Methodology for Logbook Estimates of Catch and Effort with Dockside Validation

Preparation for MRIP Certification

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Table of Contents

Methodology for Logbook Estimates of Catch and Effort with Dockside Validation 1
1. Introduction 1
1.1 Planning 1
1.2 Paperwork Reduction Act Compliance 1
2. For-Hire Logbooks 1
2.1 Core Sampling Design 1
2.1.1 Vessel Directory 1
2.1.2 Logbook Frame Definition 1
2.1.3 Logbook Design & Data Submission/Processing 2
2.2 Data Collection 2
2.2.1 Quality Assurance 2
2.2.2 Quality Control and Data Editing 3
2.3 Optional Sampling Design 3
2.3.1 Hail-outs 3
3. Dockside Survey 3
3.1 Summary of MRIP General Survey 3
3.1.1 Data Collected 4
3.1.2 Supplemental Components 4
4. Methodology for Catch and Effort Estimation 4
4.1 Trip Matching 4
4.1.1 Distinct Interview Use 5
4.1.2 Example Matching Rate 5
4.2 Effort and Catch Estimation 7
Appendix A: APAIS Questionnaire 10
Appendix B: SC For-Hire Logbook Validation Metrics 13

List of Tables

Table 1. Fields used to compare dockside interviews and logbook trips, amended from Dukes et al. (2017).

Table 2. Total raw counts of APAIS for-hire trips reported (before) minus vessels matched to VTR trips for total sample size of APAIS used for expansion of FHS data (after) for each state in months of sampling for the APAIS by year.

Table 3. Total raw counts of VTR and APAIS trips reported for each state in months of sampling for the APAIS by year.

Table 4. Percentage of APAIS for-hire trips for each state which exactly matched VTR trips in months of sampling for the APAIS by year.

Table 5. Percentage of VTR trips for each state which exactly matched APAIS for-hire trips in months of sampling for the APAIS by year.

Table 6. Months of APAIS coverage on the Atlantic Coast.

List of Figures

Figure 1. Example from Dukes et al. (2017) using estimated angler trips by wave (blue dots) from the APAIS with 95% confidence intervals (blue verticals) compared to logbook reports (magenta triangles).

Figure 2. Equation for the Ty,diff2 estimator from Breidt et al. (2018). Appendix C further details the estimator math, including variable descriptors.

Figure 3. Estimated red drum catch by wave with approximate 95% confidence intervals, compared to logbook (magenta triangles). Estimators included are MRIP only (blue) and difference estimators Ty,diff1 and Ty,diff2 (green).

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1. Introduction

1.1 Planning

Catch and effort of recreational fisheries are necessary to fulfill the requirements of Section 303 (a) of the Magnuson-Stevens Fishery Conservation and Management Act (16 U.S.C. 1852 et. seq.). Additionally, data and analyses are must be included in Fishery Management Plans according to the Conservation and Management Act. To address these requirements, NOAA Fisheries, fishery management councils, interstate fisheries management commissions, and state agencies collect and use recreational catch and effort information to inform management decisions and policies. These catch and effort statistics and trends are monitored to evaluate impacts of management and policy decisions and to attempt to determine how these may affect fisheries in the future.

1.2 Paperwork Reduction Act Compliance

The methodology herein suggested is dependent on the Paperwork Reduction Act (PRA) approval of individual federal reporting systems, including the MRIP general survey and federal for-hire permit reporting regulations. State logbook programs are not affected by the PRA. MRIP APAIS has existing PRA, as do current federal logbooks so ACCSP does not expect an increased burden relative to logbook submission. Rather, we expect a decreased burden by minimizing the number of for-hire data collection interactions for each vessel representative.

2. For-Hire Logbooks

2.1 Core Sampling Design

2.1.1 Vessel Directory

The National Oceanic and Atmospheric Administration (NOAA) maintains the Marine Recreational Information Program (MRIP) Site Register (https://www.st.nmfs.noaa.gov/msd/html/siteRegister.jsp) website which houses public access sites along the U.S. Atlantic Coast and, for designated state partners, a Vessel Directory (VsD) of an extensive list of for-hire vessels. Vessels are routinely added, edited, and retired by federal and state representatives. Automated updates exist for HMS and GARFO permits, which match fishing permits with existing vessels and/or the addition of new vessels to match new permits.

All vessels listed in the VsD have a status which is used to determine if a vessel is currently eligible/active, retired, or in draft (not yet approved as eligible in the for-hire survey). Each vessel must also have a unique number (State Registration Number or U.S. Coast Guard Documentation Number) and for-hire designation as either charter or headboat. To be approved within the VsD, vessels must also have at least one active public access site (or site placeholder if trailered), for-hire fishing activity in at least one month within a current year, and a primary contact person with phone number. In addition to required fields, the VsD houses broader information about the vessel, the access site(s), contact(s) information, registration(s), and federal for-hire and HMS permits.

2.1.2 Logbook Frame Definition

The logbook frame will be populated with vessels which have permits associated with a certified program design. The permit's effective dates will be used to determine if a vessel will have its logbook data used for the entirety of a sample wave.

Within a given wave, a distinct vessel can only occur within a single frame, either the logbook or survey frame. For-hire vessels within the survey frame would consist of vessels without a certified mandatory logbook and would report their activity through existing MRIP surveys of fishing effort (For-Hire Survey (FHS)) and catch (Access Point Angler Intercept Survey (APAIS)). In order to keep pace with changing vessel statuses and the desire to use as much logbook data as possible, vessels may change between frames by wave, depending on the current status of their fishing permit(s). Vessels which have had changes to permit status from inactive to valid/active, a permit covered under a certified logbook design program, prior to its inclusion within the survey frame could then be removed from the survey frame. For instance, if a vessel's federal permit, which met certified program design, expired within a state that did not

have a certified program design for state logbooks, it would be moved from the logbook to survey frame for that wave. Changes cannot be applied on any finer scale than wave level to maintain the FHS design selection procedures and are unlikely to occur more frequently than once per calendar year due to annual nature of permit renewal process.

This frame definition was chosen because it allows for the most detailed capturing of logbook data while minimalizing the requirement to be in both the logbook and survey frames at the same time. Additionally, the concept already exists (in at least some form) within the online MRIP vessel directory, a part of the site register. Since some portion of the for-hire fishery will change permit statuses during any given year, the design should be flexible enough to accommodate permit changes and then sample the vessels appropriately (i.e., either via logbook or survey).

2.1.3 Logbook Design & Data Submission/Processing

Logbooks must be started during the trip, and completed on the logbook data collection device prior to offloading the trip at the dock. Logbook electronic applications must record the trip start/stop times, report completion time, and submission timestamps. Transmission / submission of reports from the reporting device to the database of record, via an internet connection, shall be submitted at least weekly and up to 48-hours after the end of the week (e.g., due Tuesday after a Monday-Sunday week). Did Not Fish (DNF) reports are mandatory for permitted for-hire vessels with daily-level detail, submitted at least weekly during active fishing months. Inactive vessels would be able to identify periods of inactivity seasonally. DNF reports provide an active statement of fishing effort (or the lack thereof) rather than relying on the assumption that the absence of a positive report indicates fishing did not occur. Additionally, DNFs would support evaluating reporting compliance with or without a validating intercept.

The requirements for starting the trip and completing the report on the electronic device prior to offload support observational independence between the logbook and a potential dockside intercept. Additionally, DNF reports may be used to confirm non-fishing days from potential mismatches in logbooks or positive trip reports. The submission timeline for transfer to the reporting database system allows for variable user access to internet service.

2.2 Data Collection

Each vessel permitted with a certified logbook design and every for-hire trip will be recorded in order to achieve the goal of capturing a mandatory census survey (as close to complete for-hire information from the logbook frame as possible). Data collection must be electronic (with paper forms as backup) and all logbook data will be collected via a dynamic user interface such that all required data elements for the permitted program(s) are presented to the respondent.

2.2.1 Quality Assurance

To assure observational independence between logbooks and dockside surveys, logbook software must include a trip start designation be captured before leaving the dock and a trip stop designation required before offload. Designations are electronic timestamps which are not editable by data collectors, and can be accomplished within the logbook application. To begin a trip, a ‘start trip’ option shall be selected. To end and submit a trip, data collectors will be required to use a ‘trip stop’ option which can only be selected once all relevant data elements are finalized. Once submitted, trip and catch data elements cannot be edited. Trip information would remain on their device (i.e., tablet, phone) to allow data submitters to review data post-submission and requests for changes could be made to relevant partners for editing.

2.2.1.1 Validation

Validation of logbooks (e.g., date, start/end location, vessel information) will be accomplished through independent observations of trip activity via a dockside component. Please see ‘Dockside Survey’ section below for more information.

2.2.1.2 Reporting Compliance

Logbooks must have accountability measures in place and have compliance tracking procedures developed for missing reports and non-compliance rates; these metrics should be measured at least monthly to ensure a program-wide compliance rate of at least 75% is being met. If a vessel is uncompliant for three consecutive two-month waves,

reapplication for permits in the following calendar year would be restricted or the vessel would be removed from the survey frame. This 75% compliance rate was selected due to evidence from Fitzpatrick et al. (2017) which indicated 50% compliance for the Southeast Region Headboat Survey (SRHS) from 1980-2008 and then 95% compliance after electronic reporting implemented. The scale of charter fishery is magnitudes greater than the scale of the SRHS and has lower opportunity for individual follow-up. Additionally, reporting compliance averages 80% for GARFO permitted for-hire fisheries. 75% reporting compliance was selected as a balance between data quality and staffing resources to support data collection. These measures also extend beyond weekly reporting to the submission requirements of did not fish reports. Additionally, consequences for missing, incomplete, or late reports must be established and followed. The use of robust outreach plans and communication from the permitting agency is highly recommended to maintain as high of a compliance rate as is possible.

2.2.2 Quality Control and Data Editing

Logbook data will be checked for quality via standardized, automated post-processing error/outlier programs and/or analyses. Data will be reviewable and action to correct issues must be possible. Data edits and non-responses will be communicated with data providers as is necessary. Data must identify actions taken during the data editing process and include both edited and unedited values (i.e., original and corrected values).

2.3 Optional Sampling Design

2.3.1 Hail-outs

Hail-outs, also referred to as vessel declarations, are an optional logbook design characteristic that adds a data stream to evaluate if a vessel representative submitted a logbook for their trip(s). Hail-outs can be used for reporting compliance, in combination with DNF reports by the permitting agency. Hail-outs can also be used in combination with a 'started' logbook during a trip when agency enforcement staff intercept a vessel at sea to confirm reporting compliance or potential matches to dockside intercept validations. However, it is currently not known whether hail-outs are required or optional to achieve logbook validation and statistical rigor to meet MRIP survey and data standards. Until there's clarity on this matter and how data would be used in the effort and catch estimation, the recommendation is to not require hail-outs and to instead retain as an option data element to help lower burden on for-hire industry and reduce complexity of reporting requirements to extent practicable. If implemented, data checks between hail-outs and logbooks would be automated.

3. Dockside Survey

Validation of logbook data submitted for trips will be accomplished through independent dockside observations of trip effort and catch information, using a survey approach, specifically the existing MRIP APAIS. Dockside observations will be used in the estimation process to adjust, where necessary, for differences in trips missing logbook reports, and for matched trips differences in the details of the effort and catch components.

3.1 Summary of MRIP General Survey

The APAIS is a dockside survey of anglers fishing from shore, private/rental boats, and for-hire charter boats conducted on the Atlantic Coast from Maine through Georgia. Data collected includes trip effort and catch information and demographic and social information. Maine through Virginia also perform at-sea sampling to obtain catch and discard data from for-hire headboats and party boats. The APAIS is used to produce bi-monthly catch estimates.

The for-hire recreational fishery sectors have angler effort estimates produced from the FHS, a list-directed weekly telephone survey of for-hire vessel operators. This survey operates from Maine through Mississippi. The FHS is paired with data collected through charter and headboat APAIS intercepts to estimate total for-hire catch. This estimate along with the combination of APAIS and the Fishing Effort Survey (FES), used for private boat and shore recreational estimates, is known as the MRIP general survey.

A complete description of MRIP survey design can be found in the survey design and statistical methods for estimation of recreational fisheries catch and effort[1]. The APAIS is consistent with OMB guidelines and has received clearance in accordance with the Paperwork Reduction Act (5 CFR 1320.5(b)).

3.1.1 Data Collected

The APAIS collects relevant data elements about trips (e.g., date, time, location, vessel specifics, etc.), effort (e.g., number of anglers, hours fished, gear), and harvested/discarded catch (Appendix A). On the Atlantic and Gulf coasts, interviews are conducted on tablets via a custom application. This application captures for-hire vessel information (registration number and vessel name), and date/time/GPS location snapshots during interviews, both of which help match the interviews to electronic logbook data. These criteria are used in trip matching methods described below.

3.1.2 Supplemental Components

Additional surveys, such as the State Reef Fish Survey (SRFS[2]) in Florida, have been successfully integrated into the MRIP general survey to supplement sampling coverage. Another approach could also include the use of onboard observers on larger headboats which would allow for further validation of harvested and released alive/dead fish.

4. Methodology for Catch and Effort Estimation

Vessels in the logbook frame will have both catch and effort data collected and submitted. A portion of logbook data will then be validated to compare logbook data to intercepted trips and catch via difference-based estimation methodology, adapted from methodology from Dukes et al. (2017). This methodology uses the logbook as base data for both effort and catch, and dockside interviews as a correction factor.

4.1 Trip Matching

The calculation of effort and catch estimates is reliant on the ability to match self-reported logbook trips and dockside interviews, independent from vessel representatives. Therefore, data elements from both data streams will be used for matching distinct trips via a set of mandatory matching elements for a distinct vessel, via vessel registration or coast guard number. These matches are validated by requiring at least the trip date and location (state, county, and site).

While Dukes et al. (2017) used an algorithm to match data elements between logbook and dockside survey data streams, improvements to surveys (e.g., the APAIS) and existing logbook programs (e.g., NOAA Fisheries Greater Atlantic Regional Fisheries Office (GARFO) Vessel Trip Report (VTR)) allows for better matching. The most important improvements to both logbooks and the dockside surveys is the transition from paper to electronic data collection and timely submission. This allows for cleaner collection of vessel information (i.e., exact name/number for a given sampling wave) rather than manually filled-in data and minimizes recall errors on reports.

The matching of information shared between a logbook and dockside survey helps to identify the likelihood of a trip matching within the difference-based estimation methodology (Breidt et al. 2017). Dukes et al. (2017) developed a set of seven weighted metrics (Appendix B); however, updates to data collection streams means more trips with exact matching and, while the matching is still likely not perfect, Table 1 outlines an updated recommendation of relevant matching metrics (note: the weighting has not been updated). These changes included the removal of distance and target species and the adjustment of trip end time to a comparison of hours (± 30 minutes. Additionally, the date was removed since the matching of electronic data allows for an exact match. If trips do not match on date, they are removed from the analysis. Additionally, it is worth noting that distinct trips for that day will be identified to account for multiple trips per day for a given vessel.

[1] https://media.fisheries.noaa.gov/2022-06/MRIP-Survey-Design-and-Statistical-Methods-2022-06-17.pdf
[2] https://media.fisheries.noaa.gov/dam-migration/09_gulf-reef-fish-survey-decision-memo-with-attachments.pdf

Field	Dockside Survey Definition	Logbook Definition	Match Metric Weight
Start Site	Interview site	Site reported as the start site	0.30
Anglers	Number of individuals in the party	Number of anglers reported participating	0.30
Hours Fished	Mean total hours fished of interviewees	Total hours fished as reported	0.10
Trip End Time	Mean interview time	Estimated trip end time	0.01

Table 1. Fields used to compare dockside interviews and logbook trips, amended from Dukes et al. (2017).

4.1.1 Distinct Interview Use

Each distinct APAIS interview can only be used once: either for logbook validation or for survey expansion (when used with FES/FHS). Table 2 illustrates that the use of APAIS as validation for GARFO logbooks would lower the sample size of APAIS used for expansion of FHS data by ~30% overall for the New England and Mid-Atlantic regions for APAIS sampling months in each of the Atlantic states, Maine through Virginia (See Table 6 for months of APAIS sampling by state).

	2019		2020		2021		2022	
State	**Before**	**After**	**Before**	**After**	**Before**	**After**	**Before**	**After**
ME	52	39	27	25	50	42	61	60
NH	123	64	71	38	119	44	118	15
MA	341	269	248	191	239	187	248	214
RI	240	106	231	91	260	97	339	162
CT	103	61	38	30	98	70	127	86
NY	282	153	221	130	235	102	243	95
NJ	225	122	53	43	171	89	279	151
DE	83	48	70	55	102	83	58	23
MD	279	256	149	146	281	269	155	145
VA	145	87	34	29	114	92	59	43
Total	1,873	1,205	1,142	778	1,669	1,075	1,687	994

Table 2. Total raw counts of APAIS for-hire trips reported (before) minus vessels matched to VTR trips for total sample size of APAIS used for expansion of FHS data (after) for each state in months of sampling for the APAIS by year.

4.1.2 Example Matching Rate

Using 2019-2022 federal VTR and APAIS data, ACCSP staff matched the total number of trips by year/month/day and state to compare the matching rate to that of the SC report. This analysis, done via database queries linking vessel identifiers and dates, recognizes the reality that not all VTR trips would be intercepted by APAIS, and that not all APAIS intercepted for-hire angler-trips were required to submit a VTR. Summary results below:

State	2019		2020		2021		2022	
	VTR	APAIS	VTR	APAIS	VTR	APAIS	VTR	APAIS
ME	878	52	525	27	565	52	392	61
NH	1,154	123	1008	71	1396	129	1407	118
MA	2,521	341	2,322	248	2,343	248	2,431	248
RI	1,738	240	2,050	231	1,841	317	1,951	361
CT	1117	103	797	38	692	129	851	129
NY	6,714	282	5,771	221	6,060	304	5,567	253
NJ	6,752	225	6,050	53	6,273	244	6,811	314
DE	944	83	627	70	764	118	973	65
MD	717	279	548	149	707	344	790	178
VA	930	145	932	34	848	133	887	63
Total	23,465	1,873	20,630	1,142	21,489	2,018	22,060	1,790

Table 3. Total raw counts of VTR reported and APAIS trips intercepted for each state in months of sampling for the APAIS by year.

State	2019	2020	2021	2022
ME	1.5%	0.4%	1.4%	0.3%
NH	5.1%	3.3%	5.4%	7.3%
MA	2.9%	2.5%	2.2%	1.4%
RI	7.7%	6.8%	8.9%	9.1%
CT	3.8%	1.0%	4.0%	4.8%
NY	1.9%	1.6%	2.2%	2.7%
NJ	1.5%	0.2%	1.3%	1.9%
DE	3.7%	2.4%	2.5%	3.6%
MD	3.2%	0.5%	1.7%	1.3%
VA	6.2%	0.5%	2.6%	1.8%
Average	3.8%	1.9%	3.2%	3.4%

Table 4. Percentage of APAIS for-hire trips for each state which exactly matched VTR trips in months of sampling for the APAIS by year.

State	2019	2020	2021	2022
ME	25.0%	7.4%	15.4%	1.6%
NH	48.0%	46.5%	58.1%	87.3%
MA	21.1%	23.0%	21.0%	13.7%
RI	55.8%	60.6%	51.4%	49.0%
CT	40.8%	21.1%	21.7%	31.8%
NY	45.7%	41.2%	43.8%	58.5%
NJ	45.8%	18.9%	33.6%	40.8%
DE	42.2%	21.4%	16.1%	53.8%
MD	8.2%	2.0%	3.5%	5.6%
VA	40.0%	14.7%	16.5%	25.4%
Average	37.3%	25.7%	28.1%	36.8%

Table 5. Percentage of VTR trips for each state which exactly matched APAIS for-hire trips in months of sampling for the APAIS by year.

Table 4 shows that the coastal average matching rate for a typical year (i.e., one not severely impacted by COVID-19) was over 3%. Note while 2020 was included in the analysis, the impacts of COVID-19 on fishing activity are difficult to evaluate here. While many factors may contribute to these differences in matching rates between GARFO logbooks to APAIS and SC logbooks to APAIS, this analysis shows a higher average matching between electronic logbooks and electronic dockside interviews. Not only is the coastal average higher, but each state exceeds the minimum benchmark of 1% matching rate proposed by Dukes et al. (2017). Thus, each state's list of federal vessels could have adequate validation of logbook data. For the same timeframe, Table 5 shows that the matching rate of VTRs to APAIS trips was ~28% but this is not representative of an accurate percentage as some of the vessels from APAIS trips do not have GARFO permits (and thus do not report via federal VTR). Figure 1 helps to illustrate how closely the matching of APAIS and logbook data can be, even at lower matching percentages.

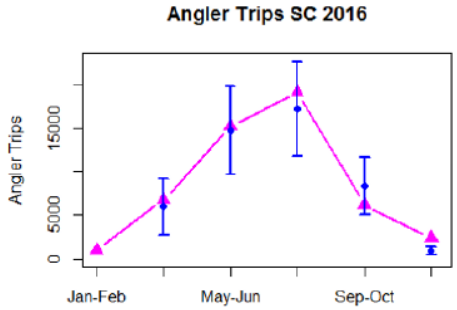


Figure 1. Example from Dukes et al. (2017) using estimated angler trips by wave (blue dots) from the APAIS with 95% confidence intervals (blue verticals) compared to logbook reports (magenta triangles).

Since the analysis above did not take months outside of APAIS sampling into consideration (Table 6), it is worth noting the need for ongoing analysis of logbooks submitted outside the APAIS sampling period. If logbook reported fishing activity is high enough, then conducting APAIS in for-hire mode year-round to use as validation for VTRs reported by state is worth further consideration in areas with active for-hire fisheries in all months.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
ME					X	X	X	X	X	X		
NH					X	X	X	X	X	X		
MA				X	X	X	X	X	X	X	X	
RI				X	X	X	X	X	X	X	X	
CT			X	X	X	X	X	X	X	X	X	X
NY			X	X	X	X	X	X	X	X	X	X
NJ			X	X	X	X	X	X	X	X	X	X
DE			X	X	X	X	X	X	X	X	X	X
MD			X	X	X	X	X	X	X	X	X	X
VA			X	X	X	X	X	X	X	X	X	X
NC	X	X	X	X	X	X	X	X	X	X	X	X
SC			X	X	X	X	X	X	X	X	X	X
GA			X	X	X	X	X	X	X	X	X	X

Table 6. Months of APAIS coverage on the Atlantic Coast.

4.2 Effort and Catch Estimation

Using matched trips, estimates can be developed that account for underreporting (trips that occurred but were not reported), misreporting (trip specifics which are not correctly reported), or both. Based on the findings of Dukes et

al. (2017), a difference-based estimation (Breidt et al. 2017) is preferred to that of the capture-recapture methodology since it is less sensitive to small sample sizes and because it preserves additivity across domains (i.e., combined logbook estimates for all waves sum to annual total). These combined estimates can be applied to both logbook and survey analyses such as the angler/boat trips, overall catch, and harvested/discarded catch by species.

Building on Breidt et al. (2018), included as Appendix C, wherein four estimators (two multiplicative (ratio) and two difference-based) were described, we propose the use of the one of the $T_{y,diff2}$ difference-based estimator (also used in Duke et al. 2017) as the estimation method, displayed in Figure 2. The difference-based estimators both performed better than the ratio-based estimators but we choose $T_{y,diff2}$ specifically because it typically had tighter confidence intervals than the alternate difference-based estimator ($T_{y,diff1}$). Further exploration of results amongst other states/years would help provide more real-world context but we recommend the use of mathematical equations used in an imperfect matching setting.

$$\widetilde{T}_{y,\mathrm{diff2}} = \widetilde{T}_{y,\mathrm{diff1}} + \sum_{k\in s}\sum_{\ell\in\mathscr{A}} \frac{m_{k\ell}\{\mu(\mathbf{a}_\ell) - y_k\}}{\pi_k}$$
$$= \sum_{\ell\in\mathscr{A}} \mu(\mathbf{a}_\ell) + \sum_{k\in s} \frac{y_k(1 - \sum_{\ell\in\mathscr{A}} m_{k\ell})}{\pi_k}$$

Figure 2. Equation for the $T_{y,diff2}$ estimator from Breidt et al. (2018). Details of the estimator math, including variable descriptor are further described in Breidt et al. (2018).

Difference-based estimators are based on survey-weighted intercept data, logbook data, and match metrics from a matching algorithm. Estimator calculations include standard error. In the difference-based estimation of catch specifically, the method is calculated as: logbook effort/catch, plus estimated unmatched effort/catch (on trips intercepted by dockside survey but with no logbook trip reported), plus the difference between logbook reported and survey observed effort/catch.

This analysis is reliant on the match metrics. These metrics will be categorized as (1) high quality, (2) low-quality, and (3) non-match. This will determine the weighting of the effort and catch estimates from a trip – non-matches will be weighted as 0, low-quality matches will be weighted as 0.5, and high-quality matches will be weighted as 1. If a combination of high-quality, low-quality, and non-match values is observed for a given trip match, the weight values between 1.0 and 0 will be attributed based on that match value. Using an amended delineation from Dukes et al. (2017), we propose any weighted match metric value ≥ 0.5 to be considered a match and any value <0.5 to be not matched. Trips which are matched represent a sample of for-hire trips which are potentially reported but with uncertain matching. Therefore, non-matches represent a sample of trips that were likely not reported or misreported.

The same estimation process for effort will be used for catch: a combination of intercept records, logbook catch records, and match metrics from a matching algorithm will be used to develop difference-based estimators. Kept and released fish records will be treated separately since released species are self-reported whereas kept records can be validated by the dockside interviewer. The combined estimators of the difference-based estimation track logbook catch values closely if there is no MRIP-intercepted catch, and otherwise adjust catch upward to reflect unmatched (and presumably unreported) trips. The combined estimators tend to have standard errors no larger than the standard errors of MRIP-only estimators. When matching is good, MRIP and logbook catch values are consistent with one another, and the standard errors for the combined catch estimators can be much smaller than those of MRIP-only (Figure 3). The reliability of catch matches is lower than trip matches because logbooks record catch for the whole party while APAIS records have catch for each individual angler.

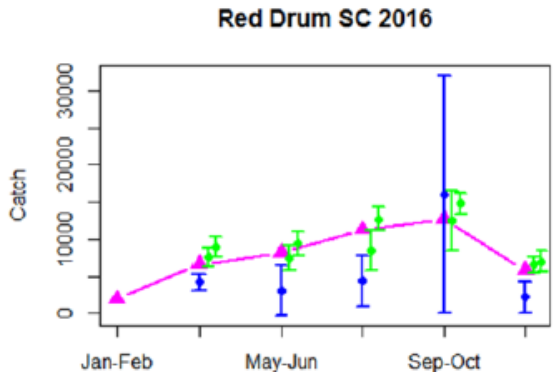
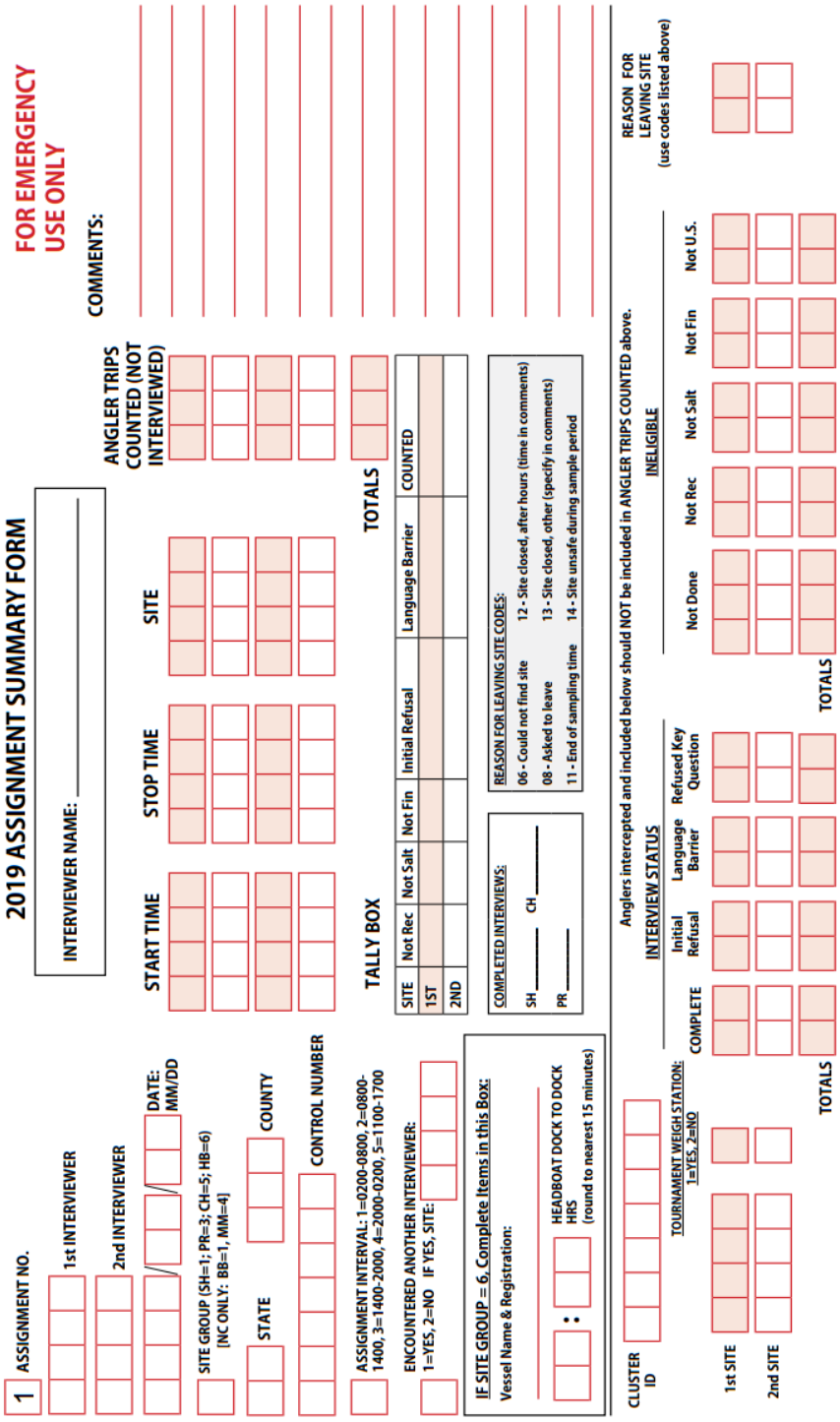


Figure 3. Estimated red drum catch by wave with approximate 95% confidence intervals, compared to logbook (magenta triangles). Estimators included are MRIP only (blue) and difference estimators $T_{y,diff1}$ and $T_{y,diff2}$ (green).

Appendix A: APAIS Questionnaire

Note: Legacy paper forms presented here for ease of visibility of data elements. For 2019 forward, electronic data collection via tablets maintains the same data elements.



1. FORM

FOR EMERGENCY USE ONLY

2. ASSIGNMENT NO. 1

3. INTERVIEWER ID

4. DATE: MM/DD

5. INTERCEPT NO.

6. INTERVIEW TIME (use 2400 clock) — Time this interview was completed

7. STATE CODE

8. COUNTY CODE

9. SITE CODE

10. INTERVIEW STATUS (Key Item = *)

1 Questionnaire Complete
2 Refused Non-Key Item
5 Refused Key Item

READ PRIVACY ACT: This study is being conducted in accordance with the privacy act of 1974. You are not required to answer any question that you consider to be an invasion of your privacy.

***11. Would you say you were fishing from ...**

SHORE
0 Pier
1 Dock
2 Jetty, Breakwater
3 Bridge, Causeway
4 Other Man-made Structure (Specify) _____
5 Beach or Bank (Additional hours required in Q16)

BOAT
6 Headboat
7 Charterboat
8 Private Boat
9 Rental Boat

***12. Was most of your (specify mode) fishing effort today in the ...** (Select only one)

1 Ocean/gulf
2 Sound (Other than listed)
3 River (Other than listed)
4 Bay (Other than listed)
5 Other (Specify) _____

V Cape Cod Bay
A Narragansett Estuary
B Buzzard's Bay Estuary
C Long Island Estuary
D Hudson/Raritan Estuary
E Delaware Estuary
F Chesapeake Estuary
G Albemarle/Pamlico Estuary

***13. Was that ...**

1 Three Miles or Less From Shore
2 More Than Three Miles
8 Waterbody Does Not Apply

13a. Were you fishing an artificial reef today?

Yes — If yes, enter Reef Code (If "Don't Know" = 998, If "Refused" = 999)
No

Name: _____

14. What type of gear was primarily used? (Select one only)

01 Hook and Line
02 Dip Net, A-frame
03 Cast Net
04 Gill Net
05 Seine
06 Trawl
07 Trap
08 Spear
09 Hand
10 Other (Specify) _____
98 Unknown
99 Refused

15a. To the nearest half-hour, how many hours have you spent (specify mode) **fishing today? That is, how many hours have you actually spent with your gear in the water?**

No. of Hours (If "Don't Know" = 99.8, If "Refused" = 99.9)

15b. [If on boat] To the nearest half-hour, how many hours have you spent on the boat, away from the dock, today?

No. of Hours (If "Don't Know" = 99.8, If "Refused" = 99.9)

Not Applicable – SH mode

16. [Ask, only if "Beach" or "Bank"] How many additional hours do you expect to fish from shore today? That is, how many more hours will you actually have your gear in the water?

No. of Hours (If "Don't Know" = 99.8, If "Refused" = 99.9)

Not fishing from Beach or Bank

17. What species were you primarily fishing for today?

No Particular Species/Anything

1st Target _____

2nd Target _____

18. Not counting today, within the past 12 months, that is since (insert month) **of last year, how many days have you gone saltwater sport finfishing in this state or from a boat launched in this state?**

No. of days
998 Don't Know
999 Refused

19. Not counting today, within the past 2 months, how many days?

No. of days
98 Don't Know
99 Refused

***20. What is your state and county of residence?** *If county unknown, ask:* **What city or town do you live in?**

State Code; Name: _____ (If foreign country code = 97)

County Code; Name: _____ (If foreign country code = 997)

21. What is the ZIP code of your residence?

99997 Foreign Country
99998 Don't Know
99999 Refused

23a. Gender (observed, do not ask)

Male
Female

23b. How old were you on your last birthday?

Age

Refused

24. In the event that my supervisor wishes to verify that I have been conducting interviews here today, may I please have your name and phone number?

Angler Name

Phone ___ - ___ - ____ Day ☐ or Night ☐

(If name and/or phone number not given, Q10 = Status 2)
☐ Name and/or phone number not given
☐ Angler aged 16 years or younger (Check both boxes)

BOX B. [If headboat ride-along:] Is this one of the anglers you monitored for discard (Type 9) catch? ☐ Yes ☐ No ☐ Not a HB ride

***25. UNAVAILABLE CATCH Did you catch any fish that are not here for me to look at? For example, any that you may have thrown back or used for bait? NOT GROUP CATCH - Only catch from Angler being interviewed.**

Disposition Codes for Q25

1 - Thrown back alive	3 - Eaten/plan to eat	5 - Sold/plan to sell	7 - Some other purpose
2 - Thrown back - not legal	4 - Used/plan to use for bait	6 - Thrown back dead/plan to throw away	

TYPE 2 RECORDS: ***(CATCH UNAVAILABLE IN WHOLE FORM; FILLETS ARE UNAVAILABLE CATCH.)***

	Species Name	Species Code	# of Fish	Disp.
1.				
2.				
3.				
4.				
5.				

***26. Did you catch any fish while you were fishing that I might be able to look at?**
1 ☐ Yes
2 ☐ No - *Code Q27, Q28, Q29 as "Not Applicable"*
3 ☐ Yes, BUT fish on another angler's form – *Record interview # where fish are listed*
☐☐ *Code Q27, Q28, Q29 as "Not Applicable"*

***27. Did you catch these yourself or did someone else catch some of them?**
1 ☐ All Caught by Angler - *Code Q28, Q29 as "Not Applicable"*
2 ☐ *Other Contributors* 8 ☐ Not Applicable

***28. Can you separate out your individual catch?**
1 ☐ Yes – *Code 29 as "Not Applicable"*
2 ☐ No 8 ☐ Not Applicable

***29. How many anglers including yourself have their catch here? Please do not include anyone who did not catch fish. Only count those who have their catch here.**
☐☐ No. of Contributors 88 ☐ Not Applicable

BOX C. If Q11 is SH mode, code Q30 as "888," and Code Box D as "8."

***30. How many people fished on your boat today?**
☐☐☐ No. of People 888 ☐ Shore Mode

BOX D.** ***If response to Q30 is 001, code as "Not Applicable." Otherwise, is this the first angler from this boat that I have interviewed?
1 ☐ Yes 8 ☐ Not Applicable
2 ☐☐ No – *Record interview # of 1st angler in the fishing party.*

BOX E:** ***Is this charter/headboat on the Good List? ☐ Yes ☐ No **Vessel name or registration:** _____

☐ **Check box if vessel has no name AND no registration number. If checked, Q10 (Status) = 5.**

***31. AVAILABLE CATCH – ASK: May I look at your fish? What do you plan to do with the MAJORITY of the (species)?**

Disposition Codes for Q31

3 - Eaten/plan to eat	5 - Sold/plan to sell
4 - Used/plan to use for bait	6 - Plan to throw away
	7 - Some other purpose

NOTES/COMMENTS:

TYPE 3 RECORDS: ***(INDIVIDUAL CATCH AVAILABLE IN WHOLE FORM)***

	Species Name	Species Code	# of Fish	Length (mm)	Weight (kg)	Disp.
1.					.	
2.					.	
3.					.	
4.					.	
5.					.	
6.					.	
7.					.	
8.					.	
9.					.	
10.					.	
11.					.	
12.					.	
13.					.	
14.					.	
15.					.	

Appendix B: SC For-Hire Logbook Validation Metrics

Fields used to compare APAIS interviews grouped by party and SC DNR charter logbook trip reports. Weights of the comparisons are based on importance and reliability.

Field	MRIP Definition	Logbook Definition	Match Metric Weight
Date	Date of interview	Date of reported trip	1.00
Start Site	Interview site	Site reported as the start site	0.30
Anglers	Number of individuals in the party	Number of anglers reported participating	0.30
Target Species	Species of fish being targeted	Species of fish being targeted	0.20
Hours Fished	Mean total hours fished of interviewees	Total hours fished as reported	0.10
Distance	Categorized distance from shore fished	Categorized distance from shore fished	0.10
Trip End Time	Mean interview time	Estimated trip end time	0.01