

**SUPPORTING STATEMENT**  
**U.S. Department of Commerce**  
**National Oceanic & Atmospheric Administration**  
**Florida Fishing and Boating Survey**  
**OMB Control No. 0648-0769**

**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 government units, households, or persons) in the universe covered by the collection and in the corresponding sample are to be provided in tabular form for the universe as a whole and for each of the strata in the proposed sample. Indicate expected response rates for the collection as a whole. If the collection had been conducted previously, include the actual response rate achieved during the last collection.**

The Florida Fishing and Boating Survey (FFBS) targets Florida residents who own a boat and who fish for reef fish in marine waters in either the Gulf of Mexico or the South Atlantic. The previously approved FFBS focused on anglers fishing for gag grouper in the Gulf of Mexico (GOM) during one of the annual open seasons (e.g. November and December). Under the revised FFBS, we anticipate that there will be two rounds of the survey each year with one focusing on a species in the GOM and a second focusing on a species in the South Atlantic. Depending on the management interests and needs of the agency and stakeholders, different species will be identified for each survey round, although the same species may be chosen for multiple rounds (e.g. for 2-3 years in a row). The sample frame will be drawn from the Florida State Reef Fish (SRF) fishing license database in both cases using a random sampling design. The SRF license is constructed by the state of Florida to include all anglers who fish for reef fish and is matched with the list of Florida boat owner registrations. It includes all anglers, even those who are over 65 and would not otherwise require a Florida saltwater fishing license. In the initial FFBS and pilot study, anglers over 65 were not necessarily included in the Florida fishing license frame and we had to manually match the Florida fishing license frame with the Florida boat owners frame to try and capture those boat owners who might fish for reef species but that might not have a license. Since 2020, the state of Florida has initiated improvements to the SRF license so that all anglers are now required to get a SRF license, thereby allowing us to just pull licenses directly from the SRF license frame.

As in the initial FFBS, we will use data from the Marine Recreational Fishing Information Program (MRIP) to identify Florida counties that are most likely to be associated with the species of interest on each coast of Florida. As an example, the survey may target GOM private boat fishing for gag grouper. In the initial FFBS, a county was “associated” with gag grouper fishing in the GOM if at least 50% of the 2005 to 2017 average annual estimated fishing trips from the county were to the GOM from West Florida (WFL). Note that this sample frame did not cover the entire population of anglers that fish in the GOM from WFL because, based on 18 years of MRIP data, approximately 14% of anglers fishing in the GOM from WFL from a private boat reside outside Florida. We defined trips during this period as “associated” with gag grouper if the angler either targeted (primary or secondary) or caught (kept or released dead or alive) gag grouper in the GOM from WFL. For the FFBS, counties can be classified as coastal (along either coast) or inland. Inland counties can be assigned to either coast depending on the species being targeted and the proportion of trips that originate from those counties for that species.

The most recent data from the FSRF license frame shows that the number of Florida resident anglers who both provided email addresses and who owned a boat are approximately 57,600 for the counties

categorized as Gulf of Mexico or inland, and 45,000 for the South Atlantic or inland. The previous FFBS found that approximately in 25% of the returned and completed surveys, anglers indicated that they targeted gag grouper. We do not know the true proportion of anglers who target gag grouper in the FSRF license frame, but as an approximation, we will use the sample statistic and assume it is 25% of all license holders who also own a boat. Using this value, we therefore estimate that the population size of gag grouper anglers is approximately 14,400 (57,600 \*0.25) for GOM and inland counties with potential gag grouper anglers. A similar calculation for the South Atlantic would yield 11,250 (45,000 \*0.25). Following Equation 1 (Yamane 1967) approximately 390 observations are required to represent the true value for a population between 11,250 (n=386) and 14,400 (n=390) assuming a +/- 5% precision rate,

$$Equation\ 1.\quad n = \frac{N}{1 + N(e)^2}$$

where  $n$  is the sample size,  $N$  is the population size, and  $e$  is the level of precision required. The equation assumes a confidence interval of 95% and maximum variability in the sample (.50). An observation unit is an individual respondent. Based on these estimates, the goal of the FFBS study is to have at least 390 surveys completed by anglers who fish for the target species (e.g. gag grouper in GOM). There are additional questions on the survey related to general boating and fishing activity that will also provide relevant information related to preferences, behavior and cost for fishing and boating for those anglers who did not fish for the target species or who did not fish but still used their boats.

We expect that 98% of the initial draw of the sample will consist of unique names and usable email addresses. Note that in the prior survey, there were relatively few sent emails that were bounced or rejected. Also, nearly 90% of respondents who started the survey actually completed it. In the initial FFBS, boaters made up 54% of the total number of returned and fully completed surveys and fishers (all fishers, both those targeting gag grouper and those not targeting) made up 46%. As said above, 25% of all completed surveys were from anglers targeting gag grouper.

Out of the total number of potential completed surveys, our goal is to have 390 from anglers who target gag grouper and answer the survey questions regarding their gag grouper fishing trips. Therefore, knowing that 25% of the total number of completed surveys will have targeted gag grouper (based on the prior FFBS results), we estimate that we would need 1,560 (=390/0.25) total completed surveys from all three types of respondents: 1) anglers that target gag, 2) anglers that target other species, and 3) boaters who did not fish at all. Of those 1,560 surveys, 390 will be from anglers targeting gag grouper, 54% will be completed by boaters (842=1,560\*0.54) and the remainder (328) will be completed by anglers who fished for something other than the target species (1,560-842-390).

Table 1 presents the estimated angler respondent universe, the number of completed surveys by anglers targeting gag grouper (780 out of 3,120), the total number of completed surveys (3,120), the number completed by boaters (1,684 out of 3,120), and the number completed by anglers fishing for something other than gag grouper (656 out of 3,120).

Table 1. FFBS Survey Disposition by GOM/South Atlantic coast of Florida

Region/Coast	Angler Respondent Universe	Number of Surveys Completed by Anglers Targeting Gag Grouper <sup>1</sup>	Total Number of Surveys Completed	Number of Surveys Completed by Boaters	Number of Surveys Completed by Anglers fishing for

	A	B	C=B÷25%	D=C×54%	other species E=C-B-D
Gulf of Mexico	14,400	390	1,560	842	328
South Atlantic	11,250	390	1,560	842	328
<b>Total</b>	<b>25,650</b>	<b>780</b>	<b>3,120</b>	<b>1,684</b>	<b>656</b>

The overall survey response rate from the prior FFBS for all respondents was 15%, calculated as the number of completed surveys divided by the number of delivered surveys. The share of delivered surveys (15%) that were fully complete in the initial FFBS is typical of the response rate achieved by email-only surveys of anglers. Using this response rate, from all anglers and from boaters, we will need to send out 10,400 surveys ( $=1,560/0.15$ ) in order to get 1,560 completes. We follow a similar calculation for the South Atlantic portion of the survey.

## 2. Describe the procedures for the collection of information including:

- Statistical methodology for stratification and sample selection,
- Estimation procedure,
- Degree of accuracy needed for the purpose described in the justification,
- Unusual problems requiring specialized sampling procedures, and
- Any use of periodic (less frequent than annual) data collection cycles to reduce burden.

### Stratification

There will be no a-priori stratification of the license frame other than how the SRF license is already constructed – e.g. by county and boat ownership; however, post stratification of the data may be possible based on survey responses.

### Estimation: Trip Demand Model

Following Alberini et. al. (2007) we use a single-site travel cost model recreational fishing with the example of gag grouper fishing in the Gulf of Mexico. Specifically, we assume that an angler chooses fishing trips,  $d$  and a numeraire good,  $X$  to maximize utility subject to a budget constraint or  $\max_{(X,d)} U(X,d)$  s.t.  $y=X+d \cdot p$  where  $y$  is income, the price of the numeraire good is set to one, and  $p$  is the cost per fishing trip. We further assume that fishing trips are a function of fishing quality,  $h$ , which is itself a function of fishing regulations,  $r$ , i.e.,  $d=d(q(r))$ . Fishing trips and quality are weak complements such that  $\partial U/\partial q=0$  if  $d=0$ , i.e. the individual does not care about quality of fishing if he or she does not fish. The number of trips is an increasing function of fishing quality,  $\partial d/\partial q>0$ .

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<sup>1</sup>  $n = 390$  is the minimum number of observations required for true population estimate of anglers targeting a specific species (gag grouper, for example) based on an estimated population size of 14,400 (GOM) or 11,250 (South Atlantic). In Column B, 390 refers to the number of surveys where the angler indicated they fished for gag grouper, out of all returned and completed surveys in Column C (1,560).

The solution to the angler problem yields the demand function for trips,  $d=d(y,p,r)$ . In our empirical work, we assume that the for demand function based on data from angler  $i$  in scenario  $j$  is linear in its arguments

$$d_{ij}=\beta z_i+\gamma p_{ij}+\delta r_{ij}+\epsilon_{ij}$$

where  $z_i$  is a vector of angler characteristics, including an intercept and income;  $\beta$ ,  $\gamma$ , and  $\delta$  are parameters to be estimated; and  $\epsilon_{ij}$  is an error term. The parameters can be estimated with data on  $d_{ij}$ ,  $p_{ij}$ ,  $r_{ij}$ , and  $y_i$  for angler  $i$  in scenario  $j$ .

We will have six observations on trips for respondents who complete the gag grouper portion of the survey and 3 trip observations for all other anglers and boaters. The scenarios are summarized in Table 5. There is two sources of variation in the scenarios when collected for a set of anglers: (i) across anglers, and (ii) across scenarios within one angler. These sources of variation should be adequate to estimate the slope of the demand function,  $\gamma$ , and the effect,  $\delta$ , of changes in the bag limit.

Table 5: Trip Scenarios

Scenario	Price ( $p$ )	Trips ( $d$ )	Bag ( $r$ )
Base (Actual)	$p_0$	$r_0$	2
Double price	$p_1=p_0*2$	$r_1$	2
Half price	$p_1=p_0/2$	$r_2$	2
Bag 3	$p_0$	$r_3$	1
Bag 1	$p_0$	$r_4$	3
Bag 0 (closed)	$p_0$	$r_5$	0

The observations on fishing trips for the scenarios are correlated within an individual if unobservable angler characteristics influence both actual fishing trips and the stated number of trips under the hypothetical scenarios. Therefore, we adopt a random-effects specification to combine the actual trips and trips under the hypothetical scenarios (e.g., Loomis (1997) and Alberini et. al. 2007). In this case we assume that  $\epsilon_{ij}=v_i+\eta_{ij}$ , with  $v_i$  a respondent-specific, zero-mean component, and  $\eta_{ij}$  an i.i.d. error term.  $v_i$  and  $\eta_{ij}$  are uncorrelated with each other, across individuals, and with the regressors in the right-hand side of Eq. (1). The presence of the individual-specific component of the error term ( $v_i$ ) result in correlated error terms  $\epsilon$  within a respondent. Specifically,  $E(\epsilon_{ij} \epsilon_{ik})=\sigma_v^2$ , where  $\sigma_v^2$  is the variance of  $v$ , for  $j \neq k$ , whereas the variance of each  $\epsilon_{ij}$  is  $\sigma_v^2+\sigma_\eta^2$ , with  $\sigma_\eta^2$  being the variance of  $\eta$ . Generalized Least Squares is used to estimate parameters while addressing the correlation in the model.

The estimated parameters are used to calculate elasticities that show the percent change in trips with a percent change in trip cost and the bag limit. The former is given by  $-\gamma(p_{0i}/d_{0i})$  and the later is given by  $-\delta(r_{0i}/d_{0i})$ .

The estimated parameters are also used to calculate two welfare measures. The first captures the value of access and is the consumer surplus associated with current fishing conditions and prices:

$$CS_i(p_{0i},r_{0i})=-(1/2\gamma)[z_i \beta+p_{0i} \gamma]^2.$$

The second captures the value of changes in fishing regulations, and is the change in surplus due to a change in bag limits (holding the prices the same):

$$CS_i(p_{0i}, r_{1i}) - CS_i(p_{0i}, r_{0i}) = -(1/2\gamma)[\delta^2 + 2\delta(z_i \beta + p_{0i} \gamma)].$$

### Unusual problems requiring specialized sampling procedures

The proposed random sampling design of Florida State Reef Fish recreational license should be straightforward and no specialized sampling procedures should be needed.

### Any use of periodic (less frequent than annual) data collection cycles to reduce burden

The FFBS will be conducted semi-annually (but annually for each coast of Florida). Respondents will be asked to respond to a single questionnaire in each round of the survey with no follow-up data requested. Any given respondent will not receive more than 1 survey per year.

**3. Describe methods to maximize response rates and to deal with issues of non-response. The accuracy and reliability of information collected must be shown to be adequate for intended uses. For collections based on sampling, a special justification must be provided for any collection that will not yield "reliable" data that can be generalized to the universe studied.**

We have taken steps to maximize the number of surveys completed, including making the survey a brief, concise, and clear instrument, limiting the number of open-ended questions, and revising the survey based on feedback from focus groups conducted in Tampa, FL and an initial OMB approved pilot study of two counties in Florida. We will use these same survey design features that were successful in the first FFBS, and which can help maximize survey completion rates, and improve unit, and item nonresponse.

In addition, in the first FFBS, we administered a nonresponse bias survey in order to examine whether or not respondents are systematically different from nonrespondents in some key variables, such as boat and trip characteristics and demographics. In the nonresponse bias study, people who did not respond to the survey were randomly sampled to receive a short questionnaire by first class mail imprinted with a stamp requesting the recipient to "Please Respond Within 2 weeks". A power analysis suggested that we needed at least 175 nonresponse surveys completed in order to compare the means of the responders and nonresponders using a t-test with a significance level of 0.05 to detect an effect size of 0.3 with a power of 0.8. Based on this, we aimed to get completed nonresponse surveys from 175 nonresponders. The nonresponse questionnaire was a short version of the original survey with questions regarding boat usage and income. Responses to these questions were used to examine whether respondents are systematically different from nonrespondents. The results of a Welch two-sided t-test showed no statistical difference in the means of key variables at the 95% confidence interval (e.g. number of days fished, number of people on the boat, trip length in hours, trip cost, household income (in categories)). Given these results, we do not intend to run another non-response survey for another few years.

**4. Describe any tests of procedures or methods to be undertaken. Testing is encouraged as an effective means of refining collections of information to minimize burden and improve utility. Tests must be approved if they call for answers to identical questions from 10 or more respondents. A proposed test or set of tests may be submitted for approval separately or in combination with the main collection of information.**

Prior to the original FFBS implementation, NOAA Fisheries conducted 2 focus groups with a total of 15 anglers in Tampa, FL. Their feedback was used to revise language and questions in the survey and to ensure that material is understood and interpreted by the respondent as intended. In addition, at OMB's suggestion, we conducted a pilot study to test the survey and sampling strategy for the FFBS. In the pilot study, in 2019, we only sampled from two of the counties included in the full study. In order to evaluate the response rates over the range of possible grouper fishing prevalence rates, we surveyed one county with a high estimated grouper fishing prevalence rate and one county with a low estimated grouper fishing prevalence rate. The results of the pilot study were used to adjust the survey design and sample sizes. We met with OMB after the pilot study to go over all the results and findings and before the final OMB approval of the full study. (A summary of the results are presented in italics. The full results are documented in a pilot study report):

- Compare the actual and expected response rates.

*Both the email-only contact and mail-push strategy response rates were higher than expected and we met the overall response rate goal.*

- Assess whether fishing avidity (number of trips) of the respondents are significantly different from the average avidity in the study region.

*The fishing avidity estimate from the pilot study was comparable to estimates from the mail and intercept surveys of the Marine Recreational Information Program for the same period.*

- Assess whether gag grouper fishing prevalence of the respondents is significantly different from the prevalence assumed in the study region.

*The gag grouper angler prevalence estimate from the pilot study is twice as high as we initially assumed and will significantly reduce the required overall sample size to achieve the target sample size of anglers to answer the gag grouper fishing questions.*

- Identify unusual patterns, such as the majority of respondents always choosing zero trips in the contingent behavior questions.

*The results of the contingent behavior questions were consistent with economic theory. For example, there were no respondents who stated more trips at double the cost or fewer trips at half cost. In addition, the average stated number of trips was higher with higher bag limits and lower with lower bag limits. There were no unusual patterns in the pilot study data.*

- Examine response rates for individual survey questions and evaluate whether adjustments to survey questions are required to promote a higher response rate.

*All questions were required in the internet version of the survey. Therefore, the respondent had to enter a response to continue with the survey. The respondents who returned the paper version of the survey could skip questions, but there were not any questions that suffered consistent nonresponse.*

**5. Provide the name and telephone number of individuals consulted on 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.**

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