVG ALL ELIG	7.67	EST AVG ALL ELIG	4.62	EST AVG ALL ELIG	3.44

Once we had an estimate of the approximate number of catch cards we may hand out to anglers during an assignment, we then had to make an assumption on how many catch cards we may have filled out and returned to us. Based on previous experience by Connecticut with their catch card project, we estimated this to be 25%. Since about 30% of private/rental boat anglers intercepted in 2021 and 2022 didn't report releasing any species to the APAIS field interviewers, that leaves around 45% of anglers who we assume either don't record the data or submit the card.

Since the card asks anglers to tally the total number of releases for all species but only record lengths for the fourteen prioritized species, it's possible that some of the cards returned will only have tally marks and no lengths due to the species caught. To determine how many of the returned cards may have lengths recorded for species of interest, the remaining calculations were done per species for each Atlantic coast subregion, as defined by MRIP. First, the percentage of angler intercepts that said they released the species of interest was calculated (Table 3). This gave us an estimate of the number of cards that may be returned with lengths for that particular species. Second, we calculated the average number of fish released by an individual angler for each prioritized species (Table 4). This gave us an estimate of approximately how many lengths we may collect from an angler who caught and released that species. By multiplying the number of cards, we expected back for each of the fourteen species by the average number of fish released for each species, we were able to estimate how many fish lengths we may be able to receive for each species in each subregion (Tables 5-7). In these tables, green cells indicate assignment totals which we estimate will provide 60 length samples for that region, yellow cells indicate assignment totals where we estimate we will provide 30-60 length samples for that region, and red cells indicate assignment totals where we estimate fewer than 30 length samples for that region. Black cells indicate species we don't expect to collect any sample lengths.

Based on these analyses, the various regions decided on a minimum number of overdrawn sample assignments to complete for their region. It is estimated to take 130-245 overdrawn assignments to reach the 60-length sample

minimum size for the most commonly encountered species in each region. There will be 245 overdrawn catch card assignments in the North, 130 in the Mid, and 250 in the South Atlantic.

Table 3. The percentage of anglers who release one of the 14 species of interest. Note: Some 0% values are rounded up and represent a very small percentage.

Species	North Atlantic	Mid-Atlantic	South Atlantic
Black Sea Bass	35%	25%	16%
Bluefish	8%	5%	7%
Haddock	3%	0%	0%
Spanish Mackerel	0%	1%	3%
Striped Bass	38%	17%	2%
Summer Flounder	11%	31%	0%
Tautog	11%	7%	0%
Weakfish	0%	2%	2%
Cobia	0%	1%	1%
Red Drum	0%	2%	19%
Spotted Sea Trout	0%	3%	22%
Gray Triggerfish	0%	0%	0%
Red Porgy	0%	0%	0%
Vermillion Snapper	0%	0%	1%

Table 4. The average number of releases per trip of the 14 species of interest.

Species	North Atlantic	Mid-Atlantic	South Atlantic
Black Sea Bass	5.6	6.3	5.2
Bluefish	2.7	3.1	2.9
Haddock	4.8	0.0	0.0
Spanish Mackerel	1.3	2.9	3.2
Striped Bass	4.9	4.6	2.9
Summer Flounder	3.0	4.1	2.0
Tautog	8.8	8.0	1.2
Weakfish	2.7	2.6	5.4
Cobia	0.0	1.7	1.5
Red Drum	0.0	3.2	3.1
Spotted Sea Trout	0.0	6.0	4.5
Gray Triggerfish	1.5	2.7	2.3
Red Porgy	0.0	0.0	4.4
Vermillion Snapper	0.0	0.0	4.2

Table 5. Estimated Number of Lengths Collected by Species of Interest in the North Atlantic region.

Time Slot	Number of Add On Assignments	Black Sea Bass	Bluefish	Haddock	Spanish Mackerel	Striped Bass	Summer Flounder	Tautog	Weakfish	Cobia	Red Drum	Spotted Sea Trout	Gray Triggerfish	Red Porgy	Vermilion Snapper
Avg over All Time Slots	50	82.1	9.2	5.2		77.2	14.1	40.3							
Avg over All Time Slots	100	164.2	18.3	10.4		154.4	28.2	80.6							
Avg over All Time Slots	150	246.3	27.5	15.6		231.6	42.2	120.9							
Avg over All Time Slots	200	328.5	36.7	20.8		308.8	56.3	161.2							
Avg over All Time Slots	300	492.7	55.0	31.2		463.2	84.5	241.8							

Table 6. Estimated Number of Lengths Collected by Species of Interest in the Mid-Atlantic region.

Time Slot	Number of Add On Assignments	Black Sea Bass	Bluefish	Haddock	Spanish Mackerel	Striped Bass	Summer Flounder	Tautog	Weakfish	Cobia	Red Drum	Spotted Sea Trout	Gray Triggerfish	Red Porgy	Vermilion Snapper
Avg over All Time Slots	50	64.8	7.0			32.2	52.3	23.8	2.6		2.5	7.2			
Avg over All Time Slots	100	129.6	14.1		1.5	64.5	104.6	47.7	5.2		5.1	14.5			
Avg over All Time Slots	150	194.3	21.1		2.3	96.7	157.0	71.5	7.8	1.3	7.6	21.7			
Avg over All Time Slots	200	259.1	28.1		3.1	129.0	209.3	95.4	10.4	1.8	10.2	28.9			
Avg over All Time Slots	300	388.7	42.2		4.6	193.5	313.9	143.1	15.6	2.7	15.3	43.4			

Table 7. Estimated Minimum Number of Lengths Collected by Species of Interest in the South Atlantic region.

Time Slot	Number of Add On Assignments	Black Sea Bass	Bluefish	Haddock	Spanish Mackerel	Striped Bass	Summer Flounder	Tautog	Weakfish	Cobia	Red Drum	Spotted Sea Trout	Gray Triggerfish	Red Porgy	Vermilion Snapper
Avg over All Time Slots	50	34.0	8.8		4.3	1.9			4.8		24.0	42.3			1.4
Avg over All Time Slots	100	68.1	17.5		8.5	3.8			9.6		48.0	84.6			2.7
Avg over All Time Slots	150	102.1	26.3		12.8	5.7			14.4	1.2	72.0	126.9			4.1
Avg over All Time Slots	200	136.2	35.0		17.0	7.6			19.2	1.6	96.1	169.2			5.4
Avg over All Time Slots	300	204.2	52.6		25.6	11.4			28.8	2.4	144.1	253.9			8.1

Dawn M. Franco

dawn.franco@dnr.ga.gov

(912) 266-4156

177 Brooksdale Rd, Brunswick, GA 31523

Education

Savannah State University
Master of Science in Marine Sciences

Savannah, GA
May 2014

Old Dominion University
Bachelor of Science

Norfolk, VA
May 2002

Work experience

Georgia Department of Natural Resources, Coastal Resources Division

Marine Biologist

August 2014 to present

- Coordinate and manage the Access Point Angler Intercept Survey (APAIS) and For Hire Telephone Survey (FHTS) for Georgia within the Marine Recreational Information Program (MRIP)
- Georgia representative on several ASMFC committees including the Recreational Technical Committee, Atlantic Croaker Technical committee, Spot Plan Review Team, Electronic Monitoring Standards Working Group, and NOAA Transition Team
- Coordinate Red Snapper special data collection efforts during open seasons.
- Participation in other fisheries survey activities including otter trawl, eel trap, seine-net, gill-net, trammel-net, long-line, hook and line and habitat restoration
- Provide commercial and recreational data for, and completion of, ASMFC, SAFMC and SFR reports
- Panel member and data provider for Stock Assessment Data and Review (SEDAR) and ASMFC Stock Assessments
- Public liaison presenting fisheries dependent data results to educators, students, or general public
- Certified diver with GADNR CRD Dive Team

Georgia Department of Natural Resources, Coastal Resources Division

Natural Resources Technician II

November 2007-August 2014

- Coordinate and execute Georgia's participation in the Access Point Angler Intercept Survey (APAIS) within the Marine Recreational Information Program (MRIP)
- Participation other fisheries survey activities including Otter trawl, seine-net, gill-net, trammel-net, long-line, hook and line surveys and habitat restoration
- Public liaison for GADNR CRD and therefore knowledgeable of regulatory information that impacts the public
- Data entry and database management
- Presentation of fisheries dependent data to educators
- GADNR representative for Atlantic croaker technical committee (TC) and spot plan review team (PRT)
- Diver in training for GADNR CRD Dive Team
- Collection, processing, and ageing of Atlantic croaker *Micropogonias undulatus*

Georgia Department of Natural Resources, Coastal Resources Division

Marine Technician I

April 2007-November 2007

- Participated in the National Marine Fisheries Service (NMFS) Marine Recreational Fisheries Statistics Survey (MRFSS)
- Participated in fisheries independent research, monitoring, and survey field sampling efforts

Technology, Skills and Certifications

- Proficient use of Microsoft Office (Word, Excel, Outlook, PowerPoint, and Access),
- Familiar with ArcGIS, SQL, Oracle Databases, R, SAS, SPLUS, and SPSS
- Seamanship skills onboard small and large vessels, completed Boat U.S. Boating Safety Course for Georgia
- Identification, collection and processing biological samples of marine organisms commonly found in the South Atlantic Region (e.g., operculum, scales, otoliths, vertebrae, gonads, and fin clips)
- SCUBA, Nitrox, and DAN oxygen provider certified

Education

University of Michigan, Ann Arbor, Michigan School of Natural Resources and Environment M.S. Aquatic Sciences: Resource Ecology and Management	2011
St. Mary's College of Maryland, St. Mary's City, Maryland B.A. Biology, <i>Magna cum laude</i> Concentration in Environmental Studies	2005

Research and Work Experience

Research Statistician IV, Analysis and Assessment Program, Fishing and Boating Services, Maryland Department of Natural Resources, February 2020-present

Research Statistician III, Analysis and Assessment Program, Fishing and Boating Services, Maryland Department of Natural Resources, January 1, 2016-February 11, 2020

Research Statistician II, Analysis and Assessment Program, Fishing and Boating Services, Maryland Department of Natural Resources, April 2014-December 31, 2016

- Conduct data analysis on various state and coastwide datasets for species managed in Maryland, including those managed through the Atlantic States Marine Fisheries Commission (ASMFC). Data are analyzed using a variety of techniques from simple statistical analyses to more complex models, such as population dynamics models and fish tagging models. Write reports summarizing the results, present the results both internally and externally, and provide state and coastal fisheries management advice for both Maryland and other states through the ASMFC.
- Review new analysis methods based on literature and write new analysis codes as needed.
- Serve as the primary contact regarding recreational fishing surveys and data collection in Maryland tidal waters and serve as Maryland's representation to the ACCSP Recreational Technical Committee (current Chair).
- Serve as a consultant for biologists within the Fishing and Boating Services and periodically organize and lead staff trainings on data analysis.
- Have participated on ASMFC fishery management plan development teams for striped bass and cobia, including the analysis of bag and size limits and season analysis.
- Member of the ASMFC Red Drum Stock Assessment Subcommittee, Striped Bass Tagging Subcommittee, Weakfish Stock Assessment Subcommittee, Cobia Technical Committee (current Chair), and Cobia Plan Review Team. Also, a member of the Maryland Oyster Stock Assessment Committee.

Natural Resources Biologist II, Striped Bass Program, Fisheries Service, Maryland Department of Natural Resources, September 2008-April 2014

- Participated in the collection of biological data on striped bass in Maryland including a spawning stock gill net survey, juvenile seine survey, sampling pound net catches, and monitoring of the commercial and recreational fisheries in support of striped bass stock assessments.
- Supervised the trophy creel survey, sampling charter boat catches and interviewing recreational anglers with supervision over one seasonal biologist.
- Participated in the tagging of striped bass, using tagging models such as Program MARK and the Instantaneous Rates Catch and Release (IRCR) model, and serving as a representative from Maryland on the Atlantic States Marine Fisheries Commission (ASMFC) Striped Bass Tagging Subcommittee.
- Provided technical support to the striped bass program, including GIS mapping, statistical analysis of data, evaluation of the gill net selectivity model, and report writing.

Natural Resources Technician IV, Monitoring and Non-Tidal Assessment, Maryland Department of Natural Resources, February-September 2008

- Assisted with sampling streams across Maryland as part of the Maryland Biological Stream Survey. Data collected included water chemistry, physical habitat, and fish, macroinvertebrate, and herpetofauna data.
- Other duties included data entry, calibration of water quality sondes, and working with ArcGIS.

**Aquatic Ecologist, CILER Summer Fellowship at NOAA Great Lakes Environmental Research Lab (GLERL),
May-August 2007**

Worked on a project with Dr. Stuart Ludsin and George Leshkevich to examine the influence of river plumes in the western basin of Lake Erie to the survival of larval yellow perch to recruitment. Duties included: using ArcGIS to determine the area covered by plumes between April and June based on satellite imagery; beginning work to determine the properties of the plumes using satellite and CTD data; processing water samples for water chemistry analysis and analyzing chlorophyll, suspended matter, and phosphorus concentrations; and some field work aboard the R/V Laurentian collecting zooplankton and larval fish as well as preserving stomach contents of predators.

Research Assistant, Institute for Fisheries Research and the University of Michigan, May-August 2006

GIS project mapping yellow perch catch in Lake Erie and lake trout in Lake Superior using data from the agencies along the lakes. Data manipulated in Microsoft Excel and Access for use in ArcGIS. Data were mapped to look for spatial patterns in catch by catch method, year, season, and age class and correlated with habitat data.

Computer and Statistical Skills

Microsoft Office Programs (Word, Excel, PowerPoint, Access), ArcGIS, Statistical Package for the Social Sciences (SPSS), R, SAS, AD Model Builder, Program MARK, Stock Synthesis 3, National Fisheries Toolbox programs

Awards

2021 Maryland Department of Natural Resources Fishing and Boating Services Team of the Year (Access Point Angler Intercept Survey Team)

2017 Maryland Department of Natural Resources Fishing and Boating Services Employee of the Year

Teaching Experience

Graduate Student Instructor, NRE 409: Ecology of Fishes, School of Natural Resources and Environment, University of Michigan. Winter 2007.

Graduate Student Instructor, CHEM 125/126: General Chemistry Lab, Chemistry Department, University of Michigan. Fall 2006.

Teaching Assistant for Ecology and Evolution, St. Mary's College of Maryland. Spring 2004, Spring 2005.

Teaching Assistant for Principles of Biology I, St. Mary's College of Maryland. Fall 2002.

Presentations

Giuliano, A.M. Climate Effects on the Timing of Maryland Striped Bass Spawning Runs. 151st Annual Meeting of the American Fisheries Society, Baltimore, MD, November 6-10, 2021.

Giuliano, A.M., E.S. Rutherford, C. Riseng, M. Luttenton, and M.J. Wiley. Effects of Zebra Mussels on a Lake Michigan Tributary Fish Community. 137th Annual Meeting of the American Fisheries Society, San Francisco, California, September 2-6, 2007.

Publications

Giuliano, A. 2023. Climate effects on the timing of Maryland Striped Bass spawning runs. *Marine and Coastal Fisheries: Dynamics, Management, and Ecosystem Science*, 15, e10274. <https://doi.org/10.1002/mcf2.10274>

Brown, S. C., Giuliano, A. M., & Versak, B. A. 2024. Female age at maturity and fecundity in Atlantic Striped Bass. *Marine and Coastal Fisheries: Dynamics, Management, and Ecosystem Science*, 16, e10280. <https://doi.org/10.1002/mcf2.10280>