SUPPORTING STATEMENT
MARINE RECREATIONAL FISHERY STATISTICS SURVEY
OMB CONTROL NO. 0648-0052

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 survey, which will be conducted in North Carolina, will utilize a dual-frame approach to sample recreational, saltwater anglers. The sample universe is all saltwater anglers in NC. The sample will be selected from state databases of licensed, saltwater anglers and address frames derived from the USPS DSF. The license frames include all anglers who have a saltwater fishing license for NC, and the DSF frames will include all households within the study areas.

	NC License Frame	NC USPS DSF	Totals
Frame Size	540,000[1]	3,496,600[2]	
Sample Size	15,200	35,000	50,200
Complete Screeners	6,080 (40%)	10,500 (30%)	16,580
Eligible (Active) Anglers	2,432	1,050	3,482
Complete Diaries	1,459[3]	630[3]	2,089

1. Approximate number of licensed saltwater anglers as of 12/31/2008.

2. Estimated number of occupied housing units (Demographics USA, 2008).

3. Assumes that 75% of eligible respondents will agree to participate in the follow-up diary survey, and a subsequent response rate of 80%. of the75%, or an overall response rate of 60%.

A primary goal of this study is to determine the response rates that can be achieved in a recreational fishing mail survey. Based upon the survey literature, we expect response rates to the screener questionnaire for the license frame and address frame samples to be approximately 40% and 30%, respectively. The higher response rate assumption for the license frame samples is premised on licensed anglers being more willing to participate in the survey than the general population.

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.

The survey includes a screener questionnaire to generally characterize respondents' fishing activity and collect fishing effort data, and a follow-up diary survey to collect information about the types and numbers of fish caught. The screener questionnaire will be used to estimate fishing effort, as well as identify a sample of anglers from which to collect more detailed catch information in the diary survey. The diary survey will be used to compare catch characteristics and catch rates between angler trips that would be accessible to field samplers (public-access trips) and angler trips that would not be accessible to field samplers (private-access trips).

This study will use a mail survey as an alternative to the random-digit-dialing (RDD) telephone survey for the household component of the dual-frame. The survey will be conducted in North Carolina to evaluate the procedure and processes.

A major reason for examining the replacement of the RDD survey, the CHTS, with a mail survey is the incompleteness of the RDD frame. Exclusions from the RDD frame are not completely remedied by the existing dual frame approach since the license frame is also incomplete due to licensing exemptions. The main sources of under-coverage in CHTS are households that do not reside in coastal counties, households without landline telephone service (Blumberg and Luke (2008) estimate this at 18% of households at the end of 2007), and households that have landline numbers that are excluded in standard RDD list-assisted samples (Fahimi, Kulp, and Brick (2008) estimate about 20% of all landline telephone households are not in the standard RDD frame). Additional benefits of mail surveys are described in more detail below.

The purpose of this project is to test mail surveys as alternatives to telephone surveys in the dual-frame approach. Generally, address frames are more complete and likely provide more accurate contact information than telephone survey frames. The pilot test is intended to examine various aspects of a dual-frame approach using a mail survey with samples selected from a general household address frame and from an angler license frame. Specifically, the goals of the pilot study are to, 1) assess the coverage of the independent sample frames (license and address frames), 2) assess the response rates that can be achieved by using a mail survey from both the general population and the license frame, 3) assess the timeliness of mail surveys for estimating recreational fishing effort, and 4) determine if overlapping sample frame units (units on both sample frames) can be identified by matching addresses, rather than relying on survey responses, as is currently done in the dual-frame telephone surveys. The ability to match sample frames by address is of particular consequence, as it will provide data for both respondents and non-respondents, reduce the potential for measurement error, and reduce the length of the questionnaire by eliminating the need for questions designed to identify overlapping frame units.

Dual-Frame Approach

The target population for the survey is all households that have at least one eligible angler. The CHTS attempts to survey this population by means of an RDD sample of households that live in

counties along the coast. The dual-frame approach samples households that are defined as being accessible by the union of the address frame and the license registration frame.

The address and license frames are overlapping. In fact, the license frame is essentially a subset of the address frame (households in the license frame should also be on the address frame). More generally, the union of the frames consists of three domains: households in address frame but not in the license frame (S_1), households in the license frame but not the address frame (S_2), and households in both frames (S_{12}). If the address frame were complete, then S_2 would be empty. The completeness of the address frame (and the extent that S_2 is null) will be evaluated.

Independent samples will be selected from the two frames, and estimates of total numbers of participants and fishing effort will be made from each of the three domains. From the address frame, estimates are made for S_1 and S_{12}; from the license frame estimates are made of S_2 and S_{12}. Since both frames estimate the characteristics for the overlap domain (S_{12}), these two will be averaged to produce a more precise estimate for S_{12}. The three estimates are then summed to produce an estimate of the total population. More details are given on the frames and the methods of sampling from the frames below.

The Address Frame

The address frame is derived from the USPS Delivery Sequence Files (DSF). Several commercial organizations have obtained and enhanced the DSF, and these are available for sampling purposes. The sampling for a mail survey includes all households, not just coastal county households, thus eliminating one of the sources of undercoverage in the CHTS.

A stratified sample will be selected from the address frame, with different sampling rates in the strata. Coastal counties will be included in one stratum, and the remaining counties will be in the second stratum. Since a much higher rate of eligibility is expected in the coastal counties, optimal allocation rules would result in higher sampling rates being applied in the coastal county stratum than in the remainder stratum. For this study, the optimal allocation is not as relevant since the goals of the survey are to better understand the response mechanisms in this new approach rather than estimating specific population parameters.

The License Frame

The license frame is the list of anglers who are licensed to participate in saltwater fishing in NC. The state maintains a list of licensed anglers as part of its regular administrative systems. Angler lists will be pre-processed to identify anglers with duplicate listings and households with multiple anglers (the survey will be at the household level and not specific to an angler living at the household).

The license frame will be stratified into the same two geographic strata used in the address frame, i.e., coastal counties and non-coastal counties. In addition, a third stratum that includes non-resident anglers will be sampled. After counts of the number of licensed anglers in each stratum have been determined, the sample will be allocated so that a large enough sample is selected from each stratum to allow response rates to be estimated reasonably in each stratum.

One of the advantages of a mail survey over a telephone survey in a dual frame approach is that determining the overlap (the households that could be selected from both frames) may be simpler than in a telephone survey. The sample from the DSF will be matched to the license frame by address (notice this is matching the DSF sample to the entire license frame not the license sample). The goal is to determine if the overlap can be quantified without asking survey respondents questions about their possession of a fishing license (this is likely a source of measurement error in the current telephone survey approach). If successful, then there are important consequences since these data are essential for computing the probability of selection of the households. First, the data are available for both respondents and nonrespondents. Second, the measurement error in determining the overlap domain can be greatly reduced. Third, this procedure can be used to improve the allocation of the sample in future administrations (e.g., households on the license frame could be assigned a more appropriate sample size). Fourth, questions designed to determine overlap among the frames would not be needed.

Estimation

As mentioned above, independent samples will be selected from the two frames to make direct estimates of totals of the numbers of participants and fishing effort from each of the three domains. Estimates of totals from the address frame will be produced for S_1 and S_{12}; while from the license frame estimates will be produced for S_2 and S_{12}. The two totals for S_{12} will be averaged to give a more precise overall estimate for S_{12}. The three estimates will be summed to estimate the total population.

The first step in estimation is to develop base weights that are the inverses of the probabilities of selection for the units by frame. These standard weights will then be adjusted by the inverse of the response rates within stratum, separately by frame, to account for nonresponse from within each frame. The estimates produced from these weights will overestimate totals because the units in the overlap are over-represented because they could be sampled from both frames. The final step is to adjust the weights of the units in the overlap. A simple averaging of the two overall domain estimates can be accomplished by dividing the weight of any unit in the overlap by two. More sophisticated weighting could be carried out but this is not the main point of the survey and the average has some benefits, notably simplicity of operation and explanation. More complex schemes such as post-stratification of the weights will also be investigated.

Information collected through the angler diary survey will be further partitioned into domains defined by the characteristics of the fishing trips. Two primary domains will be defined; 1) trips that would be accessible to field samplers (fishing trips occurring at or returning to publicly-accessible sites), and 2) trips that would not be accessible to field samplers (fishing trips occurring at or returning to private-access sites such as private residences, community marinas, private yacht clubs, etc..). Catch rate by fishing mode (shore, private boat) and species will be independently estimated for each domain.

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.

Standard mail survey protocol will be implemented (Dillman et al, 2008). Sampled households will be mailed an advance letter describing the survey and requesting that the household participate when the questionnaire is sent. Screener questionnaires, along with a $1 cash incentive, will be mailed three days later. Households will be asked to complete the instrument and mail it back in the material provided.

Approximately 2 weeks after the first mailing, a thank you postcard will be sent to all addresses. Households that have participated will be thanked for their prompt response. Households that have not yet responded will be reminded to participate. Three weeks after the initial contact, a second questionnaire will be mailed to all households that have not responded. Additional measures to increase response rates may include a final, specialized mailing by FedEx and/or a follow-up telephone contact.

In addition to increasing response rates, the sequential reminders will allow us to compare response variables among respondents who participate with varying levels or prompting (e.g. early respondents vs. late respondents). This will help us identify and measure non-response 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.

We plan to conduct focus groups and/or cognitive testing with up to 50 individuals to ensure that instructions and survey instruments are clear. Mail survey questionnaires will be developed by Dr. Nancy A. Mathiowetz, University of Wisconsin-Milwaukee.

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
Dr. Nancy A. Mathiowetz, University of Wisconsin-Milwaukee, 414-229-2216

Dr. Dave Van Voorhees (301-713-2328) is Chief of the Fisheries Statistics Division, which administers the MRFS Program.

The present contractor for the telephone survey is Macro International, Inc., of Burlington, Vermont.