SUPPORTING STATEMENT
**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.**

1.1. MRIP Fishing Effort Survey

The MRIP Fishing Effort Survey (MFES) is bi-monthly (wave), cross-sectional mail
survey designed to estimate the total number of individuals who participate in marine
recreational fishing and the total number of private boat and shore-based recreational
fishing trips taken by anglers in the study states. The survey consists of two
independent components; 1) the Resident Angler Survey (RAS), which estimates
saltwater fishing effort by residents of coastal states, and 2) the Nonresident Angler
Survey (NAS), which estimates saltwater fishing effort by residents of non-coastal
states. The RAS is an address-based sample (ABS) that covers all residential
addresses within the study states. The NAS is a list-based sample that covers
individuals who are licensed to participate in saltwater fishing in the study states but
reside in a different state.

1.2. Resident Angler Survey

The sample universe for the RAS includes all residential addresses within the study
area that are serviced by the United States Postal Service (USPS). Sampling is
stratified by coastal state and geographic proximity to the coast within each state.
Specifically, counties with any border that is within 25 miles of the coast are in the
coastal stratum, and all other counties are in the non-coastal stratum[1]. Geographic
stratification within states provides an opportunity to sample different segments of the
population at different rates, thereby increasing the efficiency of data collection. For
example, historical estimates from the Marine Recreational Fisheries Statistics Survey
(MRFSS) demonstrate that 65-90% of recreational saltwater fishing trips are taken by
residents of coastal counties. Subsequently, addresses in coastal strata are sampled at
a higher rate.

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[1] Florida is not stratified due to the relatively high rate of fishing across the state, and Connecticut,
Delaware, Hawaii, Puerto Rico and Rhode Island are not stratified due to the small geographic areas of
the states.

Each wave, a representative sample of addresses is selected for each stratum in a single stage from a comprehensive list of residential addresses maintained by a vendor licensed to distribute the USPS Computerized Delivery Sequence File. In each state, sampled addresses are matched, by address and telephone number, to databases of anglers who are licensed to participate in saltwater fishing in the respective state. License databases are provided to NMFS by state natural resource agencies approximately one month prior to the beginning of data collection for each wave. Prior to matching, addresses within the license databases are formatted to conform to USPS postal addressing standards, and duplicate angler records are identified and removed.

Matching addresses to license databases screens the ABS sample to identify households with (matched) and without (unmatched) licensed anglers, effectively stratifying the sample into matched and unmatched strata (Lohr, 2009). Augmenting the ABS sample in this manner provides an additional opportunity to optimize sampling - previous studies (Andrews et al., 2010, Brick et al., 2012a, MFES pilot study) have demonstrated that residents of households that match to license databases respond to fishing surveys at a higher rate and are more likely to have fished during the reference wave than residents of unmatched households.

Table 1 provides the sample universe, target sample sizes and estimated number of completed household interviews for each stratum within a given reference wave, and **Table 2** provides the annual target sample size and expected number of completed interviews for each state. The target sample size is achieved by retaining all matched addresses from an initial ABS sample, and sub-sampling unmatched addresses at a rate of approximately 30%. Within each state, sample is optimally allocated among strata to maximize the precision of estimates of total fishing effort. The allocation and expected response rates are based upon results of the MFES pilot study and will be reassessed following each wave. Target sample sizes are expected to result in a completed number of household surveys that will achieve a coefficient of variation of 15% on estimates of total fishing effort[2] for each state and wave.

Table 1. Estimated size of the sample universe, target sample sizes, expected response rates and estimated number of completed household interviews per wave for the Resident Angler Survey.

State	Geographic Stratum	Estimated Number of Households	Target ABS Sample Size[3]	Expected Response Rates[4]	Estimated Completed Interviews
AL	Coastal	1,661,055	2,775	43.8%	1,215

[2] Total fishing effort includes fishing by both resident (RAS) and nonresident anglers (NAS).

[3] Target sample sizes reflect the number of addresses that will be mailed a survey questionnaire and are achieved by retaining all addresses from initial ABS samples that match to a state license database and 30% of addresses that do not match.

[4] Estimated response rates and sampling requirements are based upon results from the MFES pilot study and are assumed to be uniform among states within a region (e.g. New England, Mid Atlantic, South Atlantic and Gulf).

AL	Noncoastal	244,831	307	43.8%	135
CT	Coastal	1,376,955	2,842	47.5%	1,350
DE	Coastal	349,794	4,141	32.6%	1,350
FL	Coastal	7,631,375	3,082	43.8%	1,350
GA	Coastal	3,447,326	2,608	46.6%	1,215
GA	Noncoastal	247,113	326	41.2%	135
HI	Coastal	466,705	3,230	41.8%	1,350
LA	Coastal	828,328	2,775	43.8%	1,215
LA	Noncoastal	945,732	307	43.8%	135
MA	Coastal	631,148	2,416	47.5%	1,147
MA	Noncoastal	1,956,720	413	49.1%	203
MD	Coastal	244,923	3,199	32.6%	1,043
MD	Noncoastal	1,954,989	669	45.9%	307
ME	Coastal	97,900	2,415	47.5%	1,147
ME	Noncoastal	462,106	413	49.1%	203
MS	Coastal	948,126	2,775	43.8%	1,215
MS	Noncoastal	180,716	307	43.8%	135
NC	Coastal	3,065,955	2,608	41.1%	1,215
NC	Noncoastal	787,088	327	46.6%	135
NH	Coastal	144,104	2,415	47.5%	1,147
NH	Noncoastal	378,763	413	49.1%	203
NJ	Coastal	142,908	3,199	32.6%	1,043
NJ	Noncoastal	3,095,540	669	45.9%	307
NY	Coastal	2,788,575	3,199	32.6%	1,043
NY	Noncoastal	4,620,155	669	45.9%	307
PR	Coastal	1,181,112	3,230	41.8%	1,350
RI	Coastal	413,196	2,842	47.5%	1,350
SC	Coastal	1,254,690	2,608	41.1%	1,215
SC	Noncoastal	598,096	327	46.6%	135
VA	Coastal	1,744,021	3,199	32.6%	1,043
VA	Noncoastal	1,393,148	669	45.9%	307
Total		45,283,193	61,373	41.8%	25,650

Table 2. Annual target sample sizes and estimated number of completed interviews for the Resident Angler Survey.

State	Target ABS Sample Size	Expected Response Rates	Estimated Completed Interviews
AL	18,492	43.8%	8,100
CT	14,210	47.5%	6,750
DE	20,705	32.6%	6,750
FL	18,492	43.8%	8,100
GA	14,670	46.0%	6,750

HI	19,380	41.8%	8,100
LA	18,492	43.8%	8,100
ME	14,145	47.7%	6,750
MD	19,340	34.9%	6,750
MA	14,145	47.7%	6,750
MS	18,492	43.8%	8,100
NH	14,145	47.7%	6,750
NJ	19,340	34.9%	6,750
NY	19,340	34.9%	6,750
NC	17,604	46.0%	8,100
RI	14,210	47.5%	6,750
SC	14,670	46.0%	6,750
VA	19,340	34.9%	6,750
PR	19,980	40.5%	8,100
Total	329,192	41.8%	137,700

1.3. Nonresident Angler Survey

Non-resident anglers are sampled from lists of individuals who are licensed to participate in saltwater fishing in each study state. The sample frame for each state consists of anglers who were licensed to fish in the state (license state) during the wave but reside in another state. Databases of licensed anglers are provided to NMFS by state natural resource agencies approximately one month prior to the beginning of data collection for each wave. Prior to sampling, addresses within the license databases are formatted to conform to USPS postal addressing standards, and duplicate angler records, as well as records for individuals less than18 years of age are identified and removed.

Each wave, a simple random sample of licensed anglers is selected from each state's license frame. The survey instrument collects information about recent saltwater fishing activity for the sampled angler, as well as any other individuals who reside at the same address as the sampled angler; each sampled angler represents a cluster of anglers who reside at the same address. **Table 3** provides the sample universe, sample size, expected response rates and estimated number of completed surveys for each state within a given reference wave, and **Table 4** provides the annual sample size and expected number of completed interviews for each state.

Table 3. Estimated size of the sample universe, sample sizes, expected response rates and estimated number of completed interviews per wave for the Nonresident Angler Survey.

State	Estimated Number of Nonresident Anglers[5]	Sample Size	Expected Response Rate[6]	Estimated Completed Interviews

[5] Based upon participation estimates from the Marine Recreational Fisheries Statistics Survey

AL	341,049	244	61.4%	150
CT	67,024	241	62.2%	150
DE	150,946	279	53.7%	150
FL	2,654,378	244	61.4%	150
GA	72,437	212	70.8%	150
HI	223,717	234	64.1%	150
LA	164,403	244	61.4%	150
ME	126,542	241	62.2%	150
MD	258,122	279	53.7%	150
MA	308,116	241	62.2%	150
MS	91,219	244	61.4%	150
NH	53,958	241	62.2%	150
NJ	431,069	279	53.7%	150
NY	53,123	279	53.7%	150
NC	761,744	212	70.8%	150
PR	13,795	234	64.1%	150
RI	768,799	241	62.2%	150
SC	406,195	212	70.8%	150
VA	193,905	279	53.7%	150
Total	7,140,541	4,683	60.9%	2,850

[6] Estimated response rates are based upon results from the MFES pilot study and are assumed to be uniform among states within a region.

Table 4. Annual sample sizes and estimated number of completed interviews for the Nonresident Angler Survey.

State	Sample Size	Expected Response Rate	Estimated Completed Interviews
AL	1,466	61.4%	900
CT	1,206	62.2%	750
DE	1,397	53.7%	750
FL	1,466	61.4%	900
GA	1,059	70.8%	750
HI	1,404	64.1%	900
LA	1,466	61.4%	900
ME	1,206	62.2%	750
MD	1,397	53.7%	750
MA	1,206	62.2%	750
MS	1,466	61.4%	900
NH	1,206	62.2%	750
NJ	1,397	53.7%	750
NY	1,397	53.7%	750
NC	1,271	70.8%	900
PR	1,404	64.1%	900
RI	1,206	62.2%	750
SC	1,059	70.8%	750
VA	1,397	53.7%	750
Total	25,073	61.0%	15,300

A resident of a study state who is also licensed to fish in one of the other study states could be sampled for both the RAS and the NAS. However, given the sampling rates, it is extremely unlikely (less than 1/10 of 1%) that the same individual would be sampled from both frames. Each wave, sample from each frame will be cross-checked against the other sample to identify any duplicates. If this situation were to occur, the NAS sample will be withheld and treated as a special case of nonresponse.

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. Data Collection Procedures

The RAS and NAS are both single-phase, self-administered mail surveys, and data collection procedures for the two survey components are identical. These data collection procedures have been extensively tested through previous MRIP pilot

studies (Andrews et al. 2010, Brick et al. 2012a). Each year, the surveys are 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 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 follow-up thank you/reminder contact is initiated. For sample units with an attached landline telephone number (sample units for which a landline telephone number can be found through a lookup service), an automated voice message is delivered to remind sample units to complete and return the questionnaire. Previous studies have demonstrated that varying the delivery mechanism, for example, switching from regular first class mail to telephone or special mail, may improve response rates in mail surveys (Brick et al., 2012b). For sample with no associated landline telephone number, a thank you/reminder postcard is sent via regular fist class mail. We expect to identify landline telephone numbers for approximately 50% of sampled addresses.

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

Final sample weights for both the RAS and the NAS are calculated in stages. In the first stage, base sample weights within each stratum are calculated as the inverse of the selection probability ($\omega_i = \pi_i^{-1}$, where π_i is the probability of selecting unit i for the sample). In the RAS, base weights for addresses that cannot be matched to an angler license database (sample units in the unmatched strata), are adjusted to account for subsampling by multiplying the base weight by the inverse of the subsampling rate.

In the second stage, base weights (or adjusted base weights in unmatched RAS strata) are adjusted to account for nonresponse. Specifically, the weights of nonresponding units are increased by the inverse of the weighted response rate within nonresponse adjustment cells

$$\omega_{ci}^{\lambda} = \omega_{ci} \widehat{\varnothing}_c^{-1}$$

where

$$\widehat{\varnothing}_c = \sum^r \omega_{ci} / (\lambda \sum^r \omega_{ci} + \sum^m \omega_{ci}) \lambda$$

and $\sum^{r} \omega_{ci}$ and $\sum^{m} \omega_{ci}$ are the sums of base weights in cell c for respondents and nonrespondents, respectively. Weights for all individuals who reside at a sampled address are equal to the final sample weight for the address.

In the RAS, nonresponse adjustment cells will be defined by state or residence, coastal/non-coastal county, matched/unmatched designation, and whether or not the address was successfully matched to a landline telephone number. In the NAS, adjustment cells will be at the stratum level (license state). Other potential criteria for defining nonresponse adjustment cells will be examined after each wave of data collection and may include demographic information and type of recreational fishing license.

Estimates of total fishing effort, as well as associated estimates of variance, are calculated in SAS Version 9.3 using the surveymeans procedure. For a given coastal state and wave, total effort is the sum of resident angler effort (from RAS) and nonresident angler effort (from NAS), both of which are calculated as weighted sums

$$\hat{Y} = \sum_{h=1}^{H} \sum_{i=1}^{n_h} \sum_{j=1}^{m_{hi}} \omega_{hij}^{¿} y_{hij}$$

where $\omega_{hij}^{¿}$ and y_{hij} are the final weight and reported number of recreational fishing trips, respectfully, for unit j at address i of stratum h.

Variance of the total effort estimate is estimated using the Taylor series method

$$\hat{V}(\hat{Y}) = \sum_{h=1}^{H} \hat{V}_h(\hat{Y})$$

where

$$\hat{V}_h(\hat{Y}) = \frac{n_h(1-f_h)}{n_h-1} \sum_{i=1}^{n_h} (y_{hi\cdot} - \bar{y}_{h\cdot\cdot})^2$$

$$y_{hi\cdot} = \sum_{j=1}^{m_{hi}} w_{hij}^{¿} y_{hij}$$

$$\bar{y}_{h\cdot\cdot} = \left(\sum_{i=1}^{n_h} y_{hi\cdot} \right) / n_h$$

For estimating total fishing effort, we expect stratification to be more effective than simple random sampling due to the higher rate of sampling in coastal strata and of licensed households. Results from the MFES for waves 5-6, 2012 resulted in an overall design effect of 0.72 for estimates of total fishing effort.

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.

Through three waves of the MFES pilot study, response rates for the RAS and NAS are 41.8% and 60.9 %, respectively when a $2.00 cash incentive is included in the initial survey mailing. We expect similar response for the MFES when the survey is expanded to additional states.

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 the initial waves of the MFES pilot study, a $2.00 incentive was found to be optimal in terms of maximizing response and minimizing data collection costs. Either a thank-you/reminder postcard or automated voice message 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 anglers and non-anglers. The MFES pilot study tested two versions of the survey instrument. The MFES will utilize the "Weather and Outdoor Activity Survey" instrument, which provided the most representative sample of the general population in the MFES pilot study.

The MFES pilot study 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 RAS and the NAS with the delivery of an advance letter via regular first-class mail. Five days later, a survey packet, including a cover letter, questionnaire (the same questionnaire used in the RAS and NAS), 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.

To date, the nonresponse follow-up study has achieved a 40% response rate, and respondents to the nonresponse follow-up study are not significantly different from RAS and NAS respondents in terms of recreational fishing activity. These findings suggest that nonresponse bias in the RAS and NAS is minimal.

We will continue to assess nonresponse bias as the MFES is expanded to additional states. First, we will compare early and late responders with respect to reported fishing activity. This analysis will identify differences in respondents based upon the level of effort required to solicit a response. Previous studies (Brick et al., 2012,

MFES pilot study) demonstrated that early and late responders are similar in terms of reported recreational fishing activity.

We will also utilize information from sample frames to define weighting classes for post survey weighting adjustments. Weighting classes will be defined such that response rates and fishing activity are similar within classes. Nonresponse bias will be measured by comparing unadjusted estimates to estimates that have been adjusted to account for differential nonresponse among weighting classes. Previous studies identified differential nonresponse and reported fishing activity between households with and without licensed anglers and demonstrated that nonresponse weighting adjustment decreased estimates of fishing effort by 25% over unadjusted estimates (Andrews et al., 2010).

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.

No additional testing is planned.

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

References

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