

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.

Target and Sampling Populations

Table 5. Definitions of the target and sampling populations for the survey.

| Category | Crew Survey |
|--|---|
| Target population – The population that the survey effort is interested in collecting data about. | Individuals who work as crew on commercial fishing vessels operating in the Northeast or Mid-Atlantic states. |
| Sampling population – The set of individuals from which the sample units are drawn. | Individual crew members that can be encountered on the public areas of docks. |

Population and Sample Sizes

The target population for the Crew Survey consists of individuals who work as crew on commercial fishing vessels operating in the Northeast or Mid-Atlantic states (Table 5). There is no available database of information on those who work as crew on commercial fishing vessels in the target regions. Therefore, SSB will utilize estimates of employment in commercial fishing in the Northeast and Mid-Atlantic states as the sampling frame from which to calculate an appropriate sample size. The employment estimates come from data made available to SSB by IMPLAN (Minnesota IMPLAN Group, 2014 IMPLAN System (data and software), 1725 Tower Drive West Suite 140, Stillwater, MN 55082 www.implan.com). IMPLAN derives estimates of employment from three sources of data from 2014 (the most recent available data): 1) Census County Business Patterns (CBP), 2) Bureau of Labor Statistics (BLS) Covered Employment and Wages (CEW), and 3) Bureau of Economic Analysis (BEA) Regional Economic Accounts (REA). These estimates of commercial fishing employment by state across the Northeast and Mid-Atlantic are provided in Table 6. The total estimated population of individuals employed in commercial fishing in the Northeast and Mid-Atlantic is 21,616. From this population estimate, a sample size of 1,100 was calculated using Cochran’s (1977) formula for categorical data, described in detail below.

Table 6. Commercial Fishing Employment Estimates by State, Northeast and Mid-Atlantic

| State | Estimated Number Employed in Commercial Fishing |
|---------------|---|
| Maine | 7,005 |
| New Hampshire | 408 |

| | |
|---------------|--------|
| Massachusetts | 5,770 |
| Rhode Island | 1,435 |
| Connecticut | 464 |
| New York | 1,360 |
| New Jersey | 1,319 |
| Delaware | 191 |
| Maryland | 1,899 |
| Virginia | 1,765 |
| Total | 21,616 |

Since data collection will involve an intercept method at docks where commercial fishing activity takes place, SSB will select a random sample of fishing ports from the universe of ports in the Northeast and Mid-Atlantic states. To ensure that the most active ports are selected, SSB will employ a probability proportional to size (PPS) sampling method. Specifically, under a PPS approach a port’s probability of being selected into the sample will be related to the “size” of the port with larger ports being more likely to be selected into the sample. The PPS approach is necessary to ensure that selected ports are more active and thus, more likely to result in completed crew surveys. For this study, the size of the port will be assessed using a commercial fishing engagement index from the 2014 Social Indicators previously developed by SSB staff (Jepson and Colburn 2013). This index is reported by community and was generated from a principal component factor analysis of variables associated with fishing activity. The “community level” here refers to data at the level of Census Designated Place (CDP) nested within a set of counties designated as “coastal” by their connection to the ocean through a coastline, river, bay, or estuary. The variables used to determine commercial fishing engagement included the number of commercial fishing permits, the value of landings, dealers with landings, and the total landings in pounds (Table 7).

Table 7. Commercial Fishing Engagement Index (table adapted from Jepson and Colburn 2013)

| Commercial Fishing Engagement Index | Factor Loadings | Percentage Variance Explained |
|--|------------------------|--------------------------------------|
| Value of landings | 0.906 | 57.57 |
| Number of commercial fishing permits | 0.862 | |
| Dealers with Landings | 0.580 | |
| Pounds of Landings | 0.635 | |

Response Rates

SSB expects that the response rate to be around 40 percent. The prior data collection effort expected a 90 percent response rate based on a similar outcome of a recent survey that utilized

an intercept method for interviewing crew in New England¹. The actual response rate for the prior data collection effort was about 35%. There were multiple factors that played a role in the prior data collection effort underachieving to such a large extent. Section A15 describes these issues and the changes that have been made to improve the response rate and other aspects of the data collection effort.

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.

Sample Selection

The sample size was calculated using Cochran’s (1977) formula for categorical data (Bartlett et al. 2001). Determining sample size requires specifying acceptable margins of error for the “items that regarded as most vital to the survey,” (Cochran 1977). Since SSB will be collecting both categorical (e.g., educational level, ethnicity, etc.) and continuous (e.g., five-point scales for attitudes, beliefs, and perceptions) data, the formula and procedures for categorical data will be utilized given that categorical data require larger sample sizes than continuous data.

In determining sample size, SSB will consider two key factors as derived from Cochran’s formula: 1) an acceptable margin of error, and 2) an acceptable alpha level, or the probability of committing Type 1 error, i.e., incorrectly rejecting the null hypothesis (Bartlett et al. 2001). SSB will use the most common margin of error for categorical data (i.e., 5%) and the most common alpha level (i.e., .05) used in research in the social and behavioral sciences. The alpha level directly corresponds to the confidence level such that increasing the alpha level will result in a decreased confidence level. The alpha level of .05 used in this sample selection method will mean a confidence level of 0.95, or 95% confidence. Sample size determination also requires estimating the variance of the primary variables of interest in the study. SSB will employ the recommended .50 as an estimate of the population proportion for categorical data.

Using the above outlined variables of measurement and estimated population size, SSB calculated the sample size based on Cochran’s correction formula for final sample size determination (Bartlett et al 2001):

$$n = \frac{(t)^2 * (p)(q)}{(d)^2}$$

Where *t* = the *t*-value derived from selected alpha level,
(p)(q) = estimate of variance,
and *d* = margin of error

$$n = \frac{(1.96)^2 (.5)(.5)}{(.05)^2} = 384$$

Cochran’s correction for an estimated population of 21,616:

¹ This response rate is based on a project entitled “Job Satisfaction, Well-being and Change in New England Fishing Communities” coordinated by Richard Pollnac at the University of Rhode Island.

$$n^1 = \frac{n}{(1 + n / \text{Population})}$$

$$n^1 = \frac{384}{(1 + 384/21,616)} = 377$$

A sample size of 1,100, using the above outlined variables of measurement, is sufficiently large to accurately estimate the true values of the primary variables of interest in this population as well as to account for non-response.

Unusual Problems

No unusual problems are expected to be encountered.

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.

The crew survey will be implemented as an intercept approach in which interviewers will intercept crew at the docks. A random intercept survey is being used to maximize response rates and is a method used for studies of hard-to-find individuals (Miller et.al. 1997) such as crew, who may not have a permanent address or phone number or may live aboard the vessel on which they work (Kitner 2006). A study similar to this one involved a 90 percent response rate from 350 fishermen New England in 2009 and 2010.²

To maximize response rates, surveys will be conducted in-person. Face-to-face interviews are an effective method for the collection of information from people such as illiterate individuals who may not be able to participate using other methods (Bernard 2006). Face-to-face interviews also make it possible to probe for more in-depth answers and clarify respondent questions (Bernard 2006). In addition, the individuals participating in the research have the opportunity to communicate with the researcher and provide additional information that is useful to the overall objectives of the study. If more than one crew member is available and willing to take the survey, then the interviewer may hand out the survey with a clip board and pen and wait for the respondents to take the survey, answering questions if needed.

Prior to the implementation of the survey, interviewers will explain that the survey is anonymous, participation is voluntary and that the interview can be stopped at any point. It will also be explained that participants can skip questions they do not want to answer.

In addition, SSB will work with town harbor commissioner and NOAA port agents in sample ports to determine the best times of the year and day to perform an intercept survey of crew. SSB will use an electronic vessel tracking system so that we have alerts when vessels are departing/arriving and conduct workshops/webinars leading up to deployment of the survey so that fishing industry members have some knowledge of the purpose and to foster "buy-in" to the project ahead of time.

SSB has employed the following practices to maximize response rate:

- Survey length—SSB has limited the length of the survey to ensure it can be completed in a reasonable amount of time. The survey questionnaire has been reduced in length significantly from the previous version because the previous questionnaire often required 30 minutes to complete. The current survey questionnaire is expected to take

² See footnote [1](#) above.

about 15 minutes to complete due to a substantial reduction in the number of Likert-style questions, open-ended questions, and loaded or double-barreled questions.

- Best-practices design—SSB staff have expertise in survey design, including question sequencing, wording, and graphic elements on the survey. Staff also have experience programming many different survey software platforms to allow for question branching, skip patterns, and ideal question presentation for ease of interpretation and response (i.e., clear instructions, menu options, response formatting restrictions and error messaging, etc.).

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.

The survey questions in this study are based on a crew survey (OMB Control No. 0648-0636), which was tested and implemented in 2012-2013. Over 400 interviews were conducted with commercial fishing crew. The results of the initial data collection (Henry and Olson 2014; Cutler et al. 2017) were used to improve the clarity of questions and reduce the implementation time for the proposed survey.

No testing was considered necessary for these changes.

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.

The following individuals were involved in the statistical aspects of the design and will be responsible for the collection and analysis of data generated from this study.

| Name and Affiliation | Phone | Email |
|---|--------------|--|
| Lisa Colburn, Northeast Fisheries Science Center | 401-782-3253 | lisa.l.colburn@noaa.gov |
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