



NOAA Technical Memorandum NMFS-NE-274

A Comparison of Waves I (2012/2013) and II (2018/2019) of the Survey on the Socio-Economic Aspects of Commercial Fishing Crew in the Northeast U.S.

**US DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
Northeast Fisheries Science Center
Woods Hole, Massachusetts
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A Comparison of Waves I (2012/2013) and II (2018/2019) of the Survey on the Socio-Economic Aspects of Commercial Fishing Crew in the Northeast U.S.

Angela Silva¹, Lauren E. Gentile², Matthew J. Cutler³, Lisa L. Colburn⁴

¹ *ECS Federal Inc., 28 Tarzwell Dr., Narragansett, RI 02882*

² *U.S. Environmental Protection Agency, Washington, D.C. 20004*

³ *NOAA Fisheries Northeast Fisheries Science Center, 166 Water St., Woods Hole, MA 02543*

⁴ *NOAA Fisheries Northeast Fisheries Science Center and NOAA Office of Science & Technology, 28 Tarzwell Dr., Narragansett, RI 02882*

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1. INTRODUCTION

The Northeast Fisheries Science Center’s (NEFSC) “Socio-Economic Survey of Hired Captains and Crew in New England and Mid-Atlantic Commercial Fisheries”¹ (“crew survey”) was first implemented in 2012-2013 as a baseline survey (hereafter referred to as “Wave 1”) of commercial fishing crew in the New England and Mid-Atlantic regions. Crew are vital to the success of the commercial fishing industry, yet there is a lack of basic demographic and economic information on crew for U.S. fisheries. This 2018-2019 crew survey effort (hereafter referred to as “Wave 2”) provides the next set of socioeconomic data in this longitudinal study and documents fishing participants’ perceptions, concerns, and ideas about the fishing industry. Survey implementation for Wave 2 took place from July 2018-June 2019 from Maine to North Carolina. Considering crew are a hard-to-reach population (no crew registry or database), teams of interviewers intercepted potential crew respondents at ports for in-person interviews. In Wave 2, a total of 478 surveys were completed, 1 was partially completed, and 39 intercepted contacts refused to participate. Information collected as part of this survey includes basic demographic information about crew (e.g., age, education level, income), availability of work, job characteristics, fishing practices, job satisfaction and well-being, and perceptions about fisheries management. This document provides an overview of the survey’s background and objectives, the development of the survey, its implementation, and basic statistical summaries of the results for each of the questions asked, as well as some comparisons between the Wave 1 and Wave 2 surveys.

2. BACKGROUND

The NEFSC has conducted long-term data collection efforts in the biological sciences for many decades and, for some collections, more than a century. For example, fishery landings data have been available since the 1800s and early 1900s for some species (Fogarty 1995, Skud 1982, Lange and Palmer 1983), the bottom trawl survey program began in 1963 (NOAA 1988), and observers have been collecting fisheries data since 1972. However, comparable data streams for the social sciences have been lacking, including even basic demographic information about fishery participants (especially crew members) and stakeholders.

The Social Science Branch (SSB) of the NEFSC designed and completed the Wave 1 baseline crew survey and a separate owner survey (Henry and Olson 2014, Cutler et al. 2017) to address data gaps in newly developed social and economic performance measures of regional fisheries. These performance measures were developed by SSB staff after a lengthy process of literature and policy review and were refined further through outreach to industry, policy, and academic stakeholders (Clay et al. 2014). The primary goals motivating the development of performance measures were a) to track trends over time and across fisheries to provide for enhanced analysis of the economic and social impacts of proposed regulations and b) to compare the social and economic outcomes of different regulatory approaches. SSB staff identified five primary components of fishery performance: 1) financial viability, 2) distributional outcomes, 3) stewardship, 4) governance, and 5) well-being. Indicators for these performance measures were developed using existing data and the development of new data collection (Clay et al. 2014).

Wave 1 was implemented in 2012-2013 in conjunction with a separate, yet similar, survey of vessel owners and was comprised of a lengthy set of questions presented in two partially

¹ OMB Control #0648-0636

overlapping versions. The survey was designed to provide the baseline for many important social and economic variables that had not been collected on such a scale before. It was also designed with the expectation that it would be conducted every 3-5 years to facilitate long-term monitoring and time-series trend analyses of the socioeconomic aspects of the region's fisheries. As such, Wave 2 survey development began in early 2018. The primary goal of the Wave 2 effort was to balance the competing needs of minimizing the burden on respondents and collecting critical sociodemographic information. The results of the initial data collection in Wave 1 were used in Wave 2 to improve the clarity of questions and reduce the time it took participants to complete the survey. While not a central focus of the Wave 2 survey, the questions included in the Wave 2 instrument can also help to inform the SSB performance measures outlined above. These data allow for changes in basic demographics and subjective job satisfaction and well-being to be tracked over time so policymakers can better understand how fisheries management actions affect crew in the Northeast, as well as enhance the analyses in future Social Impact Assessments for Fishery Management Plans.

Given the need to reduce the length of the survey in order to minimize burden on respondents, several questions asked in Wave 1 were not included in the Wave 2 instrument. These were mostly concentrated in the sections aimed at assessing the stewardship and governance of performance measures. Questions related to governance measured attitudes among crew about management and the extent to which they felt included in the management process, among similar issues. Most crew do not participate in fisheries management and may not have complete knowledge about the rules, regulations, and fines or penalties associated with non-compliance. While hired captains likely do understand the rules and may be involved in the management process, they do not compose a substantial proportion of the target sample. Wave 1 also included multiple stewardship-themed questions not asked in Wave 2. These included crew perceptions about levels of bycatch, discards, and high-grading taking place in their primary fisheries. Although crew may be more familiar with these factors than issues related to management, the need for sociodemographic information outweighed the importance of understanding crew perceptions about stewardship behaviors taking place in their fisheries. While items related to governance and stewardship were reduced in number, multiple questions were retained that can still inform these performance measures for crew and hired captains in the Northeast. Questions on the Wave 2 survey related to governance included whether or not crew had participated in fisheries management, the extent to which they agreed with rules, and whether they felt the fines associated with violations of the rules were fair.

SSB staff collaborated closely with staff from the Greater Atlantic Regional Fisheries Office (GARFO) in order to increase the likelihood of intercepts at selected ports and improve survey response overall. Port agents, in particular, provided critical information about the nature of daily operations at selected ports and piers, as well as key contacts within the industry to help facilitate interviews with crew. The New England Fisheries Management Council (NEFMC) and Mid-Atlantic Fisheries Management Council (MAFMC) were notified about the implementation of Wave 2, and feedback was solicited through multiple avenues, including the distribution of informational pamphlets and presentations to meetings of council committees, advisory panels, plan development teams, and a full meeting of the NEFMC in June 2018. In addition to consultations with fisheries managers and councils, SSB staff made trips to selected ports in advance of fieldwork to become familiar with the geographic layout and notify local harbor masters and port officials about the presence of staff conducting interviews.

Fieldwork began in August 2018 and continued through May 2019. Due to the timing of contractor agreements and budgetary limitations, interviewers were unable to conduct interviews during the months of June and July. Interviews also did not take place for several weeks extending from December 2018 through January 2019 due to the 35-day lapse in appropriations for some portions of the federal government. While a large portion of landings occur in June and July for some ports in the northern Northeast region, many ports throughout the region's southern states do not follow the same schedule of fishing effort for a variety of reasons, including differences in the seasonality of weather and the prevalence or abundance of particular fish stocks. Additionally, SSB staff analyzed data from the previous year's vessel trip reports and federally permitted dealer reports in order to prioritize the timing of intercepts to coincide with likely periods of increased fishing effort at all ports selected for sampling. Therefore, the sample of crew captured in Wave 2 may underrepresent some fishers in the northern portion of the Northeast who have been historically more active in the summer months, but these data should not systematically exclude any fisheries in the region.

3. METHODS

3.1 Sampling Strategy

The target population for the crew survey consists of individuals who work as crew and hired captains on commercial fishing vessels operating in the New England and Mid-Atlantic regions from Maine to North Carolina (Table 1). There is no federal registry of crew or other standardized collection of information about crew across states. Therefore, estimates of employment in commercial fishing in New England and Mid-Atlantic states provided an approximation of the sampling frame from which to calculate an appropriate sample size. The employment estimates come from data purchased from IMPLAN² by NOAA's Office of Science & Technology and made available to SSB. IMPLAN derives estimates of employment from 3 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 New England and the Mid-Atlantic are provided in Table 2.

The total estimated population of individuals employed in commercial fishing in New England and the Mid-Atlantic was 21,616. From this population estimate, the sample size based on an acceptable margin of error (described below) 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 are regarded as most vital to the survey" (Cochran 1977). The survey instrument included the collection of both categorical (e.g., educational level, ethnicity) and continuous (e.g., five-point scales for attitudes, beliefs, and perceptions) data, and the formula and procedures for categorical data were used given that categorical data require larger sample sizes than continuous data. In determining sample size, two key factors derived from Cochran's formula were considered: 1) an acceptable margin of error and 2) an acceptable alpha level, or the probability of committing a Type 1 error (i.e., incorrectly rejecting the null hypothesis) (Bartlett et al. 2001). The most common margin of error for categorical data (5%) and the most common

² Minnesota IMPLAN Group, 2014 IMPLAN System (data and software), 1725 Tower Drive West Suite 140, Stillwater, MN 55082 (www.implan.com)

alpha level (.05) used in research in the social and behavioral sciences were applied to this sample strategy. 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 corresponded to a confidence level of 0.95, or 95% confidence. Sample size determination also required estimating the variance of the primary variables of interest in this study. The recommended .50 was utilized as an estimate of the population proportion for categorical data. Using these outlined variables of measurement and estimated population size, the sample size was calculated 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 (n^1) for an estimated population of 21,616:

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

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

A sample size of 377 was sufficiently large to accurately estimate the true values of the primary variables of interest in this population. However, the estimated target sample size was increased by 20% to 452 to account for potential non-response or underachievement of the sample needed to have the desired statistical properties.

Since data collection involved an intercept method at docks where commercial fishing activity takes place, a random sample of fishing ports was selected from the universe of ports in New England and the Mid-Atlantic states. To ensure the most active ports were selected, a probability proportional to size (PPS) sampling method was applied to add weight in the selection process to ports with more fishing activity. Specifically, under a PPS approach, a port's probability of being selected into the sample is related to the "size" of the port, with larger ports being more likely to be selected into the sample. The PPS approach was necessary to ensure selected ports were more active and thus, more likely to result in completed crew surveys. This would also reduce costs to achieve the target sample by visiting ports that were cost-effective to field work time spent there. Port size was assessed using a commercial fishing engagement index from the 2014 NOAA Fisheries Social Indicators (Jepson and Colburn 2013). This index is reported by the 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 3). A sample of fifty CDPs containing moderately and highly engaged ports throughout New England and the Mid-Atlantic was drawn using the PPS method. The sample is listed in Table 4 along with the corresponding commercial engagement factor scores and categorical designations.

3.2 Data Collection

Survey data collection employed an intercept method in which interviewers approached and interacted with, or “intercepted,” individuals on or around vessels at the piers and docks within the selected set of ports. This type of random intercept method is commonly used to maximize response rates among hard-to-reach populations, such as crew, who may not have a permanent address, phone number, or may even live aboard the vessel on which they work (Miller et.al. 1997, Kitner 2006). After intercept, potential respondents were screened for eligibility (i.e., asked whether they were actively working as crew or hired captains on commercial vessels) and provided with clear notification that their participation was entirely voluntary and anonymous. Once eligibility and consent were established, interviewers collected responses to the survey instrument in face-to-face interviews with respondents on the spot. Interviewers also took notes and maintained a logbook detailing interactions, interviews, and in-depth qualitative information whenever the interviewees provided it.³ Survey responses were recorded mostly on paper copies of the survey instrument by interviewers, then the data was entered into the primary survey management software account owned by the SSB at a later point in time by the interviewers themselves. The original paper copies have been retained for record. Several interviews were also conducted using an iPad tablet computer and were saved to a secondary tablet-based survey software account also owned by the SSB. The data were then transferred to the primary survey management software account referenced previously.

The survey questions in this study (see Appendix I for survey instrument) were based on the baseline survey developed in Wave 1. Over 400 interviews were conducted with commercial fishing crew in Wave 1. The results of the initial Wave 1 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 Wave 2 survey. The survey implementation time was significantly reduced from Wave 1. On average, interviews took 37 minutes in Wave 1, whereas interviews in Wave 2 took an average of 10 minutes to complete. There was a substantial reduction in the number of Likert-style questions, open-ended questions, and loaded or double-barreled questions. The critical aims of the survey were reconsidered and refocused to capture the most essential information, such as core demographics (e.g., age, education, race/ethnicity), fishing activities (e.g., species targeted, trip duration), employment characteristics (e.g., position on vessel, hours worked, payment system), job satisfaction, and well-being. While a few items were retained in the instrument to capture perception of fisheries management, the number of these items was dramatically reduced because the items were repetitive in style (i.e., blocks of statements with Likert scale responses) and redundant in content (i.e., repeating similar themes related to rules and regulations). Moreover,

³ Most often, this information took the form of nuanced opinions about fisheries management, difficulties related to retaining crew, patterns of drug abuse among crew, and other topical areas not explicitly covered or adequately addressed in the survey instrument itself.

most crew do not often engage with the fisheries management process, as evidenced by responses to the question of whether they had ever participated in federal management activities.

There was significant improvement between the two waves in regard to survey completion and response rate. A total of 478 interviews were completed in Wave 2. One participant began the survey but was unable to complete it. Of the 478 completed surveys, 24 were self-administered due to the logistical challenges related to crew availability for in-person interviews. In addition, 7 of the 478 were intercepted in person but completed by phone at a later date due to crew availability. A total of 359 completed the survey in Wave 1, and 42 were not able to be completed. The survey response rate improved from 34% in Wave 1 to 92% in Wave 2.

4. RESULTS

Descriptive statistics are reported below for Wave 2 in the following sections: Crew Demographics, Crew Job Characteristics, Crew Job Satisfaction and Well-Being, and Perceptions of Fisheries Management. The most notable results were reported in the text while the full list of descriptive statistics can be found in the tables at the end of this report. Statistical significance tests were run between Wave 1 and Wave 2 in order to track any potential changes between the two waves for each question. Wave 1 is only referenced in text when differences between Wave 1 and Wave 2 are statistically significant. See Henry and Olson 2014 for the complete Wave 1 results. As outlined in the Methods section, Wave 1 and Wave 2 had different sampling strategies and slightly different survey protocols due to the nature of trying to survey this hard-to-reach population. Therefore, any statistical significances noted between the two time periods isn't generalizable to the entire population but does indicate potential change over time.

4.1 Crew Demographics

In this section, results are presented for port and fishery information including primary fishery, intercept port, and primary port. Socio-demographics of crew are also presented here.

4.1.1 Port and Fishery Information

To sample across different locations and fishing seasons, fishermen were intercepted across 33 commercial fishing ports from Maine to North Carolina from July 2018-June 2019 (Figure 1). Each port that crew were surveyed in was recorded as the intercept port. New Bedford, MA, had the greatest number of completed surveys (100), representing 21%, followed by Point Judith, RI, with 34 completed (7%), Cape May, NJ, with 32 completed (7%), and Montauk, NY, with 24 completed (5%) (see Table 5 for the full list of intercept ports for both Wave 1 and Wave 2).

Crew were asked to provide their primary port (the port where their primary vessel was docked or moored most often in the previous fishing year). The most frequently mentioned primary ports (Figure 2) typically corresponded with the intercept ports. Notably, 21% of participants named New Bedford, MA, as their primary port followed by 7% for Cape May, NJ, 7% for Point Judith, RI, and 5% each for Gloucester, MA, and Montauk, NY (see Table 6 for the full list of primary ports for both Wave 1 and Wave 2). A total of 14 crew (3%) could not distinguish working in a single port for the majority of the year, so they stated more than one primary port.

The cost of living in coastal areas makes it difficult for fishermen and their families to live near the ports in which they work (Murray and Schuetz 2018). When asked how many miles participants traveled from where they live to their primary ports, crew reported an average of 91.76 miles (Table 7). This average is influenced by the lucrative nature of the scallop industry, which allows crew to live and work in different states. For example, many scallop crew work primarily

in New Bedford, MA, but live elsewhere (e.g., Maine, New Jersey, Virginia). By contrast, the median number of miles may better reflect where crew live in relation to the ports where they work, with crew members commuting about 15 miles from their homes to their primary ports. This question was posed differently in Wave 1 as “Where do you live?” – which we considered perhaps too personal and potentially undermined the anonymity of respondents.

Crew were also asked their most frequent port of landing—where they offloaded their catch most in the previous year. Figure 3 illustrates the frequency with which a port was declared as their port of landing. Similar to the intercept and primary ports, the most frequently mentioned ports of landing were New Bedford, MA (24%), Cape May, NJ (7%), Point Judith, RI (7%), Gloucester, MA (6%), and Montauk, NY (6%) (see Table 8 for full list of ports of landing for both Wave 1 and Wave 2). A total of 24 crew (5%) reported they had multiple ports of landing as they were unable to distinguish spending more time landing in one port over another throughout the course of a year. For example, in Virginia and North Carolina, some fishermen fish for summer flounder (*Paralichthys dentatus*), aka fluke, in Virginia in early spring and then move south to fish for fluke in North Carolina in late spring. The need to primarily land in multiple ports or have more than one primary port may indicate fishermen’s ability to adapt to changing environmental and regulatory conditions as they seek out the best return for their fishing effort.

Crew were asked to provide their primary fishery in terms of income over the last year. Crew most commonly referred to sea scallop (*Placopecten magellanicus*) (31%), lobster (17%), squid (*Loligo* and/or *Illex*) (9%), and groundfish (7%) as their primary fisheries (Table 9). “Groundfish” here refers to any of the so-called large mesh or regulated mesh species under the Northeast multispecies (groundfish) complex, which includes Atlantic cod (*Gadus morhua*), haddock (*Melanogrammus aeglefinus*), pollock, yellowtail flounder (*Limanda ferruginea*), witch flounder (*Glyptocephalus cynoglossus*), winter flounder (*Pseudopleuronectes americanus*), windowpane flounder (*Scophthalmus aquosus*), American plaice (*Hippoglossoides platessoides*), Atlantic halibut (*Hippoglossus hippoglossus*), Acadian redfish (*Sebastes fasciatus*), Atlantic wolffish (*Anarhichas lupus*), ocean pout (*Zoarces americanus*), and white hake (*Urophycis tenuis*), as well as small-mesh multispecies, such as silver hake (*Merluccius bilinearis*), offshore hake (*Merluccius albidus*), and red hake (*Urophycis chuss*). Six percent of crew surveyed could not provide one fishery they relied upon for the majority of their income. Rather, they had multiple primary fisheries that contributed to their annual income equally. This is consistent with 5% of fishermen stating they primarily landed their catch at multiple ports. If fishermen are targeting multiple species, it is possible they also land at different ports in order to gain the most competitive price for their catch. While hired captains may make fishing decisions, most crew likely do not have a role in what species are targeted or where fish are landed.

There were notable changes between the primary fisheries reported in Wave 1 and Wave 2, including a decrease in the number of participants who reported groundfish as their primary fishery from 20% in Wave 1 to 7% in Wave 2. Additionally, squid showed an increase from 4% in Wave 1 to 9% in Wave 2. While these results are based on different sampling strategies, they still provide useful information that could indicate some changes in crew’s primary fisheries in the Northeast region.

4.1.2 Socio-Demographics of Crew

The average age for crew was 39 years old (Table 10). Almost one-third of crew (32%) were between the ages of 25 and 34, 21% were ages 35-44, and 22% were ages 45-54. There was a statistically significant difference between waves for the 18-24 age group with 18% in Wave 1

and 11% in Wave 2 ($\chi^2=7.234$, $p<.05$, Table 11). This decrease could indicate fewer young crew entering the fishing industry in the Northeast.

The majority of interviewed crew (63%) had a high school degree or equivalent (Table 11). Fourteen percent reported they had less than a high school degree, and 11% of crew reported having a bachelor's degree.

Most crew were either never married (39%) or married (37%), and smaller percentages of crew were either divorced (14%), widowed (2%), separated (2%), or living unmarried with a partner (7%) (Table 11).

Overwhelmingly, 89% of crew in the Northeast were born in the U.S. compared to only 11% born outside of the U.S. (Table 12).

The majority of crew (90%) reported English as their primary language. Spanish was the second most frequently spoken language for crew at 3% followed by Portuguese at 2%. The results of crew's reported primary language aligns with ethnicity and race. The majority of participants did not identify as Hispanic or Latino (93%). Hispanic or Latino ethnicity was asked separately from race. The race categories used in this survey align with those used by the U.S. Census Bureau. Most (89%) identified their race as White, an increase from 85% in Wave 1. There were also slight differences between waves for other races (slight increase in Asian respondents and decrease in American Indian and Black respondents). Although these were slight differences between Wave 1 and Wave 2, results were statistically significant for race ($\chi^2=16.288$, $p<.05$, Table 12).

Despite being in a very dangerous profession, 42% of crew reported they did not have health insurance within the last year. Of those insured, 27% of participants reported they had private insurance followed by 13% who reported they had federal or state insurance. Both of these sources of healthcare showed a slight increase from Wave 1. Fewer crew reported their employer as a source for healthcare coverage (3% vs <1%), as well as a source of healthcare coverage for their spouse/partner (10% vs. 15%) in Wave 2 ($\chi^2=16.374$, $p<.05$, Table 13).

Across all fisheries, 27% of crew reported having an income of \$120,000 or more with the next greatest number of crew reporting a range of \$30,000-\$59,999 (20%) and \$60,000-\$89,999 (20%). Comparatively, in Wave 1, only 7% of participants reported making \$120,000 or more while 34% were making \$30,000-\$59,999. In terms of the lowest income range, 23% of fishermen reported making less than \$30,000 per year in Wave 1 while only 9% of fishermen reported this for Wave 2. The differences between the categorical income for crew between Wave 1 and Wave 2 are statistically significant ($\chi^2=95.740$, $p<.001$, Table 14).

4.2 Crew Employment Characteristics

In this section, results are presented for various aspects of crew employment. These include factors related to overall industry participation (e.g., familial connection to fisheries, past participation in the industry), as well as current vessel employment characteristics (e.g., crew positions, payment systems).

4.2.1 Participation in the Commercial Fishing Industry

4.2.1.1 Familial Connection to the Commercial Fishing Industry

Sixty percent of crew reported having at least one family member involved in the commercial fishing industry in some capacity, whether as fishing crew, vessel owners, or employed in related shoreside businesses (Table 15). The majority of crew surveyed (60%) reported having multiple generations of their families involved in commercial fishing, including 42% with three or more generations of their family involved in the industry.

4.2.1.2 Employment History in the Commercial Fishing Industry

Surveyed crew reported an average of about 19 years of being involved in the commercial fishing industry, with almost half (49%) involved for more than 15 years (Table 16). Only about 16% of crew surveyed reported being involved in commercial fishing for less than 5 years.

Most crew respondents (64%) reported working for only one vessel owner in the past year (Table 16). The overwhelming majority of respondents (95%) reported that deckhand was their first position on the first vessel they were employed with upon entering the industry. While a large majority (86%) in Wave 1 also reported that deckhand was their first position, there was statistically significant variation among first crew positions other than deckhand. About 14% of crew in Wave 1 reported some other position than deckhand as their first job in the industry versus only 5% of respondents in Wave 2 ($\chi^2 = 28.3315$, $p < .001$, Table 16).

4.2.2 Characteristics of Current Vessel Employment

4.2.2.1 Employment Characteristics with Current Vessel

The majority of surveyed crew (60%) had been employed by their current vessel for less than 5 years. About one-third of crew (31%) had been employed from 5-15 years (Table 17). The most common path to employment among crew was by word of mouth (43%), while about one-quarter (26%) were referred by a friend, and about 12% were related to a vessel owner and 4% related to a non-owner member of the crew. Paths to employment among crew has shifted dramatically according to differences between Wave 1 and Wave 2. Among crew surveyed in Wave 1, the most common path to employment was previous work with the same vessel (39%), followed by referrals from friends (22%), or familial relations to vessel owners (10%). This statistically significant shift from employment through prior work to word of mouth employment suggests crew membership may be less stable and consistent than in the past ($\chi^2 = 193.0405$, $p < .001$, Table 17). Additionally, these data also indicate that finding employment is not as easy as it had been in the past for prospective crew. While about three-quarters of crew (76%) in both Wave 1 and Wave 2 reported it was either easy or very easy to find employment on their current vessels, a smaller percentage in Wave 2 compared to Wave 1 reported it was very easy (31% compared to 50%, respectively). Moreover, there was a slight increase in the percentage of crew respondents who reported it was either difficult or very difficult to find employment on their current vessels. Notably, about 16% in Wave 2 reported it was difficult (12%) or very difficult (4%), up from 12% in Wave 1. This change in reported difficulty finding employment was statistically significant ($t = 2.8109$, $p < .01$, Table 17).

4.2.2.2 Characteristics of Labor Activities on Current Vessel

Surveyed crew reported working on average 15 hours per day (Table 18). About 28% of surveyed crew worked on vessels that fished for single-day trips, whereas about 72% worked on vessels that fished on trips for multiple days. Among those on vessels that fished for multiple days per trip, respondents reported an average of about 7 days per trip. Crew reported a statistically significant difference in trip durations from crew in Wave 1 with an average of 4.89 days per trip versus 5.45 days per trip in Wave 2 ($t = -1.7273$, $p < .05$, Table 18). This difference may be due in part to the differences in target fisheries represented in each survey wave, but it may also reflect an increased need for greater fishing effort over time related to fisheries management or ecosystem changes.

4.2.2.3 Crew Characteristics for Current Vessel

Most surveyed crew (57%) reported working on vessels operated by a hired captain. This was a statistically significant change from Wave 1, in which the majority of crew (58%) reported working on owner-operated vessels ($\chi^2 = 17.6881$, $p < .001$, Table 19). A majority of crew (57%)

reported deckhand as their position on their current vessels, while about 22% were either hired captains or held other (11%) or multiple (10%) positions on their current vessels. Crew respondents reported their current vessels carried an average of about 5 crew members per trip, which was a statistically significant increase over the average of 4 crew reported by respondents in the Wave 1 survey ($t = -5.0768$, $p < .001$, Table 19). About one-third of respondents (32%) reported their current vessel carries 6 or more crew members, whereas only about 21% reported this average crew size in Wave 1. The differences between the two waves are statistically significant ($\chi^2 = 31.24$, $p < .001$). This difference may be due in part to differences in the representation of fisheries and ports across survey waves, such as a slightly higher proportion of scallop-targeting vessels that often employ more crew members than vessels in other fisheries.

4.2.2.4 Remuneration Characteristics on Current Vessel

The large majority of surveyed crew (85%) reported they were paid through a share system on their current vessels (Table 20). Even though the same percentage of respondents reported being paid by share in Wave 1, crew in Wave 2 reported a statistically significant higher mean percentage of the share paid to them versus crew in Wave 1. Crew in Wave 1 reported on average that 42% of the share was paid to crew members, whereas Wave 2 respondents reported on average that they received about 45% of the share ($t = -2.4695$, $p < .01$, Table 21). Most crew surveyed in Wave 2 reported that fuel (72%), food (59%), and ice (53%) were among the expenses deducted from their shares. Other less frequently reported expenses deducted from shares included general supplies (hooks, bags, totes, gloves, etc.) (31%), bait (19%), fishing quota (8%), or some other expense (6%). A statistically significant increase among crew surveyed in Wave 2 versus Wave 1 reported that ice (53% vs. 39%, $\chi^2 = 13.4269$, $p < .001$), bait (19% vs. 13%, $\chi^2 = 4.3421$, $p < .05$), and fishing quota (8% vs. 4%, $\chi^2 = 5.2019$, $p < .05$) were deducted from their shares. On the other hand, a statistically significant decrease among crew surveyed in Wave 2 versus Wave 1 reported that general supplies (31% vs. 43%, $\chi^2 = 9.6672$, $p < .01$) and some other expense (6% vs. 22%, $\chi^2 = 40.9727$, $p < .001$, Table 22) were deducted from their shares.

4.3 Crew Job Satisfaction and Well-being

In this section, results are presented for various questions on job satisfaction and well-being of crew. These include nine job satisfaction scale questions developed by Pollnac et al. (2014) to measure levels of job satisfaction and three questions to measure fishermen's well-being. Also presented here are questions pertaining to crew's perceptions toward fishing as a career.

4.3.1 Job Satisfaction

To understand crew's job satisfaction with commercial fishing, nine questions were asked based on Pollnac et al. (2014). Crew were asked to give their level of satisfaction with each of the nine questions, and responses were coded on a 5-point Likert scale of Very Dissatisfied (1), Dissatisfied (2), Neutral (3), Satisfied (4), and Very Satisfied (5). The mean scores for each of the job satisfaction questions for both survey waves can be found in Table 23. For both survey waves, three components of job satisfaction were calculated (Basic Needs, Social and Psychological Needs, and Self-Actualization) by summing the scores for the 3 items that have persistently explained the most variance in each component (the highest factor scores) in multiple analyses (Pollnac et al. 2014). For example, the coded scores for *Your actual earnings*, *Predictability of your earnings*, and *Job safety* were summed creating a range from 3-15 for the Basic Needs component (see the full list of items summed for each component in Table 24). Between both waves, no crew participants responded Very Dissatisfied with the *Adventure of the job*, therefore the Self-Actualization component ranges from 4-15.

The mean scores and standard deviation (in parenthesis) for each of the 3 components is shown in Table 25. There were statistically significant differences between both survey waves for the Basic Needs category ($t=-9.786$, $p<.001$). This difference suggests crew in Wave 2 were more satisfied overall with their actual earnings, the predictability of their earnings from fishing, and job safety (physical risks) than those surveyed in Wave 1. This corresponds with higher incomes reported in Wave 2 than Wave 1. The component with the highest mean scores was the Self-Actualization component, suggesting crew continue to be most satisfied with the adventure of the job, challenge of the job, and opportunity to be their own boss.

Two additional job satisfaction questions were asked to crew: “Would you advise a young person to enter fishing today?” and “Would you still fish if you had your life to live over?” The possible answers for these questions were “Yes,” “No,” or “Maybe/unsure.” Over half of crew (56%) stated they would advise a young person to enter fishing today, an increase from 46% in Wave 1. Differences in responses for recommending a young person were statistically significant between the two waves ($\chi^2=54.847$, $p<.001$, Table 26). Fewer crew in Wave 2 versus Wave 1 said they would not advise a young person to enter fishing (29% vs. 49%) while more responded with Maybe/Unsure in Wave 1 (16% vs. 4%). Given the high number of scallop crew and higher reported incomes in Wave 2 versus Wave 1, this could be an indicator that crew involved in this fishery are more positive about fishing as a career into the future. The majority of crew (78%) would fish again if they had their lives to live over. Only 12% of crew members responded negatively to this question in Wave 2 versus 20% in Wave 1 ($\chi^2=10.455$, $p<.05$, Table 26).

4.3.1.1 Perceptions of Fishing as a Career

Participants were read two statements on a 5-point Likert scale to determine their perceptions on fishing as a career (Table 27). Responses to “Fishing is just a job to me” and “Leaving the fishing industry is something that I have considered” were coded on a Likert scale from Strongly Disagree (1) to Strongly Agree (5) with Neutral (3) in the middle. The majority of crew (69%) stated they Disagree/Strongly Disagree with the statement “Fishing is just a job to me.” Results were mixed in regard to the question “Leaving the fishing industry is something that I have considered” with 49% responding Disagree/Strongly Disagree and 44% responding Agree/Strongly Agree.

4.3.2 Well-being

Three questions were asked on a 5-point Likert scale to measure fishermen’s level of personal well-being. Crew were asked their level of satisfaction with “Your life,” “Your physical health,” and “The overall health of the marine environment.” Responses were coded on a scale of Very Dissatisfied (1) to Very Satisfied (5) with Neutral (3) in the middle. The vast majority of fishermen (87%) answered positively as Satisfied/Very Satisfied with their lives. There were statistically significant differences between survey waves with more crew reporting they were satisfied with their lives in Wave 2 than in Wave 1 ($t=4.172$, $p<.001$, Table 28). The majority of crew were Satisfied/Very Satisfied with their physical health (81%). The majority of participants (62%) were Satisfied/Very Satisfied with the overall health of the marine environment. The majority of participants were Satisfied/Very Satisfied in both waves, but more remained neutral in Wave 2 (23% vs. 10%) and fewer responded negatively in Wave 2 (15% vs 25%) ($t=2.043$, $p<.05$, Table 28).

4.4 Perceptions of Fisheries Management

In this section, descriptive statistics are presented for questions pertaining to crew’s perception of fisheries management on their primary fishery. Crew were asked if they participate

in fisheries management and read three statements to understand their perceptions of fisheries regulations.

4.4.1 Participation in Fisheries Management

The majority of crew surveyed (60%) did not participate in fisheries management (e.g., attending meetings, writing letters, serving on a committee) (Table 29).

4.4.2 Perceptions of Fisheries Regulations

Three statements were read to each crew member to understand their perceptions of fisheries regulations on their primary fishery (Table 30). Responses were coded on a 5-point Likert scale from Strongly Disagree (1) to Strongly Agree (5) with Neutral (3) in the middle. For the statement, “The rules and regulations change so quickly it is hard to keep up,” the majority of participants (62%) answered Agree/Strongly Agree.

When read the statement, “Fines associated with breaking the rules and regulations of my primary fishery are fair,” just under half of crew (47%) answered positively with Agree/Strongly Agree. Overall, fewer respondents disagreed with the statement that fines are fair in Wave 2 versus Wave 1 (23% vs. 45%). Differences between survey waves for opinions on fines were statistically significant ($t=6.083$, $p<.001$, Table 30).

Just over half of crew (52%) answered Agree/Strongly Agree to the question, “I feel that the regulations in my primary fishery are too restrictive.” Results between survey waves for this question were statistically significant ($t=2.457$, $p<.05$, Table 30). Sixty-five percent of crew answered Agree/Strongly Agree in Wave 1. More crew remained neutral to regulations being too restrictive in Wave 2 versus Wave 1 (24% vs. 10%). The differences between survey waves for these last two questions could be a result of more scallop crew in Wave 2 being less negative regarding their fishery’s management strategies. Further analyses would need to be done to understand any differences between fishery types.

5. DISCUSSION AND FUTURE STEPS

This crew survey provides critical information that is useful for understanding the perceptions of, impacts on, and issues facing commercial fishing crew in the U.S. Northeast. Some of the differences found between survey waves reinforce the importance of creating a time series dataset that allows examination of trends in the fishing industry and filling information gaps on how fishery management and environmental changes could affect fishing crew and their communities. For example, while sea scallop was the most frequently reported primary fishery (31%) for Wave 2, there were notable changes between the primary fisheries reported between both waves. There was a decrease in the number of participants who reported groundfish as their primary fishery from 20% in Wave 1 to 7% in Wave 2, while squid fisheries showed an increase from 4% in Wave 1 to 8% in Wave 2. Even though these results are based on different sampling strategies, they still provide useful information that could indicate some changes in crew’s primary fisheries in the Northeast region. In this case, the move to catch share management for groundfish in 2010 was a major change in how fish were managed in the U.S. Northeast with unknown socioeconomic implications for both fishermen and coastal communities. To help address these concerns, the NEFSC’s SSB developed performance measures and indicators to monitor the socioeconomic outcomes of various management programs (Clay et al. 2014) like catch shares. The change to catch shares may help explain the decrease in the number of crew reporting groundfish as their primary fishery.

There were significant changes between reported income in both waves. Notably, almost one-third of crew (30%) reported having an income greater than \$120,000 in Wave 2. This increase is unsurprising for Wave 2 since one-third of the crew (32%) reported scallop as their primary fishery, which tend to command the highest market prices and, therefore, the highest incomes. Similarly, there was a decrease in the number of crew making \$30,000-\$59,999 from 38% in Wave 1 to 22% in Wave 2. This may be due in part to the decrease in the number of crew who reported groundfish as their primary fishery—from 20% in Wave 1 to only 6% in Wave 2.

Most crew surveyed in Wave 2 had family members currently involved in the commercial fishing industry, as well as multiple previous generations of their family in the industry. While the number of crew with family in the industry was up from the previous survey wave, this increase was not statistically significant. These results do demonstrate, however, that commercial fishing in the Northeast is an intergenerational occupation rooted in strong family tradition and culture. Despite the intergenerational nature of the industry, there is also evidence from these data of a decline in young and new entrants to the industry. There was a statistically significant difference between waves for the 18-24 age category, where there were fewer crew in this age category in Wave 2. Relatively few crew members surveyed in Wave 2 said they had been involved in the industry for less than 5 years, while on average, crew reported 19 years in the industry. Though this was not a significant change from the previous wave, these results—as well as significantly fewer crew in the younger age category—do indicate the industry is not attracting new and young individuals to the occupation of commercial fishing. This may have a profound impact on the sustainability of the commercial fishing industry in the Northeast in the years and decades to come.

In terms of specific employment on their current fishing vessels, crew surveyed in Wave 2 differed dramatically on some key characteristics of employment from their previous wave counterparts. Paths to employment among crew changed significantly, with the most common method being word of mouth employment in the current survey wave as compared to previous work with the same vessel in the prior wave. This suggests employment on fishing vessels has become less stable over time as crew move from vessel to vessel in search of more consistent employment and income. To compound this shift in employment stability, crew surveyed in Wave 2 were significantly more likely to report difficulty finding employment on their current fishing vessels.

Significantly more crew in Wave 2 reported working on vessels operated by hired captains as opposed to vessel owner-operators. These results highlight an interesting development that may indicate shifting patterns of vessel ownership. The consolidation of certain sectors of the commercial industry in the Northeast could be driving the increase in crews led by hired captains instead of individuals who own and operate their own vessels. Among those paid through share systems, crew members surveyed in Wave 2 reported significantly, though not substantially, larger shares on average. The average percentage of the total share paid to them went up 3% between Wave 1 and Wave 2. While it could be gleaned that this change is evidence of increasing pay for crew, there are multiple important caveats to bear in mind when interpreting these results. Share system distribution likely differs by fishery depending upon how many crew are employed and how profitable the fishery is in general. Moreover, hired captains may take home larger proportions of the overall crew share than other vessel employees, such as deckhands.

Crew were overall more satisfied in Wave 2 than Wave 1 with the Basic Needs component of job satisfaction: their actual earnings, predictability of earnings, and safety (physical risks) of fishing. This could be attributed to the high number of scallop crew with higher reported income. Interestingly, crew were overall most satisfied with items in the Self-Actualization component of

job satisfaction for both Wave 1 and Wave 2 with almost no difference between survey waves. This component includes their satisfaction with the adventure of the job, challenge of the job, and opportunity to be their own boss. Past research has found these components of job satisfaction in fishing to be unlike any other industries (Acheson 1981; Anderson 1980; Smith 1981; McCay et al. 1993; Bunce et al. 2000; Pollnac and Poggie 2006, 2008). The challenge, adventure, and independence of commercial fishing represents a human need to fish, even in the face of decreasing incomes (Pollnac and Poggie 1988, Pollnac et al. 2014). The question, “Would you advise a young person to enter fishing?” has been frequently used in previous studies and proven a useful indicator of respondents’ perceptions of the future in the industry (Pollnac and Poggie 1988; Pollnac et al. 2014). More respondents (54%) in Wave 2 stated they would recommend a young person to enter fishing than in Wave 1 (46%). Most participants (88%) were Satisfied/Very Satisfied with their lives overall. There were significant differences between both survey waves where more crew were dissatisfied with their lives overall in Wave 1. The negative responses in Wave 1 for advising younger people to enter fishing as well as for subjective well-being could be associated with management actions causing crew to have less control over aspects of their occupational activities (Smith and Clay 2010, Smith et al. 2000, Smith and Gilden 2000). This could be true with more reported groundfish in Wave 1 and the uncertainty that crew were dealing with at that time with the recent implementation of catch shares. Fewer crew in Wave 2 agreed with the statement, “I feel the regulations are too restrictive.” As these initial results show, crew’s experience and perceptions can vary by fishery type. Future analyses will explore crew survey responses by fishery type to help understand any differences and potential impacts from management.

There were a number of lessons learned in Wave 2 of crew survey implementation. The primary goal of the Wave 2 effort was to reevaluate the survey questions from the baseline Wave 1 in order to decrease the implementation time of the survey while capturing the most essential information regarding crew. The improvement in response rate (92% vs. 34%) can be attributed in part to the shortened survey. The average time to complete the survey for Wave 2 was just under 10 minutes versus 37 minutes in Wave 1. When fishermen are in port, they could be working on gear, offloading catch, or loading provisions (e.g., fuel, ice, groceries) for an upcoming trip. Most of the time, these tasks need to be done as quickly as possible, so it can be difficult for crew to participate in long, extensive surveys. The updated, shortened survey was more convenient, allowing crew to take quick breaks to participate or, if possible, respond to questions while they worked. The shorter survey also allowed multiple crew to be interviewed from the same vessel. In many instances, the owner or captain would relieve one crew member at a time from their task to take the survey. With the influx of survey research on fisheries in recent decades, it is important to respect fishermen’s time. Future implementations will maintain this shorter survey with hopes of continued response rate success.

While vessel owners are reachable through vessel registrations and permits, there is no contact information or registry for crew. This makes facilitating crew to participate and evaluate their perceptions and experiences in the industry difficult. The intercept survey allows researchers to connect with a hard-to-reach population. However, there are always challenges to the intercept survey method, especially when targeting members of the fishing industry. Fishermen’s schedules are dependent on a number of factors (e.g., weather, fishing seasons, management measures). In addition to unpredictable schedules, access to crew can be difficult depending on the port. As many fisheries consist of large corporations, there are issues with gated facilities on private property restricting access. In these circumstances, a lot of groundwork and research was done prior to fieldwork to find contacts and gain access. To maximize fieldwork efforts, Wave 2 used more

internal networks with direct relationships with industry such as port agents and the Cooperative Research Branch at the NEFSC and their Study Fleet vessels. In order to make trips to ports most effective, research was done prior to fieldwork to understand the best times of the year to visit each port based on the fisheries targeted and fishing seasons.

Despite extensive prior research and connections through contacts, fishermen can still be difficult to access, especially in smaller ports. It would be beneficial in the future to consider mixed method sampling. Many fishermen expressed the convenience of providing an online survey. As noted above, 24 surveys were self-administered. This was a result of a large corporation handing out paper copies to their employees to fill out while at sea. The company explained it would be impossible for researchers to intercept crew there because they show up to the facility the day they leave for a trip and return at unpredictable hours and immediately go home. Many small boat ports, especially in New England, have vessels on moorings in the harbors. Therefore, they are only accessible very early in the morning when they are in a hurry to get to their vessel, or when they walk to their vehicles and leave after a long day's work. Some fishermen in these ports expressed that we should provide an online option or give a paper copy to mail back because it is difficult for them to take the time after working 10- to 12-hour days. Multiple fishermen provided their phone numbers when intercepted and asked us to call at a better time, therefore 7 were completed over the phone.

Researchers took detailed field notes based on their observations that will also be analyzed in the future and provide valuable qualitative data to help understand crew's experiences in the fishing industry. These field notes will also provide information on specific ports (i.e., busy times, important contacts, accessibility) that will make future implementations easier. Other insights for future data collection from the implementation of the second survey wave included the need to explore different survey modes for participation (i.e., web-based and mobile surveys), establish contacts with industry stakeholders early in the planning phase, provide tangible data products and results for stakeholders, and aim for survey fielding in the most active months by fishery.

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Table 1. Definitions of the target and sampling populations for the Crew Survey.

| Category | Crew Survey |
|---|---|
| Target population – The population the survey effort is interested in collecting data about. | Individuals who work as crew on commercial fishing vessels operating in New England 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. |

Table 2. Commercial fishing employment estimates by state, New England 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 |

Table 3. Commercial Fishing Engagement Index (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 | |

Table 4. Sample of Census Designated Places (CDPs) containing moderately and highly engaged ports throughout New England and Mid-Atlantic

| CDPs | Engagement Score | Categorical Score |
|-----------------|------------------|-------------------|
| New Bedford, MA | 25.50 | 4 |
| Gloucester, MA | 9.67 | 4 |
| Cape May, NJ | 8.99 | 4 |

| CDPs | Engagement Score | Categorical Score |
|--|-------------------------|--------------------------|
| Narragansett/Point Judith, RI | 7.74 | 4 |
| Reedville/District 5 (Northumberland County), VA | 6.66 | 4 |
| Montauk, NY | 4.76 | 4 |
| Portland, ME | 4.58 | 4 |
| Point Pleasant, NJ | 3.64 | 4 |
| Barnegat Light, NJ | 3.11 | 4 |
| Stonington, ME | 2.98 | 4 |
| Boston, MA | 2.70 | 4 |
| Port Clyde-Tenants Harbor/St. George, ME | 2.62 | 4 |
| Bailey Island/Harpswell, ME | 2.52 | 4 |
| Beaufort, NC | 1.86 | 4 |
| Atlantic City, NJ | 1.84 | 4 |
| Wilmington, NC | 1.83 | 4 |
| Newport News, VA | 1.75 | 4 |
| Hampton Bays/Shinnecock, NY | 1.71 | 4 |
| Rockland, ME | 1.70 | 4 |
| Scituate/North Scituate, MA | 1.62 | 4 |
| Beals, ME | 1.56 | 4 |
| Vinalhaven, ME | 1.53 | 4 |
| Jonesport, ME | 1.46 | 4 |
| Hatteras, NC | 1.43 | 4 |
| Fairhaven, MA | 1.43 | 4 |
| Newport, RI | 1.23 | 4 |
| Wanchese, NC | 1.23 | 4 |
| Friendship, ME | 1.18 | 4 |
| Belford, NJ | 1.12 | 4 |
| Marshfield/Green Harbor-Cedar Crest, MA | 1.09 | 4 |
| District 1/Grafton/Seaford/Yorktown, VA | 1.07 | 4 |
| Corea/Gouldsboro/Prospect Harbor, ME | 1.04 | 4 |
| Sneads Ferry, NC | 1.02 | 4 |
| New London, CT | 0.94 | 3 |
| Plymouth, MA | 0.94 | 3 |
| Barnstable Town, MA | 0.92 | 3 |
| Provincetown, MA | 0.81 | 3 |
| Milbridge, ME | 0.74 | 3 |
| Rye, NH | 0.72 | 3 |
| Kennebunkport, ME | 0.63 | 3 |
| Seabrook, NH | 0.61 | 3 |
| Kill Devil Hills, NC | 0.61 | 3 |
| Kittery/Kittery Point, ME | 0.61 | 3 |
| Hampton, NH | 0.60 | 3 |
| Owls Head, ME | 0.59 | 3 |
| Morehead City, NC | 0.57 | 3 |
| Steuben, ME | 0.56 | 3 |
| Sandwich/East Sandwich/Forestdale, MA | 0.55 | 3 |
| Machiasport, ME | 0.54 | 3 |

| CDPs | Engagement Score | Categorical Score |
|--------------|------------------|-------------------|
| Rockport, MA | 0.51 | 3 |

Table 5. Intercept ports for Wave 1 and Wave 2.

| | Wave 1 | Wave 2 |
|-------------------------------|-------------------|-------------------|
| | N (%) | N (%) |
| Total | 359 (100%) | 478 (100%) |
| New Bedford, MA | 36 (10%) | 100 (21%) |
| Narragansett/Point Judith, RI | 27 (8%) | 34 (7%) |
| Cape May, NJ | 35 (10%) | 32 (7%) |
| Montauk, NY | 14 (4%) | 24 (5%) |
| Cape Charles, VA | - | 23 (5%) |
| Gloucester, MA | 50 (14%) | 23 (5%) |
| Hampton, VA | - | 23 (5%) |
| Portland, ME | 14 (4%) | 23 (5%) |
| Newport News, VA | 62 (17%) | 21 (4%) |
| Barnegat Light, NJ | - | 20 (4%) |
| Stonington, ME | 7 (2%) | 18 (4%) |
| Atlantic City, NJ | - | 16 (3%) |
| Beaufort, NC | 10 (3%) | 14 (3%) |
| Fairhaven, MA | - | 14 (3%) |
| Point Pleasant, NJ | - | 13 (3%) |
| Hampton Bays/Shinnecock, NY | - | 11 (2%) |
| Sandwich, MA | - | 11 (2%) |
| Boston, MA | 9 (3%) | 9 (2%) |
| Engelhard, NC | - | 9 (2%) |
| Rockland, ME | 15 (4%) | 6 (1%) |
| Newport, RI | - | 5 (1%) |
| Stonington, CT | 6 (2%) | 5 (1%) |
| Wanchese, NC | 13 (4%) | 5 (1%) |
| Portsmouth, NH | 18 (5%) | 3 (<1%) |
| Provincetown, MA | - | 3 (<1%) |
| Seaford, VA | - | 3 (<1%) |
| Green Harbor/Marshfield, MA | - | 2 (<1%) |
| Hampton, NH | - | 2 (<1%) |
| Owls Head, ME | - | 2 (<1%) |
| Chatham, MA | 4 (1%) | 1 (<1%) |
| Kennebunkport, ME | - | 1 (<1%) |
| Plymouth, MA | 8 (2%) | 1 (<1%) |
| Stumpy Point, NC | - | 1 (<1%) |
| Chincoteague, VA | 5 (1%) | - |
| Oriental, NC | 6 (2%) | - |
| Oyster, VA | 7 (2%) | - |
| Scituate, MA | 2 (1%) | - |
| Seabrook, NH | 10 (3%) | - |

| | | |
|--------------------|---------|---|
| Virginia Beach, VA | 1 (<1%) | - |
|--------------------|---------|---|

Table 6. Primary ports for Wave 1 and Wave 2.*

| | Wave 1 | Wave 2 |
|-----------------------------|-------------------|-------------------|
| | N (%) | N (%) |
| Total | 358 (100%) | 492 (100%) |
| New Bedford, MA | 53 (15%) | 102 (21%) |
| Cape May, NJ | 25 (7%) | 36 (7%) |
| Point Judith, RI | 28 (8%) | 33 (7%) |
| Gloucester, MA | 44 (12%) | 26 (5%) |
| Montauk, NY | 14 (4%) | 25 (5%) |
| Barnegat Light, NJ | 4 (1%) | 22 (4%) |
| Fairhaven, MA | 1 (<1%) | 20 (4%) |
| Portland, ME | 13 (4%) | 18 (4%) |
| Stonington, ME | 7 (2%) | 18 (4%) |
| Point Pleasant, NJ | 2 (<1%) | 18 (4%) |
| Cape Charles, VA | 2 (<1%) | 12 (2%) |
| Sandwich, MA | - | 12 (2%) |
| Engelhard, NC | 4 (1%) | 12 (2%) |
| Atlantic City, NJ | 7 (2%) | 10 (2%) |
| Hampton Bays/Shinnecock, NY | - | 10 (2%) |
| Boston, MA | 6 (2%) | 9 (2%) |
| Beaufort, NC | 3 (<1%) | 9 (2%) |
| Hampton, VA | - | 8 (2%) |
| Newport News, VA | 28 (8%) | 8 (2%) |
| Rockland, ME | 13 (4%) | 6 (1%) |
| Wanchese, NC | 14 (4%) | 6 (1%) |
| Newport, RI | - | 6 (1%) |
| Stonington, CT | 5 (1%) | 5 (1%) |
| Owls Head, ME | - | 4 (1%) |
| Provincetown, MA | - | 4 (1%) |
| Seaford, VA | 4 (1%) | 4 (1%) |
| Swan Quarter, NC | - | 4 (1%) |
| Poquoson/Messick Point, VA | - | 3 (1%) |
| Oyster, VA | 3 (<1%) | 3 (1%) |
| Portsmouth, NH | 11 (3%) | 3 (1%) |
| Hyannis, MA | 2 (<1%) | 3 (1%) |
| Brunswick, GA | - | 3 (1%) |
| Amagansett, NY | - | 2 (<1%) |
| Hampton, NH | 4 (1%) | 2 (<1%) |
| Hoopers Island, MD | - | 2 (<1%) |
| Rushmere/Tylers Beach, VA | - | 2 (<1%) |
| Smith Island, MD | - | 2 (<1%) |
| Tangier, VA | - | 2 (<1%) |
| Chatham, MA | 8 (2%) | 1 (<1%) |
| Crisfield, MD | - | 1 (<1%) |
| Green Harbor, MA | - | 1 (<1%) |
| Hobucken, NC | - | 1 (<1%) |
| Kennebunkport, ME | - | 1 (<1%) |

| | Wave 1 | Wave 2 |
|---------------------------|---------|---------|
| Kodiak, AK | | 1 (<1%) |
| Madison, MD | - | 1 (<1%) |
| Marshfield, MA | - | 1 (<1%) |
| Monhegan, ME | - | 1 (<1%) |
| Ocean City, NJ | - | 1 (<1%) |
| Oriental, NC | - | 1 (<1%) |
| Pascagoula, MS | - | 1 (<1%) |
| Plymouth, MA | 2 (<1%) | 1 (<1%) |
| Port Royal, SC | | 1 (<1%) |
| Sneads Ferry, NC | - | 1 (<1%) |
| Southold, NY | - | 1 (<1%) |
| Stumpy Point, NC | - | 1 (<1%) |
| Sea Isle City, NJ | 3 (<1%) | 1 (<1%) |
| Badgers Island, ME | 1 (<1%) | - |
| Bayou La Batre, AL | 1 (<1%) | - |
| Cape Canaveral, FL | 4 (1%) | - |
| Carvers Harbor, ME | 1 (<1%) | - |
| Chincoteague, VA | 4 (1%) | - |
| Dorchester, NJ | 1 (<1%) | - |
| Falmouth, MA | 1 (<1%) | - |
| Islip, NY | 1 (<1%) | - |
| Jones Inlet, NY | 1 (<1%) | - |
| Kittery, ME | 2 (<1%) | - |
| Lynnhaven Inlet, VA | 1 (<1%) | - |
| Manchester-by-the-Sea, MA | 1 (<1%) | - |
| McClellanville, SC | 3 (<1%) | - |
| Morehead City, NC | 1 (<1%) | - |
| Point Lookout, NY | 1 (<1%) | - |
| Port Norris, NJ | 1 (<1%) | - |
| Prospect, ME | 1 (<1%) | - |
| Rescue, VA | 1 (<1%) | - |
| Rockport, MA | 3 (<1%) | - |
| Rockport, ME | 2 (<1%) | - |
| Sakonnet Point, RI | 1 (<1%) | - |
| Scituate, MA | 2 (<1%) | - |
| Seabrook, NH | 6 (2%) | - |
| South Bristol, ME | 1 (<1%) | - |
| South Freeport, ME | 2 (<1%) | - |
| Southwest Harbor, ME | 1 (<1%) | - |
| Wachapreague, VA | 1 (<1%) | - |
| Wickford, RI | 1 (<1%) | - |
| Yarmouth, ME | 1 (<1%) | - |

*Frequencies reflect the sum total of the number of times a port was stated as primary. Some fishermen could not choose only one primary port they worked in the most throughout the year, therefore the total number for primary port is above the total number of completed surveys.

Table 7. Descriptive statistics of commute time to primary port (in miles) for Wave 2.

| | N | Min | Max | Mean | Median |
|---------------------|----------|------------|------------|-------------|---------------|
| Commute Time | 477 | 0 | 3000 | 91.76 | 15.00 |

*Commute mileage was not assessed on the first survey wave.

Table 8. Ports of landing for Wave 1 and Wave 2.*

| | Wave 1 | Wave 2 |
|-------------------------------|-------------------|-------------------|
| | N (%) | N (%) |
| Total | 358 (100%) | 507 (100%) |
| New Bedford, MA | 56 (16%) | 120 (24%) |
| Cape May, NJ | 24 (7%) | 36 (7%) |
| Narragansett/Point Judith, RI | 27 (8%) | 33 (7%) |
| Gloucester, MA | 48 (13%) | 29 (6%) |
| Montauk, NY | 14 (4%) | 27 (5%) |
| Barnegat Light, NJ | 4 (1%) | 22 (4%) |
| Stonington, ME | 9 (3%) | 19 (4%) |
| Point Pleasant, NJ | 2 (<1%) | 15 (3%) |
| Portland, ME | 11 (3%) | 15 (3%) |
| Beaufort, NC | 4 (1%) | 14 (3%) |
| Cape Charles, VA | 2 (<1%) | 14 (3%) |
| Boston, MA | 3 (<1%) | 13 (3%) |
| Newport News, VA | 28 (8%) | 13 (3%) |
| Engelhard, NC | - | 12 (2%) |
| Hampton, VA | - | 12 (2%) |
| Sandwich, MA | - | 12 (2%) |
| Atlantic City, NJ | 7 (2%) | 10 (2%) |
| Hampton Bays/Shinnecock, NY | - | 10 (2%) |
| Wanchese, NC | 14 (4%) | 7 (1%) |
| Fairhaven, MA | 1 (<1%) | 6 (1%) |
| Stonington, CT | 4 (1%) | 6 (1%) |
| Newport, RI | - | 5 (1%) |
| Rockland, ME | 11 (3%) | 5 (1%) |
| Swan Quarter, NC | - | 5 (1%) |
| Seaford, VA | 4 (1%) | 4 (1%) |
| Brunswick, GA | - | 3 (1%) |
| Crisfield, MD | - | 3 (1%) |
| Hoopers Island, MD | - | 3 (1%) |
| Hyannis, MA | - | 3 (1%) |
| Owls Head, ME | - | 3 (1%) |
| Portsmouth, NH | 11 (3%) | 3 (1%) |
| Provincetown, MA | - | 3 (1%) |
| Poquoson/Messick Point, VA | - | 2 (<1%) |
| Rushmere/Tyler's Beach, VA | - | 2 (<1%) |
| Bayou La Batre, AL | 1 (<1%) | 1 (<1%) |
| Chatham, MA | 8 (2%) | 1 (<1%) |
| Fall River, MA | - | 1 (<1%) |
| Green Harbor, MA | - | 1 (<1%) |
| Hampton, NH | 4 (1%) | 1 (<1%) |

| | Wave 1 | Wave 2 |
|---------------------------|---------|---------|
| Madison, MD | - | 1 (<1%) |
| Marshfield, MA | - | 1 (<1%) |
| Mattituck, NY | - | 1 (<1%) |
| Ocean City, NJ | - | 1 (<1%) |
| Oriental, NC | - | 1 (<1%) |
| Oyster, VA | 2 (<1%) | 1 (<1%) |
| Plymouth, MA | 2 (<1%) | 1 (<1%) |
| Port Royal, SC | - | 1 (<1%) |
| Sea Isle City, NJ | - | 1 (<1%) |
| Seabrook, NH | 6 (2%) | 1 (<1%) |
| Southold, NY | - | 1 (<1%) |
| Stumpy Point, NC | - | 1 (<1%) |
| Tangier, VA | - | 1 (<1%) |
| Cape Canaveral, FL | 4 (1%) | - |
| Carvers Harbor, ME | 1 (<1%) | - |
| Cherry Point, SC | 1 (<1%) | - |
| Chincoteague, VA | 4 (1%) | - |
| Cundys Harbor, ME | 1 (v%) | - |
| Dorchester, NJ | 1 (<1%) | - |
| Falmouth, MA | 1 (<1%) | - |
| Islip, NY | 1 (<1%) | - |
| Jones Inlet, NY | 1 (<1%) | - |
| Kittery, ME | 3 (<1%) | - |
| Lynnhaven Inlet, VA | 1 (<1%) | - |
| Manchester-by-the-Sea, MA | 1 (<1%) | - |
| Match Landing, NJ | 1 (<1%) | - |
| McClellanville, SC | 3 (<1%) | - |
| Minceville, VA | 1 (<1%) | - |
| New Gloucester, ME | 2 (<1%) | - |
| North Kingstown, RI | 1 (<1%) | - |
| Point Lookout, NY | 4 (1%) | - |
| Rescue, VA | 1 (<1%) | - |
| Rockport, MA | 3 (<1%) | - |
| Rockport, ME | 2 (<1%) | - |
| Sakonnet Point, RI | 1 (<1%) | - |
| Scituate, MA | 2 (<1%) | - |
| Sea Isle, NJ | 3 (<1%) | - |
| South Bristol, ME | 1 (<1%) | - |
| South Freeport, ME | 2 (<1%) | - |
| Southwest Harbor, ME | 1 (<1%) | - |
| Wachapreague, VA | 1 (<1%) | - |
| Woods Hole, MA | 1 (<1%) | - |
| Yarmouth, ME | 1 (<1%) | - |

*Frequencies reflect the sum total of the number of times a port was stated as port of landing. Some fishermen could not choose one port of landing they offloaded their catch at most frequently throughout the year, therefore the total number for port of landing is above the total number of completed surveys.

Table 9. Primary fishery targeted for Wave 1 and Wave 2.*

| | Wave 1 | Wave 2 |
|---|-------------------|-------------------|
| | N (%) | N (%) |
| Total | 356 (100%) | 498 (100%) |
| Scallop | 100 (28%) | 155 (31%) |
| Lobster | 70 (20%) | 85 (17%) |
| Squid | 13 (4%) | 44 (9%) |
| Groundfish** | 72 (20%) | 33 (7%) |
| Fluke (summer slouder) (<i>Paralichthys dentatus</i>) | 20 (6%) | 24 (5%) |
| Blue Crab (<i>Callinectes sapidus</i>) | - | 21 (4%) |
| Surf Clam (<i>Spisula solidissima</i>)/ Ocean Quahogs (<i>Arctica islandica</i>) | 8 (2%) | 21 (4%) |
| Shrimp | 9 (3%) | 16 (3%) |
| Herring | 8 (2%) | 14 (3%) |
| Jonah Crab (<i>Cancer borealis</i>) | - | 14 (3%) |
| Menhaden | - | 10 (2%) |
| Monkfish | 9 (3%) | 10 (2%) |
| Tuna | 7 (2%) | 7 (1%) |
| Scup (<i>Stenotomus chrysops</i>) | 2 (<1%) | 5 (1%) |
| Black Sea Bass (<i>Centropristis striata</i>) | 3 (<1%) | 5 (1%) |
| Oyster | 3 (<1%) | 5 (1%) |
| Swordfish (<i>Xiphias gladius</i>) | 5 (1%) | 4 (1%) |
| Skate | 5 (1%) | 3 (1%) |
| Bluefish (<i>Pomatomus saltatrix</i>) | - | 3 (1%) |
| Tilefish | 2 (<1%) | 3 (1%) |
| Striped Bass (<i>Morone saxatilis</i>) | 1 (<1%) | 3 (1%) |
| Crab | 10 (3%) | 2 (<1%) |
| Atlantic Croaker (<i>Micropogonias undulates</i>) | 2 (<1%) | 2 (<1%) |
| Vermillion Snapper (<i>Rhomboplites aurorubens</i>) | - | 2 (<1%) |
| Black Drum (<i>Pogonias cromis</i>) | - | 1 (<1%) |
| Grouper | - | 1 (<1%) |
| Mackerel | 1 (<1%) | 1 (<1%) |
| Spiny Dogfish (<i>Squalus acanthias</i>) | 4 (1%) | 1 (<1%) |
| Smooth Dogfish (<i>Mustelus canis</i>) | - | 1 (<1%) |
| Triggerfish | - | 1 (<1%) |
| Mahi Mahi (<i>Coryphaena hippurus</i>) | - | 1 (<1%) |
| Conch | 2 (<1%) | - |

*Frequencies reflect the sum total of the number of times a fishery was stated as primary in terms of income.

**Groundfish refers to any of the 12 species managed under the Northeast Multispecies (groundfish) species which include: Atlantic cod (*Gadus morhua*), haddock (*Melanogrammus aeglefinus*), pollock, yellowtail flounder (*Limanda ferruginea*), witch flounder (*Glyptocephalus cynoglossus*), winter flounder (*Pseudopleuronectes americanus*), windowpane flounder (*Scophthalmus aquosus*), American plaice (*Hippoglossoides platessoides*),

Atlantic halibut (*Hippoglossus hippoglossus*), redfish (*Sciaenops ocellatus*), ocean pout (*Zoarces americanus*), and white hake (*Urophycis tenuis*).

Table 10. Descriptive statistics for age of crew for Wave 1 and Wave 2.

| | Wave 1 | Wave 2 |
|--------|--------|--------|
| | N=355 | N=478 |
| Min | 15 | 18 |
| Max | 74 | 75 |
| Mean | 38 | 39 |
| Median | 37 | 38 |

$t=-2.139, p<.05$

Table 11. Age groups, education, and marital status for Wave 1 and Wave 2.

| | Wave 1 | Wave 2 |
|---------------------------|------------|------------|
| | N (%) | N (%) |
| Total | 359 (100%) | 478 (100%) |
| Age* | | |
| 18-24 | 63 (18%) | 53 (11%) |
| 25-34 | 93 (26%) | 151 (32%) |
| 35-44 | 94 (26%) | 99 (21%) |
| 45-54 | 70 (20%) | 104 (22%) |
| 55 or older | 39 (11%) | 71 (15%) |
| Education | | |
| Less than high school | 60 (17%) | 65 (14%) |
| High school or equivalent | 211 (59%) | 300 (63%) |
| Associate/2-year degree | 48 (13%) | 54 (11%) |
| Bachelor's/4-year degree | 30 (8%) | 50 (11%) |
| Graduate degree | 3 (<1%) | 3 (<1%) |
| Don't know/No answer | 7 (2%) | 6 (1%) |
| Marital status | | |
| Married | 158 (44%) | 176 (37%) |
| Widowed | 1 (<1%) | 7 (2%) |
| Divorced | 45 (13%) | 64 (14%) |
| Separated | 7 (2%) | 11 (2%) |
| Never married | 124 (35%) | 188 (39%) |
| Living with partner | 22 (6%) | 31 (7%) |
| Don't know/No answer | 2 (<1%) | 1 (<1%) |

$*\chi^2=14.261, p<.05$

Table 12. Place of birth, primary language, ethnicity and race for Wave 1 and Wave 2.

| | Wave 1 | Wave 2 |
|----------------------------------|-------------------|-------------------|
| | N (%) | N (%) |
| Total | 359 (100%) | 478 (100%) |
| Place of birth | | |
| Outside U.S. | 38 (11%) | 55 (11%) |
| U.S. | 320 (89%) | 423 (89%) |
| Don't know/No answer | 1 (<1%) | - |
| Primary language | | |
| English | 321 (89%) | 431 (90%) |
| Spanish | 17 (5%) | 15 (3%) |
| Portuguese | 7 (2%) | 7 (2%) |
| English & Spanish | 5 (1%) | 7 (2%) |
| English & Portuguese | 1 (<1%) | 7 (2%) |
| Other | 5 (1%) | 11 (2%) |
| Don't know/No answer | 3 (<1%) | - |
| Hispanic or Latino | | |
| Yes | 34 (10%) | 32 (7%) |
| No | 319 (89%) | 444 (93%) |
| Don't know/No answer | 6 (2%) | 2 (<1%) |
| Race* | | |
| White | 306 (85%) | 423 (89%) |
| Black | 10 (3%) | 6 (1%) |
| American Indian/Alaska Native | 8 (2%) | 1 (<1%) |
| Asian | - | 5 (1%) |
| Native Hawaiian/Pacific Islander | - | 1 (<1%) |
| Other race | 18 (5%) | 21 (4%) |
| Multiracial | 11 (3%) | 9 (2%) |
| Don't know/No answer | 6 (2%) | 12 (3%) |

* $\chi^2=16.288, p<.05$

Table 13. Health insurance coverage and source for Wave 1 and Wave 2.

| | Wave 1 | Wave 2 |
|--------------|-------------------|-------------------|
| | N (%) | N (%) |
| Total | 359 (100%) | 478 (100%) |

| | | |
|--------------------------------|-----------|-------------------|
| Not insured | 147 (41%) | 200 (42%) |
| Employer (vessel) | 9 (3%) | 3 (<1%) |
| Another employer | 3 (<1%) | 1 (<1%) |
| Spouse/partner | 55 (15%) | 48 (10%) |
| Private insurance | 82 (23%) | 129 (27%) |
| Fed or state insurance | 38 (11%) | 64 (13%) |
| Other | 15 (4%) | 32 (6%) |
| Don't know/No answer (source) | 5 (<1%) | 1 (<1%) |
| Don't know/No answer (insured) | 5 (<1%) | - |

$\chi^2=16.374, p<.05$

Table 14. Yearly income for Wave 1 and Wave 2.

| | Wave 1 | Wave 2 |
|----------------------|-------------------|-------------------|
| | N (%) | N (%) |
| Total | 359 (100%) | 478 (100%) |
| Less than \$30k | 81 (23%) | 43 (9%) |
| \$30-59k | 122 (34%) | 93 (20%) |
| \$60-89k | 61 (17%) | 93 (20%) |
| \$90-119k | 31 (9%) | 73 (15%) |
| \$120k or more | 25 (7%) | 130 (27%) |
| Don't know/No answer | 39 (11%) | 46 (10%) |

$\chi^2=95.740, p<.00$

Table 15. Familial connection to the commercial fishing industry for Wave 1 and Wave 2.

| | Wave 1 | Wave 2 |
|--|-------------------|-------------------|
| | N (%) | N (%) |
| Total | 359 (100%) | 478 (100%) |
| Family involved in the commercial fishing industry | | |
| Yes | 194 (54%) | 286 (60%) |
| No | 165 (46%) | 192 (40%) |
| Generation of family in the commercial fishing industry | | |
| First | 162 (45%) | 194 (41%) |
| Second | 69 (19%) | 87 (18%) |
| Third | 62 (17%) | 98 (21%) |
| Fourth or greater | 63 (18%) | 99 (21%) |
| Don't know/No answer | 3 (1%) | 0 (0%) |

Table 16. Employment history in the commercial fishing industry for Wave 1 and Wave 2.

| | Wave 1 | Wave 2 |
|--------------|-------------------|-------------------|
| | N (%) | N (%) |
| Total | 359 (100%) | 478 (100%) |

| | | |
|--|-----------|------------------|
| Years in the commercial fishing industry | | |
| Less than 5 | 66 (18%) | 77 (16%) |
| 5-15 | 100 (28%) | 168 (35%) |
| 16-29 | 109 (30%) | 110 (23%) |
| 30 or More | 81 (23%) | 123 (26%) |
| Don't know/No answer | 3 (1%) | 0 (0%) |
| Number of vessel owners employed for in past year | | |
| One vessel owner | 239 (67%) | 305 (64%) |
| Two vessel owners | 71 (20%) | 97 (20%) |
| Three vessel owners | 32 (9%) | 49 (10%) |
| Four or more vessel owners | 17 (5%) | 27 (6%) |
| First crew position upon entering the industry* | | |
| Captain | 8 (2%) | 0 (0%) |
| Deckhand | 309 (86%) | 452 (95%) |
| Engine Mechanic | 2 (1%) | 3 (1%) |
| Cook | 8 (2%) | 8 (2%) |
| Mate/First Mate | 6 (2%) | 7 (1%) |
| Other | 26 (7%) | 8 (2%) |

* $\chi^2 = 28.3315, p < .001$

Table 17. Employment characteristics on current vessel for Wave 1 and Wave 2.

| | Wave 1 | Wave 2 |
|--|---------------|-------------------|
| | N (%) | N (%) |
| Total | 359 (100%) | 478 (100%) |
| Years on current vessel | | |
| Less than 5 | 209 (58%) | 289 (60%) |
| 5-15 | 114 (32%) | 148 (31%) |
| 16-29 | 26 (7%) | 36 (8%) |
| 30 or more | 10 (3%) | 5 (1%) |
| Path to employment on current vessel* | | |
| Word of mouth | 74 (21%) | 204 (43%) |
| Referred by a friend | 78 (22%) | 123 (26%) |
| Related to owner | 36 (10%) | 56 (12%) |
| Related to non-owner | 9 (3%) | 21 (4%) |
| Previous work | 139 (39%) | 23 (5%) |
| Advertisement | 1 (<1%) | 2 (<1%) |
| Other | 0 (0%) | 48 (10%) |
| Don't know/No answer | 22 (6%) | 1 (<1%) |
| Difficulty finding employment on current vessel** | | |
| Very easy | 181 (50%) | 146 (31%) |
| Easy | 94 (26%) | 217 (45%) |
| Neither easy nor difficult | 37 (10%) | 40 (8%) |
| Difficult | 22 (6%) | 55 (12%) |
| Very difficult | 22 (6%) | 19 (4%) |
| Don't know/No answer | 3 (1%) | 1 (<1%) |

* $\chi^2 = 193.0405, p < .001$

** $t = 2.8109, p < .01$

Table 18. Labor activity characteristics on current vessel for Wave 1 and Wave 2.

| | Wave 1 | Wave 2 |
|-----------------------------|-------------------|-------------------|
| | N (%) | N (%) |
| Total | 359 (100%) | 478 (100%) |
| Trip duration* | | |
| 1 day | 151 (42%) | 134 (28%) |
| 2-4 days | 55 (15%) | 85 (18%) |
| 5-7 days | 49 (14%) | 103 (22%) |
| More than 7 days | 104 (29%) | 155 (32%) |
| Don't know/No answer | 0 (0%) | 1 (<1%) |
| Hours worked per day | | |
| 8 hours or less | 50 (14%) | 50 (10%) |
| 9-14 hours | 114 (32%) | 138 (29%) |
| 15-17 hours | 61 (17%) | 126 (27%) |
| 18 hours or more | 133 (37%) | 164 (34%) |
| Don't know/No answer | 1 (<1%) | 0 (0%) |

* $t = -1.7273, p < .05$

Table 19. Crew characteristics on current vessel for Wave 1 and Wave 2.

| | Wave 1 | Wave 2 |
|-----------------------------|-------------------|-------------------|
| | N (%) | N (%) |
| Total | 359 (100%) | 478 (100%) |
| Vessel operator* | | |
| Owner-operated | 208 (58%) | 207 (43%) |
| Hired captain | 150 (42%) | 271 (57%) |
| Don't know/No answer | 1 (<1%) | 1 (<1%) |
| Position on vessel | | |
| Captain | 68 (19%) | 103 (22%) |
| Deckhand | 215 (60%) | 272 (57%) |
| Other | 29 (8%) | 55 (11%) |
| Multiple positions | 47 (13%) | 48 (10%) |
| Average crew size ** | | |
| 1-2 members | 111 (31%) | 75 (16%) |
| 3-5 members | 174 (48%) | 252 (53%) |
| 6 or more members | 74 (21%) | 151 (32%) |

* $\chi^2 = 17.6881, p < .001$

** $t = -5.0768, p < .001$

Table 20. Payment system on current vessel for Wave 1 and Wave 2.

| | Wave 1 | Wave 2 |
|--------------|-------------------|-------------------|
| | N (%) | N (%) |
| Total | 359 (100%) | 478 (100%) |

| Payment system | | |
|-----------------------|-----------|-------------------|
| Share system | 305 (85%) | 408 (85%) |
| Other payment system | 52 (14%) | 69 (14%) |
| Don't know/No Answer | 2 (1%) | 1 (<1%) |

Table 21. Mean percent distribution to the boat (vessel owner) and crew for share payment systems on current vessel for Wave 1 and Wave 2.

| | Wave 1 | Wave 2 |
|--|---------------|------------------|
| | N=305 | N=408 |
| For share systems- Percent Distribution | | |
| % Owner share, mean % (N) | 58% (275) | 55% (250) |
| % Crew share, mean % (N)* | 42% (275) | 45% (250) |
| Don't know/No Answer, (N) | 30 | 158 |

* $t=-2.4695, p<.01$

Table 22. Remuneration characteristics for share payment systems on current vessel for Wave 1 and Wave 2.

| | Wave 1 | Wave 2 |
|--|-------------------|-------------------|
| | N (%) | N (%) |
| Total | 244 (100%) | 478 (100%) |
| For share systems- Expenses deducted from share, N (discrete %) | | |
| Fuel | 172 (70%) | 342 (72%) |
| Food | 160 (66%) | 281 (59%) |
| Ice ^a | 94 (39%) | 253 (53%) |
| Bait ^b | 31 (13%) | 90 (19%) |
| General supplies ^c | 104 (43%) | 148 (31%) |
| Fishing quota ^d | 9 (4%) | 39 (8%) |
| Other ^e | 54 (22%) | 29 (6%) |

a. $\chi^2=13.4269, p<.001$

b. $\chi^2=4.3421, p<.05$

c. $\chi^2=9.6672, p<.01$

d. $\chi^2=5.2019, p<.05$

e. $\chi^2=40.9727, p <.001$

Table 23. Mean of job satisfaction scores for Wave 1 and Wave 2.

| How satisfied are you with... | Wave 1 | Wave 2 |
|--|---------------|---------------|
| | N=359 | N=478 |
| | \bar{x} | \bar{x} |
| Your actual earnings ^a | 3.35 | 3.94 |
| Predictability of your earnings ^b | 2.72 | 3.26 |
| Job safety (physical risks) ^c | 3.43 | 3.77 |
| Time you spend away from home | 3.03 | 2.99 |
| Physical fatigue of the job ^d | 3.03 | 3.18 |
| Healthfulness of the job ^e | 3.29 | 3.47 |

| | | |
|---------------------------------|------|-------------|
| Adventure of the job | 4.44 | 4.34 |
| Challenge of the job | 4.21 | 4.16 |
| Opportunity to be your own boss | 3.75 | 3.79 |

- a. $t=-7.811, p<.001$
b. $t=-7.036, p<.001$
c. $t=-5.022, p<.001$
d. $t=-2.171, p<.05$
e. $t=-2.455, p<.05$

Table 24. Three job satisfaction components and the item summed to create them for Wave 1 and Wave 2.

| Basic Needs (3-15) | Social and Psychological Needs (3-15) | Self-Actualization (4-15) |
|----------------------------------|---------------------------------------|----------------------------------|
| Actual earnings (1-5) | Fatigue of the job (1-5) | Adventure of the job (2-5) |
| Predictability of earnings (1-5) | Healthfulness of the job (1-5) | Challenge of the job (1-5) |
| Safety of the job (1-5) | Time spent away from home (1-5) | Opportunity to be own boss (1-5) |

Table 25. Mean scores and standard deviation (in parenthesis) for three components of job satisfaction for Wave 1 and Wave 2.

| | Wave 1 | Wave 2 |
|------------------------------|------------|------------|
| Basic Needs* | 9.5 (2.4) | 11.0 (1.9) |
| Social & Psychological Needs | 9.4 (2.5) | 9.6 (2.2) |
| Self-Actualization | 12.4 (2.1) | 12.3 (2.0) |

* $t=-9.786, df=826, p<.001$

Table 26. Responses for the questions "Would you advise a young person to enter fishing?" and "Would you still be a fisherman if you had your life to live over?" for Wave 1 and Wave 2.

| | Wave 1 | Wave 2 |
|---|------------|------------|
| | N (%) | N (%) |
| Total | 359 (100%) | 478 (100%) |
| Would you advise a young person to enter fishing?* | | |
| Yes | 166 (46%) | 266 (56%) |
| No | 177 (49%) | 136 (29%) |
| Maybe/Unsure | 14 (4%) | 76 (16%) |
| No answer | 2 (<1%) | - |
| Would you still be a fisherman if you had your life to live over?*** | | |
| Yes | 264 (74%) | 372 (78%) |
| No | 70 (20%) | 58 (12%) |
| Maybe/Unsure | 24 (7%) | 48 (10%) |
| No answer | 1 (<1%) | - |

* $\chi^2=54.847, df=2, p<.001$

** $\chi^2=10.455, df=2, p=.05$

Table 27. Perceptions of fishing as a career for Wave 1 and Wave 2.

| | Wave 1 | Wave 2 |
|--|---------------|---------------|
| | N (%) | N (%) |
| Total | 359 (100%) | 478 (100%) |
| Fishing is just a job to me | | |
| Strongly Disagree | 103 (29%) | 181 (38%) |
| Disagree | 177 (49%) | 148 (31%) |
| Neutral | 14 (4%) | 34 (7%) |
| Agree | 49 (14%) | 97 (20%) |
| Strongly Agree | 14 (4%) | 17 (4%) |
| Don't know/No answer | 2 (<1%) | 1 (<1%) |
| Leaving the fishing industry is something I have considered | | |
| Strongly Disagree | 57 (16%) | 107 (22%) |
| Disagree | 102 (28%) | 125 (26%) |
| Neutral | 20 (6%) | 34 (7%) |
| Agree | 156 (44%) | 167 (35%) |
| Strongly Agree | 19 (5%) | 45 (9%) |
| Don't know/No answer | 5 (1%) | - |

Table 28. Perceptions of personal well-being for Wave 1 and Wave 2.

| | Wave 1 | Wave 2 |
|--|---------------|---------------|
| | N (%) | N (%) |
| Total | 359 (100%) | 478 (100%) |
| How satisfied are you with your life?* | | |
| Very Dissatisfied | 9 (3%) | 4 (<1%) |
| Dissatisfied | 28 (8%) | 12 (3%) |
| Neutral | 34 (10%) | 44 (9%) |
| Satisfied | 181 (50%) | 235 (49%) |
| Very Satisfied | 104 (29%) | 183 (38%) |
| Don't know/No Answer | 3 (<1%) | - |
| How satisfied are you with your physical health? | | |
| Very Dissatisfied | 12 (3%) | 7 (2%) |
| Dissatisfied | 35 (10%) | 23 (5%) |
| Neutral | 22 (6%) | 59 (12%) |
| Satisfied | 198 (55%) | 276 (58%) |
| Very Satisfied | 86 (24%) | 113 (24%) |
| Don't know/No Answer | 6 (2%) | - |
| How satisfied are you with the overall health of the marine environment?*** | | |
| Very Dissatisfied | 16 (5%) | 7 (2%) |
| Dissatisfied | 72 (20%) | 63 (13%) |
| Neutral | 35 (10%) | 111 (23%) |
| Satisfied | 188 (52%) | 233 (49%) |

| | | |
|----------------------|----------|----------|
| Very Satisfied | 35 (10%) | 63 (13%) |
| Don't know/No Answer | 13 (4%) | 1 (<1%) |

* $t=4.172$, $df=665.9$, $p<.001$

** $t=2.043$, $df=677.3$, $p<.05$

Table 29. Crew participation in fisheries management for Wave 1 and Wave 2.

| | Wave 1 | Wave 2 |
|--------------|------------|------------|
| | N (%) | N (%) |
| Total | 200 (100%) | 478 (100%) |
| Yes | 65 (33%) | 190 (40%) |
| No | 135 (67%) | 288 (60%) |

Table 30. Perceptions of fisheries management for Wave 1 and Wave 2.

| | Wave 1 | Wave 2 |
|---|------------|------------|
| | N (%) | N (%) |
| Total | 159 (100%) | 478 (100%) |
| The rules and regulations change so quickly it is hard to keep up | | |
| Strongly Disagree | 2 (1%) | 5 (1%) |
| Disagree | 36 (23%) | 79 (17%) |
| Neutral | 12 (8%) | 96 (20%) |
| Agree | 62 (39%) | 199 (42%) |
| Strongly Agree | 41 (26%) | 98 (21%) |
| Don't know/No answer | 6 (4%) | 1 (<1%) |
| The fines associated with breaking the rules and regulations are fair* | | |
| Strongly Disagree | 37 (23%) | 49 (10%) |
| Disagree | 34 (21%) | 62 (13%) |
| Neutral | 17 (11%) | 144 (30%) |
| Agree | 35 (22%) | 199 (42%) |
| Strongly Agree | 2 (1%) | 23 (5%) |
| Don't know/No answer | 34 (21%) | 1 (<1%) |
| I feel the regulations are too restrictive** | | |
| Strongly Disagree | 2 (1%) | 10 (2%) |
| Disagree | 33 (21%) | 104 (22%) |
| Neutral | 16 (10%) | 116 (24%) |
| Agree | 56 (35%) | 140 (29%) |
| Strongly Agree | 48 (30%) | 107 (22%) |
| Don't know/No answer | 4 (2.5%) | 1 (<1%) |

* $t=6.083$, $df=175.3$, $p<.001$

** $t=2.457$, $df=256.4$, $p<.05$

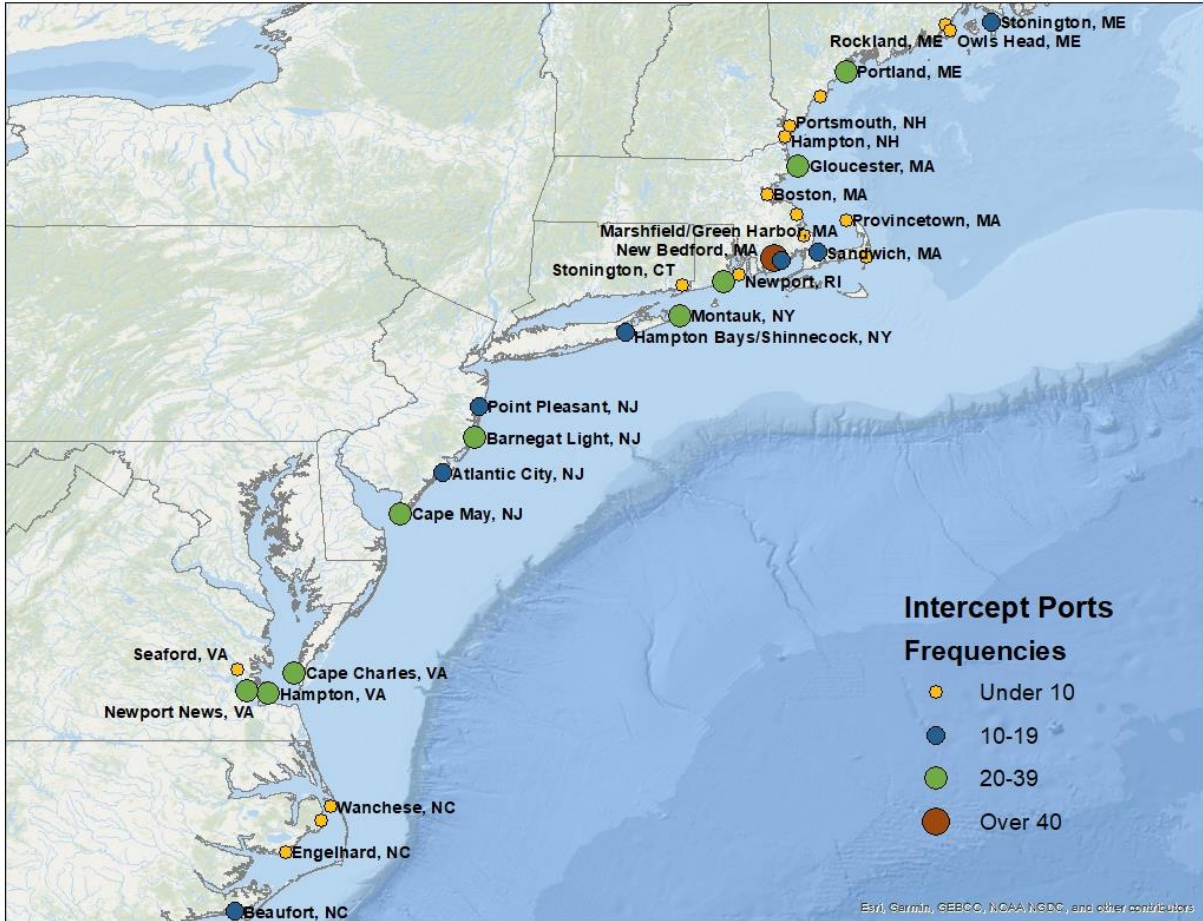


Figure 1. Intercept ports for Wave 2.

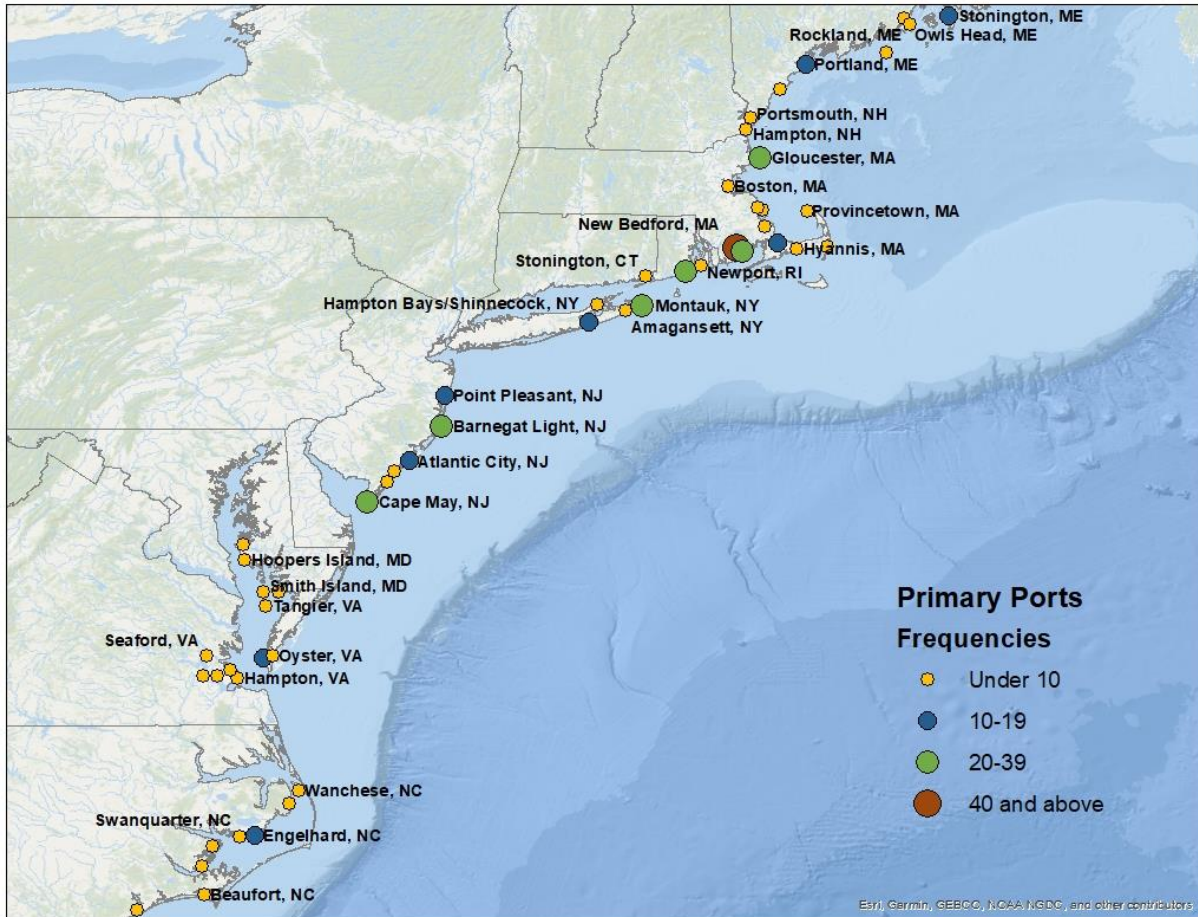


Figure 2. Primary port for Wave 2.*

*Some fishermen responded that they had more than one primary port. Therefore, frequencies reflect the total number of times a port was stated as primary. Map only shows the New England and Mid-Atlantic regions. To see full results of all primary ports mentioned, see Table 5.

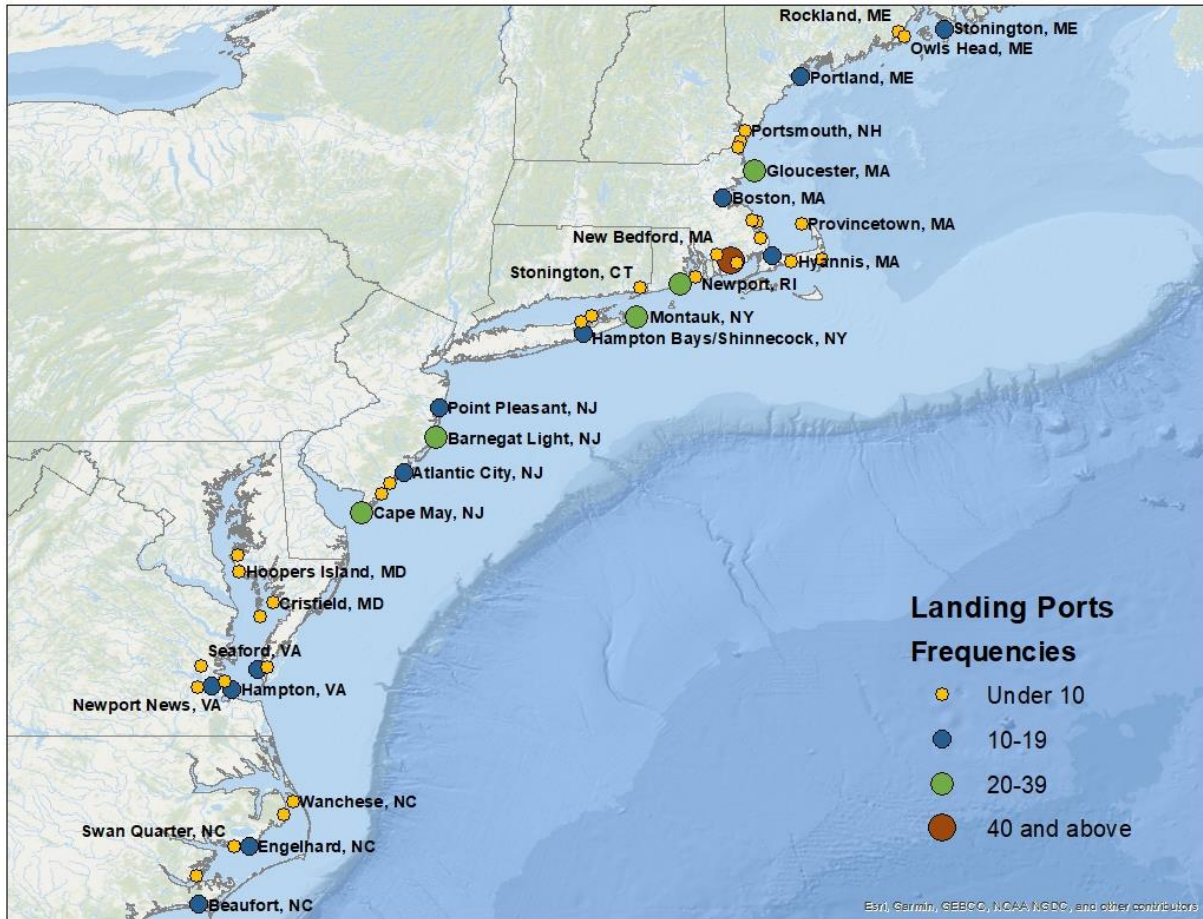


Figure 3. Port of landing for Wave 2.*

*Some fishermen responded that they had more than one port of landing they most frequently offloaded their catch in throughout the year. Therefore, frequencies reflect the total number of times a port was stated as their primary port of landing. Map only shows the New England and Mid-Atlantic regions. To see full results of all primary ports mentioned, see Table 8.

APPENDIX I: SURVEY PROTOCOL

*In this survey, please tell us about your fishing in the last year.
The information you provide will remain private and you will not be identified with your answers.*

1. What fisheries do you target? Of these, which do you consider your primary fishery in terms of income?

| Northeast and Mid-Atlantic Fisheries | Check ALL That Apply | Primary Fishery (Check ONE only) |
|--|--------------------------|----------------------------------|
| Lobster | <input type="checkbox"/> | <input type="checkbox"/> |
| Scallops | <input type="checkbox"/> | <input type="checkbox"/> |
| Groundfish | <input type="checkbox"/> | <input type="checkbox"/> |
| Haddock, Pollock, Redfish, American Plaice, Winter Flounder, Yellowtail Flounder, Cod, Hake, Halibut, Ocean Pout | | |
| Black Sea Bass | <input type="checkbox"/> | <input type="checkbox"/> |
| Bluefish | <input type="checkbox"/> | <input type="checkbox"/> |
| Butterfish | <input type="checkbox"/> | <input type="checkbox"/> |
| Herring | <input type="checkbox"/> | <input type="checkbox"/> |
| Mackerel | <input type="checkbox"/> | <input type="checkbox"/> |
| Monkfish | <input type="checkbox"/> | <input type="checkbox"/> |
| Ocean Quahogs | <input type="checkbox"/> | <input type="checkbox"/> |
| Red Crab | <input type="checkbox"/> | <input type="checkbox"/> |
| Scup (Porgy) | <input type="checkbox"/> | <input type="checkbox"/> |
| Skate | <input type="checkbox"/> | <input type="checkbox"/> |
| Spiny Dogfish | <input type="checkbox"/> | <input type="checkbox"/> |
| Squid | <input type="checkbox"/> | <input type="checkbox"/> |
| Fluke (Summer Flounder) | <input type="checkbox"/> | <input type="checkbox"/> |
| Surfclams | <input type="checkbox"/> | <input type="checkbox"/> |
| Other: | <input type="checkbox"/> | <input type="checkbox"/> |

2. What port did you primarily work out of in the last year?

Port _____ State _____ Country _____

3. Are any members of your family (for example, parents, children, siblings, uncles/aunts, cousins, in-laws) involved in commercial fishing or other fishing-related activities (for example, book-keeping, provisioning vessels, marketing)?

1. YES

2. NO

4. How many generations of your family have fished commercially including yourself?

_____Generations

5. How long have you been involved in commercial fishing? If less than a year, how many months?

_____YEARS

_____MONTHS

6. What percentage does fishing contribute to your annual household income?

_____% (If 100% SKIP to Q8)

7. If you have other sources of household income besides fishing, please list the top three most important sources of income other than fishing for your household.

| | Source |
|--------------------------------|--------|
| Most important | |
| 2 nd most important | |
| 3 rd most important | |

In the following questions, we are interested in gathering demographic data about crew.

8. What is your age? _____

9. Are you of Hispanic, Latino, or Spanish origin? “Hispanic or Latino” refers to a person of Cuban, Mexican, Puerto Rican, South or Central American, or other Spanish culture or origin, regardless of race.

1. Yes
2. No

10. Which racial category describes you? (CHECK ALL THAT APPLY)

1. White
2. Black or African American

11. What is the primary language you speak at home?

1. English
2. Spanish
3. Portuguese

4. Other:

12. Where were you born?

1. U.S.
2. Outside U.S.

13. About how many miles do you travel from where you live to where your primary vessel docked for the past year?

_____Miles

14. What is your marital status?

1. Never Married
2. Married
3. Widowed
4. Divorced
5. Separated
6. Living with an unmarried partner

15. What is the highest level of education you've completed?

1. Some high school
2. High school diploma/equivalency
3. Associate's/ two year degree
4. Bachelor's/ four year degree
5. Graduate degree

In the following questions, please tell us about your fishing activities and employment on your primary vessel.

16. How many days (24 hour periods) does a typical trip last before returning to port?

_____Days

17. What was the average size of the crew in the last year (including the captain)?

_____Members

18. How many hours per day (24 hour period) did you usually work while on a fishing trip?

_____Hours

19. Was the vessel you worked on most in the last year owner-operated?

1. YES
2. NO
3. DON'T KNOW

20. What was the main port of landing for that vessel in the last year?

Port _____ State _____ Country _____

21. What was your position on the vessel in the last year? (CHECK ALL THAT APPLY).

1. Captain
2. Deck hand
3. Engine mechanic
4. Cook
5. Other (please specify): _____

22. Which of the following was the first crew position you ever had when you began fishing?

1. Captain
2. Deck hand
3. Engine Mechanic
4. Cook
5. Other (please specify): _____

23. How were you hired for the vessel you currently work on?

1. Word of mouth
2. Referred by a friend
3. Related to owner
4. Related to non-owner crew member (may include hired captain)
5. Previous work with the same vessel
6. Advertisement
7. Other _____

24. How difficult was it for you to find employment on your vessel?

1. Very easy
2. Easy
3. Neither easy nor difficult
4. Difficult
5. Very difficult

*Within your primary fishery, consider the vessel you worked on the most in the last year.
Please answer the following questions based on your fishing activities on that primary vessel.*

25. As of today, how many years have you worked on your primary vessel?

_____ Years
_____ Months

26. How many different vessel owners did you work for in the last year?

_____ Vessel owners

27. Did you have health insurance in the last year?

1. YES (CONTINUE)
2. NO (SKIP TO Q29)

In the following questions please tell us how revenues and expenses are distributed amongst crew.

28. Where did the insurance come from?

1. From employer (the vessel owner)
2. From another employer I have
3. Spouse's/partner's place of employment
4. Private insurance
5. Federal or state insurance program
6. Other

29. For your current vessel, how were you paid?

1. A share system: revenues and expenses were shared between the boat and crew (CONTINUE)
2. Other (e.g., per trip, hourly), please specify: _____ (SKIP TO Q32)

30. For share systems, what were the typical percentages distributed to the boat (the vessel owner) and crew?

_____ % Boat (owner) share
_____ % Crew share
_____ Don't Know

31. For share systems, which trip expenses were usually deducted? (CHECK ALL THAT APPLY)

1. Fuel/Oil
2. Ice
3. Fishing quota or days-at-sea
4. Food
5. General fishing supplies (hooks, bags, totes, gloves, etc.)
6. Bait
7. Other _____

In the following section, we are going to go through a series of scale questions regarding how you feel about regulations in your primary fishery and how satisfied you are with commercial fishing.

32. Please indicate the extent to which you agree or disagree with the following statements regarding the rules and regulations in your primary fishery. (CHECK ONE RESPONSE PER ITEM)

| | Strongly Disagree | Disagree | Neutral | Agree | Strongly Agree |
|--|-------------------|----------|---------|-------|----------------|
| a. The rules and regulations change so quickly it is hard to keep up. | 1 | 2 | 3 | 4 | 5 |
| b. The fines that are associated with breaking the rules and regulations of my primary fishery are fair. | 1 | 2 | 3 | 4 | 5 |
| c. I feel that the regulations in my primary fishery are too restrictive. | 1 | 2 | 3 | 4 | 5 |

33. Have you ever participated in any aspect of federal fisheries management (such as attending meetings, writing letters, or serving on a committee)?

1. YES
2. NO

34. Please indicate the extent to which you agree or disagree with the following statements about fishing as a career. (CHECK ONE ITEM PER RESPONSE)

| | | | | |
|-------------------|----------|---------|-------|----------------|
| Strongly Disagree | Disagree | Neutral | Agree | Strongly Agree |
|-------------------|----------|---------|-------|----------------|

| | | | | | |
|--|---|---|---|---|---|
| a. Fishing is just a job to me. | 1 | 2 | 3 | 4 | 5 |
| b. Leaving the fishing industry is something that I have considered. | 1 | 2 | 3 | 4 | 5 |

35. How satisfied or dissatisfied are you with the following items relating to the job of fishing? (CHECK ONE ITEM PER RESPONSE)

| | Very Dissatisfied | Dissatisfied | Neutral | Satisfied | Very Satisfied |
|---|----------------------|--------------|---------|-----------|-------------------|
| a. Your actual earnings | 1 | 2 | 3 | 4 | 5 |
| b. The predictability of your earnings | 1 | 2 | 3 | 4 | 5 |
| c. Job safety (e.g. physical risks to you from working as a fisherman) | 1 | 2 | 3 | 4 | 5 |
| d. The amount of time spent away from home | 1 | 2 | 3 | 4 | 5 |
| e. Physical fatigue of the job | 1 | 2 | 3 | 4 | 5 |
| f. Healthfulness of the job (e.g how your job as a fisherman may impact your physical and mental) | 1 | 2 | 3 | 4 | 5 |
| g. Adventure of the job | 1 | 2 | 3 | 4 | 5 |
| h. Challenge of the job | 1 | 2 | 3 | 4 | 5 |
| i. Opportunity to be your own boss | 1 | 2 | 3 | 4 | 5 |

36. In general, how satisfied are you with: (CHECK ONE ITEM PER RESPONSE)

| | Very Dissatisfied | Dissatisfied | Neutral | Satisfied | Very Satisfied |
|---|----------------------|--------------|---------|-----------|-------------------|
| a. Your life | 1 | 2 | 3 | 4 | 5 |
| b. Your physical health | 1 | 2 | 3 | 4 | 5 |
| c. The overall health of the marine environment | 1 | 2 | 3 | 4 | 5 |

37. Would you advise a young person to enter fishing?

1. YES

2. NO
3. UNSURE

38. Would you still be a commercial fisherman if you had your life to live over?

1. YES
2. NO
3. UNSURE

39. What was your annual fishing income in the last year?

1. Less than \$10,000
2. \$10,000 - \$19,999
3. \$20,000 - \$29,999
4. \$30,000 - \$39,999
5. \$40,000 - \$49,999
6. \$50,000 - \$59,999
7. \$60,000 - \$69,999
8. \$70,000 - \$79,999
9. \$80,000 - \$89,999
10. \$90,000 - \$99,999
11. \$100,000 - \$119,999
12. \$120,000 or more

Your contribution to this effort is greatly appreciated. Thank you!

APPENDIX II: CODEBOOK

| Q# | Variable | Value | Label |
|----|----------------------------|-------|-----------------------------|
| 1 | Participant Sex | 1 | Male |
| | | 2 | Female |
| | Survey Wave | 1 | 2012-13 |
| | | 2 | 2018-19 |
| | Survey Complete/Incomplete | 1 | Complete |
| | | 2 | Incomplete |
| | Intercept Port, Combined | 1 | Atlantic City, NJ |
| | | 2 | Barnegat Light, NJ |
| | | 3 | Beaufort, NC |
| | | 4 | Boston, MA |
| | | 5 | Cape Charles, VA |
| | | 6 | Cape May, NJ |
| | | 7 | Chatham, MA |
| | | 8 | Chincoteague, VA |
| | | 9 | Engelhard, NC |
| | | 10 | Fairhaven, MA |
| | | 11 | Gloucester, MA |
| | | 12 | Green Harbor/Marshfield, MA |
| | | 13 | Hampton, NH |
| | | 14 | Hampton, VA |
| | | 15 | Hampton Bays/Shinnecock, NY |
| | | 16 | Kennebunkport, ME |
| | | 17 | Montauk, NY |
| | | 18 | Narragansett, RI |
| | | 19 | New Bedford, MA |
| | | 20 | Newport News, VA |
| | | 21 | Newport, RI |
| | | 22 | Oriental, NC |
| | | 23 | Owls Head, ME |
| | | 24 | Oyster, VA |
| | | 25 | Plymouth, MA |
| | | 26 | Point Judith, RI |
| | | 27 | Point Pleasant, NJ |
| | | 28 | Portland, ME |
| | | 29 | Portsmouth, NH |
| | | 30 | Provincetown, MA |
| | | 31 | Rockland, ME |
| | | 32 | Sandwich, MA |
| | | 33 | Scituate, MA |

| | | | |
|---|-----------------------------------|----|-------------------------|
| | | 34 | Seabrook, NH |
| | | 35 | Seaford, VA |
| | | 36 | Stonington, CT |
| | | 37 | Stonington, ME |
| | | 38 | Stumpy Point, NC |
| | | 39 | Virginia Beach, VA |
| | | 40 | Wanchese, NC |
| 1 | Primary Fishery, Combined | 1 | Atlantic Croacker |
| | | 2 | Black Drum |
| | | 3 | Black Sea Bass |
| | | 4 | Blue Crab |
| | | 5 | Bluefish |
| | | 6 | Conch |
| | | 7 | Crab |
| | | 8 | Fluke (Summer Flounder) |
| | | 9 | Groundfish |
| | | 10 | Grouper |
| | | 11 | Herring |
| | | 12 | Jonah Crab |
| | | 13 | Lobster |
| | | 14 | Mackerel |
| | | 15 | Menhaden |
| | | 16 | Monkfish |
| | | 17 | More than one |
| | | 18 | None |
| | | 19 | Other |
| | | 20 | Oyster |
| | | 21 | Rockfish |
| | | 22 | Scallop |
| | | 23 | Scup |
| | | 24 | Shrimp |
| | | 25 | Skate |
| | | 26 | Spiny Dogfish |
| | | 27 | Squid |
| | | 28 | Striped Bass |
| | | 29 | Surf Clam/Ocean Quahogs |
| | | 30 | Swordfish |
| | | 31 | Tilefish |
| | | 32 | Tuna |
| | | 33 | Vermillion Snapper |
| 2 | Primary Port (Homeport), Combined | 1 | Amagansett, NY |

| | | | |
|--|--|----|-----------------------------|
| | | 2 | Atlantic City, NJ |
| | | 3 | Badger's Island, ME |
| | | 4 | Barnegat Light, NJ |
| | | 5 | Bayou La Batre, AL |
| | | 6 | Beaufort, NC |
| | | 7 | Boston, MA |
| | | 8 | Brunswick, GA |
| | | 9 | Cape Canaveral, FL |
| | | 10 | Cape Charles, VA |
| | | 11 | Cape May, NJ |
| | | 12 | Carvers Harbor, ME |
| | | 13 | Chatham, MA |
| | | 14 | Chincoteague, VA |
| | | 15 | Chrisfield, MD |
| | | 16 | Dorchester, NJ |
| | | 17 | Engelhard, NC |
| | | 18 | Fairhaven, MA |
| | | 19 | Falmouth, MA |
| | | 20 | Gloucester, MA |
| | | 21 | Green Harbor, MA |
| | | 22 | Hampton, NH |
| | | 23 | Hampton, VA |
| | | 24 | Hampton Bays/Shinnecock, NY |
| | | 25 | Hobucken, NC |
| | | 26 | Hoopers Island, MD |
| | | 27 | Hyannis, MA |
| | | 28 | Islip, NY |
| | | 29 | Jones Inlet, NY |
| | | 30 | Kennebunkport, ME |
| | | 31 | Kittery, ME |
| | | 32 | Lewis Bay, MA |
| | | 33 | Lynnhaven Inlet, VA |
| | | 34 | Madison, MD |
| | | 35 | Manchester-by-the-Sea, MA |
| | | 36 | Marshfield, MA |
| | | 37 | McClellanville, SC |
| | | 38 | Messick Point, VA |
| | | 39 | Monhegan Island, ME |
| | | 40 | Montauk, NY |
| | | 41 | Morehead City, NC |
| | | 42 | Nauset Inlet, MA |

| | | | |
|--|--|----|----------------------|
| | | 43 | New Bedford, MA |
| | | 44 | Newport, RI |
| | | 45 | Newport News, VA |
| | | 46 | Ocean City, NJ |
| | | 47 | Oriental, NC |
| | | 48 | Owls Head, ME |
| | | 49 | Oyster, VA |
| | | 50 | Poquoson, VA |
| | | 51 | Pascagoula, MS |
| | | 52 | Plymouth, MA |
| | | 53 | Point Judith, RI |
| | | 54 | Point Lookout, NY |
| | | 55 | Point Pleasant, NJ |
| | | 56 | Port Norris, NJ |
| | | 57 | Portland, ME |
| | | 58 | Portsmouth, NH |
| | | 59 | Prospect, ME |
| | | 60 | Provincetown, MA |
| | | 61 | Rescue, VA |
| | | 62 | Rockland, ME |
| | | 63 | Rockport, MA |
| | | 64 | Rockport, ME |
| | | 65 | Rushmere, VA |
| | | 66 | Sakonnet Point, RI |
| | | 67 | Sandwich, MA |
| | | 68 | Scituate, MA |
| | | 69 | Sea Isle, NJ |
| | | 70 | Seabrook, NH |
| | | 71 | Seaford, VA |
| | | 72 | Smith Island, MD |
| | | 73 | Sneads Ferry, NC |
| | | 74 | Southold, NY |
| | | 75 | South Bristol, ME |
| | | 76 | South Freeport, ME |
| | | 77 | Southwest Harbor, ME |
| | | 78 | Stonington, CT |
| | | 79 | Stonington, ME |
| | | 80 | Stumpy Point, NC |
| | | 81 | Swan Quarter, NC |
| | | 82 | Tangier, VA |
| | | 83 | Wachapreague, VA |

| | | | |
|----|---|----|---|
| | | 84 | Wanchese, NC |
| | | 85 | Wickford, RI |
| | | 86 | Yarmouth, ME |
| | | 87 | Multiple Ports |
| | | 88 | No answer |
| 3 | Family Involved in Comm. Fishing, Combined | 0 | No |
| | | 1 | Yes |
| 4 | Number of Generations in Comm. Fishing, Combined | 98 | DK/NA |
| 5 | Years in Commercial Fishing (0 if less than a year), Combined | 98 | DK/NA |
| 8 | Age, Combined | 1 | Under 25 |
| | | 2 | 25-34 |
| | | 3 | 35-44 |
| | | 4 | 45-54 |
| | | 5 | 55 or older |
| 9 | Hispanic, Latino, Spanish | 0 | No |
| | | 1 | Yes |
| | | 98 | DK/NA |
| 10 | Race, Combined | 1 | White |
| | | 2 | Black |
| | | 3 | American Indian/Alaska Native |
| | | 4 | Asian |
| | | 5 | Native Hawaiian or Other Pacific Islander |
| | | 6 | Other race |
| | | 7 | Multiracial |
| | | 98 | DK/NA |
| 11 | Primary Language, Combined | 1 | English |
| | | 2 | Spanish |
| | | 3 | Portuguese |
| | | 4 | English & Spanish |
| | | 5 | English & Portuguese |
| | | 6 | Other |
| | | 98 | DK/NA |
| 12 | Place of Birth, Combined | 0 | Outside U.S. |
| | | 1 | U.S. |
| | | 99 | NA |
| 14 | Marital Status, Combined | 1 | Married |
| | | 2 | Widowed |
| | | 3 | Divorced |
| | | 4 | Separated |
| | | 5 | Never Married |

| | | | |
|----|---------------------------------|----|--------------------------|
| | | 6 | Living with partner |
| | | 98 | DK/NA |
| 15 | Education, Combined | 1 | Less than HS |
| | | 2 | HS or equivalent |
| | | 3 | Associate/2-year degree |
| | | 4 | Bachelor's/4 year degree |
| | | 5 | Graduate degree |
| | | 98 | DK/NA |
| 18 | Hours Worked Per Day, Combined | 98 | DK/NA |
| 19 | Owner-operator Status, Combined | 0 | Hired Captain |
| | | 1 | Owner-operated |
| | | 98 | DK/NA |
| 20 | Landing Port, Combined | 1 | Atlantic City, NJ |
| | | 2 | Barnegat Light, NJ |
| | | 3 | Bayou La Batre, AL |
| | | 4 | Beaufort, NC |
| | | 5 | Boston, MA |
| | | 6 | Cape Canaveral, FL |
| | | 7 | Cape Charles, VA |
| | | 8 | Cape May, NJ |
| | | 9 | Carvers Harbor, ME |
| | | 10 | Chatham, MA |
| | | 11 | Cherry Point, SC |
| | | 12 | Chincoteague, VA |
| | | 13 | Chrisfield, MD |
| | | 14 | Cundys Harbor, ME |
| | | 15 | Dorchester, NJ |
| | | 16 | Engelhard, NC |
| | | 17 | Fairhaven, MA |
| | | 18 | Falmouth, MA |
| | | 19 | Fall River, MA |
| | | 20 | Gloucester, MA |
| | | 21 | Green Harbor, MA |
| | | 22 | Hampton, NH |
| | | 23 | Hampton, VA |
| 24 | Hampton Bays/Shinnecock, NY | | |
| 25 | Harpers Island, MD | | |
| 26 | Hoopers Island, MD | | |
| 27 | Hyannis, MA | | |
| 28 | Islip, NY | | |
| 29 | Jones Inlet, NY | | |

| | | | |
|--|--|----|---------------------------|
| | | 30 | Kittery, ME |
| | | 31 | Lewis Bay, MA |
| | | 32 | Lynnhaven Inlet, VA |
| | | 33 | Madison, MD |
| | | 34 | Manchester-by-the-Sea, MA |
| | | 35 | Marshfield, MA |
| | | 36 | Match Landing, NJ |
| | | 37 | McClellanville, SC |
| | | 38 | Messick Point, VA |
| | | 39 | Minceville, VA |
| | | 40 | Montauk, NY |
| | | 41 | Nauset Inlet, MA |
| | | 42 | New Bedford, MA |
| | | 43 | New Gloucester, ME |
| | | 44 | Newport, RI |
| | | 45 | Newport News, VA |
| | | 46 | North Kingstown, RI |
| | | 47 | Ocean City, NJ |
| | | 48 | Oriental, NC |
| | | 49 | Owls Head, ME |
| | | 50 | Oyster, VA |
| | | 51 | Poquoson, VA |
| | | 52 | Plymouth, MA |
| | | 53 | Point Judith, RI |
| | | 54 | Point Lookout, NY |
| | | 55 | Point Pleasant, NJ |
| | | 56 | Portland, ME |
| | | 57 | Portsmouth, NH |
| | | 58 | Provincetown, MA |
| | | 59 | Rescue, VA |
| | | 60 | Rockland, ME |
| | | 61 | Rockport, MA |
| | | 62 | Rockport, ME |
| | | 63 | Sakonnet Point, RI |
| | | 64 | Sandwich, MA |
| | | 65 | Scituate, MA |
| | | 66 | Sea Isle, NJ |
| | | 67 | Seabrook, NH |
| | | 68 | Seaford, VA |
| | | 69 | South Bristol, ME |
| | | 70 | South Freeport, ME |

| | | | |
|----|---|----|----------------------------|
| | | 71 | Southwest Harbor, ME |
| | | 72 | Stonington, CT |
| | | 73 | Stonington, MA |
| | | 74 | Stonington, ME |
| | | 75 | Stumpy Point, NC |
| | | 76 | Swan Quarter, NC |
| | | 77 | Tangier, VA |
| | | 78 | Tyler's Beach, VA |
| | | 79 | Wachapreague, VA |
| | | 80 | Wanchese, NC |
| | | 81 | Woods Hole, MA |
| | | 82 | Yarmouth, ME |
| | | 83 | Multiple Ports |
| | | 84 | No answer |
| 21 | Position on Current Vessel Combined | 1 | Captain |
| | | 2 | Deckhand |
| | | 3 | Mate |
| | | 4 | Engine Mechanic |
| | | 5 | Cook |
| | | 6 | Other |
| | | 7 | Multiple Positions |
| 22 | First Crew Position in Commercial Fishing, Combined | 1 | Captain |
| | | 2 | Deckhand |
| | | 3 | Engine Mechanic |
| | | 4 | Cook |
| | | 5 | Mate/1st Mate |
| | | 6 | Other |
| | | 98 | DK/NA |
| 23 | Path to Employment on Current Vessel, Combined | 1 | Word of mouth |
| | | 2 | Referred by a friend |
| | | 3 | Related to owner |
| | | 4 | Related to non-owner |
| | | 5 | Previous work |
| | | 6 | Advertisement |
| | | 7 | Other |
| 24 | Difficulty Finding Employment, Combined | 1 | Very difficult |
| | | 2 | Difficult |
| | | 3 | Neither easy nor difficult |
| | | 4 | Easy |
| | | 5 | Very easy |
| | | 98 | DK/NA |

| | | | |
|-------|---|-----|--------------------------|
| 27/28 | Health Insurance, Combined | 1 | Employer (vessel) |
| | | 2 | Another employer |
| | | 3 | Spouse/partner |
| | | 4 | Private insurance |
| | | 5 | Fed or state insurance |
| | | 6 | Other |
| | | 7 | Not insured |
| | | 8 | DK/NA (source) |
| | | 9 | DK/NA (insured) |
| 29 | Payment System, Combined | 1 | Share system |
| | | 2 | Per trip |
| | | 3 | Hourly |
| | | 4 | Multiple payment systems |
| | | 5 | Other |
| 30a | Boat Percent Share, Combined | 998 | DK/NA |
| 30b | Crew Percent Share, Combined | 998 | DK/NA |
| 31a | [Fuel/Oil] Expenses Deducted from Share, Combined | 0 | No |
| | | 1 | Yes |
| | | 98 | DK/NA |
| 31b | [Ice] Expenses Deducted from Share, Combined | 0 | No |
| | | 1 | Yes |
| | | 98 | DK/NA |
| 31c | [Fishing quota] Expenses Deducted from Share, Combined | 0 | No |
| | | 1 | Yes |
| | | 98 | DK/NA |
| 31d | [Food] Expenses Deducted from Share, Combined | 0 | No |
| | | 1 | Yes |
| | | 98 | DK/NA |
| 31e | [Fishing Supplies] Expenses Deducted from Share, Combined | 0 | No |
| | | 1 | Yes |
| | | 98 | DK/NA |
| 31f | [Bait] Expenses Deducted from Share, Combined | 0 | No |
| | | 1 | Yes |
| | | 98 | DK/NA |
| 31g | [Other] Expenses Deducted from Share, Combined | 0 | No |
| | | 1 | Yes |
| | | 98 | DK/NA |
| 32a | "The rules and regulations change so quickly it is hard to keep up," Combined | 1 | Strongly Disagree |
| | | 2 | Disagree |
| | | 3 | Neutral |
| | | 4 | Agree |

| | | | |
|-----|--|----|-------------------|
| | | 5 | Strongly Agree |
| | | 99 | DK/NA |
| 32b | “The fines that are associated with breaking the rules...are fair,” Combined | 1 | Strongly Disagree |
| | | 2 | Disagree |
| | | 3 | Neutral |
| | | 4 | Agree |
| | | 5 | Strongly Agree |
| | | 99 | DK/NA |
| 32c | “I feel that the regulations...are too restrictive,” Combined | 1 | Strongly Disagree |
| | | 2 | Disagree |
| | | 3 | Neutral |
| | | 4 | Agree |
| | | 5 | Strongly Agree |
| | | 99 | DK/NA |
| 33 | “Participated in Fisheries Management,” Combined | 0 | No |
| | | 1 | Yes |
| 34a | “Fishing is Just a Job to Me,” Combined | 1 | Strongly Disagree |
| | | 2 | Disagree |
| | | 3 | Neutral |
| | | 4 | Agree |
| | | 5 | Strongly Agree |
| | | 98 | DK/NA |
| 34b | “Considered Leaving the Industry,” Combined | 1 | Strongly Disagree |
| | | 2 | Disagree |
| | | 3 | Neutral |
| | | 4 | Agree |
| | | 5 | Strongly Agree |
| | | 98 | DK/NA |
| 35a | [Your actual earnings] Job Satisfaction, Combined | 1 | Very Dissatisfied |
| | | 2 | Dissatisfied |
| | | 3 | Neutral |
| | | 4 | Satisfied |
| | | 5 | Very Satisfied |
| | | 98 | DK/NA |
| 35b | [Predictability of earnings] Job Satisfaction, Combined | 1 | Very Dissatisfied |
| | | 2 | Dissatisfied |
| | | 3 | Neutral |
| | | 4 | Satisfied |
| | | 5 | Very Satisfied |
| | | 98 | DK/NA |
| 35c | [Job safety] Job Satisfaction, Combined | 1 | Very Dissatisfied |

| | | | |
|-----|---|----|-------------------|
| | | 2 | Dissatisfied |
| | | 3 | Neutral |
| | | 4 | Satisfied |
| | | 5 | Very Satisfied |
| | | 98 | DK/NA |
| 35d | [Time away] Job Satisfaction, Combined | 1 | Very Dissatisfied |
| | | 2 | Dissatisfied |
| | | 3 | Neutral |
| | | 4 | Satisfied |
| | | 5 | Very Satisfied |
| | | 98 | DK/NA |
| 35e | [Physical fatigue] Job Satisfaction, Combined | 1 | Very Dissatisfied |
| | | 2 | Dissatisfied |
| | | 3 | Neutral |
| | | 4 | Satisfied |
| | | 5 | Very Satisfied |
| | | 98 | DK/NA |
| 35f | [Healthfulness] Job Satisfaction, Combined | 1 | Very Dissatisfied |
| | | 2 | Dissatisfied |
| | | 3 | Neutral |
| | | 4 | Satisfied |
| | | 5 | Very Satisfied |
| | | 98 | DK/NA |
| 35g | [Adventure] Job Satisfaction, Combined | 1 | Very Dissatisfied |
| | | 2 | Dissatisfied |
| | | 3 | Neutral |
| | | 4 | Satisfied |
| | | 5 | Very Satisfied |
| | | 98 | DK/NA |
| 35h | [Challenge] Job Satisfaction, Combined | 1 | Very Dissatisfied |
| | | 2 | Dissatisfied |
| | | 3 | Neutral |
| | | 4 | Satisfied |
| | | 5 | Very Satisfied |
| | | 98 | DK/NA |
| 35i | [Own boss] Job Satisfaction, Combined | 1 | Very Dissatisfied |
| | | 2 | Dissatisfied |
| | | 3 | Neutral |
| | | 4 | Satisfied |
| | | 5 | Very Satisfied |
| | | 98 | DK/NA |

| | | | |
|-----|--|----|---------------------|
| 36a | How satisfied are you with [your life]? Combined | 1 | Very Dissatisfied |
| | | 2 | Dissatisfied |
| | | 3 | Neutral |
| | | 4 | Satisfied |
| | | 5 | Very Satisfied |
| | | 98 | DK/NA |
| 36b | How satisfied are you with [your physical health]? Combined | 1 | Very Dissatisfied |
| | | 2 | Dissatisfied |
| | | 3 | Neutral |
| | | 4 | Satisfied |
| | | 5 | Very Satisfied |
| | | 98 | DK/NA |
| 36c | How satisfied are you with [the overall health of the marine environment]? Combined | 1 | Very Dissatisfied |
| | | 2 | Dissatisfied |
| | | 3 | Neutral |
| | | 4 | Satisfied |
| | | 5 | Very Satisfied |
| | | 98 | DK/NA |
| 37 | “Would Advise Young to Enter Fishing,” Combined | 0 | No |
| | | 1 | Yes |
| | | 98 | Don't know |
| | | 99 | No answer |
| 38 | “Would Fish Again if Life Lived Over,” Combined | 0 | No |
| | | 1 | Yes |
| | | 98 | Don't know |
| | | 99 | No answer |
| 39 | Income, Combined | 1 | Less than \$10,000 |
| | | 2 | \$10,000-\$19,999 |
| | | 3 | \$20,000-\$29,999 |
| | | 4 | \$30,000-\$39,999 |
| | | 5 | \$40,000-\$49,999 |
| | | 6 | \$50,000-\$59,999 |
| | | 7 | \$60,000-\$69,999 |
| | | 8 | \$70,000-\$79,999 |
| | | 9 | \$80,000-\$89,999 |
| | | 10 | \$90,000-\$99,999 |
| | | 11 | \$100,000-\$119,999 |
| | | 12 | \$120,000 or more |

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