

SUPPORTING STATEMENT
U.S. Department of Commerce
National Oceanic & Atmospheric Administration
Marine Recreational Information Program Fishing Effort Survey
OMB Control No. 0648-0652

B. COLLECTIONS OF INFORMATION EMPLOYING STATISTICAL METHODS

1. Describe (including a numerical estimate) the potential respondent universe and any sampling or other respondent selection method to be used. Data on the number of entities (e.g. establishments, State and local governmental units, households, or persons) in the universe and the corresponding sample are to be provided in tabular form. The tabulation must also include expected response rates for the collection as a whole. If the collection has been conducted before, provide the actual response rate achieved.

The MRIP Fishing Effort Survey (FES) is a bi-monthly (wave), cross-sectional mail survey designed to estimate the total number of private boat and shore-based recreational, saltwater fishing trips taken by residents of coastal states. For each administration, the FES utilizes address-based samples (ABS) covering Hawaii and 16 coastal states along the Atlantic coast and Gulf of Mexico (Maine through Alabama). The sample frame is derived from the USPS Computerized Delivery Sequence File (CDS) and includes all full-time (non-seasonal), residential addresses, with the exception of PO boxes that are not flagged as the only way to get mail. Sampling is stratified both geographically and by angler license status. Within each state, sampling is stratified into coastal and non-coastal sub-state regions defined by geographic proximity to the coast. For the purpose of the FES, 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, and Florida are not geographically stratified due to relatively consistent rates of fishing among counties.

Within the geographic strata, addresses are matched to the National Saltwater Angler Registry (NSAR), which consists of state lists of licensed saltwater anglers. This creates two additional strata; license matched (households with one or more licensed anglers) and license unmatched (households that cannot be matched to NSAR). This stratification provides additional information to optimize sampling. Within each stratum, addresses are selected in a single stage using simple random sampling.

Table 1 provides the sample universe, annual target sample sizes, and estimated number of completed household interviews for each state. The sample sizes for each state and wave are expected to result in estimates of total fishing effort with coefficients of variation of 0.20 or less. Within each state and wave, sample are allocated using a Neyman approach, where the sample is distributed among strata in proportion to the product of the population size and the standard deviation. Standard deviations are based upon historical FES data and estimates.

Table 1. Estimated size of the sample universe, annual target sample sizes, expected response rates and estimated number of completed household surveys.

State	Estimated Number of Households ¹	Target FES Sample Size	Expected Response Rate (%)	Estimated Completed Interviews ²
AL	1,861,977	23,815	30.7	7,321
CT	1,356,762	20,161	32.7	6,588
DE	357,937	16,128	34.1	5,492
FL	7,694,069	10,116	30.7	3,108
GA	3,740,163	33,800	26.6	9,007
HI	458,075	15,458	39.6	6,128
ME	549,870	9,055	36.9	3,338
MD	2,206,854	19,151	32.2	6,168
MA	2,605,314	30,280	32.8	9,943
MS	1,106,063	21,598	30.9	6,677
NH	529,216	12,751	34.6	4,407
NJ	3,218,798	22,128	28.5	6,307
NY	7,311,723	33,416	23.1	7,716
NC	3,955,354	20,368	33.6	6,838
RI	408,675	20,624	34.3	7,080
SC	1,910,576	19,518	34.5	6,725
VA	3,133,590	21,700	33.0	7,156
Overall	42,405,016	350,065	31.4	110,000

*The denominator for the calculation of response rates includes all addresses, including those returned by the postal service as non-deliverable. Based upon historical FES administrations, approximately 6% of addresses will be returned as non-deliverable. In 2020, the overall response rate, excluding non-deliverable addresses, was approximately 33.3%.

2. Describe the procedures for the collection, including: the statistical methodology for stratification and sample selection; the estimation procedure; the degree of accuracy needed for the purpose described in the justification; any unusual problems requiring specialized sampling procedures; and any use of periodic (less frequent than annual) data collection cycles to reduce burden.

2.1. Statistical Methodology and Data Collection Procedures

The FES is a self-administered mail survey. As described in detail in Question 1, sample selection is based on stratification of the target population by geography and angler license status. Data collection procedures have been extensively tested through several pilot studies (Andrews et al. 2010, 2014; Brick et al. 2012a). Each year, the survey is administered for six, two-month reference waves. The data collection period for each wave begins one week prior to the end of the wave with an initial survey mailing. The timing of the initial mailing is such that materials are received prior to the end of the reference wave. The initial mailing is delivered by

¹ Source: American Community Survey, 2019

² Results may vary due to rounding errors associated with the Expected Response Rate.

regular first class mail and includes a cover letter stating the purpose of the survey, a survey questionnaire, a post-paid return envelope, and a prepaid cash incentive (as described in section A.9).

One week following the initial mailing, a thank you/reminder postcard is sent via first class mail to all sample units. Three weeks after the initial survey mailing, a follow-up mailing is delivered to all sample units that have not responded to the survey. The follow-up mailing is delivered via first class mail and includes a nonresponse conversion letter, a second questionnaire and a post-paid return envelope.

2.2. Estimation Procedures

The FES estimates fishing effort (angler trips) by residents of sampled states. An adjustment to account for non-resident fishing activity is derived from the MRIP Access-Point Angler Intercept Survey (APAIS, OMB Control No. 0648-0052).

Final FES weights 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) and license match (matched or unmatched). In addition to these stratification variables, samples are matched by address to state lists of registered boats, which is subsequently included in the formation of nonresponse adjustment cells. The base weights of the respondents in each adjustment cell ($w_{ci,r}$) are then divided by the response rate for that cell ($\hat{\phi}_c$) to calculate the adjusted weight (w_{ci}^i)

$$w_{ci}^i = \frac{w_{ci,r}}{\hat{\phi}_c}$$

where $\hat{\phi}_c = \frac{\sum_{i \in c} w_{ci,r}}{\sum_{i \in c} w_{ci,r} + \sum_{i \in c} w_{ci,nr}}$,

$\sum_{i \in c} w_{ci,r}$ is the sum of the base weights of each respondent within adjustment cell c , and
 $\sum_{i \in c} w_{ci,nr}$ 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 variables. Raked weights are calculated as

$$w_{ri}^{\dot{i}} = w_{ci}^{\dot{i}} R_s$$

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 are used as population control totals. Raked weights are post-stratified to household-level control totals within coastal and non-coastal strata. The resulting post-stratified weight ($w_{hi}^{\dot{i}}$) of address i in stratum h is calculated as

$$w_{hi}^{\dot{i}} = w_{ri}^{\dot{i}} \left(\frac{H_h}{\widehat{H}_h} \right)$$

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).

Estimates of fishing effort by residents of coastal states, as well as associated estimates of variance, are calculated in SAS Version 9.4 using the survey means procedure. For each state and wave, total resident effort is calculated as a weighted sum over the sample

$$\widehat{Y}_r = \sum_{\square} \sum_{\square} \omega_{hi}^{\dot{i}} y_{hi}$$

where $\omega_{hi}^{\dot{i}}$ and y_{hi} are the final weight and reported number of recreational fishing trips, respectively, for address i in stratum h .

Variance is estimated using the Taylor series linearization

$$\widehat{V}(\widehat{Y}_r) = \sum_{\square} \frac{n_h}{n_h - 1} \left(\sum_{\square} w_{hi}^{\dot{i}} y_{hi} - \frac{1}{n_h} \sum_{\square} w_{hi}^{\dot{i}} y_{hi} \right)^2$$

Adjustments to account for fishing activity by non-resident anglers are estimated from the APAIS. For each coastal state and wave, resident effort is adjusted by the inverse of the estimated proportion of fishing trips taken by resident anglers (\hat{p}_r) to estimate total effort (\hat{Y}_t),

$$\hat{Y}_t = \hat{Y}_r \hat{p}_r^{-1}$$

and

$$\hat{V}(\hat{Y}_t) = \frac{\hat{V}(\hat{Y}_r)}{\hat{V}(\hat{p}_r)} = \frac{1}{\hat{p}_r^2} \hat{V}(\hat{Y}_r) + \frac{\hat{Y}_r^2}{\hat{p}_r^4} \hat{V}(\hat{p}_r)$$

where the proportion is estimated from APAIS data as the weighted mean of an indicator variable.

$$\hat{p}_r = \frac{\left(\sum_h \sum_i \sum_j w_{hij} p_{hij} \right)}{\sum_h \sum_i \sum_j w_{hij}}$$

$$p_{hij} = \{1, \text{resident intercept} \wedge 0, \text{non-resident intercept}\}$$

and

$$\hat{V}(\hat{p}_r) = \sum_h \frac{n_h}{n_h - 1} \sum_i \left(\frac{\left(\sum_j w_{hij} (p_{hij} - \hat{p}_r) \right)}{\sum_h \sum_i \sum_j w_{hij}} - \sum_i \frac{\left(\frac{\left(\sum_j w_{hij} (p_{hij} - \hat{p}_r) \right)}{\sum_h \sum_i \sum_j w_{hij}} \right)}{n_h} \right)^2$$

3. Describe the methods used to maximize response rates and to deal with nonresponse. The accuracy and reliability of the information collected must be shown to be adequate for the intended uses. For collections based on sampling, a special justification must be

provided if they will not yield "reliable" data that can be generalized to the universe studied.

Previous administrations of the FES resulted in response rates ranging from 25-40%. We expect a similar response for future administrations of the survey.

The expected response rates will be achieved by using standard mail survey protocols (Dillman et al, 2008). An initial mailing will include an introductory letter stating the purpose of the survey, the survey questionnaire, a business reply envelope, and a prepaid, \$2.00 cash incentive. During testing of the FES design, a \$2.00 incentive was found to be optimal in terms of maximizing response and minimizing data collection costs. A thank-you/reminder postcard will be administered to all sample units one week following the initial mailing. A final mailing, including a second questionnaire, a nonresponse conversion letter, and a business reply envelope will be sent to all nonrespondents three weeks after the initial mailing.

We will minimize nonresponse bias by using a questionnaire that maximizes responses by the entire sample population, including both fishing and non-fishing households. Testing of the FES design included two versions of the survey instrument, a fishing-specific version and a more general version that included non-fishing questions. The FES will utilize the more general "Weather and Outdoor Activity Survey" instrument, which provided the most representative sample of the general population during testing.

FES testing also included a nonresponse follow-up study to assess nonresponse bias in the data collection design. Each wave, 400 nonrespondents were sampled for the follow-up study. Data collection for the nonresponse study was initiated six weeks after the final contact for the FES with the delivery of an advanced letter via regular first-class mail. Five days later, a survey packet, including a cover letter, questionnaire (the same questionnaire used in the FES), post-paid return envelope, and a \$5.00 cash incentive was delivered via FedEx (USPS Priority Mail was used where FedEx is unavailable). A thank you/reminder postcard was delivered eight days after the FedEx.

The nonresponse follow-up study achieved a 40% response rate, and respondents to the nonresponse follow-up study were not significantly different from FES respondents in terms of recreational fishing activity. These findings suggest that nonresponse bias in the FES is minimal. A second nonresponse follow-up study was implemented in 2020 and found similar results – follow-up study respondents were not significantly different from FES respondents with respect to fishing activity (Andrews 2021).

Finally, the FES will use information from the sample frame to define weighting classes for nonresponse weighting adjustments (as described above). Weighting classes are defined such that response rates and fishing activity are similar within classes. Andrews et al. (2010) and Andrews (2021) describe the effect of weighting adjustments on reducing nonresponse bias.

4. Describe any tests of procedures or methods to be undertaken. Tests are encouraged as effective means to refine collections, but if ten or more test respondents are involved OMB must give prior approval.

One-Month Wave Study: In reviews of the Marine Recreational Information Program completed in 2017 and 2021, the National Academies of Sciences, Engineering, and Medicine (NAS) concluded that implementation of annual catch limits (ACL's) is challenged by the lack of timeliness in survey data, resulting in lost fishing opportunities, and that two-month waves make it difficult for fishery managers to respond to changes in a fishery as they are happening. The Modernizing Recreational Fisheries Management Act (MFA) of 2018 (P.L. 115-405) incorporated findings from the 2017 NAS review, requiring MRIP to consider its findings. Transitioning to one-month waves in the FES would address NAS recommendations, as required by the Magnuson-Stevens Fishery Conservation and Management Reauthorization Act (MSRA) of 2006 (P.L. 109-479) and MFA, and increase the utility of the survey by supporting in-season management of fisheries.

The one-month wave pilot study will be administered concurrently with the production FES to evaluate the impact of the revised reference period on measures of reported fishing activity and collect the data necessary to calibrate historical fishing effort estimates. To account for possible geographic and temporal effects of questionnaire changes on reporting, as well as support state-level calibrations, the study will be conducted in all FES states (ME-MS and HI) for 12 consecutive months, beginning with January, 2024 and concluding with December, 2024.

The pilot study questionnaire is included as Appendix 3. With the exception of the reference periods, the survey materials for the experiment, including the questionnaire, cover letters, postcard and envelopes, will be identical to the FES. Addresses will be sampled for the study at the beginning of each reference month. Otherwise, all sampling, data collection, data processing and sample weighting procedures for the pilot study will be consistent with the production FES. The total annual sample size for the pilot study, 700,130 addresses, will be sufficient to produce monthly estimates with similar precision levels to current FES bi-monthly estimates. For each reference month, the total number of sampled addresses and the allocation of sample among states and sub-state strata, will match the FES sample allocation for the corresponding reference wave. This will provide sufficient power to detect differences between questionnaire versions and support precision requirements for calibration.

5. Provide the name and telephone number of individuals consulted on the statistical aspects of the design, and the name of the agency unit, contractor(s), grantee(s), or other person(s) who will actually collect and/or analyze the information for the agency.

Statistical support was provided by the following:

Dr. J. Michael Brick, Westat, 301-294-2004

Rob Andrews, Fisheries Biologist, NOAA Fisheries Service, Office of Science and Technology, 301-427-8105 is the point-of-contact for the Agency.

John Foster, Chief, Recreational Fisheries Statistics Branch, NOAA Fisheries Service, Office of Science and Technology, 301-427-8130.

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