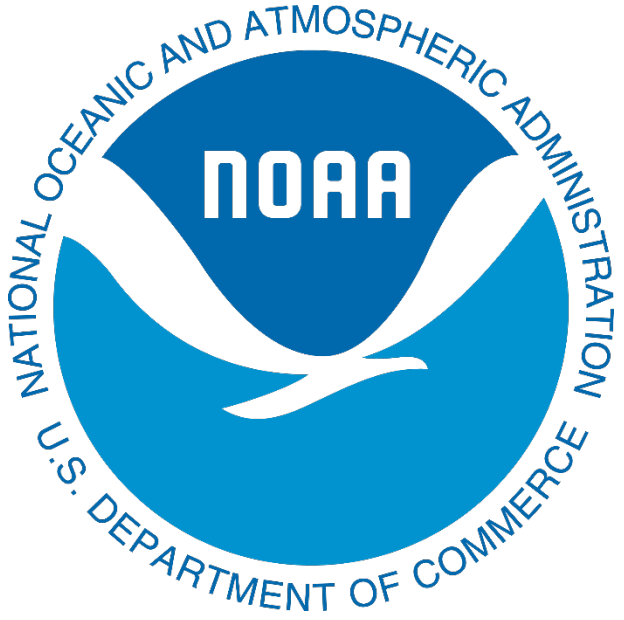

Fishing Effort Survey

2021 Annual Report

Acknowledgments

We would like to thank RTI International for administering the Fishing Effort Survey on behalf of NOAA, National Marine Fisheries Service during 2021.

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1. Overview

Recreational fisheries catch and effort data collection is necessary to fulfill the requirements of Section 303 of the Magnuson-Stevens Fishery Conservation and Management Act (16 U.S.C. 1852 et. seq.) and to comply with Executive Order 12962 on Recreational Fisheries. Section 303 (a) of the Magnuson-Stevens Fishery Conservation and Management Act specifically mandates that data and analyses be included in Fishery Management Plans. As per these requirements, recreational fishing catch and effort data are used on an ongoing basis by NOAA Fisheries, regional fishery management councils, interstate marine fisheries commissions and state natural resource agencies in developing, implementing and monitoring fishery management programs. These catch and effort statistics are used to determine the effects of fishing on fish stocks and develop sound management strategies and policies. Continuous monitoring of catch and effort is also used to assess trends, evaluate the impacts of management regulations, and project how different management scenarios may influence a fishery.

The Fishing Effort Survey (FES) is a cross-sectional, self-administered mail survey used to estimate recreational saltwater fishing effort in coastal states along the Atlantic coast, Gulf of Mexico and Hawaii. The FES utilizes an "engaging" approach designed to encourage participation of anglers and non-anglers by broadening the scope of inquiries to include both fishing and non-fishing questions. Household-level priming questions ask respondents about different types of outdoor activities and household characteristics while person-level questions, collected for up five household members, obtain information about individual demographic characteristics and recreational saltwater shore and private boat fishing effort during the previous two and 12 months (Appendix A). In 2021, the FES was administered in 16 states along the Atlantic Coast and Gulf of Mexico, as well as Hawaii (Table 1). The survey is administered for six, independent two-month reference waves beginning with wave 1 (January/February) and ending with wave 6 (November/December). The FES is consistent with OMB guidelines, and has received clearance in accordance with the Paperwork Reduction Act (5 CFR 1320.5(b)) under OMB Control No. 0648-0652. The current clearance is valid through 09/30/2023.

2. Sampling Methodology

Recreational saltwater fishing data are collected for all household members. Consequently, each household receiving a survey represents a sampling unit. The FES utilizes address-based samples (ABS) within coastal states to collect information about recent recreational saltwater fishing activity. The sample frame is derived from the USPS Computerized Delivery Sequence File (CDS) and includes all full-time (non-seasonal), residential addresses, with the exceptions of group quarters and PO boxes that are not flagged as the only way to get mail. Within each coastal state, sampling is stratified by sub-state region, which is defined by geographic proximity to the coast. Generally, counties with borders that are within 25 miles of the coast are in the "coastal" stratum and all other counties are in the "non-coastal" stratum. Rhode Island, Connecticut, Delaware, Florida and Hawaii are not geographically stratified due to relatively consistent fishing rates among counties. The designation of coastal counties in North Carolina, South Carolina, Georgia, Alabama, and Mississippi changes throughout the year to reflect seasonal changes in fishing activity. Coastal county designation by state and wave for 2021 are provided in Appendix B.

Because angling households represent a relatively rare component of the general population, the ABS frame is supplemented by matching addresses on the CDS to lists of licensed saltwater anglers in each state. State license lists are derived from the National Saltwater Angler Registry (NSAR) and include all anglers licensed to participate in saltwater fishing in the study area between the beginning of each wave and the time the lists are compiled, approximately one month prior to the end of the wave. Augmenting the ABS sample frame with fishing license information creates additional strata (license matched and unmatched) and allows households with and without licensed anglers to be sampled at different rates.

The sample size for each state and wave is targeted to produce estimates of fishing effort with coefficients of variation of 0.20. Within each state, stratum sample sizes are initially determined using the Neyman allocation approach (e.g. Wright 2014) where the sample is distributed among strata in proportion to the product of the population size and the standard deviation. The goal of Neyman allocation is to maximize the precision of estimates for a fixed sample size. Standard deviations are based upon historical FES data and estimates. Following the initial allocation, base weights are reviewed, and sample may be manually re-distributed among strata to reduce extreme weights and minimize the variation of weights among strata. Sample may also be re-distributed to maximize the probability of detecting fishing activity. Table 1 provides final sample sizes by wave and state for the 2021 FES.

Table 1. Sample size by state and wave during 2021

State	Survey Wave						Total
	1	2	3	4	5	6	
AL	4,814	3,081	2,613	2,941	4,277	3,779	21,505
CT	.	8,288	3,211	1,549	2,863	8,424	24,335
DE	.	4,428	2,800	2,370	3,190	5,393	18,181
FL	1,613	1,758	1,516	1,633	1,924	1,586	10,030
GA	.	10,034	5,659	7,611	6,441	5,963	35,708
HI	5,635	3,948	2,962	2,844	3,112	2,751	21,252
ME	.	.	2,976	1,951	3,331	.	8,258
MD	.	5,090	2,511	2,840	2,878	3,926	17,245
MA	.	13,133	2,564	1,800	3,646	9,209	30,352
MS	6,984	4,570	3,808	3,080	4,311	7,986	30,739
NH	.	.	3,461	3,186	4,238	.	10,885
NJ	.	7,455	3,417	3,163	3,863	4,993	22,891
NY	.	13,712	4,840	2,662	5,342	6,834	33,390
NC	6,148	3,709	2,385	2,797	3,125	3,204	21,368
RI	.	8,068	2,738	1,612	2,282	4,234	18,934
SC	.	3,713	3,721	2,882	2,881	5,403	18,600
VA	.	8,493	3,409	2,484	2,867	3,515	20,768
Total	25,194	99,480	54,591	47,405	60,571	77,200	364,441

3. Data Collection

FES data collection begins with an initial survey mailing one week prior to the end of each reference wave to ensure survey materials are received as close to the end of the wave as possible. This initial mailing, delivered by regular, first class mail, includes a cover letter stating the purpose of the survey, a survey questionnaire, business reply envelope (BRE), and a $2 prepaid cash incentive.

One week after the initial mailing, a follow-up, thank you and reminder postcard is delivered via regular first class mail to all sampled addresses.

Three weeks after the initial survey mailing, a final mailing is delivered to all addresses that have not yet responded to the survey. The follow-up includes a nonresponse conversion letter, a second questionnaire, and a pre-paid return envelope. As with prior mailings, the follow-up is delivered via first class mail. All FES supporting materials are available in Appendix C.

Data collection for each reference wave is terminated thirteen weeks after the initial survey mailing. Questionnaires returned after thirteen weeks are scanned but are not committed

to the final survey datasets. The complete data collection schedule for 2021 is provided in Table 2.

Table 2. Data collection schedule for the 2021 FES

	Reference Period					
Task/Event	**Wave 1, 2019**	**Wave 2, 2019**	**Wave 3, 2019**	**Wave 4, 2019**	**Wave 5, 2019**	**Wave 6, 2019**
Wave begins	1/1/2021	3/1/2021	5/1/2021	7/1/2021	9/1/2021	11/1/2021
Initial survey mailing	2/22/2021	4/23/2021	6/24/2021	8/25/2021	10/25/2021	12/29/2021
Wave ends	2/28/2021	4/30/2021	6/30/2021	8/31/2021	11/1/2021	12/31/2021
Postcard reminder mailing	3/1/2021	4/30/2021	7/1/2021	9/1/2021	11/1/2021	1/5/2022
Follow-up mailing	3/18/2021	5/17/2021	7/19/2021	9/20/2021	11/18/2021	1/21/2022
Preliminary wave data files	3/29/2021	5/28/2021	7/28/2021	9/28/2021	11/29/2021	1/28/2022
Final wave data files	6/1/2021	7/29/2021	9/29/2021	11/30/2021	1/31/2022	3/31/2022

4. Data Processing

During the 13 week data collection window, all surveys received by the FES data collection contractor are sorted by response status (e.g. complete, refusal) or return status designated by the Postal service (e.g. postal return with no new address, postal return with new address, type of undeliverable) and categorized by mailing. Return rates by state, sub-state region, and license match for each wave may be found in Appendix D.

Returned questionnaires are electronically scanned and, in the case of multiple returns by a household, only the first return is accepted to minimize recall bias. The total number of scanned pages is matched to the number of pages per survey to ensure no pages are missed, and the contrast and brightness is adjusted to provide a clear image. After scanned images are generated, a classification and optical character recognition (OCR) process converts the scanned images to an initial survey dataset. Several rounds of verification are then performed during which all open ended questions are manually entered.

Following verification, data are committed to a dataset, and PDFs of each survey are created. Preliminary data processing identifies missing responses, instances where a respondent marked more options than should have been marked, and recodes observations to inapplicable or missing based upon the number of reported household members relative to the number of individual person sections containing information. An initial survey disposition is assigned using a combination of standardized USPS codes, for undeliverable surveys and postal returns, and classifications of survey completeness.

Data from each reference wave are delivered to NOAA on two separate occasions as preliminary and final data sets. Preliminary data are delivered approximately four weeks after the end of the wave and include data received up to three weeks after the conclusion of the reference wave. Final data are delivered thirteen weeks after the end of the reference wave and include all data collected up to 12 weeks after completion of the wave. Preliminary data generally includes 70-80% of all returned surveys and is used to produce preliminary estimates

of recreational saltwater fishing effort (Table 3). Upon delivery of final data, estimates are updated to minimize variance by including data captured over the entire 12 week sample collection.

Table 3. Number and percentage of total surveys included in preliminary and final data by state during 2021.

State	Prelim.		Final*	
	%	N	%	N
AL	70.94	4,182	29.06	1,713
CT	67.91	4,889	32.09	2,310
DE	67.95	3,875	32.05	1,828
FL	71.83	1,984	28.17	778
GA	71.09	6,008	28.91	2,443
HI	67.41	5,348	32.59	2,586
MA	67.58	6,104	32.42	2,928
MD	68.53	3,280	31.47	1,506
ME	76.97	2,086	23.03	624
MS	65.84	5,336	34.16	2,769
NC	74.59	4,923	25.41	1,677
NH	77.33	2,684	22.67	787
NJ	68.42	4,058	31.58	1,873
NY	66.70	4,816	33.30	2,404
RI	74.03	4,429	25.97	1,554
SC	72.38	4,385	27.62	1,673
VA	71.76	4,318	28.24	1,699
Total	70.00	72,705	30.00	31,152

*** Final data are additional surveys that were not yet received in the preliminary data**

Following data delivery for each wave, a check-in process verifies the presence and formatting of all variables, confirms responses are within acceptable ranges, and compares response distributions for each survey measure to historical data to identify large-scale inconsistencies relative to the time-series.

Once data validity is confirmed, item nonresponse (missing data) and illogical responses (extra data) are examined. Identifying missing (nonresponse) and extra (illogical) responses requires a determination of the expected number of individual residents within each household. This is achieved by comparing the reported number of household members to the count of individual household residents for whom information is provided. A person is enumerated if any effort question (Q15 and/or Q16) and at least one demographic question (Q11-Q14) are completed (Appendix A). Item response and illogical response are then placed into one of five categories:

1) Complete – household and person-level items are complete and consistent
2) Missing people – the count of responding persons is fewer than the reported number of household members
3) Extra people – the count of responding persons is greater than the reported number of household members
4) Extra information – the count of responding persons equals the reported number of household members, but there are demographic or effort responses present for at least one uncounted person
5) Missing household members – the number of reported household members is missing or zero

Surveys containing item nonresponse and illogical response are examined via an automated process which attempts to match the number of people responding to the number of reported household members. The automated process ranks individual person sections from complete to blank and, using imputation and automatic edits, additively retains the most complete to less complete people, while also removing extra information, until the sum of counted persons matches the number of reported household members or the number of household members is adjusted to match additional people that responded. This process maximizes the completeness of individual person sections within a survey while minimizing the number of edits. Any nonresponse or illogical response that cannot be resolved by automated processing is flagged for manual examination.

Imputation is the process of assigning values to missing data (item nonresponse). A common imputation in the FES results when an individual reports complete demographic information but fails to check the "did not fish" box and reports no value for shore or private boat effort. In this scenario, the count of people is often less than the number of reported household members, and it is assumed that effort questions were intentionally left blank because questions about fishing activity were not applicable to the respondent. As a result, zeros are imputed for missing effort which results in the correct number of people relative to the reported number of household members and reconciles item nonresponse.

Automatic edits work in reverse of imputation and serve to eliminate extra responses or adjust existing responses that are illogical. A common automatic edit occurs when all person sections (five) are completed regardless of the reported number of people in the household. The result is that the count of completed person sections exceeds the reported number of household members. Extra people are often identifiable as duplicates, containing the same age and gender as other household members. Any duplicate people greater than the number of reported household members are automatically edited to inapplicable if their removal allows the number of people to equal the number of reported household members.

Once data are corrected for missing and illogical values, all surveys, including those previously flagged for manual review by automated processing, are examined via logic checks for contradictory, nonsensical, and unlikely/extreme values and flagged for manual review upon failure. During manual review changes may be made to the survey disposition, number of household members, demographic information, and saltwater fishing effort. Scanned images of surveys flagged for manual review are compared directly to coded data to ensure anomalous

values are not the result of poor handwriting that resulted in scanning errors. Surveys flagged via logic checks for large amounts of reported effort or effort with contradictory information (e.g. checked the shore or boat did not fish box but reported non-zero effort) undergo a critical but conservative review.

Edits applied during automated or manual processing are documented through the creation of unique identifier variables. Original, unedited, values are also retained to maintain accountability and permit comparisons between edited and original values. Overall, 11.46% of eligible surveys returned during 2021 received some form of data edit. Edit rates across waves were consistently below 15% ranging from 10.98% to 13.00% (Table 4).

Table 4. FES survey edit rates by wave during 2021

Survey Wave	Not Edited		Data Edit	
	N	%	N	%
1	6,821	87.00	1,019	13.00
2	24,882	88.31	3,295	11.69
3	13,926	89.02	1,717	10.98
4	11,674	88.59	1,503	11.41
5	14,244	88.02	1,938	11.98
6	19,451	88.17	2,611	11.83
Total	90,998	88.28	12,083	11.72

Following automated and manual data processing, a final review of data is completed to identify surveys that are unlikely to be representative of other households within the stratum. Total two month saltwater shore and private boat effort within a household are examined relative to other households during each reference wave and relative to the time series to identify data that are non-representative. For example, a household may be identified as non-representative if it is hundreds of miles from the coast, does not contain a licensed angler, and reported dozens of saltwater private boat trips. The non-representative examination is based on expert review and assigned sparingly. A total of 62 households (0.06%) were identified as non-representative during 2021; rates were consistently low across waves ranging from 0.04% to 0.11% (Table 5). Survey weights for households deemed non-representative were adjusted to be self-representative (assigned a final weight of 1) and residual weights were re-distributed among other sampled addresses within the same stratum.

Table 5. Non-representative surveys during 2021

Survey Wave	Not Edited		Non-Representative	
	N	%	N	%
1	7,835	99.94	5	0.06
2	28,166	99.96	11	0.04
3	15,637	99.96	6	0.04
4	13,162	99.89	15	0.11
5	16,167	99.91	15	0.09
6	22,052	99.95	10	0.05
Total	103,019	99.94	62	0.06

5. Response Rates

After data processing, unit response rates were calculated using the American Association for Public Opinion Research (AAPOR) Response Rate 2 (RR2) calculation for un-named mail surveys which excludes ineligible samples from the sample total. Response rates were calculated as

$$RR2 = \frac{(\mathrm{I} + \mathrm{P})}{(\mathrm{I} + \mathrm{P}) + (\mathrm{R} + \mathrm{NC} + \mathrm{O}) + (\mathrm{UH} + \mathrm{UO})}$$

where I and P are the number of eligible interviews containing complete (I) and partially complete (P) surveys,
R, NC, and O are the number of eligible non-interviews including refusals (R), non-contacts (NC), and Other (O) and,
UH and UO are the number of unknown eligible surveys including housing occupancy (UH) or other unknowns (UO).

The overall, weighted, unit response rate during 2021 was 27.41% (Table 6). By wave, weighted response rates fluctuated slightly ranging from 25.35% during wave five to 30.64% during wave one (Table 6).

Table 6. Weighted response rates by wave during 2021

Survey Wave	Response		Unknown Eligibility		Other*		
	N	Weighted %	N	Weighted %	N	Weighted %	Total
1	7,838	30.64	15,391	69.09	65	0.27	23,294
2	28,158	28.66	65,853	71.07	255	0.27	94,266
3	15,628	27.30	35,854	72.39	119	0.31	51,601
4	13,171	27.25	31,469	72.45	120	0.30	44,760
5	16,172	25.35	40,991	74.47	120	0.19	57,283
6	22,045	27.36	50,594	72.30	190	0.33	72,829
Total	103,012	27.41	240,152	72.31	869	0.28	344,033

*** Includes nonresponse and removed surveys**

Across states, weighted response rates varied substantially ranging from 23.17% in Georgia to 39.36% in Hawaii (Table 7).

Table 7. Weighted response rates by state during 2021

State	Response		Unknown Eligibility		Other*		Total
	N	Weighted %	N	Weighted %	N	Weighted %	
AL	5,843	26.55	13,862	73.10	53	0.35	19,758
CT	7,145	29.10	15,922	70.66	57	0.24	23,124
DE	5,667	30.56	11,782	69.22	38	0.22	17,487
FL	2,733	27.76	6,645	71.91	29	0.32	9,407
GA	8,373	23.17	25,156	76.59	79	0.25	33,608
HI	7,876	39.36	11,853	60.35	58	0.29	19,787
MA	8,961	29.87	19,745	69.89	73	0.25	28,779
MD	4,753	28.17	11,593	71.62	33	0.21	16,379
ME	2,691	35.43	5,017	64.32	19	0.25	7,727
MS	8,047	25.74	19,902	74.06	60	0.20	28,009
NC	6,557	28.62	13,559	71.13	45	0.25	20,161
NH	3,448	33.20	7,059	66.59	25	0.21	10,532
NJ	5,875	24.99	16,037	74.74	59	0.27	21,971
NY	7,133	24.75	24,680	74.91	89	0.34	31,902
RI	5,934	31.99	12,128	67.72	53	0.29	18,115
SC	6,011	30.43	11,343	69.33	47	0.25	17,401
VA	5,965	29.71	13,869	70.06	52	0.24	19,886
Total	103,012	27.41	240,152	72.31	869	0.28	344,033

*** Includes nonresponse and removed surveys**

Item response rates are also evaluated to provide insight into the way respondents interpret individual questions. Unusually high nonresponse rates for individual questions (items) can help illuminate issues with question interpretation and content sensitivity. Item response rates during 2021 were high at over 94% for all household and person level questions (Table 8).

Table 8. Response rates by question (item) during 2021

Question	Response		Nonresponse		Multiple Response	
	N	%	N	%	N	%
Weather	102,839	99.83	173	0.17	.	0.00
Evac	102,646	99.64	348	0.34	18	0.02
Warning	101,754	98.78	1,137	1.10	121	0.12
Beach Flag	102,699	99.70	294	0.29	19	0.02
Fresh Fish	102,611	99.61	350	0.34	51	0.05
Salt Fish	102,604	99.60	358	0.35	50	0.05
HH Phone	101,035	98.08	583	0.57	1,394	1.35
HH Description	101,751	98.78	1,115	1.08	146	0.14
HH Years	102,312	99.32	678	0.66	22	0.02
HH Members	102,938	99.93	74	0.07	.	0.00
Age	235,052	95.18	11,912	4.82	.	0.00
Gender	238,052	96.39	8,665	3.51	247	0.10
Origin	232,812	94.27	14,092	5.71	60	0.02
Race	232,942	94.32	14,022	5.68	.	0.00
Boat Trips	232,265	94.05	14,699	5.95	.	0.00
Shore Trip	233,978	94.74	12,986	5.26	.	0.00
Total	2,428,290	96.67	81,486	3.24	2,128	0.08

6. Weighting

After data processing, sample weights for each survey are calculated in stages. In the first stage, base weights (w_i) for each sampled address within a given stratum are calculated as the inverse of the inclusion probabilities

$$w_i = \frac{1}{\pi_i}$$

where π_i is the probability that unit i is included in the sample.

In the second stage, base weights are adjusted to compensate for unit nonresponse (e.g. when households fail to mail back the completed survey). The sample is partitioned into nonresponse adjustment cells, or weighting classes, by state, sub-state region (coastal or non-coastal), license match (matched or unmatched), and boat ownership registration (e.g. whether a

sampled address could be matched to state boater registration list). The base weights of the respondents in each adjustment cell ($w_{ci.r}$) are then divided by the response rate for that cell ($\widehat{\emptyset}_c$) to calculate the adjusted weight (w^*_{ci})

$$w^*_{ci} = \frac{w_{ci.r}}{\widehat{\emptyset}_c}$$

where $\widehat{\emptyset}_c = \frac{\sum w_{ci.r}}{\sum w_{ci.r} + \sum w_{ci.nr}}$,
$\sum w_{ci.r}$ is the sum of the base weights of each respondent within adjustment cell c, and
$\sum w_{ci.nr}$ is the sum of the base weights of each nonrespondent within adjustment cell c.

In the third stage, nonresponse weights are further adjusted through a process known as raking, which adjusts weights so that the separate or marginal distributions for select variables in the sample data conform to corresponding distributions from independent data sources (Brick and Kalton 1996). For the FES, auxiliary variables are derived from the American Community Survey, Current Population Survey and National Health Interview Survey, and include households with seniors, households with children, household tenure (own/rent), households with three or more household members, and wireless-only households. Raking is an iterative procedure that sequentially adjusts weights to force sample distributions to match marginal distributions for each auxiliary variable. The weights are repeatedly adjusted until the sample marginal distributions match the auxiliary marginal distributions for all selected varialbes. Raked weights are calculated as

$$w^*_{ri} = w^*_{ci} R_s$$

where R_s is a generalized raking adjustment in state s.

During the fourth stage, raked weights are post-stratified to account for incomplete coverage of the target population. Post-stratification is commonly used to make respondent data conform to target population totals from other sources independent from the survey (Brick and Kalton 1996). The most recent estimates of the number of residential households available from the American Community Survey (United States Census Bureau 2016) are used as population control totals. Nonresponse adjusted weights are post-stratified to household-level control totals within coastal and non-coastal strata (as defined at the time of sampling for each wave). The resulting post-stratified weight (w^*_{hi}) of address i in stratum h is calculated as

$$w^*_{hi} = w^*_{ri} \left(\frac{H_h}{\widehat{H}_h} \right)$$

where the adjustment factor is equal to the ratio of the control total (H_h, from the American Community Survey) to the estimated total based upon the sum of nonresponse adjusted weights ($\widehat{H}_h$).

Following these three weighting adjustments, a final weight trimming process is applied to mitigate the impacts of extreme values on the precision of survey estimates. Highly variable weights can result in large sampling variances, so it is often desirable to minimize the frequency and size of extreme weights. There is a tradeoff, however, between increasing precision and

biasing estimates through weight trimming procedures. The Estimated Mean Square Error (MSE) Trimming procedure allows for evaluating various trimming levels to identify an optimal level that minimizes the estimated mean square error of an estimate (i.e. minimizes the sum of sampling variance and the square of the estimated bias, Potter 1990; Potter 1988). The MSE for various levels of trimming ($\widehat{MSE}(\hat{T}_t)$) is estimated as

$$\widehat{MSE}(\hat{T}_t) = (\hat{T}_t - \hat{T})^2 - V(\hat{T}) + 2[V(\hat{T}_t)V(\hat{T})]^{1/2}$$

where $\hat{T}$ is the effort estimate using untrimmed weights,
$\hat{T}_t$ is the effort estimate using trimmed weights, and
$V(\hat{T})$ and $V(\hat{T}_t)$ are the estimated variance of $\hat{T}$ and $\hat{T}_t$ respectively.

The automated procedure is carried out by repeatedly reducing maximum weighted values by increments of 5% and redistributing excess weights among untrimmed sample cases. The $\widehat{MSE}(\hat{T}_t)$ is estimated for each incremental adjustment until the minimum value is identified, indicating that the optimal level of trimming has been reached. Trimming is performed separately for each fishing mode resulting in two final survey weights, one for private boat fishing and one for shore fishing.

7. Estimates

After weights are finalized, total shore and private boat fishing effort by residents of coastal states are estimated as weighted sums. Correction factors to account for fishing effort by residents of non-coastal states are derived from the complementary Access Point Angler Intercept Survey (APAIS).

Upon completion of the review and estimation processes, estimates of recreational saltwater fishing effort are available, first for preliminary data and updated with final, within 45 days of the end of the reference wave. Current and prior year estimates can be found: https://www.st.nmfs.noaa.gov/recreational-fisheries/data-and-documentation/queries/index

8. Quality Management

The FES contractor performs quality and project management functions, and NOAA Fisheries monitors and assesses performance by reviewing the contractor's planning documentation, hosting project kickoff meetings, tracking all survey tasks, and attending weekly conference calls.

At the start of each new FES contract, the contractor is required to develop and submit a quality and project management plan to NOAA Fisheries. The plan includes a detailed schedule of project activities, and reflects the requirements specified in the contract and/or describes and justifies revisions to any of those requirements. The plan also reflects a set of quality management procedures to ensure the collection of high quality data at all stages of the process, addressing each of the following activities: printing, preparing mailing packages, processing returned questionnaires (paper and/or web), data entry/data verification, and data file

production. It further specifies procedures and management controls, and includes a template and schedule for reporting results of quality management operations to NOAA Fisheries staff.

9. Process Improvement

The MRIP Fishing Effort Survey was designed and tested through a series of pilot studies completed between 2007-2014. We continue to evaluate nonsampling errors and potential survey improvements. Below is a comprehensive list of pilot study reports available on our website.

1. A Comparison of Recreational Fishing Effort Survey Designs (2012): Coverage error (ABS vs. RDD, Household vs. License), Nonresponse, Measurement (Gatekeeper, recall, salience)
2. Continued Development and Testing of Dual-Frame Surveys of Fishing Effort: Testing a Dual-Frame, Mixed Mode Design (2013): Coverage error (ABS vs. license sampling) and measurement error (mail vs. phone)
3. Development and Testing of Recreational Fishing Effort Surveys: Testing a Mail Survey Design (2014): Test of FES design. Includes results from initial nonresponse follow-up study and assessment of various sources of nonsampling error
4. Evaluating a Gatekeeper Effect in the Coastal Household Telephone Survey (2018): Evaluates screening error in the CHTS
5. A comparison of recall error in recreational fisheries surveys with one and two-month reference periods (2015): Measurement error in FES (Andrews, William & Papacostas, Katherine & Foster, John. (2018). A Comparison of Recall Error in Recreational Fisheries Surveys with One- and Two-Month Reference Periods. North American Journal of Fisheries Management. 10.1002/nafm.10233.)
7. Testing a Web-Push Design for Estimating Recreational Fishing Effort (2018)
8. Evaluating Nonresponse Bias in the MRIP Fishing Effort Survey (2021): FES nonresponse bias study and weighting procedures

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Appendix A. Questionnaire

4803037005

HOUSEHOLD MEMBER 4

11 What is this person's gender?
- ☐ Male
- ☐ Female

12 How old is this person?
If less than 1 year, mark 0 years

☐☐ Age in years

13 Is this person of Hispanic, Latino, or Spanish origin?
- ☐ Yes, of Hispanic origin
- ☐ No, not of Hispanic origin

14 What is this person's race? Mark one or more boxes.
- ☐ White
- ☐ Black, African-American
- ☐ Asian
- ☐ American Indian or Alaska Native
- ☐ Native Hawaiian or other Pacific Islander

Please think only about recreational saltwater fishing in North Carolina.

15 **How many days did this person go recreational saltwater fishing from the SHORE in North Carolina?**

The shore includes docks, bridges, causeways, beaches, banks, or any other shore-based place or area. Do not include freshwater fishing.

☐ Did not recreational saltwater fish from shore in last 12 months ➔ ***Go to question 16***

☐☐ Number of days saltwater shore fishing in January and February of 2021

☐☐☐ Number of days saltwater shore fishing in last 12 months, including January and February

16 **How many days did this person go recreational saltwater fishing from a private or rental BOAT that returned to shore in North Carolina?**

Do not include freshwater trips or trips where a paid captain or crew helped locate and catch fish.

☐ Did not recreational saltwater fish from private boat in last 12 months

☐☐ Number of days saltwater boat fishing in January and February of 2021

☐☐☐ Number of days saltwater boat fishing in last 12 months, including January and February

If you have more people in your household, continue to Household Member 5. If you have answered for all people in your household, please return your survey.

HOUSEHOLD MEMBER 5

11 What is this person's gender?
- ☐ Male
- ☐ Female

12 How old is this person?
If less than 1 year, mark 0 years

☐☐ Age in years

13 Is this person of Hispanic, Latino, or Spanish origin?
- ☐ Yes, of Hispanic origin
- ☐ No, not of Hispanic origin

14 What is this person's race? Mark one or more boxes.
- ☐ White
- ☐ Black, African-American
- ☐ Asian
- ☐ American Indian or Alaska Native
- ☐ Native Hawaiian or other Pacific Islander

Please think only about recreational saltwater fishing in North Carolina.

15 **How many days did this person go recreational saltwater fishing from the SHORE in North Carolina?**

The shore includes docks, bridges, causeways, beaches, banks, or any other shore-based place or area. Do not include freshwater fishing.

☐ Did not recreational saltwater fish from shore in last 12 months ➔ ***Go to question 16***

☐☐ Number of days saltwater shore fishing in January and February of 2021

☐☐☐ Number of days saltwater shore fishing in last 12 months, including January and February

16 **How many days did this person go recreational saltwater fishing from a private or rental BOAT that returned to shore in North Carolina?**

Do not include freshwater trips or trips where a paid captain or crew helped locate and catch fish.

☐ Did not recreational saltwater fish from private boat in last 12 months

☐☐ Number of days saltwater boat fishing in January and February of 2021

☐☐☐ Number of days saltwater boat fishing in last 12 months, including January and February

Please return your survey in the enclosed postage-paid envelope.

RTI International
5265 Capital Boulevard, Raleigh NC 27690-1652

21199999

OMB#: 0648-0652
Exp. Date: 9/30/2023

North Carolina

Weather and Outdoor Activity Survey

Public reporting burden for this collection of information is estimated to average 10 minutes per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other suggestions for reducing this burden to Rob Andrews, NOAA Fisheries Service, 1315 East-West Hwy., Silver Spring, MD 20910.

No personally identifiable information will be collected through this survey. Responses will only be associated with a unique, randomly assigned identification code. Any public release of survey data will be without identification as to its source or in aggregate statistical form. All survey data will be stored on secured, password protected servers, and all transfer of survey data will utilize secure file transfer protocols.

0008483

This survey should be filled out by an adult member of the household. Complete and return this form even if no one in your household participates in any of these activities.

START HERE

Please carefully follow the steps below when completing this survey.

- Use only a blue or black ink pen that does not blot the paper
- Make solid marks inside the response boxes
- Do not make other marks on the survey

Example

RIGHT WAY ☒ WRONG WAY ☒

1 How do members of this household obtain information about the weather, including current weather conditions, forecasts, and warnings? Mark all that apply.

- ☐ Television
- ☐ Radio
- ☐ Newspaper
- ☐ Internet
- ☐ Other

2 During the past 12 months, has anyone in this household had to evacuate or seek shelter due to a severe weather event, such as a tornado, hurricane, or thunderstorm?

- ☐ Yes
- ☐ No

3 In your area, how often do the advanced warnings you get for severe weather events allow you enough time to prepare properly?

- ☐ All the Time
- ☐ Some of the time
- ☐ Rarely
- ☐ Never

4 During the past 12 months, has anyone in this household visited a public beach, national seashore, coastal state park, or other coastal nature reserve or protected area?

- ☐ Yes
- ☐ No

5 During the past 12 months, has anyone in this household been freshwater fishing in North Carolina?

- ☐ Yes
- ☐ No

6 During the past 12 months, has anyone in this household been saltwater fishing in North Carolina?

- ☐ Yes
- ☐ No

7 Which of the following best describes how your household receives telephone calls?

- ☐ All are received on cell phones
- ☐ Most are received on cell phones
- ☐ Some are received on cell phones and some on landline phones
- ☐ Most are received on landline phones
- ☐ All are received on landline phones
- ☐ No calls are received on cell phones or landline phones

8 Which of the following best describes this house, apartment, or mobile home?

- ☐ Owned with a mortgage or loan
- ☐ Owned (without a mortgage)
- ☐ Rented
- ☐ Occupied without payment or rent

9 How long have you lived at this address?

- ☐ 1 year or less
- ☐ Less than 5 years, more than 1 year
- ☐ 5 years or more

10 How many people, including all adults and children, live in this household?

☐☐ Number of people

Please answer the next section for each member of your household, starting with yourself. Please answer for all people in your home, including people who fish and people who do not fish.

If you have more than 5 people living at this address, answer for the oldest members of the household.

Please use the calendars to help answer questions 15 and 16.

January

S	M	T	W	T	F	S
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31						

February

S	M	T	W	T	F	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28						

HOUSEHOLD MEMBER 1 (YOU)

11 What is your gender?

- ☐ Male
- ☐ Female

12 How old are you?
If less than 1 year, mark 0 years

☐☐ Age in years

13 Are you of Hispanic, Latino, or Spanish origin?

- ☐ Yes, of Hispanic origin
- ☐ No, not of Hispanic origin

14 What is your race? Mark one or more boxes.

- ☐ White
- ☐ Black, African-American
- ☐ Asian
- ☐ American Indian or Alaska Native
- ☐ Native Hawaiian or other Pacific Islander

Please think only about recreational saltwater fishing in North Carolina.

15 How many days did you go recreational saltwater fishing from the SHORE in North Carolina?

The shore includes docks, bridges, causeways, beaches, banks, or any other shore-based place or area. Do not include freshwater fishing.

☐ Did not recreational saltwater fish from shore in last 12 months ➔ ***Go to question 16***

☐☐ Number of days saltwater shore fishing in January and February of 2021

☐☐☐ Number of days saltwater shore fishing in last 12 months, including January and February

16 How many days did you go recreational saltwater fishing from a private or rental BOAT that returned to shore in North Carolina?

Do not include freshwater trips or trips where a paid captain or crew helped locate and catch fish.

☐ Did not recreational saltwater fish from private boat in last 12 months

☐☐ Number of days saltwater boat fishing in January and February of 2021

☐☐☐ Number of days saltwater boat fishing in last 12 months, including January and February

If you have more people in your household, continue to Household Member 2. If you have answered for all people in your household, please return your survey.

HOUSEHOLD MEMBER 2

11 What is this person's gender?

- ☐ Male
- ☐ Female

12 How old is this person?
If less than 1 year, mark 0 years

☐☐ Age in years

13 Is this person of Hispanic, Latino, or Spanish origin?

- ☐ Yes, of Hispanic origin
- ☐ No, not of Hispanic origin

14 What is this person's race? Mark one or more boxes.

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- ☐ Black, African-American
- ☐ Asian
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☐ Did not recreational saltwater fish from shore in last 12 months ➔ ***Go to question 16***

☐☐ Number of days saltwater shore fishing in January and February of 2021

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☐ Did not recreational saltwater fish from private boat in last 12 months

☐☐ Number of days saltwater boat fishing in January and February of 2021

☐☐☐ Number of days saltwater boat fishing in last 12 months, including January and February

If you have more people in your household, continue to Household Member 3. If you have answered for all people in your household, please return your survey.

HOUSEHOLD MEMBER 3

11 What is this person's gender?

- ☐ Male
- ☐ Female

12 How old is this person?
If less than 1 year, mark 0 years

☐☐ Age in years

13 Is this person of Hispanic, Latino, or Spanish origin?

- ☐ Yes, of Hispanic origin
- ☐ No, not of Hispanic origin

14 What is this person's race? Mark one or more boxes.

- ☐ White
- ☐ Black, African-American
- ☐ Asian
- ☐ American Indian or Alaska Native
- ☐ Native Hawaiian or other Pacific Islander

Please think only about recreational saltwater fishing in North Carolina.

15 How many days did this person go recreational saltwater fishing from the SHORE in North Carolina?

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☐ Did not recreational saltwater fish from shore in last 12 months ➔ ***Go to question 16***

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☐☐ Number of days saltwater boat fishing in January and February of 2021

☐☐☐ Number of days saltwater boat fishing in last 12 months, including January and February

If you have more people in your household, continue to Household Member 4. If you have answered for all people in your household, please return your survey.

Appendix B. Coastal Designations by County for Each State Sampled During 2021

State	Counties
AL	Baldwin, Clarke**, Escambia**, Mobile, Monroe, Washington**
CT*	All Counties
DE*	All Counties
FL	All Counties
GA*	Appling**, Brantley, Bryan, Bulloch**, Camden, Charlton, Chatham, Effingham, Evans**, Glynn, Liberty, Long, Mc Intosh, Pierce**, Screven**, Tattnall**, Ware**, Wayne
HI	All Counties
MA*	Barnstable, Bristol, Dukes, Essex, Middlesex, Nantucket, Norfolk, Plymouth, Suffolk
MD*	Anne Arundel, Baltimore, Baltimore City, Calvert, Caroline, Cecil, Charles, Dorchester, Harford, Howard, Kent, Montgomery, Prince Georges, Queen Annes, Somerset, St Marys, Talbot, Wicomico, Worcester
ME*	Androscoggin, Cumberland, Hancock, Kennebec, Knox, Lincoln, Penobscot, Sagadahoc, Waldo, Washington, York
MS	Forrest**, George, Greene**, Hancock, Harrison, Jackson, Pearl River, Perry**, Stone
NC	Beaufort, Bertie, Bladen, Brunswick, Camden, Carteret, Chowan, Columbus, Craven, Cumberland**, Currituck, Dare, Duplin, Durham**, Edgecombe, Franklin**, Gates, Granville**, Greene, Halifax, Harnett**, Hertford, Hoke**, Hyde, Johnston**, Jones, Lenoir, Martin, Moore**, Nash**, New Hanover, Northampton, Onslow, Pamlico, Pasquotank, Pender, Perquimans, Pitt, Richmond**, Robeson, Sampson, Scotland**, Tyrrell, Vance**, Wake**, Warren**, Washington, Wayne, Wilson
NH*	Hillsborough, Merrimack, Rockingham, Strafford
NJ*	Atlantic, Bergen, Burlington, Camden, Cape May, Cumberland, Essex, Gloucester, Hudson, Mercer, Middlesex, Monmouth, Morris, Ocean, Passaic, Salem, Somerset, Union
NY*	Bronx, Kings, Nassau, New York, Putnam, Queens, Richmond, Rockland, Suffolk, Westchester
RI*	All Counties
SC*	Allendale**, Bamberg**, Beaufort, Berkeley, Charleston, Clarendon**, Colleton, Dillon**, Dorchester, Florence, Georgetown, Hampton, Horry, Jasper, Marion, Orangeburg**, Williamsburg
VA*	Accomack, Caroline, Charles City, Chesapeake City, Chesterfield, Colonial Heights City, Dinwiddie, Essex, Fredericksburg City, Gloucester, Hampton City, Hanover, Henrico, Hopewell City, Isle Of Wight, James City, King And Queen, King George, King William, Lancaster, Mathews, Middlesex, New Kent, Newport News City, Norfolk City, Northampton, Northumberland, Petersburg City, Poquoson, Portsmouth City, Prince George, Prince William, Richmond, Richmond City, Southampton, Spotsylvania, Stafford, Suffolk City, Surry, Sussex, Virginia Beach City, Westmoreland, Williamsburg City, York

*** State is not sampled every wave; ** County is only considered coastal for waves 3 - 5**

Appendix C. Survey Supporting Materials

G1694-W1#-0008483 P005 T00063 **********5-DIGIT 28226

NORTH CAROLINA RESIDENT

February 22, 2021

Dear North Carolina Resident,

I am writing to ask for your help in a study that RTI International is conducting on behalf of the National Oceanic and Atmospheric Administration (NOAA). This survey asks questions about severe weather and outdoor activities. The results will be used to learn more about the environment and help improve the quality of marine and coastal resources.

For this study to be accurate, we need all households who receive this short survey to complete it and send it back. Your address was randomly picked from a list of addresses in North Carolina, and we can't replace you with someone else. Your responses will help all residents of North Carolina have their voices heard.

This survey asks about many outdoor activities. Some people enjoy many of these activities, while others aren't interested in these activities. **It is very important that your household complete the survey, even if no one participates in these activities.**

This survey should be completed by an adult living at this address. We have included a small gift of $2 as a way of saying thank you for your help.

This is a voluntary survey, and your responses are confidential and will only be used in combination with answers from other households. If you have any questions or comments about this study, we will be happy to talk to you. Please call 1-877-212-7229.

Thank you very much for your help with this important study. Please return your finished survey to RTI International using the enclosed postage-paid envelope.

Yours sincerely,

John Foster
Chief, Recreational Fisheries Statistics Branch
NOAA Fisheries Office of Science & Technology

No personally identifiable information will be collected through this survey. Any public release of survey data will be without identification as to its source or in aggregate statistical form.

0008483

L1

301_21199999

Commonly Asked Questions

- **How did you get my address?**
  Your address was randomly selected from all addresses in North Carolina. You and your household represent many other households in your part of North Carolina.

- **Nobody in my household participates in outdoor recreational activities. Should I still complete the survey?**
  Yes. It is important that everyone who receives this short questionnaire complete it and return it. For the results of the study to be accurate, we need basic information about all households who received the survey – regardless of whether they participate in outdoor recreational activities.

- **Why can't you interview another household instead of mine?**
  We can't select another household. For the results to be accurate, we need all households who receive this short questionnaire to complete it and send it back.

- **How much time will this survey take?**
  On average, it should take less than ten minutes to complete, including reviewing instructions, and answering the questions.

- **Who is sponsoring the survey?**
  This study is being sponsored by the National Oceanic and Atmospheric Administration (NOAA). NOAA's mission is to understand and predict changes in the Earth's environment and conserve and manage coastal and marine resources to meet our nation's economic, social, and environmental needs.

- **How will the information I provide be used?**
  This survey collects information about how outdoor and marine resources in North Carolina are used and will help us better manage these resources for the future.

  Your answers are completely confidential and will be used only for this study in accordance with the Privacy Act of 1974. Call RTI International, toll-free, at 1-877-212-7229 with questions about this survey.

North Carolina Weather and Outdoor Activity Survey
c/o RTI International (0217587.000.003)
5265 Capital Boulevard
Raleigh, NC 27616-2925

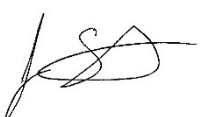
0001260 P003 T00003 *********ALL FOR AADC 283
NORTH CAROLINA RESIDENT

March 1, 2021

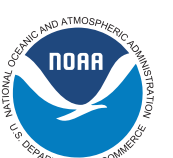
Last week we sent your household a North Carolina Weather and Outdoor Activity Survey that RTI International is conducting on behalf of the National Oceanic and Atmospheric Administration (NOAA). If you have already completed and returned the survey, please accept our sincere thanks. If not, I hope you will do so today. It should take no more than 5 to 10 minutes to fill out the survey.

RTI International and NOAA are conducting this study to learn more about outdoor activities and natural resources in North Carolina. Your responses are very important to us. Please know that your answers are completely confidential and will be used only for this study in accordance with the Privacy Act of 1974.

If you did not receive the survey or need another copy, please call RTI International toll-free at 1-877-212-7229.



John Foster
Chief, Recreational Fisheries Statistics Branch
NOAA Fisheries Office of Science & Technology



G1696-W1#-0008011 P005 T00058 **********5-DIGIT 28540

NORTH CAROLINA RESIDENT

March 18, 2021

Dear North Carolina Resident,

A few weeks ago we sent a survey to your household on severe weather events and outdoor activities. RTI International is conducting this study on behalf of the National Oceanic and Atmospheric Administration (NOAA). If you have already returned the survey, we thank you. If you have not returned it, we ask you to please complete the enclosed survey and return it in the postage-paid envelope as soon as possible.

Your completed survey will help our understanding of the environment and coastal resources in the state of North Carolina.

Your address was randomly selected from a list of all addresses in North Carolina. For this study to be accurate, we need **all** households who receive this short survey to fill it out and send it back – whether or not you participate in outdoor activities. The survey should be completed by an adult member of the household.

We are very grateful for your help. If you have any questions or comments, we will be happy to talk with you. Please call 1-877-212-7229.

Yours sincerely,

John Foster
Chief, Recreational Fisheries Statistics Branch
NOAA Fisheries Office of Science & Technology

No personally identifiable information will be collected through this survey. Any public release of survey data will be without identification as to its source or in aggregate statistical form.

0008011

L1

303_21199999

Commonly Asked Questions

- **How did you get my address?**
  Your address was randomly selected from all addresses in North Carolina. You and your household represent many other households in your part of North Carolina.

- **Nobody in my household participates in outdoor recreational activities. Should I still complete the survey?**
  Yes. It is important that everyone who receives this short questionnaire complete it and return it. For the results of the study to be accurate, we need basic information about all households who received the survey – regardless of whether they participate in outdoor recreational activities.

- **Why can't you interview another household instead of mine?**
  We can't select another household. For the results to be accurate, we need all households who receive this short questionnaire to complete it and send it back.

- **How much time will this survey take?**
  On average, it should take less than ten minutes to complete, including reviewing instructions, and answering the questions.

- **Who is sponsoring the survey?**
  This study is being sponsored by the National Oceanic and Atmospheric Administration (NOAA). NOAA's mission is to understand and predict changes in the Earth's environment and conserve and manage coastal and marine resources to meet our nation's economic, social, and environmental needs.

- **How will the information I provide be used?**
  This survey collects information about how outdoor and marine resources in North Carolina are used and will help us better manage these resources for the future.

  Your answers are completely confidential and will be used only for this study in accordance with the Privacy Act of 1974. Call RTI International, toll-free, at 1-877-212-7229 with questions about this survey.

Appendix D. Return Rates by Stratum for Waves 1 – 6, 2021

Appendix D. Return Rates by Stratum for Waves 1 – 6, 2021

Wave 1			Returns	N	% Returned
AL	Coastal	Match	217	570	38.1
		Unmatch	735	2,708	27.1
	Non-Coastal	Match	30	88	34.1
		Unmatch	397	1,448	27.4
FL	Coastal	Match	142	438	32.4
		Unmatch	339	1,175	28.9
HI	Coastal	Unmatch	2,235	5,635	39.7
MS	Coastal	Match	124	221	56.1
		Unmatch	971	3,422	28.4
	Non-Coastal	Match	20	41	48.8
		Unmatch	758	3,300	23.0
NC	Coastal	Match	581	1,494	38.9
		Unmatch	523	1,824	28.7
	Non-Coastal	Match	221	605	36.5
		Unmatch	610	2,225	27.4

Appendix D. Return Rates by Stratum for Waves 1 – 6, 2021

Wave 2			Returns	N	% Returned
AL	**Coastal**	**Match**	133	388	34.3
		Unmatch	520	1,790	29.1
	Non-Coastal	**Match**	35	94	37.2
		Unmatch	222	809	27.4
CT	**Coastal**	**Match**	321	648	49.5
		Unmatch	2,182	7,640	28.6
DE	**Coastal**	**Match**	499	1,123	44.4
		Unmatch	1,020	3,305	30.9
FL	**Coastal**	**Match**	130	448	29.0
		Unmatch	363	1,310	27.7
GA	**Coastal**	**Match**	249	735	33.9
		Unmatch	599	2,587	23.2
	Non-Coastal	**Match**	700	2,347	29.8
		Unmatch	959	4,365	22.0
HI	**Coastal**	**Unmatch**	1,517	3,948	38.4
MA	**Coastal**	**Match**	138	264	52.3
		Unmatch	3,471	11,905	29.2
	Non-Coastal	**Match**	49	101	48.5
		Unmatch	287	863	33.3
MD	**Coastal**	**Match**	390	1,229	31.7
		Unmatch	980	3,629	27.0
	Non-Coastal	**Match**	20	47	42.6
		Unmatch	55	185	29.7
MS	**Coastal**	**Match**	171	327	52.3
		Unmatch	482	1,757	27.4
	Non-Coastal	**Match**	21	55	38.2
		Unmatch	579	2,431	23.8
NC	**Coastal**	**Match**	285	766	37.2
		Unmatch	381	1,370	27.8
	Non-Coastal	**Match**	303	876	34.6
		Unmatch	187	697	26.8

Appendix D. Return Rates by Stratum for Waves 1 – 6, 2021

Wave 2			Returns	N	% Returned
NJ	Coastal	Match	222	473	46.9
		Unmatch	1,730	6,690	25.9
	Non-Coastal	Match	15	31	48.4
		Unmatch	77	261	29.5
NY	Coastal	Match	187	674	27.7
		Unmatch	2,498	12,273	20.4
	Non-Coastal	Match	128	452	28.3
		Unmatch	96	313	30.7
RI	Coastal	Match	463	1,456	31.8
		Unmatch	2,065	6,612	31.2
SC	Coastal	Match	362	926	39.1
		Unmatch	490	1,609	30.5
	Non-Coastal	Match	122	317	38.5
		Unmatch	227	861	26.4
VA	Coastal	Match	397	1,114	35.6
		Unmatch	1,562	5,854	26.7
	Non-Coastal	Match	71	167	42.5
		Unmatch	440	1,358	32.4

Appendix D. Return Rates by Stratum for Waves 1 – 6, 2021

Wave 3			Returns	N	% Returned
AL	Coastal	Match	134	359	37.3
		Unmatch	308	1,107	27.8
	Non-Coastal	Match	44	130	33.8
		Unmatch	229	1,017	22.5
CT	Coastal	Match	177	452	39.2
		Unmatch	727	2,759	26.4
DE	Coastal	Match	368	1,057	34.8
		Unmatch	494	1,743	28.3
FL	Coastal	Match	183	557	32.9
		Unmatch	233	959	24.3
GA	Coastal	Match	292	828	35.3
		Unmatch	425	2,054	20.7
	Non-Coastal	Match	140	385	36.4
		Unmatch	526	2,392	22.0
HI	Coastal	Unmatch	1,083	2,962	36.6
MA	Coastal	Match	138	314	43.9
		Unmatch	547	1,890	28.9
	Non-Coastal	Match	30	57	52.6
		Unmatch	89	303	29.4
MD	Coastal	Match	194	692	28.0
		Unmatch	392	1,611	24.3
	Non-Coastal	Match	20	54	37.0
		Unmatch	53	154	34.4
ME	Coastal	Match	169	479	35.3
		Unmatch	847	2,391	35.4
	Non-Coastal	Match	11	39	28.2
		Unmatch	23	67	34.3
MS	Coastal	Match	80	147	54.4
		Unmatch	756	2,655	28.5
	Non-Coastal	Match	17	40	42.5
		Unmatch	206	966	21.3

Appendix D. Return Rates by Stratum for Waves 1 – 6, 2021

	Wave 3		Returns	N	% Returned
NC	Coastal	Match	293	795	36.9
		Unmatch	256	952	26.9
	Non-Coastal	Match	59	175	33.7
		Unmatch	115	463	24.8
NH	Coastal	Match	241	639	37.7
		Unmatch	812	2,504	32.4
	Non-Coastal	Match	20	70	28.6
		Unmatch	89	248	35.9
NJ	Coastal	Match	161	393	41.0
		Unmatch	701	2,943	23.8
	Non-Coastal	Match	19	39	48.7
		Unmatch	16	42	38.1
NY	Coastal	Match	144	524	27.5
		Unmatch	681	3,642	18.7
	Non-Coastal	Match	53	132	40.2
		Unmatch	167	542	30.8
RI	Coastal	Match	180	448	40.2
		Unmatch	680	2,290	29.7
SC	Coastal	Match	266	688	38.7
		Unmatch	580	2,044	28.4
	Non-Coastal	Match	101	249	40.6
		Unmatch	201	740	27.2
VA	Coastal	Match	220	619	35.5
		Unmatch	542	2,059	26.3
	Non-Coastal	Match	48	159	30.2
		Unmatch	165	572	28.8

Appendix D. Return Rates by Stratum for Waves 1 – 6, 2021

Wave 4			Returns	N	% Returned
AL	Coastal	Match	162	455	35.6
		Unmatch	336	1,395	24.1
	Non-Coastal	Match	37	160	23.1
		Unmatch	223	931	24.0
CT	Coastal	Match	150	419	35.8
		Unmatch	315	1,130	27.9
DE	Coastal	Match	207	561	36.9
		Unmatch	509	1,809	28.1
FL	Coastal	Match	156	532	29.3
		Unmatch	280	1,101	25.4
GA	Coastal	Match	112	402	27.9
		Unmatch	397	1,776	22.4
	Non-Coastal	Match	201	825	24.4
		Unmatch	983	4,608	21.3
HI	Coastal	Unmatch	1,052	2,844	37.0
MA	Coastal	Match	209	567	36.9
		Unmatch	266	940	28.3
	Non-Coastal	Match	25	72	34.7
		Unmatch	67	221	30.3
MD	Coastal	Match	220	716	30.7
		Unmatch	477	1,977	24.1
	Non-Coastal	Match	27	60	45.0
		Unmatch	23	87	26.4
ME	Coastal	Match	190	583	32.6
		Unmatch	415	1,246	33.3
	Non-Coastal	Match	23	67	34.3
		Unmatch	16	55	29.1
MS	Coastal	Match	127	275	46.2
		Unmatch	404	1,672	24.2
	Non-Coastal	Match	40	83	48.2
		Unmatch	243	1,050	23.1

Appendix D. Return Rates by Stratum for Waves 1 – 6, 2021

	Wave 4		Returns	N	% Returned
NC	Coastal	Match	302	846	35.7
		Unmatch	389	1,486	26.2
	Non-Coastal	Match	65	168	38.7
		Unmatch	73	297	24.6
NH	Coastal	Match	219	670	32.7
		Unmatch	632	2,092	30.2
	Non-Coastal	Match	18	59	30.5
		Unmatch	126	365	34.5
NJ	Coastal	Match	132	337	39.2
		Unmatch	628	2,686	23.4
	Non-Coastal	Match	17	45	37.8
		Unmatch	19	95	20.0
NY	Coastal	Match	81	282	28.7
		Unmatch	376	2,012	18.7
	Non-Coastal	Match	36	70	51.4
		Unmatch	94	298	31.5
RI	Coastal	Match	139	388	35.8
		Unmatch	387	1,224	31.6
SC	Coastal	Match	349	863	40.4
		Unmatch	282	1,058	26.7
	Non-Coastal	Match	117	317	36.9
		Unmatch	168	644	26.1
VA	Coastal	Match	156	452	34.5
		Unmatch	410	1,494	27.4
	Non-Coastal	Match	54	106	50.9
		Unmatch	129	432	29.9

Appendix D. Return Rates by Stratum for Waves 1 – 6, 2021

Wave 5			Returns	N	% Returned
AL	Coastal	Match	184	506	36.4
		Unmatch	549	2,273	24.2
	Non-Coastal	Match	22	74	29.7
		Unmatch	314	1,424	22.1
CT	Coastal	Match	193	524	36.8
		Unmatch	600	2,339	25.7
DE	Coastal	Match	402	1,220	33.0
		Unmatch	555	1,970	28.2
FL	Coastal	Match	243	795	30.6
		Unmatch	265	1,129	23.5
GA	Coastal	Match	185	709	26.1
		Unmatch	464	2,093	22.2
	Non-Coastal	Match	156	704	22.2
		Unmatch	565	2,935	19.3
HI	Coastal	Unmatch	1,112	3,112	35.7
MA	Coastal	Match	238	683	34.8
		Unmatch	533	2,188	24.4
	Non-Coastal	Match	21	58	36.2
		Unmatch	176	717	24.5
MD	Coastal	Match	273	926	29.5
		Unmatch	447	1,728	25.9
	Non-Coastal	Match	17	50	34.0
		Unmatch	51	174	29.3
ME	Coastal	Match	236	827	28.5
		Unmatch	701	2,239	31.3
	Non-Coastal	Match	18	68	26.5
		Unmatch	61	197	31.0
MS	Coastal	Match	95	257	37.0
		Unmatch	726	2,823	25.7
	Non-Coastal	Match	22	68	32.4
		Unmatch	233	1,163	20.0

Appendix D. Return Rates by Stratum for Waves 1 – 6, 2021

	Wave 5		Returns	N	% Returned
NC	Coastal	Match	393	1,142	34.4
		Unmatch	270	1,039	26.0
	Non-Coastal	Match	153	389	39.3
		Unmatch	103	555	18.6
NH	Coastal	Match	428	1,275	33.6
		Unmatch	753	2,572	29.3
	Non-Coastal	Match	33	95	34.7
		Unmatch	100	296	33.8
NJ	Coastal	Match	160	426	37.6
		Unmatch	699	3,291	21.2
	Non-Coastal	Match	26	51	51.0
		Unmatch	28	95	29.5
NY	Coastal	Match	74	285	26.0
		Unmatch	814	4,356	18.7
	Non-Coastal	Match	45	155	29.0
		Unmatch	155	546	28.4
RI	Coastal	Match	241	698	34.5
		Unmatch	463	1,584	29.2
SC	Coastal	Match	396	1,054	37.6
		Unmatch	235	893	26.3
	Non-Coastal	Match	121	318	38.1
		Unmatch	135	616	21.9
VA	Coastal	Match	245	730	33.6
		Unmatch	356	1,388	25.6
	Non-Coastal	Match	58	151	38.4
		Unmatch	145	598	24.2

Appendix D. Return Rates by Stratum for Waves 1 – 6, 2021

Wave 6			Returns	N	% Returned
AL	Coastal	Match	240	617	38.9
		Unmatch	484	1,712	28.3
	Non-Coastal	Match	54	150	36.0
		Unmatch	286	1,300	22.0
CT	Coastal	Match	504	1,279	39.4
		Unmatch	2,030	7,145	28.4
DE	Coastal	Match	405	1,152	35.2
		Unmatch	1,244	4,241	29.3
FL	Coastal	Match	208	620	33.5
		Unmatch	220	966	22.8
GA	Coastal	Match	167	623	26.8
		Unmatch	517	1,988	26.0
	Non-Coastal	Match	276	1,100	25.1
		Unmatch	538	2,252	23.9
HI	Coastal	Unmatch	935	2,751	34.0
MA	Coastal	Match	552	1,459	37.8
		Unmatch	1,830	6,536	28.0
	Non-Coastal	Match	19	63	30.2
		Unmatch	347	1,151	30.1
MD	Coastal	Match	332	1,031	32.2
		Unmatch	749	2,679	28.0
	Non-Coastal	Match	12	33	36.4
		Unmatch	54	183	29.5
MS	Coastal	Match	143	347	41.2
		Unmatch	714	2,578	27.7
	Non-Coastal	Match	27	75	36.0
		Unmatch	1,146	4,986	23.0
NC	Coastal	Match	318	761	41.8
		Unmatch	373	1,301	28.7
	Non-Coastal	Match	161	451	35.7
		Unmatch	186	691	26.9

Appendix D. Return Rates by Stratum for Waves 1 – 6, 2021

Wave 6			Returns	N	% Returned
NJ	Coastal	Match	134	323	41.5
		Unmatch	1,005	4,212	23.9
	Non-Coastal	Match	21	38	55.3
		Unmatch	121	420	28.8
NY	Coastal	Match	458	1,512	30.3
		Unmatch	1,011	4,899	20.6
	Non-Coastal	Match	10	35	28.6
		Unmatch	112	388	28.9
RI	Coastal	Match	353	925	38.2
		Unmatch	1,012	3,309	30.6
SC	Coastal	Match	789	1,903	41.5
		Unmatch	647	2,188	29.6
	Non-Coastal	Match	318	741	42.9
		Unmatch	152	571	26.6
VA	Coastal	Match	209	574	36.4
		Unmatch	623	2,357	26.4
	Non-Coastal	Match	45	133	33.8
		Unmatch	142	451	31.5