APPENDIX I

Measuring Species Diversity Among IFQ Vessels Using the Herfindahl Index

LAGC IFQ Program Review, 2016-2023

APPENDIX I – MEASURING SPECIES DIVERSITY AMONG IFQ VESSELS USING THE HERFINDAHL INDEX

Greg Ardini, Northeast Fishery Science Center, SSB

Intro and Methods

The Herfindahl Index is a metric that is commonly used to measure concentration in a market place. In this more generally utilized form, the calculation of the index involves squaring the share each firm holds in a market. For the purposes of this section, the Herfindahl Index is used to measure the concentration of revenue by IFQ vessels among various fisheries, such that the proportion of revenue from each fishery is squared (Equation 1).

$$H = \sum_{i=1}^{N} s_i^2 \#(Equation\ 1)$$

NMFS dealer data was the source for revenues and fisheries were grouped largely based on Fishery Management Plans (Table 1). The Herfindahl Index was calculated for scallop fishing years (FYs) 2004-2023 for all vessels that had an IFQ permit for at least one FY during 2010-2023. The fleet was divided into those that held both for an IFQ permit and LA permit during the same FY at some point and those that were never duel-permitted. Calculations were made for all FYs in which vessels were active. A total of 4,781 vessel/FY combinations were included for IFQ-only permitted vessels and 1,252 vessel/FY combinations for duel-permitted vessels.

Table 1. Fishery groupings for calculation of the Herfindahl Index by Vessel/Fishing Year.

Fishery	Council Managed
Bluefish	MAFMC
Dogfish	MAFMC/NEFMC
Groundfish	NEFMC
Herring	NEFMC
Highly Migratory Species	Other
Lobster	Other
Menhaden	Other
Monkfish	MAFMC/NEFMC
Red Crab	NEFMC
Scallop	NEFMC
Shrimp	Other
Squid, Mackerel, Butterfish	MAFMC
Summer Flounder, Scup, Black Sea Bass	Other
Surf Clam, Ocean Quahog	MAFMC
Tilefish	MAFMC
Whiting	NEFMC
Other	N/A

The full set of vessel/FY combinations were grouped into three different time periods to illustrate changes in reliance on scallops over time. The first time period (FYs 2004-2009) covers when these vessels were fishing under a General Category (GC) permit and when they were fishing under an IFQ permit with a fleet-wide TAC. The second period (FYs 2010-2015) covers years from the previous IFQ scallop program review. The third period (FYs 2016-2023) covers years not previously included in a program review. This method is a more simplified approach in which

all non-scallop revenue is aggregated at the vessel level. Conversely, the number of species groups a vessel lands aside from scallops will change its Herfindahl Index (Equation 1).

Results and Discussion

A plot of the Herfindahl indices for the IFQ-only vessel/FY combinations is shown in Figure 1. There is a generally upward trend, indicating a less diverse catch portfolio over time. Median values are noticeably highest during the most recent FYs of 2020-2023. The 75th percentile is close to or close to 1.0 in every fishing year, indicating the large number of vessels heavily dependent on a single fishery. Vessels that had a high index in a given FY may not necessarily derive the majority of their revenue from sea scallops, as they may rely on another fishery from Table 1. The inverse of the Herfindahl indices are presented in Figure 2. This metric represents the number of species groups that would comprise aggregate revenue if revenue shares were equal across all species (e.g. a vessel with an inverse Herfindahl index of 2.0 could attain all of their revenue from two species groups equally). The fact that the vast majority of data points lie below 2.0 indicates there is a relatively small number of fisheries that comprise most of the revenue generated by IFQ-permitted vessels. Circles in the figure are considered outliers (beyond 1.5*IQR from the 25th or 75th percentiles) and roughly correspond to inverse values >3.0 in most fishing years. Therefore, a vessel that generates revenue from three or more fisheries relatively equally is rare.

The Herfindahl indices for the duel-permitted vessel/FY combinations are shown in Figure 3. Compared to IFQ-only permitted vessels, duel-permitted vessels show an even larger concentration of revenues among fisheries. Changes over time are less apparent, as duel-permitted vessels have been heavily reliant on a small number of fisheries throughout the time series. Figure 4 shows the inverse of the Herfindahl indices presented in Figure 3. Again, the inverse Herfindahl index represents the number of species groups that would comprise aggregate revenue if revenue shares were equal across all species. In comparison to Figure 2, the distribution is even closer to 1.0, in which all vessel-level revenue is generated from a single fishery.

Table 2 gives the breakdown of scallop landings revenue relative to overall landings revenue for IFQ-only permitted vessels. A higher percentage of vessels in the most recent time period derive 75% - <100% or 100% of their revenue from scallops relative to the two earlier time periods. Of particular significance, the number of vessels in each revenue grouping other than 100% declined in the most recent time period. This may indicate a concentration of revenue among fewer IFQ vessels; further exploration is warranted. The percentage of vessels deriving 0% or 0.1% - <25% of their revenues from scallops declined slightly from 2016-2023 compared to 2010-2015. The percentage of vessels with 0% of ex-vessels revenues from scallops is considerably higher compared to the pre-IFQ period, possibly indicating vessels that had previously participated in the fishery but now lease out their quota. Table 3 gives the same breakdown as the previous table among duel-permitted vessels. These vessels derive the vast majority of their revenues from scallops for all time periods. There was a noticeable increase in the number of vessels deriving 100% of their revenues from scallops during 2016-2023 compared to the earlier time periods.

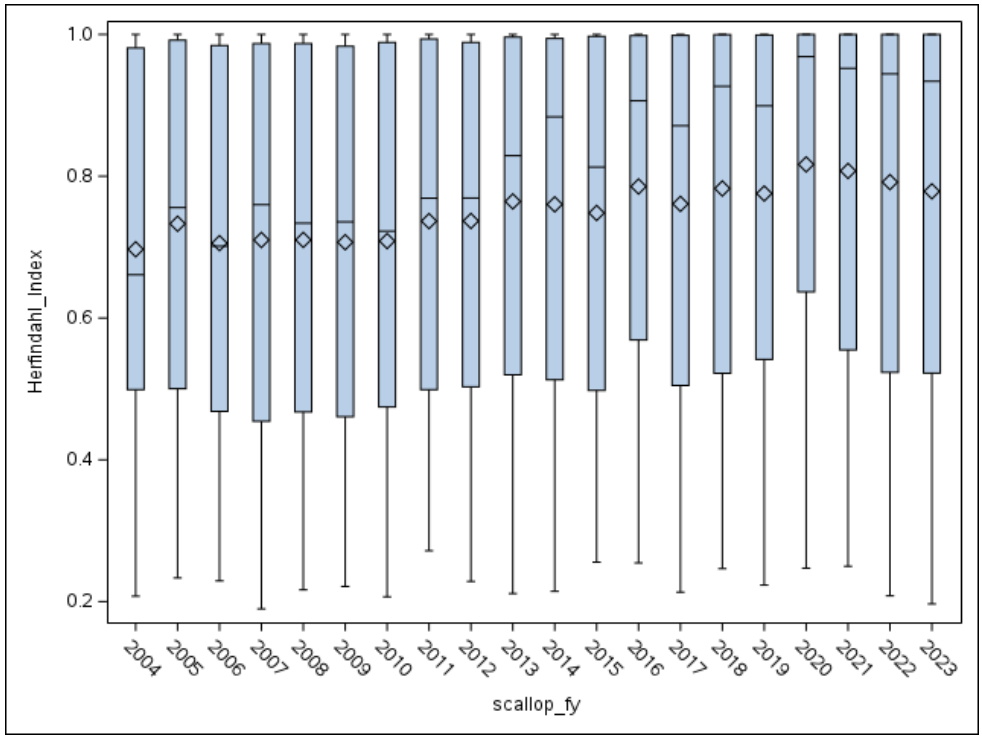


Figure 1. Herfindahl indices by vessels holding an IFQ permit in at least one fishing year from 2010-2023, includes all active vessel/fishing year combinations; no LA permits

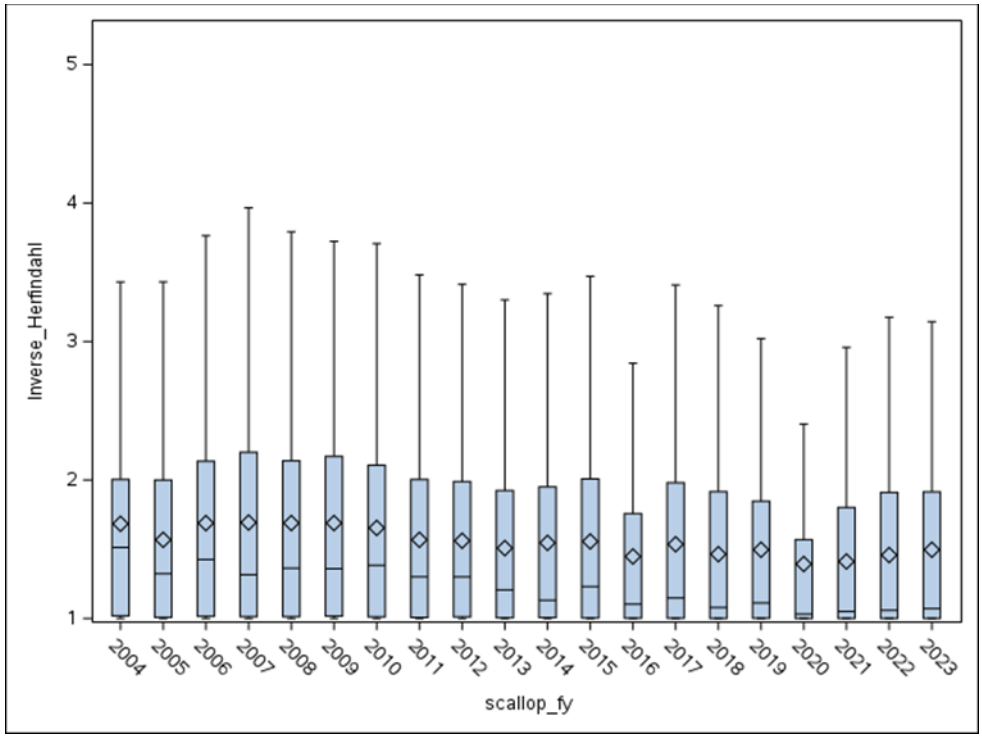


Figure 2. Inverse of the Herfindahl indices among vessels holding an IFQ permit in at least one fishing year from 2010-2023, includes all active vessel/fishing year combinations; no LA permits

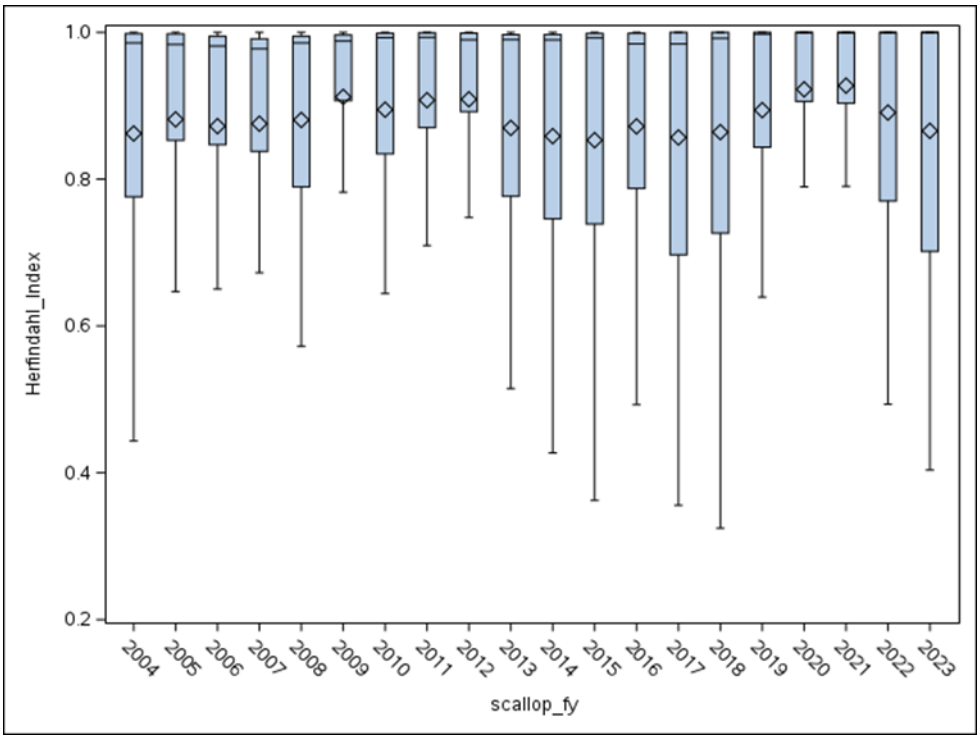


Figure 3. Herfindahl indices by vessels holding both an IFQ and LA permit in at least one fishing year from 2010-2023, includes all active vessel/fishing year combinations

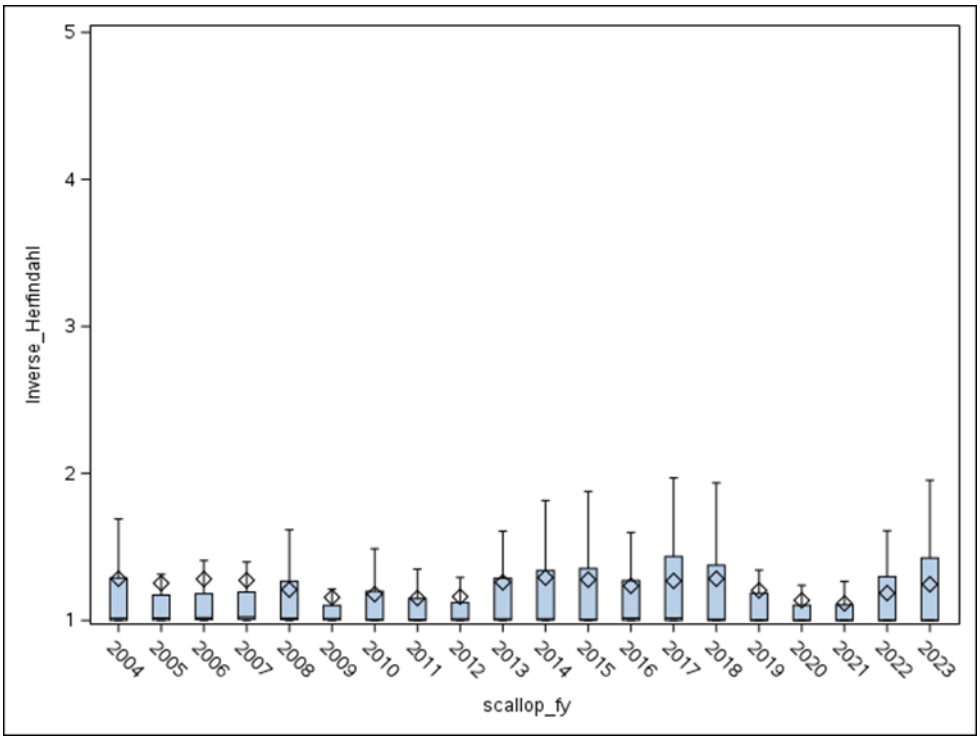


Figure 4. Inverse of the Herfindahl indices among vessels holding both an IFQ and LA permit in at least one fishing year from 2010-2023, includes all active vessel/fishing year combinations

Table 2. Reliance on revenue from scallops among vessels holding an IFQ permit in at least one fishing year from 2010-2023; no LA permits

% Revenue from Scallops	2004-2009	2010-2015	2016-2023
0%	47 (13.1%)	74 (24.0%)	53 (19.0%)
0.1% - <25%	106 (29.4%)	69 (22.4%)	54 (19.4%)
25% - <50%	50 (13.9%)	30 (9.7%)	28 (10.0%)
50% - <75%	24 (6.7%)	24 (7.8%)	19 (6.8%)
75% - <100%	124 (34.4%)	101 (32.8%)	99 (35.5%)
100%	9 (2.5%)	10 (3.3%)	26 (9.3%)

**Note: if an IFQ-permitted scallop vessel had no revenue from any fishery during an entire time period, it is not included*

Table 3. Reliance on revenue from scallop among vessels holding both an IFQ permit and LA permit simultaneously in at least one fishing year from 2010-2023

% Revenue from Scallops	2004-2009	2010-2015	2016-2023
0%	0	0	C
0.1% - <25%	5 (7.4%)	C	C
25% - <50%	C	C	4 (5.7%)
50% - <75%	C	8 (11.8%)	5 (7.1%)
75% - <100%	58 (85.3%)	58 (85.3%)	48 (68.6%)
100%	C	0	11 (15.7%)

**Note: if a duel-permitted (LA-IFQ) vessel had no revenue from any fishery during an entire time period, it is not included. C indicates that the data is confidential.*

APPENDIX II

Northeast Fisheries Science Center (NEFSC) Crew Survey

LAGC IFQ Program Review, 2016-2023

Crew Survey Component of the LAGC IFQ 5-Year Review

Dr. Robert Murphy, Northeast Fishery Science Center, SSB

Summary

This analysis incorporates data from the NEFSC Social Sciences Branch's *Crew Survey,* which was conducted over three separate waves: 2012/2013, 2018/2019, and 2023/2024. Over these three waves, commercial fishing crew were surveyed on various aspects of their employment including on 1) Commercial fishing vessel crew demographics; 2) Participation and practices; 3) Views on fishery management; 4) Job satisfaction; 5) Well-being over time. The first survey wave enabled analysis of IFQ vessel crew specifically. However, survey length was reduced substantially over time to improve response and completion rates, such that we are unable to compare IFQ vessel crew to those that work on non-IFQ vessels (i.e., LA). Coupled with generally low sample sizes, analyses here are limited to comparisons 1) between Sea Scallop crew and other fishery crews and 2) within Sea Scallop crew over time. Additionally, the majority of respondents indicated that there were on average roughly 7 crew members on vessels in which they fished. This suggests that most participants of the survey may primarily fish on vessels with Limited Access permits (although LA vessels may also hold IFQ permits).

The primary findings from this analysis are listed here and described in detail below:

- Across the three Crew Survey waves, crew income generally peaked in 2018/2019 with more than half of the survey respondents making more than $120,000 per year. The Sea Scallop fishery appears to have lost the oldest crew members between the second and third waves (2018/2019 to 2023/2024).
- Average Sea Scallop crew experience has declined over time, whereas crew on non-Sea Scallop vessels seems more stable across the three survey waves. Similarly, the average number of hours worked per day has remained relatively stable in non-Sea Scallop fisheries but in the latest wave, average hours worked amongst Sea Scallop crew went down ~5 hours per day.
- Both Sea Scallop and non-Sea Scallop crew find it much easier to find employment in commercial fishing in the latest Crew Survey wave.
- Crew perceptions on the fairness of fishing-related fines have been variable over time. In particular, perceptions of fine fairness have declined from the second to the third wave amongst Sea Scallop crew.
- For both Sea Scallop and non-Sea Scallop crew, the sentiment that regulations are too restrictive has grown between the second and third Crew Survey wave.
- The proportion of crew that participate in management has declined over time with only ~25% of Sea Scallop crew participating.
- Crew, on average, are satisfied with their job safety. Similarly, there is generally satisfaction with actual job earnings. However, there seems to be consistency across

time where Sea Scallop crew are more satisfied with the predictability of their earning than non-Sea Scallop crew.
- Sea Scallop crew are generally neutral toward leaving the industry. This has been consistent over time.
- The proportion of revenue distributed to fishing crew has declined over time. The types of expenses that are deducted from crew shares have also changed.

The first IFQ 5-year Review used survey data from the first wave of the Crew Survey only, which did allow for a comparison of crew on IFQ vessels versus non-IFQ vessels. A bulleted list of those initial findings for the period 2012/2013 are pasted here:

- Crew members of IFQ vessels were more likely than those on non-IFQ vessels to report that they did not trust managing authorities to make the right decisions when it came to regulating fisheries.
- Crew members of IFQ vessels were more likely than those on non-IFQ vessels to report that their captains were able to fish where he wanted to.
- Crew members of IFQ vessels were more likely than those on non-IFQ vessels to report that overall levels of bycatch and discards were high in their primary fisheries. IFQ vessel crew members were also more likely than non-IFQ crew to report that regulations had increased levels of bycatch and discards in their primary fishery.
- There were no significant differences between IFQ and non-IFQ crew members on any of the items assessing job satisfaction or overall health and wellbeing. Both groups of crew members generally expressed satisfaction with their earnings, time away from home, and the adventure of the job. Both groups also generally expressed that they felt connected to other fishermen and that they were proud to be fishermen.

Introduction

This report is meant to provide insights into the socio-demographic characteristics and perspectives of fishing crew in the Atlantic Sea Scallop fishery. Specifically, survey-based data from Sea Scallop crew are analyzed over time and are compared to crew on non-Sea Scallop vessels. Given that the goal of this review is broadly to assess the IFQ program's effects on the net benefits to the Nation, this analysis and report contributes context from the perspective of Sea Scallop crew.

Specifically, data for this analysis is derived from the *Survey on the Socio-Economic Aspects of Commercial Fishing Crew in New England and Mid-Atlantic* (i.e., Crew Survey) conducted by the Social Sciences Branch (SSB) of the National Oceanic and Atmospheric Administration (NOAA) Fisheries Northeast Fisheries Science Center (NEFSC). While we are unable to compare IFQ fishermen to non-IFQ fishermen, this analysis highlights potential vulnerabilities of Sea Scallop crew, including theoretical vulnerabilities based on socio-demographic attributes and crew perceptions of their employment. The enactment of the IFQ management system is just one of many system changes that Sea Scallop fishermen have had to navigate (Gibbs et al.

in review), such that an understanding of fishing crew vulnerabilities in general will better equip managers to predict the possible outcomes of future system states.

Methods

The NEFSC Crew Survey has used an intercept-style survey across three distinct collection waves: 2012/2013, 2018/2019, and 2023/2024. Over these three waves, commercial fishing crew were queried on various aspects of their employment. While some questions and sections were eliminated in subsequent years to reduce response burden, each survey wave captured information on the following topics: 1) Commercial fishing vessel crew demographics; 2) Participation and practices; 3) Views on fishery management; 4) Job satisfaction; 5) Well-being over time.

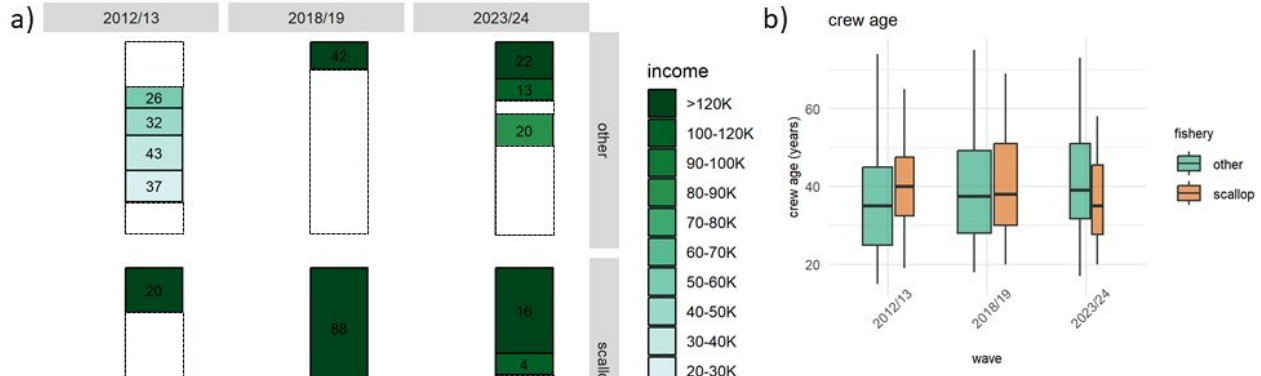
Detailed information on the methods used to execute the Crew Survey can be found in the NOAA Technical Memorandum NMFS-NE-274 (Silva et al. 2021) and published work by Cutler et al. (2022).

Social Scientists from the NEFSC intercepted commercial fishing crew at various ports throughout the Northeast's Greater Atlantic region (North Carolina to Maine), where they administered voluntary and confidential surveys that took roughly 10 minutes to complete in the most recent wave. The survey was not limited to federal vessels and all crew members could participate, including hired captains. Port sampling schemes (i.e., location and timing prioritization) were most recently determined based on vessel trip reports and federally permitted dealer reports. For the first survey wave, a geographically stratified random sampling approach was utilized. Inefficiencies resulting from this approach resulted in the use of a probability proportional to size (PPS) sampling method for the second and third wave. Specifically, this sampling scheme prioritized the most active ports, identified via a *commercial fishing engagement index* from NOAA's Community Social Vulnerability Indicators (Jepson and Colburn 2013). Given that there is no federal registry for commercial fishing crew, target sample sizes were determined based on estimates of the total population of individuals employed in commercial fishing in New England and the Mid-Atlantic. For example, a target sample size of 377 was determined to be representatively sufficient during wave 2. Across the three waves, the total numbers of responses were 359, 478, 162, respectively, such that responses are generally representative of commercial fishing crew in New England and Mid-Atlantic regions for the first two waves. The most recent survey wave underachieved somewhat on the overall target sample size and the results, therefore, may be less reliable when broken down into sub-sample aggregations such as primary fishery. However, a strength of the new (2nd and 3rd wave) sampling strategy is that researchers focused on intercepting crew at ports where commercial fishing was more active and, therefore, fisheries such as Sea Scallop tend to be well represented in the data.

Results and Discussion

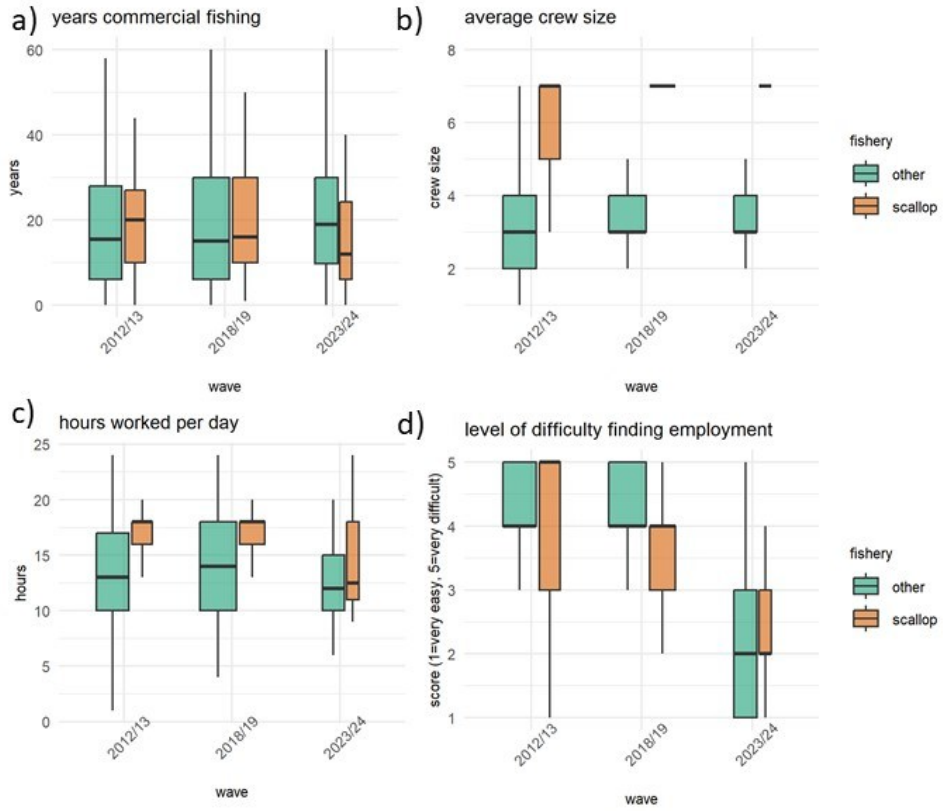
Results from the Crew Survey suggest that important socio-demographics characteristics of the Sea Scallop fishery may have changed over time. Sea Scallop crew have also been able to achieve higher salaries than other fisheries, although there is a clear decline in top end salaries from Wave 2 to 3; 62% of Wave 2 survey respondents made over $120,000, while this dropped to 44% in Wave 3 (Figure 1a). The Sea Scallop fishery also appears to have lost the oldest crew members between the 2018/19 and 2023/24 such that the average age of Sea Scallop crew is 4 years less than other fisheries (Figure 1b). Collectively, this suggests that the composition of Sea Scallop crew and incomes have changed over time, likely impacting the capacity of crew to sufficiently respond to change. It is possible that this cohort of younger crew with lower incomes may be more likely to leave the fishery if conditions decline.

Figure 1. *A summary of socio-demographic information over the three Crew Survey waves demonstrating important differences between scallop crew and non-scallop crew and/or within scallop crew over time. a) crew income by categories, where darker colors indicate higher incomes. Numbers in each bar represent the number of respondents. To protect participant confidentiality, categories of income are shown only when they represent over 10% of the total for each plot; b) Crew age data summarized via box plots (center black line = median age).*



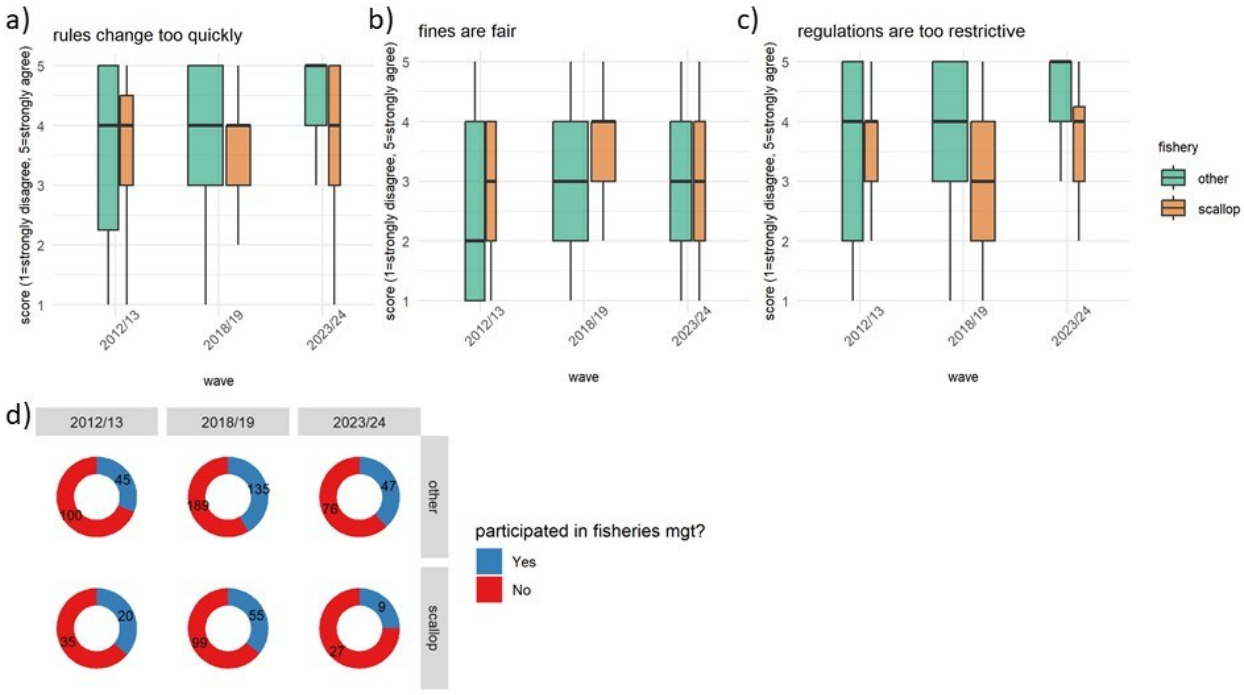
In line with the declines in crew age, the average experience of Sea Scallop crew has declined over time, with a notable drop from 2018/19 to 2023/24; the median number of years experience in commercial fishing for Sea Scallop decreased from 16 to 12 years (Figure 2a). The on-the-water experiences of crew seem to have also changed over time, with both Sea Scallop and non-Sea Scallop crew working far fewer hours per day in the most recent Crew Survey wave. Specifically, the median number of hours worked by Sea Scallop crew declined by over 5 hours from 2018/19 to 2023/24 (Figure 2c). There is also a clear trend in which crew members across fisheries believe that it is much easier to find employment most recently (Figure 2d). Younger, less experienced crew coupled with shorter work days highlight that the fishery has changed over time. The impact of these changes is uncertain however.

Figure 2. *A summary of fishing attribute information over the three Crew Survey waves demonstrating important differences between scallop crew and non-scallop crew and/or within scallop crew over time. For all plots, summarized data is shown via box plots (center black line = median); a) number of years of commercial fishing; b) average crew size on primary vessel; c) number of hours work per day on average on primary vessel; d) level of difficulty in finding employment (answers ranged from 1= very easy to 5 = very difficult).*



The perception that rules change too quickly has been relatively consistent across time, although in the most recent Crew Survey wave only, non-Sea Scallop crew tend to have more negative opinions of the speed at which fishery rules change (Figure 3a). There appears to be general agreement between Sea Scallop and non-Sea Scallop crew on the fairness of fishing-related fines for the most recent Crew Survey. These groups disagreed previously (Figure 3b). Perceptions of fine fairness become less positive from the second to the third Wave amongst Sea Scallop crew. Crew members across fisheries and across time tend to believe that regulations are too restrictive, although this sentiment has grown between the second and third Crew Survey wave (Figure 3c). The proportion of crew that participate in management has declined over time with only ~25% of Sea Scallop crew participating. Collectively, these findings suggest that the Sea Scallop fishery in particular is increasingly feeling pressure from regulatory actions, potentially decreasing their adaptive capacity to future system states. The decreasing propensity for crew to participate in management also highlights that public comments and overall feedback from the fishing industry may have become less representative over time.

Figure 3. *A summary of questions related to fisheries management over the three Crew Survey waves demonstrating important differences between scallop crew and non-scallop crew and/or within scallop crew over time. For the first three plots, summarized data is shown via box plots (center black line = median) and answers ranged from 1= strongly disagree to 5 = strongly agree; a) crew perceptions of whether fishery rules change too quickly; b) crew perceptions of whether fines are fair; c) crew perceptions of whether fishery regulations are too restrictive; d) circular bar plot showing the proportion of crew that have participated in fisheries management processes (numbers in bars represent sample sizes).*

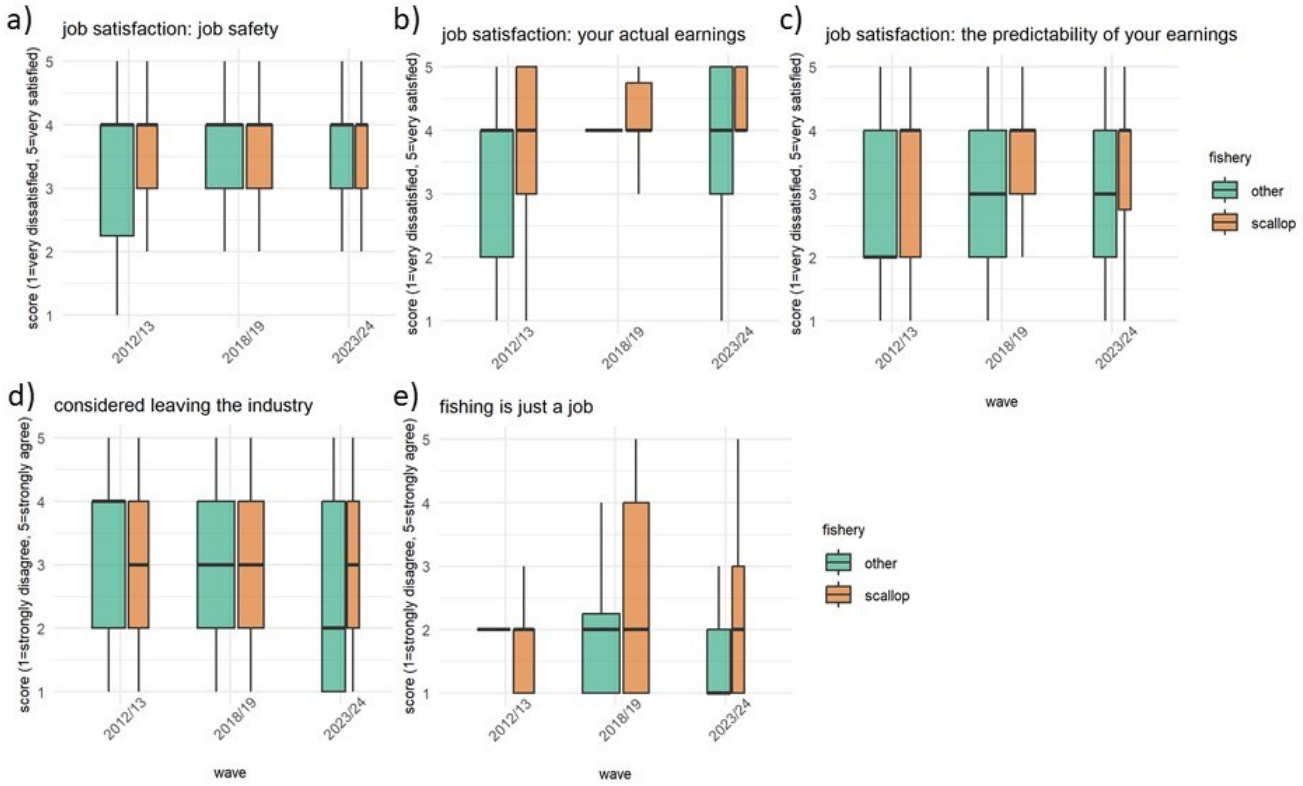


Commercial fishing crew across fisheries are satisfied with their job safety on average. The median of this perception has been consistent over time, although there is considerable variability in crew perceptions (Figure 4a; *also as indicated by raw data not shown in the report due to confidentiality constraints*). Similarly, Sea Scallop crew are mostly satisfied with their actual earnings and the predictability of their earnings (Figure 4b, 4c). There seems to be consistency across time where Sea Scallop crew have more positive median perceptions of earnings predictability compared to non-Sea Scallop crew. The median response to whether Sea Scallop crew would consider leaving the fishing industry has been consistently neutral over time (Figure 4d). The majority of commercial fishing crew across fisheries and survey periods believe that fishing is more than a job, highlighting the cultural significance of commercial fishing operations (Figure 4e).

While we cannot deduce differences between IFQ and non-IFQ Sea Scallop crew, we do not find evidence of large declines in crew perceptions (i.e., more negative viewpoints) of careers in

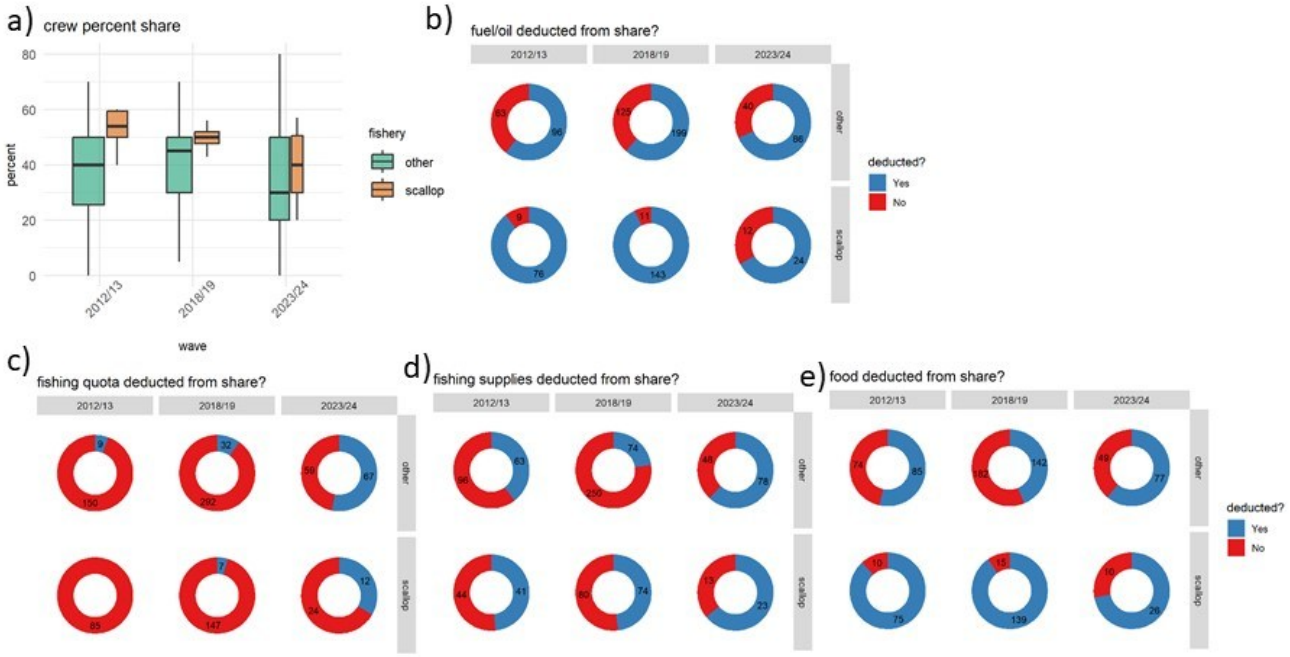
fishing over the time since the IFQ program has been implemented. However, we do not have data pre-IFQ program, precluding a Before-vs-After analysis.

Figure 4. *A summary of crew perceptions of their job satisfaction and general experiences as assessed from the three Crew Survey waves demonstrating important differences between scallop crew and non-scallop crew and/or within scallop crew over time. For all plots, summarized data is shown via box plots (center black line = median). For the first three plots, answers ranged from 1= very dissatisfied to 5 = very satisfied and for the last two plots, answers ranged from 1= strongly disagree to 5 = strongly agree. a) crew satisfaction of job safety; b) crew satisfaction of their actual earnings; c) crew satisfaction of the predictability of their earnings; d) crew perceptions of leaving the industry; e) crew perceptions of whether fishing is just a job.*



For crew that are employed under a share system, survey responses suggest that the proportion of revenue distributed to fishing crew has declined over time (Figure 5a). In the Sea Scallop fishery, the median proportion of shares distributed to crew was 54%, 50%, and 40%, across the three survey waves, respectively (Figure 5a). Furthermore, the types of expenses that are deducted from crew shares have also changed. While fuel/oil and food is deducted less frequently in the Sea Scallop fishery in 2023/24, both fishing supplies and fishing quota are more frequently deducted most recently (Figure 5b-e). Coupled with declines in salary over time (Figure 1b), these results suggest that Sea Scallop crew are more vulnerable to changes that would reduce vessel revenue.

Figure 5. *A summary of questions related to share systems used on vessels over the three Crew Survey waves demonstrating important differences between scallop crew and non-scallop crew and/or within scallop crew over time. For the first plot, summarized data is shown via box plots (center black line = median). a) the percentage of revenue distributed to crew (as opposed to the boat). Plots b through e are circular bar plots illustrating the proportion of items that are versus are not deducted from crew shares (numbers in bars represent sample sizes); b) the proportion of crew that indicated fuel and oil were deducted from their payment share; c) the proportion of crew that indicated fishing quotas were deducted from their payment share; d) the proportion of crew that indicated fishing supplies were deducted from their payment share; e) the proportion of crew that indicated food was deducted from their payment share.*



References

Cutler, M., Silva, A., Gentile, L., & Colburn, L. (2022). Tracking shifts in the vulnerability and resiliency of commercial fishing vessel crew and hired captains in New England and the Mid-Atlantic. Marine Policy, 138, 104980.

Henry, Anna and Olson, Julia. 2014. An Overview of the Survey on the Socio-economic Aspects of Commercial Fishing Crew in the Northeast. NOAA Technical Memorandum NMFS-NE-230. Woods Hole, MA. Available at http://www.nefsc.noaa.gov/publications/.

Gibbs, S., Murphy Jr, R., Grabowski, J., Harris, B., Scyphers, S. (2025) Threats Perceived by Five Prominent U.S. Commercial Fisheries. In review

NEFMC. 2014. Limited Access General Category (LAGC) IFQ Fishery Performance Evaluation (LAGC IFQ REPORT). Newburyport, MA. Available at http://www.nefmc.org/library/ifq-report-information

APPENDIX III

Social and Wellbeing Outcomes in Catch Share Programs: A Case Study of the LAGC IFQ Program, Draft Survey Results

LAGC IFQ Program Review, 2016-2023

Social and Wellbeing Outcomes in Catch Share Programs: A Case Study of the LAGC IFQ Scallop Program

Draft Survey Results

Prepared for

Walton Family Foundation

July 2025

Prepared by

Northern Economics
P.O. Box 1109140
Anchorage, Alaska 99511
Phone: 907-274-5600
Fax: 907-290-2464
www.northerneconomics.com

Gulf of Maine Research Institute
Science. Education. Community.

PROFESSIONAL CONSULTING SERVICES IN APPLIED ECONOMICS AND SOCIAL SCIENCES

Principals:
Marcus L. Hartley, M.S. – President
Diane Sauer – Office Manager

Consultants:
Leah Cuyno, Ph.D.
Melissa Errend, M.S.
Diana Perry, Ph.D.
Don Schug, Ph.D.
Colleen Young, MBA

Associate:
Michael Fisher, MBA

Administrative Staff:
Terri McCoy, B.A. – Editor

P.O. Box 110914
Anchorage, Alaska 99511
Phone: 907.274.5600
Fax: 907.290.2464

Email: mail@norecon.com
www.northerneconomics.com

Preparers

Team Member	Project Role
Melissa Errend	Principal Investigator, Project Manager
Kanae Tokunaga	Principal Investigator
Kat Maltby	Principal Investigator
Don Schug	Co-Author
Ben Cotton	Research Assistant
Tom Sanborn	Analyst
Terri McCoy	Editor

Please cite as: Northern Economics, Inc. *Social and Wellbeing Outcomes in Catch Share Programs: A Case Study of the LAGC IFQ Scallop Program*. Prepared for Walton Family Foundation. July 2025.

Contents

Introduction & Survey Description

Project Background

Under a grant from the Walton Family Foundation, Northern Economics and Gulf of Maine Research Institute are investigating how different tools and structural changes in U.S. catch share programs may work to achieve equity goals while minimizing adverse impacts to participants, communities, and other stakeholders. Our research questions are as follows:

1. What strategies have been employed in catch share programs to promote equity? What have the consequences been of these measures on equity and wellbeing outcomes? What other measures could be implemented?

2. What strategies would be most likely to increase equitable outcomes, increase wellbeing, and minimize negative impacts to extant users, fishery dependent businesses, and communities?

3. How would modifications designed to affect equity influence outcomes in an extant catch share program in the U.S.?

To answer these research questions, our work is being conducted in three key phases: 1) Develop an analytical framework of equity strategies and outcomes, 2) Examine this framework with a case study approach using interviews and empirical analysis, and 3) Synthesize findings and develop recommendations. This report presents results from a survey of LAGC IFQ scallop fishery stakeholders as part of the case study. Results of the first phase are presented in a separate white paper (Northern Economics and Gulf of Maine Research Institute 2024) and a full report on results of the case study and overarching conclusions will be prepared and made publicly available in the fall of 2025.

Stakeholder Survey

Survey description

A survey was used to understand wellbeing dimensions of IFQ scallop fishery participants. The survey was composed of two main sections, primarily using a series of statement-based questions (*Appendix: Survey Instrument).* Section one collected information regarding people's background and involvement in the fishery, and wider information including permits and quota ownership, leasing arrangements and dependence on the fishery. Section two was composed of statement-based questions regarding different wellbeing dimensions. An optional open-ended question 'Can you provide an explanation of your responses' was associated with each set of statements.

The survey was designed to obtain information about wellbeing dimensions at a generalized level of the fishery, rather than individual specific answers. This was to complement the broader Bayesian model design that captures and reflects generalizable trends and patterns in the fishery system as a whole, as opposed to specific individual level insights. Additionally, making the survey more generalized provided the potential opportunity for different types of fishery stakeholders associated with the fishery to take part in the survey – i.e. active participants, quota owners who no longer fish, shoreside business owners associated with the fishery, etc.

Prior to implementing the survey, we sought input from three individuals at fishing organizations and in the management system to aid in further refinement of survey questions and statements. This helped to ensure that the questions were understandable by the target audience, consider ordering of questions, and that nuances regarding roles/backgrounds/associations with the fishery were adequately captured by the questions. We then tested the survey with two individuals with detailed knowledge of the scallop fishery to check timing and understanding.

The final survey was administered through the online SurveyMonkey platform, and took between 15-20 minutes to complete.

Recruitment

We used a multi-pronged approach to recruit survey participants due to the wide-geographic range of the fishery and participants being a hard-to-reach sample community and having varying backgrounds associated with the fishery. Initially, emails were sent to key identified 'connectors' within the fishery who could send the online link and associated information to their networks. These connectors included those in fishing associations and organizations, key businesses and individuals in fisheries management positions. Additionally, a paid advertisement of the survey was placed on Facebook and Instagram for 8 days. Paper flyers were provided at an industry focused event, the Maine Fishermen's Forum, at a GMRI booth and during a scallop specific visioning session. These approaches were selected to target both active fishers, but also those with other connections to the fishery. After two weeks of using these approaches with limited participation, we chose to obtain and utilize a scallop permit list which contained phone numbers of individuals with scallop IFQ permits. Two project members rang all individuals on the permit list, providing an option to complete the survey over the phone or online. If individuals were interested in participating online, the survey link was sent via text or email (preferred methods). If individuals wanted to do it over the phone, a time was identified for a follow-up conversation, or the survey was conducted during the immediate conversation. Completion of the survey over the phone typically lasted 1 hour. In all cases, either online participation or over the phone, informed consent information was provided and individuals verbally or electronically provided consent before answering questions.

Final number obtained

The survey was open for 1 month between March and April 2025. During this time frame we collected 32 responses. 25 of these were done online and 7 of these were done over the phone.

Survey Results

Demographics & Representation

A total of 32 respondents participated in the survey. An overview of respondent demographics and associations with the fishery is found in Table 1. The average respondent age was 51 years. Most respondents (87.5%) indicated that their primary role in the fishery was an active fisherman (participated in the last five years); 93.8% of respondents indicated that they were IFQ vessel or permit owners; and 50% were IFQ quota holders. The majority of respondents indicated that they live in Massachusetts for their primary residence (71.9%, Table 2), but respondents also lived in New Jersey, Virginia, North Carolina, Maine, and Rhode Island. Of active fishermen, 50% had been involved in the IFQ program every year since its establishment, but only 31% were initial recipients of quota, meaning that they were granted initial quota shares based on historical fishing effort.

Table 1. Summary of respondents by region/location, age, stakeholder type/role and other characteristics

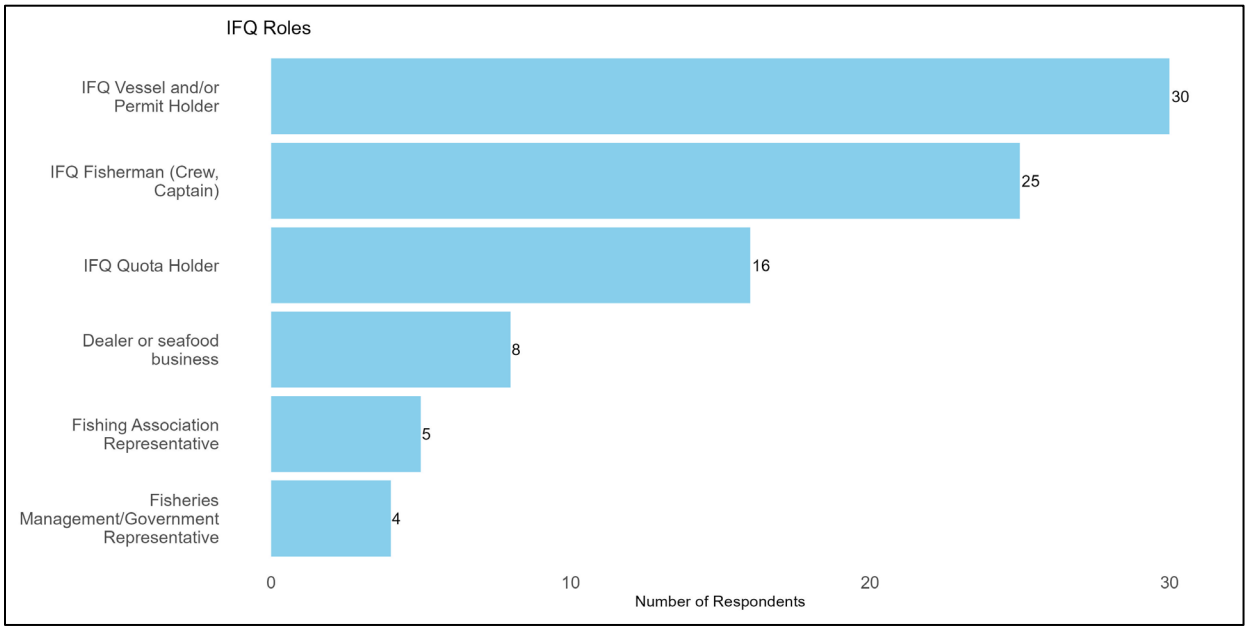
Question	Data Summary
Mean Age	51 years
Active IFQ Fishermen	87.5%
Vessel Owner	93.8%
Quota Holder	50%
Use a quota bank	61%
Average trip length is less than 24 hours	61%
Involved in IFQ every year since 2010	50%
Initial quota recipient	31%
Receives over 40% of fishery income from IFQ fishery	61.53%
Has no other non-fishery income sources	62%

Table 2. Respondents by primary residence state and region (N=32)

State	Region	Percent of Respondents
Massachusetts	Northeast	71.9%
New Jersey	Mid-Atlantic	12.5%
Virginia	Mid-Atlantic	6.3%
North Carolina	Mid-Atlantic	3.1%
Maine	Northeast	3.1%
Rhode Island	Northeast	3.1%

While most people who participated in the survey indicated their primary role to be an active fisherman, serving as a captain, crew, and/or vessel owner, many held additional roles (Figure 1). Most commonly this included being an IFQ vessel and/or permit holder, quota holder, or a dealer/seafood business.

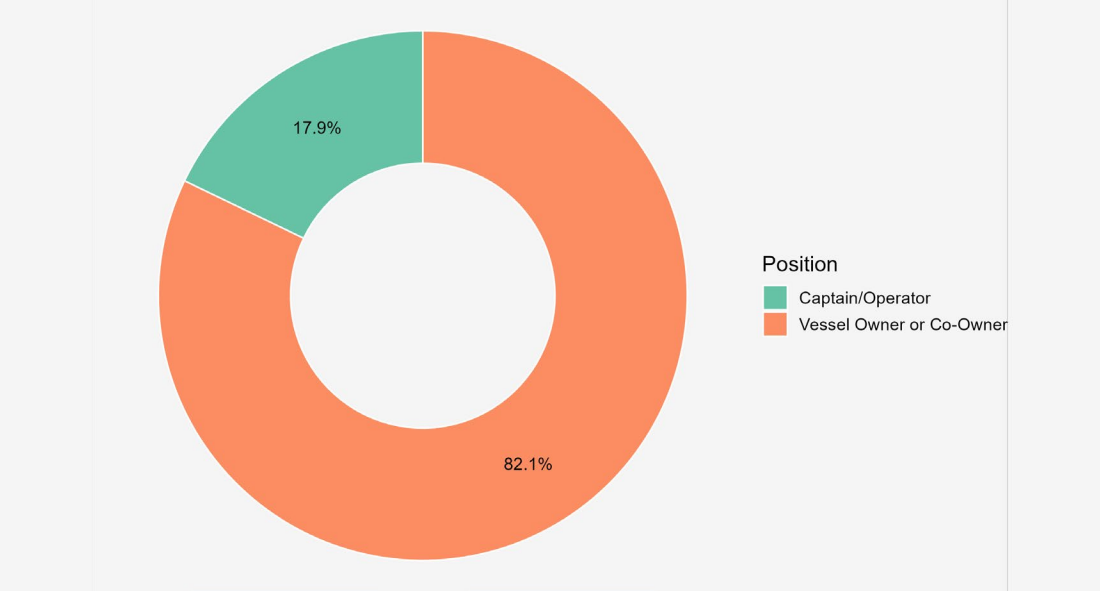
Figure 1. Roles of survey participants within the IFQ scallop fishery (n=32)



Note: Respondents were asked to check all that apply in this question.

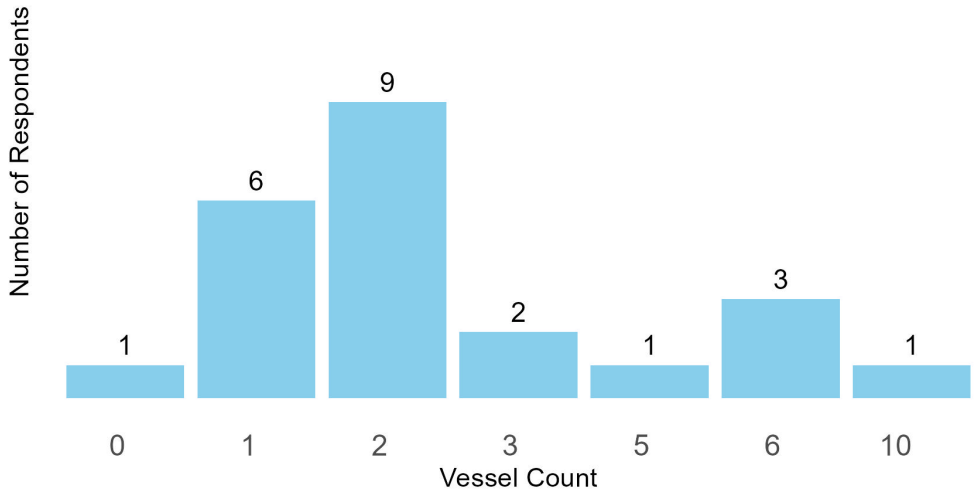
After respondents answered the question about their roles in the fishery, the survey presented different questions depending on the answer. Former IFQ fishermen skipped the current role questions (Q6–Q16) and IFQ permit owner not participating in last 5 years or never participating in IFQ skipped the remainder of the background section (Q6–Q22). Among those indicating that they are active IFQ fishermen, another question (Q6) asked for more information about their role, and asked for the best description of their role as either vessel owner or co-owners, captain/operator, or crew. Those answering crew or vessel operator skipped to Q15. Because of these differences, the numbers of respondents presented in the following section vary from the overall number of respondents and where relevant, the number of respondents is noted in figure captions and in text. Notably, among active IFQ fishermen (28 respondents, or [n=28]), the vast majority of respondents reported being vessel owners (23), a minority reported being vessel captains or operators (5), and none reported being primarily crew members (Figure 2).

Figure 2. Active Fishermen Current Positions in the LAGC IFQ Scallop Fishery (n=28)



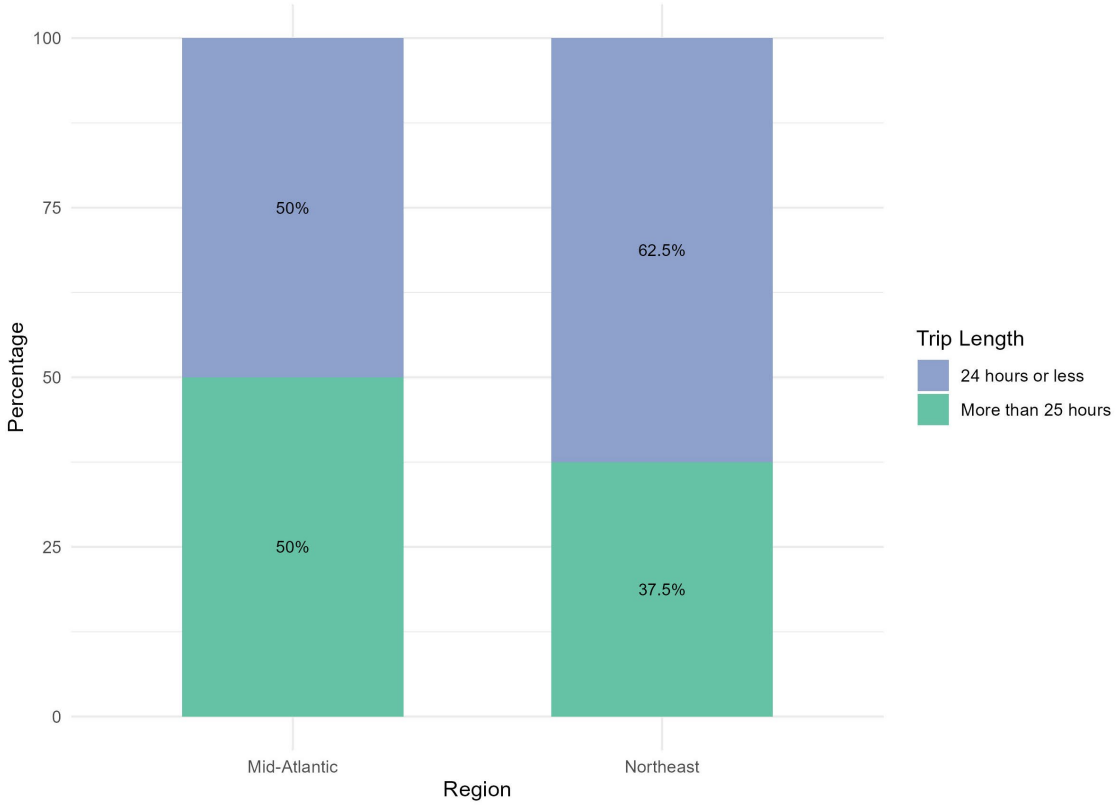
Respondents that indicated an ownership stake in active vessels (n=23) varied in the number they had a stake in, with an average of 2.7 and median of 2 vessels (Figure 3).

Figure 3. Number of active vessels in which respondents held an ownership stake (n=23)



Across all respondents, most (61%) indicated that their typical trip length was less than 24 hours (Figure 4). There was a slight difference when accounting for regional variation, with those from the Mid-Atlantic (n=4) conducting more trips over 24 hours in length compared to those in the Northeast (n=24).

Figure 4. Trip length by region (n=28)

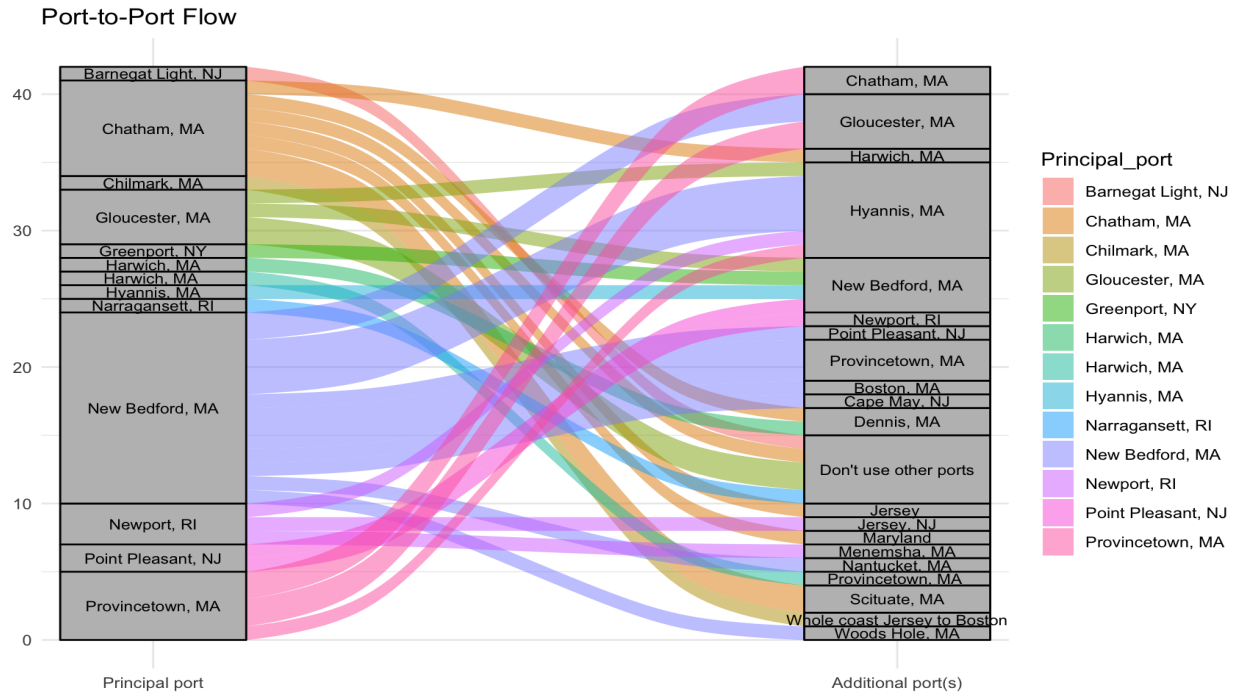


Most respondents indicated their principal port was in Massachusetts (Table 3). However, 77% of respondents answered that they fished out of other ports in addition to their principal port, while 23% fished only out of their principal port. Table 3 summarizes percentages of respondents' usage of different ports, while Figure 5 shows the links for an individual respondent's principal port and the additional ports that they reported using. Notably, while respondents reporting New Bedford as their principal port represent the largest share of respondents, none of these respondents reported only fishing out of New Bedford, with the most common secondary ports being Hyannis and Gloucester, but other ports listed spanned Massachusetts to New Jersey. One respondent indicated that they utilize all ports from New Jersey to Boston.

Table 3. Principal Port State and State of Other Ports Utilized (n=26)

Principal Port State	Percent	Additional Port State	Percent (n=26)
Massachusetts	77%	Massachusetts	78%
New Jersey	11%	Rhode Island	12%
New York	4%	New Jersey	7%
Rhode Island	8%	Maryland	3%

Figure 5. Links between respondents principal port and additional ports that they use

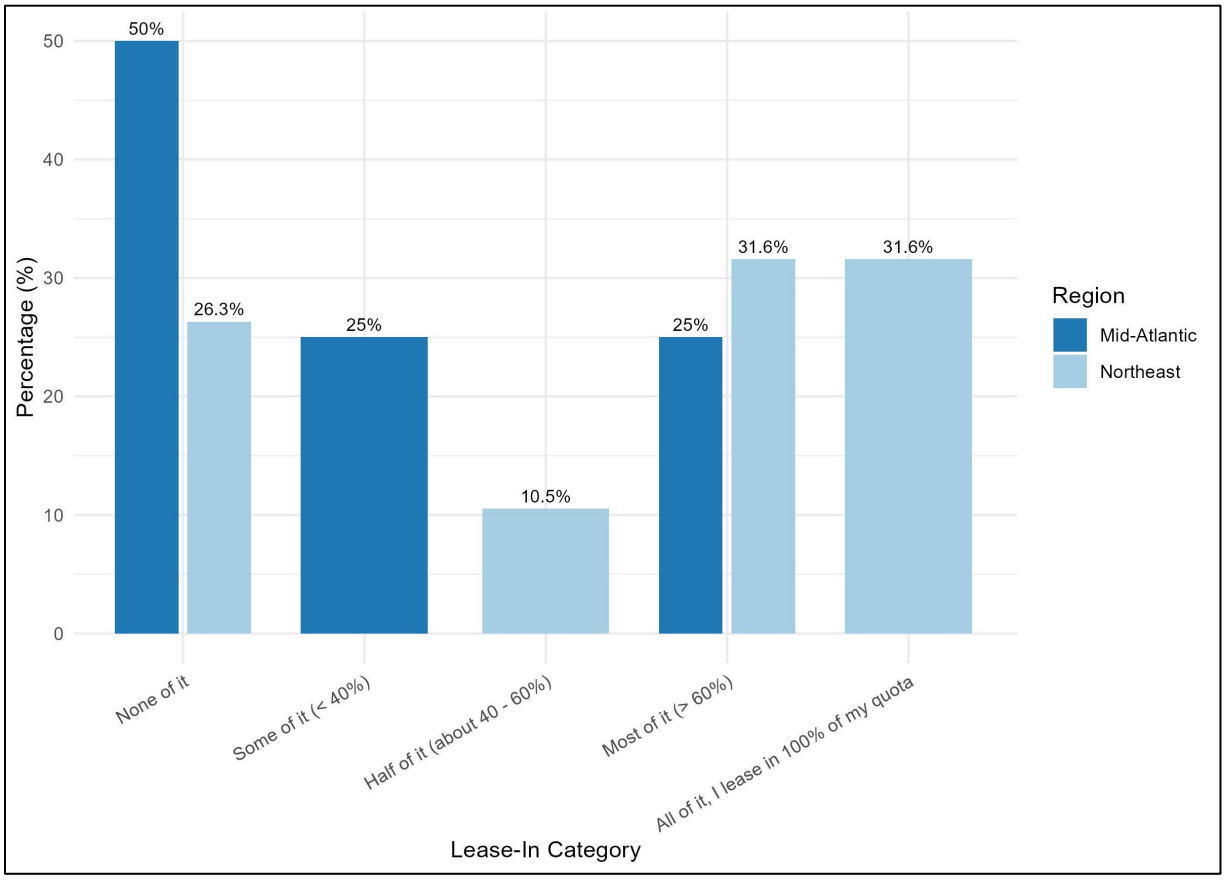


Quota Ownership and Leasing

To better characterize baseline conditions among active fishermen, respondents who indicated that they were vessel owners were asked about their leasing arrangements in terms of the typical proportions of scallop IFQ quota they lease in or out, as well as their usage of quota banks.

Over half of all respondents (56%, n=23) indicated that they leased in the majority to all of the quota used on their vessel, with 30% indicating that they leased in the majority of the quota used ('Most of it >60%') and about a quarter (26%) stating that they were completely lease dependent, leasing in all the quota used. Another 30% of respondents indicated that they did not need to lease in any quota, indicating that all quota used on the vessel was owned outright. The remaining answered 'Half of it' (8%) or 'Some of it' (4%). When looking at lease-in trends across regions, Mid-Atlantic respondents broadly leased in less quota compared to those in the Northeast, but differences were not significant (T-test, p=0.13) (Figure 6).

Figure 6. Leasing-in percentages by region (n=23)



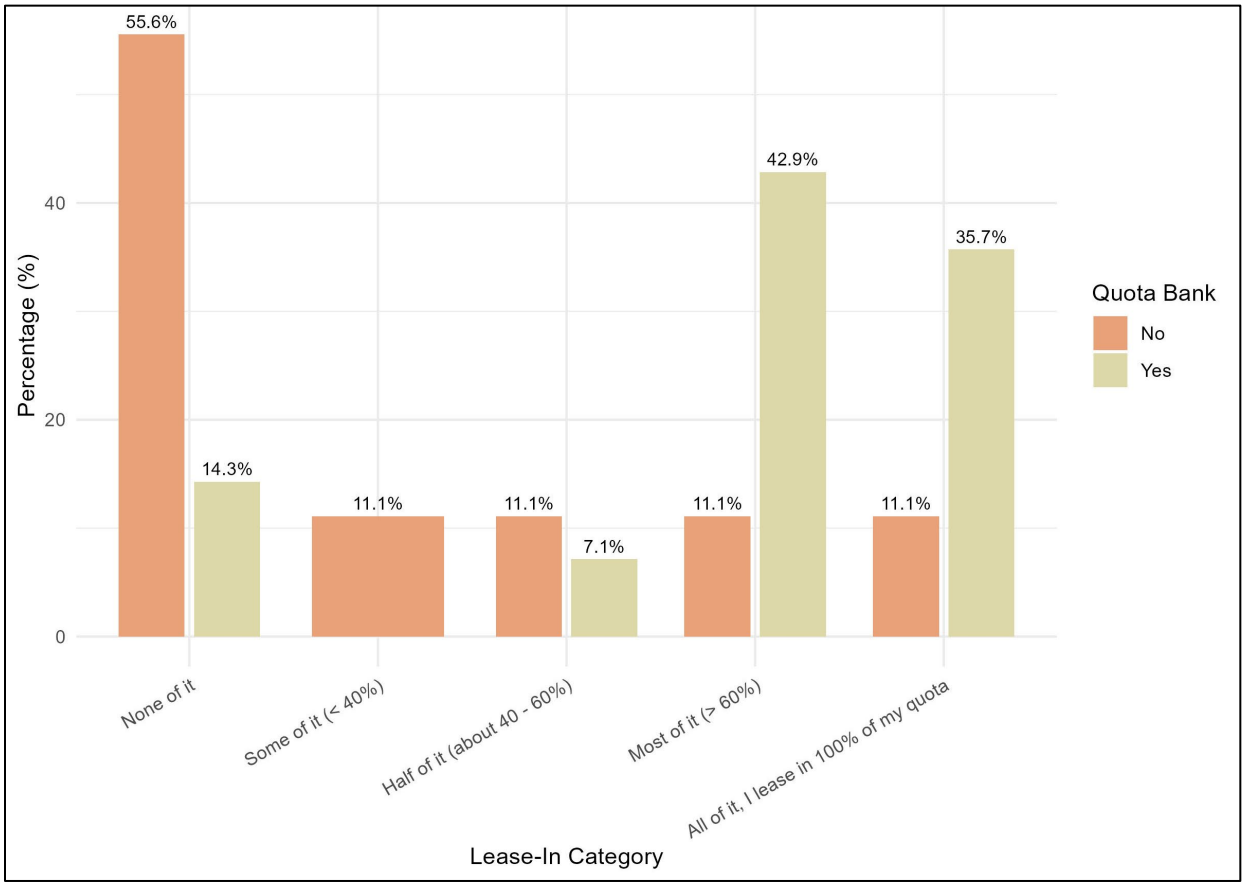
Note: T-test by region was not significant (p=0.13)

When asked about typical amounts of quota that respondents lease out to others, a large proportion of respondents reported they did not lease out any quota and instead fished it themselves (65%, N=23). A smaller proportion (13%) said they leased out 'Some of it <40%', while the remaining 21.7% reported that they are not allocated any quota. Notably, none of the respondents reported that they lease out the entirety of their allocation.

The survey also asked about quota bank usage. Over the last five years, 60.8% of respondents stated that they had received scallop IFQ quota from a quota bank (N=23). Some respondents provided further contextual information regarding their use of quota banks (N=15). Four stated that they used a quota bank because it provided cheaper quota prices compared to the open market, and one stated that they used it to ensure continued access to the fishery. One stated it was more expensive to lease from a quota bank. Two respondents stated that they used the quota bank to ensure continued membership and have voting rights, to ensure they could advocate against policies of the quota bank that they felt were detrimental to small scale operators in the fishery. Three other respondents also described issues with the quota bank they used, citing personal issues, being 'against it', and issues with the running and organization of the quota bank.

As might be expected, those who reported leasing in higher proportions of their quota were more likely to report receiving quota from a quota bank in the last five years. When considering leasing-in arrangements by quota bank status, use of a quota bank was associated with more respondents who leased in quota compared to those who did not (Figure 7).

Figure 7. Quota bank membership and leasing-in arrangements across respondents (n=23)



Note: T-test was significant (p=0.01).

Wellbeing dimensions

The majority of the survey questions were focused on understanding baseline conditions with respect to wellbeing outcomes under the program. Here, results are summarized by theme:

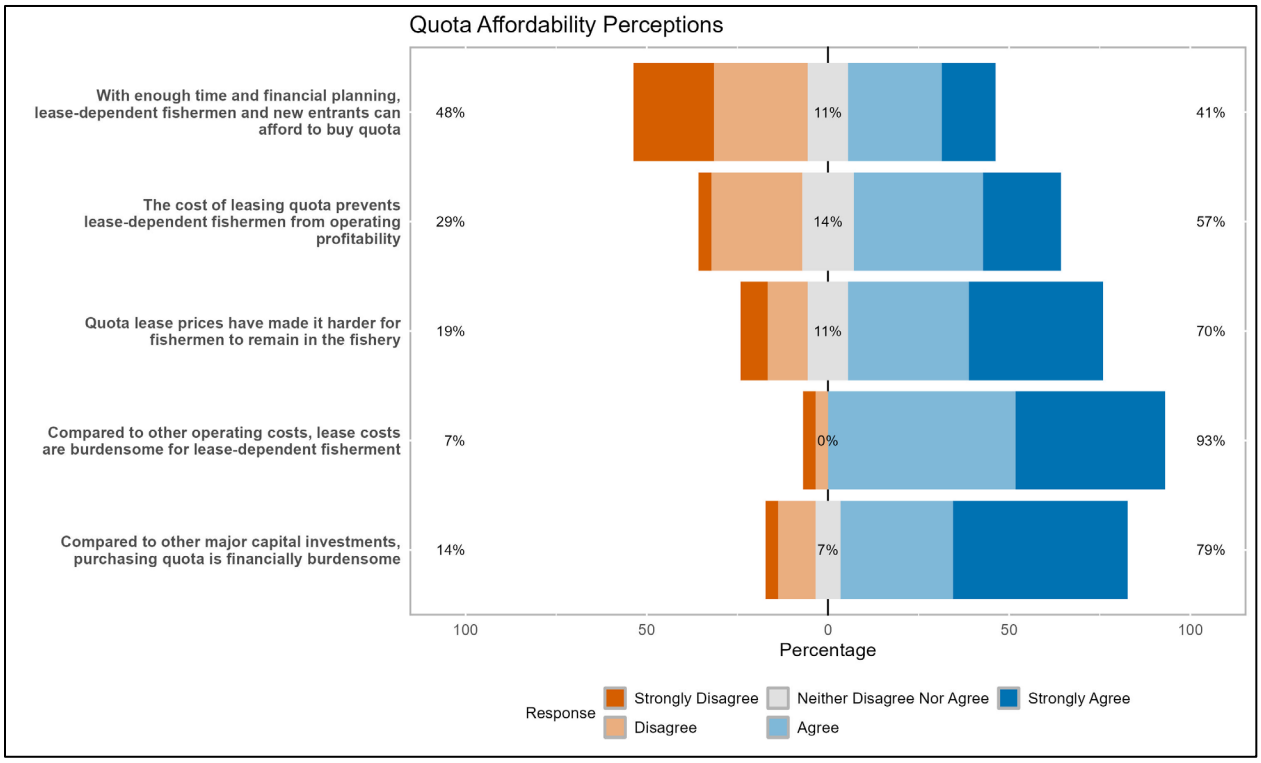
- Quota affordability and availability
- Fishing reliance, diversification, job satisfaction and mental wellbeing
- Upward mobility, continuity of fishing as a livelihood and crew shares
- Social relationships
- Management perspectives

All respondents, regardless of their status as an active fisherman or not, were provided all questions in the wellbeing section of the survey. Where relevant, questions from the previous sections of the survey are summarized to contextualize results.

Quota affordability and availability

Respondents were presented with a series of wellbeing statements across a number of dimensions, including several statements regarding quota availability and affordability. Across all statements, respondents agreed or strongly agreed that quota was unaffordable, in terms of both leasing and purchasing quota (Figure 8). This was seen as challenging not just for the profitability and ability to remain in the fishery of current fishermen, but also for those seeking to enter the fishery.

Figure 8. Responses to quota affordability statements (n=29)



Written comments from respondents further emphasized perceptions of unaffordability:

> *Buying quota is too expensive* –Vessel owner or co-owner, Massachusetts

> *Purchasing quota is very expensive and really has to be planned for, but it's doable... Leasing in quota gets expensive as well, and has to be planned for the year previous, to know what you'll be able to catch and how much quota is around to lease.* –Active IFQ fisherman, Massachusetts.

> *My son loves fishing, but I wouldn't let him get into it. Everything is too expensive and I don't see a future.* –Vessel owner or co-owner, Massachusetts

Another described how quota being owned by non-active fishermen affected the affordability and price:

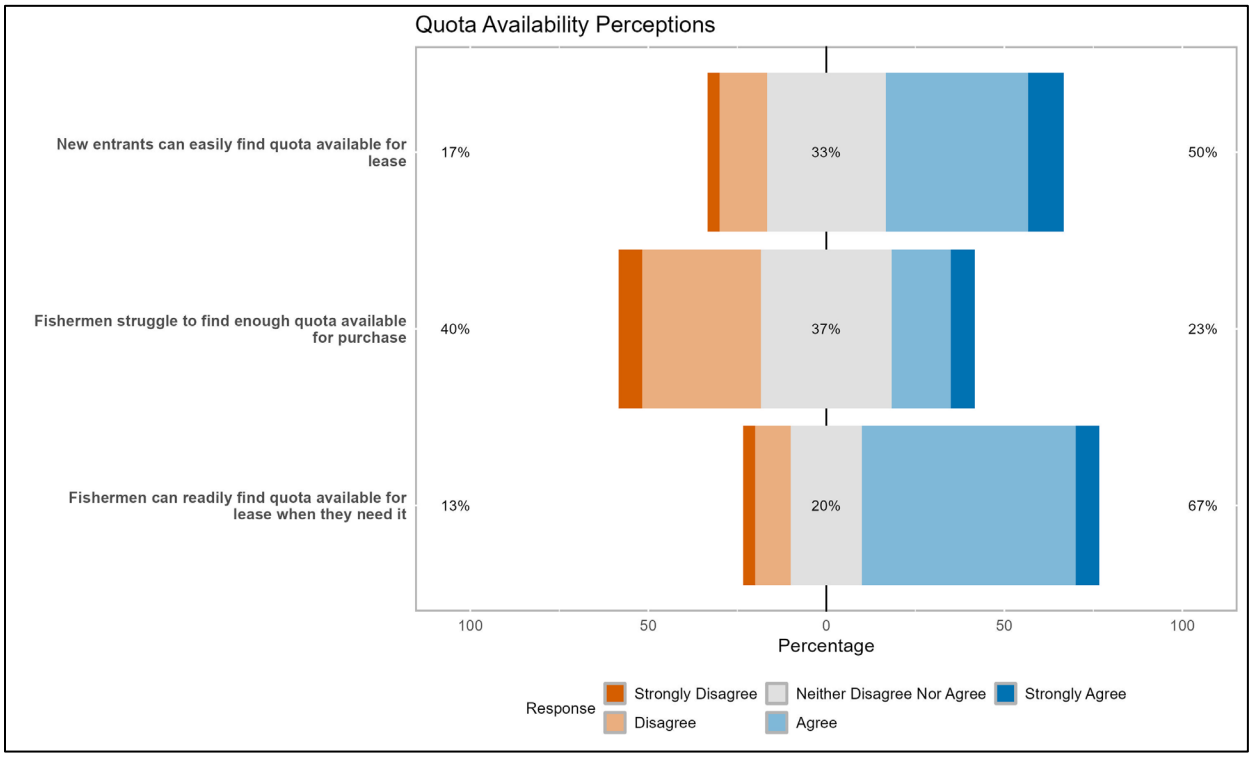
> *Varies a lot from year-to-year. [The] reality is [that] there are enough larger quota owners with a lack of transparency that prices can be manipulated, not prohibitively expensive, but if quota was owned solely by fishermen would solve market manipulation problems.* –Vessel owner or co-owner, Massachusetts

Another described the additional costs of leasing quota, in addition to the price itself (e.g., agent or permit bank fees etc.):

> *The added costs of leasing IFQ or paying off notes for purchased IFQ makes the lean years very difficult and the good years far less rewarding.* –Vessel owner or co-owner, Massachusetts

For quota availability, responses were more mixed. Respondents generally agreed or strongly agreed that finding quota to lease or purchase was easy for new entrants and current fishermen (Figure 9).

Figure 9. Responses to quota availability statements (n=30)



However, these statements also resulted in several respondents selecting 'Neither disagree nor agree,' indicating that there could be more nuanced factors involved in influencing answers to these statements that this survey does not capture.

For example, variability in both quota affordability and availability was described by a respondent who highlighted the ripple effects this has on fishing behavior and decision-making, as well as wider impacts on crew and fishing families:

> *Quota lease costs are variable to the time of year. During the last 5 years there has been a trend of highest quota lease at the beginning of the year when scallop prices begin to drop (an effort of non-fishermen entities to maximize their return on investment into quota). The effect of this is that the best fishing and most effort from the IFQ fishery (most access to grounds, best yield, best weather) is performed when quota costs are highest and vessel prices are lowest. The resulting choice to the fisherman is to suffer tight margins or to fish areas and seasons that take more effort (longer trips, worse weather, reduced yields) and lease residual IFQ pounds at reduced market costs once the bulk of the quota has been caught. This unofficial seasonality is stressful to families and crews. Either work your ass off for less money and binge work your summer (missing critical family time for heads of households) or grind it out during the shoulder or winter months and spend more time under tougher conditions.* –Vessel owner or co-owner, Massachusetts

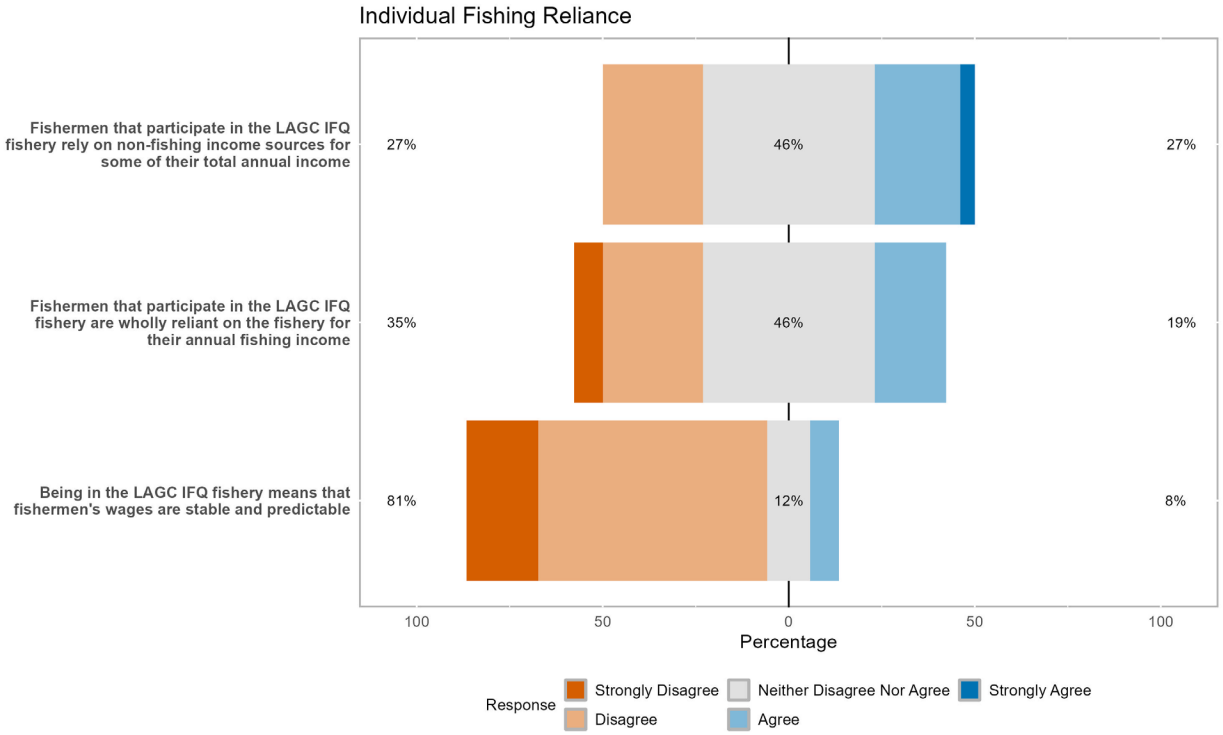
Fishing reliance and diversification, job satisfaction and mental wellbeing

In this section, responses to questions regarding perspectives of general fishing reliance and diversification, job satisfaction and mental wellbeing among IFQ participants are presented.

Fishing Reliance and Diversification

Respondents were asked about fishing reliance in the scallop IFQ program at a general population level (Figure 10). A similar number of respondents (27%) both agreed/strongly agreed and disagreed/strongly disagreed that fishermen in the scallop IFQ fishery are dependent on non-fishing income, while 46% neither agreed or disagreed. This likely reflects the individual nature of income dependence in that it can be variable and subject to individual and household circumstances, and that some respondents may have struggled to answer across a general population level because sharing income dependency information may not be common among those in the fishery. Slightly more respondents disagreed that fishermen in the fishery were wholly reliant on it for their annual fishing income, which could indicate that they are operating in other fisheries that provide financial benefits. Similarly, however, 46% neither agreed nor disagreed, again highlighting the individual nature of this question.

Figure 10. Responses to individual fishing reliance statements (n=26)



Qualitative information provided some additional insights into people's perceptions regarding these statements. One respondent stated the need to be involved in other fisheries, while another described the need to scallop for a large portion of their year to justify their participation costs:

> *Again, this year has been all over the place in the scallop world. I'm involved in more than just that to compensate.* –Captain/Operator, Massachusetts

> *We must participate at least 75 percent of the year to justify the costs associated with scalloping.* –Captain/Operator, Massachusetts

Another described how quota amounts and availability intersect with fishing reliance:

> *Not everybody has the same amount of quota, so some must rely on other sources. Differences in quota mean some have to go elsewhere because they can't buy quota* –Vessel owner/co-owner, Virginia

Others noted the personal nature of these questions, highlighting why survey responses may have received a higher percentage neutral responses:

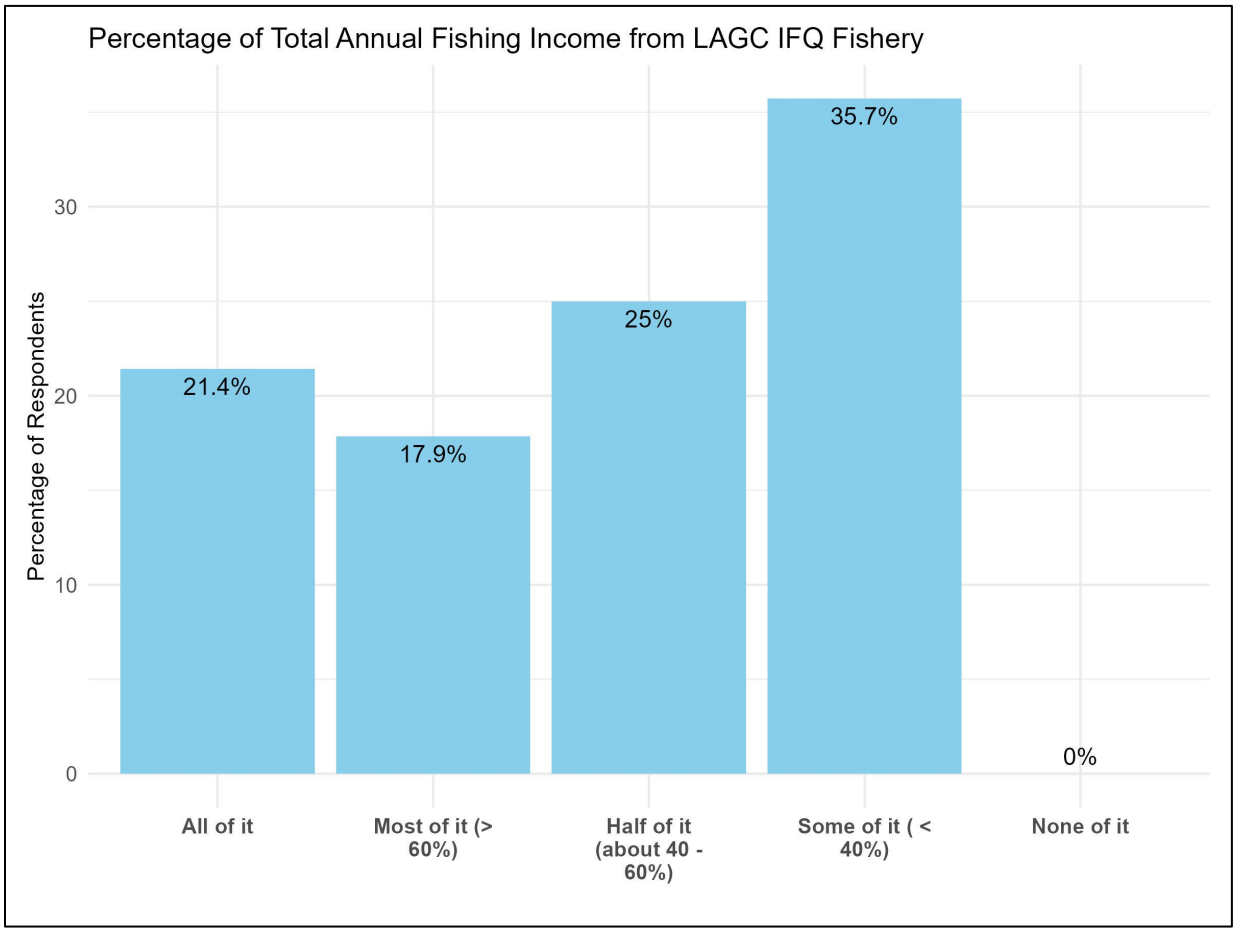
> *Some do, depends on where you're at, fishing used to be real good and now there's no money in it.* –Vessel owner/co-owner, Massachusetts

> *I don't think one could make any of those 3 generalizations. I certainly think that there are less vessels that can singularly target IFQ harvested scallops and those owners that do likely have outside incomes.* –Vessel owner/co-owner, Massachusetts

Finally, a majority of respondents disagreed or strongly disagreed that being in the scallop IFQ program meant their wages were more stable and predictable, which contradicts wider purported economic benefits of IFQ programs. As one respondent stated, "no fishing wages are predictable".

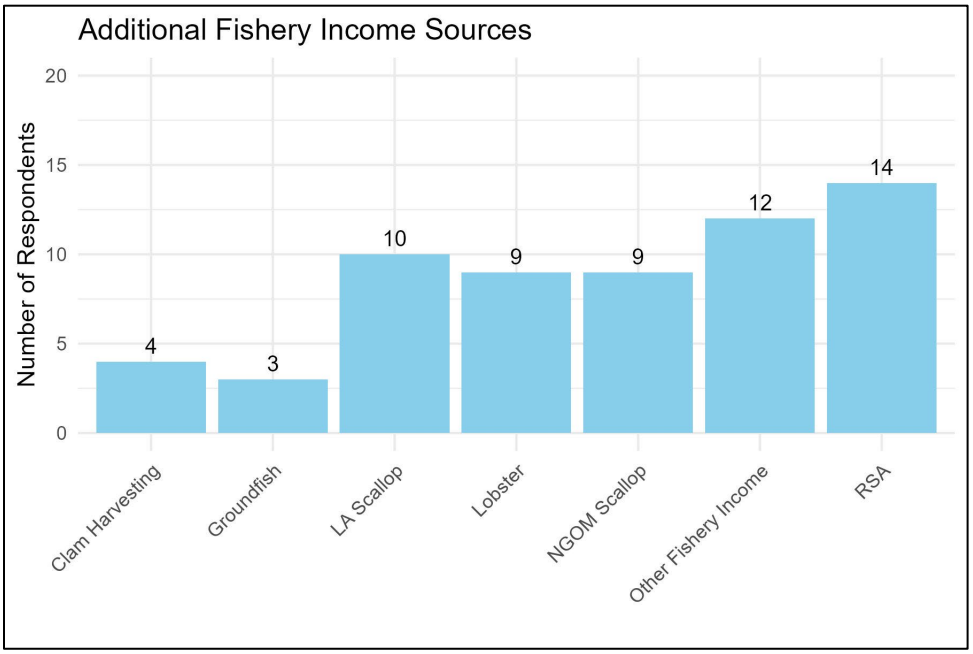
In addition to responding to these statements about fishing reliance, respondents were also asked to indicate their own individual reliance on the IFQ fishery for their total annual fisheries income. Results were somewhat mixed; 35% answered 'some of it <40%', 25% answered 'half of it 40-60%', 17% answered 'most of it >60%' and 21% answered 'all of it' (Figure 11).

Figure 11. Fishing Income Dependency on the IFQ Fishery (n=28)



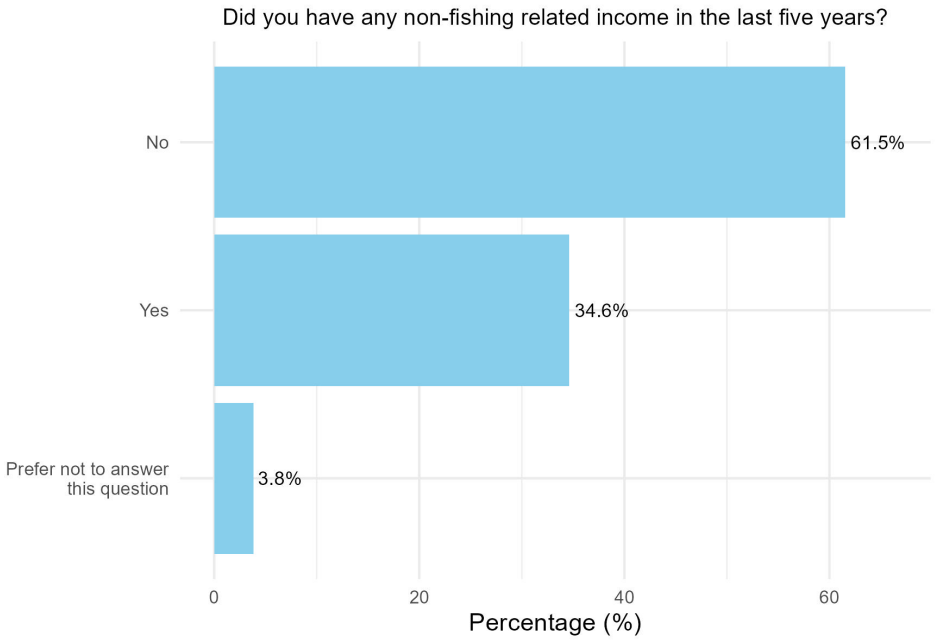
This indicates a majority of respondents (77%) receive at least 40% of their annual fishing income from the IFQ fishery, but 79% receive at least some fishing-related income from other fisheries. The most commonly identified other fisheries that respondents participate in included other scallop fisheries (LA, NGOM, and RSA), as well as lobster and groundfish (Figure 12).

Figure 12. Other Sources of Fishery Income (n=26)



In another question (Q22), individuals identifying as active or inactive IFQ participants were asked about sources of non-fishery employment (Figure 13). Respondents generally indicated that they are reliant on fisheries for their full income (61.5%, N=16). Only a few respondents indicated the type of other income sources, but those listed included boat building, farming, social security, research trips, oyster business, and hurricane assistance.

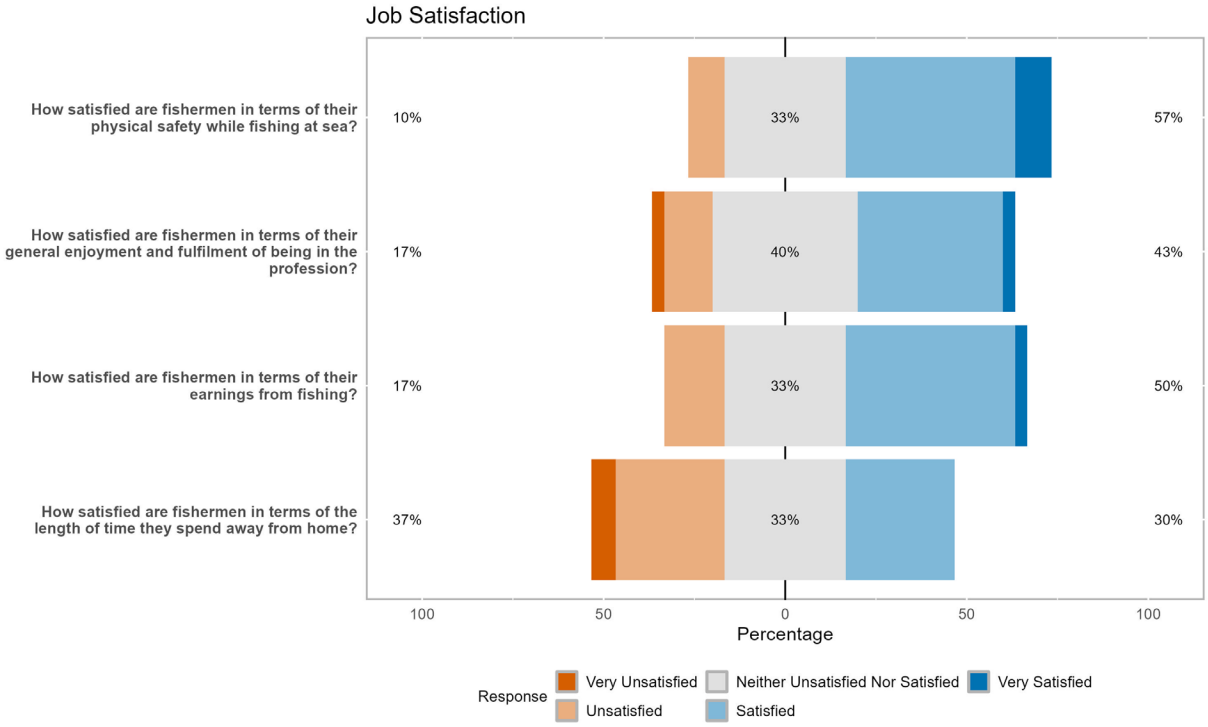
Figure 13. Proportion of Respondents with Non-Fishery Income (n=26)



Job satisfaction

Respondents' answers to job satisfaction are shown in Figure 14. These statements capture different elements of job satisfaction, including physical safety, general enjoyment and fulfilment, satisfaction with earnings, and satisfaction with length of time away from home.

Figure 14. Responses to job satisfaction statements (n=30)



Responses generally indicated that fishermen are satisfied across the first three dimensions, although roughly a third for each statement answered neutrally. There were slightly more who disagreed with the statement regarding satisfaction with time spent away from home. Qualitative answers provided greater insights into some of the nuances and variability regarding satisfaction within the fishery:

> *Big distinction between owner operator and crew satisfaction—crew not satisfied, owner operators more satisfied. As we progress, [it's] harder to find crew who want to do the job and deal with [the] toughness of the job.* –Captain/Operator, Massachusetts

> *Profession is very rewarding, but policy failure makes it hard to find enjoyment even when predicting fishing conditions correctly.* –Vessel owner/co-owner, Massachusetts

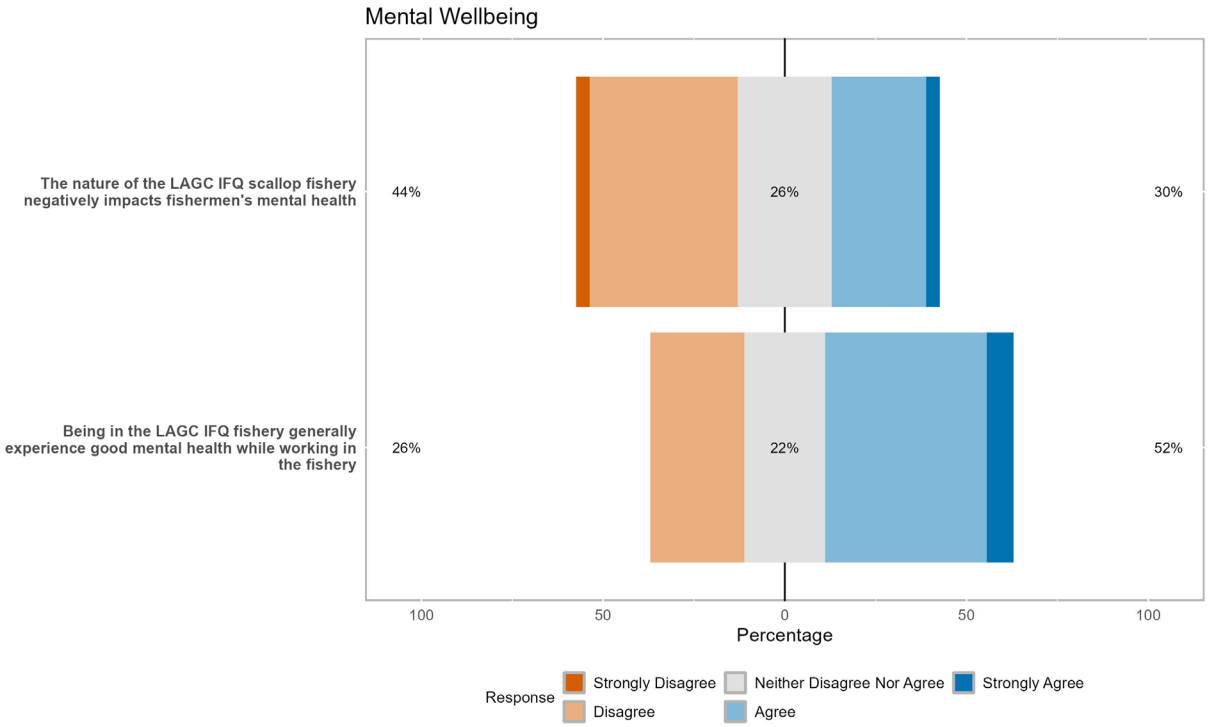
> *No one is real happy with the way the fishery is going, and god forbid the bid boats find out where you're fishing. Younger folks are not happy with the length of time they have*

to spend to get catch, and no one is happy now compared to previous years. –Vessel owner/co-owner, Massachusetts

Safety has improved, making trainings more mandatory [is] important. –Vessel owner/co-owner, Massachusetts

Respondents were then asked to assess two statements regarding mental health within the fishery. Generally, results suggest that respondents agreed that fishermen in the fishery were experiencing good mental health (Figure 15).

Figure 15. Perceptions of mental wellbeing in the fishery (n=27)



However, between a quarter and a third of respondents did indicate this was not necessarily the case. Comments within the survey provided insight into some of the challenges being felt within the fishery, such as stress, anxiety and sleep deprivation:

Might be negative on mental health when staying awake for 50 hours, better when able to run more crew. Switching to 3-handed in recent years has given ability to add in nap rotations, recently switched in last couple of years. –Vessel owner/co-owner, Massachusetts

Not very happy with way fishery is going, causes anxiety depending on how much you have tied up in fishery. Still stressful even if not leveraged because everything feels like it sucks. –Vessel owner/co-owner, Massachusetts

> *Up until last fall [we] were very satisfied. But since catch has been so poor, [it's] difficult to get them to go to sea. Drugs and alcohol use goes in line with the boom and bust with the fishery*. –Vessel owner/co-owner, Massachusetts

Some respondents who disagreed that the IFQ fishery negatively impacted mental health and agreed that participants in the IFQ fishery experienced good mental health provided comments that being in the Limited Access Fleet was more stressful compared to the IFQ fishery:

> *High stress occupation with derby style regulations.* –Captain/Operator, Massachusetts

> *Derby fishing in closed areas and lack of open bottom scallops was very stressful.* –Permit/Quota owner, New Jersey

Upward mobility, continuity of fishing as a livelihood, and crew shares

The survey asked a number of questions about crew and/or new entrants to the fishery, upward mobility within the occupation, and perceptions regarding continuity of fishing as a livelihood into the future.

Regarding crew shares specifically, 91% (n=23) answered that they used a crew share system. Only 2 responded 'Other', citing 'After Fuel' and 'Straight-cut percentage'. The average reported crew share was 45.8% (Table 5), but varied.

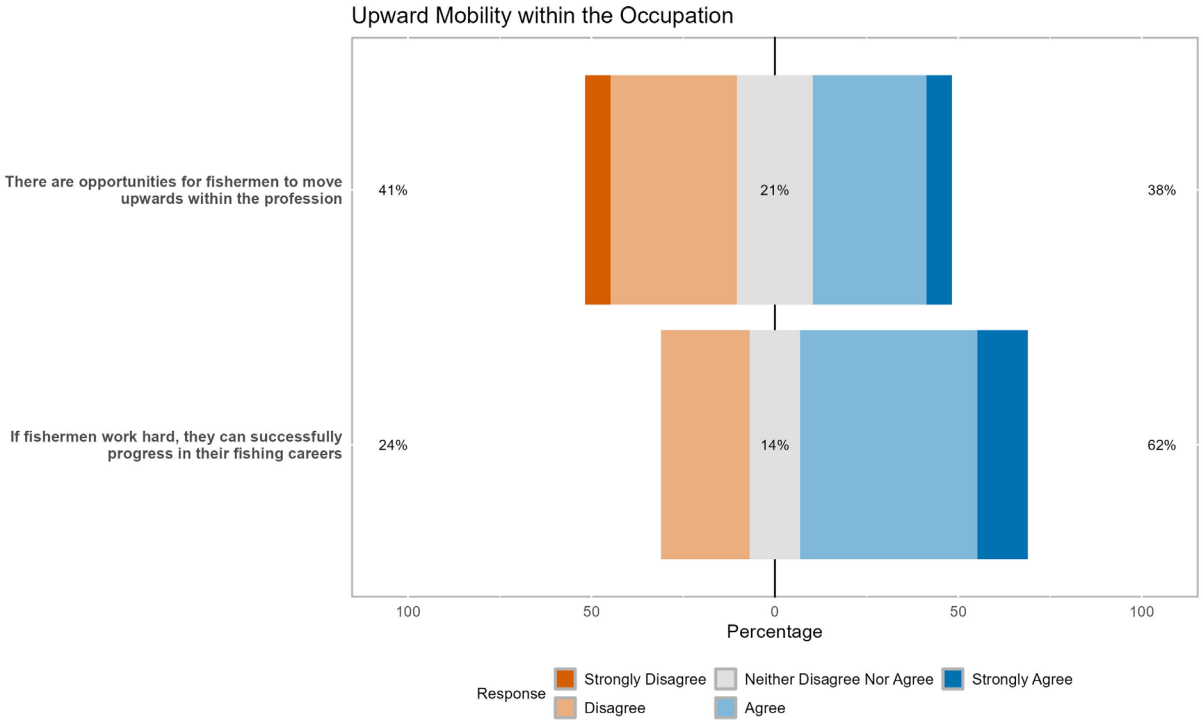
When asked if quota lease costs are deducted from the vessel's gross revenue before the crew share is applied 80% answered 'yes' (15) while 25% answered 'no' (4).

Table 4. Average Reported Crew Pay Share and Variance (n=23)

Average Crew Pay Share (%)	Standard Deviation
45.8 %	13.71

Regarding upward mobility within the occupation (e.g., from crew to permit holder, vessel owner or quota shareholder), there were mixed responses to the statement that there are opportunities for fishermen to move upwards with slightly more disagreeing with the statement (41%) than agreeing (38%) (Figure 16). Most respondents (62%) agreed that if fishermen work hard they can successfully progress in their careers. However, as evidenced in earlier results regarding perceptions of quota affordability, there may be other barriers that affect crew or new entrants' ability to move upwards within the profession.

Figure 16. Responses to Upward Mobility Statements (n=29)



Qualitative comments provided support for and disagreement with the statements:

> *I'm living proof that you can work your way up in any business.* –Vessel owner/co-owner, Massachusetts

> *LAGC IFQ fishery gives individuals an opportunity and platform to get started in career and fishery*. –Vessel owner/co-owner, North Carolina

> *Really hard to get all the way to the top, and not sure who would want to, given how the fishing is*. –Vessel owner/co-owner, Massachusetts

> *Comparatively to other NE fisheries, the IFQ scallop fisher bears a high cost of entrance and high cost of maintaining efforts: The cost of a vessel that has appropriate horsepower and gear reduction, the cost of rigging to handle heavy gear, the permit cost and then quota purchase and/or lease. (Almost always inclusive of leasing but many never buy). Quota lease costs are variable to the time of year.* –Vessel owner or co-owner, Massachusetts

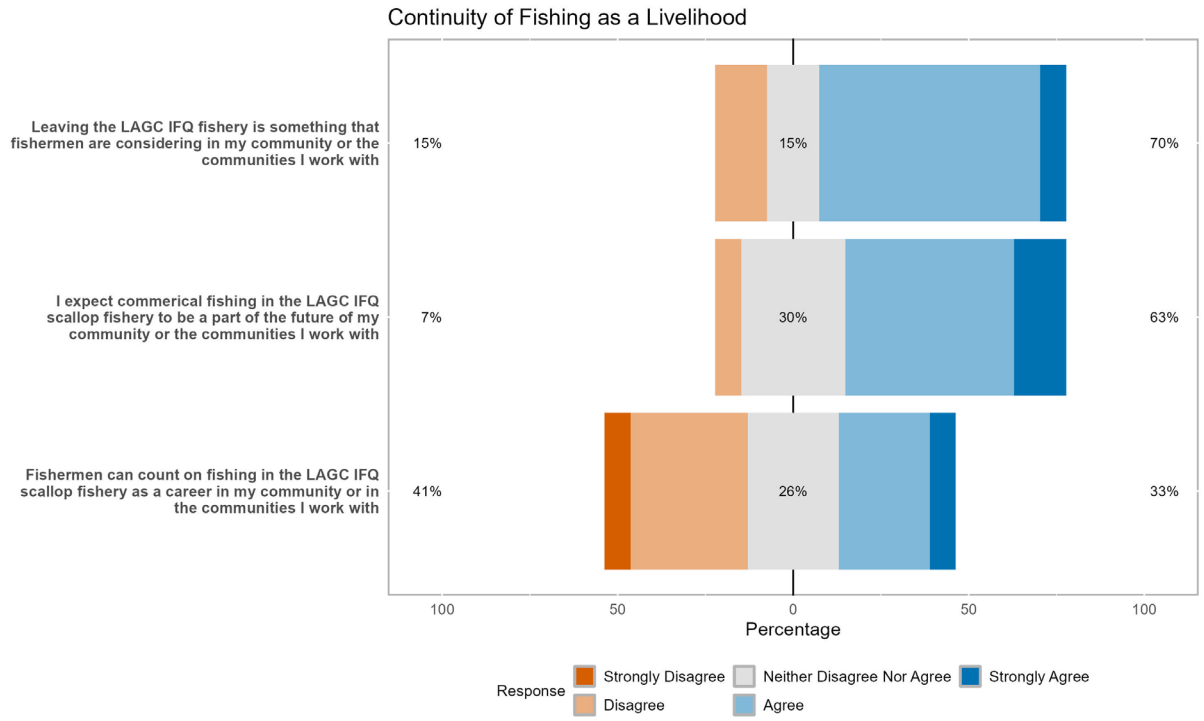
Others highlighted the need for financial planning in order to be successful in the fishery and consider future career progression:

> *The role of being a fisherman has changed you MUST be prepared to reinvest monthly and yearly*. –Vessel owner/co-owner, Massachusetts

> *Purchasing quota is very expensive and really has to be planned for, but it's doable. Upward mobility is as well in the cards. I started out as crew on a LA Part time and now own my own boat, have crew etc. Leasing in quota gets expensive as well, and has to be planned for the year previous, to know what you'll be able to catch and how much quota is around to lease.* –Captain/operator, Massachusetts

When asked about perceptions of the continuity of the scallop IFQ fishery as a livelihood into the future, within their own community or ones they worked in, 70% of respondents agreed that fishermen were considering leaving the fishery, and 41% disagreed that the fishery was something fishermen could count on as a career (**Error! Reference source not found.**).

Figure 17. Perceptions of continuity of the scallop IFQ fishery as a livelihood into the future (n=27)



Despite this, 63% agreed that the scallop IFQ fishery would be a part of their community's future. Together these results potentially suggest that despite a relatively grim outlook for current and future participants, respondents are less worried that communities will be negatively affected in the long run as a result of these challenges.

Comments suggested that some fishermen are leaving the fishery, but suggest that it may only be temporary:

> *It was a tough year, I think people are looking to other fisheries.* –Captain/Operator, Massachusetts

> *A number of fishers have already left the IFQ fishery. I expect some changes to come in the management of the IFQ component and am unsure if the IFQ component will remain. Likely a hybrid model of quota rights with more controls. Or less IFQ allocation and areas that will be common pool.* –Vessel owner/co-owner, Massachusetts

> *Wouldn't tell anybody new to get into it because currently unstable, seems like fishery is slowly dying.* –Vessel owner/co-owner, Massachusetts

> *Scalloping has always cycled 7 years at a time. We are in the downturn and worse is yet to come. Some experienced the boom now can't hack the grind.* –Vessel owner/co-owner, Massachusetts

> *It will be there, but at what point will it no longer be worth grinding out? [I] really don't know, fishery and market is not in a good way right now, hard to predict. [I] see boats/permits coming up for sale in the mid-Atlantic, guys are trying to get out.* –Vessel owner/co-owner, Massachusetts

However, others pointed to wider and long-term issues regarding workforce availability and reliability, and the connections to the continuity of fishing within communities:

> *Very difficult. Guy like me, solid business with 6 boats. [It's] not about allocation or capital, it's about lack of operators. Because of regulations there is no glamour or value to operating a vessel. No recruitment of operators or crew. Not about quota or vessels or permits*. –Vessel owner/co-owner, Massachusetts

> *Simple economics. The local crews won't be there to come back even if the resource does. Coastal areas are already struggling to keep workforce because of home values.* –Vessel owner/co-owner, Massachusetts

> *People are wanting to leave because [it's] hard to get quality help, catch [is] down and fuel $ up, so economically [it's] hard, have to spend more time at sea.* –Vessel owner/operator, Virginia.

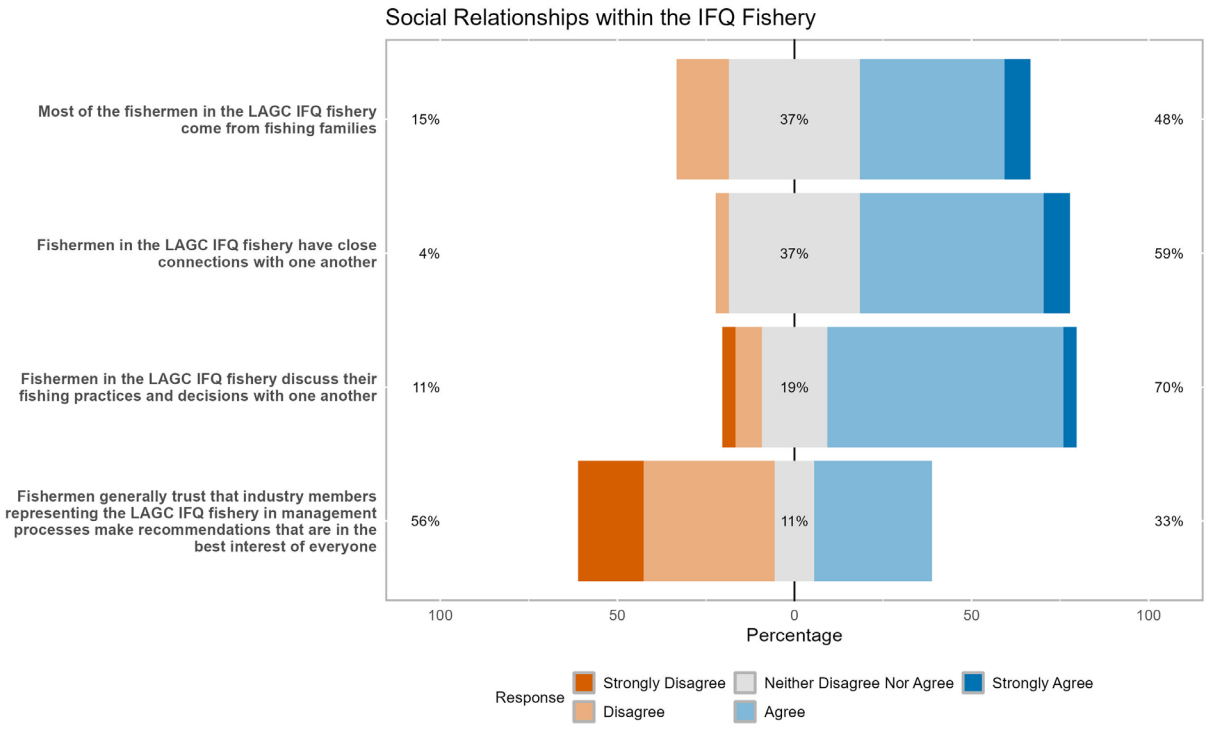
Social Relationships

Respondents were asked about four statements regarding social relationships within the scallop IFQ fishery (Figure 18).

Generally, respondents agreed that fishermen in the fishery have close connections with one another and discuss their fishing practices. Many also agreed that most fishermen came from fishing families, but as one comment stated:

Most fishermen come from fishing families but of course there are many exceptions. Having a family member in a fishery gives a serious advantage over those without but that certainly doesn't mean it's prescriptive. –Vessel owner/co-owner, Massachusetts.

Figure 18. Perceptions of social relationships within the fishery (n=27)



There was more disagreement (56%) with the final statement regarding trust in industry members representing the IFQ scallop fishery in management decisions. A few comments showed agreement and disagreement with the statement:

Hard to tell if the people representing us are actually sincere. Not sure if they will wave our flag or champion our interests. –Vessel owner/co-owner, Massachusetts.

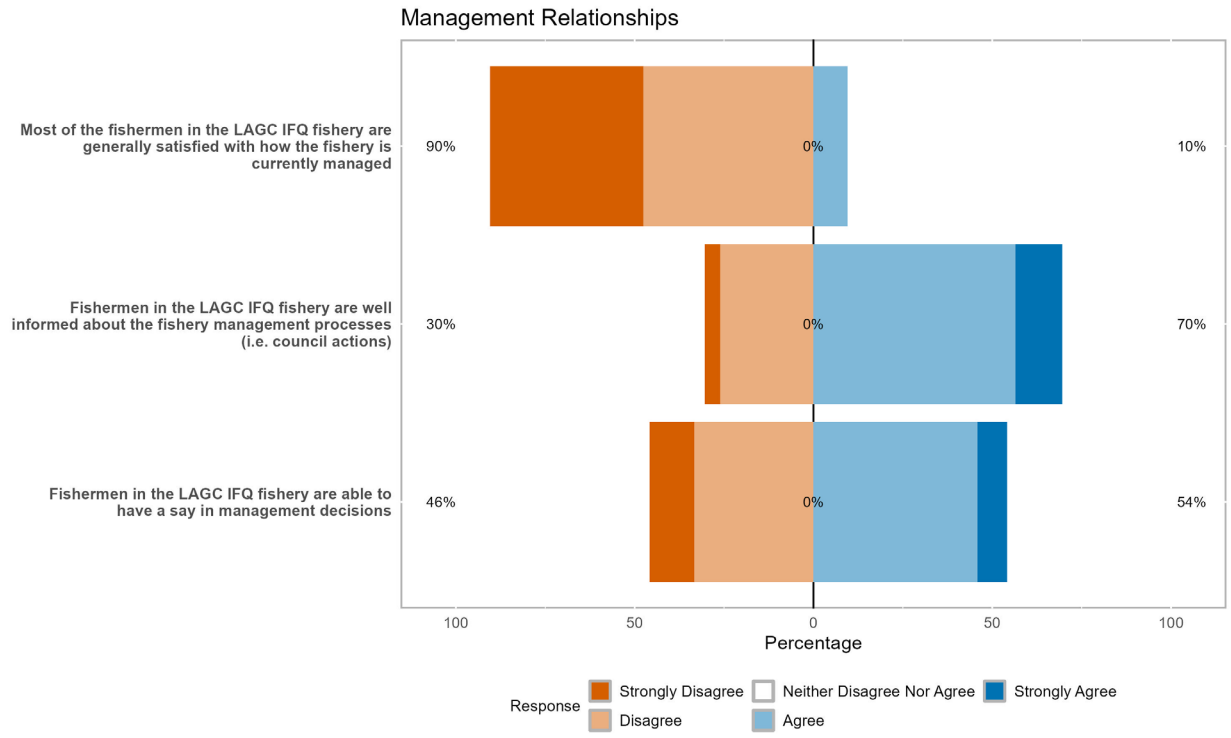
The groups most involved in assisting development of the fishery have their own operating costs and profits to be mindful of. This isn't best practice. –Vessel owner/co-owner, Massachusetts

For industry representatives, trusted because voted and can be voted. –Vessel owner/co-owner, Virginia.

Management Perspectives

Finally, respondents were asked about a series of statements regarding management of the scallop IFQ fishery (Figure 19). Seventy percent agreed that fishermen were well informed about management processes, and 54% stated they were able to have a say in decisions. Despite this, a strong majority (90%) disagreed that fishermen were satisfied with how the fishery is currently managed.

Figure 19. Management Relationships within the Fishery (n=28)



Appendix: Survey Instrument

Introduction

You are invited to participate in a research project being conducted by Northern Economics and the Gulf of Maine Research Institute and funded by the Walton Family Foundation. The project aims to understand the ways catch share programs can affect social and wellbeing outcomes, using the Northeast Limited Access General Category (LAGC) Individual Fishing Quota (IFQ) Scallop program as a case study. Specifically, the project investigates how management changes to the program might impact different stakeholders, such as crew, vessel owners, seafood dealers, and other community members involved in the LAGC IFQ scallop fishery.

The project will use information gathered in survey responses and interviews to develop a model to understand how different management interventions, specifically in catch share programs, may influence different social and wellbeing outcomes for fisheries stakeholders. In addition, the study seeks to understand how changes to these programs could affect the distribution of costs and benefits to better understand potential trade-offs associated with management changes that seek to improve social and wellbeing outcomes.

Who is this survey for?
This survey is for those who have participated in, or have knowledge about, the scallop IFQ program, including:

- **Fishermen (captains and crew) who work on LAGC IFQ scallop vessels**
- **LAGC IFQ scallop permit, vessel, or quota owners**
- **Dealers and seafood businesses who purchase scallops from IFQ vessels**
- **Fishing Associations who represent IFQ scallop fishermen**
- **Quota or permit banks who own IFQ quota or permits**
- **Fisheries Management or government officials who are knowledgeable about the IFQ program**
- **Family members of IFQ scallop fishermen**

If you have any questions about the survey please contact Melissa Errend at Melissa.Errend@norecon.com (503-309-5152) or Kat Maltby at kmaltby@gmri.org (207-400-4476).

The survey is expected to last approximately 15-20 minutes. No compensation for your participation will be provided.

Click ‘next’ to progress, and learn more information about the survey.

Informed Consent

Who will be in this study?

- **You must be at least 18 years of age to participate.**
- **Stakeholders with experience with or participation in the scallop IFQ program are included in this study.**

What are the possible risks and costs of taking part in this study?

Except for your time and inconvenience, there are no direct risks to you from participating in this study. However, while this study is not affiliated with any federal management agency or entity, this study has the potential to inform the future development or modification of fishery management rules and regulations, which may change the distribution of costs and benefits of the scallop IFQ program to participants and other stakeholders. When answering questions there may be some discomfort for participants as they reflect on their experiences within the IFQ fishery. Participants have the right to pause or stop the survey at any time. Participation is free and no costs are incurred other than those for giving up your time.

What are the possible benefits of taking part in this study?

There are no direct benefits to you for participating in this study. More broadly, your participation will help us learn more about the ways catch share programs, using the scallop IFQ program as a case study, can influence and affect different stakeholders in terms of social and wellbeing outcomes. This area of research is currently understudied and so this research may help to inform future management decisions on these themes. In addition, this study has the potential to inform the development or modification of fishery management rules and regulations, which may change the distribution of costs and benefits of the scallop IFQ program to participants and other stakeholders.

How will my privacy be protected?

No one outside of the project team will know about your participation within this study. No names are being collected through this survey. Data will only be published in summarized form to protect your anonymity.

How will my data be kept confidential?

The research team will maintain the confidentiality of all data and records associated with your participation. Data will be stored in secure online folders on an encrypted Microsoft SharePoint server securely managed by Northern Economics, indefinitely that has limited access to only project members. A numerical code will be used to protect your identity in the data set. Your identifying information will not be reported in any publications.

* 1. To proceed to the survey, please click 'Yes' to each of the below conditions:

- [ ] I am over 18 years of age
- [ ] I have experience with or have participated in the scallop IFQ program
- [ ] I consent to taking part in this survey

Part A: Introductory and Background Information

* 2. Where is your primary residence (town/city, state)?

Town/City

State

3. What is your age in years?

18 50 100+

* 4. What roles do you currently have in, or related to, the LAGC IFQ scallop fishery? (Select All That Apply)

- [ ] IFQ Fisherman (Crew, Captain)
- [ ] IFQ Vessel and/or Permit Holder
- [ ] IFQ Quota Holder
- [ ] Dealer or seafood business
- [ ] Fishing Association Representative
- [ ] Quota or Permit Bank Representative
- [ ] Fisheries Management/Government Representative
- [ ] Other (please specify)

* 5. Which of the following best describes your primary involvement with the LAGC IFQ scallop fishery? Here, participation in the scallop fishery means you or a vessel you own were directly involved in the harvesting of scallops on IFQ trips.

- ( ) Active IFQ fisherman or vessel owner (crew, captain, or vessel owner who has participated in the fishery in the last 5 years)
- ( ) Former IFQ fisherman or vessel owner (crew, captain, or vessel owner who participated more than 5 years ago and does not currently own quota)
- ( ) IFQ permit or quota owner who has not participated in the fishery in the last 5 years
- ( ) I have never participated in the IFQ program or owned an IFQ permit or quota

Part A: Introductory and Background Information

* 6. Which of the following roles best describes your current position in the LAGC IFQ scallop fishery?

- ◯ Vessel Owner or Co-Owner
- ◯ Captain/Operator
- ◯ Fishing Crew

Part A: Introductory and Background Information

* 7. Across all fisheries, how many active commercial vessels do you own or have an ownership stake in?

0 5 10+

* 8. On average over the last five years, what proportion of the scallop IFQ quota you are allocated do you lease out? (In other words, if your annual allocation of scallops is equivalent to 1,000 pounds of scallops, what proportion do you typically lease to other fishermen?)

- ◯ None of it, I fish it all
- ◯ None of it, I don't fish it but I don't lease it out
- ◯ Some of it (<40%)
- ◯ Half of it (about 40-60%)
- ◯ Most of it (>60%)
- ◯ All of it, I lease out 100% of my annual allocation
- ◯ I am not allocated any quota

* 9. On average over the last five years, what proportion of the scallop IFQ quota used on your vessel/s is leased in?

- ◯ None of it
- ◯ Some of it (< 40%)
- ◯ Half of it (about 40 - 60%)
- ◯ Most of it (> 60%)
- ◯ All of it, I lease in 100% of my quota

* 10. Over the last five years, have you received IFQ scallop quota from a quota bank?

- ◯ Yes
- ◯ No

Comment Box: please describe why you have or have not leased/received quota from a quota bank

Part A: Introductory and Background Information

* 11. On your vessel, how are crew typically paid

- ◯ A share system: revenues and expenses were shared between the boat and the crew
- ◯ Other (e.g. per trip, hourly), please specify below

* 12. For share systems, what are the typical percentages distributed to the boat (the vessel owner) and crew?

% Boat Owner Share

% Crew Share

* 13. Are quota lease costs deducted from the vessel's gross revenue before the crew share is applied?

- ◯ Yes
- ◯ No
- ◯ Not Applicable

* 14. The year 2024 has been indicated to be an ‘unusual year’ with low lease prices. Was your leasing decision different in 2024 (compared to 2019-2023)? Please choose one that best describes your situation.

- ◯ Yes – I leased out more than usual
- ◯ Yes – I leased in more than usual
- ◯ No – My leasing didn’t change
- ◯ Unsure
- ◯ Not Applicable

* 15. On average over the last five years, what is the average trip length for the IFQ vessel that you own or work on?

- ◯ 24 hours or less
- ◯ More than 25 hours

* 16. Across all the fisheries you participate in, on average over the last five years what percentage of your total annual fisheries income comes from the LAGC IFQ scallop fishery?

- ◯ None of it
- ◯ Some of it (< 40%)
- ◯ Half of it (about 40 - 60%)
- ◯ Most of it (> 60%)
- ◯ All of it

Part A: Introductory and Background Information

* 17. While participating in the IFQ scallop fishery, what is your principal port (town/city & state) where you primarily fish out of)? (If you are a retired/former IFQ fisherman please provide where your operations were based)

Town/City

State

* 18. While participating in the IFQ scallop fishery, do you land in any other ports other than your principal port? If yes, please describe. (If you are a retired/former IFQ fisherman please specify any ports you would land in when you were active)

- ◯ No, I only fish/ed out of my principal port
- ◯ Yes (please specify other port location(s))

* 19. Since the LAGC IFQ scallop program was implemented in 2010, how many years have you been, or were you, involved in the fishery?

- ◯ Less than 1
- ◯ 2-5
- ◯ 6-10
- ◯ 11-15
- ◯ Every Year

* 20. Were you an initial recipient of quota under the original LAGC IFQ Scallop Program in 2010? (i.e., qualified based on your historical participation)

- ◯ Yes
- ◯ No

* 21. At any time in the last five years, did you have any income from any other types of scallop fishing trips or any other fisheries? (select all that apply)

- [ ] LA Scallop
- [ ] NGOM Scallop (while fishing on NGOM scallop trips not your LAGC quota)
- [ ] Scallop research set-aside (RSA) trips
- [ ] LAGC Incidental
- [ ] Groundfish
- [ ] Lobster
- [ ] None, LAGC IFQ scallop is the only fishery that I received income from
- [ ] None, I did not earn income from any fishery in the last five years
- [ ] Other (please describe)

22. At any time in the last five years, did you have any non-fishing related income?

- ( ) No
- ( ) Prefer not to answer this question
- ( ) Yes (please briefly list those sources)

Part B: Wellbeing

This section will ask a series of statements about the wellbeing of fishermen at a general population level. Please answer in general terms rather than for you as an individual.

* 23. *Availability and Affordability of Quota*

Generally speaking, over the last five years for fishermen participating in the LAGC IFQ scallop fishery:

	Strongly Disagree	Disagree	Neither Disagree Nor Agree	Agree	Strongly Agree	Unsure
The cost of leasing quota prevents lease-dependent fishermen from operating profitably.	○	○	○	○	○	○
Quota lease prices have made it harder for fishermen to remain in the fishery.	○	○	○	○	○	○
Compared to other operating costs (e.g., fuel, crew wages, maintenance), lease costs are burdensome for lease-dependent fishermen.	○	○	○	○	○	○
With enough time and financial planning, lease-dependent fishermen and new entrants can afford to buy quota.	○	○	○	○	○	○
Compared to other major capital investments (e.g., vessels, permits, equipment) purchasing quota is financially burdensome.	○	○	○	○	○	○

* 24. *Availability and Affordability of Quota*

Generally speaking, over the last five years for fishermen participating in the LAGC IFQ scallop fishery:

	Strongly Disagree	Disagree	Neither Disagree Nor Agree	Agree	Strongly Agree
Fishermen can readily find quota available for lease when they need it.	○	○	○	○	○
New entrants can easily find quota available for lease.	○	○	○	○	○
Fishermen struggle to find enough quota available for purchase.	○	○	○	○	○

* 25. *Upward Mobility within the Occupation*

Generally speaking for fishermen participating in the LAGC IFQ scallop fishery:

	Strongly Disagree	Disagree	Neither Disagree Nor Agree	Agree	Strongly Agree
There are opportunities for fishermen to move upwards within the profession (e.g. from crew to mate, mate to captain, captain to vessel owner; to increase quota ownership)	○	○	○	○	○
If fishermen work hard, they can successfully progress in their fishing careers	○	○	○	○	○

Can you provide an explanation for your responses?

Part B: Wellbeing

* 26. *Job Satisfaction*

Generally speaking for fishermen participating in the LAGC IFQ scallop fishery:

	Very Unsatisfied	Unsatisfied	Neither Unsatisfied Nor Satisfied	Satisfied	Very Satisfied
How satisfied are they in terms of their general enjoyment and fulfilment of being in the profession?	○	○	○	○	○
How satisfied are they in terms of their physical safety while fishing at sea?	○	○	○	○	○
How satisfied are they in terms of the length of time they spend away from home?	○	○	○	○	○
How satisfied are they in terms of their earnings from fishing?	○	○	○	○	○

Can you provide an explanation for your responses?

* 27. *Mental Wellbeing*

Generally speaking, do you agree or disagree with these statements:

	Strongly Disagree	Disagree	Neither Disagree Nor Agree	Agree	Strongly Agree
Fishermen in the LAGC IFQ scallop fishery generally experience good mental health while working in the fishery.	○	○	○	○	○
The nature of the LAGC IFQ scallop fishery negatively impacts fishermen's mental health.	○	○	○	○	○

Can you provide an explanation for your responses?

* 28. *Continuity of Fishing as a Livelihood in Fishing Communities*

Generally speaking, do you agree or disagree with these statements

	Strongly Disagree	Disagree	Neither Disagree Nor Agree	Agree	Strongly Agree
I expect commercial fishing in the LAGC IFQ scallop fishery to be part of the future of my community or the communities I work with	○	○	○	○	○
Fishermen can count on fishing in the LAGC IFQ scallop fishery as a career in my community or in the communities I work with	○	○	○	○	○
Leaving the LAGC IFQ fishery is something that fishermen are considering in my community or the communities I work with	○	○	○	○	○

Can you provide an explanation for your responses?

* 29. What community were you thinking of when answering the question above?

Part B: Wellbeing

* 30. *Individual Fishing Reliance*

Generally speaking do you disagree/agree that:

	Strongly Disagree	Disagree	Neither Disagree Nor Agree	Agree	Strongly Agree
Being in the LAGC IFQ fishery means that fishermen's wages are stable and predictable	○	○	○	○	○
Fishermen that participate in the LAGC IFQ fishery are wholly reliant on the fishery for their annual fishing income	○	○	○	○	○
Fishermen that participate in the LAGC IFQ fishery rely on non-fishing income sources for some of their total annual income	○	○	○	○	○

Can you provide an explanation for your responses?

* 31. *Management*

Generally speaking do you disagree/agree that:

	Strongly Disagree	Disagree	Neither Agree Nor Disagree	Agree	Strongly Agree
Fishermen in the LAGC IFQ fishery are well informed about the fishery management processes (e.g., Council actions)	◯	◯	◯	◯	◯
Fishermen in the LAGC IFQ fishery are able to have a say in management decisions	◯	◯	◯	◯	◯
Fishermen in the LAGC IFQ fishery are generally satisfied with how the fishery is currently managed	◯	◯	◯	◯	◯

Can you provide an explanation for your responses?

* 32. *Social Relationships*

Generally speaking do you disagree/agree that:

	Strongly Disagree	Disagree	Neither Disagree Nor Agree	Agree	Strongly Agree
Fishermen in the LAGC IFQ fishery have close connections with one another	○	○	○	○	○
Fishermen in the LAGC IFQ fishery discuss their fishing practices and decisions with one another	○	○	○	○	○
Most of the fishermen in the LAGC IFQ fishery come from fishing families	○	○	○	○	○
Fishermen generally trust that industry members representing the LAGC IFQ fishery in management processes make recommendations that are in the best interest of everyone	○	○	○	○	○

Can you provide an explanation for your responses?

33. Is there anything else you'd like to add that we didn't ask you about but you'd like us to know?

End of Survey

34. Thank you so much for participating in our survey! The information you have provided is so valuable for supporting this research effort and we appreciate the time you gave to this work.

If you would like to be informed of future project outputs (e.g. a report or publication) please provide your email address or phone number in the box below. Note that we will keep this contact information separately from your answers in order to protect your anonymity, and it will not be shared with anyone outside of the project team.

APPENDIX IV

2023 Annual Report of the Atlantic Sea Scallop Individual Fishing Quota Cost Recovery Program

LAGC IFQ Program Review, 2016-2023

2023 Annual Report of the Atlantic Sea Scallop Individual Fishing Quota Cost Recovery Program

April 2024

Prepared by:
Greater Atlantic Regional Fisheries Office
National Marine Fisheries Service
55 Great Republic Drive
Gloucester, MA 01930

Background

The Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) requires NOAA's National Marine Fisheries Service (NMFS) to collect fees to recover the "actual costs directly related to the management, data collection, and enforcement" of an individual fishing quota (IFQ) program (16 U.S.C. 1854(d)(2)). The law provides that IFQ allocation holders pay a fee based on the ex-vessel value of fish landed under the program. The fee may be as high as, but cannot exceed, 3 percent of the ex-vessel value of the fish harvested under the IFQ program. For the Limited Access General Category (LAGC) scallop IFQ program, the ex-vessel value is calculated as the average price paid per pound of scallops during the fee period multiplied by the total weight landed.

Although the 2023 scallop fishing year ran from April 1, 2023, through March 31, 2024, the cost recovery fee is based on expenses and landings made during the fee period, which ran from October 1, 2022, through September 30, 2023. This is the 12th year that NMFS collected fees from scallop IFQ vessels.

Use of Funds

Payments received as a result of the scallop IFQ cost recovery program are deposited in the Limited Access System Administrative Fund as required by the Magnuson-Stevens Act. Funds deposited in this account are available only to the Secretary of Commerce and may only be used to defray the costs of management, data collection, and enforcement of the fishery for which the fees were collected. Therefore, fees collected as part of this cost recovery program will be used for management, data collection, and enforcement of the scallop IFQ program.

Determining the Value of the Fishery

As required in the Atlantic Sea Scallop Fishery Management Plan (FMP), NMFS determines the value of the scallop IFQ fishery by multiplying the total landings of IFQ scallops by the average price paid by dealers to IFQ scallop vessels for IFQ scallops. While ex-vessel prices for scallops vary over the course of the fee period, the Scallop FMP requires that the price of all IFQ scallops landed during the entire fee period be the basis of the average price (as opposed to the average price per vessel, per month, or some other unit of scallop landings). Federally permitted scallop dealers must report the weight and price paid for all scallops purchased. From these data, we calculated an average price of $14.37 per lb paid to vessels participating in the scallop IFQ fishery during the 2023 fee period. The total of all LAGC IFQ landings during the 2023 fee period was 1,349,781 lb (shucked meats). Using this average price, we determined that the total value of LAGC IFQ landings was $19,396,367 for the 2023 fee period. NMFS used this value to determine the overall fee percentage and the individual fees for vessel owners. We describe these determinations on page 4 of this report.

Cost of Management, Data Collection, and Enforcement

The Magnuson-Stevens Act requires the collection of the IFQ fee to recover the actual costs of the program. We have determined that the recoverable costs associated with the management, data collection, and enforcement for the scallop IFQ program include only the incremental costs of the IFQ program, and not the costs that would still have been incurred regardless of the fishery's status as an IFQ.

We calculated personnel costs by multiplying hours spent by staff on tasks directly related to the IFQ program, with the hourly salary rates for those individuals. Salary rates included the Government's share of benefits, prorated. We calculated contract expenses as the cost of contract employees prorated for the percentage of time the contract employees spent on tasks directly related to the IFQ program. In the 2023 fee period, the recoverable expenses primarily consisted of time spent by personnel working on tasks related to the administration of the IFQ program in the following Divisions:

Sustainable Fisheries Division (SFD)
SFD is primarily responsible for the management and implementation of the Atlantic Sea Scallop FMP, which includes the LAGC IFQ program. SFD staff monitor the IFQ program's allocation tracking and cost recovery components for consistency with the FMP and regulations, and generates this annual report. SFD is the principal point of contact with the New England Fishery Management Council. SFD implements any needed and approved regulatory changes recommended by the Council.

Analysis and Program Support Division (APSD)
APSD is responsible for most of the tasks associated with the ongoing operation of the scallop IFQ program. These include issuing annual IFQ allocations and processing and tracking temporary leases and permanent allocation transfers. APSD handles cost recovery tasks, such as generating individual fees, tracking payments, and, if needed, withholding permits for late payments. APSD is responsible for data collection and analysis, including extensive quality control of incoming data sources and tracking of landings against IFQ allocations. In addition, quality control is a critical function of APSD and of any IFQ program because it ensures that the landings data NMFS uses to calculate IFQ landings and, ultimately, the individual fee is correct and consistent with owners' records. APSD staff, which also includes NMFS port agents, work with vessel owners, dealers, and other NMFS offices to correct landings data, as needed.

Technology and Data Management Division (TDMD)
TDMD is responsible for development and maintenance of the information systems to support the scallop IFQ program. These systems include the internal databases and computer systems for handling allocations, the Fish Online website, and the data connections with Centralized Receivables Service, a free Department of Treasury service that issues the cost recovery bills and processes payments. These databases are critical to monitoring the IFQ program because they track individual landings, IFQ leasing, and permanent allocation transfers that take place in the LAGC IFQ fishery.

Operations and Budget Division (OBD)
OBD ensures the calculations of personnel costs and other costs are correct and meet required standards, as well as tracking the use of collected receipts.

Communications and Internal Affairs (CIA)
CIA is a team within the Regional Administrator's office and coordinates internal and external communications and messaging for the Region. CIA determined that there were no recoverable expenses associated with the scallop IFQ program during the 2023 fee period.

The Office of Law Enforcement (OLE)
OLE determined there were no increased enforcement activities as a result of the scallop IFQ program for the 2023 fee period, and, therefore, there were no recoverable expenses for enforcement.

NOAA General Counsel
The Northeast Section of the NOAA Office of General Counsel provides legal advice to NMFS and the Councils and reviews management actions for consistency with applicable legal requirements. General Counsel determined that there were no recoverable expenses associated with the scallop IFQ program during the 2023 fee period.

Table 1 provides details of the recoverable costs by division within the Greater Atlantic Regional Fisheries Office.

Table 1: Recoverable costs associated with management and enforcement of the scallop IFQ program, 2023 fee period

	APSD	SFD	TDMD	OBD	Total
Personnel †	$106,288	$1,158	$9,410	$161	$117,373
Travel	$0	$0	$0	$0	$0
Postage	$0	$0	$0	$0	$0
Supplies	$0	$0	$0	$0	$0
Equipment	$0	$0	$0	$0	$0
Other	$0	$0	$0	$356	$0
Total	$6,288	$1,158	$9,410	$518	$117,373

† Personnel costs include all benefits and contractor costs

Calculating the Fee as a Percentage of Total Fishery Value

We calculated that the recoverable costs for the scallop IFQ program for the 2023 fee period represent 0.6051 percent of the value of the scallop IFQ fishery. We calculated the fee percentage with the total fishery value of $19,396,367 and total recoverable program costs of $117,373 using the following formula:

$$\frac{\$117{,}373}{\$19{,}396{,}367} \text{ x } 100 = 0.6051 \text{ percent}$$

This value of 0.6051 percent is less than the possible upper limit fee percentage of 3.0 percent (see background section, above). Thus, we were able to assess the total recoverable costs of fee period 2023.

Calculating Fees Assessed to Individual Permit Holders

Under the scallop IFQ program regulations, an LAGC IFQ permit holder is responsible for the IFQ fee based on the value of the landings of scallops attributed to their LAGC scallop IFQ permit, including landings made from an allocation that they transferred in (permanent or temporary (lease)) from another IFQ holder. The allocation tracking program that we have developed is able to identify all scallop IFQ transfers and attribute landings to the vessel that landed the scallops. To determine the appropriate IFQ fee for each LAGC IFQ permit holder, we multiply the permit holder's landings by the average price per lb and then by the fee percentage. This is represented by the following formula:

$$(\text{Vessel's IFQ landings by lb}) \times (\$14.37) \times (0.6051 \text{ percent}) = 2023 \text{ cost recovery fee}$$

Based on this calculation, fees ranged from $10.57 to $5,271.09 per vessel.

We mailed bills for the scallop IFQ 2023 fee period to 109 LAGC IFQ permit holders on February 13, 2024. Permit holders had 60 days (April 13, 2024) to pay the balance due through Centralized Receivable Services.

Changes from Previous Years

Total recoverable costs can fluctuate from year to year. Some management tasks may need to be done every year, and some tasks may require more time and effort in some years.

Table 2. Scallop IFQ recoverable costs, fishery value, and fee percentage 2011-2023

Fee Year	Recoverable Costs	Total Fishery Value	Fee Percentage
2011	$82,557	$28,004,530	0.2948%
2012	$106,745	$33,684,037	0.3169%
2013	$118,509	$31,863,299	0.3719%
2014	$123,743	$29,249,990	0.4230%
2015	$131,361	$35,453,100	0.3705%
2016	$270,823	$44,698,121	0.6058%
2017	$142,578	$34,387,334	0.4146%
2018	$113,961	$27,814,813	0.4097%
2019	$113,095	$30,209,646	0.3743%
2020	$65,993	$27,431,586	0.2405%
2021	$72,904	$34,480,967	0.2114%
2022	$123,720	$30,676,758	0.4033%
2023	$117,373	$19,396,367	0.6051%