

SUPPORTING STATEMENT
NORTH ATLANTIC RECREATIONAL FISHING SURVEY
OMB CONTROL NO. XXXX-XXXX

A. JUSTIFICATION

1. Explain the circumstances that make the collection of information necessary.

The Northeast Fisheries Science Center (NEFSC) is conducting an economics research project to assess how changes in recreational Atlantic cod and haddock fishing regulations affect angler effort, angler welfare, fishing mortality, and future stock levels. The statistical model needed to meet this research objective requires fishing-related and socioeconomic data on users of these fisheries. To collect this essential information, the NEFSC seeks to implement the North Atlantic Recreational Fishing Survey (NARFS), a questionnaire directed toward recreational anglers who fish for Atlantic cod or haddock off the coast of Maine, New Hampshire, and Massachusetts.

Data collected by the NARFS will be used as input into a bioeconomic model that is currently used to determine recreational fishing regulations for North Atlantic cod and haddock (83 *Federal Register* 18972). Our response to question B2 provides an overview of the statistical model to be estimated using NARFS data and Lee et al. (2017) describes and illustrates how the results of this model are integrated with the biological component of the bioeconomic model described above. Since 2013, the NEFSC has used the model annually to predict how proposed fishing regulations affect angler welfare, angler effort, fishing mortality, and future stock levels. The Northeast Fishery Management Council (NEFMC), in turn, selects management options that are predicted to have the highest probability of achieving target allowable catch limits for both species.

The bioeconomic model currently uses economic data derived from an angler survey that was implemented in 2014, yet there exist several limitations of these data that necessitate new primary data that the 2019 NARFS will collect.

First, it is likely that angler targeting behavior and preferences for North Atlantic cod and haddock have shifted since the 2014 data collection effort in response to major policy changes. In response to results of a stock assessment that estimated the 2014 population of North Atlantic cod to be near historically low levels, recreational fishery managers reduced the recreational possession limit from 9 cod in 2014 to 0 cod in 2015, imposing for the first time a full moratorium on the recreational harvest of North Atlantic cod. Since 2015, daily recreational possession limits for North Atlantic cod have fluctuated annually between zero and one fish. It is plausible that during this period, some anglers have shifted their targeting behavior by taking more trips for haddock instead of cod, for example, and hence have established a new set of fishing preferences for the two species. Because estimates of angler preferences for keeping and releasing cod and haddock form the basis for the bioeconomic model's predictions, collecting contemporary cod and haddock angler preference data is critical for accurately predicting the likelihood of management success across the range of policy alternatives that are proposed annually by the NEFMC.

Additionally, the NARFS data collection effort is more narrowly focused than the 2014 data

collection effort. We intend to collect the information necessary to assess angler preferences for cod and haddock, whereas information regarding an additional groundfish species, pollock, was sought in the 2014 survey effort. While seemingly minute, this difference could have considerable influence on the results of the ensuing angler behavioral model. Excluding pollock from the scope of the NARFS is also warranted given that the policy-guiding bioeconomic model for which these data are used applies only to the recreational North Atlantic cod and haddock fisheries.

Finally, feedback from recent focus groups aimed at refining the NARFS survey instrument highlight the need for improving the clarity of the choice experiment (CE) questions, a critical component the survey discussed in more detail in A2. The 2014 survey contained these types of questions, and similar versions of them will be appear in the NARFS. During the focus groups, we presented participants with several versions of these questions, each containing the same information but differing in how the information was displayed. NARFS focus groups participants unanimously found these questions more difficult to answer when displayed in the 2014 format compared to when we displayed them in alternative formats. We believe that clarifying these questions will improve the quality of data used in the bioeconomic model described above, potentially allowing for more accurate predictions of anglers' behavioral response to regulatory changes.

Overall, the data and models reliant on such data will inform management decisions of the NEFMC, operating under the authority of the Magnuson-Stevens Fishery Conservation and Management Act (16 U.S.C. 1801 et seq.).

2. Explain how, by whom, how frequently, and for what purpose the information will be used. If the information collected will be disseminated to the public or used to support information that will be disseminated to the public, then explain how the collection complies with all applicable Information Quality Guidelines.

The data collected from this survey will be used to estimate a model of angler behavior, the economic component of the bioeconomic model described in our response to question A1. This model will be used annually by NEFSC scientists to produce estimates of angler welfare, angler effort, fishing mortality, and future stock levels conditional on proposed fishery management changes. These estimates will be used by the NEFMC to select of annual recreational fishing regulations for Atlantic cod and haddock. Each section of the survey instrument is described in more detail below.

NARFS Section A: Your Recreational Fishing Experiences

The first question in this section of the survey will be used to screen out respondents without relevant fishery experience, which we define as those who have not gone recreational fishing for North Atlantic cod or haddock in the past five years.

The remaining questions in this section are intended for respondents who have gone recreational fishing for either species in the past five years. Information collected from Questions 2 through 4 are intended to measure and control for fishing avidity in the behavioral model. These questions ask respondents if and how many times they went fishing for the species of interest during 2018, even if they did not catch or keep any. Question 4 asks respondents to indicate how much they like saltwater recreational fishing compared to other recreational activities.

The last two questions in Section A gather information about respondents' fishing experience in the North and mid-Atlantic, where there exist two separately-managed stocks of Atlantic cod. The first asks respondents to indicate whether they fish for haddock, pollock, or cod most often in the Gulf of Maine (GOM) or Georges Bank (GB), or both areas about equally. We plan to use this information to screen out anglers who fish for cod primarily in waters outside of the GOM because we are only interested in estimating angler preferences for GOM cod. The second of these questions asks respondents to indicate whether they fished for GOM cod prior to 2015. With this information, we can measure the extent to which preferences differ between anglers who starting fishing for GOM cod before and those who started fishing for GOM cod after the 2015 policy changes described in our response to question A1.

NARFS Section B: Your Saltwater Fishing Trip Preferences

The next section of the survey contains a set of CE questions. These questions are designed to elicit the tradeoffs angler are willing to make between two fishing trips that vary in the number of legal and sub-legal cod and haddock caught, regulations, total number of fish that could be kept and must be released, trip cost, and trip length, and not going saltwater fishing. After presenting respondents with these fishing and non-fishing options, the questions ask respondents to select the option they would take if given the opportunity, and what would be their second choice. Responses to these questions are the key source of data needed to estimate the economic model of angler behavior.

NARFS Section C: Saltwater Fishing trip Attributes

This one-question section will obtain additional information regarding respondents' decisions making process when answering the questions in Section B. Specifically, the question asks respondents to indicate which features of the fishing trip options (number of cod and haddock that could be kept and must be release, trip cost, and length of time), if any, did not factor into the choices they made. Obtaining and incorporating this type of information in the behavioral model may increase the statistical efficiency of the ensuing parameter estimates (Alemu et al. 2013).

NARFS Section D: About You and Your Household

Section D asks a series of demographic and other questions. These questions will gather information on age, gender, education, income, private fishing boat access, and likelihood of recreational fishing for Atlantic cod or haddock during the next 12 months. Used as conditioning variables, this information can improve estimation of the economic model. Additionally, we can use this information to assess sample representativeness by comparing the characteristics of our sample to (1) the characteristics of cod and haddock anglers from previous data collection efforts, and (2) the characteristics of the population of recreational anglers at large, which can be found in NOAA-sponsored nationwide angler expenditure reports.

The Northeast Fisheries Science Centers will retain control over the information collected by this survey effort and safeguard it from improper access, modification, and destruction, consistent with NOAA standards for confidentiality, privacy, and electronic information. See response to question A10 of this Supporting Statement for more information on confidentiality and privacy. The information collection is designed to yield data that meet all applicable information quality guidelines. Although the information collected is not expected to be disseminated directly to the public, results may be used in scientific, management, technical, or general informational

publications. Prior to dissemination, the information will be subjected to quality control measures and a pre-dissemination review pursuant to [Section 515 of Public Law 106-554](#).

3. Describe whether, and to what extent, the collection of information involves the use of automated, electronic, mechanical, or other technological techniques or other forms of information technology.

The data collection procedure involves implementing two mechanical forms of information technology. The first is a telephone pre-screening interview. We will make attempts to conduct these interviews with half of the sampling frame. Second, the survey instrument will be administered online to about $\frac{3}{4}$ of the sampling frame. Potential respondents selected for web-survey distribution will receive email invitations and reminders that include a web-link to the survey.

4. Describe efforts to identify duplication.

We conferred with state officials in Maine, New Hampshire, and Massachusetts with responsibilities for managing recreational saltwater fishing and they could not identify any existing or planned duplicative survey efforts.

We also identified two NMFS-sponsored surveys planned for 2019 and confirmed that they are not duplicative of the NARFS. The first project, “Modeling Recreational Anglers' Responses to Risky Catch” is under guidance from Jorge Holzer, an assistant professor in the Department of Agricultural and Resource Economics at the University of Maryland. Researchers for this project will, upon PRA submission and approval, conduct mail and online surveys to recreational summer flounder and black sea bass anglers licensed in coastal states from Rhode Island south to New Jersey. This contrasts with the NARFS’s target population of recreational Atlantic cod and haddock angler in Maine, New Hampshire, and Massachusetts.

The second NMFS-sponsored survey, the 2019 Social Network Analysis Mail Survey (SNAMS), was recently submitted for PRA approval. The purpose of the SNAMS is to evaluate anglers’ level of knowledge of, understanding of, trust in, and preferences for recreational saltwater fisheries regulations, management, data collection, and data. Additionally, the SNAMS asks about the sources recreational anglers use to get information on recreational saltwater fishing. The SNAMS will be directed toward recreational saltwater anglers along the Atlantic and Gulf coasts from Maine to Mississippi and will likely use the same state-based licensed frames as the NARFS. An estimated 1,000 licensed anglers from Maine, New Hampshire, and Massachusetts will be drawn into the SNAMS sample. We have coordinated with SNAMS researchers to ensure that anglers do not receive both an SNAMS and a NARFS.

The NARFS will contain a series of discrete choice experiment (DCE) questions, each of which presents respondents with two or more hypothetical, multi-attribute alternatives and asks respondents to choose or rank their most preferred alternative. Each alternative is comprised of a combination of attribute levels, the ranges of which are carefully selected to fulfill policy-relevant research objectives. Responses to DCE questions can be used to evaluate choice behavior, preferences, and WTP values for marginal changes in attribute levels (Louviere et al. 2000)

Several studies have employed a discrete choice experiment (DCE) to evaluate angler preferences for different aspects of the recreational fishing experience. Because they cover a wide range of species and fishery-specific research objectives, these studies differ in terms of the attributes used to explain angler preferences. In general, the attributes of interest to fisheries economists typically include catch or harvest rates and regulations. Angler preferences for marginal changes in catch and regulations have been estimated jointly for summer flounder in the Northeast (Massey et al. 2006; Hicks 2002), trout and grayling in Norway (Aas et al. 2000), paddlefish in Oklahoma (Cha and Melstrom 2018), trout in Michigan (Knoche and Lupi 2016), and pacific halibut and salmon in Alaska (Lew and Larson 2012; Lew and Seung 2010). In addition to catch rates and regulations, other studies have evaluated non-consumptive aspects of recreational fishing, such as hooking and losing, or seeing a target species (Goldsmith et al. 2018; Duffield et al. 2012). Lew and Larson (2015) exclude catch attributes from the utility function and estimate Alaskan charter boat angler preferences and willingness-to-pay for alternative bag and size limit restrictions. Like the proposed NARFS, some studies have examined the interface between recreational catch and regulations by estimating the nonmarket value of fish that may be kept and of those which must be released. These studies consistently find that the recreational value of keeping fish is higher than that of releasing fish for a variety of species (Atlantic cod, haddock, and pollock: Lee et al. 2017; Pacific halibut, Chinook salmon, and coho salmon: Lew and Larson 2012; rockfish along the U.S. west coast: Anderson and Lee 2013; Anderson et al. 2013; groupers, red snapper, dolphinfish, and king mackerel along the U.S. southeast coast: Carter and Liese 2012).

As noted above, recreational cod and haddock angler preferences have been evaluated previously in Lee et al. (2017). However, we believe that using new data collected by the proposed NARFS will lead to more accurate predictions of the effect of regulatory changes on angler behavior. Our response to question A1 provides a more detailed explanation of the factors warranting the proposed data collection effort.

5. If the collection of information involves small businesses or other small entities, describe the methods used to minimize burden.

The collection of information does not involve small businesses or small entities.

6. Describe the consequences to the Federal program or policy activities if the collection is not conducted or is conducted less frequently.

The survey will collect information needed to develop economic models of recreational saltwater fishing in federal waters off the coast of Maine, New Hampshire, and Massachusetts. This research will provide scientific and management support to the NEFSC and the NEFMC. Not conducting the information collection will undercut these agencies' ability to account for anglers' behavioral responses to regulatory changes and consequent impacts to angler welfare, fishing mortality, and future stock levels, thus limiting the ability of these agencies to manage fisheries consistent with federal and state law.

7. Explain any special circumstances that require the collection to be conducted in a manner inconsistent with OMB guidelines.

Not Applicable.

8. Provide information on the PRA Federal Register Notice that solicited public comments on the information collection prior to this submission. Summarize the public comments received in response to that notice and describe the actions taken by the agency in response to those comments. Describe the efforts to consult with persons outside the agency to obtain their views on the availability of data, frequency of collection, the clarity of instructions and recordkeeping, disclosure, or reporting format (if any), and on the data elements to be recorded, disclosed, or reported.

A Federal Register Notice published on Friday, July 20th, 2018 (83 FR 34551) solicited public comments. No substantive comments were received. We have also consulted with personnel at the Maine Department of Marine Resources, New Hampshire Fish and Game, and Massachusetts Division of Marine Fisheries regarding the data we are collecting. They could not identify any existing or planned duplicative survey efforts.

9. Explain any decisions to provide payments or gifts to respondents, other than remuneration of contractors or grantees.

A \$2 incentive will be included in approximately 3,110 mail correspondences to increase survey participation and to test the effect of the incentive on survey response. This is the sample allocation necessary to detect a change in response rates (1 tailed test, $\alpha=0.5$) with 80% power. Specifically, given the proposed sampling procedure (detailed in our response to question B3), all survey participants will fall into one of five sampling tracks, each of which includes at least one postal mail contact. Participants in each track will be split into two treatment groups: a control group that does not, and a treated group that does receive the \$2 incentive with the postal mail contact. We will randomly designate participants in each track into treatment groups such that number of expected completes from each group is sufficient (about 30 or more) to produce within-track response rate comparisons. Thus, in addition to ignoring any track effects and testing the effect of the incentive on the overall survey response rate, our experimental design will allow us to examine whether the effectiveness of the incentive varies within each track, i.e., whether providing an incentive with the first contact is more or less effective than providing it with the second or fourth. The total amount of incentive money distributed is estimated to be approximately \$6,220.

More broadly, including small monetary incentives in surveys serves two important functions: (1) increasing the response rate and (2) mitigating survey nonresponse bias by attracting participation from those who otherwise might not respond to the survey (Groves et al. 2006; Groves et al. 2004). Table 1, reprinted from Dillman et al. (2009), displays results from several studies that experimentally test the influence of different types of incentives on mail survey response rates. These studies consistently obtained higher response rates among groups who received a small, upfront financial incentive relative to groups that did not.

Table 1. Examples of the effect of advance token incentives in mail surveys.

Population (Year)	Sample Size	Experimental Groups (\$)	Response Rate (%)
Oregon State University (OSU) students who left the College of Agricultural Sciences without graduating (1997)	133	0	28
	130	2 Check	44
	125	2 Bill	53
Recent graduates of the College of Agricultural Sciences at OSU (1998)	129	0	59
	135	2 Bill	67
	141	5 Bill	81
OSU distance education students (1997)	249	0	20
	91	2 Check	25
	92	2 Bill	32
	87	5 Check	31
	97	5 Bill	32
OSU June 1997 Graduates (1998)	231	0	52
	234	2 Bill	65
New residents of Washington who obtained a state driver's license (1994)	368	0	44
	357	2 Bill	63
New residents of Iowa who obtained a state driver's license (1997)	317	0	42
	313	2 Singles	70
	313	2 Bill	73
New residents of Idaho aged 50-70 (1996)	526	0	53
	526	2 Bill	72
	524	300 Lottery	58
Centre County, Pennsylvania residents (1998)	470	0	39
	288	2 Bill	62

Notes: This table is reprinted from Dillman et al. (2009). Original Source: Lesser et al. (2001)

The target population for the NARFS is very different from those of the studies displayed Table 1 but results of recent and ongoing survey efforts directed at saltwater angler corroborate the findings. For example, the Marine Recreational Information Program Marine (MRIP) Effort Survey of anglers currently uses a \$2 prepaid incentive in a mail survey because pretesting (OMB Control No. 0648-0652) found that, relative to a no-incentive control group, the odds of receiving a completed survey increased significantly by 63%, 93%, and 137% when cash incentives of \$1, \$2, and \$5, respectively, were distributed within the survey package (Andrews et al. 2014). The authors note that “including a \$1 or \$2 cash incentive in the initial survey mailing actually decreased the cost of receiving a completed survey by 22% and 20%, respectively. These cost savings, which are conservative, could be used to lower overall data collection costs (for a fixed sample size) or increase the precision of survey estimates (for a fixed cost).”

Also relevant to the proposed NARFS are the results of a recently-implemented pilot test of the West Coast Saltwater Fishing Survey (WCSFS) (ICF 2018; OMB Control No. 0648-0750). Anglers in California, Oregon, and Washington who had saltwater fished in the last 12 months constituted the target population for the WCSFS. A random sample of 4,000 records, stratified by four regions (Northern California, Southern California, Oregon, and Washington) was drawn for the pilot test. The 4,000 sampled anglers were randomly assigned to one of three incentive levels (no incentive, \$2, or \$5) mailed with the first contact.

Each level of incentive significantly led to additional screener returns (Figure 1). The return rate for the \$0 incentive amount was 11%. Adding \$2 increased the return rate by 14 percentage points to 25% ($z = -9.692$; $p < 0.001$). Adding \$3 more (\$2 v. \$5) increased completion by 4 percentage points more to 29% ($z = -2.101$, $p = 0.036$ for the comparison between \$2 and \$5). The finding further warrants including a \$2 incentive in some mail correspondences during the NARFS sampling procedure, discussed in detail in our response to question B3.

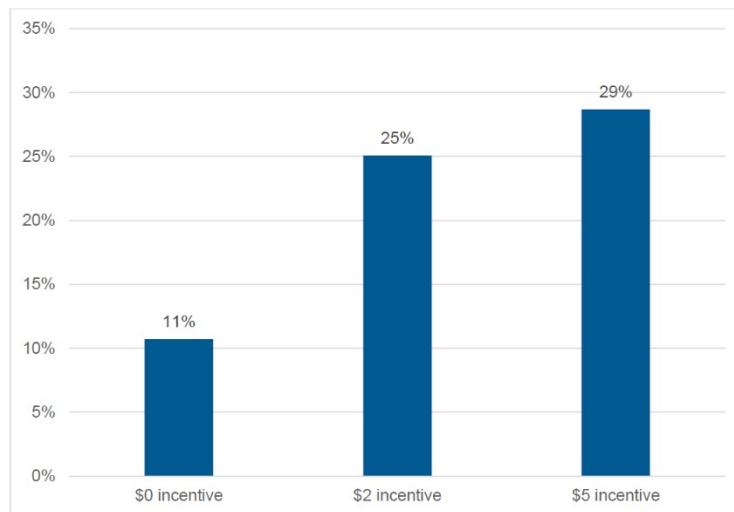


Figure 1. The Effect of Incentive on Screener Completion (ICF 2018)

10. Describe any assurance of confidentiality provided to respondents and the basis for assurance in statute, regulation, or agency policy.

Our sample frame will be drawn by an outside contractor from 2018 recreational fishing license/registry databases maintained by the states of Maine, New Hampshire, and Massachusetts. Prior to receiving these license databases, the contractor will provide a signed agreement of access and a confidentiality agreement. The information in the license database and sample frame is covered under the Privacy Act System of Records COMMERCE/NOAA-11, Contact Information for Members of the Public Requesting and Providing Information Related to NOAA's Mission. To support the anonymity of this research, no participant names will be included on the survey document. Participant names will be tracked in a separate database to code participants for protection during data analysis, confirm receipt of a survey from each individual, and avoid of duplication of responses. The NARFS will contain written text informing participants of the confidential and voluntary nature of their response.

Prior to providing deliverables, the agency contracted by the NEFSC to conduct the NARFS will delete from the data all personal information such as name, street address, and phone number such that the NEFSC cannot link this information to any individual.

When writing final reports and publishing the findings of this research, tabulations of individual responses will occur at a high enough level of aggregation so that no single individual may be identified. In addition to the confidentiality protection measures, survey participants are provided the option to skip questions of concern and stop their participation in the survey at any time with no consequence to themselves. Finally, in the event of a Freedom of Information Act (FOIA) request, we will protect the confidentiality to the extent possible under the Exemption 4 of the FOIA.

11. Provide additional justification for any questions of a sensitive nature, such as sexual behavior and attitudes, religious beliefs, and other matters that are commonly considered private.

The NARFS contains a question that solicits respondents' income, which is considered sensitive information for some people. The NEFSC may use this information in two ways: first, by incorporating it into the economic model to control for variation in income that may affect angler preferences, as is common in estimating economic demand functions, and (2) for comparing survey respondents to survey non-respondents that will inform the use of weighted estimation procedures.

12. Provide an estimate in hours of the burden of the collection of information.

The annual burden of this data collection is estimated to be 226.66 hours and 1,295 total responses.

Burden estimates are calculated by multiplying the estimated time to complete each contact by the number of estimated contacts of each type. See our response to question B3 for details about the NARFS implementation procedure. The type of and estimated time required to complete each contact and total burden hours are shown in Table 2.

Table 2. Estimated hours of the burden of the collection of information.

Contact type	Estimated time required to complete contact	Number of contacts	Estimated time multiplied by number of contacts
Completion of telephone pre-screening survey with eligible anglers	3 minutes	300	900 minutes (15 hours)
Completion of telephone survey with ineligible anglers	1 minute	250	250 minutes (4.16 hours)
Completion of mail/email surveys by an eligible angler	20 minutes	500	10,000 minutes (166.67 hours)
Completion of mail/email surveys by an ineligible anglers	10 minutes	245	2,450 minutes (40.83 hours)
<i>Total</i>		<i>1,295</i>	<i>226.67 hours</i>

13. Provide an estimate of the total annual cost burden to the respondents or record-keepers resulting from the collection (excluding the value of the burden hours in Question 12 above).

There are no costs excluding the value of the burden hours in question A12. Mailed surveys will be accompanied by a postage-paid envelope.

14. Provide estimates of annualized cost to the Federal government.

The survey will be administered by an outside contractor. The costs to the federal government are limited to the cost of the contract, which is estimated to total \$42,508.33 per year over three years on an annualized basis, plus an estimated 30 hours each from two ZP-4 NOAA economists. Although the economists will be employed full time by the federal government with or without this project, these hours would be diverted to other valuable tasks in the absence of this data collection. We use hourly loaded wage rates to estimate these opportunity costs. Assuming annual salaries of \$148,000 and a 40% benefit load, these hours amount to \$17,930 annually for salary and benefits related to this data collection. Therefore, the total estimated annual costs incurred by the federal government as a result of implementing this survey are \$60,438.33. Table 3 shows a detailed breakdown of the annualized costs to the Federal government of conducting the NARFS.

Table 3. Estimated annualized costs of the NARFS over three years.

Task	Estimated annualized cost over three years
<i>Survey Costs</i>	
Survey Design and Administration	\$25,591.67
Programming	\$2,506
Telephone pre-screening interviews	\$3,000
Printing	\$5,410
Postage	\$2,874.333
Incentives	\$3,126.333
<i>Labor Costs</i>	
30 hours each from two ZP-4 NOAA economists	\$17,930
Total	\$60,438.33

15. Explain the reasons for any program changes or adjustments.

This is a new program.

16. For collections whose results will be published, outline the plans for tabulation and publication.

Results of the economic and bioeconomic models that use data collected by the NARFS may be reported for management purposes or in peer reviewed journals. Tabulations of responses to NARFS questions will be aggregated in order to maintain respondent confidentiality, as

described in our answer to question A10.

17. If seeking approval to not display the expiration date for OMB approval of the information collection, explain the reasons why display would be inappropriate.

This is not applicable, as we are not seeking such an approval.

18. Explain each exception to the certification statement.

This is not applicable, as we are not seeking such an exception.

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